

A REVIEW OF THE TECTONICS OF THE AEGEAN REGION

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A REVIEW OF THE TECTONICS OF THE AEGEAN REGION

by

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iv
ABSTRACT	v
ÖZET	vi
LIST OF FIGURES	vii
LIST OF TABLES	xvii
1. INTRODUCTION	1
2. DATA: Review	8
2.1. GEOLOGICAL MAPS	9
2.2 MAGMATICS	10
2 2 1 Data	10
2.2.2. General Interpretation	11
2.3. METAMORPHISM	
2.3.1. Data	
2.3.2. General Interpretation	
	27
2.4.1 Data	ا لا۲ ۲۲
2.4.1. Data	
2.5. GEOMORPHOLOGICAL STUDIES	
2.5.1. Data	
2.5.2. General Interpretation	41
26 EELD WORKS ON FALLTS	4.4
2.6.1 Data	4444 41
2.6.2. General Interpretation	44
2.7. SHALLOW REFLECTION PROFILES	
2.7.1. Data	
2.7.2. General Interpretation	53
2.8. SEISMICITY	
2.8.1. Data	
2.8.2. General Interpretation	65
2.9. GEODETIC DATA	02

2.9.1. Data 2.9.2. General Interpretations	83 90
2 10 CD AVITY SUDVEY	02
2.10. GRAVITT SURVET	
2.10.2. Concred Interpretation	
2.10.2. General Interpretation	102
2.11. MAGNETIC STUDIES	106
2.11.1. Data	106
2.11.2. General Interpretation	109
2.12 MAGNETOTELLURIC	112
2.12.1 Data	112
2.12.2. General Interpretation	114
2.13. GEOELECTRICAL STUDIES	115
2.13.1. Data	115
	116
2.14. HEAT FLOW	
2.14.1. Data	
2.14.2. General Interpretation	122
2.15. TOMOGRAPHY AND SEISMOLOGICAL STUDIES	
2.15.1. Data	127
2.15.2. General Interpretation	134
	120
2.16. DEEP SEISMIC SOUNDING	139
2.16.1. Data	
2.16.2. General Interpretation	145
3 GEOLOGICAL EVOLUTION	147
4. CRUSTAL AND UPPER MANTLE STRUCTURE	
5. TECTONICS	168
5.1 THE EASTERN AEGEAN REGION	176
5.1.1 The Northeastern Aegean Region	179
5.1.2. The Southeastern Aegean Region	185
5.1.2. The Southeastern region region	
5.2. THE WESTERN AEGEAN REGION	187
5.3. THE SOUTH AEGEAN SUBDUCTION SYSTEM	
5.3.1. The Eastern Tip of the Arc	
5.3.2. The Western Tip of the Arc	
5.3.3. Adriatic	
5.3.4. Kinematics of the Slab	
5.3.5. African Plate	

5.3.6. Cretan Basin	
5.4. DRIVING FORCES	
6. CONCLUSION	
REFERENCES	211
APPENDIX A	

APPENDIX B

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ABSTRACT

The Aegean region is a remarkably deforming part of the Alpine-Himalayan orogenic belt, which has the highest seismic activity in Europe. An extensional deformation regime has led to subsidence of the continental crust over all the Aegean region behind the south Aegean consumption boundary. The region that is mainly under pure shear stress is an internally deforming part of the counterclockwise rotating (relative to Eurasia) Anatolian plate. To understand the tectonics and dynamic evolution of the region many geoscientists have collected numerous data and interpreted them.

In the present study, all available data have been compiled into a unique database. For this purpose, as a first step, raw and processed information have been compiled and classified with their sources, date information and criticism of their accuracy and limitations. This step allows the comparison of similar types of study and data in order to understand basic problems more clearly. As the second step, all interpretations of the studies are discussed and critically reviewed by considering associated data and methodology on a regional scale. The goal of the work is to determine the problems with highest priority, find the gaps in the database.

ÖZET

Ege bölgesi geniş bir levha çarpışma zonu olan Alp-Himalaya dağ kuşağının oldukça farkedilir şekilde deformasyona uğrayan bir kısmıdır. Güney Ege yitim zonunun arkasında bulunan ve tüm bölgeyi etkisi altında bulunduran aktif genişleme rejimi bu bölgedeki kıtasal yapıdaki kabuğun çökmesine sebep olmuştur. Bu bölge tümü ile, hareketi saat istikametinin tersi yönünde olan Anadolu levhasının batı bölümü olarak düşünülmekle beraber bölgenin tümü ile basit makaslama kuvvetleri etkisi altında olması bir yaygın (diffuse) deformasyonu göstermektedir. Karmaşık tektonik yapısı gereği bilim adamlarının dikkatlerini üzerine çekmekte ve bölgenin kinematiği, buna sebep olan dinamik mekanizma/lar ve dinamik evrimin açığa kavuşturulması için bir çok araştırmalar yapılmaktadır.

Bu tarama/değerlendirme çalışmasının amacı, öncelikle bölge ile ilgili yapılan çalışmaları levha tektoniği kuramının çıkışından bu yana geçen süreç içerisinde derlemek, böylece bunları belirlenmiş başlıklar altında tek bir bakış açısı altına getirmektir. Bu amaç doğrultusunda, önce ham ve işlenmiş veriler, kaynakları ve zamanları belirtilerek bir araya getirilmiştir. Bu veriler ve ilgili çalışmaların sonuçları güvenilirlikleri, amaca uygunlukları ve yeterlilikleri açısından karşılaştırılmıştır ve tartışılmıştır. Bu yaklaşım aynı tür çalışmaların birbirleri ile kolayca karşılaştırılmasını sağlamakta, temel sorunların ve tartışmaların neler olduğunu ortaya daha açık bir şekilde koymaktadır. Çalışmanın ikinci aşamasında, çalışmalarda yer alan tüm görüşler bölgesel olarak, ham veri yeterliliği kıstası ve kullanılan metod gözden kaçırılmadan, ele alınmış ve eleştirisel bir yaklaşım ile tartışılmıştır. Sonuçta bir durum değerlendirmesi yapmak ve öncelikler belirlemek olanağı elde edilebilecektir.

LIST OF FIGURES

Figure. 1.1. The plate boundaries between the plates outlined by the recent seismicity. Events are plotted with magnitude >5.5. Source: USGS catalogue.

Figure. 1.2. Location map of Aegean and surrounding area.

Figure. 2.1. Relative distribution of the volcanic activity in the Aegean area during Oligocene (A), Lower-Middle Miocene (B), Upper Miocene (C) and Pliocene-Quaternary (D).

Figure. 2.2. Maps showing (A) the distribution of the Tertiary to Quaternary volcanics, and (B) the Tertiary granitoids in the Aegean region. The active arc is shown by dotted curves. (C) Age-distance correlation plot for the Aegean volcanics and granitoids. The locations are projected onto the Aegean Transverse (line AB in (A) and (B)), to represent relative distances that are orthogonal to the Aegean trench. Symbols denote the localities that are listed in Table. 2.1. Alkaline volcanics are indicated by hatched patterns (after *Gülen, 1990*).

Figure. 2.3. (A) Relations of means of TiO_2/K_2O , (B) mean concentrations of TiO_2 (after *McKenzie and Yılmaz, 1991*).

Figure. 2.4. Measured range in Sr 87/86, Nd 143/144, and ΔPb 207/204 for four Aegean active volcanic arc islands plotted against their positions along the arc; also shown is the crustal thickness variation along the arc. The horizontal distance is without scale. ΔPb 207/204 notation is after *Hart (1984)*. The crustal thickness data are from *Makris (1978)* (after *Gülen, 1990*).

Figure. 2.5. The Attic-Cycladic-Menderes metamorphic belt, which conforms to the arcuate volcanic arc, is indicated by shaded patterns (from *Bozkurt et al., 1995*). ACM-Attic Cycladic Massif; V-volcanic arc; MM-Menderes Massif.

Figure. 2.6. (A) Model of the origin of a metamorphic core complex induced by crustal extension, (B) stages of extension; (C) beginning of crustal up doming; (D) granitoid intrusion (after *Jacobshagen, 1994*).

Figure. 2.7. Classic model of paired metamorphic belt, showing mechanism for subsequent exposure of metamorphic rocks-crustal shear zones that evolve upward into low-angle normal faults, a: Position of HP/LT metamorphic rocks that eventually will be exposed on Crete (cross-hatched), and position of HT metamorphic dome that eventually will be exposed on Naxsos. These metamorphic rocks will be dragged out from under upper crustal nonmetamorphic rocks (stippled), g: Crustal extension as a result of operation of these major movement zones. Crustal thickness is based on deep refraction profiles (*Makris, 1982*) (after *Lister et al., 1984*).

Figure. 2.8. Summary of crustal features in the Cyclades area (after *Gautier and Brun, 1994*). 1- ductile shear-sense data within Lower Unit metamorphic rocks and younger Miocene intrusions; each arrow represents the mean of measurements on several sites; 2, 3, 4- faults which have been active at least during Pliocene-Quaternary time; 2- major normal faults; 3second-order, commonly antithetic normal faults; 4- strike-slip and/or transform faults (see for more detail *Gautier and Brun, 1994*).

Figure. 2.9. Synthetic diagram of the brittle-ductile relations in the Aegean. Lines with arrows represent shear trajectories in the exhumed metamorphic domains. A gradation of darker shading shows the gradient of high temperature metamorphism from green schist to migmatites from Evvoia to Naxsos which correspond to differential exhumation of deeper and deeper portions of the crust. The window opened in the region of tilted blocks the sense of tilt and the sense of shear at depth (after *Jolivet et al.*, *1994*).

Figure. 2. 10. Schematic map showing the geographical extension and the timing of the two rotational phases documented by the paleomagnetic studies (after *Kissel and Laj, 1988*). Dotted symbols- Middle Miocene rotations: shaded symbols- Pilio-Quaternary rotation.

Figure. 2.11. Plot of paleomagnetic vectors in the Aegean region (after *Jolivet et al.*, 1994; see *Kissel and Laj*, 1988). Small numbers next to the gray arrows in the center of the figure are the ages of sites in My.

Figure. 2.12. The available paleomagnetic results in western Turkish mainland (after *İşseven*, 1995).

Figure. 2.13. A summary of the mean paleomagnetic declinations in the western part of Turkey (after *Jackson et al., 1992*). Arrows show declinations at sample sites; arrows in circles are the mean directions within roughly coherent areas outlined crudely with dotted lines. The coastlines are stippled; other lines are faults.

Figure. 2.14. Paleomagnetic results obtained from 38 sites (after Zanchi et al., 1990).

Figure. 2.15. Sampling sites and mean remnant magnetization directions of the same aged samples (after *Orbay et al.*, 1998).

Figure. 2.16. The four boxes are the Sea beam survey areas mapped by R. V. "Jean Charcot" during HEAT cruise. The dots with numbers are locations of DSDP drilling sites. The arrows are the regional slip vectors of the Mediterranean sea floor with respect to the Hellenic arc (after *Le Pichon et al.*, 1979).

Figure. 2.17. Lineament map of the main lands in the Aegean region (after Foose, 1985).

Figure. 2.18. Relief map of the Aegean and surrounding area (after Genç et al., 1996).

Figure. 2.19. (A) General map of main fault lines of the South Aegean Arc, compiled from various sources (see *Angelier et al., 1982*). Dashed lines-axes of South Aegean trench complex. Depths of more than 800m in the Cretan basin- dotted pattern. (B) Location map (after *Angelier et al., 1982*). Black- shallower than -800 km, white- deeper than -800.

Figure. 2.20. Result of tectonic analysis of fault mechanisms in the central-southern Aegean region (after *Angelier et al.*, 1982). Sticks-strikes of the horizontal or sub horizontal minimum principle stress σ_3 (directions of extension). (A) Pliocene and Early Quaternary. (B) on the basis of regional tectonic consistency. All mechanisms purely extensional.

Figure. 2.21. Active fault segments in the northwest Turkey (after *Barka and Kandinky-Cade*, 1988).

Figure. 2.22. Distribution of earthquake ruptures in the Anatolian region between 1800-1995 (after *Barka and Reilinger, 1997*).

Figure. 2.23. Location of the seismic reflection profiles (after Martin, 1987; Mascle and Martin, 1990). Heavy lines indicate multichannel seismic data (MCS); light lines indicate single channel seismic data; stippled areas are where detailed MCS surveys have been conducted.

Figure. 2.24. General structural sketch of the Aegean Sea as deduced from seismic reflection study (see *Mascle and Martin, 1990;* see also *Martin, 1987*).

Figure. 2.25. Active normal fault map of the Aegean Sea deduced from seismic profiles (after, *Saatçılar et al., 1996*). Thin lines show the seismic lines, the lines with thick marks show the normal faults.

Figure. 2.26. A summary of the observational results of Jackson and McKenzie (1988), showing the areas in which seismicity is likely to occur (after, *Jackson and McKenzie, 1988*). The belts marked 'unknown' are those where the seismicity this century is too unrepresentative of longer periods to be conclusive or where there is no independent estimate of the overall deformation rate (*Jackson and McKenzie, 1988*).

Figure. 2.27. Seismicity shown in the horizontal layers in the Aegean area (after Küleli, 1997). (A) The events (all magnitudes) in the 1964-1986 interval recorded by 53 station

(ISC), (B) hypocenter distribution in the 0-10 km depth interval for magnitudes (rmag) greater than 3; from (A) to (E) layer thickness was selected according to those from teleseismic inversion model. (C) 0,40 km depth interval, (D) 40, 80 km depth interval, (E) 80 160 km depth interval, (F) deeper than 160 km.

Figure. 2.28. Vertical cross section of the local hypocenters from (A) to (D) (after *Küleli, 1997*). Epicenters bounded on the upper panel for display of a small location map for orientation and latitude and longitude of the epicenters with an angle 90° on the marked line. Hypocenters and epicenters of events from ISC catalogue tape. Hypocenters plotted include all magnitude events.

Figure. 2.29. The displacement of the 46 points in 100 years (1892-1992) (after Davies et al., in press).

Figure. 2.30. The position of traditional geodetic networks where activities have been carried out (after *Aksoy and Deniz, 1997*) and 3 micro-networks (black filled rectangles) installed by B.U. KOERI.

Figure. 2.31. SLR stations of WEGENER-MEDLAS network in Aegean-Anatolian area (Wilson and Reinhart, 1993).

Figure. 2.32. SLR horizontal velocities and their confidence ellipses in a Eurasia-fixed reference frame for the period 1986-1990 (after *Oral, 1994*).

Figure. 2.33. GPS horizontal velocities and their confidence ellipses relative to MATE (Matera) for the period 1989-1993 (after *Kahle et al.*, 1995).

Figure. 2.34. GPS (Solid arrows) and SLR (open arrows) horizontal velocities and their 95% confidence ellipses in a Eurasia-fixed reference frame for the period 1988-1994 (after *Reilinger et al.*, 1997). Stations with their codes were denoted.

Figure. 2.35. Velocity field derived from the GPS campaigns of 1990, 1992, 1994, and 1996 in northwestern Turkey (after *Straub and Kahle, 1997*). The error ellipses reflect the formal errors.

Figure. 2.36. (A) Bouguer and (B) free-air gravity anomaly charts (after Allan and Morelli, 1971).

Figure. 2.37. Free-air gravity anomaly map of the south Aegean and surrounding area (from *Rabinowitz and Ryan, 1969*). Diagonal parallel lines represent negative anomalies; the dotted pattern positive anomalies.

Figure. 2.38. Combined free-air anomaly of Eastern Mediterranean Sea beneath southeastern Aegean region (from *Woodside*, 1975).

Figure. 2.39. Free air anomaly map of Aegean (after Genç et al., 1996a).

Figure. 2.40. Bouguer anomaly map of south and east Aegean region and Mediterranean region (from *Özelçi*, 1973).

Figure. 2.41. Bouguer gravity map of western Turkey and surrounding area (after *Genç et al.,* 1996). Contour interval is 5 mgal.

Figure. 2.42. Free-air gravity anomaly map of northwestern Turkey (after Aygül and Genç, 1998). Contour interval is 10 mgal.

Figure. 2.43. Bouguer gravity map of Aegean and surrounding area (Makris and Stobble, 1984).

Figure. 2.44. Bouguer gravity map of Greece and surrounding area (after Makris, 1985).

Figure. 2.45. Bouguer gravity anomaly map of Greece and surrounding area (after Tsokas

and Hansen, 1997).

Figure. 2.46. Magnetic map of Greece (after Makris, 1985).

Figure. 2.47. Magnetic anomaly map of western Turkish mainland and surrounding area (after *Genç et al., 1996b*). Contour interval is 2.5 nT.

Figure. 2.48. Magnetic anomaly map of Aegean and surrounding area (after Genç et al., 1996a).

Figure. 2.49. The locations of magnetotelluric profiles in western Turkey (1975-1990) (after *İlkışık et al., 1996*). See text (Section 2.12) for detail.

Figure. 2.50. Heat flow map of Aegean and surrounding area.

Figure. 2.51. Heat flow map of the Eastern Mediterranean region (after Makris, 1985).

Figure. 2.52. Heat flow density distribution in Turkey (after Koçak, 1990).

Figure. 2.53. Heat flow pattern in western Turkey (*İlkışık, 1995*).

Figure. 2.54. Silica heat flow density distribution in Turkey (after İlkışık, 1995).

Figure. 2.55. Heat flow in Anatolian-Aegean region (after Mueller et al., 1997).

Figure. 2.56. The distribution of hot springs in Turkey (Tezcan, 1979).

Figure. 2.57. Heat flow values between 20° and 30°E longitude as a function of latitude, showing the abrupt increase in heat flow northward from the Mediterranean across the South Aegean arc into the Aegean Sea (after *Erickson et al., 1977*). Circles show the values obtained using conventional oceanographic techniques; a single triangle shows a value measured in a

borehole drilled during the Deep Sea Drilling Project Leg 42A.

Figure. 2.58. Tomographic images of the Aegean/Eastern Mediterranean Upper Mantle in cross section. The upper panels in a-d display a small location map for orientation (after *Spakman et al., 1988*). The lower panels display the inferred P-Wave velocity heterogeneity. Cross (horizontal) hatching indicates positive (negative) anomalies. Regions of poor spatial resolution are not contoured (large white areas). The horizontal and depth axes are given in km, without vertical exaggeration. Black symbols indicate the projection of hypocenters with M>4 that are located 100 km from the plate. The width of the location map is 3 degrees. For more detail see *Spakman et al. (1988*).

Figure. 2.59. Tomographic images of the Aegean area (after *Ligdas et al., 1990*). Shading is as Fig. 2.58.

Figure. 2.60. Tomographic images of the Aegean area (after *Küleli, 1992*). The upper panel displays locations of the sections and location of epicenters (M>3) which were included in the tomographic images.

Figure. 2.61. Sn and Lg propagation in the Middle East (after *Rodger et al., 1997*). (a) Events and stations used in the study (b and c). (b) Zones of inefficient Sn propagation (see *Rodger et al., 1997* for detail). (c) Characteristics of Lg propagation.

Figure. 2.62. Location map of the expanding profiles (ESP recorded during the Pasiphae cruise; black dots ESP central points, i.e., the places where a velocity model is obtained (after *Voogd et al., 1992*). Dashed lines indicate the seismic profiles (*Finetti, 1976, 1982*).

Figure. 2.63. The STREAMERS line (ION-07) shown by a solid line (after Hirn et al., 1996).

Figure. 2.64. Location of Deep Seismic Soundings (DSS) in Eastern Aegean and surrounding area (after *Makris*, 1985).

Figure. 2.65. Cross sections shown in Fig 2.64 (after *Makris, 1985*). Solid lines give the computed travel-times as indicated at the middle part of the drawing. The seismic phases to be considered are at Pg, Pn, and PmP.

Figure. 2.66. Position map of normal-incidence multichannel lines and land recording stations of the STREAMERS survey in the Aegean (after *Sachpazi et al.*, 1997).

Figure. 2.67. Solid lines show the seismic refraction profiles; 1-Kestel, 2-Anadolu Kavağı, 3-Adapazarı, 4,5-Tukish-German refraction project (after *Küleli et al.*, 1995).

Figure. 3.1. Major Geological units and old oceanic remnants (ophiolites and blue schist) (after *Küleli et al., 1995*). The active volcanic arc is shown by a dotted curve.

Figure. 4.1. Moho depth map of Greece and surrounding area obtained by a Gravity computation (after *Tsokas and Hansen, 1997*). Contour interval is 1 km.

Figure. 4.2. Moho depth map of Aegean obtained by gravity computation (after *Genç et al., 1996a*).

Figure. 4.3. Moho depth map of western Turkey and surrounding area obtained by gravity computation (after *Genç et al, 1996*).

Figure. 4.4. Moho depth map of southeastern Aegean and surrounding area (after *Tsokas and Hansen*, 1997).

Figure. 4.5. Moho depth map of Aegean and surrounding areas (after *Makris*, 1985). Plotted by combining refraction and gravimetric data.

Figure. 4.6. Approximate crustal thickness (km) in the Aegean and surrounding area, derived from Moho-depth map (Fig. 4.5) published by *Makris (1976)*, with corrections including topography and bathymetry (after *Le Pichon and Angelier*, 1981).

Figure. 4.7. Moho depth map of Marmara and surrounding area obtained by gravity computation (after *Klingele and Medici, 1997*).

Figure. 4.8. Moho depth map of Marmara and surrounding area (after Gürbüz et al., 1992).

Figure. 5.1. Seismicity of the Aegean. Epicenters of earthquakes with depths between 0 and 50 km reported by the USGS PDE during the period 1973 to 1997. Earthquakes with magnitudes >5.5 are shown by bigger circles.

Figure. 5.2. Earthquakes in the central and eastern Aegean from 1976 to 1997. Source: B.U. KOERI.

Figure. 5.3. Simplified tectonic map of the Aegean region.

Figure. 5.4. Lower hemisphere projections of the focal mechanism solutions of the earthquakes studied by various seismologists (see Table. 2.5). Compressional quadrants are shaded. Numbers identify the selected solutions in Table. 2.5. The focal mechanisms selected from Table. 2.5. correspond to the solutions found by using the most reliable method and seem to be the most concordant with the tectonic scheme (see Section. 5 and Fig. 5.3).

Figure. 5.5. Hypocenter distribution of earthquakes in the Aegean and surrounding area. Data reported by the USGS PDE during the period 1973-1997. The earthquakes with magnitudes >4,5.

LIST OF TABLES

 Table. 2.1. Isotopic ages of Volcanics and granitoids in the Aegean region (after Gülen, 1990).

Table. 2.2. Ages of volcanics and granitoids observed by various geoscientists in the Aegean region. AI- acid intrusion; A- alkali; KA- calk alkali; G- granitoid; GI- granite intrusion; GE- granite emplacement; GD- gabbroic dykes; B- basic; LGD- lekogranit; AV- active volcanism. Extensional phase indicated by light gray, compression phase indicated by dark gray.

Table. 2.3. Age and type of metamorphism in the Aegean region. GE- granite emplacement; GP- granite pluton; GI- granite intrusion; GS- green schist; BS- blue schist; HP- high-pressure metamorphism; HT- high-temperature metamorphism; HP/LT; high pressure/low temperature metamorphism; HT/LP; high-temperature/low pressure metamorphism. Extensional phase indicated by light gray, compressional phase by dark gray.

Table. 2.4. Paleomagnetic results in the Aegean region. Clockwise rotation indicated by light gray; counterclockwise rotations indicated by gray; no-rotation by dark gray.

Table. 2.5. Focal mechanism solutions of earthquakes $(5.5 \le Ms)$ from many studies in the Aegean and surrounding area. All the mechanisms are equal-area projections of lower hemisphere of the focal sphere. On top of each beach-ball the two letters defines authors two first letter of last names; and two-digit date of publication.

Table. 2.6. Gravity data in the Aegean area.

Table. 4.1. Crustal thickness estimations in the Aegean area.

Table. 5.1. Obtained velocity rate and direction in various parts of the Aegean region. The numbers in METHOD column indicate the method used to measure rate and/or direction vector.

1. INTRODUCTION

The deformation pattern in the Mediterranean region that constructs a low elevated part of the Alpine Himalayan belt is rather complex, as usually occurs in continental collision zones. Five arcuate tectonic belts are situated in the Mediterranean region (in Alpine Himalayan belt). Four of them (Gibraltar, Tuscanian, Calabrian, South Aegean) have island arc system characteristics, with marginal seas. The fifth (Cyprus) arc is a relatively narrow thrust zone that is not clearly evident. Much of the structure and seismicity of the Alpine Himalayan collision zone (southern Europe, North Africa, the Middle East and Asia as far east as the Himalayas and China) can be attributed to the closure of the Neo-Tethyan Ocean.

The higher spreading rate in the South Atlantic (40 mm/yr) as compared to that in the North Atlantic (25 mm/yr) has been causing a gradual counterclockwise rotation of the African plate. This rotation results in a N-NW directed push against Eurasia. In general view, the Aegean region is situated in a part of the convergent boundary between the African plate which has rotated counter-clockwise with respect to Eurasian plate during last 92 My (*Mueller & Kahle, 1993*) and Eurasian plate. Between them, a roughly N-S directed lithospheric shortening rate is increasing from west to east (*Mueller et al., 1997*). The African plate (Tethys ocean) is being consumed by subduction towards the north. On the other hand, the Mediterranean lithosphere does not left east around Hatay (e.g., *Şengör, 1982*) where a thrusting and thickening process is taking place between the Arabian and Eurasian plates.

The crust of the Alpine Himalayan belt is constructed of approximately parallel trending units whose configuration developed in paleotectonic times. To both sides of the Aegean Sea, the units that are massifs and suture zones (ophiolite and blue schists) are linked to each other. As the Tethys closed, pieces of continent (terrenes) were swept together (accreted) to form a tampon mass between African and Eurasian plates. Evidence for this accretion may be found in the Turkish and Greek ophiolite suture zones. In the Aegean area, these units and ophiolitic suture zones are cut by prominent post orogenic active extensional structures. The Eocene blueschists and eclogites in the Cyclades in the centre of the Aegean Sea indicate that during the Mid-Eocene the region was characterised by a thick continental crust (> 70 km) because of a compressional regime. The timing and cause of transition from compressional to

extensional regime in the Aegean region and the tectonic setting of the Oligo-Miocene calcalkaline magmatism in NW Turkey are controversial. Estimates of the age of transition from compressional to extensional regime range from Late Oligocene to Late Miocene. The underlying cause of the extensional regime is also debated. One possibility is the gravitational collapse of the major topography created as a result of the mid-Eocene crustal thickening. A second is the rollback of the South Aegean Subduction Zone, creating a back-arc-type extension. The third are the forces of the boundaries created by the collision of the African-Arabian plate with the Eurasian plate. The Aegean region is bounded to the North by the stable continental Eurasian plate, to the west by the Adriatic region, to the east by the central Anatolian, and to the south probably by the oceanic material beneath the Mediterranean Sea (Northern edge of the African plate). The region is situated north of the South Aegean Arc (SAA). Northward motion of the Arabian plate relative to the Eurasian plate and a free retreating subduction boundary along the South Aegean Trench causes lateral motion of the Anatolian mass (Le Pichon et al., 1995; Oral et al., 1995; Reilinger et al., 1997). This motion causes right lateral motion along the North Anatolian Fault Zone (NAFZ) and left lateral motion along the East Anatolian Fault Zone (EAFZ) (McKenzie, 1972; Oral et al., 1995). The horizontal motions suggest that the westward movement of Anatolian plate carries Anatolia through an extensional zone where the continent is stretched and its thickness halved (e.g., McKenzie, 1978). The Aegean area includes the Aegean sea, mainland Greece, Bulgaria southern Macedonia and westem Turkey. The area deforms as a part of Anatolian mass and is called as Aegean region. The existence of a calc-alkaline inner volcanic arc, the spatial distribution of earthquakes and detailed tomographic studies indicate the existence of a northward - dipping subducted slab beneath this region. The region is an area of present day N-S extension above the South Aegean Subduction Zone.

Elevation in the Aegean region increases from the deepest basins in NW-SE direction Aegean axial trough to the SW and NE; in basins with a ENE-WSW strike in the North Aegean to the N; Cretan basin to the North Cyclades Plateau and to the South Aegean Island Arc in E-W elongation.

The region SW of the Aegean axial trough is characterised by NW-SE trending grabens that result from the SW stretching of the region. To the NE of this line cross grabens trend NE-SW approximately parallel to the SW, and they have a strike-slip component with considerable dip slip component. These trends become progressively more E-W and NW-SE to the further



Figure. 1.1. The plate boundaries between the plates outlined by the recent seismicity. Events are plotted with magnitude >5.5. Source: USGS catalogue.

east in western Turkey. The Cretan Basin that is the most aseismic area in the region possibly had been stretched parallel to the SAA. However, possible collision of the SAA with the African promontory stopped further stretching of the Cretan basin. After that event, the Aegean region underwent a new stage of the extensional regime. The Aegean Sea floor (about 350 km mean depth) is seen as a high plateau between the deeper Black Sea floor (mean depth 1300 m) and the Mediterranean Sea floor (Mean depth 1500 m) (*Küleli et al., 1993*). The region is characterised by high heat flow, which is related to thinned and deformed (stretched) continental crust. This thinning is now continuing. For this reason the area is the most seismically active and rapidly internally deforming area of the entire Alpine-Himalayan belt and the continents in the world today (*McKenzie, 1972; Mercier et al., 1977; Ekström & England, 1989; Jackson et al., 1992*). It is called the Aegean extensional region. The location of the region and main names are shown in Figure 1.1 and Figure 2.2, respectively.

The basic plate tectonic hypothesis is that the Earth's uppermost layers are divided into rigid plates, with narrow deforming borders could not rigorously apply to continental crust. For this reason the region continues to serve as a testing ground for new methods and theories as a natural laboratory (*Jackson, 1994*). Between the African and Eurasian plates beneath the Aegean region with continental crust, the boundary cannot be regarded as a single narrow deforming border. The region must be considered as an extensional part of a diffuse (wide) boundary (broad transition zone) between corresponding large plates. Probably brittle crust is being deformed diffusely by micro blocks on continuously deforming ductile material in the region (see *Thatcher, 1995*).

There is a lot of unknown geological detail in the complex Aegean region that needs to be derived. Data are often hidden away due to nationalism and protectionism. For this reason, the production of maps is extremely slow, and available maps very often lack some information. Because of the absence of data from each branch of geoscience and hard problems that are not seen in any other region of the Earth, experts in different fields should join forces to compile a list of major pieces of evidence and of the related geodynamic implications. There is always the danger that structural mapping, data processing, instrumentation or one branch becomes a goal. Furthermore there is a notable lack of dialogue between the different teams (see also *Schmid et al., 1996*). Dialogue and cooperation across borders and across scientific disciplines



Figure.1.2. Location map of Aegean and surrounding area.

are the main requirements for the promotion of future research on the Aegean region or anywhere. Many authors made studies to integrate the geological, geophysical and geodetic data with the kinematic and dynamic problems in the Aegean area. However only limited parts of known information are generally used in geodynamic reconstructions, because it is hard to search the whole literature for a scientist who studying a single branch of geoscience. This is partly because it is hard to reach geological and geophysical wide information. To handle large, multidisciplinary data sets with varying quality and resolution, *Şeber et al.* (1997) have recently adopted a Geographic Information System (GIS). It is an approach for the construction of a multipurpose database to look at the geodynamic problems in a comprehensive and unconventional way. The resulting maps are available at their web site at <u>http://atlas.geo.cornell.edu/</u>. Many authors published review papers that are based on The Aegean region or some parts of the region or that include the region. Some of these consider all the geophysical and geological methods or some selected methods. Some of these are listed in next paragraph.

Previously Lort (1971) gave a very brief description of surveys in the eastern Mediterranean. Horvath & Beckermen (1982) critically review the geological environment, structure and evolution of Mediterranean back-arc extensional basins as well as the Aegean region. Jackson & McKenzie (1988) also gave information for many extensional basins in the Mediterranean region as a general review. Mueller & Kahle (1993) made a good general review that was based on geological and geophysical data in the Mediterranean region. Mercier et al. (1989) reviewed the structural data in the Aegean region. Jackson (1993) made a critical review on deformation of the Aegean region and its surroundings. Babbucci et al. (1997) made a general geological review based on available observations in the various branches considering the Alpine Himalayan belt. Mueller et al. (1997) gave a general review which considered available geodetic, geophysical and geological data in the Anatolian-Aegean region. Cantez & Toksöz (1982) made a review based on crust and upper mantle structure in Turkey. Barka (1997) gave a good review of existing studies on tectonics of the Marmara region. Berckhemer (1977) has reviewed the existing results on the South Aegean Subduction Zone. Jongsma (1975), Udias & Buforn, (1991), Mercier (1981) and Morelli (1985) compared the Aegean subduction system's properties with the other arcs in the world. Arpat (1976) made a brief critical review of geophysical and geological data in the Aegean region. Küleli et al. (1993) provided a review on existing syntheses based on the Aegean region. Jackson (1994)

has presented an exhaustive review of the active tectonics of the Aegean region. The review of *Schmid et al. (1996)* is concerned with the active tectonics of the region. Recently *Dadaşbilge (1997)* reviewed the geology and geophysical state of the Aegean region.

This work is a critical and detailed review of the all available geoscientific data and literature in the Aegean Region. Our main goal is to provide up-to-date information that is easy to reach about geoscientific data, dynamic and kinematic hypothesis, which has been studied intensely since initiation of the plate-tectonic concept. The challenge is to determine the problems with highest priority, reveal the gaps in the database and selection of appropriate data for further studies. We try to draw up an inventory of what is known at present based on numerous observational data, trying to link them in an understandable way. To be able to access the large amount of information rapidly all available literature has been compiled into a unique database as a reference library of the study (see Appendix 2.). This database is accessible through a computer and includes a large amount of literature and data information. This study is not perfectly complete but provides the basis of the working goal proposed by this study. The GMT (Generic Mapping Tools) algorithm (Wessel & Smith, 1995) was used to prepare many of the maps. The Microsoft Office '97 (Professional) software was used for preparation of some tables and text and especially to make the "comment index" for all scanned texts that come from various parts of the numerous papers. The IRISpen (optical character recognition) system was used to edit texts from hard copy papers.

2. DATA: Review

During the last 25 or 30 years, many geological, geophysical and geodetic data have been collected in the Aegean area, providing important information about the recent tectonic and geodynamic evolution of that region. In this section available raw and processed information and data have been compiled and classified with their sources, date, other information and criticism of their accuracy and limitations. This step allows the comparison of similar types of study and data, to help understand basic problems more clearly. Most of the listed data are taken from literature that is reviewed in this study and some others are taken from references therein when we could not reach the original source.

2.1. GEOLOGICAL MAPS

There are many maps which have been produced by various mainland geological studies. However, in our study some of the well known main geological map series listed. Previously a simplified geological map of western Turkey (1: 500,000) was redrawn from the map at half a million scale in three sheets (İstanbul, İzmir, Denizli) by the Institute of Mineral Research and Exploration, Ankara, Turkey (MTA 1961, 1964). In 1989 the Geological Map of Turkey (1:12,000,000) was compiled. The 1:500,000 geological map of Turkey now has been digitising. There is a geological map of Greece on a scale of 1:500,000 published by Geology and Subsurface Research, Athens (1954). It is known that there is a geological map of Greece on a scale of 1:50,000 but we could not obtain this information. A compilation of the geology of the Mediterranean area on a scale of 1:2,500,000 was drawn by *Biju-Duval et al. (1974)*.

2.2. MAGMATICS

2.2.1. Data

An active volcanic arc called the South Aegean Volcanic Arc (SAVA), studied by Nicholls (1971), Ninkovich and Heezen (1965), Caputo et al. (1970), Ninkovich and Hays (1972), Fytikas et al. (1976), Bellon et al. (1979), Gülen (1990), Altherr et al. (1988). Fytikas et al. (1984). They discussed the Quaternary evolution of the volcanism in the whole region based on their analysis with some others from previous studies. Gülen (1990) studied a substantial number of high-precision isotope data (Table. 2.1) that have been obtained on the magmatic rocks of the region since the 1977 Colloquium in İzmir by various studies. Ertürk et al. (1990) also reviewed the tectonic evolution of the Aegean region by considering previous studies. There are many other local studies.

Turkey:

In central Anatolia and western Turkey Innocetti et al. (1977) studied the distribution of the rare earth elements in different members of each magmatic series by using stratigraphic and geochronological data. Ercan (1979) extensively studied the volcanics of western Turkey, Thrace and Cretaceous volcanites of the coasts of Black Sea. Ercan (1982) combined his data with the previous studies (e.g., Ercan, 1979, 1980; Ercan et al., 1977, 1979). In addition he reviewed the results of a collateralize project of MTA; Geology Department, İstanbul University; Earth Science Faculty, Ege University; Earth Science Faculty that called "West Anatolia Tertiary Magmatizm and Stratigraphy". He also reviewed some other previous results of these studies. After that, additional radiometric ages were obtained from the northwestern Anatolian volcanics by Ercan et al. (1985). Yilmaz (1989) made a review of magmatics in western Turkey and has synthesized his data and compared ideas with the observations of others. Francalanci et al. (1990) added new chemical and isotopic data on alkaline magmatism of the Aegean Sea, Western Turkish peninsula. Geochemical results from the Eocene-Miocene volcanics are interpreted by Ertürk et al. (1990) in western Turkey (see also Ercan, 1980; Savaşçın, 1982).

Table. 2.1. Isotopic ages of Volcanics and granitoids in the Acgean region (after Gülen, 1990).

ocation	Symbol	Age (M.y.)	References
OLCANICS:			
Cantorini	Va	06-16	8 1
Allos	Vh	₩.₩° 1.₩ A 13 %	: > 《 今 多 職
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disinence	* ** `\$_^\$	19.20 - 12.00 13.19	
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1890)a Indecim	* 5g 1.15m	2. : ~ ~ ~ ~ ~ ©	ీసు,మెలా అంశ
Shifhidi halibi Shichimmi miji	₩ F 1 1.11	√	6 i ** ** **
*******	¥1 12:	3.2° 1.4. ~ ~ ~ ~ ~	3 ili, o bia 🕴 , ika dia wa na
}&mos *	V] 	/.&~9 *~ ~ * * *	21
NDOES	× ×	13.2~14.3	2.12.13
(Blogeri • 4	V I • 7	<u>60</u>	15
joke ····	Vm	7.0	8
Chios-Veșme	Vn 	14.3-17.0	3
'sara-Uria	Vo	15.0-17.7	7
jkiros	Xp	15.0	13
(araburun, izmir	Ya	19.2-21.3	7
'salhoura	¥r	0.7	14
Agios Evstratios	Vs ···	18.0-23.2	13
-esbos-Olkill		15.5-18.0	7.19
(ula	Vu	1. 1	7.8
3ergama-Ayvalık	٧v	17.3-23.6	4,7.17
_imnos	Vw	17.8-21.6	13
3igadiç-Kepsut	V×.	19.6-21.7	8
Alexandroupolis	Vγ	30.0-33.1	14
Kanthi-Souflion	٧z	23.6-30.6	14
GRANITOIDS:			
Serifos	G1	8.0-9.5	1
Naxos	G2	11-13	1
Kos	G3	9-12	1
Laurion	G4	16	1
Mikonos	GS	9~11	*
Tines-Bodrum	G6	13-15	1
Menderes	G7	16.4-18.1	10
Egrigôz	G8	20-24	6
Tuzla	G9	28	6.12
Cataltepe	G10	20-23	6
Huwin A	611	25-27	6

2.2.2. General Interpretation

The trace element isotope analyses suggest that the calc-alkaline volcanics that are more acidic are the products of an interaction between mantle and crustal reservoirs. Whereas the alkaline volcanics that are more basic come from the mantle with negligible continental crustal (i.e. acidic material) contamination (*Savaşçın, 1990*). On the other hand, the basaltic

suite rocks occur as locally developed patches and preferentially follow some distinct zones of fracture or major fault directions especially in the grabens of western Turkey (*Yılmaz, 1989*). These main magmatic rock families were observed in the Aegean region in various ages.

To better understand the recent tectonic nature, the relationship with the geodynamic setting should be recognized. For this reason it is important to find the source characteristics of the different types of magmas in the region. Some relations were sought by researchers between distance from the arc, age and chemical composition of rocks. This relation defines the nature of the subduction zones and their behavior in time. In the Aegean region, subduction related back-arc calk-alkaline volcanism is obvious. It is generally accepted that the volcanic activity along a convergent margin develops only where the depth of the subducted lithosphere reaches suitable values, between approximately 100 and 200 km (Gill, 1981, see also Fytikas et al., 1984). Yilmaz (1981) defined a Middle-Late Cretaceous magmatic arc, related to the Northern branch of the Neo-Tethys. Borsi et al. (1972) firstly recognized that the magmatism exhibits a progressive shift in time toward the south in the Aegean region (see also Fytikas et al., 1979; 1984; Savaşçın & Güleç, 1990; Papadopoulos, 1997) (Fig. 2.1). This finding suggests that the subduction zones could be shifting towards the south somehow. Accordingly, three volcanic phases are defined by Boccaletti et al. (1974). These are early Miocene (23-14 Ma) in the Central-North Aegean, Late Miocene (14-7 Ma) in the south central Aegean and Plio-Quaternary (4 Ma-present) in the South Aegean Island Arc (see also Jongsma, 1975; Papadopoulos, 1997). According to the extensive recent study of Gülen (1990) in the Aegean region, a progressive younging trend of calk-alkaline volcanics and granitoids is also observed from NNE towards the south-southwest to the active subduction zone (Fig. 2.2). He distinguishes four volcanic zones in north-south direction. To the North of the active volcanic chain in Aegean SAVA a paleo-volcanic zone is situated along the southern periphery of the Attic Cycladic/Menderes metamorphic belt (Gülen, 1990). This zone is referred to as the "inner arc" by Innocenti et al. (1979). Further North an older (Oligocene/Middle Miocene) volcanic zone (Gülen, 1990) covers an extensive area in the Northern Aegean region where the Attic/Cycladic/Menderes metamorphic belt forms its southern boundary. The previous observations could be explained in this way. Fytikas et al. (1984) also pointed out that Oligocene volcanics occur only in the northernmost part of the belts (Thrace) whereas Miocene products are confined to the southern sector of the belt (Fig. 2.1). The oldest and more northerly position Macedonian volcanics (Alexandroupolis, Xanthi, Souflion) exist according to the data (Figs. 2.1, 2.2) (*Fytikas et al., 1984, Gülen, 1990*). On the contrary there seems to be a reverse trend for the alkaline volcanics based on a



Figure. 2.1. Relative distribution of the volcanic activity in the Aegean area during Oligocene (A), Lower-Middle Miocene (B), Upper Miocene (C) and Pliocene-Quaternary (D).

limited data set relative to more acidic volcanics (calk-alkaline) (Fig. 2.2) (*Gülen, 1990*). These types of volcanics get younger away from the arc to the North. The alkaline more basic volcanics appear to be related not the subducted slab but with the extensional (W-E) tectonic features in the Aegean area like the other extensional back-arc regions (*Dewey & Şengör, 1979; Morrison, 1980; Savaşçın, 1982, 1990*). According to this theory, this negative trend may imply that the extension in the Aegean region might have started first in the south, and then propagated Northward in time (*Gülen, 1990*). This idea well fits with the thin viscous sheet model of *Sonder and England (1989)* to investigate thermal dependent rheology for back arc continental areas. According to the model, extension progresses towards the north.

But *Savaşçın (1990)* reported E-W trend of alkali basaltic magmatism becomes younger towards the west in western Turkey along N-S extension related grabens. But it should not be forgotten that the data are limited (*Gülen, 1990*).



Figure 2.2. Maps showing (A) the distribution of the Tertiary to Quaternary volcanics, and (B) the Tertiary granitoids in the Acgean region. The active arc is shown by dotted curves. (C) Age-distance correlation plot for the Acgean volcanics and granitoids. The locations are projected onto the Acgean Transverse (line AB in (A) and (B)), to represent relative distances that are orthogonal to the Acgean trench. Symbols denote the localities that are listed in Table. 2.1. Alkaline volcanics are indicated by hatched patterns (after *Gülen*, 1990)

Studies of the composition of the lavas by *Nicholls (1971)* and *Ninkovich & Hays (1972)* show that there is a systematic increase in K₂O and Rb versus SiO₂ with distance from the South Aegean Trench (see *Jongsma, 1975*). Accordingly, *Kuno (1959)* argued that as the Benioff zone depths increase the magma becomes more alkaline. Hence, away from the arc towards the inside of the arc, the K₂O/SiO₂ ratio and also the Al₂O₃/SiO₂ ratio increase (see *Kuno, 1960; 1966; Kushiro & Kuno, 1963; Diskinson & Hatrenton, 1967; Miyashiro, 1972*). *McKenzie & Yılmaz (1991)* also reported an increasing TiO₂/K₂O ratio and TiO₂ percentage away from the arc in the North (Fig. 2.3). However, the study of *McKenzie & Yılmaz (1991)* shows that in western Turkey no trend is observed in neither E-W nor S-N direction in K₂O



Figure. 2.3. (A) Relations of means of TiO₂/K₂O, (B) mean concentrations of TiO₂ (after McKenzie and Yilmaz, 1991)

percentage. Fytikas et al. (1984) argue that the volcanism has migrated in time towards a more southerly position from a change in the chemical character of the products erupted, which tend to become richer in K_2O towards the south.

According to the *Yılmaz (1990)*, the calc-alkaline lavas (Late Oligocene to Early Miocene) of western Turkey were erupted at a time when the compressional regime led to crustal thickening and younger east-west extension normal to the compression direction (Table. 2.2). They also suggested that alkaline lavas erupted at the time when N-S extension started. There is an alternative idea that the changes from calk alkaline (Late Oligocene to Early Miocene) to alkaline are interpreted as indicating an increasing asthenosphere contribution resulting from a thinned lithosphere (*Seyitoğlu & Scott, 1992a,b*). This incompatibility of generation of calk alkaline volcanics leads to incompatibility of extension starting time in the Aegean region.

Studies based on detailed geological mapping, establishment of the local volcanic stratigraphy leading to the delineation of volcanic episodes and volcanic/sedimentary rock relationships and the analysis of volcanism by establishing the petrological character of individual volcanic episodes are surprisingly few (see *Yılmaz, 1989*). *Yılmaz (1989)* pointed and that most of the young volcanic studies are geochemical and based on analyses of limited sample populations collected from a small region. For this reason scientists could not find an exact and unique solution and there are a lot of controversial alternative ideas and incompatibilities.

Active Volcanic Arc

In the South Aegean region, an important feature is the chain of volcanic centers stretching from near Corinth to the Bodrum peninsula, which is called SAVA (*Paraskevopoulos, 1956, Nicholls, 1971*) (Fig. 2.2). Active volcanoes in the zone include Santorini (36.5°N, 25.6°E) and Nisyros (36.7°N, 27.1°E) and fumaroles are found on Methana (37,4°N, 23,5°E), Susaki (37.9°N, 23,3°E), Milos (36.8°N, 24.5°E) and Kos (*Ninkovich & Heezen, 1965*). This well-known arc is considered to be the surface expression of still-active subduction of the African plate beneath the Aegean plate (*Caputo et al., 1970; Ninkovich & Hays, 1972; Fytikas et al., 1976; Gülen, 1990*) (Table. 2.1). The products of the South Aegean Arc (SAA) form a typical calc-alkaline association, which displays a continuous evolution from basalts to rhyolites. But basaltic lavas are very rare (*Nicholls, 1971*). Granitoids show a systematic compositional variation in the E-W direction (*Altherr et al., 1988*), The eastern granitoids (Samos, Kos, and Bodrum) are monzonites; the central ones are granodiorites (Laurium, Serifiros) (*Gülen, 1990*)

Table. 2.2. Ages of volcanics and granitoids observed by various geoscientists in the Aegean region. AI- acid intrusion; A- alkali; KA- kalk alkali; G- granitoid; GI- granit intrusion; GE- granit emplacement; GD- gabroic dykes; B- basic; LGD- lekogranit; AV- active volcanism. Extensional phase indicated by light gray, compression phase indicated by dark gray.

	NEOGENE						
References and Areas beneath volcanic rocks observed		OLIGOCENE		MIOCENE	PLIOCENE		
	Lower	Upper	Lover	Middle	Upper		
Attic-Cycladic Massif	Attic-Cy	cladic Mass	sif	· · · · · · · · · · · · · · · · · · ·			
Fytikas et al., 1984				[AI	AI		
Wijbrans and McDougall, 1988				GE			
Menderes Massif	Mender	es Massif	• . 	· · · ·		. <u>.</u>	
Seyitoğlu et al., 1992			LGD	LGD	BA	BA	BA
Dora et al., 1990					[В]	
Yılmaz, 1989]	KA G	KA G]			
Seyitoğlu et al., 1992		KA G	KA G]			
Benda et al., 1974	·		[GE				
Becker,platen et al., 1977			[GE		<u> </u>		
Yılmaz, 1989	· · · · · · · · · · · · · · · · · · ·						
Ertürk et al., 1990						A	
Gülen, 1990				A			
Yılmaz, 1989			ļ	ļ	ВА	[HV	<u> </u>
Savaşçın et al., 1990; Ercan et al., 1985; Bellon et al., 1979				[A	[В А	ВА	BA
Yılmaz, 1989; Savaşçın et al., 1990	Gl	G		[A GD			
Savaşçın et al., 1990	· •						
Attic-Cycladic-Menderes Massif	Attic-Cy	cladic-Meno	leres Mas	sif	·	· · · · · ·	
Gülen, 1990			GE[GE	GE		
Borsi et al., 1972; Fytikas et al., 1984		KA]				
Active Volcanic Arc	Active V	olcanic Arc				•	
Fytikas, 1984						[AV	AV
Ercan, 1982							AV
Gülen, 1990							AV
Inner Volcanic Arc	Inner Vo	olcanic Arc		· · · · · ·			
Innocenti et al., 1979; Gülen, 1990	[G	G	1		KA	KA	
Kalkidiki Greece	Kalkidik	i Greece					
Gülen, 1990	[G	G					
(Fig. 2.4). These results could be interpreted as an extension of crustal contamination, which increases gradually from Nysiros (east) towards Aegina (west) along the active volcanic arc (Fig. 2.4) (see *Gülen*, 1990).



Figure. 2.4. Measured range in Sr 87/86, Nd 143/144, and ΔPb 207/204 for four Aegean active volcanic arc islands plotted against their positions along the arc; also shown is the crustal thickness variation along the arc. The horizontal distance is without scale. ΔPb 207/204 notation is after Hart (1984). The crustal thickness data are from Makris (1978) (after *Gülen*, 1990).

2.3. METAMORPHISM

2.3.1. Data

There are many more or less detailed studies considering metamorphism in the Aegean (e.g., Hamilton & Strickland, 1840; Erentöz & Ternek, 1968; Phillipson, 1911; Egeran & Yener, 1944; Trikkalinos, 1947; Önay, 1949; Flügel & Metz, 1954; Kaaden & Metz, 1978; Dixon & Ridley, 1987; Schuiling, 1962; Brinkman, 1966; Ketin, 1966; Başarır, 1970, 1975; Dora, 1972, 1975, 1977, 1981; Altınlı, 1973; Dürr, 1975; Altherr et al., 1976; Ben et al., 1976; Dürr et al., 1978; Şengör & Yılmaz, 1981; Öztürk & Koçyiğit, 1983; Lister et al., 1984; Ridley, 1984a,b; Maluski et al., 1987; Avigad & Garfunkel, 1989, 1991; Buick & Holland, 1989, 1991; Candan & Kun, 1989; Kaya et al., 1989; Lister & Davis, 1989; Okay, 1989; İztan & Yazman, 1990; Dora et al., 1990; Okrusch & Bröcker, 1990; Kessel, 1990; Westaway, 1990; Buick, 1991; Seyitoğlu & Scott, 1991, 1992a,b; Avigad et al., 1992; Candan et al., 1992; Paton, 1992; Erdoğan, 1992, 1993; Erdoğan & Güngör, 1992; Avigad, 1993; Dinter & Royden, 1993; Westaway & Kusznir, 1993; Gautier et al., 1993; Baker & Matthews, 1994; Gautier & Brun, 1994; Westaway, 1994; Patzak et al., 1994; Bozkurt et al., 1995; Dora et al., 1995; Genc, 1995; Feenstra, 1996; Katzır et al., 1996; Bozkurt, 1996; Bozkurt et al., 1993, 1995; Bozkurt & Park, 1993, 1994, 1997; Jacobshagen, 1994; Emre & Sözbilir, 1995 and references therein). In Section 2.3.2 brief information is given about the most important of the above have given references.

2.3.2. General Interpretation

By studying metamorphic rocks, many scientists try to analyse the phases of metamorphism to separate the tectonic regimes in the Aegean region especially on the Attic/Cyclades/Menderes Metamorphic Belt (ACMMB).

The Attic/Cycladic Metamorphic Complex in the main land of central western Greece and the Cyclades area and Menderes Metamorphic Complex in southwestern Turkey which stretches as the most important metamorphic belt in the Aegean region (see also *Ridley*, 1984b; Dora et al., 1995; Bozkurt & Park, 1997) (ACMMB). It is parallel to the main geological units, tectonic features and structures, especially the present day subduction zone (Fig. 2.5). It forms large metamorphic culminations within the Alpine Himalayan belt (*Şengör & Yılmaz*, 1981; Okay et al., 1991; Bozkurt & Park, 1997). These culminations take form under overprinted



Figure. 2.5. The Attic-Cycladic-Menderes metamorphic belt, which conforms to the arcuate volcanic arc, is indicated by shaded patterns (from *Bozkurt et al., 1995*). ACM-Attic Cycladic Massif; V-volcanic arc; MM-Menderes Massif.

metamorphism events. The belt in western Turkey is overlayed to the North by the İzmir – Ankara ophiolithic (Neo Tethyan) suture zone (see, *Şengör & Yılmaz, 1981*). To the south in Turkey it is overridden by the Lycian Napless of Taurides (*Graciansky, 1972;* see also *Bozkurt et al, 1995*). The massive pre-Alpine metamorphic and magmatic rocks, from the Early Cenozoic, have been basically subjected to two kind of metamorphic events: first a high-pressure-low-temperature (HP-LT) phase, and then a Barrovian type overprint (*Lister et al., 1984; Dora et al., 1995*). The Barrovian type metamorphism is represented by increasing temperature at the existing pressure (HP/T) and by HT/LP in later stages. Metamorphosed groups of rocks that are of the same or various types, under specific physico-chemical conditions are named as metamorphic facies. The ACMMB pre-Alpine rocks (various types) were all metamorphosed firstly under the same physico-chemical conditions and are represented by blue schist facies (*Ridley, 1984b*). This facies points to HP/LT condition i.e. compressional tectonic regime related to crustal thickening in the Aegean region (e.g., *Dürr et al., 1978; Şengör & Yılmaz, 1981; Lister et al., 1984; Ridley, 1984b; Wijbrans & McDougall, 1988; Avigad & Garfunkel, 1989; Kessel, 1990; Buick, 1991; Feenstra, 1996*). After these

conditions same facies are also seen during the neotectonic regime only along the consumption boundary, south- southwestern edge of the region, although the Aegean region including ACMMB is mainly under an extensional regime that is characterised by HT/LP conditions (*Lister et al., 1984; Feenstra, 1996*). This overprinting phase, which started just after the HP/LT phase is regarded as the main Menderes metamorphism in western Turkey (e.g., *Şengör & Yılmaz, 1981; Dora et al., 1995*).

There are two groups of scientists that have controversial ideas. According to the first group, after the compressional phase that represented blueschist facies, high temperature mediumpressure and low-pressure conditions result from detachment faults that represent high-grade extension (e.g., *Lister et al, 1984; Ridley, 1984b; Seyitoğlu & Scott, 1991, 1992b, Seyitoğlu et al., 1992; Bozkurt & Park, 1993, 1994, 1996, 1997; Verge, 1993; Gautier & Brun, 1994; Jolivet et al., 1994; Dora et al., 1995*). This model is known as a metamorphic core complex of the Cordilleran type (*Lister et al., 1984*). According to the model, this event easily explains the origin of the Early Miocene granodiorite rocks from the granite family in the Menderes Massive. *Lister et al. (1984)* found many similarities between the Cyclades islands and the metamorphic core complexes of the North American Cordillera (*Lister et al., 1984*). In addition, *Bozkurt et al. (1995)* found many similarities between Cyclades and Menderes as metamorphic core complexes. According to the theory, low-angle normal "detachment" faults in the upper crustal layer evolve into major ductile shears at depth (Figs. 2.6., 2.7). Along the



Figure. 2.6. (A) Model of the origin of a metamorphic core complex induced by crustal extension, (B) stages of extension; (C) beginning of crustal up doming; (D) granitoid intrusion (after *Jacobshagen*, 1994).

shear zone, middle-crustal rocks in the lower plate are mylonitized. Further stages of the shear zone include mylonised material dragged out from underneath the detachment faults (Lister et al.. 1984) (Fig. 2.7.). Thinned crust ie. updoming of the mantle is associated with an elevation of thermal flux which might have caused partial melting that leads to granite emplacement (Fig. 2.6., 2.7). On the other hand, the other group (Lüttig & Steffens, 1976; Sengör, 1982; Dumont et al., 1979b; Angelier et al., 1981; Şengör & Yılmaz, 1981; Yılmaz, 1997) claims that extensional features just after blueschist facies are related to further stages of compressional regime. According to this idea, a compressional regime leads to extension that is normal to the compressional direction (e.g., Candan et al., 1992). This compression-related extension leads to HT/LP metamorphism because of the well-known granite emplacement in compression directed normal faults (Table 2.3) (e.g., Becker-Platen, 1970; Benda et al., 1974; Wijbrans & McDougall, 1988; Benda & Meulenkamp, 1990). According to the this idea the neotectonic (N-S extensional) phase in the Aegean region starts after E-W extension related granite emplacement caused contact metamorphism in the country rocks (Dora et al., 1995). Mainly because of these two different ideas different ages are proposed for the beginning of the extensional regime that is ongoing to day in the Aegean region.

Recent studies show that the Gediz and Büyük Menderes grabens are example of huge ductile-brittle deformation and detachment faulting that is located in the central part of the Menderes Massif (western Anatolia) (see *Emre & Sözbilir, 1995*). *Kaya (1982), Emre (1992), Sözbilir & Emre (1996), Emre (1996), Emre & Sözbilir (1995)* study these in detail. *Kaya (1982)* recorded that the Büyük Menderes graben is early Miocene in age while the Gediz graben is Late Miocene in age. *Emre & Sözbilir (1995)* suggest that the Büyük Menderes graben is older than the Gediz graben due to the asymmetric characteristics of the shear zone. *Sözbilir & Emre (1996)* define younger basins as supradetachment basins that are formed above a low-angle normal fault system (detachment fault).

HT- high-temperature metamorphism; HP/LT; high pressure/lowe temperature metamorphism; HT/LP; high-temperature/lowe pressure metamorphism. Extensional phase indicated by light gray, compressional phase by dark gray.

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Structural studies on metamorphic rocks are a good tool for direct solutions. But to increase the resolution of the flow directions in the recent tectonic phases there should be more structural study on such detachment zones. The starting age of the neotectonic regime in the Aegean region still subject to debate.



Figure. 2.7. Classic model of paired metamorphic belt, showing mechanism for subsequent exposure of metamorphic rocks-crustal shear zones that evolve upward into low-angle normal faults, a: Position of HP/LT metamorphic rocks that eventually will be exposed on Crete (cross-hatched), and position of HT metamorphic dome that eventually will be exposed on Naxsos. These metamorphic rocks will be dragged out from under upper crustal nonmetamorphic rocks (stippled), g: Crustal extension as a result of operation of these major movement zones. Crustal thickness is based on deep refraction profiles (*Makris, 1982*) (after *Lister et al., 1984*).

Dominantly N-NE lineation patterns exist in metamorphic rocks on many islands that indicate the existence of a major shallow-dipping shear zone in the southern Cyclades e.g. Naxos and Ios (*Jansen, 1973; Lister et al, 1984; Faure & Bonneau, 1988; Gautier et al., 1990; Buick, 1991; Jansen, 1973; Robert, 1982; Gautier & Brun, 1994; Jolivet et al., 1994*) (see e.g., Fig. 2.8.). Detail structural studies of *Jolivet et al. (1994)* on the metamorphic rocks of the Cyclades region show a kinematic situation in the region. They observed that clockwise rotation is added to N-S extension to accommodate the NE-SW direction of ductile flow (Fig. 2.9). The early strain field shown in the metamorphic rocks, which represents deeper parts of



Figure. 2.8. Summary of crustal features in the Cyclades area (after *Gautier and Brun, 1994*). 1- ductile shearsense data within Lower Unit metamorphic rocks and younger Miocene intrusions; each arrow represents the mean of measurements on several sites; 2, 3, 4- faults which have been active at least during Pliocene-Quaternary time; 2- major normal faults; 3- second-order, commonly antithetic normal faults; 4- strike-slip and/or transform faults (see for more detail *Gautier and Brun, 1994*).

the crust, has been deformed in recent times in such a way that, in a first approach, it fits a same flow field (see *Jolivet et al., 1994*). *Bozkurt et al. (1995*) also investigated lineation patters that dip consistently towards the southwest away from centre of the core complex of the southern Menderes Massive. On the other hand, *Jolivet et al. (1994)* investigated the lineation pattens that dip consistently towards the north away from the core complexes to the North around the Cyclades islands. The observations from these two sites, from south and north respectively, are consistent with the core complex theory (Fig. 2.7). *Jacobshagen (1994)* on the other hand pointed out that several of these shear zones could have originated as overthrusts during nappe stacking.



Figure. 2.9. Synthetic diagram of the brittle-ductile relations in the Aegean. Lines with arrows represent shear trajectories in the exhumed metamorphic domains. A gradation of darker shading shows the gradient of high temperature metamorphism from green schist to migmatites from Evvoia to Naxsos which correspond to differential exhumation of deeper and deeper portions of the crust. The window opened in the region of tilted blocks the sense of tilt and the sense of shear at depth (after *Jolivet et al., 1994*).

2.4. PALEOMAGNETIC MEASUREMENTS

2.4.1. Data

Kondopoulou (1985) published some paleomagnetic results in the central Aegean region. Kissel & Laj (1988) have postulated important recent rotations for the whole Aegean area using all the available paleomagnetic data. The other data in the region have been obtained from Middle Miocene to Pliocene sedimentary and volcanic formations by Kissel et al. (1989). They reported data from 75 sites in the central part of the Aegean Sea and its eastern and western boundaries (Volos region, Evvoia, Skyros, Lesbos and the İzmir area) and from southern Anatolia (Antalya region). These data will be analysed together with those from northwestern Greece and with the results from the northeastern Aegean and western Turkey reported by some other authors. Taymaz et al. (1991) critically reviewed paleomagnetic sin the Aegean region and published a measured paleomagnetic pattern in Europe and Mrica. They used inclination data in the region for the first time. Information about other local studies is given below.

The South Aegean Arc:

Previous studies along the South Aegean Island Arc from the Late-Miocene marine clay sequences are presented by *Valet & Laj (1981)*, *Valente et al. (1982)* and *Laj et al. (1982)*. Along the external South Aegean Island Arc as well as in the Oligocene to Middle Miocene Ionian flysch of northwestern Greece, measurements have been made on the Mio-Pliocene sedimentary series by *Kissel et al. (1984, 1985)*. Paleomagnetic results from magmatic rock (2.5-1 My) samples from Melos island in the South Aegean back-arc area have been published by *Kondopoulou & Pavlides (1990)*. Two Late Miocene sections at Potamida and Kotsiana in western Crete have been resample by *Laj et al. (1996)*. At the eastern edge of the arc paleomagnetic study was carried out in Paleocene, Eocene and Lower-Miocene sedimentary formations of the western Taurides belt east of the Isparta (*Kissel et al., 1993*). *Horner & Freeman (1983)* studied the western edge of the South Aegean Arc (SAA) in Greece. They used 2500 paleomagnetic samples from 130 sites of the Early Jurassic to Late

Eocene carbonate sequence from the Ionian zone. For the same area *Kissel et al. (1983)* presented data from Cenozoic Ionian flysch sections. *Kissel et al. (1985)* obtained lower Miocene orientations of Ionian structures. *Mauritsch et al. (1991)* have reported Neogene rotations in the Ionian zone of southern Albania. The Neogene rotation was tentatively interpreted by *Muttoni et al. (1995)* in Albania. A paleomagnetic study of 750 samples obtained from 55 late Eocene to middle Pliocene sedimentary sites in central Albania and north of Greece was made by *Speranza et al. (1995)*. Paleomagnetic studies of older Mesozoic rocks have focused on western and northern Greece (*Marton et al., 1990, Lauer & Kondopoulou, 1991; Edel et al., 1992)*. In northwestern Greece, paleodeclination data have been obtained from Eocene and Oligocene formations by *Speranza et al. (1992)*. Magnetobiostratigraphic data are presented from Early/Middle Triassic rocks in northern Albania by *Muttoni et al. (1996)*.

Eastern Part of the Aegean Region:

Previously Gregor & Zijderveld (1964), Sanver (1968), Van der Voo (1968), Orbay (1979), and Orbay & Bayburdi (1979) presented paleomagnetic data of Triassic and older rocks from the eastern part of the Aegean region. Lauer (1984), using all the available paleomagnetic results gave tentative reconstructions for the past positions of various parts of Turkey in Triassic times. He used paleomagnetic results Turkey and Cyprus, carried out between 1973 and 1978, with the data of Gregor & Zijderveld (1964), Sanver (1968), Van der Voo (1968), Orbay (1979), and Orbay & Bayburdi (1979). Pe-Piper & Piper (1977) made determinations on volcanic rocks over sixty paleomagnetic polarity from Lesbos. From the island of Limnos, Kondopoulou & Lauer (1984) report variation of declination in volcanic rocks of 17 to 22 My. In northwestern Anatolia from samples (33-28 My old) of Volcanic rocks they reported some declination values. Kissel et al. (1987) reported other paleomagnetic data from the northeastern Aegean region. Paleomagnetic directions obtained from Miocene rocks of western Turkey (Kissel & Laj, 1988) are republished and interpreted by Zanchi et al. (1990). In the area paleomagnetic directions of volcanic rocks have been investigated by Orbay et al, (1993, 1995, 1996). Orbay et al. (1993, 1995) reveals the paleomagnetic results related to the extension of the Gulfs of Saroz and Edremit. Around Ganos in the north of the area, block rotations were observed from paleomagnetic measurements by Tapırdamaz and Yaltırak (1995). Recently, some paleomagnetic samples collected in Çanakkale-Foça and Bergama from 47 sites (eight of them Oligocene, 35 of them early Miocene, 4 of them Late Miocene) by *İşseven (1995) (see also İşseven et al., 1995b).* More recently, *Orbay et al. (1998)* obtained paleomagnetic data from the Pliocene or Late Miocene samples from western Turkey (between Balıkesir-Demirci line and Fetbiye-Burdur) on a large scale. In total, they have obtained 243 oriented drilled core samples from 28 sites in and around Balıkesir, Akhisar, Kula, Simav, Gediz and Tavşanlı. These data were evaluated together with the earlier data of western Turkey, which include 23 sites.

Western Part of the Aegean Region:

Simeakis et al. (1989) obtain Late Miocene-present-day declinations from the North Aegean. Trough (NAT). Few data exist from Mesozoic sequences of eastern central Greece (e.g., *Turnell, 1988; Morris, 1995*). Morris & Anderson (1996) study the Middle-Late Miocene intrusive rocks of the Cycladic Massif. This contribution provides the first paleomagnetic results from this area.

All the available paleomagnetic measurement results in the Aegean and surrounding area are shown in Table. 2.4.

2.4.2. General Interpretation

Important evidence that block rotations and relative N-S displacements have occurred in the Aegean region comes from paleomagnetic declination and inclination, respectively. Paleomagnetic data of Neogene sediments and volcanics have been used to reconstruct the paleogeographies (e.g., *Kissel & Laj, 1988;* see also *Laj et al., 1982; Kissel et al., 1989*). Paleomagnetic data also have been used as direct evidence in support of various seismological models for the recent deformation.

By considering paleomagnetic data *Kissel & Laj (1988)* reveal the present curvature of the South Aegean Trench by opposite post-early Miocene rotations at the two terminations of the consuming boundary (see for detail *Speranza et al., 1995; Mauritsch et al., 1995, 1991;*

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Table. 2.4. Paleomagnetic results in the Aegean region. Clockwise rotation indicated by light gray; counterclockwise rotations indicated by gray; no-rotation indicated by dark gray.

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Muttoni et al., 1996). This interesting proposal suggests, by considering paleomagnetic data that the Lower-Miocene arc was almost rectilinear with an E-W trend and that its curvature has been acquired tectonically in two major phases (see also *Kissel et al., 1993; Speranza et al., 1995*). During the Middle Miocene (13-30 My) a first phase of deformation is characterised by rotations (20-25°) occurring at the two terminations of the arc; clockwise in the west, counterclockwise in the east (Fig. 2.10) (*Kissel et al., 1984*). There was no rotation



Figure. 2. 10. Schematic map showing the geographical extension and the timing of the two rotational phases documented by the paleomagnetic studies (after *Kissel and Laj, 1988*). Dotted symbols- Middle Miocene rotations: shaded symbols- Pilio-Quaternary rotation.

in the Ionian islands during the period 12-5 My (*Kissel et al., 1985*). A second phase of rotation (25°) with clockwise direction occurring in the last 5 My about a pole situated in the southern Adriatic Sea has affected only the northwestern part (Fig. 2.10) (*Laj et al., 1982; Kissel et al., 1984; Kissel & Laj, 1988* and *Kissel et al., 1989*). This rotation started about 5 My ago and has continued since then at an average rate of about 5°/My (*Laj et al., 1982; see also Kissel et al., 1993*). A total of about 45° of clockwise rotation has been undergone by the western termination of the arc since Early Miocene times on the internal part of the arc. To the E- NE of Greece results also indicate clockwise rotation similar to the Ionian Zone. Evvoia and Skyros have rotated clockwise by about 48° and 26°, respectively. But the timing of the rotation is uncertain (*Kissel & Laj, 1988; Kissel et al., 1989*). *Kissel & Laj (1988) & Kissel et al. (1989)* suggested that it probably occurred in the last 5 My, but could have occurred over 15 My. Recently *Morris (1995)* deduced a lower clockwise rotation angle of 15° from young lacustrine sediments from the same area of Evvoia. This suggests that at least

15° of the 48° rotation of Evvoia occurred in the last phase. Clockwise rotations of 64°, which are higher than the total of 48°, are found in Mykonos (*Morris & Anderson, 1996*) from Middle and Late Miocene rocks. Results from northern Greece with other observations from the eastern Aegean region suggest that the whole mass beneath Greece has rotated clockwise towards the South Aegean Trench (Fig. 2.11).



Figure. 2.11. Plot of paleomagnetic vectors in the Aegean region (after *Jolivet et al., 1994*; see *Kissel and Laj, 1988*). Small numbers next to the gray arrows in the center of the figure are the ages of sites in My.

This region could have rotated in the same sense, with a similar magnitude and simultaneously with the arc. During these curving phases, the back of the arc region extended and major grabens such as the Corinth graben were constructed (*Kissel et al., 1993*). On the other hand paleomagnetic results (*Laj et al., 1982; Kissel et al., 1984; Kissel & Laj, 1988*) show that the central and eastern parts of the arc (Crete and Rhodes) have not undergone significant rotation since the Tortonian-Messinian stage (second phase) (see also *Kissel et al., 1993*).

Results of *Kissel et al. (1993)* suggest that the Isparta angle which represents the eastern edge of the arc would result from opposite rotations of the two branches of Isparta angle: first a late Eocene-Oligocene clockwise rotation of the Akseki-Beyşehir Taurides (trending NW-SE)

initiating the Tauride arc, and then counterclockwise rotation of the Lycian Taurides (trending NE-SW), probably during Middle Miocene times (*Kissel et al., 1993*).

To the northeast in western Turkey the situation is very complicated (see *Taymaz et al.*, 1991). In the İzmir region, the Karaburun peninsula and in the island of Lesbos significant counterclockwise, clockwise or null rotations of several blocks have taken place during the



Figure. 2.12. The available paleomagnetic results in western Turkish mainland (after *İşseven, 1995*).

neotectonic extensional regime (Figs. 2.12, 2.13, 2.14) (*Kissel & Laj, 1988; Orbay et al., 1993; İşseven, 1995; Zanchi et al., 1990*). Published paleomagnetic results from western Anatolia are too scarce for the considered epoch, so that they do not allow any definitive conclusion (see *Kissel et al., 1989*). *Taymaz et al. (1991)* suggested the possibility that the counterclockwise rotations are related to the rotation of the big strike faults whereas the clockwise rotations are seen in some smaller blocks caught up in the right-lateral shear between them (see also *Mercier et al., 1991; Nicholson et al., 1986*). The lack of data is also apparent in the central Aegean (*Kissel et al., 1989*). *Kissel et al. (1987*) reported that the paleomagnetic data between the North Anatolian Fault Zone (NAF) and the Alaşehir fault demonstrate significant clockwise and counterclockwise rotations of several blocks, which

took place during the neotectonic extensional regime (Kissel et al., 1987). They conclude that the brittle upper part of the lithosphere does not everywhere follow the motions of its lower ductile part (see also Zanchi et al., 1990). Zanchi et al. (1990) found out that in İzmir area extended from Urla in the south to Edremit in the north and from the coast to Akhisar has been affected by counterclockwise rotation of 30°±13 since 7 My. According to results of Kissel et al. (1987), this rotation taking placed during Tertiary time. *İşseven (1995)* who took together all the available results with his results (Orbay et al., 1993) in Biga Peninsula concluded that Biga Peninsula has been rotated in counterclockwise direction since Neogene. İşseven (1995) suggested that, during counterclockwise rotation of NW Turkey (Orbay et al., 1993; İsseven, 1995), south of Edremit Bay rotated faster than the northern part, as a result of this Edremit Bay was opened (Zanchi et al., 1990; Kissel et al., 1987; Kissel & Laj, 1988). But in Lesbos just south of the eastern Edremit trough there is no rotation in Tertiary time (Zanchi et al., 1990; Kissel et al., 1987). Paleomagnetic data in this eastern region is ambiguous, but consistent with very small or no rotations in the northern part and possibly counterclockwise rotations, relative to Europe, in the south (Taymaz et al., 1991). Recent study of Orbay et al. (1998) in western Turkey show that western and eastern parts of Balıkesir-Demirci line has shown counterclockwise and clockwise rotations, respectively (Fig. 2.15). All remnant magnetisation directions of Pliocene aged rocks obtained from around Gördes show 44° counterclockwise rotations (Orbay et al., 1998). 200.000, 300.000 years aged rocks obtained from Kula Region have also show counterclockwise rotations. This indicates that region has been rotating counterclockwise direction today as detected by GPS results (Barka & Reileneger, 1997). Sites of Late Oligocene age in northwestern part of the Turkey also show a counterclockwise rotation 20° to 30° (*Isseven et al., 1995*). This type of rotation (25°-15°) continued in Early and Middle Miocene (*İşseven et al.*, 1995).

On the other hand, results of paleomagnetic inclination data that studied by *Beck and* Schermer (1994) show that, the Aegean moved northward with respect to both continents. So



Figure. 2.13. A summary of the mean paleomagnetic declinations in the western part of Turkey (after *Jackson et al., 1992*). Arrows show declinations at sample sites; arrows in circles are the mean directions within roughly coherent areas outlined crudely with dotted lines. The coastlines are stippled; other lines are faults.



Figure. 2.14. Paleomagnetic results obtained from 38 sites (after Zanchi et al., 1990).

they suggested that the entire study area has undergone a northward drift of over 1000 km in the Middle Miocene.

The interpretations of these measurements that are taken place in the Aegean region are not straightforward because of the limited data. Around Aegean coasts and islands there are many paleomagnetic studies that not enough to determine the rotations exactly. Paleomagnetic data especially from the northern Aegean is more sparse and inconclusive yet.



Figure 2.15. Sampling sites and mean remanent magnetization directions of the same aged samples (after Orbay et al., 1998).

2.5. GEOMORPHOLOGICAL STUDIES

2.5.1. Data

Bathymetry

Previous bathymetry data for the Sea of Marmara exist in the Musee Oceanographique de Monaco (1960). For the eastern Mediterranean, previous data sheets were published by U.S. and U.K. Hydrographic offices (Emery et al., 1966). During the summer of 1968, the U.S. Naval Oceanographic Office conducted a detailed bathymetric survey of the Aegean Sea. This study, combined with data from other surveys (Watson & Johnson, 1969; Goncharov & Mikhailov, 1963), has resulted in a new bathymetric chart by the U.S. Hydrographic Office (Maley & Johnson, 1971). Maley & Johnson (1971) used high sensitivity "echo sounding" profiles that reflected the asymmetry of the topography better in the Aegean. Allan & Morelli (1971) published CONRAD radar data (1963) for the central Aegean Sea. Allan & Morelli (1971) and Heezen et al. (1970) published a small-scale panoramic bathymetry map. The SACLANT ASW Research Center in La Spezia and the Observatory Geofisico Sperimentale (1961-1965) (Allan & Morelli, 1971) surveyed bathymetry (1:750,000) of the Aegean and western part of the eastern Mediterranean. The bathymetric chart of the area south of Crete is based on soundings collected by the British Hydrographic Office up to until 1972, and those collected during 1972 and 1974 on R.R.S. Shackleton (Jongsma, 1975, 1977). Another bathymetric map of the Mediterranean (No. 310) published by the U.S. Defence Mapping Agency Hydrographic Centre, Washington, has been described by Carter et al. (1972). After that Morelli et al. (1975) surveyed the Aegean in some detail and a better bathymetric map has been published. In 1977 - 1978, within the framework of the HEAT (The South Aegean Arc and Trench) program by the R.V. "Jean Charcot", a multi-narrow-beam-echo-sounder Sea-Beam (Renard & Allenou, 1979) was used to map four zones along the South Aegean Trench. As a part of this program, high-resolution bathymetric maps of four key areas (Fig. 2.16) were made at a scale of 1:20,000 (Le Pichon et al., 1979). Le Pichon et al. (1979) published small portions of these bathymetric maps. They are published fully in the paper of Huchon et al. (1982). Jongsma (1975) used seismic profiles to show detailed morphology of the Cretan Sea. The Intergovernmental Oceanographic Commission (IOC) of UNESCO



Figure. 2.16. The four boxes are the Scabeam survey areas mapped by R. V. "Jean Charcot" during HEAT cruise. The dots with numbers are locations of DSDP drilling sites. The arrows are the regional slip vectors of the Mediterranean sea floor with respect to the Hellenic arc (after *Le Pichon et al., 1979*).

(IBCM, 1981) published a 1:1,000,000 bathymetric map of the Mediterranean. *Brooks & Ferentinos (1980)* and *Ferentinos et al. (1981)* have studied the bathymetry and shallow structure of North Aegean Trough (NAT) with single channel reflection seismic surveys and similar acoustic techniques. For the Sea of Marmara there are bathymetry data in Hydrographisches Institut (1987). In 1989 (IBCM, 1989) IOC of UNESCO was issued, as an overprint to the International Bathymetric Chart of the Mediterranean (IBCM, 1981) (see Morelli, 1990; Truffert et al., 1993). TCB SHOD (Türkiye Cumhuriyeti Bahriyesi Seyir Hidrografi ve Oşenografi Dairesi; the Turkish Navy Hydrography Service) and T.C. Dz.K.K. (Türkiye Cumhuriyeti Deniz Kuvvetleri Komutanlığı; Turkish Commander Army Navy 1990, 1993, 1994a, 1994b) obtained 5 m grid interval bathymetry data from the coasts of Turkey (*Genç et al., 1996b; Güneysu, 1998). Smith et al. (1995)* published bathymetric data from the Marmara Sea that have been prepared by TCB SHOD. *Wong et al. (1995)* published 50 m interval data for the Marmara Sea. They modified bathymetry from Musee Oceanographique de Monaco (1960) and Hydrographisches Institut (1987) using their data. *Genç et al. (1996a,b)* digitised the data of coastal bathymetric contours of Turkey from TCB SHOD.

They combined these data with data of IBCM, the bathymetric data of the Marmara Sea from seismic profiles and topographic data of western Anatolia from MTA (1:25,000). *Woodside (1995)* published a detailed bathymetric map for the Anaximander Mountains, which lie at the junction between the South Aegean and Cybrus arcs. There is no bathymetric map of the Aegean and surrounding areas drawn from the completion of various data sources.

Topography

A geomorphplogical map of Turkey (1:1,000,000) has been published by the Turkish General Directorate of Mineral Research and Exploration (MTA, 1991). Global topographic data with 5 minute grid interval resolution are available from NGDS. *Genç et al. (1996b)* collected data from various sources and prepared topographic maps with 2 km grid interval values for western Turkey. To see the morphologic features they showed the relief map drawn from these data illuminated from various directions.

Remote Sensing

Foose (1985) made a satellite survey of the Mediterranenan (Fig. 2.17). Enhanced LANDSAT-5 Thematic Mapper (ITM) images, covering Central Macedonia, in northern Greece, were evaluated digitally for the purpose of mapping various morphostructural and geological features by *Astaras & Soullakel (1990)*. *Angelier et al. (1982)* presented fault traces from aerial images. They compare them with Greek geological maps. Almost all geomorphologists have used remote sensing results.

Submersible Studies

In 1979, a field study using the 3000 m submersible "Cyana" was conducted in the South Aegean Trench system (see *Le Pichon et al.*, 1979, 1980, 1981, 1982) (Fig. 2.16). The South Aegean Trench is the first subduction zone in which both Sea Beam and submersible technologies have been used simultaneously.



Figure. 2.17. lineament map of the mainlands in the Aegean region (after Foose, 1985).

2.5.2. General Interpretation

The Direction of the axis of maximum shortening and extension could be determined from Sea-Beam data, submersible dives, field exploration and geological remote sensing (photogeology) satellite imagery. Lineament orientation, shape and length provide important basic information about the direction and nature of the stress field. Visual angle, artificial effects, the Sun's illumination and light type are important parameters of remote sensing (*Foose, 1985*). For tectonic purposes the light angle is taken low in relief maps. Lineaments and their identification involves the use of raised plastic relief maps, commercially produced from existing bathymetric and topographic maps and aerial photographs (see also *Foose, 1985*).

In the Aegean Sea floor, the morphology and bathymetry are almost completely controlled by the faults only where they are active, because the sedimentation rate is high (*Angelier et al., 1982*). But footwalls under water are protected for a long time because wear and tear does not take place under water. In the Aegean Basin there are some very well-developed preferred orientations of lineaments that reflect radial tensional conditions in the crust (Figs. 2.18) (e.g., *Kronberg & Gunther, 1978*).



Figure. 2.18. Relief map of the Aegean and surrounding area (after Genç et al., 1996).

The dominance of normal faults is also obvious in satellite photographs all over the Aegean region (*McKenzie*, 1978). Thirteen percent of all straight lineaments lie within N-N50W

orientation, suggesting a strong system of normal faults in Greece (*Foos*, 1985). Along the coast of Albania 68 per cent of all wavy linements are in the same direction, which suggests strongly that there was a significant NE-SW compressional stress field. Visual examination of satellite images shows normal faults sharply truncating thrusts in this region (*Foos*, 1985; see also *McKenzie*, 1978).

In Crete thirty-two percent of all lineaments and many wavy lineaments that are visible on Landsat photographs define a strongly preferred orientation of thrusting systems that is parallel to the northern coast line (*Foos*, 1985). But it is necessary to check in the field. In particular, some normal faults are almost certainly active, cutting the alluvial plains and the hilly regions, but are not visible on the photographs (e.g., *McKenzie*, 1978).

The fault segmentation and variations in hanging-wall lithology (*Roberts and Jackson*, 1991) control the drainage system in land areas of the Aegean region (*Taymaz et al., 1991*). Over the Menderes Massive the rivers have eroded the surface more vertically than horizontally (*Arpat & Bingöl, 1969*). Some of these rivers run in very narrow valleys having a depth of approximately 500-600 m (*Arpat & Bingöl, 1969*). Considering these findings, *Arpat & Bingöl (1969)* suggested that the Menderes massif has been uplifted as a whole.

The morphology of the sea floor also indicates that the crust type is continental. *Arpat* (1976) pointed out that the Aegean Sea does not have the morphological characteristics of an oceanic crust, especially near coastal areas (Fig, 2.18).

2.6. FIELD WORK ON FAULTS

2.6.1. Data

Geological History of Faulting

A description of sub-phase stress fields of the last extensional tectonic phase can be made by means of fault set analyses (e.g., Angelier, 1977, 1978, 1979; Mercier et al., 1979, 1987; Angelier et al., 1981, 1982; Barrier & Angelier, 1982; Lyberis et al., 1982). 4,770 measurements of faults were performed by Angelier (1978) in the southern Aegean region, of which most are on Crete and surrounding islands. After that Angelier et al. (1982) mapped approximately 4,000 faults around the southern Aegean on land and sea floor, of which 3,700 are reliable (Angelier et al., 1982) (Fig. 2.19, 2.20). They combine their new data with the field data of Angelier (1978). They also combine air photograph, satellite imaginary and sea



Figure. 2.19. (A) General map of main fault lines of the South Aegean Arc, compiled from various sources (see Angelier et al., 1982). Dashed lines-axes of South Aegean trench complex. Depths of more than 800m in the Cretan basin- dotted pattern. (B) Location map (after Angelier et al., 1982). Black- shallower than -800 km, white- deeper than -800.

beam data with these data (Fig. 2.19). They used them to draw stress trajectories (fields) for different sub-phases of the last tectonic phase. After that they made deformation reconstruction models for each sub-phase. *Mercier et al. (1989, 1991)* reviewed the structural data from the North Aegean region. The principal tool of their analysis is the construction of

an average regional stress tensor from measurements of slip on numerous faults of different orientation (*Carey*, 1979).



Figure. 2.20. Result of tectonic analysis of fault mechanisms in the central-southern Acgean region (after *Angelier et al.*, 1982). Sticks-strikes of the horizontal or sub horizontal minimum principle stress σ_3 (directions of extension). (A) Pliocene and Early Quaternary. (B) on the basis of regional tectonic consistency. All mechanisms purely extensional.

Seismotectonics

In the western Turkish mainland, Ketin (1969) investigated the relation between tectonic features and earthquakes. He analysed the active tectonic features of Turkey. Arpat & Bingöl (1969) studied the Alaşehir earthquake surface break and the kinematics of grabens of western Turkey and tectonism of the adjacent region in detail. Previously Pinar (1943) mapped the active faults around the Marmara Sea. Ambraseys (1970) studied the North Anatolian Fault (NAF) zone in detail. Papazachos & Comninakis (1971) and Mulder (1973) studied on Crete and mapped the stress field by field geology techniques. McKenzie (1972, 1978) compared seismicity and active fault studies in the field all over the Aegean region. Crampin & Üçer (1975) made a field study in northwestern Turkey. Dewey & Şengör (1979), Barka & Hancock (1984) and Koçyiğit (1990) made field studies on NAF zone to find the first occurrence of this fault. Barka & Kandinsky-Cade (1988) have reviewed and described the geometry of Turkish strike-slip faults (Fig. 2.21). A recent active fault map of Turkey



Figure. 2.21. Active fault segments in the northwest Turkey (after Barka and Kandinky-Cade, 1988).

(1:1.000.000) for land areas was prepared in 1987 (*Şaroğlu et al., 1997*) and published in 1992 by MTA. An extensive trenching effort was made along the İznik-Mekece section of the middle strand of the NAF by *Ikeda et al. (1989, 1991)* and *Barka (1993)*. *Ambraseys & Jackson (1990)* determined the location, magnitude, and likely style of faulting for all earthquakes with Ms>5.8 of central Greece between 1890 and 1988, using macroseismic and

instrumental data. Armijo et al. (1996) made a detailed field investigation of the Corinth rift. Caputo (1990) made a field study of the NAF. During the study new archeological data were discovered. Barka (1997) reviewed the existing fieldwork in the Marmara region. Greber (1997a,b) studied stratigraphic evolution and tectonics in the east Marmara Sea. In the same region, field analyses were carried out recently by Zanchi et al. (1993). There are many other regional and local field studies in the Aegean region (e.g., Ateş & Tabban, 1976; Ambraseys & Tchalenko, 1970, Ketin & Roesli, 1953), which could not reached.

In some cases, earthquakes have produced impressive surface ruptures several kilometers long. Such structures give important information on the seismotectonic characteristics of the region. Among the surface breaks analysis are the 1912 Saros earthquake (*Ambraseys & Finkel, 1987*), 1928.04.14 (*Richter, 1958*), 1928.04.18 (*Richter, 1958*), 1930.03.28 (*Ambraseys & Tchalenko, 1972*), 1943.06.20 (*Fouche & Pinar, 1943*), 1953 Yenice-Gönen earthquake (*Ketin & Roesli, 1954; Diligan and Hagiwara, 1955*), 1954.04.30 (*Ambraseys, 1975*), 1963.07.26 (*Ambraseys, 1975*), 1963.09.18 (*Ketin, 1966*), 1964.10.06 (*Ketin, 1966*), 1966.10.29 (*Ambraseys, 1975*), 1967.07.22 (*Ambraseys & Zatopek, 1969*), 1967.11.30 (*Sulstarova & Kociaj, 1969; Arsovsky, 1970*), 1969.03.28 Alaşehir earthquake (*Arpat & Bingöl, 1969; Ambraseys & Tchalenko, 1972; Erinç et al., 1971*), 1970.03.28 Gediz earthquake (*Ambraseys & Tchalenko, 1972*), 1971.05.12 Burdur earthquake (*Ambraseys & Tchalenko, 1972*), 1971.05.12 Burdur earthquake (*Ambraseys & Tchalenko, 1972*), 1971.05.12 Burdur earthquake (*Ambraseys & Tchalenko, 1972*), 1971.05.12 Burdur earthquake (*Ambraseys & Tchalenko, 1972*; *Erinç et al., 1971*), 1986 Kalamata earthquakes' (*Lyon-Cean et al., 1988*). *Barka & Kandinsky-Cade (1988*) mapped the active fault segments in northwestern Turkey in detail (Fig. 2.21). Barka & Reilinger (1997) reviewed the earthquake ruptures (1800-1995) in western Turkey and surrounding region (Fig. 2.22).

2.6.2. General Interpretation

In some part of the region a significant part of the deformation occurs aseismically (Fig. 2.26). For this reason seismicity does not accommodate the total predicted deformation (e.g., *Pondrelli et al., 1995*). One can recognise probable aseismic deformation by field, study. In addition, active structures have been effectively aseismic for only the last hundred years. In these cases also, field studies on faults are necessary. It is probable that the maximum length of fault segments restricts the maximum magnitude. The length appears to be 15-20 km (*Ambraseys & Jackson, 1990*). Reliable estimates of scalar moment can be computed from

historical catalogues to try to evaluate motions over a longer time interval (e.g., Jackson & McKenzie, 1988; Pondrelli et al., 1995).



Figure. 2.22. Distribution of earthquake ruptures in the Anatolian region between 1800-1995 (after Barka and Reilinger, 1997).

Studies of the kinematics of faults that have been active during the latest extensional phase of the Aegean region offer a detailed view of stress fields. Such structures have given important information on the seismotectonic characteristics of the region at a specific time. *Angelier (1978, 1977), Mercier et al. (1972, 1987)* have shown that the state of stress has changed since the well-known extensional regime of the lower Pliocene time. They also showed that the deformation history of this stage could be divided into sub-phases. Late Miocene and Plio-Quaternary tectonics of the Aegean are poly and complicated; they include both extensional and compressional events (*Angelier, 1978*). In the internal domain, neotectonics appear to be characterized by an alternation of long-lived extensional periods and short-lived compressional events (*Mercier et al., 1987*). *Papzachos & Comninakis*

(1971) and *Mulder* (1973) studied Crete and mapped the ongoing compressional stress field using field geology techniques.

Normal faulting is vigorous in regions of western Turkey, Bulgaria, Greece and Albania. The main dip-slip fault and grabens that are active in Turkey, are: the area between İznik-Bandırma, Adapazarı-Düzce - Hendek depressions, İznik Lake, Sapanca Lake, central part of the Sea of Marmara, gulf of Sarof, Edremit, İzmit, Gemlik and Kerme, the flanks of valleys of Gediz (Alaşehir) and Büyük and Küçük Menderes, Simav, Bergama grabens, Burdur Lakes etc. (*Ketin, 1969, Arpat & Bingöl, 1969*). There are also many of smaller dimensions of dip-slip faults all over Turkey (*Ketin, 1969*). Previously *Arpat & Bingöl (1969)* found that western Turkey was covered by listric faults, whose dip angle decreases with depth. In these grabens the sequences' deep angles decrease with decreasing age (*see also McKenzie, 1972*).

If both focal mechanism solutions and surface breaks are available for the same shock, the ambiguity between the fault and auxiliary plane can be resolved, and hence the slip vector can be determined (see *McKenzie*, 1972). For this reason, detailed maps of surface breaks of large earthquakes are extremely important, but, unfortunately, few such reports exist (*McKenzie*, 1978).

2.7. SHALLOW REFLECTION PROFILES

2.7.1. Data

Mediterranean

The first measurements in the East Mediterranean were obtained by H.M.S. Challenger in 1952 and were interpreted by *Gaskell & Swallow (1953)* and *Gaskell et al. (1953, 1958)*. Long Flexotir seismic profiles in which good penetration was obtained have shown the thickness of the sedimentary sequence in the eastern Mediterranean from Africa to just south of Milos (Profile Kaita) (*Sancho et al., 1973*). The reflection seismic profiling (sounding) was done during 3 marine geophysical cruises undertaken by Cambridge University, U.K., and the Bundesanstalt für Bodenforschung, Hannover, W. Germany. The Osservatorio Geofisico Sperimentale (OGS) shot a vertical reflection seismic line (MS33) off Trieste in 1971 (*Finetti, 1976, 1982*). This seismic line crosses the Sirte abyssal plain from SW to NE, the deformation front, the western Mediterranean Ridge and the South Matapan trench (see also *Lallemant et al., 1994*). The STREAMERS project shot a marine vertical seismic reflection profile ION- 7 with a powerful air gun source running from SW to NE for 180 km from the deep Ionian basin into the western Gulf of Patras, augmented with a few wide-angle seismometer stations on land (*Hirn et al., 1996*).

Aegean

In the South Aegean Trough (SAT) continuous seismic reflection profiling was first carried out in 1959 (see *Hersey*, 1965) to delineate sedimentary basins and pounding effects, particularly south of the South Aegean Arc (SAA) and in the Tyrrhenian and Ionian Seas. Earlier seismic reflection work in the southern Aegean (OSS Oceanographer, 1967) has been published by *Watson & Johnson (1969)*, *Ryan et al. (1969)* and *Wong & Zarudzki (1969)*. Some other previous efforts to obtain information on the sedimentary structure of the area were made by *Ryan et al. (1969)* and *Wong et al. (1971)*. In November 1972, R.R.S. Shackleton ran 200 nautical miles of air gun profiles in the SAT in conjunction with a Heat Flow program (*Jongsma, 1975*). In southern Crete seismic reflection data were collected and

published by *Woodside (1975)*. Single channel data along several seismic profiles were collected south and SE of the Crete (*Jongsma, 1977; Jongsma et al., 1983, Jongsma, 1987*). In the Aegean region the Institute of Geophysics of NASA (1981) studied some 20 seismic reflection profiles and two refraction profiles. The study of *Martin (1987)* represents available seismic lines in the Aegean and led to a map of offshore Cenozoic faults inside the basins (see also *Mascle & Martin, 1990*) (Fig. 2.23, 2.24). Multi-channel seismic reflection data were



Figure. 2.23. Location of the seismic reflection profiles (After *Martin, 1987; Mascle and Martin, 1990*). Heavy lines indicate multichannel seismic data (MCS); light lines indicate single channel seismic data; stippled areas are where detailed MCS surveys have been conducted.

acquired from the South Aegean Trenches and the eastern Mediterranean Sea during the MSC Prismed survey (March 1993) (*Chaumillon & Mascle, 1995; Chaumillon et al., 1996*). For the region around the Anaximander Mountains at the junction between the South Aegean and Cyprus arcs, *Woodside (1995)* published a bottom reflectivity map. *Eryılmaz (1996)* also studied the basin structures in the Aegean Sea using shallow seismic data.

Several Local Studies

Marathon Oil (1975) provided a N-S trending seismic reflection profile in the Marmara Sea. Several short high-resolution sub-bottom profiles showing neotectonic offsets near the Peloponnesus have been published and interpreted by *Stanley (1974)*. The sedimentary cover, particularly of the Thermaikos, has been studied in connection with oil exploration by multi-



Figure. 2.24. General structural sketch of the Aegean Sea as deduced from seismic reflection study (*Mascle and Martin, 1990*; see also *Martin, 1987*).

channel reflection seismic profiles (Lalechos & Savoyat, 1977). In the North Aegean, Jean Charcot 1972 obtained 5 shallow seismic refraction profiles. Three reflection seismic profiles were run in 1972 during the Heat Flow program, which provide information on features in the North Aegean Sea (Jongsma, 1975). In 1980, a geophysical study of the North Aegean Trough (NAT), comprising seismic reflection and refraction studies, was conducted by Ginzburg et al. (1987). Saner (1985) studied Saros bay by means of seismic profiling. The Gemlik bay area was studied by Kurtulus (1985), who interpreted MTA Sismik-1 obtained from high-resolution shallow (<300m) seismic reflection profiles obtained in 1984. Myrianthis (1984) gave reflection seismic results for the Gulf of Corinth graben. The structure and fault patterns of recent deformation in the Central NAT were studied by Roussos & Lyssimachou (1991) based on detailed interpretation of marine reflection seismic lines. Data from continuous seismic profiling, echo sounding, and core sampling of the Late Quaternary sedimentary cover acquired during the 1991 expedition of the RIV Moskovskii Universitet are provided by Roslyakov & Srokin (1997) for the northern slope of the Sporades basin. On the basis of multi-channel seismic and the other geophysical data the tectonic and sedimentary evolution of the Saros basin area was be discussed by Sari et al. (1995). Ergün & Özel (1995) studied the shallow seismic reflection data in northern part of the Marmara Sea. Koral & Oncel (1995) published Izmit bay seismic profiles. Smith et al. (1995) used high-resolution sparker seismic profile data to study the neotectonics and sedimentation of the Marmara region. Wong et al. (1995) published seismic reflection studies of the Marmara region. To

investigate the marine geology and geophysics of the area, high resolution shallow seismic data were acquired along the coasts of Marmara Sea with the cooperation of Turkish Naval Forces, Department of Navigation, Hydrography and Oceanography (TCB SHOD), İstanbul Technical University (ITÜ) and TÜBİTAK in a joint Marine Geology and Geophysics project. The seismic data were acquired using a high-resolution seismic data collection system (Kurt, 1994; Yilmaz, 1996). Uluğ et al. (1998) depict the seismic facies and stratigraphy, thickness, and major sedimentary sequences of the Gulf of Gökova, based on high-resolution seismic profiles. The data were combined with those of the Turkish Petroleum Company (TPAO). Recent detailed multi-channel seismic reflection data has been collected in the Marmara Sea (Cetin et al., 1998). Seismic data in İzmit bay were obtained in 1994 (Dokuz Evlül University) (Uluğ et al., 1998) (see also Senöz, 1998). The northeasten part of the Strait of Canakkale was investigated by Demirbağ et al. (1998), using seismic data. This study, which was conducted by the Marine Sciences and Management Institute (İstanbul University), Mining Faculty (İstanbul Technical University) and supported by the Earth, Sea, Atmosphere and Environment Exploration Group of TÜBİTAK, was made at the Aegean exit of the strait of Canakkale (Dardanelles) (Alpar et al., 1998).

The collection of the data took 20-25 year and it was collected by various organizations using differing standards and techniques. Because of these, *Saatçılar et al. (1996)* have reviewed and put all the available data together, using one standard for all the available seismic data in Aegean Sea. *Saatçılar et al. (1996)* first studied the Saros graben (Fig. 2.25). *Eryılmaz et al. (1998)* reinterpreted seismic reflection data, which were collected by different institutions, to explore the main structural, stratigraphic and sedimentologic features of the Aegean Sea.

2.7.2. General Interpretation

Seismic exploration beneath the Aegean Sea shows that three layers exist in the basins (e.g., *Martin, 1987; Mascle & Martin, 1990; Eryılmaz, 1996; Eryılmaz et al., 1998*). These are, from bottom to top: the basement, the Messinian deposits with evaporates, and Plio-Quaternary deposits. Widespread evaporates were the most characteristic feature of Late Miocene (Messinian) times (*Woodside, 1975*), called reflector "M" in the Aegean Sea. *Mascle & Martin (1990)* detected late Miocene sediments as the oldest sea sediments on top of the


Figure. 2.25. Active normal fault map of the Aegean Sea deduced from seismic profiles (after *Saatçılar et al., 1996*). Thin lines show the seismic lines, the lines with thick marks show the normal faults.

Oligocene-Early Miocene conglomerate. According to Le Pichon et al. (1984), at the base of the Late Miocene-Quaternary sea sediments, a continental conglomerate of probable Lower-Miocene age is assumed to mark the end of the tectonic compressive phase. They correlate the seismic profiles with drilling results to find out the ages of the corresponding layers. From shallow seismic data it is seen that the faulting mechanism continues to the present (e.g., Mascle & Martin, 1990; Eryılmaz, 1996; Eryılmaz et al., 1998). Recently, Uluğ et al. (1998) suggested that a large part of the Gulf of Gökva basin is subsiding based on seismic reflection data. According to Sari et al. (1995), the basins of the North Aegean and the Sea of Marmara show characteristics of rapid subsidence accommodated by extension and transform motions (see also Saatçılar et al., 1996). Lalechos & Savoyat (1977) inferred the distribution of Neogene sediments and showed that their maximum thickness in the NAT is near the Sporades. In the Thermaikos, some 1000 m of Pleistocene and Pliocene sediments were penetrated, followed by some 1600 m of Miocene and 2000 m of Eocene-Oligocene sediments (Ginzburg et al., 1987). The sediment thickness becomes thinner in the Central Aegean Sea and their reflection characters are disturbed (Eryilmaz et al., 1998). The thinnest sediments are found in the southern Aegean Sea (Eryılmaz et al., 1998).

In the eastern Mediterranean Sea the thick sedimentary cover (about 8 km in the Ionian basin and at least 12 km in the Herodotus plaint are known from both reflection and refraction data and are thought to include Mesozoic to Tertiary sequences (e.g., *Finetti, 1976; Ginzburg & Ben-Avraham, 1987*).

In the northern Aegean Sea, faults generally trend NE-SW (Fig. 2.24, 2.25), whereas in the Central Aegean Sea, the general fault trend is in the direction of NW-SE (Fig. 2.24). The Samos and Tharia Basins were interpreted as extensions of the generally E-W trending Menderes Neogene graben system (*Eryılmaz et al., 1998*). Further south, the fault systems developed in the north of Crete are W-E to the east and NW-SE to the west (Fig. 2.24) (see also *Martin, 1987; Mascle & Martin, 1990; Eryılmaz et al., 1998*). In general, faults in the east of the Aegean region strike roughly NE-SW (Fig. 2.24; 2.25) (*Martin, 1987; Saatçılar et al., 1996*) while to the west faults strike NW-SE (*Martin, 1987*) (Fig, 2. 24) (see Section 3 for detail).

Özhan et al. (1985) and Kavukçu (1990) studied shallow seismic reflection profiles in the İzmit bay area and pointed out that the area is not a single graben, but that there are two basins. Akgün & Ergün (1995), Koral & Öncel (1995), Senöz (1998), Uluğ et al. (1998) studied seismic reflection profiles and onshore geological structures, and concluded that the İzmit bay area consists of a few en-echelon strike-slip fault segments. They suggest that these form pull-apart basins such as the İzmit and Karamürsel basins (see also Barka & Kadinsky-Cade, 1988; Barka, 1991, 1992, 1993). In the Izmit basin, subsidence is greatest in the south so the northern area is being tilted southward (Uluğ et al., 1998). Smith et al. (1995) found that normal faults and half grabens in the Marmara sea strike approximately E-W, WNW-ESE. This suggested that the faults that occur in the northern half of the Marmara sea have a clearer morphology, since the sedimentation rate is less, relative to the southern Marmara shelf (Barka, 1997). The northern Marmara has several pull-apart steps, which form its basins (Wong et al., 1995; Ergün & Özel, 1995; Barka, 1997). The fault pattern of the southern shelf region east of Marmara Island appears to be similar to that of the onshore region between Manyas and the Marmara Sea. The studies mentioned are not enough to explain the structure beneath the Marmara Sea.

Saatçılar et al. (1996) compared the fault geometry found by using seismic reflection data with the focal mechanism solutions of the moderate earthquakes that had been investigated.

This comparison did not show any consistency between them especially for the central Aegean region. The focal mechanism solutions in the central Aegean Sea have a large strikeslip component (Fig. 5.4). However, no strike-slip geometry was observed by *Saatçılar et al.* (1996). The focal mechanism solutions of *Pavlides & Caputo (1994)* have little strike-slip component. On the other hand *Martin (1987)*, who made an extensive seismic reflection study in the Aegean, suggests that right lateral strike-slip motion occurs on these faults.

2.8. SEISMICITY

2.8.1. Data

Networks

Good determinations of epicenters can be made only for earthquakes, which occurred since 1930, and focal mechanism solutions have become reliable only since the installation of the worldwide network in 1937 (*McKenzie, 1978*). Before 1961 short period polarity measurements alone are available. These are less consistent than long period readings (see for detail *McKenzie, 1972*). Accurate epicenters have been determined since 1961 by the new USCGS worldwide network of seismic stations (World Wide Standard Seismograph Network: WWSSN). Since 1980 Global Digital Seismological Network (GDSN) data have become available.

After 1976, the earthquake detection level was greatly improved through the installation of permanent stations and radio-linked seismic station networks around the Marmara sea (MARNET) and the İznik regions (IZINET) (Ücer et al., 1997). The networks in these regions are able to record micro-earthquakes down to a magnitude of M=2.4 ($Ücer \ et \ al.$, 1997). Kandilli Observatory and Earthquake Research Institute (KOERI) installed a network which is called as IZINET in 1992 around the İznik-Mekece fault (east of Gemlik bay) to detect seismic properties of a possible earthquake as part of a multidisciplinary earthquake study of BÜ KOERI in collaboration with Japan institutions (Lio et al., 1991; see also Dadaşbilge, 1997). Since 1995, 12 seismic stations (weak and strong motions) have been operating in the Bursa area (Sellami et al., 1997). The project "Seismicity and seismotectonics of the Bursa region" was carried out by the following institutions: IGETH: Institute of Geophysics, Federal Institute of Technology Zürich (Switzerland), ITÜ: Department of Geophysics, Mining Faculty of Istanbul Technical University (Turkey), TÜBİTAK: Department of Earth Sciences, Marmara Research Institute of TÜBİTAK, Gebze (Turkey) and KOERI. The sub-project was initially planned for two years (1992-1993) and later extended for another two years (1994-1995). The goal of the project was to install a seismic network to allow detailed monitoring of earthquake activity in the area. Eyidoğan et al. (1998) investigated the earthquake activity of the Marmara Sea region by using one and half months

operation of a dense network of 52 seismic stations around the Marmara Sea region in 1995, with the collaboration of the institutes, IPGS, TÜBİTAK-Malm BÜ-KOERI and İTÜ. They located the epicenters of micro-earthquakes and determined the focal mechanisms and the stress regime in the region.

After the 1978 earthquake sequence within the Mygdonian graben, the Geophysical Laboratory of the Aristotelian University of Thessaloniki installed a permanent network of 8 seismological stations around the Chalkidiki peninsula (Christodoulou & Hatzfeld, 1988). Hatzfeld et al. (1989) determined geometry of the west of the slab by using microseismic data collected from 46 temporary stations. They also determined the T axes of focal mechanism solutions on the slab. From these results they map a heterogeneous strain field in the western part of the South Aegean Arc (SAA). To obtain more detailed information about the tectonics of the western SAA, in the summer of 1986 Hatzfeld et al. (1990) installed a dense network of 46 temporary stations and conducted a microearthquake survey lasting 7 weeks. During the summer of 1988, Hatzfeld et al. (1993) installed 82 seismological stations over the SAA and southern Aegean Sea. Seismological data collected during the summer of 1988 are prepared and analyzed to discuss the microearthquake deformation in western Crete (Greece) (Chabalier et al., 1992). The experiment consisted, of a dense network of 34 stations, among them 13 three-component digital stations (Chabalier et al., 1992). Rigo et al. (1995) made a microseismic investigation in Gulf of Corinth. 35 stations of the temporary network were installed 5 days after the Galaxsidi earthquake (Hatzfeld et al., 1996).

Catalogues

Gutenberg & Richter (1954), Galanopoulos (1960, 1963, & 1968) and Ergin (1967) have published earlier earthquake catalogues for the region. Sources of seismologic data an available for periods and various reliability in Karnik (1968, 1969), Ergin et al. (1967), the Bulletins of the Seismological Institute of the National Observatory of Athens and publications of the BCIS, the United States Coast and Geodetic Survey (USCGS), Kandilli Observatory Database, ISS, ISC monthly catalogues, USGS PDE catalogues

Pinar & Lahn (1952) prepared the first descriptive catalogue of historical earthquakes in Turkey. Later *Ergin et al. (1967)* prepared a catalogue, including earthquakes between 1100-1964 AD. *Soysal et al. (1981)* prepared a catalogue of historical earthquakes that occurred

between 2100 BP and 1900 AD by studying Selçuk, Byzantine and Ottoman documents. Recently, *Ambraseys & Finkel (1991, 1995)* have presented a more reliable and complete earthquake catalogue, especially for the destructive earthquakes that occurred in the Marmara sea and surrounding region, for the period between 0- 1900 AD. Completeness analysis for the historical earthquakes has been carried out in the Marmara region by *Üçer (1990)* (see also *Angagi, 1997*). *Üçer et al. (1997)* review the various historical earthquake catalogues for Turkey.

For the Aegean region, the relation between various magnitude scales has been derived in order to produce a statistically homogeneous catalog of historical and present century earthquakes (*Papazachos & Comninakis, 1971; Kiratzi and Papazachos, 1984; Papanastasiou, 1989; Papazachos et al., 1997*). Formulas are also available to calculate the magnitude of strong shocks using macroseismic data (*Galanopoulos, 1961; Drakopoulos, 1978; Tassos, 1984; Papaioannou, 1984; Papazachos et al., 1997; Papazachos, 1992*). Ketin & Abdüsselamoğlu (1969), Ambraseys & Tchalenko (1972) and Ambraseys (1985) determine the focal depths of the some earthquakes using macroseismic data of faults.

Using joint hypocenter location techniques, Crampin & Üçer (1975) and modeling of the long-period body-waves, Eyidoğan & Jackson (1985) and Taymaz et al. (1991), improve hypocenter quality in the region. Makropoulos & Burton (1981) also have made an effort to improve hypocenter quality in the SAA. Papadopoulos et al., (1988) have calculated better locations in the southwestern SAA. There have been several efforts made (Crampin & Üçer, 1975; Makropoulos & Burton, 1981) to relocate earthquakes, which occurred pre-1964 (see Üçer et al., 1997). All the earthquakes, which occurred during the instrumental period (1900-1995), have been recompiled mainly from Ayhan et al. (1987) in Marmara region. Küleli (1992) also relocated some selected critical events in the region.

Seismotectonics

Gutenberg & Richter (1954) made an early study of seismicity of the Aegean region. Galanopoulos (1963) tried to separate the most seismically active zones in Greece. Cantez & \ddot{U} çer (1967) prepared a catalogue of focal mechanism diagrams for the earthquakes that occurred in Anatolia and adjoining areas. The study was based on first motions of both P and S waves in the interval 1939-1965. Ketin (1969) described epicentral distribution along the general tectonic features in Turkey. *Papazachos & Delibasis (1969)*, using a statistical treatment of focal mechanism solutions of about 90 earthquakes, studied the stress regime along the South Aegean Consumption Boundary (SACB). *Caputo et al. (1970)* and *Papazachos & Comninakis (1971)* studied the Benioff zone using hypocenter distribution of



Figure. 2.26. A summary of the observational results of *Jackson and McKenzie (1988)*, showing the areas in which seismicity is likely to occur (after *Jackson and McKenzie, 1988*). The belts marked 'unknown' are those where the seismicity this century is too unrepresentative of longer periods to be conclusive or where there is no independent estimate of the overall deformation rate (*Jackson and McKenzie, 1988*).

local earthquakes. *McKenzie (1970, 1972, 1978)*, by using first motion focal mechanism solutions and seismicitiy distribution, studied the Aegean region in considerable detail. He used the WWSSN long period network that was installed in 1962 to determine the focal mechanisms. Data concerning the focal mechanism and the spatial distribution of earthquakes have been used to investigate the active tectonics of the northern Aegean and surrounding area by *Papazachos (1976)*. *Richter & Stobach (1982)* presented the three-dimensional earthquake distribution and the corresponding tectonic structures in the Aegean region. *Kocaefe & Ataman (1976)* studied Antakya, Finike, Denizli and surrounding area by means of seismicity. *Alptekin (1978)* solved the focal mechanisms of damaging earthquakes that have occurred in the Aegean-Anatolian region from an analysis of P-wave first motions on the long-period seismograms of the worldwide-standardized seismographs (WWSSN). *Alkan (1979)* made focal mechanism solutions for southwestern Turkey. *Le Pichon & Angelier (1979)*, using focal mechanisms of shallow earthquakes occurring along the SAA and the

extent of the intermediate seismic belt, made a quantitative estimate of the relative motion between the two plates. The pattern of seismicity and focal mechanism solutions of earthquakes are used to outline the tectonic features of southern Turkey by Rotstein & Kafka (1982). For central Greece, McKenzie and Jackson (1983) describe the basic geometry of the deformation by using seismicity data. Jackson & McKenzie (1984a) made focal mechanism solutions for the eastern Mediterranean. Eyidoğan & Jackson (1985), by using inversion techniques, investigated source parameters of the earthquakes that occurred in Turkey. Ücer et al. (1985) studied the seismicity of western Turkey. They displayed clusterings in time and space. Yoğurtçuoğlu (1986) reviewed the focal mechanism data for the whole of Turkey. Yilmaztürk (1986) investigated the seismology of the Burdur area (SW Turkey) by using the NOAA catalogue. Kalafat (1988) studied the seismicity of southern Turkey and surrounding area. Eyidoğan (1988) studied slip rates in western Turkey by using focal mechanisms of the large (Ms >5.5) earthquakes that occurred since 1943. Martin (1988) investigated the seismicity of slab by using a careful selection of well-defined ICS data events. Jackson & McKenzie (1988) studied actual deformation and seismic deformation using 1901-1981 seismicity data in the Aegean-Anatolian area (Fig. 2.26). Lyon-Cean et al. (1988) studied the tectonics of the subduction margin by mean of seismicity data. They give information about western part of the zone. Extröm & England (1989) examined how much motion could be accommodated by earthquakes of Ms>6 in the period 1909-1981. They computed the strain rates and obtained the average extension rate of the Aegean region. U_{cer} (1990) studied the seismicity of the Marmara region by using data from the ISK and MARNET networks. Papazachos (1990) studied seismicity distribution and its relation with zones of the Aegean and Surrounding area. Taymaz et al. (1991) solved focal mechanisms of major earthquakes by using waveform technique for the Aegean region. They compare first motion solutions of some previous studies with their solutions. Three-component long-period seismograms from the Global Digital Seismic Network (GDSN) are used to determine the focal mechanisms of recent large (Mb>5.5) earthquakes in the SAA (Taymaz et al., 1991). Some events were relocated. Additional information was obtained from long-period (LP) Worldwide Standard Seismograph Network (WWSSN) records in order to improve coverage of the focal sphere (Taymaz et al., 1991). Udias & Bufron (1991) selected the focal mechanism solutions of 83 European earthquakes with M>6 from a total of 140 (1935-1983). These were used to derive the directions of the principle axes of stress along the plate boundary between the Eurasian and African plates from Azarodes islands to the Caucasus mountains. Hatzfeld & Martin (1992), using ISC data, determine the geometry of the slab. Taymaz & Price (1992) studied the seismotectonics of the Burdur region (SW Turkey). Papazachos et al. (1992) made a crustal deformation analysis of the Aegean region based on their previous work that includes the seismicity and the available focal mechanisms. The components of the strain rate tensor and of the velocity tensor are presented for 26 seismic regions identified in the Aegean region by Papazachos et al. (1992). They computed the strain rates and the total seismic energy release for the last century. Papazachos & Kiratzi (1992) used recent large earthquake data (observational period of 30 yr) to better define deformation in the region. The seismic activity in the region associated with major structures was determined by Küleli (1992). Local data were obtained from the ISC database for the 23 year interval 1964-1986 recorded by 53 stations in the region (Küleli, 1992) (Fig. 2.27). For this region, hypocenters of local earthquakes are displayed on horizontal and vertical cross sections (Küleli, 1992) (Fig. 2.28). Jackson et al. (1992, 1994) computed a velocity field from the seismic moment tensor of earthquakes of Ms>6 in the period 1909-1983 to estimate the spatial variations in seismic strain rates in the twentieth century for the whole Aegean region. Mueller & Kahle (1993) use recent seismic activity in the eastern Atlantic and in the Mediterranean-Alpine region for the period 1970-1980 to describe the motions of the plate boundaries. The available focal mechanism solutions of shallow earthquakes occurring in the central part of western Anatolia were reviewed to determine the active stress directions in this region by Zanchi & Angelier (1993). Jackson et al. (1994) compare geodetic (SLR) data with a computed velocity field from the seismic moment, for the whole Aegean region. They used earthquakes of Ms>6 in the period 1909-1983 to estimate the spatial variations in the seismic strain rates that are calculated from the horizontal field. Pavlides & Caputo (1994) solve the focal mechanism of moderate earthquakes in the Aegean region. A catalog of published focal mechanism solutions of earthquakes that have occurred between 1963 and 1990 in Turkey and the adjoining area has been prepared by Özçep & Alptekin (1995). This includes 164 focal mechanism solutions. The reliable focal mechanism of the earthquakes (Ms < 4.2) felt in Turkey and the surrounding regions, were determined and their seismotectonic implications were discussed by Kalafat (1995) using first motion polarity of P waves method. In addition, only moderate and destructive earthquakes for which various investigators did focal mechanism studies were inclusively compiled by him. Waveform solutions of some 24 large earthquakes that have teleseismic records in Turkey, which occurred between 1964 and 1992, were inverted to their sources by *Pinar (1995)* to get a rupture process. *Ponderelli et al.* (1995) estimated seismic deformation in the Mediterranean area by moment tensor summation. They applied this method to a data set consisting of seismic events that had



Figure. 2.27. Seismicity shown in the horizontal layers in the Aegean area (after *Küleli, 1997*). (A) The events (all magnitudes) in the 1964-1986 interval recorded by 53 station (ISC), (B) hypocenter distribution in the 0-10 km depth interval for magnitudes (rmag) greater than 3; from (A) to (E) layer thickness was selected according to those from teleseismic inversion model. (C) 0,40 km depth interval, (D) 40, 80 km depth interval, (E) 80 160 km depth interval, (F) deeper than 160 km.

occurred between 1908 and 1992. They use the Centroid Moment Tensor (CMT) Catalog prepared at Harvard University and older data from *Jackson & McKenzie (1988)*. They determine the seismic deformation and compare it to estimates of the overall deformation as obtained from global plate motion and geological studies. *Papazachos et al. (1996)* made a crustal deformation analysis of the Aegean region based on their previous work on the seismicity and available focal mechanisms. The components of the strain rate tensor and of



Figure. 2.28. Vertical cross section of the local hypocenters from (A) to (D) (after *Küleli*, 1997). Epicenters bounded on the upper panel for display of a small location map for orientation and latitude and longitude of the epicenters with an angle 90° on the marked line. Hypocenters and epicenters of events from ISC catalogue tape. Hypocenters plotted include all magnitude events.

the velocity tensor are presented for 63 seismic regions identified in the Aegean region by *Papazachos et al. (1996). Dadaşbilge (1997)* displayed the clusterings, locations of maximum magnitudes and energy released per year between the years 1975-1996 in the Aegean region. In the Marmara region Ü*çer et al. (1997)* investigated the patterns of the earthquake distribution in time and space for the period of 1976-1995. They also examined the patterns of seismicity for longer periods, including historical (pre-1900) and instrumental (1900-1975) earthquake records for the Marmara region. Utku (1997), using a linear moment tensor inversion method, studied some of the earthquakes from western Turkey.

There are many other studies for the region, which I merely note (e.g., *Delibasis & Galanopoutos, 1965; Hodgsom & Wickens, 1965; Galanopoulos, 1967; Wickens and Hodgson, 1967; Barazangi & Dorman, 1969; Karnik, 1969, 1972; Papazachos & Comninakis, 1971; Papazachos & Comninakis, 1977; Myrianthis, 1984; Scordilis et al., 1985; Caputo, 1990; Ergin & Aktar, 1990*). Available focal mechanism solutions of earthquakes (Ms \geq 5.5) are displayed in Table. 2.5, giving strike, deep, rake, coordinate, reference and solution method information. In this Table one can see available focal mechanism solutions for a specific earthquake (see Appendix 1).

2.8.2. General Interpretation

It is generally believed that earthquakes can nucleate in continental crust at temperatures of less than 300 °C (*Chen & Molar, 1983; Alptekin et al., 1990*). For this reason the heat structure and crustal and upper mantle structure could be defined by considering the maximum thickness of the seismogenic (brittle) layer, called the upper crust.

The epicenters and fault mechanism solutions are closely associated with major structures in the crust (e.g., *Canttez & Üçer, 1967; McKenzie, 1972, 1978; Jackson & McKenzie, 1984b; Şengör et al., 1985; Şengör, 1987; Küleli, 1992*), or between the plates. Determination of the main seismic zones in the Aegean region and surrounding area has been made by plotting epicenters of shallow and intermediate depth earthquakes (Figs. 2.27, 2.28).

The relative movement of plates gives rise to earthquakes. The slip on the fault that generates the earthquake is determined by the direction of relative plate motion, and the relative plate velocity controls the average displacement rate. Mechanisms of shallow earthquakes with sufficient magnitude can be used to drive the motion of a plate relative to the surrounding plates. Since the empirical evidence, combined with theoretical considerations, led seismologists to conclude that the 'double-couple' (plane shear stress) system of earthquake equivalent forces is the most appropriate model for the most earthquakes, first-motion studies have usually been interpreted in terms of nodal plane solutions. Some basic discoveries were made by studying the signs of the first arrivals of body waves (e.g., *Sykes, 1967; Isacks et al., 1968*). Further, one seismologist could determine some aspects of the rupture process by

waveform modeling using some very broadband P and SH waveforms recorded by global networks (*Ekström and England., 1989*). However, small earthquakes could not modeled teleseismically because of insufficient network of stations. The mechanism of earthquakes determines the direction, but not the rate, of motion between plates (*McKenzie, 1972*). *Brune (1968)* has overcome this problem by using the cumulative scalar moment (M_0) (seismic moment tensor) of earthquakes of a given plate boundary to estimate the total slip which occurred over several decades. Nevertheless, they are obviously correct when the plate boundary consists of a single fault. Most earthquakes happen on preexisting fault planes of weakness, and slips can occur at different angles relative to the principle axes. However, the stress axes that are derived from focal mechanism solutions of large earthquakes may appear as an indication of their general trend for a given region (*Udias & Buforn, 1991*). The foci of the large shocks are better determined because of the better distribution of the recording stations and the larger macroseismic effects. The energy released during microearthquake experiments is small compared to that from earthquakes with a large (>5.5) magnitude (*Hatzfeld et al., 1990*).

After the WWSSN long period network was installed in 1961, focal mechanisms were determined more accurately. But there is always an ambiguity about which plane among two possible nodal planes is the fault plane and which is the auxiliary plane. To avoid the wrong choice, seismologists consider other evidence (see also *Taymaz et al.*, *1991*):

1. Some of the earthquakes were associated with surface faulting, and the choice of nodal plane was thus straightforward;

2. Some of the offshore events occurred in, or were adjacent to, basins whose clear asymmetry suggests the polarity of the faulting and hence which nodal plane is likely to be the fault plane;

3. The strongest evidence supporting a fault mechanism is the spatial distribution (elongation) of the aftershock zones (locations) of events (*McKenzie*, 1972);

4. Based on the similarity of the dipping slip vector with those in the nearby events;

5. Based on the known dominant tectonic regime.

Much of the deformation must be aseismic in the Aegean region (Jackson & McKenzie, 1988; see also Jackson, 1993) (Fig. 2.26). Moreover, many new active structures were effectively aseismic for the last hundred years. Straub & Kahle (1997) calculate that earthquakes release about 60% of the deformation derived from the geodetic data. Recent investigations of seismic strain rates indicated that they account for 74% of regional SLR rates in NW Turkey (Jackson et al., 1994). These results clearly show that a considerable amount of aseismic creep or strain accumulation has been released (Straub & Kahle, 1997; see also Jackson et al., 1992). However, one must keep in mind that the periods, both of geodetic and seismic data collection, are very short. They might not be representative for a longer time scale (Straub & Kahle, 1997). But no reliable catalogue exists for the earlier instrumental times and no catalogue exists of all for the oldest times. For this reason, even though spanning a shorter time interval, the CMT Catalog often gives a better estimate of deformation geometry than the whole data set (85 yr.) (Pondrelli et al., 1995). Reliable fault-plane solutions exist only for recent large earthquakes (Papazachos et al., 1992; Papazachos & Kiratzi, 1992). Jackson & McKenzie (1988) used 70 years data that they calculated to be sufficiently long to be representative of the Aegean and South Aegean Trench, though possibly for NE Iran, and probably not long for the North Anatolian Fault (NAF). Further progress in understanding the geometry and rates of deformation requires additional information, not contained in the seismic moment tensors (Jackson & McKenzie, 1988). Such information is likely to come from paleomagnetic and geological observations (Jackson & McKenzie, 1988 see also Jackson, 1994). It is possible to extend the deformation period back in time, by assuming the fault parameters of the past events, and this has been done by some researchers (Jackson & McKenzie, 1988; Ambraseys & Jackson, 1990; Papazachos et al., 1990; Kiratzi, 1991; Taymaz et al., 1991; Papazachos & Kiratzi, 1992). No matter how well justified these assumptions are, it is very likely that they introduce considerable error and bias (Papazachos & Kiratzi, 1992). The use of all available complete data, which include information on smaller recent shocks and on strong instrumental and historical earthquakes of a much longer period reliable field observations of past strong earthquakes are needed (Papazachos & Kiratzi, 1992). The contribution of smaller earthquakes, with Ms <5.8, will increase displacements by around 50% (Ambraseys & Jackson, 1990; Papazachos & Kiratzi, 1992). However, according to Lyon-Caen et al. (1988), it is common for small earthquakes to have mechanisms incompatible with a uniform regional strain field principally because they reflect stresses and deformation within the lithosphere, rather than motions between Plates (see McKenzie, 1972; Taymaz et al., 1991).

Seismologists try to improve existing data. By modeling of the long-period body-waves Evidoğan & Jackson (1985) determined more accurate focal depths of some earthquakes. The faults inferred by using macroseismic data (Ketin & Abdüsselamoğlu, 1969; Ambraseys & Tchalenko, 1972; Ambraseys, 1985) and modeling of the long-period body-waves (Eyidoğan & Jackson, 1985) indicate that the major earthquakes in the region are not deeper than 10-15 km (see also Crampin & Üçer, 1975; Eyidoğan, 1988; Jackson & McKenzie, 1988; Ekström & England, 1989; Taymaz et al., 1991). The depth of most events in the Bursa area was found to be less than 15km by micro-earthquakes (Sellami et al., 1997). They confirm NE-SW to almost N-S oriented crustal extension and E-W dextral shear for the northern part of the area. The focal depths of the earthquakes in western Turkey range from 0 to 50 km according to various bulletins and sources, based on arrival times alone or with those based on crude empirical relationships, but these reports are not reliable (Evidoğan, 1988). The depth control is poorer for all magnitudes (see for detail McKenzie, 1978). The hypocenters of very poorly determined events are fixed at 33 km or 10 km depth, which explains the peculiar concentration of events at these levels (Meulenkamp et al., 1988) (Fig. 2.27). Small shocks (Mb < 5.0) are much less accurately located. Recent locations from a local network in Greece have shown that several shocks located by NOAA at depths below 70 km are in fact much shallower (McKenzie, 1978). Papadopoulos et al., (1988) find 60 km misallocation of epicenters along the subduction zone perpendicular to the arc. Given the proximity of the Greek National Network, epicenter misallocation in western SAA appears to be larger than one might have expected (Papadopoulos et al., 1988; Meulenkamp et al., 1988). The cause for the misallocation is demonstrated to be the presence of a high-velocity subducted slab (Engdahl et al., 1982; Frohlich et al., 1982; Papadopoulos et al., 1988). Seismic rays, which leave the earthquake sources heading north to teleseismic distances, travel in part through the high-velocity slab of the subducted plate. For this reason, these rays will arrive earlier than expected (Papadopoulos et al., 1988). Although Makropoulos & Burton (1981) have made an effort to improve hypocenter quality in the SAA, calculated locations of earthquakes could further be improved in several ways by Papadopoulos et al. (1988). Papadopoulos et al. (1988) made this improvement, based on their results for the SW SAA, or based on relocations using other temporary networks at other parts of the plate boundary. Another means of improving the locations could come from accurate arrival times of North African stations (*Papadopoulos et al., 1988*).

Velocity models that are used at the hypocenter affect the solutions. *McKenzie (1978)* criticized the solutions of *Alptekin (1973)* in this respect. According to *McKenzie (1978)*, and *Alptekin (1973)* probably used too low a velocity at the hypocenter. For these reason his solutions have a much greater component of strike slip motion than the solutions of *McKenzie (1978)*.

All three main types of stress distributions (strike-slip, extensional and compressional) and their variations dominate the Mediterranean-Alpine area (see e.g., *Udias, 1980*). But all of them are manifestations of the compressional stress regime governing the diffuse zone of plate contact between the Eurasian and African plates giving an immediate impression of the present state of stress and deformation in the lithosphere (*Mueller & Kahle, 1993*). However, most of the focal mechanisms of the earthquakes along the entire edge of the African plate indicate that N thrusting is the dominant mode of seismic deformation between the Eurasian and African plates (see *Rotstein & Kafka, 1982*).

The Aegean region is one of the most seismically active in the world (e.g., McKenzie, 1972, 1978; Mercier et al., 1977; Jackson et al., 1982; Armijo et al., 1996). The region that has continental crust is a part of African-Eurasian boundary, situated north of the northern edge of the Africa plate, and it deforms diffusely (Fig. 2.27). The scatter in the Aegean region is not due to errors in the location of epicenters, which are usually less than 30 km. The intense seismicity and continental deformation attracts a lot of earth scientists' attention. Shocks of large magnitude have occurred in limited zones along known major fractures within the region (Fig. 5.1) (see also Ryan et al., 1969). The present shallow seismicity is concentrated in two diffuse belts along the South Aegean Trench and arc and in the northern Aegean (Galanopoulos, 1967; Caputo et al., 1970; Ryan et al., 1969; McKenzie, 1970, 1972; Papazachos & Comninakis, 1971; Agarwal et al., 1976) (Fig. 2.27). Large magnitudes (Ms ≥ 5.5) recorded in the region have been observed west of North Aegean Trough (NAT) and NAF (Fig. 5.1). The earthquakes recorded around the subduction area in the Cretan basin and Crete, all show similar large magnitudes (Ms \geq 5.5) (Fig. 5.1). The SAT and island arc are seismic regions that contain a broad belt in which seismic activity has occurred at both shallow and intermediate depths (Fig. 2.27). Graben-like basins in western Turkey and Greece are also dominated by high seismicity and large earthquakes $(5,5 \le Ms)$ (Ambraseys & Tchalenko, 1970; Abdüsselamoğlu, 1977; Kocaefe & Ataman, 1982; Akçığ, 1988; Eyidoğan, 1988; Alptekin et al., 1990) (Fig. 5.1). The other grabens in which large earthquakes have occurred are Corinth and Edremit.

Caputo et al. (1970) and Papazachos & Comninakis (1971) provided the first evidence about the subduction using the hypocenter distribution of local earthquakes (Fig. 2.28). The SAT elongation could be identified on a seismicity map as a curved shape (Fig. 2.27). Most of the seismicity stops abruptly about 40 km from the trench. The highest concentration is seen in the western part of the Peloponnesus (Leydecker et al. 1978). Some clusters are located where there are changes in the morphology of the SAT (Hatzfeld et al., 1989). The distribution of macroseismic intensities of the earthquakes at intermediate focal depth just behind of the Ionian Trench in Greece is very asymmetrical and strikes parallel to the trench (Papazachos & Comninakis, 1971). The same phenomenon is also observed in the some shocks of normal focal depth, but it is not so characteristic as it is to inter-mediate earthquakes (Papazachos & Comninakis, 1971). Barış et al. (1998), using an inversion technique, modeled subevents of recent large earthquakes around the Ionian trench. The trend was also investigated parallel to the trench (Baris et al., 1998). The 100 km and 150 km isodepth contours of hypocetres of earthquakes obtained from ISC catalogue are not parallel to the South Aegean Trench (Hatzfeld & Martin, 1992) (Fig. 5.5). The gently dipping part of the slab is longer in the west than in the east (Fig. 5.5) (Hatzfeld & Martin, 1992 see also Papazachos, 1990).

Reverse faulting is observed from focal mechanisms of earthquakes along the South Aegean Consuming Boundary (e.g., *McKenzie, 1972, 1978*). Published focal mechanisms show that reverse faulting is also observed all along the South Aegean Trench (*Hatzfeld et al., 1990*) (Fig. 5.3). On the other hand, in the internal part of the arc normal faulting is obvious (*Hatzfeld et al., 1990*) (Fig. 5.3). The transition between reverse faulting and normal faulting is rather sharp, but with some overlap of the two families (*Hatzfeld et al., 1990*). In the western part a very shallow dipping aseismic zone, found from ISC catalogue data, extends 200 km NE from the trench and then steepens abruptly at depths of about 50-80 km, eventually reaching dips of 45° (*Hatzfeld & Martin, 1992*). Intermediate microseismicity determined by *Hatzfeld et al. (1989*) also defines a subducted slab dipping gently (10°) towards the northeast for the first 200 km and dipping more steeply (45°) beneath the Gulf of Argols. These results are consistent with the seismicity obtained by a careful selection of well

defined events (ISC data) by *Martin (1988)*. T-axes of focal mechanism solutions for the deeper events are consistent with the pulling of the cold lithosphere probably towards the north and towards the edge of the slab. They indicate N-S extension similar to the shallow earthquakes above (*Hatzfeld et al., 1989*). Thus this extension is observed on the slab and not only within the overriding crust (*Hatzfeld et al., 1989*).

In the Aegean region a N-S extension is characteristic from focal mechanism solutions. Shallow seismicity is also spread over most of the Aegean area with concentration in some places, such as the Gulf of Corinth and the western Peloponnese (*Hatzfeld et al., 1990*). Several NW-SE trending grabens accommodate NE-SW extension south of the Aegean axial trough to the SAA. However no clear individual faults can be mapped from the seismicity, even in the Gulf of Corinth (*Hatzfeld et al., 1990*). But many large earthquakes are located around the Gulf of Corinth (Fig. 5.1). The focal mechanisms show a consistent pattern of E-W trending normal faulting. This pattern is consistent with microseismic observations obtained by dense temporary networks (*Hatzfeld et al., 1990; Rigo et al., 1995*). Results support a listric type fault dipping to the N.

The most obvious problem in accounting for the observed deformation is the relationship between the thrusting and normal faulting in the northwestern part of the area beneath Albania (*McKenzie, 1978*). Since the thrust and normal faults have similar strikes and dips there is almost no overlap of the dilatational quadrants of the focal mechanism solutions (*McKenzie, 1978*).

Dextral strike-slip faults are obvious in the NAF and NAT in the northern Aegean (*Papazachos & Kiratzi, 1996*). Clear SW-NE striking earthquake lineaments can be traced across the northern Aegean Sea (Figs. 2.27, 5.1). The three earthquakes located to the northwest of the Marmara sea display major strike-slip mechanisms (*Eyidoğan et al., 1998*). Fault mechanism solutions of micro earthquakes also show a strike-slip mechanism (*Eyidoğan et al., 1998*). The rest of the other micro-earthquakes show that normal fault activity is abundant in the region (*Eyidoğan et al., 1998*). The stress tensor obtained for the former period shows that the extension occurs, but that is still within a shear regime (*Eyidoğan et al., 1998*). The seismicity in western Turkey (eastern Aegean Sea) for large earthquakes (M > 4.5) is considerably lower than that in the northern part of the Aegean. The orientation of the stress tensor calculated the earthquakes during the 1995 microearthquake

experiment shows that the crustal extension in NNE or NE direction dominates in the Marmara region (*Eyidoğan et al., 1998*). Pull-apart structures in the Marmara Sea have been identified from the microearthquake epicenter distribution (\ddot{U} *çer, 1990*). The focal mechanism solutions of large earthquakes and composite focal mechanism solutions of micro-earthquakes in Marmara show oblique mechanisms (\ddot{U} *çer, 1990*). Slip vectors show SW orientation in the Marmara region (*Evans et al., 1985; Üçer, 1990*). The Sea of Crete and the Cyclades area are relatively aseismic (Fig. 2.27) (*Taymaz, 1996*).

The seismicity in western Turkey is high and displays swarm-type activity with remarkable clustering of low-magnitude earthquakes in time and space (Fig. 5.2) (\ddot{U} cer et al., 1985). South of Bursa (at about 39°N) a striking seismicity feature is located. It has the shape of a NW-SE oriented active cluster extending from the small town of Sindırgı (NE of Akhisar) as far as SE of Afyon (Fig. 5.2) which is obviously related to the Simav-Afyon fault zone and not to the Bursa-Eskişehir fault which has not been significantly affected by major earthquakes in the recent past (*Mueller et al., 1997*). At its western end this zone is cut by a NE-SW directed seismically moderate lineament, which goes past Mudanya (NW of Bursa) region, the Gulf of Gemlik and terminates at Yalova (Fig. 5.2) (*Mueller et al., 1997*). This activity follows the western part of the İzmir-Ankara ophiolite zone lineation (Figs. 3.1 and 5.2) between Adapazarı and İzmir (\ddot{U} cer, 1990).

The stress regime in western Turkey is extensional with dominant normal fault motions and increasing importance of strike-slip faults from south to north (*Zanchi & Angelier, 1993*). The epicenters lie in the grabens of Gediz, Büyük Menderes and Küçük Menderes valleys in western Anatolia, and in the fault zones of the Gulf of Iskenderun and Amok Plain in the southeast (*Ketin, 1969*). The dips of at least some of the normal faults in western Turkey become shallower at depth and are called listic faults. The best evidence comes from the 1970.3.28 earthquake whose fault break was mapped by *Ambraseys & Tchalenko (1972)* (see *McKenzie, 1978*).

Zanchi & Angelier (1993) compared stress orientation reconstructed using crustal earthquake mechanisms at different depths (0-20 km and 20-40 km). Trends of extension direction are N-S near the surface and NE-SW (N40°E) with depth. Moreover, the percentage of strike-slip faults increases at depth (Zanchi & Angelier, 1993). It looks as if a torque of the stress field was active in the crust beneath western Turkey (Zanchi & Angelier, 1993). They interpret this

change of the average stress pattern with depth as related to the behavior of pre-existing discontinuities in rock mass, which play a more important role near the surface due to the decrease in lithostatic component of stress. It is well known that a large number of faults in western Anatolia is inherited from older faults with various strikes (*Arpat & Bingöl, 1969; Kaya, 1981; Zanchi et al., 1990*). This is especially the case for large E-W trending faults inherited from the Late Cenozoic extension (*Zanchi & Angelier, 1993*). However, oblique reactivation of such major faults may be difficult in the lower crust (*Zanchi & Angelier, 1993*). In contrast, superficial faulting and the deeper shallow earthquakes give a better account of the regional stress regime, because accommodation is easier at the surface, and confining pressure increases at depth (*Zanchi & Angelier, 1993*). *Pinar (in press)* identified subevents of the Dinar earthquake and found the same difference between subevents of the same earthquake. The results agree with those of *Zanchi & Angelier (1993*).

The focal mechanisms give the impression that the north and central Aegean Sea is dominated by distributed strike-slip faulting, most of it right-lateral with a NE to ENE strike (Fig. 5.3) (*Taymaz et al., 1991*). The parallel troughs in the east Aegean ends abruptly in front of the South Aegean Axis Line. In front of the NW-SE trending South Aegean Axis Line, NE deeping nodal planes of normal faulting is obvious. For example, the 1967.3.4 earthquake probably represents the Skyros basin NE deeping escarpment (*Taymaz et al., 1991*). Like the NAT, the Edremit trough is also the site of strike-slip faulting, with mechanisms consistent with right-lateral slip on NE to ENE trending nodal planes (*Taymaz et al., 1991*). The aftershock zone following the earthquakes of 19 and 27 December 1981 suggests that the NEstriking nodal planes were the fault planes (*Taymaz et al., 1991*). Saatçılar et al. (1996) who studied seismic reflection profiles in the Aegean did not observe any pure shear (strike-slip) evidence beneath the eastern Aegean Sea. Their results are consistent with those of *Pavlides* & *Caputo (1994)*, who solved focal mechanisms of earthquakes by using local stations. They defined NAT by strike-slip faulting. Table. 2.5. Focal mechanism solutions of earthquakes $(5.5 \le Ms)$ from many studies in the Aegean and surrounding area. All the mechanisms are equal-area projections of lower hemisphere of the focal sphere. On top of each beach-ball the two letters defines authors two first letter of last names; and two-digit date of publication.

Am90	Ambraseys and Jackson, 1990	Kiy87	Kiyak 1987
An87	Anderson et al., 1987	Li89	Liotier, 1989
Ba97	Baker et al., 1997	Ly88	Lyon-Cean et al., 1988
Be97	Bernard et al., 1997	Mc72	McKenzie 1972
Ca67	Canitez and Üçer, 1967	Mc78	McKenzie 1978
Ca84	Canıtez and Büyükaşıkoğlu, 1984	Oc60	Öcal 1960
C197	Clarke et al., 1997	PaB96	Papazachos Basil, 1996
Dr82	Drakopoulos et al., 1982	PaC92	Papazachos, 1992
Ex89	Extröm et al., 1989	PaE93	Papadimitriou 1993
Ey85	Eyidoğan & Jackson 1985	Pi95	Pinar 1995
Ey88	Eyidoğan, 1988	Pi96	Pinar et al. 1996
Ha96	Hatzfeld et al., 1996	Pi98	Pinar, in press
Ha97	Hatzfeld et al. 1997	Sh72	Shirokova (1972)
J a8 4	Jackson et al., 1984	Ta90	Taymaz et al. 1990
Ja88	Jackson et al., 1988	Ta91	Taymaz et al. 1991
Ja92	Jackson et al., 1992	CMT H	CMTHarvarth
Kir91	Kiratzi et al., 1991		

The final letter gives the source of the earthquake focal mechanism:

(a) from P, SH, or Centroid Moment Tensor waveform inaersions

(b) first motions only

(c) from surface faulting

(d) a guess based on nearby faults

(e) from nearby earthquakes

(G) geodetic method

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Some of the solutions used in Figure 5.4. to derive tectonic scheme of the region. (see Appendix. 1 for more information).















Table. 2.5. (continue)



Table. 2.5. (continue)



2.9. GEODETIC DATA

2.9.1. Data

Triangulation (Terresial) Network

Greece

Estimation of the velocity across the deforming zone, from the southern side of the Gulf of Corinth and the Sporades islands, comes from *Billiris et al. (1989, 1991)*, who resurveyed the 1890-1900 triangulation network (Fig. 2.29). They also compared results of this survey and a 1988 GPS survey in the region. *Curtis et al. (1997)* used the same terresial data to recover the long-term component of deformation. They compared results from a terresial network with



Figure. 2.29. The displacement of the 46 points in 100 years (1892-1992) (after Davies et al., in press).

seismicity and GPS measurements. *Davies et al. (in press)* compared seismic strain with measured strain from the terresial network. *Clarke et al. (1997)* estimated the rate of extension of the Gulf of Corinth by using same terresial geodetic data. They also compared them with strain has been released by earthquakes during this century.

Turkey

Local geodetic networks were established around the western section of the North Anatolian Fault (NAF) zone and Marmara region since 1972. The general Directorate of Mapping, İstanbul Technical University (İTÜ) Geodesy Working Group, Office of Mineral Research and Earthquake Research Office of Turkey participated in the establishment of these local networks (see for detail *Aksoy & Deniz, 1997*). After 1984, with the participation of various departments from German Universities, the Turkish national project was enlarged to the German-Turkish Project on Earthquake Prediction Research, as well as geodetic control research. Measurements of the networks, which used to study crustal movements in northwestern Turkey (*Uğur, 1974; Öztürk et al., 1987; Deniz et al., 1993; Eren, 1983*). Recently *Aksoy & Deniz (1997)* reviewed all the data of these networks and display up to date results (Fig. 2.30). Under foundation of Boğaziçi University, three micro-geodetic networks



Figure. 2.30. The position of traditional geodetic networks where activities have been carried out (after Aksoy and Deniz, 1997) and 3 micro-networks (black filled rectangles) installed by B.U. KOERI.

were installed around the east of the Marmara Sea to detect crustal motions that could be related with NAF by B.Ü. KOERI (Boğaziçi University, Kandilli Observatory and Earthquake Research Institute) (Fig. 2.30).

SLR (Satellite Laser Ranging)

The WEGENER-MEDLAS (Working Group of European Geoscientists for the Establishment of Networks for Earthquake Research - MEDiterranean LASer ranging) Project was started in 1985 by European Institutions (*Wilson & Reinhart, 1993*). On the Eurasian plate a number of sites were occupied by mobile laser systems (SLR) during the WEGENER-MEDLAS campaigns from 1986 to 1989 (Fig. 2.31) (see *Wilson & Reinhart, 1993; Smith et al., 1994; Noomen et al., 1995a,b*). The SLR station coverage in the eastern Mediterranean provides



Figure. 2.31. SLR stations of WEGENER-MEDLAS network in Aegean-Anatolian area (Wilson and Reinhart, 1993).

some information on broad-scale plate motions (Noomen et al., 1991, 1995a,b; Cenci et al., 1993). In Turkey and Greece SLR measurements were taken between 1986-1989 for ten sites (Wilson & Reinhart, 1993; see also Oral, 1994; Smith et al., 1994; Straub & Kahle, 1997) (Figs. 31, 32). Jackson et al. (1994) compared the earthquake moment vectors with the measured velocities of SLR in the Aegean region. Since 1988, GPS experiments have been conducted simultaneously with the SLR observations in the Aegean region. Oral et al. (1993,

1995) and Oral (1994) found consistency of the SLR measurements with GPS data for the "Anatolian plate".



Figure. 2.32. SLR horizontal velocities and their confidence ellipses in a Eurasia-fixed reference frame for the period 1986-1990 (after Oral, 1994).

GPS (Global Positioning System)

Greece

A collaborative GPS-Project called West Hellenic Arc and Calaxian Arc Tectonics (WHAT A CAT) was started to determine the crustal strain rates along the western South Aegean Arc (SAA) (*Kahle et al., 1993*). Various institutions from Germany, Greece, Italy and Switzerland are conducting the project. In 1989 the first extensive GPS campaign along the western SAA was carried out by the National Technical University, Athens, Greece, and the ETH, Zurich, Switzerland. GPS stations were also connected to WEGENER-MEDLAS stations (*Kahle et al., 1993*). By using this network at two epochs (1989 and 1993) *Kahle et al. (1995)* described the strain field of southwestern mainland Greece and the Ionian islands (northwest of the western South Aegean Trench) (Fig. 2.33). A permanent network has been installed, which was designed to monitor the ongoing deformation across the KFZ

(Kephelania Fault Zone) and the SAA by Peter et al. (in press) (see Mueller et al., 1997). Relative displacement vectors for the western Aegean (Greece) were determined by Davies et al. (1994) using GPS receivers in 1992. For the southern Aegean region, GPS measurements have been presented by Kastens et al. (1993, in press) and Gilbert et al. (1994).



Figure. 2.33. GPS horizontal velocities and their confidence ellipses relative to MATE (Matera) for the period 1989-1993 (after Kahle et al., 1995).

Co-seismic displacements of the 1995.05.13 Kozani-Grevena Earthquake, Greece, were measured by *Clarke et al. (1997)*, using a limited number of GPS stations. This method was used for the first time on fault plane determination in the Aegean region.

Turkey

GPS measurements were started in the western Turkish mainland in 1988 (Oral, 1993). Surveys carried out in Turkey and surrounding area in 1988, 1989, 1990, 1991, 1992 and 1994 have been most recently published by *Reilinger et al.* (1997) (see also, Oral et al., 1993, 1995; Oral, 1994). In 1996 extensive GPS campaigns continued at the previously measured stations (Fig. 2.34) (Mueller et al., 1997). Several universities in Turkey (Hacettepe University, Boğaziçi University and İstanbul Technical University) contributed to the collection of data. Durham University (England), IfAG (Germany) and ETH-Z (Switzerland) conducted GPS experiments in Turkey. There is a summary by Lenk (1995) of space-based geodetic research activities in Turkey. Oral et al. (1993) presented the first results of GPS measurements of regional crustal deformations in Turkey, based on 1988 and 1990 data from western Turkey. They combine the GPS measurements in Turkey with more widely spaced SLR data that provide valuable information for quantifying the diffuse deformation in the eastern Mediterranean. Oral et al. (1995) display velocity vectors in both western and eastern Turkey, using 1988, 1990 and 1992 observations (see also Oral, 1994). They present crustal velocities of the "Anatolian Plate" by combining their results with independent SLR measurements.

In northwestern Turkey 1990, 1992, 1994 and 1996 GPS campaigns were carried out across a dense network called the Marmara Sea Network (see *Straub & Kahle, 1994, 1997*). The results from the network are summarized by *Straub & Kahle (1997)* (see also *Straub & Kahle, 1995; Straub, 1996*) (Fig. 2.35).

Mueller et al. (1997) summarized all the geodetic studies in the Aegean region and surrounding area. *Mantovani et al. (1995)* critically reviewed SLR and GPS observations in the Aegean region. New GPS campaigns were recently started in the eastern Mediterranean, including also the Balkan region and northern Africa (see *Mueller et al., 1997*).



Figure. 2.34. GPS (Solid arrows) and SLR (open arrows) horizontal velocities and their 95% confidence ellipses in a Eurasia-fixed reference frame for the period 1988-1994 (after *Reilinger et al.*, 1997). Stations with their codes were denoted.


Figure. 2.35. Velocity field derived from the GPS campaigns of 1990, 1992, 1994, and 1996 in northwestern Turkey (after *Straub and Kahle, 1997*). The error ellipses reflect the formal errors.

2.9.2. General Interpretations

The challenge for many earth scientists is to geodetically observe motions across tectonic boundaries and in the interiors of plates, to find out the kinematics of the crust. Modern space geodetic techniques (VLBI, SLR, GPS) have made it possible to measure directly the ongoing rates of the moving plates over long distances (some thousands of kilometers) even though the magnitude of the displacements is relatively small. Until recently, the only way to attempt a reconstruction of the kinematic pattern of such a system was based on the analysis of types and rates of deformation along plate boundaries inferred from geological and geophysical observations, from earthquake focal mechanisms and from terresial geodetic measurements. Geodetic measurements, more recently those using satellite geodesy, provide constraints on the displacement of reference points installed over the Aegean region.

SLR results give a good pattern of the large-scale deformation in the eastern Mediterranean consistent with GPS results (*Oral, 1994; Oral et al., 1995; Le Pichon et al., 1995; Reilinger et al., 1997; Mueller et al., 1997*). However, the SLR network is not sufficiently dense to delineate the details of deformation associated with ongoing continental collision (*Noomen et al., No*

al., 1991, Oral et al., 1993). The Global Positioning System (GPS) is currently a recent and fast developing geodetic tool (*Straub & Kahle, 1997*). It involves 21 satellites (plus 3 reserves), which emit radio signals (*Straub & Kahle, 1997*). SLR site distribution in the eastern Mediterranean is rather sparse due to the high cost of transporting and operating a mobile system (*Oral, 1994*). On the other hand, GPS is a cheap, easy and sensitive method (*Oral, 1994*). To get better results from satellite geodetic measurements more repeted measurements with more stations must be made. Neither method is useful for estimating vertical movements. It is important to note that the deformation rate found by using geodetic systems is not constant so that the calculated reconstructions may not be true for the longer periods.

From GPS and SLR data Oral et al. (1995) and Le Pichon et al. (1995) modeled the velocity field of the Anatolian region as a counter-clockwise rigid rotation about an Euler pole located in northern Egypt (near the Sinai Peninsula) relative to Eurasia (see also Oral et al., 1993; Noomen et al., 1993; Oral, 1994; Le Pichon et at., 1995; Cianetti et al., 1997; Reilinger et al., 1997). At least 90 per cent of the motion of Anatolia can be accounted for by such rotation (Reiliniger et al., 1997). Sites west of the Karliova triple junction have a tendency to a more westerly directed motion which becomes progressively more pronounced to the W-WSW with stations indicating SW oriented rates in southwestern Turkey (Reilinger et al., 1997; Mueller et al., 1997) (Fig. 2.34). However, the lengths of the vectors are not all the same. Residual velocities appear to increase toward the SAA (Fig. 2.34) (Oral et al., 1995; Reiliniger et al., 1997). A 2 mm/yr internal deformation is observed on the "Anatolian Plate". On the basis of the GPS and SLR velocities Reiliniger et al. (1997) suggest that the motion of the Anatolian-Aegean region may be best described in terms of a single plate (Anatolian Plate) in whose western part (the Aegean region) gradual deformation is taking place internally (south increasing N-S extension) (Fig. 2.34). Even in the Marmara region the highest rates, which are considered as the overall motion of the Anatolian block, are found in the southern part of the Marmara Sea relative to Eurasia (Fig. 2.35) (Straub & Kahle, 1995, 1997 see also Mueller et al., 1997). Further SW the stations in the southern part of the Aegean Sea, south of a line from Evvoia to Chios, are moving at a rate of about 40-45 mm/yr to the SW relative to the Eurasian plate (Mueller et al., 1997). This area is also undergoing SW-NE extension in the same direction as the slip vectors on the strike-slip faults in the North and central Aegean (Figs. 2.29, 2.33, 2.34) (Billiris et al., 1991). The kinematic field of western Greece, relative to South Italy, is characterized by a negligible motion north of the Kephalonia fault zone (KFZ). Clarke et al. (1997) observed that the extension in the western part of the Corinth rift is greater than that on the eastern part (e.g., Fig. 2.29). This indicates that, in the southwestern part of the Aegean Region, clockwise motion is taking place. *Mueller et al. (1997)* argue that in the area south of the Evvoia-Chios line the motion is essentially homogeneous. On the other hand *Billiris et al. (1991)* and *Clarke et al. (1997)*, who used terresial systems, argue that the area is under going SW-NE extension.

According to the GPS and SLR data, the leading edge of the African plate is being subducted along the SAA at a higher rate than the relative northward motion of Africa (*Oral et al.*, 1995). This result is very important because this kind of behavior in subduction systems is an essential indicator of retreat of slab (*Royden*, 1993a,b).

2.10. GRAVITY SURVEY

2.10.1. Data

Source information for gravity data discussed below are listed in Table 2.6.

Table 2.6. Gravity data in the Aegean area

References	Data source (Numbers from No column. No indicate data source number)	<i>Locations</i> EAST MEDITERRANEAN AEGEAN REGION	Νο
Makris (1973)	18+14	Aegean Sea, Turkey and Greek mainland	16
Makris and Stobbe (1984)	+ data from Greek institutions		Fig. 2.43, 2.44
Chailas et al. (1992)		Aegean Sea, Turkey and Greek mainland	23
Lagios et al. (1988)	IGME and DEP	Greece and Aegean Sea	21
Morelli (1990)	IBCM, 1989		22
Needham et al. (1973)		North Aegean Sea	17
Vogt and Higgs (1969)		Aegean	13
Genç et al. (1996a)	altimeter data from ERS1	Aegean Sea	26 Fig. 2.39
Allan and Morelli (1965, 1970, 1971)	4+15+SACLANT ASW	Aegean Sea	14 Fig. 2.36
Morelli et al. (1975)			
Morelli (1990)			
Finetti and Morelli (1973)			
Cassinis (1941)		Ionian Sea to Aegean Sea	3
Elbek (1952, 1963)	1999-1	Turkish mainland	6
Özelçi (1973)	15+MTA	Turkish mainland	18 Fig. 2.41
Akdoğan (1995)	MTA	Turkish mainland	25
Oral (1987)	HGK and MTA	western Turkey	20
Genç et al. (1996b)	MTA	western Turkey	27 Fig. 2.41
Canitez (1962)	<u></u>	NAF	10
Şalk (1994)	Magsat data	western Turkey and the Aegean Sea	24
Woodside and Bowin (1970)	12+ ACIC	western Turkey and South Aegean Sea	15
Woodside (1975)	12+18+15+C.I.M.	western Turkey and Southeastern Aegean Sea	19 Fig. 2.38

Mediterranean and South Aegean Sea

Vening-Meinesz (1932)		1
Cassinis and de Pisa (1935)		2
Fleischer (1964)		4
Cooper et al. (1952)	HMS TALENT	5
De Bruyn (1955), Harrison (1955)	pendulum data	7
Fisher and Hess, (1963)		
Girdler and Harrison (1957)		8
Worzel (1959)	pendilum data	9
Morelli et al. (1967)		11
Woollard and Rose (1963)		
Woodside (1968)	1+2+3+4+5+8+9+W.H.O.I.	12
Rabinowitz and Ryan (1970)		



Figure. 2.36. (A) Bouguer and (B) free-air gravity anomaly charts (after Allan and Morelli, 1971).

In an early study Cassinis (1941) observed the large gravity gradient across the Ionian Sea to



Figure. 2.37. Free-air gravity anomaly map of the south Aegean and surrounding area (from *Rabinowitz and Ryan, 1969*). Diagonal parallel lines represent negative anomalies; the dotted pattern positive anomalies.



Figure. 2.38. Combined free-air anomaly of Eastern Mediterranean Sea beneath southeastern Aegean region (from *Woodside*, 1975).



Figure. 2.39. Free air anomaly map of Aegean (after Genç et al., 1996a).

the Aegean Sea. The British submarine HMS TALENT (*Cooper et al., 1952*) made further submarine gravity measurements in the eastern Mediterranean that covers the south of Aegean Sea. For the South Aegean, Fleischer constructed a map of free air gravity anomalies in 1946 (see *Fleischer, 1964*). Some gravity measurements were made with the pendulum apparatus aboard submarines and were used in the isostatic gravity maps of the *De Bruyn (1955)*, *Harrison (1955)* and *Fisher & Hess (1963)*. Worzel (1965) has summarised and catalogued the pendulum data along the South Aegean Trough (SAT). During the period 1961-1965 co-operative cruises between SACLANT ASW Research Centre, La Spezia, and Osservaterio Geofisico Sperimentale, Trieste, resulted in data that cover most of Aegean Sea (Allan & Morelli, 1970, 1971; Morelli et al., 1975; Morelli, 1990). Contour charts of free air and Bouguer gravity anomalies have been constructed a scale of 1:750,000 with 20 miligal

contours (Fig. 2.36) (Allan & Morelli, 1965, 1970, 1971; Finetti & Morelli, 1973). Allan & Morelli (1970, 1971) published the data that cover all the Aegean region. However, the data of Finetti & Morelli (1973) also cover part of the Aegean Sea. Another gravimetric study was by Needham et al., (1973) in the North Aegean Sea. Some of the surface ship gravity profiles were obtained in 1964 and 1966 aboard the R.V. "Robert D. Conrad" of Lamont-Doherty Geological Observatory, during a reconnaissance survey of the Mediterranean by the Woods Hole Oceanographic Institution (W.H.O.I.). The resulting free air gravity data (Woodside, 1968, Rabinowitz & Ryan, 1970) cover part of the South Aegean region (Fig. 2.37). The authors estimate the value of the gravity measurements has an accuracy of 5 miligal. Woodside & Bowin (1970) combine preliminary data of Osservatorio Geofisico Sperimentale of Trieste (O.G.S.T.) with the data of Woodside (1968). They also combine these data with land data obtained from the world gravity holdings of the Aeronautical Chart and Information Centre (ACIC) of the U.S. Government. For the purpose of studying the distribution of gravity anomalies which include south and north of Crete. Rabinowitz & Ryan (1970) firstly collated their gravity data with data from published pendulum measurements of Vening-Meinesz (1932), Cassinis & Pisa (1935), Cassinis (1941), Cooper et al. (1952), Girdler & Harrison (1957), Fleischer (1964) and Worzel (1959). Allan & Morelli (1971) included their gravity data (1961-1965 co-operative research) with those of Fleischer (1964) and Woodside & Bowin (1970). The density of the survey information that cover most of the Aegean region was designed to be similar to that of the adjacent surveys carried out for the NATO Subcommittee on Oceanographic Research (Allan & Morelli, 1971). Cambridge had made an international commitment to the C.I.M. (Cooperative Investigation of the Mediterranean). This study covers the south of the Aegean and western Anatolia (Woodside, 1975). Woodside (1975) put these results and earlier data (Woodside, 1968, Rabinowitz & Ryan, 1970) together (Fig. 2.38) to be issued by the Intergovernmental Oceanographic Commission (IOC) of UNESCO. Morelli (1990) printed a Bouguer Gravity Anomaly map (1: 1.000,000, 10 sheets) in 1989 for the Aegean region. A free Air Anomaly (FAA) gravity map derived from the Marine Bouguer Anomaly maps, IBCM (International Bathymetric Chart) (IBCM, 1989) and the bathymetric maps (IBCM, 1981) (see Truffert et al., 1993). Sandwell & Smith (1992) collected altimeter data from ERS1 and converted them to free-air anomaly, covering all the oceans of the world.

Makris (1976) presented some two-dimensional crustal sections across the Aegean region developed by gravity computations with deep-sea sounding. Agarwal et al. (1976) interpreted





Figure. 2.41. Bouguer gravity map of western Turkey and surrounding area (after *Genç et al., 1996*). Contour interval is 5 mgal.

Figure. 2.40. Bouguer anomaly map of south and east Aegean region and Mediterranean region (from *Özelçi*, 1973).

a two-dimensional gravity profile across the island of Karpathos in terms of a dipping plate in the upper mantle. *Gregersen & Jaeger (1984)* also made a 3-D gravity calculation for a dipping lithospheric plate. Gravity anomalies were also presented for the Central Aegean Sea, Turkey and Greek mainland by *Chailas et al. (1992)*. *Genç et al. (1996a)* published these data for the Aegean Sea area (Fig. 2.39). The gravity map prepared by *Genç et al. (1996a)* has the higher resolution than previous maps for the Aegean (Fig. 2.39). They calculate crustal thickness by using inversion techniques in gravity data from the more detailed regional anomaly map. *Tsokas and Hansen (1997)* also calculate crustal thickness of the central and eastern Aegean region.



Figure. 2.42. Free-air gravity anomaly map of northwestern Turkey (after Aygül and Genç, 1998). Contour interval is 10 mgal.

Turkish Mainland

Several measurements have been made at major cites (*Elbek*, 1952, 1963), and at a few gravity base stations tied in to the world gravity net (*Woollard & Rose*, 1963). A few measurements have been made in the region of the North Anatolian Fault (NAF) (*Canttez*, 1962). He used the gravity method to infer the crustal thickness of the NW Anatolia. *Özelçi* (1973) combined *Woodside & Bowin* (1970) data with the data of MTA in Turkey (Fig. 2.40). The Bouguer anomalies in Turkey were obtained from the Cambridge survey (*Woodside*, 1975) during June and early July of 1973, with contours and trends beyond the limits of that survey supplied from the work of *Özelçi* (1973) (*Woodside*, 1975). Oral (1987) used maps prepared by the Mapping Service of the Turkish Army (HGK) and MTA. MTA used approximately 5 km station spacing whereas this was 10 km or more in the HGK and MTA data. Oral (1987) stripped the Bouguer anomalies in western Anatolia and took profiles that indicate several surface geological features such as basins filled with Quaternary



Figure. 2.43 Bouguer gravity map of Aegean and surrounding area (Makris and Stobble, 1984).



Figure. 2.44. Bouguer gravity map of Greece and surrounding area (after *Makris*, 1985).

and Neogene sediments. *Şalk (1994)* considered Bouguer gravity and Magsat data to prepare a Bouguer gravity map (1 / 5000000) of western Turkey and the Aegean Sea. *Şalk (1994)* calculated crustal thickness over the Aegean Sea and western Turkey and took some profiles. *Akdoğan (1995)* prepared a Turkish Bouguer Anomaly Map from MTA data. *Sarı & Şalk (1995)* also analysed the depth of the metamorphic basement of grabens in West Turkey by 2-

D and 3-D gravity inversion techniques. *Sarı & Ergün (1985)* made a 3D analysis to obtain discontinues in the crust beneath the Saros Bay by using a gravity inversion method (see also *Sarı et al., 1995*). *Genç et al. (1996b)* compiled gravity data from measurements of MTA (65.000) with maximum 5 km interval (Fig. 2.41). *Klingele & Medici (1997)* produced a stripped gravity map of northwestern Anatolia. Gravity data around the Marmara Region have been investigated by *Aygül & Genç (1998)* (Fig. 2.42). They try to minimize artificial effects in merging processes by analyzing data sets. They used land gravity data that were taken from the TÜBİAK YDABCAG 237/G project. Marine gravity data used by them were obtained from *Sandwell & Smith (1992)*, based on altimeter data. *Demirel et al. (1998)*, by using the "Bouguer gravity map of the western Anatolia" that was prepared by the General Command of Mapping and the Directorate of Mineral Research and Exploration, studied the Merle and Enez deltas.

Greek MainlandA Bouguer map with new data, by *Makris (1973)*, covers all the Aegean Sea and Greek mainland (Figs. 2.43, 2.44) (see also Makris & Stobbe, 1984). It includes all available gravity data collected by a number of Greek institutions for the Greek mainland. It has been extended the data for the sea areas around Greece by surveys published by *Finetti & Morelli (1973)* and to western Turkey by *Özelçi, 1973* (see Makris & Stobbe, 1984). Tsokas and Hansen, (1997) used mainly the data of the Institute for Geology and Mineral Exploration of Greece (IGME) and the Greek Public Petroleum Company (DEP) which were taken from *Lagios et al. (1988)* (Fig. 2.45). *Tsokas and Hansen, (1997)* computed the gravity effect of the crust and extracted it from the Bouguer anomaly. They also extracted the gravity effect of the subducting lithosphere model from the Bouguer anomaly. The remaining anomalies appear to be related to near-surface features and an area of low-velocity mantle in the central Aegean Sea. The map was reproduced from the 4 km grid interval data, which are available to the public.



Figure. 2.45. Bouguer gravity anomaly map of Greece and surrounding area (after Tsokas and Hansen, 1997).

2.10.2. General Interpretation

There is not yet a map with ERS1 and the land data displayed in the region. One of the most common applications of gravimetry is the determination of lateral density distribution, i.e. the geometry of structures, such as the size of an intrusive body, the thickness of the sediments filling a basin, or the depth of the crust-mantle boundary. In the qualitative interpretation of gravity anomalies, the first rule is to try to separate the long-wave anomalies from the short-

wave ones: in the relative sense, the long-wave anomalies are due to deeper mass variations, the short-wave anomalies are on the other hand due to shallower ones. The gravity stripping technique is primarily aimed at modeling the effects of surface geology such as sedimentary basin fills. To do that the long wavelengths are reduced. The short wavelength gravity decreases the effects of the deep structures. The resulting anomaly with short wavelengths the signature of some ultrabasic rocks, ophiolite zones or, sedimentary basins near the surface. The filtering techniques are aimed at reduce by short wavelengths effects. This reveals deeper effects of the mass.

Where the Aegean region has the thinnest crust the Bouguer Gravity values become positive and bathymetric depth maximal (Fig. 2.18, 2.43). Generally, a large positive Bouguer anomaly of gravity is observed in the Cretan basin, while negative anomalies are observed on the Turkish and Greek mainlands (e.g., Fig. 2.43) (Makris, 1976). Except for the partly undercompensated coastal area with a positive anomaly in the Turkish mainland (Fig. 2.43) (Özelçi, 1973; Makris, 1985; Oral, 1987), the Aegean region is generally in approximate isostatic equilibrium (Oral, 1987). The positive Bouguer gravity anomaly that is observed in the western tip of the Turkish mainland (*Rabinowitz & Ryan*, 1970; Özelçi, 1973; Şalk, 1994) is interpreted as the eastern limit of the positive anomaly belt that has been identified as the back of the South Aegean Island Arc. In addition, the Sea of Marmara and north of it gives rise to positive anomalies in contrast to the expected (negative) Bouguer anomaly that would indicate isostatic equilibrium for lands (Fig. 2.43). The zero contour of the Bouguer gravity anomaly follows the trend of NAF at the eastern parts of the Sea of Marmara because of the basin fill (Salk, 1994). The anomaly decreases eastwards with a smooth gradient in Turkey (Özelçi, 1973; Salk, 1994). Negative Bouguer anomalies are observed all over the Greek mainland (Fig. 2.43) (Makris & Stobbe, 1984). In the Greek mainland the situation is different from that observed in the western coast of the Turkish mainland (Salk, 1994). The area is exactly in isostatic equilibrium beneath Menderes Massif where relatively higher gravity values are observed as a result of mantle rise and the effects of magmatic rocks near the surface (Salk, 1994). In the Gediz and Menderes Massifs in western Turkey, which have generally E-W trends, large areas are identified with negative Bouguer anomalies (Fig. 2.41) (Salk, 1994). Lort (1971) suggested that the Mesozoic granitic bodies exposed in western Turkey possibly continue into the sea, based on gravity anomaly patterns (see also Ercan & Kiliçer, 1998). Also in the Marmara region, high gravity anomalies are observed. Oral (1987) suggest denser material beneath the axis of the gravity high in the Marmara region (see also *Lyberis*, 1984).

The pattern of the gravity anomalies indicates the existence of a fracture zone running from the northern Evvoia Gulf across the Sperchios Valley and the Greek mainland to the Gulf of Preveza (Fig. 2.44) (*Makris, 1977*). This is also the case along the Gulf of Corinth between the Greek mainland and the northern coast of the Peloponnesos (*Makris, 1977*). From the behavior of the gravity field, *Makris (1977)* separated the ophiolites of the Greek mainland into two groups: one consisting of the ophiolites of the Pindos Mountains and North Evvoia and the second consisting of the Vourinos Complex and the ophiolites of the Vardar Zone along the Chalkidiki Peninsula. These areas are characterised by positive Bouguer values (*Makris, 1977*). Results of *Makris (1977)* indicate that all Greek ophiolites have been moved out of their original position and that their maximum thickness does not exceed 2.5 km (*Makris, 1977*). On the other hand, along the Greek-Bulgarian border, the gravity field becomes negative with values of approximately -60 miligal at the Rhodopi crystalline massive (*Makris, 1977*).

In the Aegean Sea the isogravity lines are less dense than over the surrounding land areas, so the variations are seen more easily (*Makris*, 1985). Strong positive Bouguer anomalies exist over the Aegean Sea that are not seen on land areas (*Fleischer*, 1964; *Rabinowitz & Ryan*, 1970; Allan & Morelli, 1971; Özelçi, 1973; Makris, 1973, 1976; Agarwal et al., 1976; Morelli, 1990; Şalk, 1994) (Fig. 2.43). Two main zones in the area can be divided according to the gravity anomalies: in the south high Bouguer gravity anomalies (75 miligal) and to the north low gravity anomalies (0 Miligal) (*Genç et al.*, 1996a) (Fig. 2.39). The highest values (+175) are measured in the Cretan Basin (*Makris*, 1978a). In the central Aegean Sea values range between +100 and +50 miligal (*Makris*, 1985). Makris (1977) found a series of gravity maxima in the Cretan graben. On the other hand, using MAGSAT spacecraft data, Şalk (1994) found low gravity anomalies trend ENE-WSW direction.

A narrow zone of large negative (0 to 80 miligal) gravity anomalies marks the southern edge of the Aegean region. It is parallel to the island arc and along the South Aegean and Pliny-Strabo trenches from western Greece to the Rhodes abyssal plain (e.g., Figs. 2.39, 2.43) (*De Bruyn, 1955; Harrison, 1955; Fisher & Hess, 1963; Worzel, 1965; Woodside & Bowin, 1970; Allan & Morelli, 1971; Agarwal et al., 1976*). Relatively high anomalies (free-air anomaly as

high as -60 miligal and Bouguer anomaly of +100 to + 140 miligal) centered over the Anaximander seamounts separate the arcuate low south of Crete from a similar trend south of Cyprus (Fig. 2.37) (*Woodside & Bowin, 1970; Rabinowitz & Ryan, 1970; Ergün et al., 1998*). The region over Köyceğiz demonstrates the negative anomalies that appear in contrast to the surrounding (western Turkey) characteristic positive Bouguer gravity field, which could be related to a subduction zone (Fig. 2.41) (*Özelçi, 1973; Şalk, 1994, Woodside, 1975; Oral, 1987*).

The regional Bouguer anomalies are positive in the Mediterranean Sea (Morelli, 1990; Şalk, 1994). The strongest positive Bouguer anomalies exist over the Ionian sea (Fig. 2.43) (De Bruyn, 1955; Fahlquist, 1963; Woodside & Bowin, 1970; Makris, 1976; Morelli, 1990; Şalk, 1994). According to Morelli (1990) a very thin oceanic crust with a very thick sedimentary cover exists in the Ionian abyssal plain. In the Herodoutos abyssal plain the crust was modeled by Şalk (1994), using gravity data, oceanic. On the other hand Morelli (1990) pointed out that the Adriatic Promontory has a continental crust.

2.11. MAGNETIC STUDIES

2.11.1. Data

During 1957-1958, the Magnetics Division of the U.S. Naval Oceanographic Office made an aeromagnetic survey to prepare total magnetic field intensity charts of most of the eastern Mediterranean (Vogt & Higgs, 1969; Lort, 1971). The first aeromagnetic surveys conducted over the Turkish mainland were by MTA (1960-1961). The data collection was made by Canadian Aeroservice (Hutchison et al., 1962; see also Aydın & Karat, 1995). Data on total magnetic-field intensity have been obtained from marine surveys made by Saclant ASW Research Centre, La Spezia and the Ossenaterio Geofisico Sperimentalle, Trieste from 1961 to 1965 (Allan & Morelli, 1965, 1971; Finetti & Morelli, 1973). It is presumed that marine data are more reliable for detailing features in the Aegean region because of the dense tracking of the ships (see Lort, 1971). In 1966 an extensive Ferro field exploration survey was started in western and eastern Turkey (see Aydın & Karat, 1995). The intervals between profiles are set according to the lithologic structures (Genç et al., 1996b). Sanver (1975) prepared a filtered magnetic map for western Turkey. Ergün (1977) reviewed the magnetic data obtained by MTA in Marmara and Saros. Agocs (1977) obtained an airborne magnetometer profile that crossed the Marmara Sea from Lake Manyas to Yeşilköy Airport (S-N). The magnetic data of Greece and surrounding area have been published by Makris (1985) (Fig. 2.46). The Intergovernmental Oceanographic Commission (IOC) of UNESCO issued an overprint of existing Magnetic Anomalies (1993). Between 1978 and 1989 a new aeromagnetic survey was made in Turkey (Aydın & Karat, 1995). Şalk (1994) prepared magnetic maps from Magsat data obtained from the British Geological Survey covering the area between 25°-45° E longitudes and 35°-45° N latitudes collected by the Magsat Spacecraft (Satellite magnetometer). Salk (1994) used no magnetic data (Vogt & Higgs, 1969; Allan & Morelli, 1971) from conventional aeromagnetic surveys. Genç et al. (1996b) converted the analog data that had been collected in 1966 in western and eastern Turkey (see above) to digital. The data was sampled with 2.5 m interval from this map (Genç et al., 1996b). They mixed this data with previous data for the Aegean Sea (Finetti & Morelli, 1973) (Fig. 2.47, 2.48). However, the resolution of the sea data is smaller than the resolution of land data. To adapt the two groups of data Genç et al. (1996b) reduce the land data to the sea data interval.



Figure. 2.46. Magnetic map of Greece (after Makris, 1985).



Figure. 2.47. Magnetic anomaly map of western Turkish mainland and surrounding area (after *Genç et al., 1996b*). Contour interval is 2.5 nT.



Figure. 2.48. Magnetic anomaly map of Aegean and surrounding area (after Genç et al., 1996a).

2.11.2. General Interpretation

An aeromagnetic survey of most of the eastern Mediterranean reveals a large region south of the South Aegean Arc (SAA), which is unusually undisturbed by anomalies (smooth field) and of low amplitude (Fig. 2.48) (*Vogt & Higgs, 1969*). No patterns of magnetic lineation are as distinctive as those over the oceanic ridges (*Allan & Morelli, 1971*). Processes that could have erased magnetisation contrasts are related to the tectonic deformation in the

Mediterranean Sea floor (ie metamorphism or intense fracturing of the magnetic skin on the oceanic crust). *Allan & Morelli (1971)* suggest that this is because a thick sedimentary crust was created by compression between Africa and Europe.

In contrast, the concave side of the South Aegean Volcanic Arc (SAVA) in the Aegean Sea is characterised by regular short-wavelength anomalies (Fig. 2.48) (*Vogt & Higgs, 1969; Allan & Morelli, 1970, 1971; Rabinowitz & Ryan, 1970; Woodside & Bowin, 1970; Finetti & Morelli, 1973*). These anomalies can be related to intrusives of magmatic and granitic masses. (*Caputo et al., 1970; Şalk, 1994*). Linear belts of anomalies coincide with structural trends in the lines of Hercynian granites of the Aegean (*Lort, 1971*). Relatively undisturbed magnetic anomalies occur in the Aegean Sea north of the shallow trough that is between Crete and the SAVA (Fig. 2.48). The magnetic field is smooth (*Vogt & Higgs, 1969*) but relatively high (*Emery et al., 1966*) in the area.

The active volcanic arc zone (SAVA) is remarkable with high magnetic anomalies (*Maley & Johnson, 1971*). The other intense positive magnetic anomalies observed in the Aegean Sea occur along the North Aegean Trough (NAT) (Fig. 2.48) (*Vogt & Higgs, 1969; Şalk, 1994*). This suggests that it may be a tensional graben along which magnetised rock has been intruded (*Vogt & Higgs, 1969*). Allan & Morelli, (1970) suggested that this trough probably represents new crust, which is presently being created in a similar way to that of the Red Sea rift (see also Allan & Morelli, 1971). But no magnetic lineation like that in mid-oceanic ridges exists along this trough.

The filters eliminate very short wavelengths, sharp anomalies, and rapid variations that depend on surface structures. In all filtered maps of *Şalk (1994)*, the major magnetic anomalies show trend of NE-SW direction at the western Turkish mainland and values increase toward to north (see also *Sanver, 1975*). Important positive magnetic anomalies are observed in NW Turkey (from Biga peninsula to Thrace region), along the İzmir-Ankara ophiolite zone and the Massifs in western Turkey (Fig. 2.47) (Menderes, Gediz, Kazdağ and Uludağ) *Şalk (1994)*. These magnetic anomalies are associated with the granodiorites and the andesitic volcanism, which resulted from active faulting in the region due to extensional tectonics (*Şalk, 1994*). A positive anomaly belt follows the North Anatolian Fault (NAF) zone (*Şalk, 1994*). The filtered magnetic map of *Sanver (1975)* allows comparison of anomalies with volcanic cumulations (see also *Hisarlı, 1995*). Observed NE trending anomalies in the

Aegean Sea may reflect the southwestward extension of Mesozoic igneous complexes from Turkey, and Cenozoic volcanic activity (*Vogd & Higgs, 1969*). A magnetic profile of *Agocs* (1977) in the Marmara Sea shows that a major normal fault is indicated north of and parallel to the south coast of the Marmara Sea.

The Teke domain, indicated by a negative anomaly, which has been considered as an relic of the old oceanic crust of the African plate is placed at the south of the positive anomaly along the Fethiye–Burdur fault zone (*Şalk, 1994*). SW Turkey is considered the transition zone from positive magnetic values to negative magnetic values (Fig. 2.47) (*Şalk, 1994*).

2.12. MAGNETOTELLURIC

2.12.1. Data

Thrace (northwestern Turkey)

In 1976, magnetoteulliric measurements were made of 9 sites in the Thrace peninsula, (1976), from Kırklareli to Tekirdağ (*İlkışık et al., 1996*). The sedimentary and crustal thicknesses were determined from these results (see Table 4.1). In 1980 some additional magnetotelluric soundings were performed in the area (T in Fig. 2.49) (see *İlkışık et al., 1996*). Results show variations of crustal thickness (see Table 4.1).In 1995 changes of the magnetoteulliric field with time were measured at 40 stations in Thrace by the Türkiye Ulusal Deniz Jeolojisi and



Figure. 2.49. The locations of magnetotelluric profiles in western Turkey (1975-1990) (after *İlkışık et al.*, 1996). See text (Section 2.12) for detail.

Jeofiziği Araştırma Programı (National Marine Geology and Geophysics Research Program) (*İlkışık et al., 1996*). The stations are along a 20 km profile (NE-SW) from the Black Sea to the Aegean Sea (Fig. 2.49).

North Anatolian Fault Zone (northwestern Turkey)

In 1983 and 1984 magnetotelluric data were collected at 11 stations in north-northwestern Turkey at two different locations. Six of the sites lie on a profile approximately normal to the North Anatolian Fault Zone (NAFZ) near İzmit (D in Fig. 2.49) (*İlkışık et al., 1996*). The remaining five sites lie to the SE of Zonguldak (J in Fig. 2.49) (*İlkışık et al., 1996*). The measurements cover an approximate depth range of 2 to 100 km (*İlkışık et al., 1996*).

Western Taurudes (southwestern Turkey)

In 1984 and 1985 magnetotelluric measurements were made at 45 sites along 3 profiles in western Tourides, which are approximately normal to the thrust font of the Lycian Naples on the Bey Mountains autochthon and Menderes massive (E, K, H in Fig. 2.49) (*İlkışık, 1990b*).

Western Turkey

In Salihli and Alaşehir magnetotelluric measurements were made for geothermal studies (see *İlkışık et al., 1996*). These measurements in the Gediz graben allow an estimation of crustal thickness (Table 4.1).

Greece

The magnetotelluric sounding method was employed at 15 sites in the Gulf of Corinth, Central Greece, to investigate the electrical properties of the crust and upper mantle.

Ilkışık et al. (1996), who reviewed magnetotulliric studies in Turkey and near environs noted that, in 1986 in Milos island in the Aegean Sea, detailed magnetotelluric studies were made by four European Institutes (*İlkışık et al., 1996*).

2.12.2. General Interpretation

Crustal thickness determined from site measurement is included in Table 4.1. The shape of the Lycian Naples and the deep structure of the thrust-front and the structural connection between the Likya Naples and the Menderes massive can be deduced from the 1984-1985 magnetotulliric measurements (*İlkışık, 1990b; İlkışık et al., 1996*) (see Fig. 2.49). The other finding is the shear zone of Fethiye – Burdur (NE-SW) (*İlkışık, 1990b; İlkışık et al., 1996*). The southern edge of the Menderes Masif lies beneath the Gölhisar area (*İlkışık, 1990b; İlkışık et al., 1996*).

2.13. GEOELECTRICAL STUDIES

2.13.1. Data

MTA made geoelectrical studies to determine sediment thickness in Germencik-Aydın and Sarayköy-Denizli areas (*Turgay et al., 1980; Şahin & Ünay, 1981*). Recent geoelectrical studies carried out by MTA were mainly directed to the investigation of Neogen basins for shallow resources (*Şardar, 1995*). The Denizli Kızıldere, Aydın-Sultanhisar-Salavatlı and Aydın-Gemecik-İncirliova geothermal areas were examined by means of geoelectrical studies (*Yücel, 1995*). Recently, to obtain the two dimensional geoelectrical structure of the Büyük Menderes Graben and to illustrate the lateral geoelectrical discontinuities (possible faults), *Çağlar et al. (1998)* have used vertical electric sounding data. The study is continuing. There are many other local studies in the region.

2.14. HEAT FLOW

2.14.1. Data

Europe and Whole Aegean Region:

In 1977, Cermák & Hurtig (197?) prepared a map of the heat flow field in Europe (Fig. 2.50). This effort was followed by other studies (Fig. 2.51) (*Cermák, 1978, 1979; Cermák & Rybach, 1979*). Stobbe (1980), using heat flow map of Cermák (1979) (Fig. 2.51), represented some cross sections, which cut the Aegean region in various directions. They made corrections taking account of the sediment thickness and conductivity of the rocks. They displayed them with other correlative geophysical data (see Makris & Stobbe, 1984; Makris, 1985). Hurtig et al. (1990) prepared a European heat flow map. In this map, the data for Turkey comes from the study of Tezcan (1979) (Fig. 2.52).



Figure. 2.50. Heat flow map of Aegean and surrounding area.



Figure. 2.51. Heat flow map of the Eastern Mediterranean region (after Makris, 1985).

Turkey

In Turkey a survey and determination of the chemical composition of thermal springs and mineral waters was first made in 1961. The Mineral Research and Exploration Institute, Ankara, Turkey (MTA) (Çağlar, 1961), published the results. Geological and geophysical systematic studies of geothermal areas were started in 1962 by MTA. They contain more than 600 chemical analyses of hot springs and mineral waters and descriptions of their localities (see *Tezcan*, *1979*). A public "Association of Geothermal Energy, Ankara" was founded as late as 1971. A symposium held by this association in 1971 provided a survey of valuable research done in the thermal areas of Turkey (*Demirörer*, *1971*). *Tezcan* (*1979*) published a heat flow map of Turkey using thermal measurements in some bore-holes. In 1975, Istanbul University (I.Ü.) made thermal water inventory studies in Turkey. In 1979 *Tezcan* (*1979*) prepared preliminary heat flow maps for Turkey. MTA made thermal water inventory studies in 1980 and investigated all the thermal and mineral water spring groups in Turkey. In 1983



Figure. 2.52. Heat flow density distribution in Tukey (after Koçak, 1990).

Canik & Başkan (1983) prepared a map of mineral and thermal waters of western Turkey. Using empirical relationships between the seismic P-wave velocity and the heat production (Rybach & Buntebarth, 1982), several heat generation depth sections for different velocity data were determined for western Turkey (see Alptekin et al., 1990). These sections suggest that the major portion of heat generation in the crust in western Turkey is in the uppermost 10-15 kilometers (Alptekin et al., 1990). Simsek (1985, 1988) investigated total thermal and mineral water spring groups in Turkey. İlkışık (1989), made geothermal studies to find out the heat flow pattern of northwestern Anatolia. Tezcan & Turgay (1989) prepared preliminary heat flow maps for Turkey. Alptekin et al. (1990) pointed out a relationship between the high heat flow values, the high seismic activity and geological structures in western Turkey. *İlkaşık*, (1990a) determined a new heat flow map for western Turkey from silica contents and chemical contents of 187 thermal springs (Fig. 2.53, 2.54). Koçak (1990) explained relations between the geothermal systems and the graben structures in western Turkey. Şimşek (1990) listed total thermal and mineral water spring groups in Turkey. Tezcan & Turgay (1991) displayed a heat flow map of west and central Turkey based on 204 temperature soundings in oil, gas and coal wells and especially in deep geothermal wells. They also made investigations on the terrestrial heat flow density distribution. Rybach & Pfister (Straub et al., 1992) have been working on thermal research in the Marmara region (see also İlkışık, 1995). The main aim of the interdisciplinary MARMARA Poly-Project of the ETH Zurich (Switzerland) was to study tectonic activity and its relationship to the circulation of normal and geothermal waters, the distribution of zones with elevated seismicity and the spatial heat flow pattern



Figure. 2.53. Heat flow pattern in western Turkey (İlkışık, 1995).



Figure. 2.54. Silica heat flow density distribution in Turkey (after İlkışık, 1995).

(Schindler & Pfister, 1997). In 1994 MTA Geophysics Department started detailed a heat

flow project (Türkiye Isı Akısı Haritası Projesi) to made a detailed heat flow map of Turkey starting from western Turkey. For this project, besides sampling of old and new temperature and gradient logs, the temperature conductivity coefficient (K) of various core samples was measured (see İlkışık, 1995). İlkışık (1995) and Tezcan (1995) made investigations on terrestrial heat flow density distribution. İlkışık (1995) critically reviewed the heat flow studies in the Aegean region. Simsek (1995) listed and explained total thermal and mineral water spring groups in Turkey. Tezcan (1995) made geothermal studies related to the heat flow in Turkey. Hisarli (1995) determine Curie point depths in Edremit, Susurluk. Using a constant heat conductivity value, he calculated an approximate heat flow map for the area. In Turkey, heat flow values have been collected from thermal measurements taken in deep boreholes (*İlkaşık, 1995*). The map of Curie depth points was compared with the gravity, magnetic and geological maps of the area. A seismology group within the MARMARA Poly-Project (1997) recorded hydraulic level changes of the geothermal water system coinciding with the deformation of the earth's crust and seismic signal behavior (Greber et al., 1997). Pfister et al. (1997) studied the heat flow in the Marmara region to characterize the geothermal situation of this area by detailed regional (terrestrial) heat flow density mapping and thermal spring studies. High-resolution temperature logs and measurements of rock thermal conductivity were used to determine the terrestrial heat flow density and the thermal profiles. The search for available and suitable bore holes was made possible mainly with the help of some national organizations. Simsek (1997) considered hot shallow springs and deep exploration wells in geothermal areas in the Marmara region. He calculated the total potential of natural thermal spring capacity in Marmara. In 1997, Hacettepe University, the International Research and Application Center for Karst Water Resources (UKAM) and the Swiss Federal Institute of Technology (ETH Zurich) signed an agreement concerning "Geothermal investigations in the Marmara region" and "Tectonic activity and its interactions with groundwater circulation, geothermics and seismicity in NW Turkey" under the coordination of the MARMARA Poly-Project. This study also includes a general geothermal potential evaluation of NW Turkey by using various methods and data (see also Simsek, 1997). Recently Mueller et al. (1997) compiled a heat flow map of the Anatolian-Aegean region from Tezcan & Turgay (1991) and a heat flow map of Europe (Cermák & Rybach, 1979) (Fig. 2.55). Ercan & Kiliçer (1998) studied the seaward extent of geothermal fields in western mainland Turkey. There are also some local studies concerning geothermal waters, among them Tchihatcheff (1853), Schliemann (1881), Leaf (1923) are the earliest authors. Eşder & Şimşek (1975), İztan &



Figure. 2.55. Heat flow in Anatolian-Aegean region (after Mueller et al., 1997).

Yazman (1990), Conrad et al. (1995), Filiz & Tarcan (1995), Eisenlohr et al. (1997), Greber et al. (1997), Yalçın (1997) and Şimşek (1997) are some of the others.

Greece

Fytikas et al. (1976) presented a list of hot springs in Greece. *Fytikas & Kolios (1977)* prepared a heat flow map of the Greek mainland (1:1,000,000), Aegean and Ionian, based on previous heat flow observations obtained in Greece. The whole work is within the frame of the project "Geothermal Energy Investigation in Greece". In the work they have used data that have already been published by other authors on the marine area, and data based on their own measurements and calculations concerning mainly the continental area but also some parts of the marine area.

Aegean Sea and Front of the South Aegean Arc

In the Aegean Sea, first *Erickson (1970)* made the first heat-flow measurement, located in the south of that sea. This measurement is one of the 40 measurements in the eastern Mediterranean. These have been summarized by *Ryan et al. (1969)* and are treated in detail by *Erickson (1970)*. In the Aegean Sea, *Jongsma (1974, 1975)* installed 13 stations, of which nine are continuous. He collected important data, and defined characteristic heat flow structure beneath the Aegean Sea. However, there were not enough stations to find sufficiently reliable results. *Hsu et al.* measured temperature in a drill hole bored by Glomar Challenger 22 (*Fytikas & Kolios, 1977*). In the Aegean Sea, a heat flow value was measured from one of the five boreholes drilled in the eastern and western Mediterranean and Aegean Seas during Leg 42A of the Deep Sea Drilling Project (*Erickson et al., 1977*). This value was compared with 14 conventional values measured previously. *Erickson et al. (1977)* critically reviewed heat flow data from the Mediterranean and Aegean Sea.

2.14.2. General Interpretation

Regional heat flow values give information about the heat flux from the deeper parts of the Earth. There is an inverse relationship between heat flow and the depth of the Moho discontinuity. However, inhomogeneities in rock composition may considerably affect the regional heat flow. For example, the existing fault system, especially normal and strike-slip faults, can be a controlling factor because additional convective heat transport can be assumed here. Large thermal springs occur more frequently, where transtensional and extensional tectonics appear together. This extensional movement tears up the strike-slip faults and causes deep reaching zones of high hydraulic permeability. High permeability permits hot water to rise quickly and to transport heat to the surface from greater depths (*Pfister et al., 1997*). Not surprisingly a close relationship exists between the high heat flow values and the high seismic activity that is a sign of active faults. Nevertheless, the spatial pattern of thermal springs in a region does not coincide with the regional heat flow density distribution (*Pfister et al., 1997*).

Heat flow density is by multiplication of vertical temperature gradient one common method of determining by K (thermal conductivity of the rocks of the specific site). The other method to determine heat flow values that especially from geothermal water contamination of SiO_2 .

To prepare a reliable regional heat flow map it is important to know K (thermal conductivity) at each measurement site. If we know K, we can reduce causes that originate from surface and near surface conditions. In continents and also seas, reliable heat flow measurements could just be obtained from deep bore-holes. It is harder to determine reliable results in continents then at sea because of the high probability of ground-water mixing. The neotectonic and Tertiary magmatic (volcanic) activities also provided the basis for significant variations in regional heat flow (Tezcan, 1995; Simsek, 1997). In the Aegean Sea, sedimentation rates, irregularities in sediment cover, sea floor subbottom topography and bottom water temperature variations can cause the heat flow observed near the sea floor and give an additional error to regional anomalies (Erickson et al., 1977). Some regional studies show that the region is on a high heat flow zone of Europe (Fig. 2.55). Nevertheless, a detailed heat flow map of the region could not be prepared because of the lack of knowledge about heat conductivity for the estimation sites (e.g., *İlkışık*, 1995). To make reliable estimates, the thermal conductivity coefficient (K) most be known for specific regions. Beside that, knowledge of the ground water circulation system is important to make reliable measurements for a specific site. The data collected on silica contamination of hot springs from western Turkey (İlkışık, 1990a) also have some problems (see İlkışık, 1990a).

Existing heat flow data indicate a heat flow with a mean value of 2.1 HFU in the northern and central Aegean (*Jongsma, 1974*). Relatively low heat flow values are located in western Greece, in the Ionian Sea and south of Crete (*Erickson, 1970; Ryan et al., 1969; Erickson et al., 1977*), i.e., along the sedimentary arc of the South Aegean Trench (*Fytikas & Kolidos, 1977*) (Fig. 2.55). *Jongsma (1974)* has shown that the mean heat flux through the sea floor is higher than the continental mean and about twice that through the sea floor south of the South Aegean Trench (*Fytikas & Kolios, 1977; McKenzie, 1978*). *Erickson (1970)* had previously taken a heat flow value from a station in the South Aegean, which is one of the Mediterranean stations. The station in the southern Aegean gave a value, which is lower than the worldwide average (*Jongsma, 1975*). Nevertheless, a reliable borehole heat flow measurement that was made in the southern Aegean by Erickson (see *Erickson et al., 1977*) is significantly greater than any of the conventional heat flow measurements (*Jongsma, 1974*) in the southern

Aegean Sea (triangle in Fig. 2.57). The Aegean, because of its shallow average depth, has extremely variable water temperature (*Wüst, 1961; Pollack, 1951*) and it would appear possible that conventional heat flow values (*Jongsma, 1974*) could be seriously affected in the region (*Miller, 1972; Erickson et al., 1977*). However, the general image of the relatively high heat flow must be considered certain. In general the values become higher away from the Trench on the concave side of the arc, similar to other arcs in the World (Fig. 2.57) (*Jongsma, 1975*).

The most outstanding are the areas with high to very high heat flow: the Aegean Sea and western Anatolia (see *Meier et al., 1977*). Studies based on silica content of geothermal waters (*İlkışık, 1990a*) suggest that the mean value of the heat flow for Turkey is 50 per cent higher than the world average (65 mWm) (*İlkışık, 1995*, see also *Alptekin et al., 1990; İlkışık, 1990a*). Western Turkey is characterized by numerous thermal springs (*Tezcan, 1979*). Identified and explored geothermal areas lie mainly along the NE-SW oriented grabens (e.g., Büyük Menderes Graben) (Fig. 2.56) (*Eşder, 1990; Şimşek, 1997; Koçak, 1990*). In western Turkey, at the intersection of grabens, geothermal fields are hotter (*Ercan & Kılıçer, 1998*).



Figure. 2.56. The distribution of hot springs in Turkey (Tezcan, 1979).

The tendency to an increase of the geothermal gradients around Hot Springs implies that the regional heat flow also increases in the area around hot springs (*Tezcan*, 1979). However, it

should not be unforgotten that the spatial pattern of thermal springs in a region does not coincide with the regional heat flow density distribution (*Pfister et al., 1997*). Northwestern Turkey is also characterized by normal to locally elevated terrestrial heat flow density, compared to a normal value defined by the worldwide continental mean value of 65mWl m (*Pollack et al., 1993*) (see *Tezcan & Turgay, 1991; İlkışık, 1995; Tezcan, 1995; Mueller et al., 1997; Pfister et al., 1997*). The Marmara region (northwestern Turkey) is one of the areas in western Turkey characterized by a high density of geothermal areas (*Eisenlohr, 1997*). Thermal springs are a very common feature of the region. More than 90 hot springs, up to 19 gradient, 24 shallow and 5 deep exploration wells in geothermal areas show the enormous potential of the Marmara region (*Şimşek, 1997*). The high values are concentrated over the NAF zone and extensional faults (*Alptekin et al., 1990, Eisenlohr, 1997, Pfister et al., 1997*). On the other hand, normal heat flow values occur in the northern and eastern part of the area (Bursa, İznik, İzmit and Thrace region) (*Crampin & Evans, 1986; Straub & Kahle, 1997; Pfister et al., 1997*).



Figure. 2.57. Heat flow values between 20° and 30°E longitude as a function of latitude, showing the abrupt increase in heat flow northward from the Mediterranean across the South Aegean arc into the Aegean Sea (after *Erickson et al., 1977*). Circles show the values obtained using conventional occeanographic techniques; a single triangle shows a value measured in a borehole drilled during the Deep Dea Drilling Project Leg 42A.

He (Helium) anomalies in western Turkey and the presence of 3He enrichments in the crust of western Turkey, are more than expected from normal crustal lithologies (*Koçak, 1990*). He suggests that they have been produced from a mantel source (*Koçak, 1990*). Similarly, Boron found in thermal and mineral waters probably originated from the mantle or during
metamorphism from marine sediments. Most of the isotope analyses of C02 gases in thermal and mineral waters in the Gediz Basin also indicate a mantle origin (*Filiz & Tarcan, 1995*). In conclusion, the formation of geothermal areas mainly depends on the mentle source, which means that the heat generated in the deeper parts is transferred by volcanism to a shallower depth in the crust (*Koçak, 1990*).

2.15. TOMOGRAPHY AND SEISMOLOGICAL STUDIES

2.15.1. Data

Moskalenko (1966) used body-waves and surface-waves for calculation of the seismic velocities as well as crustal structure. Travel-time curves for the most prominent phases of the longitudinal (P) and shear (S) waves have been constructed for southeastern Europe by Papazachos et al. (1966) by using data for about 1000 earthquakes. The velocity structure of the crust and upper mantle has been studied using dispersion of surface-waves by *Papazachos* et al. (1967). Molnar & Oliver (1969) studied lateral variations in the attenuation of Sn waves in the Aegean region. Papazachos (1969) estimated shear-wave (S) velocity layer from phase velocities of Rayleigh waves. Payo (1967, 1969) used a large number of observations of phase velocity of Love and Rayleigh waves to determine the crust-mantle structure in the Mediterranean region. Cantez (1969), studying the Love and Rayleigh waves, found a crustal thickness for the northern and southern Aegean. Papazachos & Comninakis (1971), using travel time residuals of intermediate shock, showed a striking anomaly along the South Aegean Arc (SAA). Crampin & Ücer (1975) investigated seismic velocities beneath the Marmara sea by examining four earthquakes recorded at 35 seismic stations. They found the crustal thickness beneath the Marmara Sea. Cantez (1975) determined an average crustal thickness and an uppermost mantle P-wave velocity for the northern Aegean Sea, using dispersion of surface-waves. Teleseismic P-wave travel time residual data for distant earthquakes was observed at 7 Greek seismic stations by Agarwal et al. (1976). Their data, however, do not allow a conclusion on the depth of slab penetration (Papadopoulos, 1997). P wave seismic travel-time (residual) data for Greek earthquakes observed at distant stations have been interpreted in terms of a dipping plate under the island of Karpathos near 36°N 27°E by Gregersen (1977). Kenar (1977, 1978), using three component seismograms recorded by stations of ITÜ, determined a crustal thickness beneath Istanbul from the spectral ratios of P waves. Jacoby et al. (1982) analysed travel time residuals beneath the dipping slab. Papazachos & Comninakis (1978) studied recordings of earthquakes from 6 stations in Greece. Ezen (1979) examined surface waves that sourced from the South Aegean and was recorded by station of İTÜ. He interpreted qualitatively the group velocities. Chen et al. (1980) determined a Pn velocity beneath Turkey from travel time-distance relations. Cantez

& Toksöz (1980) calculate absolute or relative station residuals to determine crustal thickness for the Aegean region. Romanowicz (1980) applied tomography techniques to eastern Europe. Using all available long-period Rayleigh wave observations in Europe, Panza et al. (1980) and Suhadolc et al. (1990) outlined the thickness of the lithosphere in the Europe-Mediterranean region. Panza et al. (1980), using all available long-period Rayleigh wave observations in Europe, outlined the thickness of the lithosphere in the eastern-Mediterranean region. Hovland & Husebye (1981) obtained tomographic results on the Upper mantle structure in the northern Aegaen. They used an independent data set consisting of teleseismic P-wave delays of events. Necioğlu et al. (1981) determined Pn velocities at permanent earthquake stations in western Turkey. Seismic travel times of teleseismic P-waves and station residuals were used to study the crust/upper mantle structure and its lateral variations in Turkey (Cantez & Toksöz, 1982). They used P-wave travel time residuals from 125 earthquakes received at 18 stations. The travel times were taken from ISC Bulletins. These data are complemented by the available phase and group velocities of surface-waves (Cantez & Toksöz, 1982). The velocity structure of the crust and upper mantle beneath the western Aegean region has been studied using dispersion of surface-waves by Calganile et al. (1982). Jacoby et al. (1982) calculate absolute or relative station residuals to investigate changes of the crustal thickness or upper mantle velocity for the Aegean region. Teleseismic tomography has been applied by Hovland & Husebye (1981) to eastern Europe. In this study more attention is paid to the Aegean region by including 15 stations from Turkey, Greece, Bulgaria and former Yugoslavia. Delibasis (1982) discussed seismic wave attenuation (velocity structure) of the upper mantle beneath the Aegean region. Ezen (1983) examined Rayleigh wave propagation beneath the Aegean. A Q-value was obtained in the region by Tassos (1984). Panagiotopoulos & Papazachos (1985) calculated Pn velocities based on 23 accurately located very shallow earthquakes (h=1-14 km) in northern (1978) and central (1984) Greece, in central and eastern Greece, south-east of the former Yugoslavia, the Aegean sea, Bulgaria, southern Romania and western Turkey. For Europe and the Mediterranean region an estimate of the 3D-mapping of the earth's seismic P-wave velocity structure from the surface down to a depth of 800km exists, derived from detailed investigation of delay-time tomography (Spakman, 1985, 1988; Spakman et al., 1988, 1993) (Fig. 2.58). The dipping high-velocity zone is recognised by Spakman (1985, 1986) as the blurred image of the African slab that penetrates deep into the Aegean Upper Mantle. Spakman (1986) argued that his data had high enough spatial resolution to permit a significant interpretation. Spakman & Nolet (1987) argue that the outline of the slab is resolved with a spatial error between 50-100 km



Figure. 2.58. Tomographic images of the Aegean/Eastern Mediterranean Upper Mantle in cross section. The upper panels in a-d display a small location map for orientation (after *Spakman et al., 1988*). The lower panels display the inferred P-Wave velocity heterogeneity. Cross (horizontal) hatching indicates positive (negative) anomalies. Regions of poor spatial resolution are not contoured (large white areas). The horizontal and depth axes are given in km, without vertical exaggeration. Black symbols indicate the projection of hypocenters with M>4 that are located 100 km from the plate. The width of the location map is 3 degrees. For more detail see *Spakman et al. (1988)*.

and that the signs of the velocity anomaly amplitudes are well resolved. The tomograms have better resolution than the image of *Hovland & Husebye (1981)*. Because *Hovland & Husebye (1981)* used an independent data set consisting of P-wave delays of events from outside of this region, whereas *Spakman (1986)* used data coming from events in the Mediterranean region and over half a million teleseismic delay time data reported by ISC. In a more recent study by *Spakman et al. (1993)*, the volume under study encompassed the mantle to a depth of 1400 km and the number of ISC data for inversion increased by a factor of four including data selected from the ISC database, from regional events and from stations up to epicentral distance are used. About 18,000 events and 937 stations were used. *Kalafat et al. (1987)* determined the thickness of the crust beneath western Turkey from the travel times by using the Pn phase readings of the stations operated by KOERI in SW Turkey. *Drakatos et al. (1988, 1989)* and *Ligdas & Lees (1993)* made local scale tomographic studies in various parts of the Aegean region. *Ezen (1988, 1991a, b)* studied the effect of crustal thickness in western

Turkey on Rayleigh-wave records. Three-dimensional seismic attenuation has been investigated beneath the Aegean region by *Hashida et al. (1988)*, using the tomographic technique. They found that high-Q values correspond to the distribution of intermediate-depth earthquakes across the SAA, and that low-Q spots near Athens and in the southeastern Aegean sea correspond to volcanoes. *Christodoulou & Hatzfeld (1988)* used a three dimensional inversion technique of the teleseismic travel time residual in the Chalkidiki (Thessaloniki) network to determine velocities for the crust and mantle lithosphere and crustal thickness beneath the Chalkidiki peninsula (Macedonia). *Drakatos (1989)* applied a tomographic technique to determine crust and upper mantle of the region. *Mindevalli & Mitchell (1989)* used the group velocities of Rayleigh and Love waves to determine crustal velocities and thickness in western and eastern Turkey. *Granet & Trampert (1989)* investigated the 3-D velocity structure beneath the Euro-Mediterranean domain down to 1200 km by using teleseismic P-wave arrival times.

Yilmaztürk (1989) used Pn arrivals at seismic stations in the Aegean region, taken from the ISC bulletins, to investigate velocity variations beneath the Aegean region. Alptekin et al. (1990) used the observed group velocity of fundamental mode Rayleigh waves from twenty earthquakes (Mb > 4.5) generated in the Burdur region, to find the crust layer and Pn wave velocity between İstanbul and Burdur. They found on optimum structural model for western Anatolia. Suhadolc et al. (1990) using all available long-period Rayleigh wave observations in Europe, outlined the thickness of the lithosphere in the eastern-Mediterranean region. Ligdas et al. (1990) used P-wave travel time residuals and seismic tomographic techniques to better illuminate the velocity structure of the crust and upper mantle beneath the broad Aegean region (Ligdas & Main, 1991; see also Ligdas, 1990) (Fig. 2.59). They included teleseismic records between 1976 and 1986 from local stations, which do not routinely report to the ISC, and, therefore, the database for the inversion is substantially different from that of Spakman et al. (1988). Three-dimensional images of the upper mantle in the central Mediterranean were obtained using tomography techniques by Drakatos & Drakopoulos (1991). The data used are arrival times of P-waves of local events. Ezen (1991b) determined the thickness of the crust along the N-S direction in western Turkey. Ezen (1988, 1991a,b) studied the effect of crustal thickness in western Turkey on Rayleigh-wave records. Osmansahin (1989) used the same method to study the crustal thickness of the Aegean Sea. The most comprehensive study so far of the 3-D S-wave velocity field below Europe based on delay-time and waveform inversions has been carried out by Zielhuis (1992). Küleli (1992)



Figure. 2.59. Tomographic images of the Aegean area (after Ligdas et al., 1990). Shading is as Fig. 2.58.

using P-wave arrivals applied inversion of teleseismic data from a 23 year interval (1964-1986) for teleseismic and local data events obtained from the ISC and mapped tomographic images in the Aegean region (Fig. 2.60) (see *also Küleli et al.*, 1995). *De Jonge et al.* (1993)



Figure. 2.60. Tomographic images of the Aegean area (after Küleli, 1992). The upper panel displays locations of the sections and location of epicenters (M>3) which were included in the tomographic images.

studied the seismic tomography of the region. *Blanco & Spakman (1993)* estimated the present P velocity structure from delay time tomography. The results describe the threedimensional structure of the lithosphere and mantle from the surface down to a depth of 1400 km. Kalogeras et al. (1993) determined the mean dispersion curve for a Dodecaoese to Athens propagation path. The Pn tomography study of Hearn & Ni (1994) provides the best estimates of sub-Moho P-wave velocities for the region (see Rodgers et al., 1997). Previously, Akinci et al., (1994) studied the seismic attenuation in western Anatolia with limited data sets by using the coda wave nethod. The P-wave tomographic velocity structure of the Tyrhennian (Calabric) and the South Aegean subduction zones were calculated by De Jonge et al. (1994). Papazachos (1994) made tomographic studies in the region for the crust and upper mantle. Alessandrini et al. (1995) described the P-wave velocity structure of the crust and uppermost mantle of the Aegean and Italian regions obtained through the tomographic inversion of arrival times of regional events. Horasan & Cantez (1995) modelled the crustal structure of western Turkey using complete synthetic seismograms. Papazachos et al. (1995) used more than 100,000 P-wave arrivals from 4,229 earthquakes in the Aegean region for the determination of the detailed structure of the crust and the upper mantle in this area. The data they used in the study come from the annual bulletins of the Geophysical Laboratory of the University of Thessaloniki (GLUT) for the time period 1981-1987 for events with surfacewave magnitude 2-3.5. They added data from the ISC bulletins as relocated for the period 1971 -1980 for events with surface-wave magnitude M>5. The original data came from the preliminary monthly bulletins of the National Observatory of Athens (NOA), GLUT, and seismological laboratories of neighboring countries (Italy, Albania, Yugoslavia, Bulgaria and Turkey). The data were enriched with observations from four local experiments in the Thessallaniki basin (northern Greece), Peloponnesus (southern Greece), southern Aegean, and Epirus (northwestern Greece). These data were collected during the summers of 1985, 1986, 1988, and 1989 by the Geophysical Laboratories of the Universities of Thessaloniki and Athens (LGIT) and the Laboratoire de Geophysique Interne et Tectonophysique of the University of Grenoble (France) (Hatzfeld et al., 1990, 1993; Hatzidimitriou et al., 1992). Taymaz (1996) used S-P wave travel time residuals, which confirmed the lateral velocity variation in the South Aegean region. He found average S and P-wave travel time residuals from 29 earthquakes in the Aegean and the South Aegean Trench near Crete. To reduce the uncertainties in the residuals, Taymaz et al. (1990) used synthetic seismograms of P and SH waveforms to constrain depths of earthquakes in the South Aegean Trench near Crete. Recently, a relationship was inreferred between the deep velocity anomaly that extends from beneath southern Asia and the anomaly beneath the Aegean sea by Widiyantoro & Van der Hilst (1996). An analysis of Rayleigh waves (inversion techniques applied to the dispersion of Rayleigh waves) generated by earthquakes in the broader Aegean was undertaken to estimate

variations in the S velocity structure in the crust and upper mantle down to about 70 km depth by Kalogeras & Burton (1996). The three-dimensional attenuation structure beneath the Aegean sea and the surrounding regions was determined by inversion of seismic intensity data by Stavrakakis et al. (1997). In the Mediterranean basin a tomographic study was made by Martinez et al. (1997), based on the fundamental mode of Rayleigh waves. This database was formed from regional and teleseismic events recorded from 1990 to 1993 at very-broadband stations belonging to MEDNET and other cooperative stations, located in the Mediterranean area. Papadopoulos (1997) discussed seismic tomography images, presented by other authors' tomography images in the light of an alternative interpretation. Regional seismic tomography of Iberia, Italy, the South Balkans and the Aegean region down to about 400 km are discussed by Plomerova (1997) along with results of studies on the anisotropic structure of the lithosphere based on an analysis of spatial variations of P-wave residuals. The threedimensional velocity structure of the crust beneath the Aegean sea and the surrounding area is investigated by inversion of about 10,000 residuals of arrival times of P-waves from local events reported by the ISC by Drakatos et al. (1997). The crustal velocity structure of a 50x50x20 km domain near Patras in the Gulf of Corinth (Greece) was recovered by Le Meur et al. (1997) using microearthquake data. These data were recorded during a field experiment in 1991 where a dense network of 60 digital stations was deployed. Papazachos & Nolet (1997) presented the detailed characteristics of the P and S velocity structure of the South Aegean Subduction and the Aegean Sea in crust and upper mantle scale in the southern Aegean from the inversion of travel times of local events. Sources of data are the annual and monthly bulletins of GLUT for the period 1980-1994. Many of these travel time data have also been published in the ISC bulletins. A large portion of the data, which comes from the monthly bulletins of seismological observatories of Greece and neighbouring countries, was not routinely reported to ISC but is included in the GLUT final data set of travel times. For the period 1980-1994 almost 4,300 local events were used. Ekström et al., (1997) used a large number of globally recorded Rayleigh and Love waves to develop deep structures. Alessandrini et al. (1997), by using Pn, found the regional scale characteristics of the seismic wave velocity in the lithosphere (crust and upper mantle) for the Ionian and Aegean Sea. They used ISC catalogue data for earthquakes from 1964-1992 in the area. All the first P-wave arrivals used were recorded by seismological stations operating in a wider area. Küleli et al. (1995) investigated seismic wave velocity distribution in the crust and uppermost mantle by using travel times of P-wave data from earthquakes in western Turkey. They selected Pg_and Pn phase arrival times and epicentral distances from ISC bulletins for a 6-year (1981-1986)

interval and also used travel times. Zielhuis & Nolet (1994) made a three-dimensional model for the S-wave velocity in the upper mantle below Europe. As a result of this modeling Precambrian cratones were found. Using the global body wave tomography technique, Van der Hilst et al. (1997) resolved long narrow structures in the lower mantle, some of which can be followed to sites of present-day plate convergence at the Earth's surface including the Aegean subduction zone. Rodgers et al. (1997) presented propagation characteristics of the Sn and Lg phases for the Middle East and Mediterranean (Fig. 2.61). Horasan et al. (1998) used a large set of seismic events and stations to determine the average attenuation in the region by using the coda wave method and the coda normalization method and interpreted the results obtained

2.15.2. General Interpretation

Essentially, there are 2 types of seismic waves that radiate from a source (fault):

- 1) Body waves (P and S)
- 2) Surface waves (RAYLEIGH and LOVE)

The dispersion of seismic surface-waves is widely used in studying the structure of the Earth's crust. It provides an estimate of the average properties of the crust between the epicentre of the earthquake and the recording station. Differences in travel times, amplitudes, and frequency content of regional phases (Pn, Pg, Sn, and Lg) have proven to be very useful in characterising structural variations in the lithosphere (crust and uppermost mantle). Pn is the first arriving phase at regional distances. For this reason, Pn travel times are sensitive to the uppermost mantle. Seismic tomography, which is a three-dimensional imaging method in Seismology by inverse solution, has been proved an efficient tool to image the interior of the Earth. Since the well-known works of Aki & Lee (1976), or Crosson (1976), many authors have used first-arrival times to recover the 3D seismic velocity structure as well as hypocentre coordinates at local, regional and global scales. In the linearised approach the method inverts for the evaluation of the velocity field from a radially symmetric reference earth using the difference between the observed and calculated travel time (the so-called delay time of travel time residual). Total number of earthquakes, degree of intersection of crossing rays, size of array, position of stations, epicentral distance range, size of cells as well as the inversion



Figure. 2.61. Sn and Lg propogation in the Middle East (after *Rodger et al., 1997*). (a) Events and stations used in the study (b and c). (b) Zones of inefficient Sn propogation (see *Rodger et al., 1997* for detail). (c) Characteristics of Lg propogation.

method applied are the most important factors influencing the reliability of the 3D tomographic images. Teleseismic rays illuminate the deep mantle structure but the resolution in tomography decreases with depth when teleseismic data are used (*Drakatos &*

Drakopoulos, 1991). The tomographic images suggest a close relationship between seismic wave (P, S) velocity pattern and a subduction system. Before thermal assimilation, older subducted oceanic lithosphere exhibits lower temperatures than the surrounding mantle. Hence such subducted slabs will be imaged as high velocity zones in tomography. The upper mantle of the European-Mediterranean region has been the subject of many recent tomographic studies which the aim to determine the velocity-depth distribution of seismic P and S waves in an attempt to obtain quantified images of the lithosphere-asthenosphere system.

A fundamental application of seismology is to study the velocity distribution of the Earth's interior. The Earth's crust may be considered as a layered medium. Each layer has different physical properties, and is influenced by temperature and pressure, which causes seismic wave velocity variations, related to depth. It is not so expensive to get information on the travel times from earthquake data as from DSS, because in this case the energy is offered by nature and the recording permanent seismic stations already exist. However, these travel times are not accurate because the origin times and the foci of the earthquakes are not known with sufficient accuracy, unlike in the DSS method (see section, 2.16). To get better results the number and coverage stations should be improved.

Sn waves in the concave part of the South Aegean Arc (*Molnar & Oliver*, 1969) indicate that the thickness of the lithosphere beneath the inner part of the arc is rather small. Sn is a seismic shear-wave that propagates in the uppermost mantle. It propagates very efficiently across the stable regions of the earth, the continental shields, and deep-ocean basins, but propagation is very inefficient when paths cross the crests of the mid-ocean ridge system or the concave sides of most island arcs. If low attenuation correlates with high strength, the data imply that the uppermost mantle is considerably weaker under the ridge crests and the concave sides of the island arcs than it is elsewhere (*Molnar & Oliver*, 1969). Like Pn, Sn predominantly travels within the uppermost mantle (see e.g., *Stephens & Isacks*, 1977); however, because it is a shear-wave, it is more sensitive to attenuation. Sn generally does not propagate across regions of high heat flow such as spreading centres and back-arcs (*Beghoul et al.*, 1993). Lg does not propagate in ocean crust (*Press & Ewing*, 1952; *Zhang & Lay*, 1995). Accordingly Lg propagates efficiently for the events from the western coast of Turkey (*Rodgers et al.*, 1997). Sn propagates efficiently across East Mediterranean (*Molnar & Oliver*, 1969; *Kandinsky-Cade et al.*, 1981; *Rodgers et al.*, 1997). Concordantly Lg propagates inefficiently

around the southwestern coast of Turkey (*Rodgers et al., 1997*). These indicate that off the southwestern coast of Turkey beneath the Mediterranean an oceanic type of crust exist.

Earlier Jacoby et al. (1982) found a high-velocity slab from the analysis of travel time residuals. In the upper mantle a relevant high velocity anomaly extends below the Greek mainland and the SAA (Hashida et al., 1988; Drakatos & Drakopoulos, 1991; Babuska et al., 1987; Zielhuis, 1992; Alessandrini et al., 1997; Plomerova, 1997; Drakatos et al., 1997; Papazachos & Nolet, 1997). A high-Q anomaly also characterises the subducting African slab that represents ongoing subduction (Hashida et al., 1988; Stavrakakis et al., 1997).

Between the overridden crust and subducting slab, low velocities are observed at shallow depths in the upper mantle beneath the Aegean back-arc region (e.g., Jacoby et al., 1982; Spakman, et al., 1988; Ligdas, et al., 1990; Küleli, 1992; Kalogeras & Burton, 1996; Alessandrini et al., 1997; Plomerova, 1997; Drakatos et al., 1997). The average, S-P residuals from earthquakes in the North and central Aegean are nearly all positive (late arrivals) and some are large (> 3 s) in the crust and upper mantle (Taymaz, 1996). This is also supported by the low Q-value in the region (Tassos, 1984; Hashida et al., 1988; Stavrakakis et al., 1997). A low velocity zone dominates especially in the inner part of the Aegean volcanic arc and absorbs the greater part of seismic energy (Drakatos & Drakopoulos, 1991). This anomaly is associated with the slab dehydration that is well developed under the volcanic arc, especially around a depth of 60 km (Papazachos & Nolet, 1997). The low velocity is also observed in western Turkey (Yılmaztürk, 1989; Drakatos & Drakopoulos, 1991; Drakatos et al., 1997; Stavrakakis et al., 1997). The NW of Turkey, NAF is recognised also by low Pn velocities (Yilmaztürk, 1989). An area of low velocities is also observed, trending parallel to the North Aegean Trough (NAT) (Papazachos et al., 1995). These anomalies indicate weak crust. Low-Q zones were obtained (20-40 km) particularly in the southeastern part of the South Aegean Trench because of the thick sediment series in the trough (Stavrakakis et al., 1997; Hashida et al., 1988).

The Pn travel time residuals of local earthquakes were used by *Gregersen (1977)*, who interpreted residual anomalies between Crete and Rhodes as indicating a high velocity plate dipping underneath the Aegean arc. *Romanowicz (1980)* used tomography techniques to find a very strong negative residual anomaly at stations in Greece, which represents the presence of a subducting slab of the African plate. *Spakman (1985, 1986), Meulenkamp et al. (1988)*

Spakman et al. (1988), Granet & Trampert (1989) and De Jonge et al. (1994) obtained three dimensional images of the upper mantle in the central Mediterranean using tomography techniques. They suggested that the Aegean subduction zone is characterised by a dipping high-velocity zone penetrating to at least 400 km depth and possibly as far as 600 km. Spakman & Nolet (1987) argue that the slab's outline is resolved with a spatial error between 50-100 km. Also from the surface to a depth of 400 km Ligdas et al. (1990), Ligdas & Main (1991) and to a depth of 480 km Küleli (1992) observed the deepening high-velocity zone. Ligdas et al. (1990) cautioned that for their tomogram the decreasing resolution with depth should also be taken into account in the interpretation of these results for depths greater than 170 km under mainland Greece and the Aegean Sea (Ligdas et al., 1990; Ligdas & Main, 1991). Van der Hilst et al. (1997) found that the slab seems to be continuous to approximately 1500 km depth, which is in agreement with the results from a regional study of Spakman et al. (1993). Beneath eastern Europe, the Aegean slab does not seem to have sunk deeper than about 1500km (Van der Hilst et al., 1997). In that study, the depth to the leading edge of this slab is well determined (Van der Hilst et al., 1997). The interpretation of large-scale positive anomalies by Spakman et al. (1993) indicated a slab anomaly down to depths of at least 670 km, possibly down to 800-900 km. They suggested that if the Aegean subduction relates to the destruction of one oceanic basin (the eastern Mediterranean part of the Tethys ocean) then the duration of subduction may possibly be extended to even more than 40 My. Ligdas & Main (1991) used a data set of well-controlled local and teleseismic ray paths (Ligdas, 1990; Ligdas et al., 1990) to put some bounds to the depth of penetration of the slab. They concluded that the peak amplitude of the tomographic image of a lithospheric slab is found from the inversion of travel-time data to be at depths at or below 400 km. However, no constraints on the maximum depth of penetration could be established with their data set. Hovland & Husebye (1981) also imaged a high velocity anomaly beneath the central Aegean down to 550 km, the deepest significant level of mapping, but they did not link this anomaly to The South Aegean Subduction. Spakman et al. (1988) and Granet & Trampert (1989) found a low velocity zone on a high velocity slab down to 120 km that possible represents a detachment zone along the slab.

2.16. DEEP SEISMIC SOUNDING

2.16.1. Data

Mediterranean

The first seismic-refraction measurements in the eastern Mediterranean were made during the round-the-world cruise of HMS Challenger in 1950-1952 (*Gaskell et al., 1958*). *Moskalenko* (1966) reported three refraction profiles, supplemented by deep-reflection profiles, between Crete and Libya. Seismic refraction surveys in the Ionian (*Ferrucci et al., 1991*) and Levantine (*Ginzburg & Ben-Avraham, 1987*) basins were made to determine the type of the crust in the East Mediterranean. Two expanding spread profiles (ESP) (two-ship refraction and oblique reflection seismic) from the recent Pasiphae cruise (1988 November 28 to December 19) were carried out in the eastern Mediterranean Sea (Fig. 2.62) (*De Voogd et al., 1992*). Results of the cruise provide a well-constrained velocity model for the deep basins of the eastern Mediterranean in the Ionian basin and Sirte abyssal plain down to Moho depth (*De Voogd et al., 1992*). STREAMERS made a study in Ionian Sea (*Hirn et al., 1996*) (Fig. 2.63)



Figure. 2.62. Location map of the expanding profiles (ESP recorded during the Pasiphae cruise; black dots ESP central points, i.e., the places where a velocity model is obtained (after *Voogd et al., 1992*). Dashed lines indicate the seismic profiles (*Finetti, 1976, 1982*).



Figure 2.63. The STREAMERS line (ION-07) shown by a solid line (after Him et al., 1996).

Aegean

The earliest seismic refraction studies in the South Aegean were made by *Wong et al.* (1971) and *Finetti & Morelli* (1973). German researchers in the Aegean region took important refraction data. After this came on extensive survey to accurately determine the crust thickness and crust type. As a first stage, deep seismic profiles were taken between 1971 and 1974 by the German research ship Meteor (*Hinz, 1974; Makris, 1973*) (Fig. 2.64, 2.65). In 1976, studies were continued with additional shootings in North Aegean Trough (NAT) (Fig. 2.64). *Makris* (1978a) correlates seismic data with earlier data obtained by other geophysical methods to find out the velocity structure of the upper mantle and crustal thickness. There is good correlation between the intersecting refraction cross-sections (*Makris, 1978b*). A combined near-normal incidence and wide-angle seismic recording program (STREAMERS) was conducted in the western Aegean Sea in 1993 with the principal objective of testing the popular hypothesis of lower crustal deformation (particularity extension) (*Sachpazi et al., 1997*).



Figure. 2.64. Location of Deep Seismic Soundings (DSS) in Eastern Aegean and surrounding area (after *Makris*, 1985).

Western Turkey

Explosion data have been obtained from quarry blast and conventional explosive sources in the Marmara area. In the last 18 years, four quarry blasts and one controlled source explosion experiment were conducted in northwestern Turkey (mostly in the Marmara region) BUKandilli Observatory and Earthquake Research Institute (*see Küleli et al., 1995*) (Fig. 2.67). Explosions made at Anadolu Kavağı in 1980, were recorded by the seismic stations installed around the Marmara region (*Gürbüz & Üçer, 1985*). First arrival times of P waves were used in the interpretation of the seismic records (*Gürbüz & Üçer, 1985*). A quarry-blast explosion at Adapazarı was recorded along N-S elongated profiles to determine the crustal thickness beneath Adapazarı (*Gürbüz et al., 1980*). In 1997 profiles were constructed with the data from temporary and permanent (portable) seismic stations located along the chosen directions. For a detailed investigation of the velocity distribution in this region, data from four quarry blasts and one controlled source explosion were recently analysed (*Küleli et al., 1995*). Controlled source explosion data were collected with reverse shootings. Associated with the controlled source seismic study, a joint Turkish-German seismic refraction project was organised in



Figure. 2.65. Cross sections shown in Fig 2.64 (after *Makris, 1985*). Solid lines give the computed traveltimes as indicated at the middle part of the drawing. The seismic phases to be considered are at Pg, Pn, and PmP.

1991 to study crustal structure in the east of the Marmara sea. Two refraction profiles were chosen perpendicular to each other (N-S and E-W) (Fig. 2.67). There are no controlled source

profiles in western and southwestern Turkey reflecting the deep structures.



Figure. 2.65. (continued)



Figure. 2.66. Position map of normal-incidence multichannel lines and land recording stations of the STREAMERS survey in the Aegean (after Sachpazi et al., 1997).



Figure. 2.67. Solid lines show the seismic refraction profiles; 1-Kestel, 2-Anadolu Kavağı, 3-Adapazarı, 4,5-Turkish-German refraction project (after *Küleli et al., 1995*).

2.16.2. General Interpretation

Because of the source is known, deep seismic sounding studies are the most reliable method to determine physical properties of the medium. The main advantage in using explosion data is that the origin times and sites of source waves are accurately known. The main disadvantage of them is their high cost. In the Aegean area, limited DSS profiles were taken. Scientists suffer from lack of DSS data especially in the western Turkish mainland.

Clear information about the crust and upper mantle structure in the eastern and central Aegean region comes mainly from deep seismic sounding data (*Makris*, 1973, 1978a,b). *Makris* (1973, 1977) published a Moho-depth map of the Greek mainland and Aegean areas derived from seismic data and gravity computations.

Below the Aegean Sea, a low velocity zone exists in the uppermost part of the mantle (*Makris, 1978a,b*). The crust in the Aegean Region is purely continental, including the Cretan basin (*Makris, 1978a*). But the Cretan basin shows a minimum crust thickness (20 km) in the central trough zone (*Makris, 1978a*). The crustal thickness increases under the mainlands of Turkey and Greece, the Cretan island arc and the Cyclades. The thickness shows a generally increasing trend from the South Aegean to the North Aegean. The maximum thickness of the sedimentary cover coincides with the thinnest part of the crustal section (*Makris, 1977*). But detailed sediment thicknesses are not known in the Aegean basin. The sedimentary cover above the crystalline basement, which outcrops at South Evvoia and the Cycladic islands, cannot be defined with deep seismic soundings because it is too thin (perhaps 1.0-1.5 km) (*Makris & Vees, 1977*) (see *Morelli, 1985*).

The relatively high velocity at the northern part of Marmara and lower velocity in the central and south of the working area indicate thinning of the continental lithosphere from north to south, or at least presence of a stable mantle lid at NW Turkey (*Küleli et al., 1995*). Pn velocities are lower than the normal mantle velocities here. This suggests the existence of thin (i.e. hot) continental crustal material in this region (*Küleli et al., 1993*)

Modelling of the seismic refraction data of two profiles crossing each other on the NAF zone in the Intra-Pontide suture in the Marmara region indicates rugged shape interfaces. The horizontal velocity variation is identified probably as due to continental depression between the wedges of the southern İstanbul and northern Sakarya zones (*Küleli et al., 1995*).

Seismic refraction surveys *Ferrucci et al. (1991)* by indicate that the Ionian basin is floored by oceanic crust, but the nature of the crust, continental versus oceanic, in the Herodotus basin is still debated (*Lort et al., 1974; Makris & Stobbe, 1984*). The crust is possibly continental in the Herodotus basin (*Lort et al., 1974; Hinz, 1974; Agarwal et al., 1976; Cloetingh et al., 1980; Makris & Stobbe, 1984; Makris et al., 1986*). De Voogd et al. (1992) obtained excellent velocity control down to Moho depth in the East Mediterranean. According to the results in the Ionian basin, the crust there is relatively thin and oceanic. In the Herodotus basin, the crust is similarly thin and sediments are thicker (*De Voogd et al., 1992*). The thick sedimentary cover in the Herodotus plain known from both reflection and refraction data (*Finetti, 1976; Ginzburg & Ben-Avraham, 1987*) suggests an old age for the floor (*De Voogd et al., 1992*). The thin crust of the Herodotus basin may be interpreted either as oceanic or thinned continental crust (about 10 km thick). The top of the crust of the Herodotus basin is much deeper than the Ionian crust suggesting that the Herodotus basin is significantly older than the Ionian basin (*De Voogd et al., 1992*).

In December 1988 *Truffert et al. (1993)* performed a two-ship refraction and oblique reflection seismic survey in the eastern Mediterranean Sea (Pasiphae cruise; *De Voogd et al., 1992*). 14 Expanding Spread Profiles (ESP) were shot along three sections: the Calabrian prism, the western Mediterranean Ridge and the eastern Mediterranean Ridge (*De Voogd et al., 1992*).

3. GEOLOGICAL EVOLUTION

It is well known that, since about the beginning of N-S convergence along the Alpine Himalayan system, which covers also Turkey, the Aegean Sea and Greece, many oceanic floors have been consumed between various continental lithospheres (e.g., *Brunn, 1960; Aubouin et al., 1963; Brinkman, 1966; Ketin, 1966; Auboin & Dercourt, 1970*). However, the paleogeography of the oceans called the Tethys and Neo-Tethys and branches of Neo-Tethys (*Şengör & Yılmaz, 1981; Ricou et al., 1984*) are still controversial (*Dilek & Moores*). To day the remnants of the oceanic materials are visible as continuous zones between continental fragments approximately EW in Turkey mainland and NW-SE on the Greek mainland (e.g., *Aubouin, 1973; Bernoulli et al., 1974; Aubouin et al., 1976; Brunn, 1976; Şengör & Yılmaz, 1981; Horvath & Berckhemer, 1982; Jackson McKenzie, 1988; Görür et al., 1992*). These ophiolitic stures and the continental fragments construct an imbricated structure in the area (Fig. 3.1). The zones are parallel cach other (Fig. 3.1). These are also parallel to young tectonic features of the Aegean region (e.g., the South Aegean Arc, normal fault system and the South Aegean Volcanic Arc).

Crystalline massifs; the Serbo-Macedonian and Rhodop massifs in Greece and Bulgaria; the Istranca, Uludağ and Kazdağ massifs in western Turkey, form the northern part of the imbricated mass. In northwest Turkey two tectonic zones are located, mainly the southern Istanbul zone and a small part of the northern Sakarya zone, which are separated by a complex suture zone, which is called the Intra-Pontide ophiolitic suture in Turkey. It continues through Greece and it is connected to the Vardar zone (e.g., *Şengör et al., 1985; Okay, 1989*).

Just below these crystalline massifs that represent the Eaurasian continental margin, the second ophiolitic suture zone defining the northern boundary of the Apulian plate follows the Vardar zone in Greece (*Smith, 1971; Dercourt, 1970, 1972; Bernoulli & Laubscher, 1972; Hynes et al., 1972; Boccaletti et al., 1974*) to the İzmir-Ankara-Erzincan (IAE) zone in Turkey which is known for its oceanic material (ophiolite and chert sequences of Jurrasic age) as a clear sture zone (*Brunn, 1960; Mercier, 1966; Brinkman, 1966*). This zone is the remnant of a northern branch of the NeoTethys that was consumed between previously explained crystalline massifs to the north and Median Aegean crystalline belt to the south which consists of metamorphic



Figure. 3.1. Major Geological units and old oceanic remnants (ophiolites and blue shist) (after Küleli et al., 1995). The active volcanic arc is shown by a dotted curve.

and nonmetamorphic Palaeozoic rocks at the base and Mesozoic and Cenozoic rocks (*Şengör & Yılmaz, 1981*). This sture displays HP/LT metamorphism, which is characteristic of suture zones which represent a collisional regime. From the behaviour of the high gravity field one can separate the Pindos Mountains, Othrys and North Evvoia, the Vourinos Complex and the ophiolites of the Vardar Zone along the Chalkidiki Peninsula (*Makris, 1977*). The same behavior of gravity anomaly is observed on the 30-100 km wide İzmir-Ankara-Erzincan suture zone (e.g., *Oral, 1987*).

The Taurid system borders the Vardar and İzmir-Ankara suture zones towards the south, situated. The Pelagonian platform on the Greek mainland, the Attic-Cyladic platform (Naxos, Paros, Mikonos, Ikaria, Tinos) and the Menderes massif in Turkey form the ACMM which represents the northern margin of Gondwanaland as well as the Taurides (*Şengör & Yılmaz*,

1981). In general this zone contains Paleozoic and Precambrian metamorphic rocks as crystalline schists and marbles. The massif has a complex internal structure and lithological distribution. Age, generation and development of the massif are still widely debated. Continental collision between the Menderes-Taurus block and the Sakarya continent resulted in crustal thickening and shortening in the area beneath the massif, which was structurally overridden by the Lycian ophiolitic napple pile from the south (see for detail Bozkurt et al., 1995). The late Cretaceus marked the beginning of a convergent regime that resulted in destruction of the Neo-Tethyan ocean at all fronts in Turkey and was particularly characterised by the emplacement of ophiolite nappes (Yilmaz, 1989, 1997). The regional metamorphism (main: HP/LT, Menderes metamorphism), caused by the latest collision across the Neo-Tethys which was taken up by lithospheric shortening and thickening (Dürr, 1975; Sengör & Yılmaz, 1981; Okay, 1989; Yılmaz, 1989; Yılmaz, 1997), was followed by thermal doming. The overthickened dome collapsed and leads to emplacement of augen gneisses and the creation of a wide extensional system all around the massif (Sengör & Yılmaz, 1981; Sengör, 1982; Bozkurt et al., 1995). This is thought to have triggered development of the first fault-bounded basins, prior to the E-W oriented Aegean grabens (see Section 2.3).

The third zone, in the Pelagonian nappe zone in Greece and which also consists of ophiolitic material the Alanya nappes (*Horvath & Berckhemer*, 1982) in western Turkey are called as the Lycian zone.

In the southern part of the region, an orogenic belt of Alpidic origin can be traced from the Apulian, the Dinarides and Hellenides in the west, through to the South Aegean Island Arc and the Taurides (Bey Dağları) and Anatorides in the east (*Biju-Duval et al., 1974; Şengör, 1979; Şengör & Yılmaz, 1981; Horvath & Berckhemer, 1982; Mueller & Kahle, 1993*). The present Taurus mountains, which were below sea level until the middle Miocene, underwent a strong uplift in the successive phases, up to 1000 m relative to the Central Anatolian Plate (*Barka & Reilinger, 1997*).

In the southermost (outermost) position, beneath the South Aegean Arc (SAA), an ongoing subduction process has been occurring parallel to the all imbricated units to the north. The subduction zone is composed of sequences of Mesozoic platform carbonates, great allochthonous masses of deep-sea Mesozoic sediments and Cretaceus to Tertiary flysch. To the east of the Aegean region the Bitlis suture zone in eastern Turkey is the manifestation of a

convergence process due to continental collision, which is still ongoing (e.g., *Mueller & Kahle, 1993*). The southernmost ophiolite belt (e.g., Troodos in Cyprus, Kızıldağ in southern Turkey) includes relatively complete and undeformed series (*Dilek & Moores*) with respect to the northern ophiolitic series beneath the Aegean region.

The volcanic rocks are also parallel to the geotectonic units and located within the three zones of the region (*Gülen, 1990*). The southernmost volcanic arc is active and linked with the South Aegean subduction processes (Fig. 2.1d). The second oldest volcanic zone is situated along the southern periphery of the Attic-Cyladic-Menderes metamorphic belt, which conforms to the arcuate trend of the subduction zone, extending between Greece and Turkey in the back-arc region (*Küleli, 1992*). This zone is referred as the "inner arc" (*Innocenti et al., 1979*) and consists of Atalanta-Volos volcanics and Antiparos rhyolite (*Küleli, 1992*). The third oldest volcanic zone covers an extensive area in the northern Aegean region where the Attic-Cyladic-Menderes metamorphic belt (*Küleli, 1992*).

HP/LT metamorphism is an indicator of a convergent plate boundary. Blueschists are the main product of HP/LT metamorphism represents subduction zones. In the Aegean region, blueschist facieces and ophiolites have been located in two zones. The first zone lies on the south of the IA suture zone in the region located near Tavşanlı in western Turkey, Mount Olympus in mainland Greece and the Cyclades islands in the Aegean sea (*Okay, 1989*). A second 'external blueschist belt' is located along the South Aegean Island Arc and is related to an on-going subduction process (*Okay, 1989*).

The Latest Tectonic Phase

Before the latest extensional regime between the southern margin of the European plate and the northern margin of the African plate, various strands of the Tethys opened and closed. The latest subduction in the Aegean area has been dominated by subduction of the African Plate beneath the SAA (*Le Pichon & Angelier, 1979*). Because of extension on the overriding plate, the crust was considerably thinned. Stretching motion has taken up normal faults that characterise the Aegean region (see for detail Section, 5). This sequence is expected by most of the scientists. But geological arguments for the duration of stretching and subduction are controversial in the Aegean region. To the east, E-W and ENE-WSW trending grabens and to the west, NW-SE trending grabens are the main structures that developed under the latest

extensional tectonics in The Aegean region. The most important problem that must be solved is that some grabens to the east, are about normal to the E-W basins. For these grabens Early Miocene age is widely accepted (*Seyitoğlu & Scott, 1991, 1994; Seyitoğlu et al., 1992b, 1994*). However, while some authors suggest that the cross grabens come from an early compressional phase, the others suggest sintectonic evolution for the cross grabens and E-W trending grabens. The following paragraphs lists suggested extension initiation times by various authors who consider various methods and models. These are critically reviewed below.

Based on field data the normal faulting in Greece previously associated with the present movements began in the Miocene (Aubouin et al., 1963). This data is consistent with the observations on land in both Greece and Turkey (Aubouin, 1973; Brunn, 1976). By studying faults on islands (horsts) in Aegean Angelier (1978) dated the extension to the Late Miocene. One group of scientists suggests that older (Early Miocene age) grabens (cross grabens) that are normal to the E-W extensional grabens in western Turkey were created under N-S compressional regime (Sengör & Yılmaz, 1981; Savaşçın, 1982; Şengör, 1982; Şengör et al., 1985; Yılmaz, 1989; Yılmaz, 1990). According to them, a compressional orogenic regime continued until the to Late Miocene. They argue that Early Miocene was the time of final emplacement of the Lycian nappes. The average crustal thickness of the overthickened crust resulting from the post-Eocene N-S intracontinental shortening, is estimated to have been over 60 km (Sengör, 1982). Another group (e.g., Savaşçın & Güleç, 1990; Savaşçın, 1990; Yılmaz, 1990) consider that the compressional and extensional regimes are represented, respectively, by calc alkaline and alkaline volcanism. They dated the extensional deformation initiation time as Early Miocene, by using radiometric methods. Furthermore Yilmaz (1997) suggested that between the two phases there is a time gap during which no volcanism was observed.

Dewey & Şengör (1979) find a similarity between the starting time of the Aegean extension and North Anatolian Fault (NAF) and suggest a relationship between them. They suggest that the collision of Arabian and Asian plates in the Middle Miocene, 10 My ago according to their theory, started the neotectonic regime in Turkey (extensional regime in western Turkey). By considering geophysical and geological data *Le Pichon et al.* (1984) studied the subsidence history of the North Aegean Trough (NAT). The drilling results interpreted by *Le Pichon et al.* (1984) in NAT show that in the Early Miocene a compressional regime dominated the deformation. According to the model, the extensional regime started in this basin during about the Tortonian (10 My ago). Tectonic analysis of *Lyberis (1984)* also shows this age for the initiation of the extensional regime.

By considering seismic profiles in the South Aegean region Jongsma (1975) determines Middle Miocene extensional features. However, from a study of the reflection profiles it appears that, after the main Alpine movement until somewhere near the end of the Tortonian, the southern Aegean Sea was largely subjected to erosion or non deposition (Jongsma, 1975). Based on field data Mercier et al. (1976) suggest that extension in the Aegean was widespread by the lower Pliocene (5 My) and started in places during the Middle Miocene (see also Şengör et al., 1985). By considering relations between sedimentation and faulting back-arc extension was dated Serrevallian (Middle Miocene) by some authors (Meulenkamp et al., 1988; Mercier et al., 1979; Le Pichon & Angelier, 1979, 1981; Angelier, 1979; Angelier et al., 1982; Lyberis et al., 1982; Kissel & Laj, 1988; Mercier et al., 1989). Based on field data Sözbilir & Emre (1996) suggest the Middle Miocene age for the creation of the E-W grabens in western Turkey.

A number of different arguments suggest that the stretching started during the early Miocene. Some scientists, by using radiometric dating of volcanic rocks and the modification of the time span of pollen assemblages suggest Late Oligocene-Early Miocene age for the initiation of extensional regime in The Aegean region (Benda, 1971; Benda et al., 1974; Benda & Mulenkamp, 1979; Seyitoğlu, 1992; Seyitoğlu et al., 1992; Seyitoğlu & Scott, 1991, 1992a,b; Seyitogtu et al., 1994; Jolivet et al., 1994; Dora et al., 1995; Seyidoğlu & Scott, 1996a,b). According to the some of these scientists (Sevitoğlu & Scott, 1996a), E-W grabens and the older grabens (Early Miocene) trending normal to them, developed together in western Turkey. This mechanism can clearly be explained by the cross-graben model of Sengör (1987). Jolivet et al. (1994) also suggest the Early Miocene age, based on mineral fabric that is related to extensional motions on metamorphic rocks. They recognised that slip vectors (i.e., present-day displacements) and Miocene ductile lineations (i.e., bulk finite strain) follow the curvature on the scale of the Aegean. This suggests has the kinematic pattern have not been strongly modified since the early Miocene (Jolivet et al., 1994). Based on evidence from metamorphic rocks Bozkurt et al. (1995) suggest that the over-thickened Menderes Metamorphic dome collapsed in the Late Eocene-Oligocene time, which is older than that previously suggested (Late Miocene) by Şengör & Yılmaz (1981). According to this result, a compressional regime could not have generated the older (Early Miocene) cross grabens.

Seyitoğlu & Scott (1992) argue that, due to the continuation of extension after the Late Miocene, calk alkaline volcanism is observed and the thickness of lithosphere was reduced and consequently alkaline volcanism became dominant in this advanced stage of the extension (Late Miocene and younger). However, an other group suggests a younger age for the initiation of extension (*Savaşçın & Güleç, 1990; Savaşçın, 1990; Yılmaz, 1990*), considering this calk alkaline volcanism as a compressional tectonic indicator. *Zanchi et al. (1990)* suggested a multiphase extension associated with a cross cutting high-angle normal fault and strike slip fault model in western Anatolia.

Variations in the Extensional Regime

There is no doubt that the strain has varied spatially over extensional time (e.g., McKenzie, 1978; Mercier et al., 1989; Le Pichon et al., 1995). In the Thermaikos basin two stages of extensional regime were identified by Brooks & Williams (1982). These are NNE-SSW in the Late Miocene-Early Pleistocene and N-S after the Late Pleistocene. According to Lyberis (1984), there are three stages of extensional regime in the Aegean region. These are NW-SE in Late Miocene, NE-SW between Early Pliocene-Early Pleistocene and N-S since the Quaternary extension. Mascle & Martin (1990) identified four stages by using seismic profiling data. These are: a compressional regime in the Early Pliocene (see also Dumont et al., 1979a,b; Angelier et al., 1981; Mercier et al., 1976); NNE-SSW in central and N-S in southern portions in the Pliocene; after the Pliocene another short extensional regime NNE-SSW in the eastern part of the Aegean region and NNW-SSE in the western part of the extensional regime. They pointed that the tectonic evolution in the region took place in a short time interval of compressional and generally dominant extension. According to the seismic reflection studies of Jongsma (1975). in the Middle Miocene a differential block movement started along E-W and N-S fracture systems, which resulted in some sinking in the Serravallian. From the Late Serravallian to the Late Tortonian the sediments show an increasingly stronger influence of marine conditions (Jongsma, 1975). This general submergence resulted in the separation of Crete from the European landmass in the middle Tortonian (Jongsma, 1975). Until this time there seems to have been a subaerial connection with the mainland as evidenced by mammalian faunas (Jongsma, 1975). Towards the end of the Tortonian and closure to the beginning of the Messinian, an abrupt change to open marine conditions took place, which gave rise to highly calcareous sediments (Jongsma, 1975). On the old E-W and N-S faults large displacements took place but younger NW-SE and SW-NE faults also played a pronounced role (Jongsma,

1975). In the western part near Crete it is likely that it corresponds to the period of erosion from somewhere in the Oligocene to the end of Tortonian (Jongsma, 1975). According to him Crete was connected to the main European landmass during this period (Drooger & Meulenkamp, 1973; Jongsma, 1975). On Crete, Drooger & Meulenkamp (1973) recognise two phases, the first (Serravallian to Recent) produced E-W and N-S trending faults. The second phase started in the Pliocene and gave rise to movement along NW-SE and SW-NE faults. On Greece in the Peloponnesus, E-W and N-S high angle normal faults of Pliocene to Holocene age cut the earlier thrust structures (Smith & Moores III, 1974). In the eastern part of the southern Aegean similar normal faulting and gentle folding has occurred during the Pliocene (Mutti et al., 1970, Bernoulli et al., 1974). Mercier (1981) recognises two compressional tectonic phases in the Miocene, Early Pliocene and Pleistocene age. Angelier (1979) proposed a series of alternating compressional and extensional tectonic episodes in the area since the Miocene from a study of the fault geometry. Zanchi et al. (1990) suggested a multiphase extension associated with a cross cutting high-angle normal fault and strike slip fault model in western Turkey. Based on field data, Mercier et al. (1976) suggest that extension in the Aegean was widespread by the lower Pliocene (5 My) and started in some places during the Middle Miocene (see also Sengör et al., 1985). Extensional structures are seen in Greece in Miocene time, though Mercier et al. (1989) argue that most of the extensional strain occurred in the last 5 My. Le Pichon et al. (1995) suggested that the African promontory began to collide with central part of the arc in the Pliocene.

Subduction Initiation Time

Papazachos (1973) calculated a mean consumption rate of 28 mm/yr by considering a 280 km slab length and 10 My subduction initiation time. *McKenzie (1972)* found a 35 mm/yr consumption rate by considering a 350 km slab length and 10 My subduction initiation time.

McKenzie (1978) considered a 200 km length of subducting plate based on the Benioff zone beneath the Aegean region and a 35 mm/yr consumption velocity rate, with the initiation of the subduction at 3 My (see also *Mercier, 1981*). *McKenzie (1978)* and *Kissel & Laj (1988)* have suggested that the onset of subduction is likely to have accompanied the onset of rapid extension in the Aegean and concluded that the subduction began 5 My ago (see also *Taymaz et al., 1991*). *Jackson & McKenzie (1988)* take into account the consumption rate (100 mm/yr) which was estimated from seismicity of overriding lithosphere (60 mm/yr) and 10 mm/yr

northward motion of the African plate and deepest seismicity of the slab (300 km) estimated 5 My (see also Jackson, 1993). Le Pichon & Angelier (1979), assuming that the Wadati-Beniof zone delineates the geometry of the lithosphere subducted beneath the Aegean region and considering the age of the oldest volcanic rocks on the active volcanic arc, concluded that subduction has been taking place during the last 13 My, with an uncertainty as much as 3 to 5 My. *Mercier et al.* (1989) date the onset of the shortening in the Ionian islands at 16 My, accompanied by subduction of the seafloor. *Spakman (1986), Spakman et al. (1988), Meulenkamp et al. (1988)* and *De Jonge et al. (1994)* have argued that the subduction is much older (26-40 My), based on a tomographically defined subducted slab length much longer than the seismically defined portion. They argue that the maximum depth of earthquakes represents not the deepest extent of the slab, but the deepest extent of material cold enough to generate earthquakes. With considering this length the authors found older ages (26-40 My) than those found previously.

Northeastward subduction of the Ionian and Adriatic Sea floor beneath Greece and Anatolia has accommodated convergence between Europe and Africa throughout much of late Cenozoic time (e.g., *Le Pichon & Angelier, 1979*). After consumption of the all suductible material, in the Late Miocene, a shortening processes that still continues occurred along the eastern Adriatic border (see *Channell & Horvath, 1976; Burchfield, 1980; Horvath, 1984; Babbucci et al., 1997*).

4. CRUSTAL AND UPPER MANTLE STRUCTURE

Considering the complexity of the surface tectonics it is important to investigate the structure of the underlying upper mantle in order to better understand the tectonic evolution of the region (e.g., McKenzie, 1978; England & Houseman, 1989; Vilotte et al., 1982; England & Jackson, 1989; Jackson et al., 1992). The global scale tomographic image of the Earth's interior indicates that the structure in the top 100-200 km is closely related to the tectonic regime at the surface. To determine the physical properties of the deep structure, potential (gravity, magnetic, magnetoteulliric, heat flow) or kinetic (seismic waves that generated from earthquakes) energy of the Earth itself and kinetic energy that is created artificially (seismic sounding) have been used in the Aegean region since the 1960's. To understand the structure of the crust and upper mantle, one should consider all the available data that represent the geophysical properties of the region (see section 2.). Tectonic processes such as subduction change the equilibrium conditions in the Earth's layered medium. As a result of these changes in the mantle, the surface geology is greatly affected or directly formed by material carried from the mantle or the subducting oceanic lithosphere. For example, the anomalous thermal and pressure conditions associated with subduction zones are the most important factors controlling petrogenesis (see Mueller & Kahle, 1993). Consequently, the surface features of the region such as magmatism and metamorphism, blueschist emplacement, ophiolites, volcanic island systems, suture zones and arcs, represent evidence about the mantle structure (rheology) of the Earth. But knowledge about the variations in the physical state and chemical composition of the upper mantle is still rather limited (Mueller & Kahle., 1993). In addition, source functions of crust and upper mantle structure must be known accurately if more accurate foci of earthquakes are to be determined.

Due to the geodynamic evolution of the Aegean area, the crustal thickness undergoes strong variations over a range of 15-25 km beneath the back-arc basin to 40-60 km beneath the orogenic belts (e.g., *Alessandrini et al., 1997*). In Table 4.1. brief information is given about crustal thickness in various parts and methods are shown for each result. In general the continental lithosphere thins from the north to south (*Makris, 1978a,b; Gürbüz et al., 1980;*



Figure. 4.1. Moho depth map of Greece and surrounding area obtained by a Gravity computation (after *Tsokas and Hansen, 1997*). Contour interval is 1 km.



Figure. 4.2. Moho depth map of Aegean obtained by gravity computation (after Genç et al., 1996a).

Genç et al., 1996a). After a deep seismic sounding study of Makris (1973) it is clearly understood that the crust in Aegean region is continental but thin. In addition, Rodgers et al. (1997) found that Lg propagates efficiently for events from the western coast of Turkey. This



Figure. 4.3. Moho depth map of western Turkey and surrounding area obtained by gravity computation (after Genç et al, 1996).

supports the well-known continental type of crust in this coastal region. In the Cretan Basin deep sea drilling under the JOIDES project also indicates absence of oceanic material there. Concordantly, the sea floor morphology of the Aegean does not have any characteristics of that of oceanic crusts (*Arpat, 1976*). A minimum thickness was seen in the north of Crete. Seismic wave velocity contrast is also seen between the mainland and the Aegean Sea (e.g., *Alessandrini et al., 1997*). Lower velocities are remarkable beneath the Aegean Sea over the subduction zone beneath the Cretan basin and Cyclades (*Alessandrini et al., 1997*). Low thickness is also seen behind the Aegean island line and along the North Aegean Trough



(NAT) (Fig. 4.1, 4.2). It is obvious that beneath the Aegean Sea and surrounding area the

Figure. 4.4. Moho depth map of southeastern Aegean and surrounding area (after Tsokas and Hansen, 1997).

crust is very thin and thickens towards the east (central Anatolia), west (Greek mainland) and north (southern Bulgaria) (Fig. 4.2, 4.3, 4.4, 4.5, 4.6). Even the in Marmara region at the NE part of the region, this decrease of crustal thickness can be clearly seen (Fig. 4.7, 4.8). Decreasing Bouguer gravity with smooth gradient is also observed in Turkey towards the east. This indicates a slight increase in crustal thickness (*Özelçi, 1973; Şalk, 1994; Cantez & Toksöz, 1982; Klingele & Medici, 1997*). *Oral (1987)* made the assumption that the eastward thickening rate in the western Anatolian crust is about 0.25 km in every 10 km.

Above the slab that is characterised by a high-velocity anomaly, an area of low-velocity anomalies is observed under the Aegean region in the Aegean Sea and western Anatolia because of the melting of the slab and a heating zone that is situated between the slab and the surface (e.g., *Alessandrini et al., 1997*). Because of this, energy of seismic waves is highly absorbed beneath the Aegean Sea (e.g., *Papazachos & Comninakis, 1971; Alessandrini et al., 1997*). The positive Bouguer anomalies beneath the Aegean basin extend in an area of high P-wave velocity (e.g., *Alessandrini et al., 1997*). Probably because the African plate subducts, it triggers upward migration of hot material in the mantle. Because of tectonic faults, permeability and support mass and heat transport increase in the region over the subducting



Figure. 4.5. Moho depth map of Aegean and surrounding areas (after *Makris*, 1985). Plotted by combining refraction and gravimetric data.



Figure. 4.6. Approximate crustal thickness (km) in the Aegean and surrounding area, derived from Moho-depth map (Fig. 4.5) published by *Makris (1976)*, with corrections including topography and bathymetry (after *Le Pichon and Angelier, 1981*).

slab. The low-velocity (Papazachos & Comninakis, 1971; Agarwal et al., 1976; Yılmaztürk, 1989; Kalogeras & Burton, 1996; Taymaz, 1996) and Sn attenuation (Molnar & Oliver, 1969; Hashida et al., 1988; Rodgers et al., 1997) anomaly in the Aegean back-arc correlates very

well with an area of high heat flow observed predominantly behind the volcanic arc (Erentöz & Ternek, 1968; Jongsma, 1974; Erickson et al., 1977; Cermák, 1979, Kocak, 1990). A process of crustal thinning extends over a zone, which has a width of about 400 km both in the E-W and N-S directions (McKenzie & Yilmaz, 1991). A positive Bouguer gravity anomaly observed in southern Bulgaria, western Turkey, and Thrace (Rabinowitz & Ryan, 1970; Özelçi, 1973; Şalk, 1994) is interpreted as the eastern limits of the positive anomaly belt identified as a concave side of an island arc. The positive gravity anomaly seen inside the coasts of the western Turkey implies a contradiction between topography and gravity. The situation appears to be normal in the Greek mainland (Özelçi, 1973) (see Yılmaztürk, 1989). The Greek mainland is characterised by a higher seismic wave velocity field (Yilmaztürk, 1989) and the thickest crust in the region (Makris, 1975). In addition seismic wave velocities in western Turkey, especially in the Menderes Massive, are lower than the velocities in Greece (Genç et al., 1996b). This all suggests that the eastern Aegean (western Turkey) region is mostly under intense simple shear of the lithosphere, as is the central Aegean region. This could be caused by regional heating (Oral, 1987). This area is also characterised by normal to locally elevated terrestrial heat flow density (Pfister et al., 1997) compared to a normal value defined by the world wide continental mean value (Pollack et al., 1993). This suggests that beneath the area the crust is thin, or a denser material exists beneath the axis of the gravity high (*Özelci*, 1973). While some authors suggest uprising of the region with dense upper mantle (Özelçi, 1973; Yılmaztürk, 1989) others suggest uprising of the upper mantle because of the extension which results from simple shear (Wernicke, 1985; Oral, 1987). Yet others suggest that an asthenospheric plume generates the extension (Agarwal et al., 1976; Makris, 1976, 1978a,b; Kalogeras & Burton, 1996).

In contrast to the Aegean Region, the heat flow map shows that low regional heat flow and uniform values are concentrated in the eastern Mediterranean Sea (*Erickson, 1970; Rabnowitz & Ryan, 1970; Ryan et al., 1969; Fytikas & Kolios, 1977*). In the Mediterranean Sea, the regional Bouguer anomalies are almost everywhere positive (*Morelli, 1990; Şalk, 1994*). The strongest positive Bouguer anomalies exist over the Ionian sea (*De Bruyn, 1955; Fahlquist, 1963; Woodside & Bowin, 1970; Makris, 1976; Morelli, 1990; Şalk, 1994*). But this gravity high is not the result of a shallow asthenosphere and low density crustal material, as it is in the Aegean. The crustal structure is of oceanic type for the Ionian (*Ferrucci et al., 1991; De Voogd et al., 1992*), Levantine (*Ginzburg & Ben-Avraham, 1987; De Voogd et al., 1992*) and Sirte basins (*De Voogd et al., 1992*). The Herodotus basin may be interpreted either as an


Figure. 4.7. Moho depth map of Marmara and surrounding area obtained by gravity computation (after *Klingele and Medici*, 1997).



Figure. 4.8. Moho depth map of Marmara and surrounding area (after Gürbüz et al., 1992).

oceanic or a thinned continental crust (*De Voogd et al., 1992*). The Lg phase, which propagates in continental crust, was not observed at the southwestern coast of Turkey near Crete (*Rodgers et al., 1997*). This result suggests an oceanic crust for the Herodotus basin. According to the recent results of deep seismic profiles in the Ionian, Sirte and Herodotus abyssal plains, the three basins have a relatively thin crust (8 to 11 km) (*De Voogd et al., 1992;* see also *Lort et al., 1974; Agarwal et al., 1976; Cloetingh et al., 1980; Makris & Stobbe, 1984; Makris et al., 1986*). The Crust of all three basins is overlain by a thick sedimentary cover (8-12 km) (*De Voogd et al., 1992*). The Herodotus basin is covered by thicker sediment than the Sirte and Ionian abyssal plains (at least 10 12 km) (*De Voogd et al., 19*).

1992). The Mesozoic to Tertiary sequences suggest an old age for these basins (*Finetti, 1976; Ginzburg & Ben-Avraham, 1987*). The restored water depth suggests that the Herodotus basin is probably significantly older than the Ionian and Sirte basins, and is possibly Triassic (*De Voogd et al., 1992*). For this reason, identification of crustal type is difficult.

The origins of the Mediterranean ridge are one of the most obvious features in the Mediterranean region that is the subject of ongoing debate. In the eastern Mediterranean the magnetic field is strikingly uniform and undisturbed (*Vogt & Higgs, 1969; Emery et al., 1966*) (see section 5.3.). There is no magnetic lineation observed beneath the Mediterranean ridge (*Ryan et al., 1969*). For this reason one cannot say that the crust is oceanic, as it lacks the magnetic lineations that are seen over all the worlds other oceanic crusts.

It is obvious that the African plate is being consumes at the Aegean Subduction Zone. Relatively higher velocities are seen beneath the volcanic arc and in the Cretan Basin under the low velocity zone (Spakman, 1986; Meulenkamp et al., 1988; Spakman et al., 1988; Granet & Trampert, 1989; Yilmaztürk, 1989; Ligdas et al., 1990; Ligdas & Main, 1991; Küleli, 1992). The dipping high velocity anomaly (positive P velocity) (Agarwal et al., 1976) is consistent with the existence of a cooler, and hence more dense (Davies & McKenzie, 1969; Sleep, 1973) and possibly chemically different (Meulenkamp et al., 1988), descending old lithosphere. The high-velocity heterogeneity follows the Benioff zone seismicity at about 200 km (e.g., Papazachos, 1973; McKenzie, 1978; Le Pichon & Angelier, 1981) and penetrates deeper than the Benioff Zone (Spakman et al., 1988; Granet & Trampert, 1989; Ligdas & Main, 1991; Küleli, 1992). The maximum depth of earthquakes can be understood either in terms of heat absorption or rheological deactivation (Ligdas & Main, 1991). Thus, the absence of earthquakes does not necessarily mean that the slab does not exist. It could simply be an indication that it is too hot to undergo either brittle failure or plastic instability, while remaining cool enough to the surrounding mantle to produce a velocity contrast which can be picked up by tomography (Spakman et al., 1988). In this case subduction velocity is a important parameter. The Mediterranean slab is continuous to approximately 1500 km depth according to a regional tomogram of Spakman et al. (1993) (see Van der Hilst et al., 1997).

In Köyceğiz is the southwestern Turkish mainland, negative Bouguer anomalies are explained as the eastern extension of the South Aegean Subduction Zone which causes a decrease in density so that Bouguer gravity unusually becomes negative along this corridor (*Woodside*, 1975; Oral, 1987; Şalk, 1994). This anomaly indicates possible eastward extension of the subduction zone.

Granet & Trampert (1989), who studied seismic wave velocities, indicate that the slab was broken at depth of 250 km. Spakman et al. (1988) pointed out that a vertical slab rupture below western Turkey initiated and facilitated slab rollback within the subduction.

Papazachos & Comninakis (1977) observed a compressional focal mechanism in shallow earthquakes and some intermediate depth earthquakes beneath the North Aegean Sea (see also Boccaletti et al., 1974; Papazachos, 1973, 1976; Papadopoulos, 1997). They interpreted these results as a second northward dipping subduction zone in the central Aegean region at the back of the South Aegean Arc (SAA). Papazachos (1976) further argues that magnetic and gravity anomalies that are associated with a probable second subduction zone. It presumed that the Oligocene-Miocene magmatic activity in the North Aegean region was produced by this subduction system (Innocenti et al., 1981) (see also Fytikas et al., 1984). The differences between the results for the paths crossing the southwestern, southern and southeastern Aegean are possibly explained by the second subduction zone (Papazachos et al., 1995). A cluster of the hypocenters has been located in the same region (Küleli, 1992). A high velocity perturbation found almost the same area was interpreted as an old subduction slab by Küleli (1992). But these high velocity perturbations do not show a clear continuity in the vertical and horizontal cross sections (Küleli, 1992). Therefore, because of the unreliability of hypocenter locations and poorly estimated velocity perturbations on the tomographic image, this blurred image could not be interpreted as a structural feature (Küleli, 1992). McKenzie (1978) pointed out the absence of evidence of thrusting on the scale required, or of associated volcanism and lack of control in the depth determination of intermediate shocks (see also Udias, 1985). Küleli (1997) argues that the depth estimation of two events shows important differences compared with ISC depth estimations and they show rather large standard errors relative to their depths. Therefore, these hypocentres that are determined from local stations were not interpreted as a seismic part of the second active subducted slab in the Aegean region (Küleli, 1997). The recent seismic tomographic studies (Spakman, 1989) do not corroborate any second subduction zone.

Recently, a surprising new tomographic feature was found which is a deep-reaching mantle plume in the Ionian Sea, which separates the two subduction slabs (see *Mueller et al., 1997*).

Table. 4.1. Crustal thickness estimations in the Aegean area.

CRUSTAL THICKNES ESTIMATIONS

References	Approx. crustal thickness	Method used based on	Locations	
			AEGEAN REGION	
Drakatos et al. (1997)	30 km		Aegean Region	
Papazachos er al. (1995) Drakatos et al. (1997)	40 km		South Aegean Island Arc	
			EASTERN TURKEY	
Canitez and Toksöz (1982)	40 (45) km	seismic wave velocity	Eastern Turkey	
			MARMARA	
Öcal (1960)	>30 km	Rayleigh wave	Marmara	
Crampin and Üçer (1975)	24 km	seismic wave velocity	Marmara	
Makris (1978a,b)	34 km		Marmara	
Canitez and Toksöz (1982)	30 km	seismic wave velocity	Marmara	
Gürbüz and Üçer (1985)	25 km	P wave velocity	Marmara	
Cürbüz et al. (1999)	07.044m	nom a quarry blast experiment	Marmara	
Klingolo & Modioi (1992)	27-34Km	seismic wave velocity	Marmara	
	20-32611	gravity computation	Warmara	
Kenar (1977)	25-26 km	P wave velocity	Istanbul	
Kenar (1978)	30 km	seismic wave velocity	Istanbul (D-B)	
Kenar (1978)	25-26 km	seismic wave velocity	Istanbul (K-D)	
Kenar (1978)	28-30 km	inversion of body- wave spectra	Istanbul	
Gürbüz and Üçer (1988)	28 km	P wave velocity from a quarty blast experiment	Istanbul	
Nacioniu et al. (1981)	30-32 km	seismic wave velocity	Istanbul	
Naciogia et al. (1001)	00 02 Mil	seisme wave velocity	15tunbur	
Gürbüz et al. (1980)	28-29 km	Pn velocity	Adapazarı,	
and Kenar (1978)		from a quarry blast experiment	south of the Marmara sea	
İlkışık et al. (1996) in1980	40-44 km	magnetotelluric soundings	Kırklareli, Thrace	
İlkışık et al. (1996) in1980	28-32 km	magnetotelluric soundings	Central Thrace	
İlkışık et al. (1996) in1980	32-35 km	magnetotelluric soundings	Tekirdag, south of Thrace	
			BLACK SEA	
Canitez and Toksöz (1982)	30 km	seismic wave velocity	Black Sea	
			MEDITERRANEAN	
Voogd et al. (1992)	8-11 km	deep seismic sounding	Ionian Sea	
Şalk (1994)	20-25 km	gravity computation	Ionian Sea	
Makris (1977)	26 km	deep seismic sounding and gravity computation	west coast of the Peloponnesos	
Payo (1969)	23 km	short-pedod surface waves	south of Greece	
Payo (1996)	23 km	short-pedod surface waves	east of Greece	
Voogd et al. (1992)	8-11 km	deep seismic sounding	Herodotus abyssal plain	

WESTERN TURKEY

		Table. 4.1. (continue)		
Canitez (1975)	36 km	surface wave dispersion	western Turkey	
Canitez and Toksöz (1982)	35 km	seismic wave velocity	western Turkey	
Oral (1987)	40 km	gravity computation	western Turkey	
Kalafat et al. (1987)	29-32 km	seismic wave velocity	western Turkey	
Alptekin et al., (1990)	35-40 km	seismic wave velocity	western Turkey	
Makris and Stobbe (1984),	28-32 km	various	western Turkey	
Meissner et al. (1987),				
Ezen (1993)				
Horasan and Canitez (1995)	31 km	SSBDS	western Turkey	
Alptekin et al. (1990)	31 km	Dispersion of surface waves	Istanbul – Burdur (N-S Profile)	
Makris (1973)	32-34 km	seimic and gravity computations	western coast of Turkey	
İlkışık (1980)	35 km	magnetoteulliric sounding	western coast of Turkey	
Oral (1987)	36-37 km	gravity computation	western coast of Turkey	
Makris (1973)	35 km	seimic and gravity computations	southwestern coast of Turkey	
Oral (1987)	30 km	gravity computation	southwestern coast of Turkey	
İlkışık (1990)	25 km	magnetoteulliric	Med. Coast of SW Turkey	
İlkışık (1990)	20 km	magnetoteulliric	Lycian Nappes	
İlkışık (1986) (Oral 1987)	47 km	magnetoteulliric	Teke Peninsula	
Şalk (1994)	25 km	gravity computation	Menderes massive	
İlkışık (1990)	42 km	magnetoteulliric	Menderes massive	
İlkışık (1996)	14 km	magnetoteulliric	Gediz Graben (Salihli-Alaşehir)	
Oral (1987)	43 km	gravity computation	central Turkey	
			TURKEY-IRAN	
Kenar and Toksöz (1980)	40-43 km	Love, Rayleigh wave dispersion	from Iran to Istanbul	
			AEGEAN SEA	
Papazachos, Polatou &	35-45 km	seismic wave velocity	Aegaen Sea	
Mandalos (1967) and				
Papazachos (1969)				
Calcagnile et al. (1982)	35 km	surface wave dispersion	Aegaen Sea	
			NORH AEGEAN SEA	
Makris (1978)	40 km	deep seismic sounding and	North Aegean Sea	
Makris (1977)	32 km	deen seismic sounding and	north of Evia	
	OZ KIII	gravity computation		
Panazachos et al. (1966)	33 km	seismic wave velocity	Athens Norh Aegean Sea	
Canitez (1969)	32 km	Love and Bayleigh waves	Athens, Norh Aegean Sea	
		Loto and hayoign mayou		
* *			SOUTH AEGEAN SEA	
Ocal (1960)	>30 km	Rayleigh wave	southern Aegean Sea	
Canitez (1969)	35 km	Love and Rayleigh waves	southern Aegean Sea	
German and Greek teams	20 km	deep seismic sounding	southern Aegean Sea	
Morelli (1985)				
Makris (1976)	20 km	gravity computation	southern Aegean Sea	

Table. 4.1. (continue)					
Chailas et al. (1992)	20 km	gravity computation	southern Aegean Sea		
Papazochos (1993)	20 km	various	southern Aegean Sea		
Papazachos (1994)	20 km	gravity computation	southern Aegean Sea		
Papazachos (1995)	25km	seismic tomography computation	southern Aegean Sea		
Makris (1978)	20-22 km	deep seismic sounding and	Cretan Sea		
		gravity computation			
Makris (1975)	20 km	deep seismic sounding and	central Cretan Sea		
		gravity computation			
Makris (1975)	28 km	deep seismic sounding and	eastern Crete Sea		
		gravity computation			
Makris (1975)	25 km	deen seismic sounding and	western Crete Sea		
	20 811	gravity computation			
		gravity competation			
			CENTRAL AEGEAN SEA		
Papazachos et al. (1966)	20-35 km	various	central Aegaen Sea		
Makris (1973, 1977, 1975),	26 km		central Aegaen Sea		
Panagiotopoulos (1984),					
Kiriakidis (1988) and					
Kalogeras & Burton (1996)					
Makris (1978)					
			GREECE		
Makris (1975)	42-46 km	deep seismic sounding and	Greece		
		gravity computation			
Papazachos et al. (1966)	43 km	seismic wave velocity	along the Greek Peninsula		
Makris (1976)	40 km	gravity computation	along the Greek Peninsula		
Chailas et al. (1992)	40 km	gravity computation	along the Greek Peninsula		
PapazQchos (1993)	40 km	various	along the Greek Peninsula		
PapazQchos (1994)	40 km	gravity computation	along the Greek Peninsula		
PapazQchos (1995)	40 km	seismic tomography computation	along the Greek Peninsula		
Calcaonile et al. (1982)	36-42 km	surface wave dispersion	along the Greek Peninsula		
Makris (1978)a, b	45 km	deep seismic sounding and	western Greece		
		gravity computation			
Panagiotopoulos (1984)	45 km	various	western Greece		
Kiriskidie (1988) and	-5 Km	Valiodo			
Choujarne et al. (1997)	29 km	magnetotelluric	Central Greece (Gulf of Corinth)		
Kelegeree & Burten (1997)	20 800	Magnetotenunc			
Raiogeras & Burton (1996)	00.47 1000	abort redad outroop wayse	acuth of Crosse		
Papazachos et al. (1966)	32-47 Km	shon-peddo sunace waves	South of Greece		
Makria (1077)	AG km	doop solemic sounding and	central Polononnesos		
Makis (1977)	40 Km	gravity computation	central reloponnesos		
	04.1	drawing computation	agatora Balanananana		
Makris (1977)	34 KM	deep seismic sounding and	eastern Peloponnesos		
14 1 1 1 1 mm		gravity computation			
Makris (1978)	46 km		Peloponnessos		
Şaik (1994)	40 km	gravity computation	Peloponnessos		
	00.071		went of Oroto		
wakris & Vees (1977)	30-34 km	deep seismic sounding and	west of Urele		
		gravity computation			
Kalogeras & Burton (1996)	45 km	wave velocity	western arc, southwest of Crete		
0 • • • • • • • • •		·			
Calcagnile et al. (1982)	31-47 km	surface wave dispersion	Macedonia, south Yugoslavia		

5. TECTONICS

Beneath eastern Turkey the Arabian plate moves northward with respect to Eurasia at a rate of about 25 mm/yr, based on GPS measurements, global kinematic models, the analysis of oceanic spreadings, fault systems, and earthquake slip vectors (see Table. 5.1. for detail) (*DeMets et al., 1990, 1994; Barka & Reilinger, 1997; Reilinger et al., 1997*). Between these plates continental collision is taking place and the east of the Anatolian mass appears as a buffer. For this reason, thickening and shortening is taking place in the compression direction in the east of Anatolia. To the west, the South Aegean Subduction Zone is formed to accommodate the final stages of convergence of Europe and Africa (*McKenzie, 1970*). Africa moves northward relative to Europe at a rate of about 10 mm/yr (*Chase, 1978; Argus et al., 1989; DeMets et al., 1990, 1994*), but across the South Aegean Trench the relative motion is thought to be approximately 40 to 50 mm/yr towards the southwest (*McKenzie, 1978; Le Pichon & Angelier, 1979; Jackson et al., 1994; Oral et al., 1995*). This was resulted from diffuse deformation (extension) of the Aegean area, behind the South Aegean Arc (SAA).

Because of no boundary to the west and a compressional regime to the east, the thickened mass (Anatolian tampon plate) escapes towards the west from the regime. Further west, the anomalous low elevated extensional area (The Aegean region) allows Anatolia to move with increasing velocity to the W - SW. A possible kinematic model has been derived by *Westaway (1994)* (see also *Oral, 1994; Oral et al., 1995; Le Pichon et al., 1995; Reilinger et al., 1997)* for the motion of Anatolia. According to the model, which is based on geodetic measurements and information from surface geology, the westward movement of the Anatolian mass (26mm/yr along the North Anatolian Fault) occurs as part of an Euler rotation. The rotation pole is situated around the Sinai peninsula. But the lithosphere of Anatolia is not behaving like a typical tectonic plate. This is because the western part of the plate, called the Aegean region, could be described as an internally deforming part of the Anatolian plate (*Reilinger et al., 1997*) and is a diffuse boundary between the Eurasian and African plates. But the velocities measured within the plate are parallel to each other and fit an Euler vector, so it could be considered as a plate. But the lengths of the velocity vectors systematically increase to the west-southwest

Table. 5.1. Obtained velocity rate and direction in various parts of the Aegean region. The numbers in METHOD column indicated the method used to measure rate and/or direction vector: (i) earthquake data, (ii) geodetic data, -s- space geodetic, -c- convensional, (iii) fault observation, (iv) paleomagnetic, (v) kinematic arguments.

Author	Rate	Direct ion	Method	Measured	Reference
Le Pichon (1968) Chase (1978)	28 mm/yr 10 mm/yr	180º	vii	EURASIA EURASIA	AFRICA AFRICA
DeMets et al. (1990, 1994) Reilinger et al. (1997) Barka and Railinger (1997)	25 mm/yr 24 ±2 mm/yr 23 ±2 mm/yr	N N	vi, i ii (s) ii (s)	ARABIA ARABIA ARABIA	EURASIA EURASIA EURASIA
Papazachos and Kiratzi (1996)	4 mm/yr	49 º	i	ADRIATIC	EURASIA
McKenzie (1972) Jestin et al. (1993)	33 mm/yr	W	vi	ANATOLIA	EURASIA
Reilinger et al. (1997)	22 mm/yr		11 (8)		EURASIA
Eyidoğan (1988) Straub and Kahle (1996)	24 mm/yr 22 mm/yr		i ii (s)	MARMARA MARMARA	EURASIA EURASIA
Oral et al. (1992)	50± 20 mm/yr		ii (s)	WTURKEY	EURASIA
Jackson and McKenzie (1984a) Jackson and McKenzie (1988) Barka (1992) Oral et al. (1995) Le Pichon et al. (1995) Straub and Kahle (1995) Reilinger et al. (1997) Barka and Railinger (1997) Cianetti et al. (1997)	32 mm/yr 39 mm/yr 6-11 mm/yr 25 mm/yr 40 mm/yr 15 ±4 mm/yr 30 ±2 mm/yr 26 ±3 mm/yr 20 mm/yr	(ub.)	<pre>i, iii i i i i i i i i i i (s) i i (s) i i (s) i i (s) i i (s) i i (s) </pre>	NAF NAF NAF NAF NAF NAF NAF NAF	
Barka and Gülen (1988) Barka ve Toksöz (1988)	25-35 mm/yr 33 mm/yr		iii iii	NAF NAFZ west of r	northern branch
Barka and Railinger (1997)	11 mm/yr		ii (s)	EAF	
Kahle et al. (1995) Papazachos and Kiratzi (1996) Mueller et al. (1997)	25 mm/yr 3 mm/yr 40 mm/yr	N45°E	ii (s) i	CF CF CF	
Zanchi and Angelier (1993) Westaway (1994) Oral (1994), Oral et al. (1995) Barka and Railinger (1997)	5 mm/yr 10 mm/yr 15 mm/yr	SSW SW	i iii ii (s)	W TURKEY (W TURKEY (W TURKEY (W TURKEY (extension) extension) extension) extension)
McKenzie (1972) Tselentis et al. (1986) Jackson and McKenzie (1988)	20 mm/yr 20-60 mm/yr	220º 218-197º	i, iii,vi i i, vi	AEGEAN (ex AEGEAN (ex AEGEAN (ex	tension) tension) tension)
Taymaz et al. (1991) Jackson et al. (1992) Oral et al. (1995) Armijo et al. (1992) McKenzie (1978) Lepichon and Angelier (1979) Jackson and McKenzie (1988) Jackson (1993)	38 mm/yr 30 mm/yr 30-50 mm/yr 30-50 mm/yr 40-60 mm/yr 52 mm/yr 20-60 mm/yr 40-50 mm/yr	227ª	vi i (s) iii vi i various	AEGEAN (ex AEGEAN (ex AEGEAN (ex AEGEAN SE S. AEGEAN S. AEGEAN S. AEGEAN S. AEGEAN S. AEGEAN	tension) tension) A (extension) EURASIA EURASIA EURASIA EURASIA

Lepichon et al. (1995)	30 mm/yr	1	ii	(ន)	S. AEGEAN	EURASIA
Straub and Kahle (1996)	40 mm/yr	SW	ii	(s)	S. AEGEAN	EURASIA
Reilinger et al. (1997)						
Cianetti et al. (1997)	30 mm/yr		V1 		S. AEGEAN	EURASIA
Mueller et al. (1997)	40-45 mm/yr	SW	11	(5)	SW AEGEAN	EURASIA
Cianetti et al. (1997)	30 mm/yr	SW	Vl		SW AEGEAN	IURKEY
Tselentis et al. (1986)	0.3 mm/yr	N-S	i		C. GREECE	FUBASIA
Tselentis et al. (1986)	0.6 mm/yr	E-W	i		C. GREECE	EURASIA
Taymaz et al. (1991)	38 mm/yr	SW	vi		C. AEGEAN	EURASIA
Billiris et al. (1991)	10-20 mm/yr		ii	(c)	C. GREECE	EURASIA
Taymaz et al. (1991)		345°±16	i		C. GREECE	EURASIA
Roberts and Jackson (1991)		305°±15	iii		C. GREECE	EURASIA
Papazachos et al. (1992)	6 mm/yr	205°	i,	iii	C. GREECE	EURASIA
Clarke et al. (1997)	13 mm/yr				W Corinth (e)	(tension)
Clarke etal. (1997)	6 mm yr				E Corinth (ex	tension)
Billiris et al. (1991)	12±2 mm/yr	NE-SW	ii	(8)	Corinth and S	porades
	i.					(extension)
Briole et al. (1993)	10 mm/yr				Corinth (extension)	
McKenzie (1972)		191º	i,	vi	S. AEGEAN	AFRICA
McKenzie (1978)	70 mm/yr<	211°	i, '	vi	S. AEGEAN	AFRICA
Jackson and McKenzie (1988)	60 mm/yr<		i		S. AEGEAN	AFRICA
Taymaz et al. (1990)	60 mm/yr<	205°	i		sw	AFRICA
					AFGEAN	
Oral (1994)	50±10 mm/yr		ii	(s)	SW.	AFRICA
					AEGEAN	
Oral (1994)	20 ± 10 mm/yr		ii	(8)	SE. AEGEAN	AFRICA

Table, 5.1. (continued)

(in The Aegean region) because of the "plate" enters in an extensional condition to the westsouthwest.

It is well known that the Alpine – Himalayan belt has an amalgamated structure that deformed and faulted in older earlier times. For this reason the Aegean region, as a part of this belt, exhibits a complex pattern with basins of different age and nature, created, overprinted, and obscured by the 180 million year history of the interaction between the African and European plates (see Section 3). Since the starting of the last post-orogenic extensional tectonic (neotectonic) regime of intense deformation, this crustal mass has been failing very easily because of reactivation of the older discontinuities (*Arpat & Bingöl, 1969; Kaya, 1981; Zanchi et al., 1990; Zanchi & Angelier, 1993; Oral et al., 1995*). Because of this, the recent deformation features do not simply show the actual recent tectonic regime and deformation. All the areas of Greece, western Turkey, Albania, southern Yugoslavia and Bulgaria that are dominated by strike-slip and normal faulting are considered together in this domain, which covers an area of approximately 500 x 500 km (*Jackson & McKenzie, 1988*). Aegean extensional region the most seismically active and rapidly internally deforming region of the entire Alpine-Himalayan belt and the continents in the world today (Fig. 5.1, 5.2) (*McKenzie, 1972; Mercier et al., 1977; Ekström & England, 1989; Jackson et al., 1992*).

It was recognised in 70's that continental lithosphere deformation differs from oceanic lithosphere deformation (e.g., *McKenzie*, 1970). Continental lithospheres are not as compact as oceanic plates because of their chemical composition and physical nature. Oceanic plate is homogenous because it is created along oceanic ridges with fresh and strong material. For this reason oceanic plates are rigid and hardly deform. On the other hand continental crust is not produced from magma as a unique material. It consists of magmatic materials and sedimentary rocks of various ages. In some areas metamorphic rocks of one known age (metamorphism age) cover large areas, but there are also older weakness zones. It does not renew like oceanic crust. Continental crusts in the world have all the evolution of the earth's crust. For this reason, in contrast with oceanic plate boundaries, continental plate boundaries deform diffusely (Figure. 5.1, 5.2). But the appropriate model to describe this kind of deformation in continents (i.e., continuum deformation versus microplate or block behavior) remains the subject of debate (*Thatcher*, 1995; *Reilinger et al.*, 1997).

At present there are two kinematic models thought to describe the diffuse deformation in the Aegean region. Block rotations, which are a common feature of continental tectonics, are driven by forces on their lateral boundaries (*Taymaz et al., 1991*) or by the flow of the continuously deforming (continuum deformation) lithosphere beneath them (*Argand, 1924; Tapponnier, 1977; McKenzie & Jackson, 1983; Jackson & McKenzie, 1984b; Walcott, 1984; England et al., 1985*). Obtaining average stress tensors from the slip directions on distributed faults is a technique to show stress direction. By using this technique stress trajectories in the Late Cenozoic have been mapped in the Aegean region by *Angelier (1979), Angelier & Le Pichon (1980)* with the consideration of field geology data that is derived from faults on lands



Figure. 5.1. Seismicity of the Aegean. Epicenters of earthquakes with depths between 0 and 50 km reported by the USGS PDE during the period 1973 to 1997. Earthquakes with magnitudes >5.5 are shown by bigger circles.

172



Figure. 5.2, Earthquakes in the central and eastern Aegean from 1976 to 1997. Source: B.U. KOERI.

and slip vectors from earthquake data determined by McKenzie (1978) and Ritsema (1974) (see also Carey & Brunier, 1974; Angelier & Goguel, 1979). The mapped stress trajectories show maximum stress directions on the crust that is assumed to be deforming continuously. They locate a pole of rotation in the southern Adriatic Sea to describe the motion between the southern Aegean and Africa. This model was later modified (Angelier et al., 1982) to account for the lack of observed palaeomagnetic rotation in Crete (Valente et al., 1982). The amount of subsidence is also used for reconstruction of the deformed southern Aegean region. Results show that, in the Pleistocene, stress trajectories trend in a clockwise direction to the SW. The velocity model constructed by Le Pichon et al. (1995), based on geodetic data, shows that Greek mainland is rotating clockwise with respect to a pole close to Athens. Jolivet et al. (1994) similarly drew stress trajectories since the early Miocene by using structural data of metamorphic core complexes, showing stretching direction. The model is subjected to ductile simple shear of lower and leading regime on the upper crust (see also Arpat & Bingöl, 1969; Wernicke, 1981; Lister et al., 1984; Bozkurt et al., 1993) (see section 2.3). Ductile simple shear occurring by continuous ductile flow in the lower crust and for a decoupling between the upper and lower crust. Sonder & England (1989) used a thin viscous sheet model to investigate thermal dependent rheology on large-scale continental extensional areas. This model is consistent with volcanic data that comes from alkaline volcanics (Gülen, 1990) (see Section 2.2.2). The calculated results are also agree with paleomagnetic data in the Aegean region. Hatzfeld et al. (1997) presented an analog model of a layer spreading under gravity to describe the Aegean extensional area. A corresponding theory suggests that the lithosphere deforms as a continuum. The laboratory experimental results agree with geodetic measurements, strain pattern from microearthquake studies and paleomagnetic rotations (Hatzfeld et al., 1997). But the real stress distribution is not the behaviour of an amalgamated structure because the strain is localised not only by real stress but also with preexisting weakness zones. These zones lead to possible errors in estimating stress distribution.

Jackson & McKenzie (1984b), Anderson & Jackson (1987) and Taymaz et al., (1991) thought that the correlation between topography and seismicity did indeed imply a relatively rigid behavior of aseismic blocks (see also McKenzie, 1970, 1972; Nowroozi, 1972; Papazachos, 1973; McKenzie, 1978). A simple deformation model proposed by Taymaz et al. (1991), using paleomagnetic data, explains the deformation in the Aegean region as block rotations and strike slip faulting (see also Jackson et al., 1992). The model consists of a set of broken slats that are pinned at their western and eastern ends to pivoting screws. They

rotate to the east counterclockwise and to the west clockwise. These rotations are concordant with kinematic data. The model is subjected to E-W shortening and the reason for this is N-S extension (see also *Brunn, 1976; Dewey & Şengör, 1979*). According to this model, velocities decrease to the south. But geodetic measurements show that the velocities increase to the south towards the South Aegean Consuming Boundary (*Oral, 1994; Oral et al., 1995*). In this respect the model does not work.

According to shallow seismic data and morphology, sediment fill of grabens in the Aegean Sea clearly show evidence of extension (e.g., Mascle & Martin, 1990). In the Aegean region the subsidence decrease towards the west and east to the both mainlands of Greese and Turkey, respectively. An extension of 50 % is calculated in the eastern Aegean region (McKenzie, 1978; Le Pichon & Angelier, 1979 see also Yilmaz, 1997), 30 to 80 % in the south Aegean region, and 50 to 70 % in the North and central Aegean (Le Pichon & Angelier, 1979). Good correlation exists between the morphology, elevatetion trend and crustal thickness (Küleli et al., 1993). The region is covered by listric faults whose dip angles decrease with depth (e.g., Arpat & Bingöl, 1969; McKenzie, 1978; Sengör, 1979; Jackson & McKenzie, 1984a; Jolivet et al., 1994). Such faults lead to more extension than is measured in the field. Extensional stresses in the central Aegean region reflect isostatic subsidence and uplift of brittle crustal blocks in response to crustal thinning (McKenzie, 1978). The Aegean lithosphere is accommodated by long low-angle shear zones. Stretching indicators on gneiss domes (footwalls of low angle listric faults) in the Cylades and Menderes Massives parallel the maximum extension direction of the region (Jolivet et al., 1994). Along such zones a supracrustal slab became detached and began to slide in the extension direction (Meulenkamp et al., 1988). The broken slat model did not show these mechanisms.

Tectonic Scheme

From the north to the south the deepest parts of the region appear as intersections of NE trending faults to the east and NW trending faults to the west of the Aegean region. The front of a NW - SE trending elevated morphological feature that traverses west of Aegean Sea almost entirely (Evvoia, Tinos, Naxos, Amargos) the intersections of NW trending faults to the east with NE trending faults to the west appears as NW-SE trending one of the most deepest line (Aegean axial trough) in the Aegean region. This trough is the biggest of the NE trending grabens that represent eastern Aegean morphology. Further north, trending of the

deepest parts of the region is related to the North Aegean Trough (NAT) which is one of the most remarkable features of the region. To the south, the remarkable E-W trending Crete basin appears parallel to the Crete.

There is evidence from palaeomagnetism that the eastern Aegean region rotates clockwise relative to stable Europe (*Laj et al., 1982; Kissel et al., 1985; Taymaz et al., 1991; Barka et al., 1995*). On the other hand, in the western Aegean region, clockwise block rotations occur in the Greek mainland and Aegean islands near the mainland (*Taymaz et al., 1991; Barka et al., 1995*) (see also *Le Pichon et al., 1995*). A model that based on geodetic data shows the same pattern of rotation that is obtained from paleomagnetic data (*Le Pichon et al., 1995; Straub & Kahle, 1995*). Normal faulting with some right lateral strike-slip is dominant in the east. Towards the north, in and surrounding the Sea of Marmara, normal faulting with E-W strike and ENE striking right-lateral strike-slip faulting are dominant (*Taymaz et al., 1991*).

5.1. THE EASTERN AEGEAN REGION

In the Aegean region it is obvious from morphology and seismic profiles that active normal fault systems created deep basins known (Sections 2.5., 2.7.). The most continuous geomorphologic escarpments in western Turkey are oriented ENE and appear to be the footwalls of major active normal faults. These escarpments are prominent on satellite images, topographic maps, in the field, and as gravity lows in Bouguer gravity maps (Oral, 1987; Sari et al., 1995; Genç et al., 1996b). Many identified and explored geothermal areas are situated along the faults (Alptekin et al., 1990; Simsek, 1997). Some hot springs that are sourced from deep fracture zones exist along the faults on land and on continuation of these faults in the Aegean Sea. A number of earthquake events also are related to these features. Mainly NE to ENE and, further east, WNW striking basins (Sredna Gora, Strymon, NAT, Gediz, Bakırçay, Edremit, Büyük Menderes and Gökova; Kütahya and Eskişehir faults) characterise the eastern part of the Aegean region (Fig. 5.3). On the western coast of Turkey, the major basins (grabens) and associated mountain chains (horsts) are perpendicular to the Aegean coast. which leads to the deeply indented coastline of the western Turkish mainland. These grabens are the dominant neotectonic structural features (Ketin, 1968; McKenzie, 1978; Dewey & Şengör, 1979; Jackson & McKenzie, 1984a; Şengör, 1982, 1987; Barka & Reilinger, 1997). Many





INTERNAL FAULTS

K Strike-slip fault

Normal fault

Figure. 5.3. Simplified tectonic map of the Aegean region.

177

major basins in the Aegean Sea appear to be a continuation of these grabens through the center of the Aegean Sea (see also *Maley & Johnson, 1971; McKenzie, 1978; Küleli et al., 1993*). The seismicity of western Turkey is high and displays swarm-type activity with remarkable clustering of low magnitude earthquakes in time and space, related to diffuse structural features (*Şengör et al., 1985; Üçer et al., 1985*) (Fig. 5.1, 5.2). The ENE-WSW / E-W striking directions of the structural features in the east of the region (western mainland of Turkey and further west in the Aegean Sea) progressively become NE-SW towards the west (central Aegean Sea) (Fig. 5.3). This trend is also easy to follow on the seismicity map (Fig. 5.1, 5.2). Accordingly the velocity vectors defined from GPS and SLR show westerly directed motion in central Turkey which becomes progressively more pronounced to the W-WSW with stations indicating SW oriented rates in southwestern Turkey (*Oral, 1994; Oral et al., 1995; Reilinger et al., 1997; Mueller et al., 1997*).

Bathymetry and shallow seismic data in the Aegean Sea suggest that NE-SW striking basins between the active faults bend abruptly to SW by NW-SE striking faults along the NW-SE coast of the Greek mainland. Islands (Sporades, Skyros, Evvoia, Anros, Tinos, Mikonos, Naxos, Amorgos, Astipalaia, Sirna) give the same impression. The faults continue in the northwestern Greek mainland (Strymon valley) (see also, Maley & Johnson, 1971; Arpat, 1976; McKenzie, 1978; Taymaz et al., 1991; Jackson, 1993). At the joints the southerlydirected component of motion (Oral et al., 1995) leads to formation of triangular (">" shape) basins (i.e. Scyros, Sporades) (Fig. 2.18). NAT and the other basins become progressively wider towards the west (Fig. 5.3). Fault mechanism solutions of earthquakes (Taymaz et al., 1991) reflect dominantly normal faulting with a right lateral strike-slip component related to those basins (Taymaz et al., 1991). But Saatçılar et al. (1996) did not observe any strike slip evidence in the profiles. According to them, the focal mechanism solutions of Barakou et al. (1994), who used also stations from islands in the Aegean Sea, are more consistent with seismic profiles. But in contrast Martin (1987) identified strike-slip evidence in these basins from extensive seismic profiling data (see also Mascle & Martin, 1990). Further, there are many seismologists (e.g., Taymaz et al., 1991) who find strike slip mechanisms on these faults (see Section 5.5.1).

Is fact that the extension on the grabens of western Turkey decreases from west to east and increases from north to south, from seismologic and geodetic evidence (*Eyidoğan, 1988;* Oral, 1994; Oral et al., 1995; Reilinger et al., 1997; Barka & Reilinger, 1997). The geodetic

velocities increase from 24 mm/yr in the southern Marmara Sea to 36 mm/yr to SW at the western flank of the South Aegean Arc (SAA) (*Barka & Reilinger, 1997*). The increase of extension from east to west in Turkey leads to the horizontal westward opening of the ">" shape gulfs along the west coast of Anatolia, such as Saros, Edremit, İzmir and Gökova and further west in the Aegean Sea (see also *Barka & Reilinger, 1997*). The northestern Aegean region is partly under the influence of the right lateral strike-slip motion especially in and around the Marmara Sea. On the other hand southwestern Anatolia is undergoing major extension, resulting in graben formation and probably listric faulting (*McKenzie, 1978*). This could be related to rollback of a slab. Paleomagnetic data are consistent with very small or no rotations in the northern part and possibly anticlockwise rotations, relative to Europe, in the south (see *Taymaz et al., 1991*). But the data are too few to made straightforward interpretations (see also *Taymaz et al., 1991*).

5.1.1. The Northeastern Aegean Region

The area is characterised by a high strike slip component of faults with the N-S extensional regime of the Aegean region. But the kinematics of faulting in the area is not clearly understood yet. The North Anatolian Fault (NAF), Marmara and surrounding basins, Strymon basin, NAT and Skyros basin are the most pronounced and are considered as the major tectonic elements in northwestern Anatolia (Fig. 5.3). Distinct epicentral zones follow these narrow lineations of morphology (Fig. 5.1, 5.2). Young tectonic activity in the region has affected the geomorphology and normal, strike-slip faults and dominantly oblique faults and basins can clearly be seen in the morphology. Strikes of the strike-slip faulting in these places are the most obvious trend in the seismicity map (*Taymaz et al., 1991; Üçer, personal communication*). A good correlation also exists between seismic activity and high heat flow anomalies, because these are deep reaching oblique faults (*Alptekin et al., 1990; Şimşek, 1997*). Gravity anomalies are also well correlated with this major tectonic lines (*Oral, 1987; Sarı & Şalk, 1995*).

To the west of Mudurnu valley there are mainly E-W trending grabens that characterise the Marmara region. NE trending short dextral faults separates these grabens in the Marmara Sea. East of the Marmara Sea, from the epicentre of the 1912.08 (40.75-27.20) Saros earthquake to the Sporades basin, a similar ENE-NE trending right-lateral strike-slip motion

with large amount of deep-slip component is dominant, which strikes along the NAT. The Strymon basin to the north of NAT and Edremit trough to the south strike parallel to the NAT. The NAT, Sporades, Edremit and Strymon troughs all terminate to the SW in a similar way (*Lyberis, 1984*). The Edremit trough strikes from the western edge of the Biga peninsula to the west, and further west to the SW. It is bordered at the NAT by NE-SW trending faults. Concordantly, the focal mechanism solution of the 1967.03.04 earthquake shows NE-SW trending normal faulting here. But also aftershocks of events and the focal mechanism solution of the 1981.12.27 event show that dextral motion is taking place as a continuation of the motion of the Edremit trough. Both lineations follow the narrow grabens that can be seen clearly from bathymetry (Fig. 2.18). On the other hand, the area in the Aegean Sea between these zones appears to form aseismic blocks (*Allan & Morelli, 1971*) (Fig. 5.1, 5.2).

This well-known that the purely dextral NAF strikes ENE to the east of the Mudurnu valley. Right-lateral motion of the NAF is clearly expressed by an abundance of physiographic and geologic features (e.g., Wallace, 1968; Allen, 1969, 1975; Seymen, 1975; Tatar, 1978; Barka, 1981; Barka & Hancock, 1984), surface breaks of large earthquakes (e.g., Ketin, 1948, 1969) and focal mechanism solutions of large earthquakes (Fig. 5.4) (e.g., Cantez & Ücer, 1967; McKenzie, 1972, 1978; Alptekin, 1973; Jackson & McKenzie, 1984a). The narrow NAFZ is the northern boundary of the westward moving Anatolian block and connects the compressional regime in eastern Anatolia with the extensional regime in the Aegean sea area (Fig. 5.3) (Angagi, 1997). The boundary becomes diffused around the Marmara region and further west. Extension affects areas to the north in Central and southern Bulgaria; Macedonia and eastern Albania further west. All the mountainous topography in this northern region may be the result of Late Miocene to recent extension (Burchfiel et al., 1997). The N-S compression-related westward escape of the Anatolian plate from the Karliova triple junction is obvious, but where the driving force that is pushing to the east ends and where the driving force that is pulling to the west starts is unclear. In the east of the region the focal mechanism solution and surface break of the 1967.7 .22 earthquake on the NAF are in good agreement and require a slip vector within a few degrees of 90° E (McKenzie, 1978). This earthquake represents the NAF pure strike slip motion. The ENE trending pure strike-slip of the NAF ends just west of the Mudurnu valley (see McKenzie, 1972). The extensional system begins west of Mudurnu earthquake epicentre (McKenzie, 1972, 1978; Jackson & McKenzie, 1984a:



Figure. 5.4. Lower hemisphere projections of the focal mechanism solutions of the earthquakes studied by various seismologists (see Table. 2.5). Compressional quadrants are shaded. Numbers identify the selected solutions in Table. 2.5. The focal mechanisms selected from Table. 2.5. correspond to the solutions found by using the most reliable method and seem to be the most concordant with the tectonic scheme (see Section. 5 and Fig. 5.3).

Lio et al., 1991). Both strike slip and extensional deformation have been distinguished by field geology, geodetic estimations and fault mechanism solutions in the area (*McKenzie*, 1978; Dewey & Şengör, 1979; Lyberis, 1984; Crampin & Evans, 1986; Barka & Kandinsky-Cade, 1988, Taymaz et al., 1991; Mueller et al., 1997). This region is under the influence of both the dextral strike-slip fault regime of the NAF and the tensional regime of the Sea of Marmara and western Turkey. Barka & Kadinsky-Cade (1988) and Barka & Gülen (1988) introduced a pull-apart model for the Marmara basins (see also Wong et al., 1995; Ergün & Özel, 1995; Akgün & Ergün, 1995; Koral & Öncel, 1995; Barka, 1997) to explain the kinematics. In agreement with the model, in the Marmara Sea WNW-ESE trending basins bordered by NE-SW trending right lateral small strike slip segments are obvious from bathymetry.

It is suggested that the right lateral strike slip component of oblique deformation in northwestern Anatolia comes from western continuation of the dextral NAF. According to another idea, the NAFZ consists of mainly a single strand between the Karlıova triple junction and the Mudurnu valley. For example *Allen (1969)*, *Ambraseys (1970)*, *Ktyak (1986)* suggest that, to the west, the Marmara sea and the North Aegean regions are under a purely extensional regime as the northern extent of the extensional regime of the Aegean region. *Jolivet et al. (1994)* argue that the strike-slip deformation is less localised in the Aegean N-S extensional domain than onland in Turkey, and the NAF zone diffuses into a brother zone. This argument suggests that the NAF splays into several segments (3 or 2 branches) in the Marmara region, west of the epicentral location of the Mudurnu earthquake (see also *McKenzie, 1978; Lyberis, 1984; Barka & Kadinsky-Cade, 1988; Taymaz et al., 1991; Barka, 1997; Barka & Reilinger, 1997*).

According to the other idea (e.g., *Ketin, 1969; McKenzie, 1972, 1978, Alptekin, 1973; Dewey* & Şengör, 1979; Le Pichon & Angelier, 1981; Lyberis, 1984; Şengör et al., 1985; Barka & Kadinsky-Cade, 1988; Mascle and Martin, 1990; Taymaz et al., 1991; Barka, 1992; Reilinger et al., 1995; Le Pichon et al., 1995; Taymaz et al., 1991; Jackson et al., 1992; Armijo et al., 1996; Mueller et al., 1997; Burchfiel et al., 1997; Barka, 1997; Barka & Reilinger, 1997; Küleli, 1997), the NAF zone continues through the Marmara and North Aegean Seas (NAT). Furthermore, according to e.g., McKenzie (1972), Reilinger et al. (1995) and Le Pichon et al. (1995), the trench system could be connected of the NAF by the Cephalona fault. However,

McKenzie (1972) also points out the absence of any obvious structure crossing Greece from the Sporades basin to Kephalena fault (see also *McKenzie, 1978; McKenzie & Jackson, 1983; Taymaz et al., 1991*). On the other hand *Dewey & Şengör (1979)* suggested that the strike slip motion of continuation of the NAF is bordered to the west by the Greek shear zone. They suggest a model for the extensional mechanism of the Aegean Region according to the this idea. West of the NW-SE striking Aegean axial trough, the SW-directed motion is taken up by motion perpendicular to the active grabens. In this case, NAT and the other parallel striking faults appear as cross grabens.

The most dramatic bathymetric feature of the North Aegean Sea is the NAT (Fig. 2.18), which consists of a series of deep fault-bounded active basins (Vogt & Higgs, 1969; Lort, 1971; Lyberis, 1984; Le Pichon et al., 1984; Mercier et al., 1991). This feature is thought to be a continuation of the NAF by many scientists. Intense seismicity clearly defines the trough (Fig. 5.1, 5.2). It is identified also by magnetic and bathymetric surveys (Vogt & Higgs, 1969; Lort, 1971). It had been thought that sea floor was being produced along the trough (McKenzie, 1970, 1972; Lort, 1971; Allan & Morelli, 1971), but magnetic surveys have failed to show any linear magnetic anomalies associated with the shallow seismicity (Vogt & Higgs, 1969; McKenzie, 1972). The results of geophysical investigations show that the crust underlying the NAT is continental, overlain by up to 5.0 to 5.5 km of sediments (see Ginzburg et al., 1987). It seems that the intense SW-NE trending magnetic anomalies, which are parallel to the bathymetric trends, are caused by magnetised rocks that have been intruded by volcanism (Vogt & Higgs, 1969; Papazachos & Comninakis, 1971). A heat flow station located over one of the anomalies gave a value of 2.5 H.F.U., showing that recent intrusion of magnetic material probably also contributes to the high heat flow observed in the area (see Jongsma, 1975).

The trough is bounded by a major fault to the south and by a faulted flexure to the north (*Ginzburg et al., 1987; Le Pichon et al., 1984; Mascle & Martin, 1990*). Major seismic activity is also located about 50 km south of the deep linear trough, which could related to the northward deeping major fault (*McKenzie, 1972*). The bathymetry and shallow structure of this trough, in which water depths reach some 1000 to 1400 m (*Maley & Johnson, 1971*), have been studied with seismic reflection surveys and acoustic techniques (*Ginzburg et al., 1987; see also Jongsma, 1975*). Some information on the deep sediments (Oligocene to present) has been published by *West (1973)* and *Lalechos & Savoyat (1977)*. The whole

sediment column up to and including the seafloor is affected by faulting which points to very recent activity (see *Jongsma, 1975; Roslyakov & Sorokin, 1997*). The NAT could be divided into two basins: the Saros basin, which trends ENE-WSW in the east and the Sporades basin, which trends NE-SW in the west. These changes could be evidence that the western part of the Anatolian Trough contains a larger component of opening (*McKenzie, 1978*). The focal mechanism solutions show that the N-S component of the motion increases westward (*McKenzie, 1978*). North of the trough, basins (Thermaikos, Orfanou, Prinou) strike normal (NNW-SSE) to the trough; they are caused by NE-SW extension (*Mascle & Martin, 1990*).

Focal mechanism solutions in the NAT show mainly right lateral strike-slip faulting (Taymaz et al., 1991) (Fig. 5.4). Roussos & Lyssimachou (1991) found typical recent strike slip fault patterns in the central NAT, based on detailed interpretation of marine reflection seismic lines (see also Saatçılar et al., 1996). They observed transtension (divergent wrenching) with high angle normal faults (see also Lalechos & Savoyat, 1977). According to them, the change in fault strike is the probable cause of the development of transtension in that area (see also Lyberis, 1984). Focal mechanism solutions of earthquakes larger than M=5.5 show normal faulting and strike slip faulting along the trough. These solutions could easily be associated with bathymetric features of the NAT. Two substantial shocks, 1967.3.4 and 1968.2.19, have occurred south of the NAT and are not associated with any major bathymetric feature (McKenzie, 1978). The aftershocks of 1968.2.19 have been relocated by North (1977), who found that they lay on a NE-SW trend to related NAT (McKenzie, 1978). This trend follows the expected fault plane and the motion must be right lateral on the fault. All the focal mechanisms for 1975.3.27 (Table. 2.6) give a normal fault with some strike slip component. This mechanism for the 1975.3.27 event together with the description of the surface break of 1912.8 .9 by Allen (1975), are consistent with a strong right lateral strike slip motion on the eastern part of the NAT. The nodal planes of these earthquakes strike parallel to the trough that bounds active faults. Lyberis (1984) suggested that displacement on the NAT is greater than along the NAFZ. Strike slip and normal faults are also observed further north over North Aegean coastal areas (Roussos & Lyssimachou, 1991). For example, focal mechanism solutions of the 1978.05.23 and 1978.06.20 earthquakes show that normal faulting is also taking place further north. In central and southern Bulgaria, Macedonia and eastern Albania, extension is effective. In the northern Aegean region, Sokoutis et al. (1993) show that in the gneiss domes of Kavala and Thassos the direction of extensional ductile shear is NE-SW, which is parallel to the North Aegean Through (see also Jolivet et al., 1994). Jongsma (1975) observed only local thrusting deformation in sediments. *Saatçılar et al. (1996)* also observed NE-SW directed thrust deformations from seismic sections at deeper levels of sediments. But no evidence of compression has been found by seismotectonic observations (see also *Lyberis*, *1984*), or seismic profiles (*Lalechos & Savoyat*, *1977*) and the evidence from seismic profiles is not very clear.

5.1.2. The Southeastern Aegean Region

Dominant strike of the major grabens in western Turkish mainland (Edremit, Alaşehir (Gediz), İzmir, Büyük Menderes and Gökova (Bodrum) grabens) is E-W to ENE-WSW. These grabens continue west of the the central (deeper) portion of the Aegean basin (*Mascle and Martin, 1990*). According to the *Barka & Akyüz (1997*), the E-W and NW-SE faults (e.g., Gökova, Büyük Menderes, Pamukkale and Dinar) are normal faults (e.g., *Şengör et al., 1985*) in western Anatolia. On the other hand NE-SW trending faults (e.g., Fethiye-Burdur fault zone) have a left lateral strike slip component (*Şaroğlu et al., 1987; Barka et al., 1995*). These grabens are closely related to the Aegean neotectonic extensional regime and they are evidence of stress distribution in the area.

The Edremit trough trends ENE-WSW direction from east of Edremit bay to the Skyros basin. The graben is bounded by the same main Northward dipping fault to the south as is the NAT (*Mascle & Martin, 1990; Taymaz et al., 1991*). The İzmir Trough trends ENE-WSW, but it is not clear from south of Midilli to the SW. It is bounded by the same SE-NW trending and northward dipping normal faults as the others to the north (*Mascle & Martin, 1990*). The Menderes Trough is also is a NE-SW trending basin which is parallel to the İzmir, Edremit and North Aegean troughs. Continuation of the Menderes graben could be clearly seen from bathymetry further WSW. NE dipping normal faults (*Mascle & Martin, 1990*) bound the graben to the WSW. There was no evidence of a strike slip component in these grabens from Gökova bay in a SW direction parallel to the other SW trending grabens in the eastern Aegean sea. This graben also ends in front of the NW-SE, trending long NE dipping normal faulting feature (*Mascle & Martin, 1990*). Southwestern Anatolia is undergoing major extension, resulting in graben formation and probably listric faulting (*McKenzie1978*). The available geodetic data are consistent with about 10 \pm 5 mm/yr extension across the Bozdağ horst,

Büyük Menderes and Gediz grabens and 5 ± 5 mm/yr extension across the Gulf of Gökova, north of the Marmaris peninsula (Barka & Reilinger, 1997). Field observations and focal mechanism solutions in western Turkey are consistent with this a number of major normal fault; events occurred along these faults, for example 1899 Büyük Menderes, 1928 Torbalı, 1955 Balat, 1969 Alaşehir, 1969 Simav, 1970 Gediz and 1995 Dinar earthquakes (Barka & Reilinger, 1997). The dips of at least some of the normal faults in western Turkey become shallower with depth, and are called listric faults (see Section 2.3, for detail). This kinematic result could be evidence of the dynamic force that leads to extension. Three shocks are related to listric faulting in western Turkey (McKenzie, 1978). The best evidence comes from the 1970.3.28 earthquake whose fault break was mapped by Ambraseys & Tchalenko (1972) (see also McKenzie, 1978). The surface break for the 1969.3.28 earthquake was mapped by Arpat & Bingöl (1969). Low angle normal faulting and listric geometry were observed on faults in a graben (Arpat & Bingöl, 1969; Yusufoğlu, 1996; Emre, 1992). The epicentres of all moderate shocks determined by McKenzie (1978), which have surface breaks, are displaced to the north of their surface breaks (McKenzie, 1978; Sengör, 1987). These basins are filled with up to 2 km of Quaternary and Neogene sediments (Sari et al., 1995). The central Menderes Massif is bounded by the northward dipping southern main boundary fault of the Alasehir (Gediz) graben in the north and the south dipping northern main boundary fault of the Büyük Menderes graben. The gravity profiles of Sarı et al. (1995) indicate that the Gediz and Büyük Menderes graben systems have asymmetric features (Roberts, 1988; Paton, 1992; Sarı et al., 1995), which supports the idea of listric fault kinematics. In western Turkey high heat flow was measured along the graben by Alptekin et al. (1990). The anomalies are related to deep reaching detachment faults. There are also many hot springs and young volcanoes in the area. For example, the volcanics of Kula are basaltic and come through huge detachment faults to the surface. In western Turkey there is a metamorphic massif outcrop that is called the Menderes Metamorphic Massif. The Simav, Alaşehir, Küçük Menderes and Büyük Menderes grabens divide the Menderes Massif into four submassifes. This massif is a key to understanding the tectonics of the Aegean region. A complex core mechanism that related to subduction is suggested for the outcropping (upwelling) of the Menderes core complex. The low angle huge detachment faults could have caused updomming of the Menderes massif and its continuation towards the west. The ages of grabens are closely related to the starting time of extension in the area. The start of the formation of the Gediz Graben has been variably assigned to the Miocene (Yağmurlu, 1987), Middle Miocene (Ercan et al., 1978; Seyitoğlu & Scott, 1991; Emre, 1992), Late Miocene (Karamanderesi & Yilmazer, 1982; Arslan, 1984) and Pliocene (Ünal & Havur, 1970; Karamanderesi, 1971; Arpat & Bingöl, 1969).

Sengör (1987) has reported active faults with SW-NE trend that cut across these main grabens, implying that it comprises many elongated blocks with dimensions of 50 to 100 km in the SW-NE and 20 km in the NW-SE directions, which can clearly be identified morphology and on gravity maps (Oral, 1987; Sarı et al., 1995). These are older (Early Miocene) than the dominant E-W grabens (Ketin, 1968; Kaya, 1979, 1982). Şengör (1987) explained these features as cross grabens (Sengör et al., 1985; Oral, 1987). According to the theory, the small grabens that occur in the hanging wall of the main graben join a huge perpendicular normal fault (breakaway fault) of main graben. It is suggested by Oral (1987) that the faulting continues deep of and cuts the entire lithosphere. According to this theory, the small grabens and the main graben have evolved simultaneously (see also Sari et al., 1995). If this suggestion is true the starting time of the extension in the region must be before that of the E-W grabens. The other suggestion is that the N-S compressional regime is of Tibet type (Yilmaz, 1997) and leads to the north trending E-W extended grabens. Younger grabens on the other hand are thought to belong to the N-S extensional deformation (Dewey & Sengör, 1979; Sengör, 1982; Sengör et al., 1985). If this suggestion is accepted the starting time of the extension must be more recent than that of the N-S trending grabens.

5.2. THE WESTERN AEGEAN REGION

The Hellenides-Peloponnisian peninsula is characterised by a NNW-SSE trending mountain belt that constructed of nappe pilling. The belt is indicated by the high negative Bouguer anomaly that strikes NNW-SSE in the western Aegean Region (*Makris, 1977, 1985*). These mountains are cut by NNW to NW striking normal faults to their NW of mountains. The NW-SE trending normal faults to the NE continue step by step to the centre of the Aegean Sea and the last fault zone occurs as eastward dipping asymmetric grabens (e.g., Strymon, Sporades, Skyros, Anros, Mikonos, Sirna) and bounds NE-SW trending basins (e.g., Kavala-Xanthi, NAT, Edremit, İzmir, Menderes and Gökova) to the east (see also *McKenzie, 1978; Roberts & Jackson, 1991; Taymaz et al., 1991*) (see Section 5.1.1). The lineation of faults over the Greek mainland can be seen from bathymetry - topography and geological structure as well as focal mechanism solutions of moderate earthquakes (*Roberts & Jackson, 1991; Taymaz et al.,* 1991). These grabens were also been recognised from diffuse seismicity distribution (McKenzie, 1978; Hatzfeld et al., 1990; Rigo et al., 1995; Hatzfeld al., 1996; Mueller et al., 1997) and a structural geological study (Mercier et al., 1976). West of the Aegean region, two huge NW-WNW striking grabens (Corinth and Evvoia) are obvious from bathymetry and topography. Towards the Aegean Sea (east) these two basins become more southerly. These grabens indicate recent extensional structures that accommodate a large part of the internal deformation of Hellenides-Peloponnese (see for detail Armijo et al., 1996; Hatzfeld et al., 1996). The Gulf of Corinth, located between Greece and Peloponnese, is a recent N-S extensional structure (McKenzie, 1978) not older than 2 My that opens at about 1 cm/yr and accommodates a large part of the extensional deformation (Armijo et al., 1996; Hatzfeld al., 1996). In the footwall, 1.3 mm/yr maximum uplifting is found from detailed field geology in this graben by Armijo et al. (1996). They suggest elastic banding theory to explain such uplifting. Microseismic surveys support a northward dipping listric shape for faults related to the Corinth graben (Hatzfeldet al., 1996). It is suggested that this detachment is due to the uncoupling of the brittle upper crust from a more ductile lower crust (Melis et al., 1989; Rigo et al., 1995) (see Section. 2.3). Its western segment is connected to the Ionian trench system by a series of NE-trending transform faults with dextral polarity. This zone is called the Kephalonia (Cappelona) Fault Zone. The rift's eastern segment transverses the volcanic arc of the Aegean orogene and can be considered a first order cross fault (Hatzfeld al., 1996). Taymaz et al. (1991) suggest that the overall NE-SW motion across the region is due to oblique (left-lateral and normal) slip on these normal faults (Berckhemer & Kowalczyk, 1978; Myrianthis, 1984). North of the Kephalonia fault zone, the NW end of the subduction zone is characterised by a negligible motion (see Mueller et al., 1997). In northwestern Greece and Albania there is a band of thrusting near the western coasts. The most obvious problem in accounting for the observed deformation is the relationship between the thrusting and normal faulting further east in the northwestern part of the area (see also McKenzie, 1978).

East of the Aegean axial trough the strike-slip faults do not cross central Greece to link with the South Aegean Trench (*Taymaz et al., 1991*) with the Kephalonia fault zone. Instead they appear to end in deep basins bounded by normal faults with a NW or WNW strike (see section 5.1). Geodetic displacements measured in Greece indicate that slip vectors parallel to the main basin trend over east and central Aegean. But in the western Aegean region the vectors are perpendicular to the strike of large scale crustal blocks bounded by normal faults (*Billiris et al., 1991; Oral et al., 1995; Jolivet et al., 1994*). On the other hand the vectors further east in the Aegean Sea areapproximately parallel to the bathymetric features which could be thought as cross grabens (e.g., *Şengör, 1987*). *Taymaz et al. (1991)*, by considering paleomagnetic and seismotectonic results; suggest that central Greece is rotating clockwise about a vertical axis as a whole. A homogeneous SW oriented motion of SW Greece reach as rates of 40 mm/yr relative to the Eurasian plate according to GPS and SLR data (e.g., *Mueller et al., 1997*). The Greek mass seems to be pulling the eastern Aegean region towards the south Aegean consumption boundary.

The deformation within the Greek mass occurs as simple shear. Faulting on land was observed dipping north after the 1894 earthquakes along the north Gulf of Evvoia (Ambraseys & Jackson, 1990). Fault types of the same type and direction were found for the 1967.03.04 earthquake (Taymaz et al., 1991) in the Skyros basin. Skyros island that represents a footwall of the NW striking graben and appears to be tilted to the SW (Roberts & Jackson, 1991; Taymaz et al., 1991). Most major normal faults dip northeastward and are responsible for the southwestward tilt of the crustal blocks along the northeastern coast of Evvoia and Attica (see also Jolivet et al., 1994). Furthermore, Papanikolau, et al. (1988) show that the sediments deposited in the basins are tilted southward. The analysis of structures in the metamorphic domes on footwalls of Evvoia and Attic faults and the granodiorites also show a very consistent fabric with flat foliation and N-S trend of stretching lineation (Faure & Bonneau, 1988; Gautier et al., 1990; Buick, 1991; Jansen, 1973; Robert, 1982; Jolivet et al., 1994). Extension is taken up by low angle normal faults, which bound upper crustal blocks such as Evvoia and Attica (Jolivet et al., 1994). The Cyclades area is also like a shallow plateau that appear as a footwall of the northward dipping faults to the NE. It is obvious that the NAT and the other NE-SW trending basins end in front of these blocks as cross grabens.

5.3. THE SOUTH AEGEAN SUBDUCTION SYSTEM

Based on earthquake investigations as well as geophysical investigations of gravity, magnetic and seismic wave velocities, Galanopoulos (1963), Papazachos & Comninakis (1969, 1971), Caputo et al. (1970), Papazachos (1973), Agarwal et al. (1976), Gregersen (1977), Comninakis & Papazachos (1980), Gregersen & Jaeger (1984), Makropoulos & Burton (1984) and Spakman et al. (1988) have shown the existence of dipping lithospheric material towards the concave side of the South Aegean Arc (SAA). Negative low Bouguer gravity anomalies show that there is dense material (a sinkable slab) beneath Crete, Rhodes and the Pelopennese (*Ryan et al., 1969; Makris, 1985; Tsokas & Hansen, 1997*).

Recent volcanism on some islands is that parallel to the South Aegean trough is related to a subducting plate (slab) in the Aegean region. Most of the heat flow values observed over the Cyclades are like those for other island arc systems in the world (*Jongsma*, 1974). Furthermore, heat flow values increase towards the inside of the arc from the trench, as they do in the Kuril and Japan island arcs (*Jongsma*, 1974) (Fig. 2.57). The Benioff zone ends beneath the volcanic arc. At greather deprth the slab could not accumulate stress because it behaves as plastic material above a critical heat and pressure. Limited isotopic data suggest that little of the sediment is incorporated into the volcanic rocks of the Aegean arc (*Barton et al.*, 1983; Briqueu et al., 1986), presumably because it is not transported deep enough into the mantle for melting to occur (*Taymaz et al.*, 1990). A low-velocity layer is observed in the upper mantle in the middle of the Aegean Sea from earthquake data (*Spakman et al.*, 1993; *Papazachos*, 1994; Papazachos et al., 1995). This remarkable low velocity anomaly may be caused by the dehydration of the subducting lithosphere around a depth of 80 to 90 km (*Papazachos & Nolet*, 1997; *Tsokas & Hansen*, 1997).

Along the western coast of Albania and Greece, and seaward of a trench from SW Greece through Crete to SW Turkey, the SAA is one of the most remarkable tectonic features of the Mediterranean area as well as of the Aegean region (Fig. 5.3). This is the consuming boundary of the African plate is the region. A narrow zone of negative free air gravity anomalies (Fig. 2.37) (Woodside & Bowin, 1970, Allan & Morelli, 1971) and low seismic wave velocities (Alessandrini et al., 1997; Papazachos & Nolet, 1997) coincides with this trench. A thick sedimentary prism along the trench causes these anomalies. The detailed morphology in this trough extremely complicated (Jongsma, 1977). The South Aegean Trench consists of a number of prominent deep basins that from an arc shape from Kefallinia to Rhodes (Fig. 2.18) (e.g., Ryan et al., 1969). To the east of the trough there are narrow linear basins called the Pliny and Strabo trenches. On the other hand, along the Ionian trench, structures west of Crete are not linear line and they extend towards the Ionian Sea (McKenzie, 1978). These depressions are collectively called the South Aegean Trough (SAT). To the East based on focal mechanism solutions of earthquakes and shallow seismic profiles McKenzie (1972) suggest that the Pliny Trench is the main zone of subduction, rather than the Strabo Trench as supposed by Ryan et al. (1973) (see Jongsma, 1977). On the other hand the Strabo trench continues further to the NE than the Pliny Trench and probably links up with another trench system to the east. Because the convergent rate is high enough, the deforming structures can be clearly seen in on bathymetry without sedimentary carpet (*Jongsma*, 1977). However these deep basins of the South Aegean Trench are considerably shallower and more highly curved (R=400km) than the other subduction related main trenches elsewhere in the world (*Le Pichon & Angelier, 1979; Jongsma, 1977*). Seismic profiles to the West show that the South Aegean Trench contains as much as 800 m of acoustically stratified recent fill (*Ryan et al., 1969, 1973*), and it may be locally thicker than 1.5 - 2 km (*Biju-Duval et al., 1974; Jongsma, 1977*).

Using Sea-Beam data, geodetic data, oceanic studies and field studies of islands and surrounding mainland, *Angelier et al. (1982)* used detailed investigations of faults to describe the kinematic situation around the area. They recognise three different segments along the South Aegean Trench according to the main fault alignments. In addition, based on microearthquake data focal mechanism solutions of earthquakes, normal faulting is found that indicates NW-SE extension in southern Peloponnese and western Crete and E-W extension in central and eastern Crete (*Hatzfeld et al., 1993*). The Pelaponnises have NNW elongated faults, Crete has E-W, ENE-WSW and NE-SW strike faults and Rhodes has NNE-SSW elongated faults. These faults are mainly normal and strike parallel to the elongation of the South Aegean Trench system. *Armijo et al. (1992)* suggested that the present day E-W extension of the South Aegean region is related to the arc curvature, and the arc parallel extension is possibly related to slabpull force (see section 5.4).

5.3.1. The Eastern Tip of the Arc

Harrison (1955) first drew attention to the similarity of the properties of the South Aegean Island Arc to those of major arcs in the Pacific. This arc has such general characteristics of the arcs as a trench in its convex side, a seismicity belt and negative free air anomaly along the trench, a sedimentary arc in the trench as well as a volcanic arc and a marginal sea (Aegean Sea) in its concave part. In addition, there is convergence between the Aegean lithosphere (in the concave part) and underplating Mediterranean lithosphere (in the convex part). The Aegean region is one of intense seismicity, most of which occurs in a wide belt that roughly follows the bathymetric part of the inner wall of the South Aegean Trench

system (e.g., *McKenzie, 1978; Hatzfeld et al., 1993*). Nearly all the earthquakes, including micro-earthquakes deeper than 80 km, however, occurred beneath the Sea of Crete (*Hatzfeld et al., 1993*). No deep seismicity is observed outside the arc, south of Crete. Recent records of microseismic activity study (*Hatzfeld et al. 1997*) show that most of the seismic activity is located along the South Aegean Trench and is related to the active convergent boundary, and most of the larger shocks lie between the deepest part of the trench and the islands.

The trend of the compressional axis of focal mechanisms of earthquakes is perpendicular to the SAA in its western and southern part, keeping the same pattern to become parallel to the arc in the Pliny and Strabo trenches (with left-lateral strike-slip motion) at the eastern end of the arc (fig. 5.4) (e.g., McKenzie, 1978; Mueller et al., 1997). These results are compatible with GPS measurements (fig. 2.34) (Oral et al., 1995). The compressional axes are nearly horizontal and trending N-S to NNE-SSW, parallel to the suggested SW motion of the Aegean region (e.g., McKenzie, 1972; Hatzfeld et al., 1993; Jackson et al., 1992; Taymaz et al., 1990). In Crete by, shoreline change measurements imply by a 2-3 mm/yr uplifting which is related to the compressional regime along the subduction boundary (Angelier, 1979; Angelier, 1981; Angelier et al., 1982). Also on Crete there is some field geological evidence of normal faulting (e.g., Angelier et al., 1982). If the slab-pull mechanism exists, why is compressional evidence found? Just NE of the thrust zone in the internal part of the arc, normal faulting with similar strikes and deep as the reverse faults on the consuming boundary parallel to the trench, is very well known from the Evvoia to Crete (McKenzie, 1978; Hatzfeld et al., 1990). The transition between reverse faulting and normal faulting is rather sharp, but with some overlap of the two families, especially in the NW (Hatzfeld et al., 1990). In the area of normal faulting, strike-slip mechanisms are also observed by Hatzfeld et al. (1990). Sea-beam and submersible diving observations and seismic profiles demonstrate that extensional faulting is seen at the sea surface as far south as the inner wall of the South Aegean Trench and north of the inner wall (Jongsma, 1977; Huchon et al., 1982; Taymaz et al., 1990). Jongsma (1975) also observed normal faulting near the outer wall of the trench in profiles that he interpreted. There is no evidence of normal faulting earthquakes south of the south coast of Crete (Taymaz et al., 1990). From morphological studies made by submersible diving, it is observed that the compressional structures affect the sedimentary cover of the outer wall and trench whereas extensional tectonics is present on the inner wall (Huchon et al., 1982). The focal mechanism solutions of large earthquakes by Taymaz et al. (1991) indicate shortening in the outer wall of the South Aegean Trench south of Crete. These mechanisms and the spatial distribution of the slab show that along this belt the Eurasian lithospheric plate is underthrusted by the African lithospheric plate, In addition there is evidence that most of the upper sedimentary cover is not subducted but rather piles up in front of the trench to form the Mediterranean ridge. And just back of the arc an extensional process is taking place (*McKenzie*, 1978).

The location of the consuming boundary not perfectly known. *Papazochos et al. (1995)* indicate that the lithosphere dives approximately along the line of the south coast of Crete. Recent tomographic results (*Papazachos & Nolet, 1997*) lead to the same conclusion. *Tsokas & Hansen (1997)* also modeled the subduction boundary as this line. *Hatzfeld et al. (1993)*, using microearthquake data, suggested that the boundary between the subducting African plate and the overriding arc cannot be located farther than 50 km south of the South Aegean Trench. However, the model of *Gregersen & Jaeger (1984)* indicates that the subduction process starts about100 km farther to the south. *Küleli (personal communication)* also suggested that the subduction prosesses starts further south. Recent seismic profiles beneath the Ionian islands, interpreted by *Hirn et al. (1996)*, suggest a more seaward position (using the Ionian islands) for the Ionian thrust than was previously assumed. By using gravity modeling and deep seismic data *Truffert et al. (1993)* also locate the consuming boundary more seeward than previously assumed. Their results show that at the trench itself and further outward there is overriding plate material under consolidated sediments which possibly thrust the sheets emplaced during a compressional regime.

The mean slip vector direction of the relative motion between the southern Aegean and Africa found by *McKenzie (1978)* is approximately parallel to the narrow slots in the sea-floor known as the Pliny and Strabo trenches east of Crete. Hence, the eastern part of the South Aegean Trench must be dominantly a strike-slip fault (*McKenzie, 1978; Le Pichon et al., 1979; Huchon et al., 1982*). *Ritsema (1969)* has shown that the motions along the faults are dextral in the eastern part of the region and sinistral in the western part (see *Papazachos, 1973; Le Pichon et al., 1995*). But the available data do not support this model. Some focal mechanism solutions, and the evidence of the sediment disturbance below the inner wall of both Pliny and Strabo trenches, support a thrusting kinematic, but without strike slip component (*Ryan et al., 1969; Jongsma, 1977*). Only the 1957.4.24 and 1957.4.25 earthquakes showed strike slip motion, but the solutions were not well constrained (*McKenzie, 1978*).

The Strabo trench continues further to the NE than the Pliny Trench and probably links up with another trench system and the Isparta Angle, which constitutes the junction between the Cyprus and South Aegean arcs (Brunn et al., 1971; Barka et al., 1995; Eyidoğan & Barka, 1996; Yağmuroğlu et al., 1997; Barka & Reilinger et al., 1997; Pinar, in press). Oral (1987) observed a high gravity anomaly over the Fethiye-Burdur fault zone (Köyceğiz Corridor) that could probably be explained by continuation of the subduction zone. This anomaly could be evidence of a strand of the slab There is also a high isostatic anomaly observed over the region (Oral, 1987). Isparta Angle is a tectonic assemblage, which has a complex tectonic history (Barka & Reilinger, 1997). This zone has been studied intensely for the last 25 years (e.g., Brunn et al., 1971; Graciansky, 1972; Monod, 1977; Ricou et al., 1979; Şengör & Yılmaz, 1981; Yılmaz, 1983, 1984; Poisson et al., 1984; Şenel, 1983; Hayward, 1984; Robertson & Woodcock, 1984; Waldron, 1984; Marcoux, 1987; Akay & Uysal, 1988; Yılmaz, 1989; Robertson, 1990; Kissel et al., 1993; Frizon de Lamotte el al., 1995; Ersoy, 1995; Barka et al., 1995; Barka & Reilinger, 1997). According to paleomagnetic data (Kissel et al., 1993), the angular shape of the Isparta Angle is related to post-Eocene tectonic activity. GPS measurements made in Turkey during the period of 1988-1992 indicate that the center of the Isparta Angle (Antalya site) has slower motion, less than 10 mm/yr, relative to Eurasia (Oral, 1994; Barka et al., 1995; Barka & Reilinger, 1997). By contrast, Central Anatolia (east of the Isparta Angle) moves westward relative to Eurasia at about 15 mm/yr, and western Anatolia (west of the Isparta Angle) moves SW at about 30 mm/yr (Reilinger et al., 1997). The eastern flank of the Isparta angle is bounded by the NW-SE trending Sultandağ thrust fault (Saroğlu et al., 1983, 1987; Boray et al., 1985) and the western flank is made up of the transtensional left-lateral NE-SW trending Fethiye-Burdur fault zone (Dumont et al., 1979a, b; Şaroğlu et al., 1987; Taymaz & Price, 1992; Eyidoğan & Barka, 1996). This is compatible with GPS results (Reilinger et al., 1997). Based on the anomalous tectonic nature of the Isparta Angle, Barka & Reilinger (1997) suggest that the eastern flank of the Isparta Angle, which is the northwestern continuation of the Cyprus arc into SW Anatolia, may slow down the westward motion of southern Central Anatolia. This difference is taken up by shortening along the Sultandağ mountains and Aksu thrust (Barka & Reilinger, 1997). Retreating of the South Aegean subduction to the south might have followed the incidence of a lateral tear that separated the South Aegean and Cyprian arcs according to Barka et al. (1995). They assume that this lateral tear occurred along the Pliny-Strabo-Fethiye-Burdur shear zone.

5.3.2. The Western Tip of the Arc

There is much evidence to show that the SAA does not extend north of 39° N latitude along the coasts of Albania and Yugoslavia (McKenzie, 1978; Taymaz et al., 1991; Jackson et al., 1992). Only one mechanism for a shock beneath Greece (McKenzie, 1978) that of 1966.10.29, shows thrusting. To the north of the trench, the seafloor shoals and the seismically active zone run into the northwestern Greece (McKenzie, 1978; Jackson et al., 1992). The isobaths in the Ionian Sea (Morelli et al., 1975) have a NW-SE trend south of Kefallinia and Zakynthos, but further up, west and SW of Kefallinia island, the isobaths exhibit a NE-SW trend (Kiratzi et al., 1991). The latitude also marks the northern limit of intermediate shocks and volcanism (McKenzie, 1972). The other recent evidence is that the Bouguer gravity anomaly that shows a smooth pattern north of the island of Cephalonia in the Ionian Sea (Tsokas & Hansen, 1997). In map view, the convex arc of the South Aegean Trench resembles a gigantic active transform fold formed at the SW end of a belt of distributed right-lateral shear trending NE-SW (Brunn, 1976; Anderson & Jackson, 1987; Taymaz et al., 1991). Both the small-scale bathymetry (Allan & Morelli, 1971; Stride et al., 1977) and land geological studies (British Petroleum, 1971; Brooks et al., 1988; Underhill, 1989; Sorel, 1992) suggest that the deformation is taken up by a number of right-handed strike-slip faults (Kefalinia Fault Zone) (McKenzie, 1978; Tsokas & Hansen, 1997). The zone can be defined by the location of large dextral strike-slip earthquakes (e.g., 1983.01.17) (see Anderson & Jackson, 1987; Kiratzi et al., 1991). Micro-earthquakes on Kefalinia show the full range of focal mechanisms, thrust, strike-slip, and normal faults (Amorese, 1993) because of the local stress regimes in the wide shear zone (see also Hirn et al., 1996). Its importance is emphasised by structural trends on land and offshore (Finetti, 1982), by the alignment of earthquakes (e.g., Makropoulos & Burton, 1984; Melis et al., 1989; Amorese, 1993) and by displacement rates determined from GPS observations (Kahle et al., 1995). Based on geophysical data the Kefalinia Fault Zone (KFZ), Calabrian and SAA possibly form a triple junction in the Ionian Sea (Kahle et al., 1995). However, only tomographic results (Spakman et al., 1988, 1993; Papazachos et al., 1995) show that the Benioff zone must extend so far to the north. These images may belong to a subducted lithosphere that has finished its evolution.

5.3.3. Adriatic

The Adriatic region (the Adriatic-Apulia platform) represents, in broad terms, the remnant of an African (*Channel & Horvath, 1976*) part of lithosphere currently confined by Tertiary-Quaternary collisional belts between the Apulian block and Albania, Yugoslavia and Greece (*McKenzie, 1978; Jackson et al., 1992; De Alteriis, 1995*). Recent seismic studies of *De Alteriis (1995)* on sediments show that the Adriatic basin is under pure shear to the south and a compressional regime to the north. This result is consistent with earthquake focal mechanism data.

5.3.4. Kinematics of the Slab

In basic view the slab shape gives a previous impression of the kinematic situation within the subduction zone. To the west of the arc, earthquakes deeper than 40 km define a very gentle slope (about 10°) starting at the trench and continuing for 200 km further inside to the east, where the zone abruptly steps to about 45° beneath the gulf of Argolis (*Hatzfeld et al., 1989*). This change occurs beneath an aseismic shallow mass within the crust (*Martin, 1988; Hatzfeld et al., 1989; Papazachos & Nolet, 1997*) Powerful marine vertical-incidence reflection profiling images (*Hirn et al., 1996*) show a major reflector at a depth of about 13 km slightly dipping to the east under the western slope of the Ionian islands then dipping steeply under them.

Papazachos & Comninakis (1971) assumed a symmetrical aphytheatrical shape for the subducting slab. However, based on teleseismic data that was studied by *Hatzfeld & Martin (1992)* and tomographic studies (*Papazachos & Nolet, 1997*) the gently dipping part of the slab is longer in the west than in the east. Acording to recent tomographic results (*Papazachos & Nolet, 1997*) the subducted slab shows a complicated geometry, with a slope that gradually increases from west to east and toward the deeper sections of the slab. In addition the isodepth contours of intermediate earthquakes are not parallel to the South Aegean Trench (Fig. 5.5) (e.g., *Hatzfeld & Martin, 1992; Hatzfeld et al., 1993*). This distribution confirms that the slab is being subducted shallower at the western end than at the eastern end (*Hatzfeld et al., 1992, Hatzfeld et al., 1997*).



Figure. 5.5. Hypocenter distribution of earthquakes in the Aegean and surrounding area. Data reported by the USGS PDE during the period 1973-1997. The earthquakes with magnitudes >4,5.
There is a sharp boundary between shallowly and steeply dipping sub-crustal seismicity, which can be explained by gravity pulling on the slab. A part of the process could due to the loading of the subducted lithosphere by the overriding plate. It is clear that the plunge of the T-axes of micro-earthquakes' focal mechanism solutions deeper than 30 km, investigated by Hatzfeld et al. (1989) support the idea of a pulling of the cold lithosphere towards the north. They located two mechanisms within the mantle beneath the Gulf of Corinth at a depth of 50 km, which show N-S extension, similar to the shallow earthquakes within the overriding crust. Another microearthquake study of Hatzfeld et al. (1993) showed that the P axes were nearly horizontal and trending N-S to NNE-SSW, but T axes of earthquakes deeper than 80 km plunge steeply along the downgoing slab direction in the western and eastern parts. They interpret this uncommon behaviour as the downgoing slab being under a dominantly gravitational body force of the slab acting on own body. Based on micro-earthquakes Hatzfeld et al. (1993) and on moderate earthquakes Taymaz et al. (1990) observed a similar pattern for some large earthquakes located deeper than 40 km beneath Crete. Based on geophysical and geological data analysis Royden (1993b) studied some retreating and advancing subduction boundaries. He suggested that, across a retreating subduction boundary in the South Aegean, the system shows that subduction is driven by gravitational forces acting on dense subducted slabs at depths between about 50 and 250 km (see also e.g., McKenzie, 1972; Le Pichon & Angelier, 1979; Meulenkamp et al., 1988). At subduction boundaries where the rate of oveall plate convergence is less than the rate of subduction (termed here retreating subduction boundaries), the transmission of horizontal compressive stress across the plate boundaries is small, and regional deformation of the overriding plate is by horizontal extension (Royden & Burchfiel, 1989; Royden, 1993b). The tectonic expression of these retreating subduction boundaries includes topographically low mountains, little erosion or denudation, low-grade to no metamorphism, little or no postcollisional convergence, anomalously deep foredeep basins, and a pronounced history of flysch deposition within the adjacent foredeep basin (Royden & Burchfiel, 1989; Royden, 1993b; Mueller & Kahle, 1993). Royden (1993a,b), who recognized this evidence more or less in the Aegean region, suggests that the density of the subducting plate plays an important role to drive this kinematic (see also Royden & Burchfiel, 1989; Mueller & Kahle, 1993). The old, i.e. cold and dense, crust of the Mediterranean (see Section 4) probably enables activation of gravitational potential forces on the slab. The nappe emplacements seen over Peloponnese, Crete and southwestern Turkey are related to old, i.e. copressional, paleotectonic regimes. Since the starting of the extensional regime that constructed the Aegean region, the thrusting has been taking place only along the Crete, western Pelopennese, Karpathos and Rhosos represents a boundary condition of the SAA system (see also Angelier, 1981; Le Pichon & Angelier, 1981; Meulenkamp et al., 1988). Further north at the back of the arc there is the greatest extensional deformation and associated seismicity (called here the Aegean extension) in any of the continents (*Truffert et al., 1993*). Sediment is removed from the upper surface of the subducting lithospheric plate and added to the edge of the overriding plate (e.g., *Karig, 1974; Von Huene, 1984; Moore & Silver, 1987*). This process probably leads to outward thrusting along the trench.

5.3.5. African Plate

The African plate is sinking towards the north beneath the Aegean region. The nature of the lithosphere is important to understand how the slab generates slabpull force. The Mediterranean basins are significantly shallower than the major oceanic basins in the world. The depths in the eastern Mediterranean do not generally exceed 4000 m (*Ryan et al., 1969*). The southern boundary of the Mediterranean is a passive boundary between African continental crust and Mediterranean oceanic (?) crust. These two crusts are parts of the African plate. The northward directed motion of the African plate beneath Eurasia proceeds at about 10 mm/yr (*Minster & Jordan, 1978; Chase, 1978; Argus et al., 1989; DeMets et al., 1990, 1994*). East of the Mediterranean Sea, the Arabian plate moves northward with respect to Eurasia at a rate of about 25 mm/yr (see Table. 5.1 for detail) (*DeMets et al., 1990, 1994; Barka & Reilinger, 1997; Reilinger et al., 1997*). The difference between the velocity vectors in the Arabian plate (25 mm/yr) and Mediterranean Sea (10 mm/yr) is taken up by the left lateral Dead Sea fault. The African plate is subducting to the north along the South Aegean Consumption Boundary (SACB) beneath the Aegean region.

The type of the Mediterranean crust is not well known, although there have been many studies. Seismic profiles show that the Ionian, Sirte and Herodotus basins have a relatively thin crust (8 to 11 km) overlain by a thick sedimentary cover, up to 10 km in the Herodotus abyssal plain. The crustal structure is of oceanic type for both the Ionian and Sirte basins, where typical oceanic layers 2 and 3 are recognised by *De Voogd et al. (1992)* (see also *Ferrucci et al., 1991; Ginzburg & Ben-Avraham, 1987*). But the thin crust of the Herodotus basin may be interpreted either as oceanic or thinned continental crust (about 10 km thick)

(Lort et al., 1974; Makris & Stobbe, 1984; De Voogd et al., 1992). The top of the crust of the Herodotus basin is much deeper (De Voogd et al., 1992). Therefore, the Herodotus basin is probably significantly older than the Ionian basin, Triassic versus Early Cretaceous in age (De Voogd et al., 1992). De Voogd et al. (1992) concluded that the three deep eastern Mediterranean basins mentioned here (Jonian, Sirte, and Herodotus abyssal plains) are most likely relics of a Mesozoic (Neothetis) oceanic crust.

The thickening of sediments above the subducting African plate continues at least 100-150 km south of Crete, and is probably responsible for the shallow bathymetry and deformation of the Mediterranean Ridge, as suggested by numerous authors (e.g., Ryan & Heezen, 1965; Ryan et al., 1969; Jongsma, 1975; Ryan et al., 1982; Le Pichon et al., 1982; Jackson & McKenzie, 1988; Taymaz et al., 1990). The deformation of the Mediterranean Ridge is complex and greatly affected by diapiric and dissolution structures (Ryan et al., 1982; Le Pichon et al., 1982). Since the work of Ryan et al. (1969), many authors (e.g., Biju-Duval et al., 1974; Le Pichon et al., 1982; Ryan et al., 1982) have suggested that this structure is essentially an accretionary prism of material that has been scraped off the downgoing slab in the South Aegean Trench during subduction (see review by Le Pichon et al., 1982). It is either thickened in the Mediterranean Ridge or underplates Crete and is partly responsible for its uplift (e.g., Angelier et al., 1982; Taymaz et al., 1990). Le Pichon et al. (1982) suspected, from the bathymetry and seismicity, that the steep submarine escarpments south of both the Gavdos Rise and the rise farther east are bathymetric expressions of steep northward dipping imbricate reverse faults that reach the surface. Jongsma (1975) explained this mechanism as "crumbling and piling up of the sediment carpet" on the Mediterranean Ridge. So the sedimentary cover is deforming independently from the basement, partly by folding. On the other hand the Mediterranean Rise was interpreted by Woodside & Bowin (1970) as a crustal thickening in the sediments due to piling in front of the subduction zone at the SAA or to crustal shortening (Rabinowitz & Ryan, 1970; Finetti, 1976). But based on recent seismic profiling studies the crust is not too thin to consider this theory. Based on seismic profiling *Hirn et al.* (1996) suggest that a continental backstopped accretionary prism, located well in front of the (SAA), does not seem unlikely as the western end of the subduction zone (Ionian islands). But the sedimentary pill is crushed with African continental crust to the south. Sedimentary wedges (slices) have been thrust upward to the south away from the trench axis, and thus are not the results of gravitational slumping (Rabinowitz & Ryan, 1970). There is also an indication that the intensity of folding increases from south to north (Allan & Morelli,

1971). Kastens (1991), based on detailed geological and geophysical studies, found that the Mediterranean Ridge has grown at a rate of 10 about mm/yr. The Mediterranean Ridge rate of growth is faster than that inferred for most other accretionary wedges (Kastens, 1991). This could have been caused by the onset of back arc extension in the Aegean and/or by the introduction of a mechanically weak halite layer into the incoming stratigraphic section (Kastens, 1991). He further calculates the back arc extension age by considering sediment thickness of the front of the arc. Since the sediment cover in the eastern Mediterranean is considerably thicker (4 km according to Sancho et al., 1973) than that of the Pacific Plate (9.5), it seems probable that the amount of material, which has been added to the SAA, is very large (Jongsma, 1975). It is here postulated that the uphilling Ptolemy and Stabo Mountains (Ergün et al., 1998) are the result of sedimentary accretions to the SAA as a result of subduction (Jongsma, 1975).

5.3.6. Cretan Basin

The Cretan basin is situate between the outer arc (Kithera, Andikithera, Crete, Karpathos and Rhodes) and the active volcanic arc (the Cyclades, Thira, Milos etc.). Based on crustal thickness determined from DSS and gravity inversion (*Makris, 1978a*), maximum extension occurs in the Cretan Basin region that is just behind the consuming boundary (see Table. 4.1). It has been stretched perhaps more than any other part of the Aegean (*Le Pichon & Angelier, 1979, 1981; Angelier et al., 1982*), but now it is an undeforming part of the Aegean region (see also *McKenzie, 1978*). *McKenzie (1978)* suggested that the region moves to the south as a whole i.e., not deforming internally. It is characterised by the highest positive gravity anomalies in the Aegean region. The models of some scientists (*McKenzie, 1978; Le Pichon & Angelier, 1979; Angelier & Le Pichon, 1980; Angelier et al., 1982*), based on the relation between crustal thickness and extension, show that Crete is detached from the Cyclades area. The three acoustic units that represent basin filling sediment are also observed in the Cretan basin and in other parts of Aegean Sea by *Mascle & Martin, (1990*).

The deformation in this region must have slowed down recently, probably because of collision to the south of the South Aegean Trench. By using seismic profiling information *Mascle & Martin (1990)* observed decreasing extension since the Late Miocene in the Cretan basin. In the southern part of the Aegean there is little recent seismic activity clearly

identifiable beneath the Cretan Sea (see also Galanopoulos, 1967; Ergin, 1966) (Fig. 5.1). This suggests inactivity or no deformation in the region. Watson & Johnson (1969) observe 600 m of unconsolidated sediment above layer M (measured by seismic reflection methods) in the Cretan Basin. Galanopoulos (1967), by using the focal mechanism solutions of Hodgsom & Wickens (1965), suggests that the active belt in the northern Aegean and the Cretan Arc formed a conjugate N-E striking fault system in the sense of Anderson (1951) and Hill & Dibblee (1953) (see also McKenzie, 1972). The Cretan basin consists of a series of elongated depressions, which, in general, follow the trend of the volcanic arc. There is a general eastward increase in the depths of the basins (Maley & Johnson, 1971). According to Jongsma (1975), immediately south of the Volcanic Arc there is a major SW dipping fault with a displacement of up to 1000 m, which forms the northern boundary of the Cretan basin and is associated with a steep scarp, which locally has an angle of 30° (Jongsma, 1975). The southern margin of the Cretan basin is also fault controlled (Jongsma, 1975). Mascle & Martin (1990) describe this basin as a half graben. A major downvard dipping fault can be traced for 105 km N of the eastern half of Crete (Jongsma, 1975). The N-S faults in the region continue to the south with a NNE-SSW direction (Angelier et al., 1982). The E-W normal faults in Crete continue to the north in the Cretan Basin (Angelier et al., 1982). East of the Mora peninsula, NW-SE trending normal faults occur in the Cretan Basin. Mascle & Martin (1990) divide the Cretan basin into three structural regions: east, central and west. In the western Cretan basin (Argoline basin), SSW and NNW trending faults are characteristic. In the North Cretan basin, trends are generally E-W with a depth of 2000m. East of the region, NE-SW trending half grabens are dominant and these surrounds the islands in the west of Cretan Basin (Mascle & Martin, 1990).

5.4. DRIVING FORCES

The dynamics of the extensional deformation in the Aegean region are not clearly known. *McKenzie (1978)* suggests 3 main forces that maintained the deformation: forces on the boundaries created by the collision of the African and Arabian plates with the Eurasian plate; the gravitational force, maintained by high topography in eastern Anatolia; and the forces at the base of the lithosphere resulting from the peel-back (or rollback) of the subducted slab over the South Aegean Arc (SAA). *Makris (1977)* suggested that another cause of the extension of the Aegean area is rising of a mantle dome.

The tectonic consequences of northward motion of the Arabian plate - and its push against the Anatolian plate are modeled using a two-dimensional, plane-stress, finite element scheme to find which force is dominant in the Aegean region (Kasapoğlu & Toksöz, 1983). Results show that the westward escape of the Anatolian plate to the east (Ketin, 1968) is not enough to drive Anatolia from central Anatolia further to the west (Kasapoğlu & Toksöz, 1983). Numerical models show that northward convergence of the Arabian and African plates alone cannot explain movements on all known faults (Kasapoğlu & Toksöz, 1983). An additional driving force that would produce westward motion of the Anatolian plate is required (Kasapoğlu & Toksöz, 1983; Royden, 1993a,b). According to the escape model, the westward moving Anatolian plate is banded to the west and for this reason the Aegean area moves to the south with extension (McKenzie, 1972; Brunn, 1976; Tapponnier, 1977; Dewey & Sengör, 1979; Sengör & Yılmaz, 1981; Şengör et al., 1985; Taymaz et al., 1991; Yusufoğlu, 1996). But recent geodetic measurements show that the velocities accelerate southward to the consuming boundary. Extensional tectonics is commonly associated with subduction zones. This is manifested in the marginal sea basins or the west Pacific arcs as well as in the continental basins (Basin and Range, Altiplano) close to the east Pacific Cordilleras. With respect to Eurasia the accelerated motion of the Aegean area (west of the Anatolian block) towards the Ionian and Levantine basins (Oral, 1993; Oral et al., 1994; Oral et al., 1995; Le Pichon et al., 1995) needs an independent cause which is most probably the retreat of the subducted Mediterranean slab (slab pull) (Tapponnier, 1977; McKenzie, 1978; Le Pichon & Angelier, 1979, 1981; Angelier, 1981; Le Pichon, 1982; Mercier et al., 1987; Jackson & McKenzie, 1988; Meulenkamp et al., 1988; Extröm & England., 1989; McKenzie & Yilmaz, 1991; Wortel & Spakman, 1992; Royden, 1993a,b; Oral, 1994; Oral e al., 1995; Le Pichon et al., 1995; Hatzfeld et al., 1997; Davies et al., in press). This can account for the high heat flow behind the arc (McKenzie, 1978). Tomographic imaging shows a large low-velocity anomaly in the region indicating the presence of a hot, partially melted upper mantle above the Aegean slab. The slab can also create an upper mantle flow and asthenospheric upwelling toward the slab – overriding lithosphere interface (*Gülen*, 1990). Mantle convection (thermal circulation) could cause heating (Kasapoğlu & Toksöz, 1983). Downbanding and final detachment of the slab could accelerate this process and cause uplift and exposure of metamorphic core complexes such as the Attic-Cycladic-Menderes metamorphic complex and establishment of an extensional stress field as a result of lithospheric thinning (Gülen, 1990). Southward migration of the magmatic activity towards the active Aegean volcanic arc is evidence of a retreating consuming boundary towards the south. A progressive steepening of slab angle could cause an additional driving force on overriding material (e.g., *Gülen, 1990*). Subduction could act in the Aegean region by creating the necessary low-stress condition, which allows gravitational collapse (*Jolivet et al., 1994*).

According to the orogenic collapse model (*Dewey*, 1988), overthickened crust would be gravitationally unstable and tend to spread (i.e., collapse) (*Makris*, 1985; Seyitoğlu & Scott, 1991, 1996b; Seyitoğlu, 1992). This could be explained by the thermal collapse model of Sonder & England (1989) (see also Sonder et al., 1987). Deformation occurs as if the South Aegean Trench acted as a stress-free boundary, which allows radial collapse of the Aegean crust (Jolivet et al., 1994).

6. CONCLUSION

From GPS and SLR, Oral et al. (1995) and LePichon et al. (1995) modeled the velocity field of the Anatolian region as a counterclockwise rigid rotation about an Euler pole located near the Sinai Peninsula, relative to Eurasia. However, the lengths of the vectors are not the same. Residual velocities appear to increase toward the South Aegean Arc (SAA). The lithosphere is not behaving like a plate as described by the plate tectonic concept because the western part of the plate, called the Aegean region, is an internally deforming of the Anatolian plate (*Reilinger et al., 1997*). Africa moves northward relative to Europe at a rate of about 10 mm/yr (*Chase, 1978; Argus et al., 1989; DeMets et al., 1990, 1994*), but across the South Aegean Trench the relative motion is thought to be approximately 40 to 50 mm/yr towards the southwest (*McKenzie, 1978; Le Pichon & Angelier, 1979; Jackson et al., 1994; Oral et al., 1995*). These cause internal deformation (extension) of the Aegean area that is behind the SAA. The N-S compression related westward escape of the Anatolian plate from the Karlıova triple junction is obvious, but where the driving force that is pushing to the east ends and where the driving force that is pulling to the west ends is unclear.

Magmatism related to subduction in the Aegean region exhibits a progressive shifting towards the south (Borsi et al., 1972; Fytikas et al., 1979, 1984; Savaşçın & Güleç, 1990; Gülen, 1990; Papadopoulos, 1997). This could be related roughly to southward shifting of subduction since the Early Miocene. There could be more than one subduction process taking place but it is clear that the ongoing subduction is mostly southerly and leads to active volcanism (South Aegean Volcanic Arc) in the South Aegean. This shifting could be related southward to a retreat of the subduction zone. Today, the leading edge of the African plate is being subducted along the SAA at a higher rate than the relative northward motion of Africa. This is more evidence of a retreating slab (Oral et al., 1995). In addition, residual GPS and SLR velocities in the Aegean region increase towards the subduction zone. This indicates that slab pull is the driving force in the Aegean region (Oral et al., 1995). Microearthquake studies of Hatzfeld et al. (1989) support a pulling mechanism of the slab. Granet & Trampert (1989), who studied seismic wave velocities, indicate a break in the slab at a depth of 250 km. De Jonge et al. (1994) pointed out that a vertical slab rupture below western Turkey initiated and facilitated slab rollback within the subduction. Paleomagnetic data show clockwise rotation in the western Aegean region, but counterclockwise rotation in the southeastern Aegean region.

Some scientists (e.g., *Kissel & Laj, 1988*) interpret the present curvature of the South Aegean Trough (SAT) in terms of opposite rotations at the two terminations of the consuming boundary. This model was suggested to explain the extensional regime in the region. It considers southward shift of the consuming boundary. But interpretations of these measurements made in the Aegean region are not straightforward because of the limited data (*Taymaz et al., 1991*). To the northeast in western Turkey, the situation is very complicated.

Recent Tomographic images (*Spakman et al., 1993; Van der Hilst et al., 1997*) show that the slab appears to be continuous to approximately 1500 km depth. This result shows that the subduction initiation time was much earlier (26-40My) than previously considered.

There is no reliable evidence indicating a second subduction in the central Aegean.

The region over Köyceğiz has a negative gravity anomaly. This could be related to the eastern part of the subduction zone (*Özelçi, 1973; Şalk, 1994; Woodside, 1975*). This zone is also identified by magnetoteulliric studies of *İlkışık (1990b*).

Between the high velocity slab and the overriding high velocity crust, a low velocity region dominates the back arc of the SAA. Some regional studies show that the region is situated on a high European heat flow zone. Heat flow values become higher away from the Trench. The low velocity and Sn attenuation anomaly in the Aegean back arc correlates very well with an area of heat flow. These anomalies indicate a shallow Moho depth in the region.

After refraction profiling (*Makris, 1978b*) it is accurately known that the region is a purely continental type with a thin crust. In the Cretan basin deep sea drilling under the JOIDES project also indicated absence of oceanic material. In addition, the sea floor morphology of the Aegean does not have any characteristics of an oceanic crust. The morphology of the Sea Floor also reflects a crustal type of sea floor. Based on sufficient Sn propagation, the Aegean region has a continental crust (*Payo, 1976*). The thickness increases under the mainlands of Turkey and Greece, The South Aegean island arc and the Cyclades. The thickness shows a generally increasing trend from the SAT to the North Aegean Sea. Where the Aegean region has the thinnest crust (*Makris, 1978a*), the Bouguer Gravity values become positive and bathymetry depth maximal (*Makris, 1977; McKenzie & Yilmaz, 1991*). A positive gravity anomaly seen inside the coasts of western Turkey suggests a contradiction between

topography and gravity. The situation appears to be normal in the Greek mainland (*Özelçi*, 1973) (see Yılmaztürk, 1989). In addition seismic wave velocities in western Turkey, especially in the Menderes Massif, are lower than the velocities in Greece. This all suggests that the eastern Aegean (western Turkey) region is mostly under intense simple shear of the lithosphere, as is the central Aegean region. This area is characterised by also normal to locally elevated terrestrial heat flow density (*Pfister et al.*, 1997). In addition, the extent of crustal contamination increases gradually from east to west along the South Aegean Volcanic Arc (SAVA) (*Gülen*, 1990). This also indicates increase of crustal thickness towards the west along the arc.

Efficient Sn and inefficient Lg propogation on the southwestern Mediterranean coast of Turkey represents an oceanic type of crust. The gravity high does not indicate a shallow asthenosphere as it does in the Aegean in the Ionian basin. The cause is the oceanic crustal material of the basin. Seismic refraction surveys indicate that the Ionian basin (*Ferrucci et al., 1991*) is floored with oceanic crust, but the nature of the crust, continental versus oceanic, is still debated for the Herodotus basin (*Lort et al., 1974; Makris & Stobbe, 1984*). The crust of the eastern Mediterranean is overlayed by a thick 8-12 km sedimentary cover (*De Voogd et al., 1992*).

From the north to the south, the deepest parts of the region appear as intersections of NE trending faults to the east and NW trending faults to the west. The front of a NW trending line from Anargos to Evvoia and, further NW, the intersections of NW trending faults to the east with NE trending faults to the west, appear as a NW-SE trend along deepest line in the Aegean region. Southwest of this line grabens appear to be stretched parallel to velocities obtained by geodetic methods and from seismic moment tensor summations. On the other hand northeast of this line the basins are approximately parallel to the velocity field and have a strike slip component according to focal mechanism solutions. These grabens could be thought of as cross grabens. The northeastern Aegean region is characterised by right lateral strike slip component mechanisms. In front of the NW-SE trending Evvoia island and other islands on the same line, NE deeping nodal planes of normal faulting are obvious. The area south of a line from Evvoia to Chios are moving essentially together at about 40-45 mm/yr to the SW relative to the Eurasian plate.

Zanchi & Angelier (1993) observed N-S trends of extension near the surface and NE-SW at depth in western Turkey. Moreover, they observed that the percentage of strike-slip faults increases with depth. *Pinar (in press)* identified subevents of the Dinar earthquake and find the same difference between subevents of the same earthquake.

Geological arguments for the duration of stretching and subduction are controversial in the Aegean reigon. Measured velocity rates based on geodetic and seismological methods could not be constant in time, so the calculated reconstructions may not be true for longer periods. The extension related metamorphism phase is not clear either. Lineation patterns on metamorphic rocks (detachment zones) show paleo stress directions. Some researchers (e.g., *Jolivet et al., 1994; Bozkurt et al., 1995*) show the earlier kinematic situation in the region by considering these lineations. The stretching directions are concordant with ongoing stretching directions (*Jolivet et al., 1994*).

Alkali volcanics exhibit a progressive shift towards the north (*Gülen, 1990*). The alkaline volcanics appear to be related to the extensional tectonic features. This shifting may imply that the extension in the Aegean area might have started first in the south and than propagated northward (*Gülen, 1990; Sonder & England, 1989*). But it should not be forgotten that the data are limited (*Gülen, 1990*).

In this study, results of studies have been compiled into some tables to compare the various results. Magnetic rocks with age and type information, metamorphism phases, and paleomagnetic results are also compiled. A table has been prepared that contains all the available focal mechanisms of earthquakes (5.5<Ms) from many studies in the Aegean and surrounding area, to compare existing solutions and methods. Crustal thickness estimation results based seismic refraction, magnetoteulliric soundings, and gravity in the Aegean region are listed in Table 4.1. Measured velocity rates and directions in various parts of the region by various methods are given in table 5.1 with reference information.

The data used in the Aegean region generally have gaps. Because of this and the complexity of the region there should be multi disciplinary studies. The main problems with the data are listed below.

- Because the source is known, deep seismic sounding studies are the most reliable to determine physical properties of the medium. Their main disadvantage is their high cost. In the western Aegean region, limited DSS profiles have been taken. But there are no DSS data in the eastern part especially in the western Turkish mainland, which is one of the most important areas for the solution of kinematic problems in the region.
- 2- It is not expensive to get information on travel time from such earthquake data as DSS. However, these travel times are not as accurate as DSS, because the origin times and the foci of the earthquakes are not known with sufficient accuracy.
- 3- Many seismologists have used moment tensor summation to find strain in the Aegean region. But there are many handicaps to this method. A significant part of the deformation occurs aseismically in some of the regions. In this case, field work on faults and/or space geodetic measurements could reveal the gap. Seismically active structures have been effectively aseismic for only the last hundred years. Field study on segments of faults gives information about historical earthquakes. Most earthquakes happen on preexisting fault planes of weakness and slip can occur at different angles relative to the principle axes. We can use only large earthquakes, but 50 per cent of the displacements are related to small earthquakes. Fourth, the results might not be representative for a longer time scale. To control this we should made field study on faults and also make paleomagnetic measurements.
- 4- To get better results from satellite geodetic measurements more repeated measurements with more stations must be made. Moreover, to get a longer data set it is necessary to wait because repeated measurements will be made only once each year. Secondly, they are not useful for the estimation of vertical movements. Some other method should be used to estimate these motions.
- 5- The historical earthquake catalogues are not complete. And identification of segmentation of faults is not complete. Trenching studies and field studies are needed.
- 6- To prepare a reliable regional heat flow map it is important to know the thermal K value (heat conductivity) at each measurement site. But few such studies exist. For these reason

the existing maps are not very reliable. Ground water mixing is another important factor that influences results.

- 7- Comparison between reflection and refraction profiling and seismicty and focal mechanisms should be made for all faults.
- 8- Studies based on detailed geological mapping, establishment of the local volcanic stratigraphy leading to the delineation of volcanic episodes and volcanic/sedimentary rock relationships and the analysis of volcanism by establishing the petrologic character of individual volcanic episodes are surprisingly few (see *Yılmaz, 1989; Gülen, 1990*).
- 9- Detailed structural studies on the metamorphic rocks (on detachment zones) are not complete enough to identify previous stages of ongoing extensional regime.
- 10- Paleomagnetic data are limited in the Aegean region especially in the north and northeastern Aegean region.

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APPENDIX. 1.

List of selected earthquakes (5.5<M) in the Aegean region and surrounding area (abravations as in Table. 2.5).

Date	Lat. Lon.	s.	D.	<i>R</i> .	depth	(km)Ref.	Source
						(
1 19951001	38.09 30.15	312	56	-84	10	Pi98a	
2 19950615	38.36 22.20	277	33	-76		Be97	
3 19950513	40.02 21.63	253	43	-95	10	C197G	
4		240	40	-85	14.2	Ha97a	
5 19921106	38.16 27.00	270	30	81	10>	Ha96a	
6 19870619		338	68	44	85	Ka88b	
7	36.77 28.13	316	54	137	59.5	Ex89a	
8 19860913	37.06 22.11	204	45	-77	10	Lygga	
9	37.03 22.20	350	46	-130	15	Ey00a	
10 19850430	39.25 22.79	281	43	-70	1.J 6	EX03d	
11	39 26 22 81	201	50	-105	11	EX09d	
12 19850421	35 07 22 20	260	26	-105	10>	Tayla	
12 19840621	3/ 80 2/ 20	110	20	/⊥ 0.2	40>	PaB96	(NEIS)
14 10040021		110	72	101	39	Tayla	
14 19040211		220	∠8 01	-121	15	Ex89a	
15 19830000	40.18 24.73	229	81	-1/4	10	Ex89a	
16	40.14 24.74	47	83	180	7	Ta91a	
17 19830705	40.33 27.23	218	32	71		Ey88	(Kiy87)
18	40.33 27.23	254	49	-173	15	Ex89a	
19 19830323	38.20 20.40	27	59	175		An87	
20 19830117		135	83	90		An87	
21	38.00 20.03	60	47	174		Kir91a	
22 19820817	33.77 22.96	230	45	109	39	Ta90a	
23 19820118	40.00 24.32	241	57	-176	10	Ex89a	
24 19811227	39.00 24.80	219	57	179	10	Ex89a	
25	38.09 24.92	45	90	180		Am90	
26	38.91 24.92	216	79	175	б	Ta91a	
27 19811219	39.39 25.09	220	73	171	10	Ex89a	
28	39.22 25.25	60	79	175	10	Ta91a	
29 19810304	38.18 23.17	238	42	-115		Ja88	
30	38.21 23.29	257	41	-59	10	Ex89a	
31	38.18 23.17	68	47	-82		Am90	
32	38.24 23.26	230	45	-90	7	Ta91a	
33	38 20 23 30	230	45	-105	7	PaC92	
34 19810225	38 14 23 05	250	42	-80	,	Ja88	
35	38 12 23 14	250	- <u>-</u> ∠ ->∆	-51	10	Ex89a	
36	20.12 22.14	204 2/1	11	-85	8	Ta91a	
37 19810224	20 10 22 24	241	40	-70	0	.Ta88	
30		205	27	. 64	10	Ev89a	
30		200	10	-04	10	Ta91a	
101000700	38.23 22.97	204	4Z	100	ΤZ	.T=920	
40 19800709C	39.23 22.59	58	41	-120		Dagze	(Dapazes
41	39.20 22.60	81	40	-90	1.0	Fac 92	(rapazo.
42 19800709b	39.27 23.04	58	41	-128	ΤU	Exoga	
43	39.23 22.76	58	41	-128		0 <i>4924</i>	
44		270	50	-90		Am90	(D C)
45	39.30 22.90	81	40	-90		Pac92	(Papaz8:
46 19800709a	39.29 22.91	284	56	-90		Ja88	
47	39.23 22.76	270	50	-90		Am90cb	
48	39.27 23.04	58	41	-128	8	Ta91a	
49	39.30 22.90	82	42	-79		PaC92	(Papaz83
50 19790615	34.80 24.20	150	75	70	40	Ta90a	
0/00TD	01100 2111						

Vo Date	Lat. 1	Lon.	s.	D.	<i>R</i> .	depth	Ref.	Source
52	38.81 2	26.53	121	42	-50	15	Ex89a	
53	38.79 2	26.57	262	41	-108	8	Ta91a	
54 19790528	36.40 3	31.75	259	78	-90	98	Ja84a	
55 19790515			253	17	65	65	Ta90a	
56 19780620	40.73 2	23.25	278	46	-70		Ja88	
57	40.78 2	23.24	286	43	-88	10	Ex89a	
58	40.78 2	23.24	271	42	-74	7	Ta91a	
59	40.73 2	23.25	271	42	-74		Ja92a	
60 19780523	40.76 2	23.27	74	36	-96	10	Ex89a	
61	40.76 2	23.27	74	36	-96	9	Ta91a	
62 19771128	36.05 2	27.76	103	46	24	85	Ex89a	
63 19770911			276	47	89	19	Ta90a	
64	34.90 2	23.00	320	30	90		PaB96	(Papaz91
65 19770818	35.30 2	23.50	114	79	96	38	Ta90a	_
66 19760612	37.50 2	20.60	115	70	90		An87	
67 19760511			172	80	90		An87	
68	37.40 2	20.40	335	14	106		PaB96	(PaE93)
69			143	77	90	13	Ba97a	
70 19751231	38.50 2	21.65	90	45	-90		Am9 0	
71 19750430	36.18 3	30.70	72	60	74	56	Mc78b	
72 19750404	38.09 2	21.98	46	54	-90	53	Mc78b	
73 19750327	40.42 2	26.14	41	60	-142	5	Mc78b	
74	40.42 2	26.14	41	60	-125		Ja88	
75	40.45 2	26.12	68	55	-145	15	Ta91a	
76	40.42 2	26.14	68	55	-145		Ja92a	
77			311	65	-35	18	Pi95a	
78 19731129	35.18 2	23.80	139	82	90	26	Mc78b	
79			224	67	10	18	Ta90a	
80 19731104	38.90 2	20.44	130	50	87	8	Mc78b	
81 19730105	35.81 2	21.84	136	60	94	33	Mc78b	
82 19720917	38.28 2	20.34	306	80	-26		An87	
83 19720913	37.93 2	22.39	128	60	170	33	Mc78b	
84	38.00 2	22.40	295	45	-70	75	Am9 0	
85 19720504	35.12 2	23.61	106	36	90	46	Mc78b	
86			112	74	98	41	Ta90a	
87 19720314	39.28 2	29.42	101	35	-88	33	Mc78b	
88	39.28 2	29.42	277	55	-88		Ey88	
89 19710512b	37.58 2	29.60	64	50	-75		Ja88	
90			64	50	-75		Ja92b	
91 19710512a	37.59 2	29.76	42	42	-73	23	Mc78b	
92	37.59 2	29.76	32	42	-66		Ey88	
93 19710223	39.62 2	27.32	86	66	160		Ey88	(Pa86)
94 19700408	38.43 2	22.66	90	70	-112	17	Mc78b	
95	38.43 2	22.66	90	74	-115		Ja88b	
96	38.34 2	22.86	75	67	-94	9	Ta91a	
97	38.43 2	22.66	75	67	-94		Ja92a	
98	38.30 2	22.60	75	67	-94		PaC92	(Li89)
99 19700328			128	55	-90	20	Mc78b	
100			308	35	-90		Ey85a	
101			200	25	_90		Ja88	

No	Date	Lat.	Lon.	s.	D.	R.	depth	Ref.	Source
	102	39.18	29.49	308	35	-90		Ja92	
	103 19691013	39.86	20.64	97	82	90	8	Mc72b	
	104			92	83	61		An87	
	105 19690708	37.50	20.30	145	88	90		An87	
	106			147	78	86	10	Ba97a	
	107 19690612	34.40	25.06	97	63	80	25	Mc72b	
	108			163	50	44	19	Ta90a	
	109 19690416	35.34	27.77	104	80	85	45	Mc72b	
	110 19690328	38.59	28.45	101	61	-90	9	Mc72b	
	111			281	34	-90	6-10	Ey85a	
	112	38.59	28.45	281	34	-90		Ja88	
	113	38.59	28.45	281	34	-90		Ja92	
	114			100	52	-93	13	Pi95a	
	115 19690325			90	40	-104	8	Ey85a	
	116	39.18	28.37	90	40	-104		Ja92	
	117 19690323	39.14	28.48	112	34	-90	8	Ey85a	
	118 19690303	40.12	27.43	107	50	135	4	Mc72b	
	119	40.12	27.43	107	50	147		Ey88	
	120	40.08	27.50	60	40	68	5	Ta91a	
	121	40.08	27.50	60	40	68		Ja92a	
	122 19690114	36.18	29.20	100	74	82	33	Mc72b	
	123	36.10	29.20	282	25	95		PaB96	
	124 19681205	36.58	26.97	212	46	-117	35	Mc72b	
	125 19681031	36.60	27.00	140	82	30		Ey88	(Dr82)
	126 19680530	35.49	27.96	104	80	85	21	Mc72b	
	127 19680328	37.80	20.90	120	71	65		An87	
	128 19680219	39.40	25.00	205	70	180		Ja88	
	129			159	82	-3	20	Pi95a	
	130 19671130	41.50	20.50	152	40	-87	29	Mc72b	
	131			200	58	-80		An87	
	132 19670730	40.70	30.40	151	44	-48	16	Mc72b	
	133	40.70	30.40	121	50	-70		EY88	
	134 19670722	40.70	30.80	93	90	180	4	MC/2D	
	135	40.67	30.69	275	88	-178	12	Ta91a	
	136	40.67	30.69	275	88	-178	1.0	Ja92a D:06-	
	137	20 00	01 20	276	89	-180	10	P196a Ma70b	
	138 19670501	39.70	21.30	107	52	-70	TD	MC72D	
	139	20 40	01 10	197	20	-44		Ano /	
		39.40	21.10	200	50	~40 110	22	Ma72h	
	141 19670304	39.20	24.60	90 00	54	-115		Ja88	
	142	39.20	24.60	90 212	12	-110	10	0200 Ta91a	
	143	39.25	24.00	212	40	-56	ΤŪ	.Ta92a	
		39.20	24.00	230	45	_90		Am90	
	145 19001029	38.80	21.10	204	4J 70	113		An 87	
	140 147 10660500	24 50	DE 10	∠∪4 1 2 0	16	110	16	та90а	
	140 1066000UUU	34.3U 20 07	20.40 01 70	176	10 16	-61	22	Mc72h	
	1/9 1/9	10.CC	⊿⊥./4 21 7∩	250	±0 66	-100		An87	
	150	20.10 20.10	21 70	103	23	-75		PaC92	
	151 10651100	36 10	21.70	128	58	30		Ca67b	
	150 106 50002	10 E0	21.40	171	70	-48		Ev88	(Ko65)
	エリム エッロコリどろう	40.30	20.02	1 / 1	, 0				· · · · · · /

,	Date	Lat.	Lon.	s.	D.	R.	depth	Pof	Course
							<u>ueptn</u>	ACL.	Source
	153 19650706	38.40	22.40	87	76	-90	20	Mc72b	
	154	38.40	22.40	90	74	-115		Ja88b	
	155 19650613			285	2	28		Ca67b	
	156	37.80	29.30	281	20	-90	16	Mc72b	
	157 19650427	35.42	23.30	191	64	-79	14	Lv88	
	158 19650409	35.10	24.30	50	70	145	51	Mc72b	
	159			63	76	157	51	Ta90a	
	160 19650405	37.70	21.80	125	74	-36	34	Mc72b	
	161	37.48	21.97	125	74	-32	10	Am90b	
	162 19650331	38.60	22.40	136	76	78	78	Mc72b	
	163	38.38	22.26	136	76	80	45	Am90b	
	164 19650309	39.40	24.00	40	90	180	18	Mc72b	
	165	39.34	23.82	135	85	15	7	Ta91a	
	166 19641006	40.30	28.20	122	54	-90	10	Mc72b	
	167	40.30	28.20	122	34	-90	_	Ev88	
	168	40.10	28.00	302	36	-90		Ja88	
	169	40.30	28.23	100	40	-90	14	Ta91a	
	170 19640717	38.20	23.70	153	74	122	150	Mc72b	
	171	38.05	23.61	270	45	-90	155	Am90	
	172 19640429	39.30	23.70	225	80	-140	33	Ta91a	
	173 19640411	40.50	25.00	130	90	0	33	Mc72h	
	174	40.50	25.00	40	90	180	33	Ta91a	
	175 19640130	37.30	29.90	296	89	26	00	Ca67b	
	176			329	85	79		Ca67b	
	177 19631216	37.10	20.90	96	80	90	15	Mc72h	
	178	0,110	20190	64	64	90		An 87	
	179			291	7	74	6	Ba97a	
	180 19630918	40.90	29.20	118	20	-82	33	Mc72b	
	181	40 71	29.09	268	70	-145	55	Ev88	
	182	40 60	29 00	268	70	-125		Ja88	
	183	40 90	29 20	304	56	-82	15	Ta91a	
	184 19630726	42 10	21 40	45	70	-156	5	Mc72b	
	185	72.10	21.40	3 N 3	74	-21	5	An87	
	186 19630311			61	68	16		Ca67b	
	187	38 10	28 30	67	75	23		Ev88	
	188 19620910	35 00	20.00	29	79	63		Ca67b	
	189 19620828	37 80	27.10	107	48	125	100	Mc72b	
	190	37.00	22.00	295	45	-70	95	Am90	
	191 19610523	36 60	22.00 20 30	200		90	72 72	Mc72b	
	192 19591115	30.00	20.00	13/	02	7	13	Ba97a	
	193 19590/25b	36 90	20.20	266	27	51	10	Ca67b	
	194 19590425D	27 05	20.00	200 g	2, 10	2		Ca67b	
	195 195 195	57.05	20.00	269	20 20	66		Ca67b	
	196 19580620	36 10	רכ בר	105	ຊາ	1 /		Ca67h	
	197 19570507	.30.40	21.30	190 271	02 77	- 14 22		Ca67b	
			21 00	⊥/נ רחר	/± יז/	25 157		Ev88	
	100 10E70E0C	40.70	3I.UU	277 222	14	101		Ca67b	
	10526D			کدد ۱۹۱	1 O 1	-01 67		Ca67b	
	200			TRT	84 95	0/ 154		0c60b	
	200		20.00	/9	70	170	0	Mc72h	
	2 U Z	40.66	30.89	87	18	1/9	0	0-04	

Date	Lat.	Lon.	s.	D.	R.	denth	Ref	Fourac
						acpen	Ner.	Source
204			196	31	162		Ca84	
205			164	72	171		Ca84	
206			78	90	180		Ja92c	
207 1957052	6a 40.80	30.80	331	68	-27		Ca67b	
208 1957042	36.20	28.90	192	24	2		Ca67b	
209 1957042	5		219	83	-42		Ca67b	
210	36.45	28.59	58	85	19	0	Mc72b	
211 1957042	24		376	78	81		Ca67b	
212			115	27	29		Ca67b	
213	36.37	28.61	83	63	16	50	Mc72b	
214 1957030	8b 39.40	22.70	58	41	-128		Ja92e	
215 1957030)8a 39.40	22.70	120	45	-90		Ja88	
216	39.36	22.63	110	45	-90		2m90e	
217	39.40	22.70	58	41	-128		Ja920	
218 1956071	.0 36.70	26.30	74	54	47		Ca67b	
219 1956070	9		122	72	-20		Ca67b	
220	36.69	25.81	60	61	20	0	Mc72h	
220	36.60	25.90	60	40	_90	0	T- 00	
221	50.00	23.90	60 60	15	_90		JmgOb	(2h72)
223 1956022	20		105	88	- 50 ריר		AIII J UD Co 67b	(511/2)
223 1750022	39.86	30 /9	140	56	/ / / 7	٥	Cat / D	
224	40.00	30.40	264	50	-4/ 125	5	MC72D	
225	40.00	50.10	204	50	-T32		Jaco 0- (7)-	
228 190001	27 66	27 10	209 EE	20 E1	-5Z	6		
227	37.00	27.19	55	51 51	127	0	MC/2D	
220 19550/2	27.00	27.20	55	7	-121		J200D	
229 1955042	L 39.30	23.03	204	40	-90		Am90	
230 1905041	.9 .30	23.10	284	20	-90	C	Jasse 3	
231	39.30	∠3.US	90	40	-90	0	All90e	
232	39.30	23.10	150	41	102	0	Ja92e	
233 1954043	39.24	22.1/	128	62	-±03	0	MC720	
234	39.30	22.20	305	45	-90		Ja88	
235	39.30	22.20	300	45	-70	0	Ja92c	
236 1953081	.2 38.11	20.72	163	34	101	0	MC/2b	
237 1953031	.8		149	78	13	<u>^</u>	Ca6/b	
238	40.07	27.39	59	76	166	0	MC/2D	
239	40.07	27.39	59	76	174		EY88	
240	40.00	27.40	60	90	180		Ja88c	
241 1949072	3 38.66	26.29	141	65	-31	0	MC/20	
242	38.66	26.29	262	41	-108		Tayle	
243	38.70	26.70	262	41	-108		Ja92e	
244 1948091	.1 37.20	23.20	300	45	-90		Ja88d	
245 1947100)6 36.80	22.00	200	45	-80		Am90e	
246 1944100	6 39.70	26.80	80	45	-90		Ja88	
247	39.70	26.80	262	41	-70		Ja92e	
248 1 94406 2	39.00	29.40	308	35	-90		Ja88c	
249 1943062	40.70	30.38	176	76	0	0	Mc72b	
250			266	75	172		Ca84	
251			88	83	180		Ca84	
252			262	79	178		Ca84	
253	40.80	30.60	176	76	0		Ja88	
254	40.68	30.47	080	90	180		Ja92d	

List of earthquakes (5.5<M) in the Aegean region and surrounding area (abravations as in Table. 2.5) (continued)

270	Date	Lat.	Lon	g	ת	72			
NO					1.	к.	depth	Ref.	Source
	255 19421115	39 30	28 10	90	4.0	104			
	255 19/10827	<i>A</i> 1 70	20.10	200	40 E 0	-104		Ja88e	
	250 19410523	37 20	20.40	200	20	-80		Ja88e	
	257 19410325	39 70	20.00	125	40	-90		Ja88d	
	258 IJ4I0J0I	20.70	22.40	150	40	-90		Ja88	
	259	29.70	22.04	T20	45	-90	0	Am90d	
	260	29.70	22.40	58	41	-128		Ja92e	
	261 19390922	39.10	27.00	93	45	-90		Ja88	
	262	39.10	27.00	262	41	-70		Ja92e	
	263 19380918	38.27	22.47	295	45	-70	50	Am90	
	264 19380720	38.30	23.80	110	45	-90		Ja88d	
	265	38.30	23.79	290	45	-70	6	Am90d	
	266 19350104	40.70	27.60	302	36	-90		Ja88	
	267	40.70	27.60	100	40	-90		Ja92e	
	268 19330511	40.50	23.70	95	45	-90		Ja88	
	269	40.50	23.70	72	73	-168		Ja92e	
	270 19330423	36.70	27.40	256	50	-90		Ja88	
	271	36.70	27.40	60	45	-90		Ja92e	
	272 19320929	40.50	23.70	95	45	-90		Ja88	
	273	40.50	23.70	72	73	-168		Ja92e	
	274 19320926	40.50	23.90	95	45	-90		Ja88	
	275	40.50	23.90	72	73	-168		Ja92e	
	276 19310308	41.30	22.50	120	45	-90		Ja88	
	277	41.30	22.50	271	42	-74		Ja92e	
	278 19300417	37.82	23.06	270	45	-90	6	Am90d	
	279 19300331	39.60	23.17	310	45	-90	10	Am90d	
	280 19300301	39.60	23.20	310	45	-70	20	Ja92d	
	281 19300223	39.60	23 17	310	45	-90		Am90	
	282 19280502	39 41	29 45	300	45	-90		.Ta92d	
	283 19280422	38 00	23.00	285	40	-70		.Ta88e	
	284	38.00	23.00	264	42	- 80		.Ta92o	
	285 19280/18	12 00	23.00	125	15	_90		.T=88c	
	286 19280410	42.00	24.70	105	15	_90		Ja88c	
	200 10200414	42.00	23.00	T00	45	- 90		Tagga	
	207 ± 9200331	20.20	27.40	30 335	45	-90	20	Jabou	
	200 192/0/01	30.78	22.20	100	40	-90	20		
	289 19200830	36.80	23.20	160	40	-90			
		36.76	23.16	340	45	-90	75	Am90a	
	291 19250807	37.90	29.60	64	50	-/5	7.0	Ja92e	
	292 19250706	37.79	21.94	295	45	-70	70	Am90	
	293 19241120	39.08	30.14	308	35	-90		Ja92e	
	294 19231215	39.90	23.20	135	45	-90	-	Ja88d	
	295 19231205	39.85	23.60	135	45	-90	6	Am90d	
	296	39.90	23.20	315	45	-45		Ja92d	
	299 19191118	39.10	27.40	270	45	-90		Ja88d	
	300 19171224	38.45	21.75	90	74	-115		Am90	
	301 19160927	38.85	22.85	290	45	-70		Am90	
	302 19160206	39.00	23.50	300	45	-70		Am90	
	303 19150604	39.10	21.40	200	56	-40	9	Am90e	
	304 19141017	38.20	23.50	100	45	-90		Ja88d	
	305 19141003	37.90	30.40	222	42	-107		Ja88e	
	306 19120913	40.10	26.80	41	60	-135		Ja88	
	307	40.10	26.80	68	55	-145		Ja92e	

ist of earthquakes (5.5<M) in the Aegean region and surrounding area (abravations as in Table. 2.5) (continued)

vo	Date	Lat.	Lon.	<u>s.</u>	D.	R.	depth	Ref.	Source
10									
	₃₀₈ 19120810	40.75	27.20	68	55	-145		Ja92e	
	309 19120809	40.70	27.20	41	60	-135		Ja88	
	310	40.75	27.20	68	55	-145		Ja92c	
	311 19111022	39.55	22.78	284	56	-90		Am90	
	312 19110218	41.10	20.70	200	58	-80		Ja88e	
	313 19090615	39.05	22.36	305	45	-90		Am90	
	- 314 19090530	38.44	22.14	90	74	-115	10	Am90e	
	315 19090119	38.70	26.90	90	45	-90		Ja88	
	316	38.70	26.90	262	41	108		Ja92e	
	317 18990122	37.20	21.69	180	45	-90	9	Am90d	
	318 18980602	37.00	22.00	155	45	-90	80	Am90d	
	319 18940427	38.66	23.03	290	45	-70	11	Am90d	
	320 18940420	38.65	23.16	290	45	-70	6	Am90e	
	321 18930523	38.30	23.25	270	45	-90	10	Am90d	

APPENDIX. 2.

Keyword index of the sited reference titles in alphabetical order. In the keyword index the title is shifted to align each significant word in a column. Index words are sorted alphabetically from center column to the right. Lines are limited in length and a plus sign will appear where the title has been cut. A '#' sign will appear where the titles begins. The keyword index includes the keyword listing, followed by author list and then the publication year. The full reference to a paper can then be found in the references (author index).

ical Study in the Light of New Geoc + arte Geologique de la Turquie, -Fai + s De

resi Depremlerinin Odak Mekanizmala + ca-Arabia-Eurasia Plate Collision Z + iyarbakır ve Padova Yer Çekim (Cazi + ürkiye Baz Cazibe Şebekesi

Report of the L Atalante Expedition + of the Strain in Greece in the Int + Structure of the Cycladic Blueschi + n of High-pressure Metamorphic Terr + Environmental Isotope Study and 2 + llü Sterneck Cihaziyle). # Diyarbakı + Seismicity# Rates Crustal Deformat + l and Instrumental Data. # Average R + and Associated Seismicity in the Gu +

Along the Active Nea Anchialos Faul Along the Active Nea Anchialos Faul ectoniques et Sismiques.# Deformati termal Alanın Jeofizik Düşey Elektr 1-Scale Geometry and Kinematics of ure and Kinematics of Upper Cenozoi the Exhumation of a Blueshist Terr ions of Fine-Scale Mica Interlaveri 9Ar Age Spectrum Measurements. # Met extension Neogene de I Eg sur / les ullürik (CSAMT) Etüdü.# Aydın - Ima ation Coordinates Computed from SLR arth Rotation and Station Coordinat g and Emplacement Ages of some Ophi iz Grabeninin Jeolojisi ve Tektoniğ in the Marmara Sea Region, Nort ion 1992): Kinematics of the Africa-Ara e, Metamorphisme et Magmatisme des Depuis le Miocene Superieur: I Evo ion a I etude Geologique des Cyclad Macroseismic Intensity.# A Tomograp tigation of the 13 May 1995 Kozani Revisited from a Detailed Seismolog ical Studies on the Dodecanese Isla the 1983 January 17 Kafallinia Ev f 18 November 1992: A Possible Aspe s in the Cycladic Area: 39Ar/40Ar D Lower-Middle Triassic Boundary Sec ion of Fluids During Amphibolite Fa of the Crystalline Units# Attic Pen ale Normal faulting Mechanisms.# A ate Cenozoic Rotations Along the No

pparionlarında Odontolojik Değişiml n Laterale des Fronts de Formation Allokton Metamorfik Birimler# Aydı

kkında Ön Sonuçlar# Ödemiş-Bayındır ications for Seismotectonics in SW e# Source Inversion of the 13.10.19

.# Orta Doğu Ege Çöküntüsünün rustal and Upper Mantle Structure B + aphic Study.# Seismic Velocity Cons + tonics Neogene and Quaternary Seque + tudy of the Tertiary Intrusives fro + Sedimentation and Sea-Level Changes + m MT Survey and its Connection betw + to Geology and Tectonic.# The Therm + tigation of the Gönen and Ekşidere + igh Boron Content in the Aquifer Sy + ismic Soundings in the Basins of th + Seismic Sounding in the Basins of + ratigraphic Evolution and Tectonics + ins of the Gediz Graben (Salihli-A + in (Salihli-Alagehir) Tektoniği (Te +

yalarm Temel-Ortü llişkisine Yapıs + tailed Study of a Normal Fault, Evi + agnetic Evidence for a Post-Eocene + in Sdevelopment During the Neotecto + egean Islands.# The Extension of th + egean Islands.# The Extension of th + Structure of the Menderes Migmatite + ations.# Post - Tortonian Westward + e Tectonics of the Alpine-Himalayan + ihli-Alaşehir).# Gediz Grabeninin (+ lojisi ve Kuvaterner Evrimi# Marmar +

Alphabetical list

. Western Anatolian Area: A Petrolog + 'Izmir'# Notes Explicatives de la C (1/50 000).# Geological Map of Naxo + (1:5.0 Mio).# Heat Flow Map of Euro + (1963 - 1990)# Türkiye ve Yakın Çev (1988-1992): Kinematics of the Afri (4 Pandüllü Sterneck Cihaziyle).# D (4 Pandüllü Sterneck Cihaziyle).# T (4-11 August 1995).# ANAXIPROBE 95 (Abstract).# Geodetic Determination (Aegean Sea) - Implications for the (Aegean Sea).# Uplift and Exhumatio (Bursa) Area of Northwestern Turkey (Cazibe) Şiddeti Ölçmeleri (4 Pandü (Central Greece) as Determined from + (Central Greece) Based on Historica (Central Greece) # Graben Formation (Central Greece)# Recent Tectonics (Central Greece).# Recent Tectonic (Cephalonie, Greece) - Donnees Neot (CSAMT) Etüdü.# Aydın - İmamkçy Jeo + (Cyclades and Evvia Island)# Crusta (Cyclades Islands, Greece),# Struct + (Cyclades), Greece.# Cooling During (Cyclades, Greece) and the Implicat (Cyclades, Greece) Utilizing 40Ar/3 (Cyclades, Greece).# Donnees Nouvel (DES) ve Kontrol Kaynaklı Manyetote (DUT) 95C02.# Earth Rotation and St (DUT) 95L02 and SSC (DUT) 95C02.# E (Eastern Central Greece), # Spreadin (Geology of the Gediz Graben). # Ged (GPS) Estimates of Crustal Deformat (GPS) Measurements in Turkey (1988-(Grece) # Paleogeographie, Orogenes (Grece).# Sur les Mauvements Egeens (Grece): I ile de Paros.# Contribut (Greece) Derived from Inversion of (Greece) Earthquake# Geodetic Inves (Greece) Earthquake of 13 May 1995 (Greece) Explanatory Notes.# Geolog (Greece)# Moment Tensor Inversion o (Greece)# The Galaxidi Earthquake o (Greece). # Dating Metamorphic Event (Greece).# Magnetostratigraphy of a (Greece). # The Nature and Distribut (Greece): Deformation and P-T Path (Greece): Implications for Large Sc (Greece); Structural Constraints# L (GSI) # Middle East Tectonics: Appli (Güneybatı Yürkiye) Geç Kuvaterner (Hellenic, Calabrian and Cyprus Out + (iles de Naxos et Paros).# Extensio (Iles Ioniennes, Acarnanie, Epire, (in Greek).# Structure of the Crust + (KAF) ile Iliskisinin Irdelenmesi# (Kasos, Karpathos, Rhodes).# Sur la + (KD Türkiye) Yapısal İlişkileri: Ka + (Kuzguncuk/Adapazari, Northwestern (Levha Sınırı) Uzantılarının İzmit (Lower to Middle Triassic) Kcira Se + (Manisa ili) Arası Gediz Nehri Güne -(Manisa) Area, Western Turkey# Geol + (Manisa) Miosen Omurgal: faunas: Hi + (Mediterranee Orientale).# Variatio (Menderes Masifi) Güney Kesimindeki + (Menderes Masifi) Metamorfizmas: Ha + (Ms=6.1): a Rupture Model with Impl (Ms=6.6) Western Hellenic Earthquak (Neojen) Stratigrafisi ve Tektoniği (North Greece).# Inversion of the C (Northern Greece) from a 3-D Tomogr (Northern Greece).# Extensional Tec (Northern Greece). # Paleomagnetic S (Northwest Turkey): Late Qaternary (NW part of Turkey) as Inferred fro (NW Turkey) and their Relationship (NW Turkey).# Hydrogeological Inves (on the Aegean Region of Turkey)# H (Pasiphae Cruise)# Two-Ship Deep Se (Pasiphae Cruise).# Two - Ship Deep (Pontides, Northwestern Turkey)# St (Salihli-Alașehir) Tektoniği (Tecto (Salihli-Alaşehir).# Gediz Grabenin (Selimiye-Muğla)# Menderes Grubu Ka (South Peloponnesus) Earthquake: De (Southwestern Turkey) # First Paleom + (Supradetachment Basin and RIft Bas (SW Turkey) into the Southeastern A (SW Turkey) into the Southeastern A + (SW-Turkey) # On Petrology, Age and (Taurus, Turkey). Geodynamic Implic (Tectonics of Aegean Region) # Activ + (Tectonics of the Gediz Graben (Sal + (Tekirdağ) Kıyı Kesiminin Deniz Jeo +

Name of Author Year Francalanci, L.+ 1990 Egeran, N.+ 1944 Jansen, J. B. H. 1973 Cermak, V. 1978 Özçep, T.+ 1995 Oral, M. B. 1994 Elbek, Y. 1963 Elbek, Y. 1952 Woodside, J. M. 1995 Billiris, H. et al. 1989 Avigađ, D. 1993 Avigad, D.+ 1991 Eisenlohr, T.+ 1997 Elbek, Y. 1963 Tselentis, G. -A.+ 1986 Papazachos, B. C.+ 1990 Myrianthis, M. L. 1984 Caputo, R.+ Caputo, R. 1990 1990 Mercier, J. L.+ 1972 Yücel, M. 1995 Gautier, P.+ 1994 Gautier, P.+ 1993 Avigad, D.+ 1992 Feenstra, A. 1996 Wijbrans, J. R.+ 1988 Faure, M.+ 1988 Yücel, M. 1995 Noomen, R.+ 1995 Noomen, R.+ 1995 Hynes, A. J.+ 1972 Emre, T. Straub, C.+ 1996 1994 Oral, M. B. 1994 Mercier, J. L. 1966 Angelier, J. 1977 Robert, E. 1982 Stavrakakis, G. N.+ 1997 Clarke, P. J.+ 1997 Hatzfeld, D.+ 1997 Mutti, E.+ 1970 Kiratzi, A. A.+ 1991 Hatzfeld, D.+ 1996 Maluski, H.+ 1987 Muttoni, G.+ 1995 Buick, I. S.+ 1991 Kessel, G. 1990 Rigo, A.+ 1995 Simeakis, K.+ 1989 Seber, D.+ 1997 Uluğ, A.+ 1998 Stride, A. H.+ Gautier, P.+ 1977 1990 Amorese, D. 1993 Papazachos, C. B. 1994 1995 Akgün, M.+ Aubouin, J.+ 1970 Kocviğit, A. 1990 Greber, E. 1997 1998 Senöz, M. . Muttoni, G + 1996 Karamanderesi, I. H. 1971 1990 Iztan, H.+ Arslan, F. 1984 Chaumillon, E.+ 1995 Candan, 0.+ 1992 Evirgen, M. M. 1977 Pinar, A. 1998 Baris, S.+ 1998 1979 Kava, O. 1988 Christodoulou, A.+ Ligdas, C. N.+ 1993 Brooks, M.+ 1982 1985 Kondopoulou, D. Smith, A. D.+ 1995 Çağlar, I. 1995 Eisenlohr, T. 1997 Yalçın, T. Filiz, Ş.+ 1997 1995 De Voogd, B.+ 1992 1992 Voogd Greber, E. 1997 Emre, T. 1992 1992 Emre, T. Öztürk, A.+ 1983 Lyon-Caen, H.+ 1988 1993 Kissel, C.+ 1996 Sözbilir, H.+ Bernoulli, D.+ Bernoulli, D.+ 1974 1974 1962 Schuling, R. D. Frizon de Lamotte, D.+ 1995 McKenzie, D. P. 1978 Emre, T. 1992 Vilmaz, B. 1996 the Sedimentary Processes on the No + (the Aegean Sea) # Neotectonics and + tono-Metamorphic Evolution of a Dis + (Tinos, Cyclades, Greece).# The Tec ersuchungen im Kanozoikum Südwest A + (Türkei).# Lithostratigraphisce Und + 8th.# The Gediz (Turkey) Earthquake of 1970 March 2 e Earthquakes in the East Anatolian + (Turkey)# Source Parameters of Larg ic Experiment. # On Seismotectonics (Turkey): Results from a Microseism ans de la Taurus Occidental au sud (Turque).# Recherches Geologiques d ctonic Significanca in the Frame of Cretaceous-Eocene) and their Te ίπ anean Region: Constrains and Uncert -(VLBI, SLR) in the Central Mediterr + Alaşehir.# Etude Geologique et Stru (W de I Anatolie) Entre Salihli et topic Characteristics of Thermal Wa (W-Turkey)# Chemical and Stable Iso (W. Taurids): A Mesozoic Paleorift. # Isparta Angle tonic Regimes, Fault Kinematics and + (W. Turkey and Greece): Timing, Tec Geochronology and Petrology of Rece (West Anatolia and Lesbos Island)# ications# Age of the Alaşehir Grabe (West Turkey) and its Tectonic Impl + ications# The Age of the Büyük Mend (West Turkey) and its Tectonic Impl (West Turkey)# Geochemistry and Tec tonic Significance of Augen Gneisse Significance# Microstructures of D (Western Turkey) and their Tectonic + ioning System# Monitoring West Hell (WHAT A CAT) Using the Global Posit (Istanbul) Sığ Deniz Sismiği Verile + rinin Değerlendirilmesi# Yedikule-B ağ) Kıyı Kesiminin Deniz Jeolojisi (Istanbul) - Marmara Ereğlisi (Tekird + n Sismik Yüzey Dalgalarında Girişim (ITÜ) Deprem İstasyonunda Kaydedile + de la Carte Geologique de la Turqu Faille ique et Ege: Collision et Arc Indui + -Taurique et les Arcs Convexes Taur + ticale de I Egee: Subduction et Exp # Neotectonique Horizontale et Ver eformation Ductile du Granite Mioce extension Neogene de I Egee: la D + ara: Report of Secont Campaign Augu + September 1992.# GPS Project Marm + 0 000).# Geological Map of Naxos (1/5 1, 1995 Dinar, Earthquake (Ms=6.1): + a Rupture Model with Implications y.# The October 1. 1995, Dinar Earthquake, SW Turke otation in Western Turkey, Observational Evidence. # Block R + 1 ermination of Three - Dimensional V A Homogenous Initial Model. # Det + ation of Hypocenter and Veolcity Pa + Simultaneous Least Squares Estim 1 Measurements# Local and Regional Co + 100 Years of Geodetic Displacement Measurements. # Local and Regional C 100 Years of Geodetic Displacement urkey: a Synthesis of Seismological + 12 Burdur Earthquake Sequence, SW T on and Upper Crustal Structure alon + 12 May 1971.# Surface Wave Dispersi + #12 Mayıs 1971 Burdur Depremi. p# Tertiary~ Quaternary Alkaline M + 12321 32432432 dsfdsfdsfds otopipot + 1 32432432 dsfdsfdsfds olopipolpi# + 123213213 dscdsf 123213sdfdsfd 1232 + dsfds olopipoipi# Tertiary- Quatern 123213sdfdsfd 12321 32432432 dsfdsf + Earthquake# Geodetic Investigation + 13 May 1995 Kozani-Grevena (Greece) ed Seismological Study# The Kozani- + 13 May 1995 Revisited from a Detail c Earthquake# Source Inversion of t 13.10.1997 (Ms=6.6) Western Helleni e Sea - Site 130.# Mediterranean Ridge, Levantin f the Europe - Mediterranean Mantle + 1400km. # Travel - Time Tomography o 1500 - 1800.# Seismicity of Turkey and Adjacent Areas, A historical Re ds (Greece) # Moment Tensor Inversio + 17 Kafallinia Event of Ionian Islan ty within the Normal Fault System o + 18 November 1992: A Possible Asperi ice 1953 Mars 18.# Le Tremblement de Terre de Yen ersuchungen Über das Nordwest Anato + 18. Marz 1953.# Makroseismische Unt acent Areas, A historical Review, 1 + 1800.# Seismicity of Turkey and Adj Shocks with Io>VI or M>5 for the Ya + 1801-1958.# Greece: A Catalogue of for Turkey and Surrounding Area, 1881 - 1980.# Earthquake Catalogue 1881.# Reise in der Troas im Mai 1890 and 1988# Seismicity and Assic iated Strain af Central Greece Betw ed Strain of Central Greece Between + 1890-1988.# Seismicity and Associat + eodetic and Seismic Strain of Greec + 1892 - 1992 # A Comparison of the G + e in the Interval 1892-1992# Geodetic Strain of Greec y.# Earthquake of August 19, 1966, Varto Area, Eastern Tueke etermination of the Strain in Greec + 1900 - 1988 (Abstract).# Geodetic D + n of Tectonic Deformation in Centra -1900 to 1988# Geodetic Determinatio nian Sea Submarine Canyons and the 1908 Messina Turbidity Current.# Io arköy-Mürefte Earthquake of 9th Aug + 1912.# Preliminary Report for the \$ 1912.# The Saros - Marmara Earthqua ke of 9 August for Turkey for the Interval 1913-1970.# An Earthquake Catalogue n of Earthquake Mechanism Solutions + 1922 - 1962. # Computer Re-evaluatio + R. Sommergible Vettor, Pisani Anno + 1931.# La Croceira Gravimetrica del 1935.# La Crociera Gravimetra del R . Sommergible Des Ganeys, Anno, urements at Sea, 1936 - 1959.# Pendulum Gravity Meas ng the North Anatolian Fault Associ + - 1967.# Slip Distribution Alo 1939 Made by H.M.S. Challanger in the At + 1950 - 1953.# Seismic Measurements + rre de Yenice 1953 Mars 18, # Le Tremblement de Te + en Über das Nordwest Anatolische Be + 1953.# Makroseismische Untersuchung H.M.S. Challanger in the Atlantic, 1953.# Seismic Measurements Made by ion P- Nodal Solutions for Larger E 1959 - 1962.# Computer - Determinat 1959.# Pendulum Gravity Measurement s at Sea, 1936 from ESSA, Coast and Geodetic Surve + - 1967.# World Seismicity Map 1961 the Mediterranean and Red Sea Durin + 1961-1964.# Geophysical Surveys in Nodal Solutions for Larger Earthqua + 1962.# Computer - Determination Prthquake Mechanism Solutions 1922 -1962.# Computer Re-evaluation of Ea 1966, Varto Area, Eastern Tuekey.# 1967 dthe Brezi Sizmogien Vlore - I Earthquake of August 19, iber.# Termeti I 30 Nendorit oseismic Activity Around the wester + 1967 Mudurnu Earthquake Fault# Micr + North Anatolian Fault Associated wi + 1967.# Slip Distribution Along the tolia, Turkey, Earthquake of 22 Jul + 1967.# The Mudurnu Valley, West Ana SA, Coast and Geodetic Survey, Epic + 1967.# World Seismicity Map from ES + Hakkında Makrosismik Gözlemler # 23 1969 Alaşehir - Sarıgöl Depremleri ir - Sarıgöl Depremleri Hakkında Ma + 1969 Demirci ve 28 Mart 1969 Alaşeh + ions for the Nature and Geometry of + 1969-70 in Western Turkey: Implicat + 1970 March 28th. # The Gediz (Turkey) Earthquake of e Gediz, Turkey, Earthquake of Marc + 1970.# Seismotectonic Aspects of th + 1971 Burdur Depremi.# 12 Mayıs nce, SW Turkey: a Synthesis of Seis + 1971 May 12 Burdur Earthquake Seque + 1971.# Surface Wave Dispersion and + Upper Crustal Structure along N - S + 1972 Jean Charcot Cruise. # North Ae + gean Sea Trough: key and Surrounding Area, 1881 -1980.# Earthquake Catalogue for Tur +

Roslyakov, A. G.+ 1997 Katzır, Y.+ Becker-Platen, J. D. 1996 1970 Ambraseys, N. N.+ 1970 Tavmaz, T.+ 1991 Gürbüz, C.+ 1998 Monod. O. 1977 Mauritsch, R.+ 1991 Mantovani, E.+ 1995 Emre. T 1000 Conrad. M. A.+ 1995 Poisson, A.+ 1984 Mercier, J. L.+ 1991 Borsi. S.+ 1972 Seyitoğlu, G.+ 1996 Seyitoğlu, G.+ 1992 Bozkurt, E.+ 1995 Bozkurt E + 1997 Kahle, H.-G.+ 1993 Kurt, H. 1994 1996 Yilmaz, B Ezen, Ü. 1979 Egeran, N.+ 1944 1976 Brunn J H Angelier, J.+ 1982 Faure, M.+ 1988 Straub, C.+ 1992 Jansen, J. B. H. 1973 Pinar, A. 1998 Evidoğan, H.+ 1996 Westaway, R. 1990 Aki. K.+ 1976 Crosson, R. 1976 Curtis, A.+ 1995 Curtis, A.+ 1997 taymaz, T.+ 1992 Ezen, Ü. 1991 Erinc. S.+ 1971 Francalanci, L.+ 1990 Francalanci, L.+ 1990 Francalanci, L.+ 1990 Clarke, P. J.+ 1997 Hatzfeld, D.+ 1997 Barış, Ş.+ Ryan, W. B. F.+ 1998 1973 Spakman, W.+ 1993 Ambraseys, N. N.+ 1995 Kiratzi, A. A.+ 1991 Hatzfeld. D.+ 1996 Diligan, H.+ 1955 Ketin, I.+ 1953 Ambraseys, N. N.+ 1995 Galanopoulos, A. 1960 Ayhan, E.+ 1987 Schliemann, H. 1881 Ambraseys, N. N.+ 1990 Ambraseys, N. N.+ 1990 Davies, R.+ 1994 Davies, R.+ 1997 Wallace, R. E. 1968 Billiris, H. et al. 1989 Billiris, H.+ 1991 Ryan, W. B. F.+ 1965 Ates, R.+ 1976 Ambraseys, N. N.+ 1987 Tezuçan, L.+ 1975 Wickens, A. J.+ 1967 Cassinis, G.+ 1935 Cassinis, G. 1941 Worzel, J. L. 1965 Barka, A. A. 1996 Gaskell, T. F.+ 1958 Diligan, H.+ 1955 Ketin, I.+ 1953 Gaskell, T. F.+ 1958 Hodgsom, J. H.+ 1965 Worzel, J. L. 1965 Barazangi, M.+ 1969 Allan, T. D.+ 1965 Hodgsom, J. H.+ 1965 Wickens, A. J.+ 1967 Wallace, R. E. 1968 Sulstarova, E.+ 1969 1991 Lio, Y.+ Barka, A. A. 1996 Ambraseys, N. N.+ 1969 Barazangi, M.+ 1969 1969 Ketin, l.+ Ketin, L+ 1969 Eyidoğan, H.+ 1985 Ambraseys, N. N.+ 1970 1972 Ambraseys, N. N.+ 1971 Erinç, S.+ taymaz, T.+ Ezen, Ü. 1992 1991 Needham, H. D.+ 1973 Ayhan, E.+ 1987

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'lzmir'# Notes Explicatives +

Ionian Islands (Greece)# Moment Te + 1983 January 17 Kafallinia Event of + ing in the Ionian Sea: the Cephalon + 1983.# Evidence for Transform Fault + Earthquake: Detailed Study of a Nor 1986 Kalamata (South Peloponnesus) ation of the Strain in Greece in th 1988 (Abstract).# Geodetic Determin estern Turkey and their Tectonic Im 1988 and 1990 GPS Measurements in W + tonic Deformation in Central Greece 1988# Geodetic Determination of Tec + ain af Central Greece Between 1890 1988# Seismicity and Assiciated Str rkey and their Tectonic Implication 1990 GPS Measurements in Western Tu + remlerinin Odak Mekanizmaları Katal 1990)# Türkiye ve Yakın Çevresi Dep + and Seismic Strain of Greece in th 1992.# A Comparison of the Geodetic of Secont Campaign August / Septemb 1992.# GPS Project Marmara: Report e Normal Fault System of the Gulf o 1992: A Possible Asperity within th Rupture Model with Implications for 1995 Dinar, Earthquake (Ms=6.1): a uake# Geodetic Investigation of the 1995 Kozani-Grevena (Greece) Earthq + mological Study# The Kozani-Greva (1995 Revisited from a Detailed Seis + L Atalante Expedition (4-11 August + 1995).# ANAXIPROBE 95 Report of the + The October 1. 1995, Dinar Earthquake, SW Turkey.# + Anomalies# Estimation of the Thick + 2-D and 3-D Analysis of the Gravity Karst Within the Gemlik (Bursa) Are 2-D-Model-Ling of Cold and Thermal ation of Hypocenter and Veolcity Pa 2. Simultaneous Least Squares Estim West Anatolia, Turkey, Earthquake o 69 Alasehir - Sarıgöl Depremleri Ha 22 July 1967.# The Mudurnu Valley, #23 Mart 1969 Demirci ve 28 Mart 19 + 28 Mart 1969 Alaşehir - Sarıgöl Dep + remleri Hakkında Makrosismik Gözlem e of 1970 March 28th.# The Gediz (Turkey) Earthquak es# Estimation of the Thickness of 3-D Analysis of the Gravity Anomali + + the Italian Region Using Local and + #3-D Crustal P - Wave Tomography of #3-D Structure of the Lithosphere n the Aegean Region ocity Constrains in the Thessalonik + 3-D Tomographic Study.# Seismic Vel + Crust and Upper and Mantle of Aege #3-D Velocity Structure Beneath the + 3-D Velocity Structure Technique.# Examination of a Velocity Model Usi + e Crust and Upper Mantle of Aegean #3-D Veolocity Structure Beneath th + f the North - Central Greece from I #3-Dimensional Velocity Structure o + en Vlore - Diber.# Termeti T 30 Nendorit 1967 dthe Brezi Sizmogi + rtiary- Quaternary Alkaline Magmati + 32432432 dsfdsfdsfds olopipoipi# Te + ks of the Island of Syros (Greece). 39Ar/40Ar Data from Metamorphic Roc Aegean Region from the Early Miocen #3D-Kinematics of Extension in the # Metamorphic Evolution of the Att + 40Ar/39Ar Age Spectrum Measurements + ations, Marine Microfossils and Mam 5. Calibration of Sporomorph Associ Earthquake of 9 August 1912.# The Saros - Marmara ion (4-11 August 1995).# ANAXIPROBE + 95 Report of the L Atalante Expedit Coordinates Computed from SLR and G 95C02.# Earth Rotation and Station otation and Station Coordinates Com + 95L02 and SSC (DUT) 95C02.# Earth R rt for the Sarköy-Mürefte Earthquak + 9th August, 1912.# Preliminary Repo + ssungen# Dil Physikalischen Etgensc Abgeleitet aus Geophysikalischen Me search in the Alps# Second Workshop + About Perspectives of Geological Re + Region.# Preview Results about Overy Blasts Aroud Adapazari + Tinos Island, Cyclades, Greece.# Lo Above and Below a Blueshist Belt to the Andes and the Aegean. # A Con Above Subduction Zones: Aplication to the Andes and the Aegean# A Con Above Subduction Zones: Application + ctonique et Deformation Acruelle de Acarnanie, Epire, Greece).# Sismote e Mediterranean Ridge Accretionary Accelerate the rate of Growth of th + d Büyük Menderes Grabens, Western A Accomodation Faults in the Gediz an + rd Growth of the Mediterranean Ridg Accretionary Complex# Rate of Outwa Accretionary Complex# Spatial Trans + Accretionary Coplex?# Did the Onset + ition from Compression to Extension of Extension in the Aegean Basin A + rgin Tectonics: Submarine Accretionary Prism.# Continental Ma ion, NW Anatolia, Inferred from GPS + Accumulation in the Marmara Sea Reg ion, NW Anatolia, Inferred from Rep + Accumunation in the Marmara Sea Reg me Tomography.# Imaging Algorithms, Accuracy and Resolution in Delay Ti - Wave Crustal Tomography of Greec Accurate Two - Point Ray Tracer.# P nd Arcs# Lateral Variation of Basal + Across Continental Margins and Isla Across North America.# Two Slow Sur face Waves Across the Hellenic Arc: the Messin + iakos, Argolikos, Saronikos and Sou + reece.# Establishent of a Permanent + Across the Kephalonia Fault Zone, G Central Greece.# GPS Evidence for Across the North Aegean and North -Across the Turkish and Iranian Plat eaus.# Lateral Variations in High ccidentale de I Arc Egeen (Iles Ion + Acruelle de la Termination Nord - O Application to Central Greece# A Fo Active Crustal Deformation and its Active Crustal Deformation in the A + egean and Surrounding Area# A Detai Marmara Sea Region, NW Anatolia, In + an# Rotational Mechanism of #Active Crustal Deformation in the Active Deformation in Greece and Ir Active Deformation in the Eastern M + editerranean# Rates of Active Deformation in the Mediterra nean and Middle East# The Relations + arc: the Strait of Kythira, Hellen + #Active Deformation of a segment of + #Active Defprmation of the Continen + ts. Evidence for Dynamic Coupling of S + Active Extension of Western Turkey# t Bay, Bandırma Bay and Erdek Bay o + #Active Fault Investigation in Izmi + #Active Faulting in Northern Turkey urrounding Area.# Orientation of Active Faulting in the Aegean and S + #Active Faults of Turkey. Active Nea Anchialos Fault Zane (Ce + ntral Greece).# Recent Tectonic Alo ntral Greece)# Recent Tectonics Alo + Active Nea Anchialos Fault Zone (Ce + oniki.# Seismotectonic Evidence of + Active Normal Fault Beneath Thessal + #Active Normal Faulting in Central Greece and Western Turkey. #Active Normal Faulting in Central + #Active Normal Faulting, Drainage P + Greece: An Overview. atterns and Sedimentation in Southw + # Structure of the Central North Ae + Active Strike-Slip Deformation Zone + late Versus Continuum Descriptions Active Tectonic Deformation# Microp #Active Tectonics in the Hellenic T + rench. #Active Tectonics of the Adriatic R + egion. #Active Tectonics of the Aegean Reg ion #Active Tectonics of the Alpine Him + alayan Belt Between Western Turkey alayan Belt: the Aegean Sea and Sur + #Active Tectonics of the Alpine-Him + alayan Belt: the Aegean Sea and Sur + #Active Tectonics of the Alpine-Him diterranean Region: Deduced From GP + #Active Tectonics of the Eastern Me + #Active Tectonics of the Mediterran + ean Region #Active Tectonics of the North and Central Aegean Sea.

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G. 1968 and Surrounding Area# Microearthqua -Activity in the Iznik-Mekece Fault Angagi, M. T. Karnik, V. 1997 gean Region. # A Note on the Morphol Activity of Seismic Zones in the Ae 1972 lt Zone in the Orhangazi Plain, Nor Activity of the North Anatolian Fau + Ikeda, Y.+ Barka, A. A.+ 1989 y in Turkey and its Influence on Ea Activity# Strike-Slip fault Geometr 1988 ns Geotectoniques.# L expansion Oce Actuelle et Fossile; ses Implicatio Dercourt, J. 1970 ak Volkanitlerinin Petrolojisi ve P + Açısından Ege Bölgesindeki Yeri# Uş + Ercan, T.+ 1979 pısı# Doğal Uzanım Açısından Ege Denizinin Jeolojik Ya + Arpat, E. 1976 inin Biçim Değişimi.# Deprem Odak M + Açısından Türkiye Tektonik Birimler Yoğurtçuoğlu, A. 1986 Tektonik Yapılarının Deprem Mekani + Açısından İrdelenmesi.# Anadolu nun + Kalafat, D 1995 ge Denizindeki Pliyo-Kuvaterner Ada Yayı Volkanizması# Akdeniz ve E + Ercan, T. 1980 # Bati Anadolu, Trakya ve Ege Adalarındaki Senozoyik Volkanizması + Ercan, T. 1979 teorolojik Etüdü #Adapazar Depreminin Jeolojik ve Me + Fouche, M.+ 1943 about Query Blasts Aroud Adapazarı Region. # Preview Results Gürbüz, C.+ 1980 micity in Greece and Adjacent Area.# A Catalogue of Seis + Makropoulos, K. C.+ 1981 1500 - 1800.# Seismicity of Turke + Adjacent Areas, A historical Review Ambraseys, N. N.+ 1995 ea and Western Anatolia# Paleomagne Adjacent Blocks in Northeastern Aeg Kissel, C.+ 1987 al Mechanism Diagrams for Turkey an Adjoining Areas# A Catalogue of Foc + Canitez, N.+ 1967 Adriatic Promotory as a Paleogeogra phic Premise for Alpine Orogeny and + Channell, J. E. T.+ 1976 Adriatic Region. # Active Tectonics of the Anderson, H.+ 1987 plications for the Oceanic Subducti Adriatic sea and Western Greece. Im Baker, C.+ 1997 sins in Italy: Examples from the Ce Adriatic Sea# Different Foreland Ba De Alteriis, G. 1995 sı.# Akyazı - dorukcan Vadisinde Ku Ağda Yatay Hareketlerin Araştırılma + Öztürk, E.+ 1987 che Stellung des Menderes Kristalli Aegaeis# Über Alter und Geotektonis + Dürr, S. 1975 gnetic Evidence for Rotation in Opp Aegea and Western Anatolia# Paleoma Kissel. C.+ 1987 Crustal-Scale Geometry and Kinemat Aegean (Cyclades and Evvia Island)# Gautier, P.+ 1994 ental deformation Above Subduction Aegean# A Continuum Model of Contin + Wdowinski, S.+ Hatzfeld, D.+ 1989 Aegean and its Geodynamic Implicati ons# Microearthquake seismicity and 1993 GPS Evidence for Westward Continua + Aegean and North - Central Greece.# + Reilinger, R. E.+ 1995 iled Study of the Active Crustal De + Aegean and Surrounding Area# A Deta + Papazachos, B. C.+ 1996 city of the Aegean and Surrounding Area# Seismi Papazachos, B. C. 1990 times of Pn-Waves in the Aegean and Surrounding Area# Travel + Panagiotopoulos, D. G.+ 1985 tation of Active Faulting in the Aegean and Surrounding Area. # Orien + Papazachos, B. C.+ 1992 plex Multiplate and Continuum Tecto + #Aegean and Surrounding Region: Com Dewey, J. 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A.+ Aegean Area Determined by Waveform + 1991 Aegean Area# Modes of Lithospheric Papazachos, B. C.+ Interaction in the 1977 Aegean Area# On the Resolving Power of Tomographic Images in the Ligdas, C. N.+ 1991 e of Miocene and Pliocene Rotationa + Kissel, C.+ Accean Area# Palaeomagnetic Evidenc 1984 for Rotational Deformations in the Aegean Area# Paleomagnetic Evidence Kissel, C.+ 1989 Aegean Area# Paleomagnetic Study of + the Neogene Formations of the Kissel, C.+ 1989 Papazachos, B. C. 1976 Aegean Area# Seismotectonics of the + Northern dels from Rayleigh-wave Dispersion + Aegean Area# Shear-wave Velocity Mo + Kalogeras, I. S.+ 1996 Aegean Area.# A Time and Magnitude + Aegean Area.# Paleomagnetic Evidenc + Predictable Model for Generation of + Papazachos, B. 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C.+ Miocene Detachment in Southern Rodo + Aegean Extension.# A Major Oligo -1993 1997 ozoic Extention in Bulgaria: the No Aegean Extensional Regime# Late Cen s from the Cycladic Massif, Greece, Aegean# First Palaeomagnetic Result Morris, A.+ 1996 Gilbert, L. E.+ 1994 Aegean GPS Experiment. # Strain Resu + lts and Tectonics from the 1995 Aegean Grabens by 2-D and 3-D Analy Sari, C.+ sis of the Gravity Anomalies# Estim + Ridley, J. Bernoulli, D.+ 1984 cance of Deformation Associated Wit Aegean Island of Syros# The Signifi he Lycian Nappes (SW Turkey) into t Aegean Islands.# The Extension of t 1974 1974 Bernoulli, D.+ he Lycian Nappes (SW Turkey) into t Aegean Islands.# The Extension of t + 1990 Gülen, L. ution of the Aegean Subduction# Iso + Aegean Magmatism and Gedynamic Evol Kondopoulou, D.+ 1984 Aegean# Palaemagnetic data from Ter + tiary Units of the North Beck Jr, M. E.+ 1994 nomalies. Is There a Tectonic Expla + #Aegean Paleomagnetic Inclination A Armijo, R.+ 1996 Corinth Rift and its Implications Aegean# Quaternary Evolution of the Stavrakakis, G. N.+ Aegean Region (Greece) Derived from + 1997 Inversion of Macroseismic Intensit + Ligdas, C. N.+ 1990 Aegean Region# 3-D Structure of the + Lithosphere in the Aegean Region# A Comparasion of Sat Jackson, J.+ 1994 ellite Laser Ranging and Seismicity + 1994 Aegean Region# A Comparasion of Sat + ellite Laser Ranging and Seismicity Jackson, J.+ 1994 Aegean Region# Active Tectonics of Jackson, J. the Hashida, R.+ 1988 ication.# Three Dimensional Seismic + Aegean Region and its Tectonic Impl + 1978 ndings# The Crust and Upper Mantle + Aegean region From Deep Seismic Sou + Makris. J. 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city and Stress Field in the Aegean Region# Reproducing the Velo + reece-Tectonic and Petrochemical Re + Aegean Region# Santorini Volcano, G tribution in the Aegean Region# Seismic Velocity Dis + Aegean Region# Seismicity and Tecto + nics of the es of the Aegean Region# Seismotectonic Studi raveltime Residuals and Deep Struct + Aegean Region# Teleseismic P-Wave T + Aegean Region# Tertiary to Qaternar + y Evolution of Volcanism in the ry Evolution of Volcanism in the Aegean Region# Tertiary to Quaterna the Alpine-Himalayan Belt: the Aeg + Aegean Region) # Active Tectonics of + ology and Activity of Seismic Zones + Aegean Region. # A Note on the Morph ttern of the Aegean Region.# Crustal Fracture Pa and Thermal Waters of Turkey Aegean Region.# IAH Map of Mineral f the Northern and Central Aegean Region. # Neogene Volcanism o s in the Crust and Upper Mantle in Aegean Region. # P - Wave Veolocitie stribution in Western Turkey and it + Aegean Region. # Seismic Velocity Di + Evolution of Marginal Seas Deduced + Aegean Region.# Some Aspects of # The North Aegean region: A Tectonics Papadox? d P-wave Crustal Velocity in the Io + Aegean Regions# Back Arcs Basins an + s Island)# Geochronology and Petrol + Aegean Sea (West Anatolia and Lesbo erranean.# Geophysical Studies in t Aegean Sea and in the Eastern Medit + Velocity Variations# A Geophysical Aegean Sea and Surrounding Area: Pn + (Tectonics of Aegean Region) # Activ + Aegean Sea and Surrounding Regions Active Tectonics of the Alpine-Him Aegean Sea and Surrounding Regions# + ned from Geophysical Survey. # Crust + Aegean Sea and the Hellenides Obtai + Crete, Greece, Obtained by Refract + ion of Large-Scale Seismic Tomograp + Aegean Sea and the Islands Evia and Acgean Sea Area# On the Interpretat + n Recent Magmatism of the Aegean Sea# Geochronological Data o + Aegean Sea# Heat Flow in the e of the Aegean Sea# Morphology and Structur + Seismotectonics of the North Aegea + Aegean Sea Network.# Seismicity and + ucture Beneath the Crust and Upper Aegean Sea Region# 3-D Velocity Str + he Moment Tensors of Earthquakes# -π Aegean Sea Region Determined from t + tructure Beneath the Crust and Uppe + Aegean Sea Region.# 3-D Veolocity S Aegean Sea Seismic Reflection Data# + Reorganization and Interpretation + Aegean Sea# The Aegean Sea Trough: 1972 Jean Charco t Cruise.# North edimentary Processes on the Northhe + Aegean Sea) # Neotectonics and the S + e Complexes of Cordilleran Type in Aegean Sea, Greece# Metamorphic Cor + or Arc - Parallel Extension Along t -Aegean Sea, Greece. # GPS Evidence f Trace Element Evidence for the Rol + ochronological Data on Granitic Roc + Acqean Sea, Greece.# Sr-isotope and + Aegean Sea, Preliminary results# Ge + e North and Central Aegean Sea. # Active Tectonics of th enon in Rayjleigh Wave Trains Assoc + Aegean Sea. # An Interference Phenom + enon in Rayleigh Wave Trains Associ Aegean Sea. # An Interference Phenom m the North Aegean Sea Network.# Se Aegean Sea. Preliminary Results fro Aegean Sea.# Static and Dynamic Pro + perties of Upper Mantle in Southern + n of the North Aegean Trough, North Aegean Sea.# Structure and Evolutio ntinuous Reflection Profiles# Shall Aegean Sea: A Synthesis Based on Co a From the Mediterranean and Aegean Seas# Rewiev of Heatflow Dat + netic Intensity, Free-air Gravity A + Aegean Seas.# Bathymetry, Total Mag + erization of Aegean Magmatism and G + Aegean Subduction# Isotopic Charact Gülen, Aegean to Describe the Contribution + Aegean Trough (W. Turkey and Greece + of Gravitational Potential Energy# +): Timing, Tectonic Regimes, Fault It Deduced from Seismicity.# Aegean Trough - North Anatolian Fau Rates Aegean Trough Fault Zone (Greece); Structural Constraints# Late Cenozo + Aegean Trough# Geophysical Investig ations in the North Aegean Trough# Subsidence History o f the North Aegean Trough# Tectonic Evolution o + f the North # Structure and Evolution of the No + Aegean Trough, Northern Aegean Sea. + ormation on the North Flank and Flo Aegean Trough. # Gravity Induced Def Aegean Trough: an Active Strike-Sli + p Deformation Zone# Structure of th + Aegean Volcanic Arc: the Case of Me los Island# Paleomagnetic and Neote -Petrological Study in the Light of Aegean-Western Anatolian Area: A Aegean.# A Continuum Model of Conti nental Deformation Above Subduction + Aegean. # A Geplogical Companion to Greece and the n the Upper Mantle Beneath the Aegean.# Seismic Wave Attenuation i Aegean: an Alternative View.# The T ectonics of the Aegean: Evidence for an Origin by C ombined Assimilation and Fractional + Aeromagnetic Survey of the Eastern Mediterranean Sea and Its Interpret -Aeromagnetic Survey of the Eastern Mediterranean Sea and its Interpret + Aeromagnetik Haritalarma Genel bir Bakıs # Türkiye af Central Greace Between 1890 and 1988# Seismicity and Assiciated Str + Africa - Eurasia - North America Pl ate Circuit and Tectonics of the Gl + Plate Kinematics: the Americas, Ea Africa, and the Rest of the World.# on Zone, Ph.D. Thesis# Global Posit Africa-Arabia-Eurasia Plate Collisi Africa.# Isogram Maps of Europe and North African - Adriatic Promotory as a P aleogeographic Premise for Alpine 0 + African - Arabian Collision Zone.# A Tomographic Image of the Upper Ma Afrika da Yüzey Dalgalarının Disper + siyonunun Incelenmesi.# Ardışık Fil Against the Core/Cover Concept in t he Southern Sector of the Menderes on of the Southern Sector of the Me Against the Core/Cover Interpretati + agaischen Raumes und der benachbart + en Gebieten# Über den Chemismus und Age and Evolution, West Turkey# Nor thern Margin of the Gediz Graben: igmatite Complex (SW-Turkey)# On Pe + Age and Structure of the Menderes M + natolian Fault Zone: Implications f Age and Total Offset of the North A + Age Data from Gördes Basin, West Tu rkey.# Neogene Palynological and Is urkey) and its Tectonic Implication + ey.# Fossil and K-Ar Data for the #Age of the Alaşehir Graben (West T + Age of the Antalya Complex, SW Turk + est Turkey) and its Tectonic Implic + Age of the Büyük Menderes Graben (W + phic Evolution of the Attic-Cycladi + Age Spectrum Measurements. # Metamor + Age.# The Akrotiri Unit on the Isla + nd of Tinos, Cyclades, Greece: With Ages of some Ophiolites in the Othr + is Region (Eastern Central Greece). + ts lake manyes to Istanbul, Turkey + an Üzerine Incelemeler.# Türkiye v + #Airbone Magnetometer Profile Resul + ait Fundamental Moddan Yüzey Dalgal + Ait Rapor.# Turgutlu - Salihli (Man + isa ili) Araşı Gediz Nehri Güneyini + Ercan, T.+ Ait Yeni Kimyasal, Izotopik ve Rady + ometrik Verilerin Yorumu# Bat: Anad +

n Content in the Aquifer Systems of + Aegean Region of Turkey)# High Boro +

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Doğu

uvaterner Ada Yayı Volkanizması e Çevresinin Depremselliği, s, Cyclades, Greece: Witness to a L + ve Yakın Çevresinin Depremselliği + , Anadolu Depremlerinin Odak Mekani + Katkısı# Türkiye Diri Fay Haritası + Bölgesi nin Deprem Etkinliği ve

n Jeodezik Ağda Yatay Hareketlerin + stern Turkey)# Stratigraphic Evolut +

aux, Reconstruction Palinipastique + Tectonic Enioma.# The

rin Oluşturduğu Deformasyon ve Geri + aj (DES) ve Kontrol Kaynaklı Manyet key# Geology and Hydrocarbon Potent ermik Enerji Yönünden Detay Jeoloji nda Makrosismik Gözlemler.# 23 Mart 969-70 in Western Turkey: Implicati ts Tectonic Implications# Age of th ctural du Graben de Gediz (W de I A their Tectonic Significanca in the the Geodynamic Evolution of the Din the Spathian to Anisian (Lower to M for Rotation of the Ionian Zone nce netic Results from Southern Albania or Cenozoic Clockwise Rotation of t esi ve Ege Bölgesi Havadan Manyetik nd and Ocean Bottom Seismograph Sta in Delay Time Tomography.# Imaging

ları ve Bunların Petrojenetik Yorum Western Anatolian Area: A Petrologi nism within the Evolution of Ispart Milos, Aegean Sea, Greece.# Sr-iso Dağları (Menderes Masifi) Güney Ke

Dağları (Menderes Masıfi) Güney Ke Thrust Belt in Western Taurides. Th oment, Seismicity and Rate of Slip rkey from Burdur Earthquake of 12 M t Zane (Central Greece).# Recent Te t Zone (Central Greece)# Recent Tec dary Derived from Focal Mechanisms t Margins - Research of the Past De S Evidence for Arc - Parallel Exten gean Sea, Greece.# GPS Evidence for Zone (Greece); Structural Constrai ociated with the Large Earthquakes Using Geodetic Methods.# Strain Ana otectonics of the Pontides: Implica ent et Ecrasement Ridge - Plastique

m Tectonic Reconstruction to Upper Mapping of the Upper Mantle Struct Areas of the Tethys, Mediterranean Shear Zone, Naxsos, Greece.# The La nd Result of a Round-Table Discussi in Turkey and Pakistan# Active Tect in the Carpatho - Balkan Region.# T ocline as an Example of Collision T ea and Surrounding Regions# Active

tion.# Paleomagnetic Results for Al + nes et Leur Extension. Reflexions s + logy: Editorial Remarks and Result + eotectonics of the Pannonian Basin + es Menderes Kristallins/SW-Anatolie + the Aegean: an iar der Turkei.# Litho-und Biostrat +

rabeni nin Tektonosedimenter Gelişi +

of the Gloria Fault.# Closure of t + ross North

Comperative Study.# Lithosphere Str + del for Cenozoic Extension of Weste + of the World.# Plate Kinematics: t + xsos (Creece).# The Nature and Dist + # P - Wave Crustal Tomography of Gr + saloniki.# Seismotectonic Evidence + one# Structure of the Central North + ern Mediterranean Sea and Its Inter + ern Mediterranean Sea and its Inter + h Anatolian Fault Zone: Implication + of the Aegean:

n.to Describe the Contribution of G + .# Deep Seismic Expression of rench, East Mediterranean.# Discove + terranean Region.# From Tectonic Re + eothermal Systems in Western Anatol + canic Rocks of Western Turkey. nic Rocks of Western Turkey.

Volcanic Rocks of Western Turkey. + zarı (Pontides, Northwestern Turkey + for the Interval 1913-1970. ite, Muscovite and Paragonite in Po +

of Marmara: A Plate Boundary in Y Graben# Graben Formation in the C +

Akdeniz Bölgesi Gravite Anomalileri + #Akdeniz ve Ege Denizindeki Pliyo-K + #Akkuyu Nükleer Güç Santralı Yeri v + Akrotiri Unit on the Island of Tino + Aktif Tektoniği.# Güneybatı Anadolu Aktif Tektonik ile Hişkileri.# Bat + Aktif Tektonikle İlgili Çalışmalara + Aktif Tektonikle Ilişkisi# Marmara Aktüel Tektoniği.# Batı Anadolu nun + Aktüel Tektoniği.# Batı Anadolunun #Akyazı - dorukcan Vadisinde Kurula + Akyazı/Adapazarı (Pontides, Northwe + Akısı Haritası.# Türkiye Isı al Lochtonie des Bey Gağlar: Orient + Alakır Çay Unit, Antalya Complex: a + Alanlarının Modellenmesi.# Depremle + Alanın Jeofizik Düşey Elektrik Sond + Alaşehir (Manisa) Area, Western Tur + #Alaşehir - Salihli Bölgesinin Jeot Alaşehir - Sarıgöl Depremleri Hakkı + Alaşehir and Gediz Earthquakes of 1 Alaşehir Graben (West Turkey) and i Alaşehir.# Etude Geologique et Stru Albania (U. Cretaceous-Eocene) and Albania and their Significance for Albania# Magnetobiostratigraphy of Albania.# First Paleomagnetic Evide Albanides and Hellenides. # Paleomag Albanides# Paleomagnetic Evidence f Alçak Geçişli Filtrelerin Düzenlenm Aleutian Subduction Zone Using Isla Algorithms, Accuracy and Resolution + Alkali Feldispatların Yapısal Durum + Alkaline Magmatism of the Aegean-Alkaline Volcanism and Active Tecto + Alkaline Volcanism on Santorini and + Allokton Metamorfik Birimler# Avdm + Along a NNW-SSE Transeci.# Neogene Along Major Fault Zones.# Seismic M + along N - 5 Direction in Western Th + Along the Active Nea Anchialos Faul Along the Active Nea Anchialos Faul Along the Eurasia-Africa Plate Boun + along the Front of Modern Convergen Along the Hellenic Arc, Greece.# GP Along the Hellenic Arc. Southern Ae Along the North Aegean Trough Fault Along the North Anatolian Fault Ass Along the North Anatolian Fault by Along the North Anatolian Fault# Ne Alpin en Mediterraneane; Poinçonnem Alpine - Mediterranean Region. # Fro + Alpine Collision Belt.# Tomographic #Alpine Deformation and the Oceanic Alpine Evolution of an Extensional Alpine Geology: Editorial Remarks a Alpine Himalayan Belt Between Weste Alpine Orogeny and Plate Movements Alpine System and the Carpathian Or Alpine-Himalayan Belt: the Aegean S Alpine-Himalayan Belt: the Aegean S + #Alpine-Himalayan Blueschists Alpine-Mediterranean Tectonic Evolu + Alpine.# Les Zones Hellenides Inter + Alps# Second Workshop on Alpine Geo Alps, Carpathians and Dinarides. # N + Alter und Geotektonische Stellung d'+ Alternative View.# The Tectonics of Altersbestimmungen aus dem Jungtert + Alumina Basalt# High Alüvyon Yelpaze Çökelleri ve Gdiz G America Plate Circuit and Tectonics + America.# Two Slow Surface Waves Ac + America: Mechanism of Uplift and a American Cordillera.# A Physical Mo Americas, East Africa, and the Rest + Amphibolite Facies Metamorphism, Na an Accurate Two - Point Ray Tracer. + an Active Normal Fault Beneath Thes an Active Strike-Slip Deformation Z #An Aeromagnetic Survey of the East + #An Aeromagnetic Survey of the East an Age and Total Offset of the Nort an Alternative View.# The Tectonics + #An Analog Experiment for the Aegea + an Ancient Plate Boundary in Europe an Anoxic Basin within the Stabro T An Application to the Alpine - Medi #An Approach to Occurrence of the G #An Approach to Origin of Young Vol + #An Approach to the Origin of Young #An Approach to the Origin of Young an Area of Seismicity: Akyazı/Adapa + #An Earthquake Catalogue for Turkey + #An EMP and TEM-AEM Study of Margar + an Escape tectonic Regime. # The Sea + An Example from SW Anatolia, Eşença +

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Eastern European Alpine System and + ormal Faults in the Basin and Range + Greece.# The Late Alpine Evolution + ex in Western Anatolia, Turkey.# So + Possible Relation with the Helleni leigh Wave Trains Associated with t + eigh Wave Trains Associated with th + lies in the Eastern Mediterranean. re in Southeastern Europe.# Prelimi + standing of Sn: Normal Models of Lo + and Fractional Crystallization# 0-5 + g in Central Greece: ite Anomalileri ve Sismolojiye Göre + Incelenmesi.# Sentetik Sismogram El lerinin Paleosismik Yöntemlerle Yaş + aları ve Bunların Aktif Tektonik il + eş Bölümünde Yerkabuğu Hareketlerin + unin Incelenmesi# Kuzey mm Incelemmesi. # Kuzev ği.# Kelkit Vadisi Kesiminde Kuzey + Irdelenmesi# Izmit Körfezi nin Yapı + armın Izmit Körfez Geçişindeki Tek + eyve-Iznik Kolları Üzerinde Paleosi + agnetic Göstergesi.# Batı arı ve Örnekler.# Batı Patlatmalarından Elde Edilen Sismi + sal ve Petrografik Ögeleri# Batı nmasında Kullanılan Yerbilimleri Kr + zi nde rfolojik Sonucları# Batı ile Ilgili Görüşler.# Orta Toroslar + magnetizması ve Genç Tektonik Evrim + ktonik Gelisimi.# Batu tic Sonuçlar.# Kuzeybatı eprem Mekanizmaları Açısından İrdel + avite Verileri ile Irdelenmesi.# Ba + Yeni Kimyasal, Izotopik ve Radyome anto Yapısının Belirlenmesi.# Yüzey + elliği ve Aktif Tektoniği.# Güneyba + Senozovik Volkanizması# Batı izması# Batı Cözümüyle Türkiye Depremlerinin Describe the Contribution of Gravi Entre Deformation Horizontale et M + n Modele Mecanique Elementaire Appl + xpansion of SW Anatolia Since the L Fault by Using Geodetic Methods.# S + nism. tern Crete from Digital Three - Com + tern Crete from Digital Three-Compo + eat Loss from the Earth & Interior: + Estimation of the Thickness of the ds.# Dispersion Curves for the Path + s for a Thin Viscous Sheet Model. # + of the Geothermal Systems in Weste onology and Petrology of Recent Vol + rphic Core Complex, Detachment Faul +
l Regime: a Review# Comparison of Y + (GPS) Estimates of Crustal Deforma + the Crustal Structure of Western nozoic Compressional and Extensiona + Continentale Recente in r Rotation in Opposite Senses of Ad + sic Metamorphic Basement Rocks of N + ary and Quaternary Volcanic Rocks f + nalyses of Fault Mechanisms and Exp + eservoirs by Means of Gradient Dril + ion: Subduction, Collision, and Arc + gon: Subduction, Collision, and Arc + rmation in the Collisional Belts: A + ments.# Active Crustal Deformation + ments.# Recent Crustal Deformation S Measurements# Recent Crustal defo + July 1967.# The Mudurnu Valley, Wes + s Massif: an incipient Metamorphic + s in Western in Southwestern st tern n of the Coastal Part of West nderes Massif Metamorphic Core Comp + on from Geophysical and Geological Y in the Light of New Geochemical a + into the Oblique Fault Zone of the + Large Earthquakes of the Period 19 ethods.# Strain Analysis Along the + city.# Rates of Crustal Deformation + e Pontides: Implications for Incomp + ce Parameters of Large Earthquakes th Aegean and North - Central Greec + an Refahiye.# Tectonic Investigatio + Valley, Western Turkey.# Geologica + 21 Plain, North Western Turkey.# La +

an Example of Collision Tectonics.# + an Extending Orogen.# Low - Angle N + an Extensional Shear Zone, Naxsos, + an incipient Metamorphic Core Compl + an Instance of Back-Arc Trust Belt: #An Interference Phenomenon in Ray; + #An Interference Phenomenon in Rayl #An Interpretation of Gravity Anoma an Investigation of Crustal Structu + an Oceanic Structure.# Toward Under an Origin by Combined Assimilation An Overview. # Active Normal Faultin + Anadolu Arz Kabuğunun Yapısı.# Grav + Anadolu da Yer Kabuğunun Yapısının + Anadolu daki Bazı Kireçtaşı fay Şev + Anadolu Depremlerinin Odak Mekanizm + Anadolu Fay Kuşağının Gerede - Çerk + Anadolu Fay Zonu nun Bati Uzantilar + Anadolu Fay Zonu nun Batı Uzantılar Anadolu Fay Zonunun Tektonik Özelli + Anadolu Fay Zonunun Tertorin + Anadolu Fayı (KAF) ile İlişkisinin + Anadolu Fayi (Levha Simiri) Uzantil Anadolu Fayı nın Sapanca-İzmit ve G + Anadolu Genişleme Merkezinin Paleom + Anadolu Jeoelektrik Harita Çalışmal + #Anadolu Kavağında Yapılan Taşocağı + Anadolu Neojen Magmatismasının Yapı + Anadolu nun Aktüel Tektoniği.# Batı + Anadolu nun Doğal Uzantısının Santa + Anadolu nun Doğal Uzanımı# Ege Deni + Anadolu nun Genç Tektoniğinin Jeomo + Anadolu nun Günevinin Neotektoniği + Anadolu nun Mikro Bloklarının Paleo + Anadolu nun Paleomagnetismas: ve 'Te + Anadolu nun Tektoniği ve Paleomagne + #Anadolu nun Tektonik Yapılarının D + Anadolu nun Yapısal Sorunlarının Gr + Anadolu Senozoik Volkanitlerine Ait + Anadolu ve Cıvarında Kabuk ve Üst M + Anadolu ve Yakın Çevresinin Deprems + Anadolu, Trakva ve Ege Adalarındaki + Anadolunun Aktüel Tektoniği.# Batı Anadolunun Genç Tektoniği ve Volkan + Analizi# Sismik Moment Tansör Ters + Analog Experiment for the Aegean to #Analyse Quantitative des Relations + #Analyse Theorique et Numerique d u + #Analyses of Fault Mechanisms and E + Analysis Along the North Anatolian + #Analysis of Earthquake Focal Mecha Analysis of Microearthquakes in Wes + Analysis of Microearthquakes in Wes + Analysis of the Global Data Set. # H + Analysis of the Gravity Anomalies# Analysis of the Rayleigh Wave Recor + Analytical and Approximate Solution + Anatolia# An Approach to Occurrence + Anatolia and Lesbos Island)# Geochr + Anatolia# Field Evidence for Metamo + Anatolia Formed under a Copressiona + Anatolia# Geology of Western Anatolia# Global Positioning System + Anatolia# Heat Flow, Seismicity and + Anatolia# Magmatic Activities of Ce + Anatolia Occidentale. # Deformazione + Anatolia# Paleomagnetic Evidence fo + Anatolia# Petrology of the Pre-Lias + Anatolia# Ree Distrubution in terti Anatolia Since the Late Miocene.# A + Anatolia# Tectonic Units of Anatolia Turkey. Determination of R + Anatolia, Eastern Mediterranean Reg + Anatolia, Eastern Mediterranean Rei + Anatolia, Eşençay Graben# Graben Fo + Anatolia, Inferred from GPS Measure + Anatolia, Inferred from GPS Measure + Anatolia, Inferred from Repeated GP Anatolia, Turkey, Earthquake of 22 + Anatolia, Turkey.# Southern Mendere + Anatolia.# Attenuation of Coda Wave + Anatolia.# Formation of the Grabens + Anatolia.# Heat Flow Map of Northwe + Anatolia. # Heat Flow Pattern of Wes + Anatolia.# Miocene Reference Sectio + Anatolia.# The Exhumation of the Me + Anatolia: Regional Stress Orientati Anatolian Area: A Petrological Stud + Anatolian Dextral Strike-Slip Fault + Anatolian Fault Associated with the Anatolian Fault by Using Geodetic M + Anatolian Fault Deduced from Seismi + Anatolian Fault# Neotectonics of th + Anatolian Fault Zone (Turkey) # Sour + Anatolian Fault Zone Across the Nor + Anatolian Fault Zone Between Erzinc + Anatolian Fault Zone in the Mudurnu + Anatolian Fault Zone in the Orhanga +

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ristic Features of the Anatolian Fault Zone# Some Characte + Anatolian Fault Zone.# Seismotecton + ic Aspects of the North Anatolian Fault Zone.# The Paléomag + netic Study of the North for Tectonics of the Eastern Medite + Anatolian Fault Zone: Implications onship Between the Sea of Marmara B Anatolian Fault.# Structural Relati + Anatolian Fault.# The North Deformation Patterns in the Convex-Anatolian Faulth Zone# Neotectonic onic Situation in the Anatolian-Aegean Region# Plate Tect + # Etude Geologique et Structural d + Anatolie) Entre Salihli et Alaşehir + aphisce Undersuchungen im Kanozoiku + Anatoliens (Türkei).# Lithostratigr # Makroseismische Untersuchungen Ü Anatolische Beben vom 18. Marz 1953 ezenniums.# Über die Tekronisch - M + Anatolischen Erdbeden des Letzten D + ırmaları ve Sonuçları. #Anaximander Dağları Jeofizik Araşt + ante Expedition (4-11 August 1995). #ANAXIPROBE 95 Report of the L Atal + e).# Recent Tectonic Along the Acti + Anchialos Fault Zane (Central Greec + e)# Recent Tectonics Along the Acti + Anchialos Fault Zone (Central Greec # Modern Flysch Sedimentation in a Ancient Geosynclinal Sedimentation. Deep Seismic Expression of an Ancient Plate Boundary in Europe.# rth Bolivia# Extensional-Compressio + Andean Cordilleria of South Peru-No odel of Continental deformation Abo Andes and the Aegean# A Continuum M + Model of Continental Deformation Ab + Andes and the Aegean.# A Continuum enic Andesites and Plate Tectonics# Orog Around the Pasific #Andesitic Volcanism and Seismicity Andreas Fault System, Southern Cali fornia.# Seismic Evidence for Conju + s, California.# San Andreas, Garlock and Big Pine Fault Angle (W. Taurids): A Mesozoic Pale orift.# Isparta Angle Normal Faulting: Tectonic Imp lications with Examples from Wester + d Range Province: Nappe Tectonics i + Angle Normal Faults in the Basin an 1 History of the Antalya Complex in Angle, Southwest Turkey, # Structura + line Volcanism and Active Tectonism + Angle, SW Turkey. # Relation of Alka tonics of the Eastern Mediterranean + tonics of the Eastern Mediterranean + Angle: Its Importance in the Neotec Angle: its Importance in the Neotec Kçira Section, Albania# Magnetobios + Anisian (Lower to Middle Triassic) Surface Wave Dispersion.# Crustal S + Anisotrophy in Turkey from Seismic f the Upper Mantle Beneath Southern + Anisotropy in Tomographic Studies o ca del R. Sommergible Vettor, Pisan + Anno, 1931.# La Croceira Gravimetri del R. Sommergible Des Ganevs. Anno, 1935. # La Crociera Gravimetra the Eastern Mediterranean# Gravity -Anomalies and Crustal Shortening in + cture in the Eastern Mediterranean Anomalies and Inferred Crustal Stru ess of the Sediments in the Aegean Anomalies# Estimation of the Thickn + ean Sea.# Gravity Anomalies in the Eastern Mediterran + ean.# An Interpretation of Gravity + e Regional Meaning of the Bouguer G + Anomalies in the Eastern Mediterran Anomalies in the Mediterranean. # Th + cations on the Crustal Structure# S ng First P - Arrival Times from Loc Anomalies of W Turkey and Its Impli Anomalies Under a Seismic Array anation?# Aegean Paleomagnetic Incl + Anomalies. Is There a Tectonic Expl Anomalileri# Doğu Akdeniz Bölgesi G ravite ev Anadolu Arz Kabuğunun Yapısı.# G + Anomalileri ve Sismolojive Göre Kuz as.# Bathymetry, Total Magnetic Int + Anomaly Mao of Ionian and Aegean Se Anomaly Map of Greece: A Recompilat ion.# The Gravity of Ionian and Aegean Seas.# Bathym -Anomaly, S, mple Bouguer Anomaly Mao ch, East Mediterranean.# Discovery he Geometry and rates of Microplate Anoxic Basin within the Stabro Tren + Anoxic Basins as Piercing Points# T e, Southwest Turkey.# Structural Hi Antalya Complex in the Isparta Angl 4 and K-Ar Data for the Age of the Antalya Complex, SW Turkey.# Fossil + e Clastic Sedimentation Related to + Antalya Complex, SW Turkey.# Miocen ic - Tertiary Tethyan, Continental Antalya Complex, Turkey as a Mesozo ics and Evolution of the Mesozoic - + # The Alakır Çay Unit, Antalya Complex. # Microplate Tecton + Antalva Complex: a Tectonic Enigma. + Antalya Nappes.# Discussion on the ean.# A Continuum Model of Continen + Aplication to the Andes and the Aeg Application to Central Greece# A Fo rmulation for Reliable Estimation o + ranean Region. # From Tectonic Recon + Application to the Alpine - Mediter Application to the Andes and the Ae gean# A Continuum Model of Continen + Application to the Tibetian Plateau .# Extension During Continental Con + ion System (GSI) # Middle East Tecto + Applications of Geographic Informat de Failles.# Analyse Theorique et Applique a I etude d une Population + tern Turkey: A Structural and Paleo + Approach# Crustal Deformatin in Wes ermal Systems in Western Anatolia# Approach to Occurrence of the Geoth + c Rocks of Western Turkey# An Approach to Origin of Young Volcani + Approach to Studying the Extending Aegean Crust# A First Coincident No + Rocks of Western Turkey.# An Approach to the Origin fo Volcanic Approach to the Origin of Young Vol Approach.# Tethian Evolution of Tur canic Rocks of Western Turkey.# An key: a Plate Tectonic scous Sheet Model. # Length Scales f + Approximate Solutions for a Thin Vi (on the Aegean Region of Turkey)# H Aquifer Systems of the Gediz Basin on Zone# Global Positioning System Arabia-Africa-Eurasia Plate Collisi Element Models# Tectonic Consequen + Arabian and Eurasian Plates: Finite + hic Image of the Upper Mantle in th Arabian Collision Zone. # A Tomograp + ru.# Aydın - Germecik - Bozköy Jeot Aramaları Rezistivite Etüdü Ön Rapo li - Buldan - Pamukkale Jeotermik E + Aramaları Rezistivite Etüdü.# Deniz + , Hidroloji ve Jeotermik Etüdüne Ai + Arası Gediz Nehri Güneyinin Jeoloji + Arasında Kalan Bölgenin (Menderes M + asifi) Metamorfizması Hakkında Ön S + enel Tektonik Durumu ile Başlıca De + Arasındaki İlişkiler# Türkiye nin G + Araştırmalar# Kuzey Anadolu Fayı ni + n Sapanca-Izmit ve Geyve-Iznik Koll + Araştırmaları ve Sonuçları.# Anaxim + ander Dağları Jeofizik Denizi ve Çevresindeki Mikro - Depr + Araştırmasının Sonuçları.# Marmara + Araştırılması# Ege Denizi ve Çevres + inin Gravite ve Manyetik Yöntemlerl + lgesinin Gravite ve Manyetik Yöntem Araştırılması# Ege Denizi ve Ege Bö + adisinde Kurulan Jeodezik Ağda Yata + Araştırılması.# Akyazı - dorukcan V + Araştırılması.# Batı Türkiye de Kab + uk ve Üst Manto Yapısının e Denizi Çıkışı Pliyo-Kuvaterner Ol + Araştırılması.# Çanakkale Boğazı Eg + Hellenic Arc, Greece.# GPS Evidence + Hellenic Arc, Southern Aegean Sea, + Arc - Parallel Extension Along the + Arc - Parallel Extension Along the + Arc# A Marine Geophysical Study of + the Hellenic Arc and Eastrn Mediterranean Ridge. + # Geophysical Features of the Greek + is# The Tectonic Development of the + Arc and the Sea of Crete: A Synthes +

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Neotectonic Evolution of the Easter + Neotectonic Evolution of the Easte + re of the Pliny and Strabo Trenches +

Arcs Convexes Taurique et Ege: Coll + Survey# The Strain Pattern in the W + A Dynamic Model of the Hellenic ne Normal-fault Scarps in the Helle + e, Epire, Greece).# Sismotectonique + et ses Relations Avec la Sismicite + ses Relations Avec la Seismicite.# + ux Taurides.# Esquisse Structurale + e la Grece Nord Occidentale Depuis +

issements Senestres Recents a I ext + om Mio-Pliocene Series of the Helle + t# Changes in the State of Stress i + Gravity# Crustal and Upper Mantle S + res of the Aegean

Kassos et Karpathos.# Structure et + ve des Relations Entre Deformation + esiduals Caused by a Dipping Plate + Taurique et les Arcs Convexes Tauri + Boundary of Anatolia, Eastern Medi + e Southern Boundary of Anatolia, Ea 1lenic

one# Neotectonic Deformation Patter + Earthquake Locations in the Wester + # Earthquake Locations in the Weste + eosynclinal Sedimentation.# Modern + c Evolution of the Hellenic # Evolution of

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de I Arc Egeen Externes: des Dinar + ue Plio-Quaternaire de I Arc Egeen Plio-Quaternaire de I arc Egeen Ex + lease Rates in the Patraikos-Saroni nın Dispersiyonunun Incelenmesi.# A r une Population de Failles.# Sur u ensional Tectonics Neogene and Quat 1 Enerji Aramaları Rezistivite Etüd eofizik Düşey Elektrik Sondaj (DES) + ney Kesimindeki Allokton Metamorfik + emlik Körfezi Yüksek Marmara Denizi Izmit Körfezi, Yükse + ean.# Seismic Stresses in the Regio + ravite Modellemesi. ta Büklümünün Kuzey Kesiminde D -1 Velocity in the Ionian and Aegean + apse# The Cause of N-S Extensional + ion with the Hellenids# The Balkani + Gediz Vadisi nde Genç Tektonik Ola Masifi Guney Kanadının Jeolojisi v + 1 Development of Neogene larına Genel bir tic Promotory as a Paleogeographic anism of the c Trust Belt: Possible Relation wit + ra Sea.# Active Fault Investigation + t, Naxos, Greece# Textural and Izot + al Margins and Island Arcs# Lateral + Basaltic Rocks# Origine of Primary + Basalt Magmas and Classification of namics in Turkey.# Space iles# Shallow structure and Recent 1 Data.# Average Regional Seismic S namic Evolution of Turkey and Cypru + ta on the Structure of the Sediment + ology of the Pre-Liassic Metamorphi + al Tectonics Neogene and Ouaternary + ey)# High Boron Content in the Agui + s and the Sedimentary Processes on + the Mediterranean Ridge Accreti + of Messiniakos, Argolikos, Saronikos a + ements from DSS Data.# Ionian tonics in an Extending Orogen.# Low + uring the Neotectonic Evolution of + .# Structural Relationship Between Belts: Alps, Carpathians and Dinari + eece: Palaeomagnetic Evidence from rranean olmography.# Preliminary Objective Gördes Basin: Tectonics and Sedimen + st Turkey.# Late Cenozoic Crustal E + te Cenozoic Crustal and c Escape: Turkey as a Case Study# S + # New Data on the Structure of the + Gravity Induced Deformation on the + ctonic Evolution of the Menderes Ma + ean t Mediterranean.# Discovery of an A + logical and Isotopic Age Data from erranean # Late Cenozoic Basin Development i + he Eastern Mediterranean as a Case in the Ionian and Aegean Regions# B + etry and rates of Microplate Motion + ional Tectonic Regimes in the Aegea + n Sea Central and Southern Adriatic Sea# Sea (Pasiphae Cruise) # Two-Ship De + Sea (Pasiphae Cruise).# Two - Ship + Submarine geology and Geophysics an + of the Taurides: One or Several Oce + of the Mediterranean Sea. # A New f the Pliny and Strabo Trenches, So + anean Sea. ty, Free-air Gravity Anomaly, S,mpl + unm Incelenmesi.# Sentetik Sismogr 4 ay Şevlerinin Paleosismik Yöntemler kanizmaları ve Bunların Aktif Tekto + Paleomagnetic Göstergesi. lısmaları ve Örnekler. n Yapısal ve Petrografik Ögeleri Jeomorfolojik Sonucları Paleomagnetizması ve Genç Tektonik + ve Tektonik Gelişimi. nın Gravite Verileri ile Irdelenmes + ne Ait Yeni Kimyasal, Izotopik ve R + ındaki Senozoyik Volkanizması Volkanizması Yapısının Araştırılması. un Yapısı.# Yapay Sismogram Modelle + ey Anadolu Fay Zonu nun

aux Taurides.# Esquisse Structurale + Avec la Seismicite. # La Neotectonig + Avec la Sismicite# La Neotectonique + #Average Regional Seismic Strain Re + Avrupa ve Afrika da Yüzey Dalgaları + Axes Principaux des Contraintes Pou + Axios Basin (Northern Greece).# Ext + #Aydın - Germecik - Bozköy Jeoterma + #Aydın - İmamkçy Jeotermal Alanın J + #Aydın Dağları (Menderes Masifi) Gü + Ayrımlı Sığ Sismik Etüdü Raporu.# G + Ayırımlı Sığ Sismik Etüdü Raporu.# + Azores - Spain - Western Mediterran + #Aşağı Meriç ve Enez Deltalarının G + B Daralma için bazı Veriler.# Ispar + #Back Arcs Basins and P-wave Crusta + Back-Arc Spreading VS Orogenic Coll + Back-Arc Trust Belt: Possible Relat + Backarc Basins# Mediterranean Bağlı Jeotermal enerii Olanakları,# + #Bafa Gölü Doğusunda Kalan Menderes + Bains in Western Greece.# Structura + Bakış.# Türkiye Aeromagnetik Harita + Balkan Region. # The African - Adria + Balkan Reigon. # The Earthquake Mech + Balkanids as an Instance of Back-Ar + Bandırma Bay and Erdek Bay of Marma + Barrovian-Style M2 Metamorphic Even + Basalt# High Alumina Basalt Magma Types Across Continent + Basalt Magmas and Classification of Basaltic Rocks# Origine of Primary Based geodetic Activities for Geody Based on Continuous Reflection Prof Based on Historical and Instrumenta + based on Palaeomagnetic Data# Geody + Basement in the Levant Sea.# New Da Basement Rocks of NW Anatolia# Petr Basin (Northern Greece).# Extension + Basin (on the Aegean Region of Turk Basin (the Aegean Sea) # Neotectonic + Basin Accelerate the rate of Growth + Basin Across the Hellenic Arc: the Basin and Calabria Arc: Some New El Basin and Range Province: Nappe Tec Basin and RIft Basin Sdevelopment D + Basin and the North Anatolian Fault + Basin and the Surrounding Mountain Basin Closure in Eastern Central Gr Basin# Deep Structure of the Medite Basin Derived from Surface - Wave T Basin Development in Weste Turkey, Basin Formation and Volcanism in We Basin Formation in West Turkey.# La Basin Formation in Zones of Tectoni Basin from Seismic Reflection Data. Basin off the North Aegean Trough.# Basin Sdevelopment During the Neote Basin# Seismicity of the Mediterran + Basin within the Stabro Trench, Eas Basin, West Turkey.# Neogene Palyno Basin. # Deep Structure of the Medit Basin: Tectonics and Sedimentation. Basins and Continental Collision: t Basins and P-wave Crustal Velocity Basins as Piercing Points# The Geom Basins During the Cenozoic.# Extens + Basins# Geology of the Mediterranea + Basins in Italy: Examples from the Basins# Mediterranean Backarc Basins of the Eastern Mediterranean Basins of the Eastern Mediterranean + Basins of the Mediterranean Sea in + Basins?# The Mesozoic Organization Bathymetric Chart and Physiography #Bathymetry and Shallow Structure o + #Bathymetry of the Eastern Mediterr + #Bathymetry, Total Magnetic Intensi + Batı Anadolu da Yer Kabuğunun Yapıs + #Bat: Anadolu daki Baz: Kireçtaş: f #Bat: Anadolu Depremlerinin Odak Me + #Bati Anadolu Genişleme Merkezinin + #Bat: Anadolu Jecelektrik Harita Ça + #Bati Anadolu Neojen Magmatismasini + #Batı Anadolu nun Aktüel Tektoniği. + #Bat: Anadolu nun Genç Tektoniğinin + #Bati Anadolu nun Mikro Bloklarının + #Bat: Anadolu nun Paleomagnetismas: + #Bat: Anadolu nun Yapısal Sorunlar: + #Bati Anadolu Senozoik Volkanitleri + #Bat: Anadolu, Trakya ve Ege Adalar + #Bati Anadolunun Aktüel Tektoniği. #Bat: Anadolunun Genç Tektoniği ve #Bat! Türkiye de Kabuk ve Üst Manto + Batı Türkiye de Kabuk ve Üst Manton + Batı Uzantılarının Incelenmesi# Kuz + zey Anadolu Fay Zonu nun Batı Uzantılarının İncelenmesi.# Ku +

Aubouin, J.+ 1976 Mercier, J. L.+ 1976 Mercier, J. L.+ 1977 Papazachos, B. C.+ 1990 Canitez, N. 1975 Angelier. J.+ 1979 Brooks, M.+ 1982 Sahin, H.+ 1981 Yücel. M. 1995 Candan 0 + 1992 Kurtulus, C. 1985 Özhan, G.+ 1985 Udias, A. 1980 Demirel, S.+ 1998 Boray, A.+ 1985 Alessandrini, B.+ 1997 Seyitoğlu, G.+ 1996 Boccaletti, M.+ 1974 Horvath. F + 1982 Karamanderesi, I. H.+ 1982 Başarır, E. 1970 Brooks, M.+ 1988 Aydın, I.+ 1995 Channell, J. E. T.+ 1976 Ritsema, A. R. 1974 Boccaletti, M.+ 1974 Kavukcu, S. 1990 Baker, J.+ 1994 Kuno, H. 1960 1966 Kuno, H. Kushiro, I.+ 1963 Kushiro, I.+ 1963 Lenk, O. 1995 Mascle, J.+ 1990 Papazachos, B. C.+ 1990 Lauer. J. P. 1984 Moskalenko, V. N. 1966 Genç, Ş. C. 1995 Brooks, M.+ 1982 Filiz, Ş.+ 1995 Roslyakov, A. G.+ 1997 Kastens, K. 1990 Papanikolaou, D. J.+ 1988 Ferrucci, F.+ Wernicke, B. 1991 1981 Sözbilir, H.+ 1996 Ergün, M.+ 1995 Horvath, F. 1984 Morris, A. 1995 Caputo, R.+ 1970 Martinez, M. D.+ 1997 Seyitoğlu, G.+ 1994 1992 Sevitoğlu, G. Seyitoğlu, G.+ 1991 Şengör, A. M. C.+ 1985 Sancho, J.+ 1973 Ferentinos, G.+ 1981 Sözbilir, H.+ 1996 1985 Udias, A. Jongsma, D.+ 1983 Sevitoğlu, G.+ 1994 Caputo, M.+ 1970 Seyitoğlu, G.+ 1994 Le Pichon, X. 1982 Alessandrini, B.+ 1997 Jongsma, D. 1987 Mercier, J. L.+ 1989 Biju-Duval, B.+ 1974 De Alteriis, G. 1995 1982 Horvath, F.+ De Voogd, B.+ 1992 Vooad 1992 Hersev, J. B. 1965 1984 Ricou, L. E.+ Carter, G. T.+ 1972 Jongsma, D. 1977 Emery, K. O.+ 1966 1970 Allan, T. D.+ Horasan, G. A.+ 1995 Barka, A. A.+ 1997 1978 Alptekin, Ö. 1998 Orbay, N.+ Şardar, S. 1995 1982 Savascin, M. Y. Kocaefe, S. S.+ 1982 1982 Erol, O. 1995 Orbay, N.+ Orbay, N.+ 1993 Akçığ, Z. 1988 1985 Ercan, T.+ 1979 Ercan, T. 1976 Kocaefe, S.+ 1982 Ercan, T. Kalafat, D.+ 1987 1998 Horasan, G. A.+ 1986 Kıyak, Ü. Kıyak, Ü. 1986

Alkan, G. 1979 Candan, 0.+ 1989 Koçyiğit, A. 1990 Trikkalinos, T. K. 1947 Trikkalinos, T. K. 1947 Kavukcu, S. 1990 Kavukçu, S. 1990 Kavukçu, S. 1990 Elbek, Y. 1952 Barka A A + 1997 Akdoğan, N. 1995 Boray, A.+ 1985 Ketin, I. 1969 Ketin, 1.+ 1953 Westaway, R.+ 1993 Trikkalinos. T. K. 1947 Kaaden, G.+ 1978 Osmansahin. I 1989 Avigad, D.+ 1989 Zielhuis, A. 1992 Spakman, W. 1991 Blanco, M. J.+ 1993 Blanco, M. J.+ 1993 Avigad D + 1001 Avigad. D.+ 1989 Jackson, J.+ 1984 Kissel, C.+ 1993 Dercourt, J.+ 1986 Poisson, A. 1990 Wijbrans, J. R.+ 1988 Royden, L.+ 1989 Papazachos, B. C.+ 1996 Avigad, D. 1993 Spakman, W. 1989 Boccaletti, M.+ 1974 1978 Dürr, S.+ McKenzie, D. P. 1978 McKenzie, D. P. 1978 Horvath, F. 1984 Ersoy, Ş. 1995 Paraskevopoulos, G. M. 1956 Christodoulou, A.+ 1988 Hearn, T. M.+ Spakman, W. 1994 1986 Spakman, W. 1986 Drakatos, G 1989 Hovland, J.+ 1981 Plomerova, J. 1997 Tavmaz, T. 1996 Hashida, R.+ 1988 Delibasis, N. D. 1982 Spakman, W. 1989 Drakatos, G.+ 1991 Drakatos, G.+ 1991 Hatzfeld, D.+ 1989 Widiyantoro, S.+ 1996 Babuska, V.+ 1987 Hatzidimitriou, P.+ 1992 1980 Chen, C. Y.+ Canitez, N.+ 1980 Romanowicz, B. A. 1980 Richter, I.+ 1982 Ambraseys, N. N.+ 1990 Ambraseys, N. N.+ 1990 1978 Tatar, Y. 1968 Ketin, I. Cağlar, I. 1995 Savaşçın, M. Y.+ 1990 1988 Jackson, J.+ McKenzie, D. P.+ 1983 Rybach, L.+ 1982 1995 Ermin, M.+ 1984 Jackson, J.+ Ricou, L. E.+ Monod, O. 1979 1977 1986 Yoğurtçuoğlu, A. Hill, M. L.+ Okay, A. I.+ 1953 1991 1990 Ertürk, 0.+ 1977 Ergün, M. Benda, L.+ 1979 1990 Benda, L.+ 1977 Becker-Platen, D.+ Aydın, I.+ 1995 1981 Yılmaz, Y. 1981 Yilmaz, Y. Kaya, O. 1982 Barka, A. A. 1991 1981 Yilmaz, Y. Öztürk, A.+ 1983 1975 Başarır, E. 1992 Candan, 0.+ Yoğurtçuoğlu, A. 1986 1970 Erickson, A. J. Gürbüz, C.+ 1980 Westaway, R. 1990 1993 Westaway, R.+

#Batı ve Güneybatı Türkiye nin Depr + Batışında Paleo-Melanj Kuşağının Va Batısındaki (KD Türkiye) Yapısal 11 + Bau der Insel Naxos# Beitrage zur E Baues Griechenlands. II. Uber den T + Bay and Erdek Bay of Marmara Sea.# Bay of Marmara Sea.# Active Fault I + Bay, Bandırma Bay and Erdek Bay of Baz Cazibe Şebekesi (4 Pandüllü Ste + Bazı Kireçtaşı fay Şevlerinin Paleo + Bazı Sonuçlar.# Türkiye Gravite Çal + bazı Veriler.# Isparta Büklümünün K + Başlıca Deprem Bölgeleri Arasındaki + Beben vom 18. Marz 1953.# Makroseis + Bed Rotation During Continental Ext + #Beitrage zur Erforschung des Tekto #Beitrage zur Gelogie des Raumnes Z + Belirlenmesi.# Yüzey Dalgası Ortam + Below a Blueshist Belt - Tinos Isla + Below Europe from Delay - Time and + Below Europe, the Mediterranean, an + Below Southern Spain.# The P - Wave Below the Iberian Peninsula: Eviden + Belt (Aegean Sea).# Uplift and Exhu + Belt - Tinos Island, Cyclades, Gree + Belt Between Western Turkey and Pak + Belt East of the Isparta Reentrant Belt from the Atlantic to the Pamir + Belt in Western Taurides. The Imbri + Belt on Naxos (Cyclades, Greece) Ut + Belt Style Related to Plate Boundar Belt.# Long-term Earthquake Predict Belt.# Tectonic Juxtaposition of Bl Belt.# Tomographic Mapping of the U + Belt: Possible Relation with the He Belt: Stratigraphy, Structure, Meta + Belt: the Aegean Sea and Surroundin + Belt: the Aegean Sea and Surroundin 4 Belts: Alps, Carpathians and Dinari Belts: An Example from SW Anatolia. benachbarten Gebieten# Über den Che Beneath Calkidiki (North Greece).# Beneath Continental Collision Zones Beneath Eurasia in Connection with Beneath Eurasia in Connection with beneath Greece and Surrounding Regi Beneath Southeastern Europe.# Three Beneath Southern Europe. # Seismic A Beneath the Aegean and the Hellenic + Beneath the Aegean Region and its T Beneath the Aegean.# Seismic Wave A beneath the Alpine Collision Belt.# + Beneath the Crust and Upper and Man + Beneath the Crust and Upper Mantle Beneath the Pelopopnesus: First Res + Beneath the Sunda Arc, Indonesia.# Beneath the Territory of Bulgaria.# + Beneath Thessaloniki.# Seismotecton + Beneath Turkey and Iran.# The Upper + Beneath Turkey. # Crustal Structure Beneath Western Europe.# A Study of + #Benioff Zones of the Aegean Arc Between 1890 and 1988# Seismicity a + Between 1890-1988. # Seismicity and Between Erzincan Refahiye.# Tectoni + Between General Tectonic Features a + between Geothermal Parameters in th + Between Magmatics and Tectonic Acti Between Plate Motions and Seismic M + Between Strain Rates, Crustal Thick + between the Petrophysical Propertie Between the Sea of Marmara Basin an + Between Western Turkey and Pakistan + Bey Gağlar: Orientaux, Reconstructi + Beyşehir (Turque).# Recherches Geol + Biçim Değişimi.# Deprem Odak Mekani + Big Pine Faults, California.# San A Biga Peninsula, Northwest Yurkey.# Biga Peninsula, NW Turkey# Petrolog Biga Peninsula.# Magnetic Studies i #Biostratigraphic Correlations in t + #Biostratigraphic Correlations in t + Biostratigraphische Deutung Radiome + bir Bakış.# Türkiye Aeromagnetik Ha + Bir Kıta Kenarına Dönüşümüne Türkiy + Bir Kıta Kenarmın Pasifik Tip Bir Bir Mekanizma# Tersiyer Sirt Yitmes + bir Mikro - Bölgelendirme Denemesi. + Bir Örnek# Atlantik Tip Bir Kıta Ke + Bir Yaklaşım (Selimiye-Muğla)# Mend + Bireysel Index Minerallerinin Doku Birimler# Aydır Dağları (Menderes M + Birimlerinin Biçim Değişimi.# Depre + Black Sea.# The Measurement and Int + Blasts Aroud Adapazarı Region.# Pre + #Block Rotation in Western Turkey, Block Rotation of Vertical Shear?#

emselliği.

rlığı# Menderes masifi nin işkileri: Karakaya, lç Toros ve Erz + rforschung des Tektonischen Baues G + ektonischen Bau der Insel Naxos# Be + Active Fault Investigation in Izmit + nvestigation in Izmit Bay, Bandırma + Marmara Sea.# Active Fault Investig + rneck Cihaziyle).# Türkiye sismik Yöntemlerle Yaşlandırılması# +

ışmaları ve uzey Kesiminde D - B Daralma için

llişkiler# Türkiye nin Genel Tekto + mische Untersuchungen Über das Nord + ension: Block Rotation of Vertical + nischen Baues Griechenlands. II. Ub + wischen Datca-Mugla-Dalaman Cay

Tepki Fonksiyonlarından Yararlanara + nd, Cyclades, Greece.# Low-angle Fa + Waveform Inversion.# S - Wave d Asia Minor# Delay-Time Tomography +

Velocity Structure of the Mantle B + ce for Subducted Lithosphere Below + mation of High-pressure Metamorphic ce.# Low-angle Faults Above and Bel + istan# Active Tectonics of the Alpi (Southwestern Turkey)# First Paleom + s since the Lias. # Geological Evolu + cate Systems of Thrust Sheets Along ilizing 40Ar/39Ar Age Spectrum Meas + y Processes?# Are Systematic Variat + ion in the Circum-Pacific Convergen ueschists and Greenschist in Sifnos + pper Mantle Structure beneath the A + llenids# The Balkanids as an Instan morphism, Magmatism.# The Median Ae + g Regions (Tectonics of Aegean Regi + g Regions# Active Tectonics of the des.# Neotectonics of the Pannonian + Esencay Graben# Graben Formation i + mismus und die provinzialen Verhalt Inversion of the Crustal and Upper : the Turkish - Iranian Plateau.# P +

the Mesozoic Tethys# Subduction the Mesozoic Tethys.# Subduction ons.# Seismic Tomography - Determin + - Dimensional Seismic Velocity Ima + nisotropy in Tomographic Studies of + Trench near Crete# S-P-Wave Travel + ectonic Implication.# Three Dimensi + ttenuation in the Upper Mantle Tomographic Mapping of the Upper M + tle of Aegean Sea Region# 3-D Veloc + of Aegean Sea Region.# 3-D Velocit + ult of a Microearthquake Study# The +

The Slab of Subducted Lithosphere Deep Structure of the Lithosphere + ic Evidence of an Active Normal Fau + most Mantle P Wave Velocities

Large - Scale Lateral Variations o +

nd Assiciated Strain af Central Gre + Associated Strain of Central Greece + c Investigation on the North Anatol + nd the Main Earthquake regions of T e Earth.# The Electrical Conductivi + vities in Western Turkey# Relations + oment Tensors, and the Rates of Act + ening, Paleomagnetism, Finite Strai + s, Density, Seismic Velocities, Hea + d the North Anatolian Fault.# Struc + # Active Tectonics of the Alpine Hi + on Palinipastique des Taurides Occi + ogiques dans de la Taurus Occidenta + zması Çözümleri Açısından Türkiye T + ndreas, Garlock and Geology and Tectonic Evolution of t + y of the Cenozoic Volcanics in the

n Cyprus and he Eastern Mediterranean Neogene. 5 + he Eastern Mediterranean Neogene. S +

trischer Altersbestimmungen aus dem + ritalarına Genel e den Bir Örnek# Atlantik Tip Bir K +

Kıta Kenarına Dönüşümüne Türkiye de + i: Doğu Ege Bölgelerinin Yapısı ve + # İstanbul un Depremselliğini Oluşt +

narmın Pasifik Tip Bir Kıta Kenarı + eres Grubu Kayaların Temel-Örtü Ili + İçerisindeki Gelişimleri# Çine Güne + asifi) Güney Kesimindeki Allokton M + m Odak Mekanizması Çözümleri Açısm + erpretation of Heat Flow in the Med +

view Results about Query 1, Observational Evidence.

Fault and Bed Rotation During Conti +

stern Anatolia# Paleomagnetic Evide + nc Tektonik Evrimi.# Bati Anadolu n + si, Bursa Güneyi.# Jura Öncesi ft and Exhumation of High-pressure ition of Blueschists and Greenschis he Aegean Island of Syros# The Sign ago, Greece, a review.# Eclogites A os Island (Aegean Sea) - Implicatio + ades, Greece.# Low-angle Faults Abo +), Greece.# Cooling During the Exhu + lojik Harita Hakkında Rapor the Lithosphere - Asthenosphere Sys terner Oluşuklarının Sismik Yönteml ne Düşünceler.# Çanakkale n Depremselliğini Oluşturan Tektoni 4 kiye nin Genel Tektonik Durumu ile Icin Olasılı Bir Mekanizma# Tersiy izması Hakkında Ön Sonuçlar# Ödemiş gnetik Verilerle Incelenmesi.# Ege Üzerine Düşünceler# Ege kdeniz Uygulanması,# İki Boyutlu Alçak Ge + Yapısı.# Ege if Tektonikle Hiskisi# Marmara Boyutlu Modellenmesi# Ege inin Petrolojisi ve Plaka Tektoniği nin Saptanması.# Edremit - Susurluk + emlerle Araştırılması# Ege Denizi v + n Detay Jeoloji Etüdü.# Alaşehir - + Boyutlu Modellenmesi.# Ege ros Körfezi Tectonics Associated with the Aegea + Jeodezik Yöntemlerle Incelenmesi # s of the Gediz Basin (on the Aegean nean Sea.# Speculations Concerning # New Data on the tion and Location of Earthquakes in + egean Seas.# Bathymetry, Total Magn diterranean. # The Regional Meaning 1 Collusion# Evolution of Retreatin Slab Pull at Continental Convergen sms of Large Earthquakes# Regional he Western Hellenic Arc Relative to me.# The Sea of Marmara: A Plate xpression of an Ancient Plate erranean Region: Subduction, Collis + erranean Reigon: Subduction, Collis em of Core-Mantle Variations in Thrust Belt Style Re +).# Magnetostratigraphy of a Lowerparison of Short and Long Term Defo the Western Hellenic Arc Relative t üzenlenmesi ve Ege Bölgesi Havadan in Sismik Tomografi ile Üç in Sismik Tomografi ile Üç ezistivite Etüdü Ön Raporu.# Aydın meti I 30 Nendorit 1967 dthe ocity Models from Ravleigh-wave Dis + ralma için bazı Veriler.# Isparta Aramaları Rezistivite Etüdü.# Deni + enizli, Sarayköy thosphere Beneath the Territory of Aegean Extensional Regime# Late Cen arı.# Gediz Vadisi nde Genç Tektoni eri.# Batı Anadolu Depremlerinin Od llanılması# Menderes Masifinde Alka Surface Wave Dispersion and Upper C ey: a Synthesis of Seismological an + ortul Kayalarm Stratigrafisi, tectonics of the eğlisi (Tekirdağ) Kıyı Kesiminin De + and its Tectonic Implications# The + trik Yapısı. tolia# Field Evidence for Metamorph + lles et Synthese# Les activities ma + m DSS Data. # Ionian Basin and # Evolving Miogeanticlines of the) Using the Global Positioning Syst ini and Milos, Aegean Sea, Greece.# ons, Marine Microfossils and Mammal + nd Big Pine Faults, onjugate Slip and Block Rotation wi + of the Crustal and Upper Mantle S Volkanik Kayaçlar Üzerinde Yapılan ay Haritası ve Aktif Tektonikle Ilg + ive Gravite olu Jecelektrik Harita a Denizi Sismik Yansıma Profili GPS Project Marmara: Report of Seco + , and the Sea - Floor Spreading The + Pliyo-Kuvaterner Oluşuklarının Sis + uşumu Üzerine Düşünceler.

as Fault System, Southern Californi +

Block Rotation within the San Andre + Blocks in Northeastern Aegea and We + Bloklarının Paleomagnetizması ve Ge + Bloklu Tortul Kayalarm Stratigrafi + Blueschist Belt (Aegean Sea).# Upli Blueschist Belt. # Tectonic Juxtapos Blueschist facies Metamorphism on t Blueschist in the Cyclades Archipel Blueschists# Alpine-Himalayan Blueschists and Greenschist in Sifn + Blueshist Belt - Tinos Island, Cycl + Blueshist Terrane: Sifnos (Cyclades + #Bodrum-Muğla Yöresinde Yapılan Jeo + Body Waves. # The Gross Features of Boğazı Ege Denizi Çıkışı Pliyo-Kuva + Boğazı Kuzeydoğusunun Oluşumu Üzeri + Bölgelendirme Denemesi, # Istanbul u Bölgeleri Arasındaki İlişkiler# Tür + Bölgelerinin Yapısı ve Magmatikliği + Bölgenin (Menderes Masifi) Metamorf + Bölgesi Genişleme Rejiminin Paleoma + Bölgesi Graben Sisteminin Gelişimi Bölgesi Gravite Anomalileri# Doğu A Bölgesi Gravite Verileri.# Marmara Bölgesi Havadan Manyetik Haritasına Bölgesi nde Yerkabuğunun Jeotermik Bölgesi nin Deprem Etkinliği ve Akt Bölgesi nin Sismik Tomografi ile Üç Bölgesindeki Yeri# Usak Volkanitler Bölgesinin Curie Nokta Derinlikleri Bölgesinin Depremselliği# Göller Bölgesinin Gravite ve Manvetik Yönt + Bölgesinin Jeotermik Enerji Yönünde + Bölgesinin Sismik Tomografi ile Üc + Bölgesinin Tektoniği ve Yapısı # Sa + Bolivia# Extensional-Compressional Bölümünde Yerkabuğu Hareketlerinin Boron Content in the Aquifer System + Bottom Circulation in the Mediterra Bottom Relief of the Mediterranean. Bottom Seismograph Stations, # Detec + Bouguer Anomaly Mao of Ionian and A Bouquer Gravity Anomalies in the Me Boundaries Formed During Continenta + Boundaries# The Tectonic Expression Boundary Derived from Focal Mechani Boundary# Earthquake Locations in t Boundary in an Escape tectonic Regi Boundary in Europe. # Deep Seismic E + Boundary of Anatolia, Eastern Medit + Boundary of Anatolia, Eastern Medit Boundary of Menderes Massif.# Probl Boundary Processes?# Are Systematic Boundary Section from Chios (Greece Boundary Through New Zealand: a Com -Boundary.# Earthquake Locations in Boyutlu Alçak Geçişli Filtrelerin D Boyutlu Modellenmesi# Ege Bölgesi n + Boyutlu Modellenmesi.# Ege Bölgesin + Bozköy Jeotermal Enerji Aramalar: R + Brezi Sizmogien Vlore - Diber. # Ter + Broader Aegean Area# Shear-wave Vel Büklümünün Kuzey Kesiminde D - B Da Buldan - Pamukkale Jeotermik Enerji + Buldan Area.# Geothermal Model of ָ ה Bulgaria.# Deep Structure of the Li Bulgaria: the Northern Part of the Buna Bağlı Jeotermal enerji Olanakl + Bunlarm Aktif Tektonik ile İlişkil + Bunların Petrojenetik Yorumlarda Ku Burdur Depremi.# 12 Mayıs 1971 Burdur Earthquake of 12 May 1971.# Burdur Earthquake Sequence, SW Turk + Bursa Güneyi.# Jura Öncesi Bloklu T Bursa Region# Seismicity and Seismo + Büyük Çekmece (Istanbul)-Marmara Er + Büyük Menderes Graben (West Turkey) #Büyük Menderes Grabeni nin Jeoelek + Büyük Menderes Grabens, Western Ana cadres geodynamiques. Donnees nouve Calabria Arc: Some New Elements fro + Calabrian and Cyprus Outher Ridges) Calabrian Arc Tectonics (WHAT A CAT Calc - Alkaline Volcanism on Santor + Calibration of Sporomorph Associati California.# San Andreas, Garlock a California.# Seismic Evidence for C Calkidiki (North Greece).# Inversio Calisma Sonuçları.# Trakya da Genç Çalışmalara Katkısı# Türkiye Diri F + Çalışmaları ve Bazı Sonuçlar. # Türk + Calısmaları ve Örnekler.# Batı Anad + Çalışmalarının Ön Sonuçlar.# Marmar + Campaign August / September 1992.# Canadian Cordillera, the Hellenides + #Çanakkale Boğazı Ege Denizi Çıkışı + #Çanakkale Boğazı Kuzeydoğusunun Ol +

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Çanakkale Tuzla Area.# Geophysical Canyons and the 1908 Messina Turbid + Carbonates# Rotational Deformation Carde Geodynamique de I Arc Egeen.# Carpathian Orocline as an Example o Carpathians and Dinarides.# Neotect Carpatho - Balkan Region. # The Afri Carte Geologique de la Turquie, -Fa Case Example# Land-Locked Oceanic B Case Hidtory.# Stratigraphic Contri Case of Melos Island# Paleomagnetic Case Study# Strike-Slip faulting an CAT) Using the Global Positioning S + Catalogue for Turkey and Surroundin Catalogue for Turkey for the Interv Catalogue of Focal Mechanism Diagra + Catalogue of Heat Flow Density Data Catalogue of Seismicity in Greece a Catalogue of Shocks with Io>VI or M + Caucasus and the Hindu - Kush Regio Cause of N-S Extensional Tectonics Caused by a Dipping Plate in the Ae + Cay# Beitrage zur Gelogie des Raumn Çay Unit, Antalya Complex: a Tecton Cazibe Şebekesi (4 Pandüllü Sternec Çekim (Cazibe) Şiddeti Ölçmeleri (4 Çekirdek Örtü Ilişkisi.# Menderes M + . Çekirge Thermal Water System# Hydra + Çekmece (İstanbul)-Marmara Ereğlisi Cenosoic Petrographic Provinces of Cenozoic Basin Development in Weste Cenozoic Clockwise Rotation of the Cenozoic Compressional and Extensio Cenozoic Crustal and Basin Formatio Cenozoic Crustal Extension, Basin F + Cenozoic Deformation of the Helleni + Cenozoic Evolution of the Aegean# Q + Cenozoic extension in Northeastern Cenozoic Extension of Western North Cenozoic Extensional Detachment on Cenozoic Extensional Tectonics in W + Cenozoic Extention in Bulgaria: the -Cenozoic Rotations Along the North Cenozoic Volcanic Evolution of the Cenozoic Volcanics in the Biga Peni Cenozoic.# Extensional Tectonic Reg + Central - Easten Mediterranean Area Central Aegean (Cyclades and Evvia Central Aegean Region# Neogene Volc Central Aegean Region. # Neogene Vol Central Aegean Sea. # Active Tectoni Central Aleutian Subduction Zone Us + Central and Eastern Mediterranean I + Central and Southern Adriatic Sea# Central and Southern Levant Contine Central and Western Anatolia# Ree D Central Greece# A Formulation for R Central Greece and Western Turkey.# Central Greece Between 1890 and 198 Central Greece Between 1890-1988.# Central Greece from 1900 to 1988# G Central Greece from Inversion of Tr + Central Greece With Respect Europe: Central Greece).# Spreading and Emp + Central Greece, # GPS Evidence for W Central Greece: An Overview.# Activ + Central Greece: Palaeomagnetic Evid + Central macedonia Area, N.Greece.# Central Mediterranean Region: Const central Mediterranean.# Structure, Central North Aegean Trough: an Act Central-Eastern Mediterranean Regio + Cephalonia Island Earthquake Sequen + Çerkeş Bölümünde Yerkabuğu Hareketl Çevresi Depremlerinin Odak Mekanizm Çevresi Depremlerinin Odak Mekanizm + Cevresindeki Mikro - Deprem Araştır Cevresinin Depremselliği ve Aktif T + Çevresinin Depremselliği.# Akkuyu N + Çevresinin Gravite ve Manyetik Yönt Cevresinin Jeolojisi ve Yapısal Öze + Cevresinin Tarihsel Deprem Kataloğu + Çeşme-Seferihisar Area, İzmir (W-Tu Chain Associated with the Hellenic Chalkidiki (Northern Greece).# Pale Chalkidiki Areas (Northern Greece) Challanger in the Atlantic, Pasific Changes# High-resolution Seismic Pr #Changes in the State of Stress in #Characteristic and tectonic Settin + Characteristic Features of the Anat + Characteristics of Thermal Waters f + Characterization of Aegean Magmatis + Characterstics of Short-period Sn a Charcot Cruise. # North Aegean Sea T + Charot. Description, Evaluation and + Chart and Physiography of the Medit +

Survey of ity Current.# Ionian Sea Submarine During Palaeogene Thrusting and Bas L Evolution Structure de la Grece f Collision Tectonics.# Eastern Eur onics of the Pannonian Basin and th can - Adriatic Promotory as a Paleo ille 'Izmir'# Notes Explicatives de asins and Continental Collision: th butions to Geodynamics in the Medit and Neotectonic Evidence for Diffe d related Basin Formation in Zones ystem# Monitoring West Hellenic Arc + g Area, 1881 - 1980.# Earthquake al 1913-1970.# An Earthquake ms for Turkey and Adjoining Areas# : Turkey.# Geothermal Atlas of Euro nd Adjacent Area.# A >5 for the Yars 1801-1958.# Greece: + ns # Focal Mechanisms of Earthquake in Western Turkey: Tectonic Escape gean Arc in Greece# P-wave Travel T + es Zwischen Datca-Mugla-Dalaman ic Enigma.# The Alakır k Cihaziyle).# Türkiye Baz Pandüllü Sterneck Cihaziyle).# Div + asifinin Kuzey Kanadının Stratigraf ulic Level Variations in a Thermal (Tekirdağ) Kıvı Kesiminin Deniz Je Japan and Surrounding Areas# Origin Turkey, Gördes Basin: Tectonics an External Albanides# Paleomagnetic E nal Tectonic Regimes in Western Ana n in West Turkey.# Late ormation and Volcanism in West Turk + de Foreland, Western Greece.# Late uaternary Evolution of the Corinth greece: Strymon Valley Detachment S American Cordillera.# A Physical M Naxos and Paros (Cyclades Islands, est Turkey, # Timing of Northern Part of the Aegean Extens + Aegean Trough Fault Zone (Greece); + Northeastern Aegean Region# Late nsula, NW Turkey# Petrology of the imes in the Aegean Basins During th + .# The Lithosphere in the Island)# Crustal-Scale Geometry and + anism of the Northern and canism of the Northern and cs of the North and ing Island and Ocean Bottom Seismog nferred from Satellite Laser Rangin Different Foreland Basins in Italy: ntal Margin # The Deep Structure of istrubution in tertiary and Ouatern eliable Estimation of Active Crusta Active Normal Faulting in 8# Seismicity and Assiciated Strain + Seismicity and Associated Strain of + eodetic Determination of Tectonic D avel Times, # 3-Dimensional Velocity Implications for Eastern Mediterra lacement Ages of some Ophiolites in estward Continuation of Dextral Str + e Normal Faulting in ence from Mesozoic Carbonates# Rota Land-Sat data Processing Techniques rains and Uncertainties# Tectonic 1 Stratigraphy and Evolution of the ive Strike-Slip Deformation Zone# S + n Since the Middle Miocene# Tentati + ce of 1983. # Evidence for Transform erinin Jeodezik Yöntemlerle Incelen aları Kataloğu (1963 - 1990)# Türki aları Kataloğu# Türkiye ve Yakın masmın Sonuçları,# Marmara Denizi ektoniği.# Güneybatı Anadolu ve Yak + ükleer Güç Santralı Yeri ve emlerle Araştırılması# Ege Denizi v + lliği.# Gediz ve Yakın .# Türkiye ve rkey)# Chemical and Stable Isotopic + Arc.# Mediterranean Ridge: a Young omagnetic Study of the Tertiary Int from a 3-D Tomographic Study.# Seis and Indian Oceans and the Mediterr ofiling in the Sea of Marmara (Nort the Overriding Plate of a Subductio g of the Shoshonite Rock Associatio + olian Fault Zone# Some rom the Çeşme-Seferihisar Area, Izm + m and Gedynamic Evolution of the Ae nd Lg in the Middle East# Propagati + rough: 1972 Jean

First Results.# Sea-Beam, Multi-Be + erranean Sea.# A New Bathymetric #Chemical and Stable Isotopic Chara + Conrad. M A + Chemismus und die provinzialen Verh + Paraskevopoulos, G. M. Chios (Greece).# Magnetostratigraph + Muttoni, G.+ Cihaziyle).# Diyarbakır ve Padova Y Elbek, Y. Cihaziyle).# Türkiye Baz Cazibe Seb Elbek, Y. #Çine Güneyindeki Metamorfitlerin P + Basarır, E. Cinematique de la Subduction Egeene Martin, C. Circuit and Tectonics of the Gloria + Argus, D. F.+ Circulation from Global Tomography# Van der Hilst, R. D.+ Circulation in the Mediterranean Se + Miller, A. R. Circulation of CO2-Rich Paleowaters + Greber, E. Circulation of the Mediterranean Se + Wüst. G Circum-Pacific Convergent Belt.# Lo Papazachos, B. C.+ Civarında Yerkabuğu Yapısı.# Sismik + Kenar, Ö. Civarında Yerkabuğu Yapısı.# İstanb + Kenar, Ö. Civarındaki Depremlere ait Fundamen + Civarının Deprem Kataloğu.# Türkiye + Canitez, N. Frain. K.+ Classification of Basaltic Rocks# Kushiro, I.+ Clastic Sedimentation Related to th + Hayward, A. B. Clockwise Rotation of the External + Speranza, F + Clockwise Rotation of the Ionian Zo Horner, F.+ Clockwise Rotation of the Western T + Kissel, C.+ Clockwise Rotation. # Paleomagnetic Edel, J. B.+ Morris, A. Argus, D. F.+ Greber. E Barazangi, M.+ Kaya, O. Akinci, A.+ Oral, M. B.+ Hirn, A.+ Sachpazi, M.+ Eryilmaz, M.+ Yağmurlu, F. Saner, S. Kaya, O. Eisenlohr. T.+ Eisenlohr, T.+ Dewey, J. F. Sevitoğlu, G.+ Spakman, W. Brunn, J. H. Kasapoğlu, K. E.+ Burchfiel, B. C. Baker, C.+ Oral, M. B.+ Reilinger, R. E.+ Oral, M. B. Spakman, W. Hearn, T. M.+ Rotstein, Y.+ Rotstein, Y.+ Le Pichon, X. Ersoy, Ş. Royden, L. H. Vilotte, J. P.+ Lister, G. S.+ Altherr, R.+ Higgins, M. D.+ Jackson, J.+ Jackson, J.+ Le Meur, H.+ Walcott, R. I. Davies, R.+ Mercier, J. L. Lauer, J. P.+ Westaway, R. Papanikolaou, D. J.+ Beghoul, N.+ Schuling, R. D. Waldron, J. W. F. Bozkurt, E.+ Turkey Bozkurt, E.+ Dinter, D. A.+ Dewey, J. F.+ Verge, N. J. Kastens, K. A. Lallemant, S.+ Emre, T.+ Yilmaz, P. O. Havward, A. B. Robertson, A. H. F.+ Robertson, A. H. F. Yılmaz, P. O. Lister, G. S.+ Lister, G. S.+ Chabalier, J. B.+ Curtis, A.+ Curtis, A.+ Mercier, J. L.+ Lallemant, S.+ Compression to Extension in the Wes Savaşçın, M. Y. Compressional and Extensional Tecto Ryan, W. B. F.+ Compressional Tectonics in the East Noomen, R.+ Noomen, R.+ Computed from SLR and GPS observati Computed from SLR and GPS observati Hodgsom, J. H.+ #Computer - Determination P- Nodal

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a. # Speculations Concerning Bottom in a Seismically Active Zone (Kuzg + a.# On the Vertical

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nal Tectonics in Western Turkey: Te + g of the Upper Mantle Structure ben + ncave Zagro -Taurique et les Arcs C an Plates: Finite Element Models# T ean Alpine System and the Carpathia chanisms of the Adriatic sea and We ons in the Eastern Mediterranean Co System Measurements of Present-day l Positioning System (GPS) Measurem e of the Upper Mantle in the Eurasi ian Plateau. # Pn Velocities Beneath ectonics of the Boundary of Anatoli tectonics of the Southern Boundary n as a Case Example# Land-Locked Oc SW Anatolia, Esençay Graben# Graben Subduction Boundaries Formed During Intraplate Deformation: Simple Mech Origin of Metamorphic Core Complexe 1 Crystallization# O-Sr Isotropic V # A Geplogical

ing and Seismicity Data in the Aege + ing and Seismicity Data in the Aege ography of the Gulf of Corinth: eformation. # The Kinematics of the mic Strain of Greece in the Interva iation of Western and Eastern Anato ria of South Peru-North Bolivia# Ex otriassic.# Paleomagnetism of the N ing Active Extension of Western Tur sin Across the Hellenic Arc: the Me ucture of Tibet and Western North A Age and Structure of the Menderes M west Turkey. # Structural History of .# Southern Menderes Massif: an inc + s Massif: A Cordilleran Type Metamo + Northeastern greece: Strymon Valle ctonics in a Convergent Zone# Aegea xhumation of the Menderes Massif Me the Mediterranean Ridge Accretionar

mpression to Extension in the Weste comodation Faults in the Gediz and r Data for the Age of the Antalya c Sedimentation Related to the Empl tiary Tethyan, Continental Margin.#

Evolution of the Mesozcic akır Çay Unit, Antalya med During Tertiary Continental Ext + e Cyclades, Aegean Sea, Greece# Met Analysis of Microearthquakes in Wes ation Extracted from 100 Years of G ation Extracted from 100 Years of G Eivages Ioniens (Cephalonie, Greec tern Mediterranean Ridge Accretiona nic Regimes in Western Anatolia# Ma ern Mediterranean# Geological Evide ons.# Crustal Deformations in the M ons: EOP (DUT) 95L02 and SSC (DUT) Solutions for Larger Earthquakes of

Closure in Eastern Central Greece: #Closure of the Africa - Eurasia -CO2-Rich Paleowaters in a Seismical Coast and Geodetic Survey, Epicente Coastal Part of West Anatolia # Mio Coda Waves in Western Anatolia.# At #Coherent Plate Motions in the East Coincident Normal Incidence and Wid Coincident Normal-Incidence and Wid Çökel Kalınlığı.# Ege Denizi Fay Te + Çökelleri ve Gdiz Grabeni nin Tekto + Çökelme İstifleri ve Tektonik Yerle + Cöküntüsünün (Neojen) Stratigrafisi Cold and Thermal Karst Within the G Cold Groundwater for the Determinat Collapse of Orogens.# Extensional Collapse# The Cause of N-S Extensio + Collision Belt.# Tomographic Mappin Collision et Arc Induits.# L Arc Co Collision of the Arabian and Eurasi Collision Tectonics.# Eastern Europ Collision Transition# Earthquake Me Collision Zone# Coherent Plate Moti Collision Zone# Global Positioning Collision Zone, Ph.D. Thesis# Globa Collision Zone.# A Tomographic Imag Collision Zones: the Turkish - Iran Collision, and Arc Jumping# Seismot + Collision, and Arc Jumping.# Seismo Collision: the Eastern Mediterranea Collisional Belts: An Example from Collusion# Evolution of Retreating Collusion.# Numerical Modelling of Colorado River Region, U.S.A.# The Combined Assimilation and Fractiona

Companion to Greece and the Aegean. Comparasion of Satellite Laser Rang Comparasion of Satellite Laser Rang Comparison of Methods.# Seismic Tom Comparison of Short and Long Term D Comparison of the Geodetic and Seis #Comparison of Young Volcanic Assoc Comparison with the Andean Cordille Comparison with the Pelagonian Perm Compensation in the Lower Crust Dur Comperative Study of Neotectonic Ba Comperative Study.# Lithosphere Str Complex (SW-Turkey)# On Petrology, Complex in the Isparta Angle, South Complex in Western Anatolia, Complex in Western Turkey.# Mendere Complex# Late Cenozoic extension in Complex Multiplate and Continuum Te Complex of Western Anatolia.# The E Complex# Rate of Outward Growth of Complex# Spatial Transition from Co Complex, Detachment Faulting and Ac Complex, SW Turkey.# Fossil and K-A Complex, SW Turkey.# Miocene Clasti Complex, Turkey as a Mesozoic - Ter Complex.# Microplate Tectonics and Tertiar Complex: a Tectonic Enigma.# The Al Complexes and Detachment Faults For Complexes of Cordilleran Type in th Component Seismograms.# A Detailed Components of Western aegean Deform Components of Western Aegean Deform Compression Dans le Quaternaire des

ke Mechanism Solutions 1922 - 1962. + Convexes Taurique et Ege: Collisio + he Menderes Massif.# Evidence Again + e Mediterranean Sea.# Speculations + in the Eastern Mediterranean# Geole + orthwestern Turkey# Regional Invest + arı (NW part of Turkey) as Inferred + ithin the San Andreas Fault System, + eters in the Earth.# The Electrical + # Subduction Beneath Eurasia in

Subduction Beneath Eurasia in e Arabian and Eurasian Plates: Fini + tuation in Greece# Some Geophysical the Petrophysical Properties, Dens nic Interpretation of Large Scale G Chalkidiki Areas (Northern Greece) of the North Anatolian Fault Zone: as Piercing Points# The Geometry an s Along the North Aegean Trough Fau f Some Active Zones in Jugoslavia. he Gediz Basin (on the Aegean Regio t Plate Motions in the Eastern Medi rkish - Iranian Plateau.# Pn Veloci Mediterranean as a Case Example# La Retreating Subduction Boundaries F odelling of Intraplate Deformation: cation to the Tibetian Plateau.# Ex The Tectonic Expression Slab Pull a e Volcanism on Santorini and Milos, Study of Normal Faulting in the De ction Zones: Aplication to the Ande ction Zones: Application to the And nt, Divergent, and Srtike-Slip Envi + Turkey.

rain Rates in Regions of Distribute + Temperature-Dependent Rheology on + rn Colorado River Region, U.S.A.# T + on of Vertical Shear?# Fault and Be + Sense Normal Simple Shear of the arine Accretionary Prism.

ture of the Central and Southern Le + of the Antalya Complex, Turkey as + # Lateral Variation of Basalt Magma + ric Scale.# Biostratigraphic Correl + cidentale.# Deformazione the

ip Motion from the North Anatolian + Dextral Strike-Slip Fault into the + a Surface Ship with the Graf Sea G + llow structure and Recent Evolution + ctonic Deformation# Microplate Vers + rmation Above Subduction Zones: App + Zone# Aegean and Surrounding Regio + udies, Their Present Status and Con + tudies, Their Present Status and Con + Failles.# Sur une Methode Simple de + des Cyclades (Grece): I ile de Paro + tial Energy# An Analog Experiment f + g in Turkey.# Geothermal Studies, Th + g in Turkey.# Geothermal Studies, T +

diterranean Crust# Geophysical Mediterranean Area: Crete as a Cas + # A Major Oligo - Miocene Detachmen + Fluids in Seferihisar Geothermal Ar + e Tibetian Plateau.# Extension Duri + ake Prediction in the Circum-Pacifi + Expression Slab Pull at Continenta + e Past Decate.# Tectonic Processes + ding Region: Complex Multiplate and + lip Environmentals: Analytical and + Anatolian Faulth Zone# Neotectonic +

et Arc Induits.# L Arc Concave Zag Blueshist Terrane: Sifnos (Cyclade Laser Range Observations.# Determi PS observations: EOP (DUT) 95L02 an in the Aegean Basin Accelerate the arison of Young Volcanic Associatio Sea -Floor Spreading Theory.# The + enozoic Extension of Western North egean Sea, Greece# Metamorphic Core omplex in Western Turkey.# Menderes + ivia# Extensional-Compressional Tec urkey.# Southern Menderes Massif: a nderes Massif: A Cordilleran Type M on in Northeastern greece: Strymon The Exhumation of the Menderes Mass nd Accomodation Faults in the Gediz s Formed During Tertiary Continenta in the Cyclades, Aegean Sea, Greece rus, Turkey). Geodynamic Implicatio + ssif.# Problem of

Sector of the Menderes Massif.# Evi + uthern Sector of the Menderes Massi + ned from Seismicity# Rates Crustal + hquake of 18 November 1992: A Possi + Large Scale Normal faulting Mechani +

#Computer Re-evaluation of Earthqua + Concave Zagro -Taurique et les Arcs + Concept in the Southern Sector of t Concerning Bottom Circulation in th Concerning Compressional Tectonics Conditions in Geothermal Areas of N Conductivity Distribution on Gölpaz Conjugate Slip and Block Rotation w Connection between Geothermal Param Connection with the Mesozoic Tethys Connection with the Mesozoic Tethys Consequences of the Collision of th Considerations on the Geodynamic Si Constitution.# Relationship between Constrains and Uncertainties# Tecto Constrains in the Thessaloniki and Constraints an Age and Total Offset Constraints by Using Anoxic Basins Constraints# Late Cenozoic Rotation #Contemporary Tectonic Properties o Content in the Aquifer Systems of t Continental Collision Zone# Coheren Continental Collision Zones: the Tu Continental Collision: the Eastern Continental Collusion# Evolution of Continental Collusion.# Numerical M Continental Convergence, with Appli Continental Convergent Boundaries# Continental Crust in Calc - Alkalin Continental Crust.# A Seismological Continental Deformation Above Subdu Continental deformation Above Subdu Continental Deformation in Converge #Continental Deformation in Western Continental Deformation# Seismic St Continental Extension# Effects of a Continental Extension in the Northe Continental Extension: Block Rotati Continental Lithosphere. # Uniform -#Continental Margin Tectonics: Subm Continental Margin. # The Deep Struc Continental Margin. # The SW Segment Continental Margins and Island Arcs Continental Stages and the Radiomet Continentale Recente in Anatolia Oc Continents.# Active Defprmation of Continuation of Dextral Strike - Sl Continuation of the North Anatolian #Continuous Gravity Measurements on Continuous Reflection Profiles# Sha Continuum Descriptions of Active Te Continuum Model of Continental Defo Continuum Model of Continental defo Continuum Tectonics in a Convergent Contouring in Turkey# Geothermal St Contouring in Turkey.# Geothermal S Contraintes Pour une Population de #Contribution a I etude Geologique Contribution of Gravitational Poten Contribution to Heat Flow Contourin Contribution to Heat Flow Contourin Contribution to Knowledge of the Me Contributions to Geodynamics in the Controlling North Aegean Extension. Convection Mechanism of Geothermal Convergence, with Application to th Convergent Belt.# Long-term Earthqu Convergent Boundaries# The Tectonic Convergent Margins - Research of th Convergent Zone# Aegean and Surroun Convergent, Divergent, and Srtike-S + Convex-Northwards Arc of the North Convexes Taurique et Ege: Collision #Cooling During the Exhumation of a + Coordinates and Motions from Lageos Coordinates Computed from SLR and G Coplex?# Did the Onset of Extension + Copressional Regime: a Review# Comp Cordillera, the Hellenides, and the Cordillera.# A Physical Model for C Cordilleran Type in the Cyclades, A Cordilleran Type Metamorphic Core C Cordilleria of South Peru-North Bol Core Complex in Western Anatolia, T Core Complex in Western Turkey.# Me Core Complex# Late Cenozoic extensi Core Complex of Western Anatolia.# Core Complex, Detachment Faulting a Core Complexes and Detachment Fault Core Complexes of Cordilleran Type Core of the Isparta Re-entrant (Tau Core-Mantle Boundary of Menderes Ma Core/Cover Concept in the Southern Core/Cover Interpretation of the So Corinth (Central Greece) as Determi + Corinth (Greece)# The Galaxidi Eart Corinth (Greece): Implications for

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or the Late Cenozoic Evolution of t + Corinth Rift and its Implications f + Corinth: A Comparison of Methods.# Seismic Tomography of the Gulf of ranean Neogene. 5. Calibration of S + Correlations in the Eastern Mediter + ranean Neogene. Sporomorph Associat + Correlations in the Eastern Mediter extremite Orientale de I arc Egeen Coulissements Senestres Recents a I + rn Greece Prior to the Tertiary Clo Counterclockwise Rotation of Northe Isostatic Compensation in the Lower Coupling of Surface Processes with ur les Mauvements Egeens Depuis le Dağılımının Saptanması,# Yinelemeli Courbure Sud-Hellenique (Grece).# S Cözüm Yöntemi ile Yeraltı Yoğunluk + k Birimlerinin Biçim Değişimi.# Dep + Çözümleri Açısından Türkiye Tektoni + lizi# Sismik Moment Tansör Ters Çözümüyle Türkiye Depremlerinin Ana + on the Island of Tinos, Cyclades, G + Cretaceous Age.# The Akrotiri Unit + Cretaceous and Eocene Pose Position + s from Northeastern Turkey.# Jurass + ic Significanca in the Frame of the Cretaceous-Eccene) and their Tecton + phic Contributions to Geodynamics i Crete as a Case Hidtory.# Stratigra + Hellenic Trench Near Crete# Earthquake Mechanisms in the lenique.# Analyse Quantitative des t Seismograms.# A Detailed Analysis Crete et la Surrection de I arc Hel + Crete from Digital Three - Componen Seismograms# A Detailed Analysis of Crete from Digital Three-Component ntensity and Reversals from Upper M Crete# Relative Geomagnetic Field I s from Earthquakes and lateral Inho Crete# S-P-Wave Traveltime Residual Crete Since the late Middle Miocene + On the Hellenic Subduction Zone a # On the Hellenic Subduction Zone Crete since the Late Middle Miocene onal Seismic Experiments.# Crustal Crete, Greece, Obtained by Refracti Successive Miocene Geomagnetic Rev Crete.# Paleomagnetic Record of two + Mio-Pliocene marine Sedimentary Ser + Crete.# Paleomagnetic Results from velopment of the Hellenic Arc and t Crete: A Synthesis# The Tectonic De # Geological Criteria for Evaluating Seismicity. gible Vettor, Pisani Anno, 1931.# L + ble Des Ganeys, Anno, 1935.# La ching of Hanging Wall in Regions of + Croceira Gravimetrica del R. Sommer Crociera Gravimetra del R. Sommergi #Cross Faults and Differential Stre + tching of hanging Walls in Regions + #Cross-Faults and Differential Stre dings in the Basins of the Eastern Cruise)# Two-Ship Deep Seismic Soun ounding in the Basins of the Easter + Cruise).# Two - Ship Deep Seismic S 972 Jean Charcot Cruise. # North Aegean Sea Trough: 1 n the Aegean Region from the Early + Crust# 3D-Kinematics of Extension i cidence and Wide-Angle Approach to Crust# A First Coincident Normal-In + n Sea Region# 3-D Velocity Structur + Crust and Upper and Mantle of Aegea by Inversion of Seismic and Gravim + Crust and Upper Mantle in SE Europe Europe# Tomography of the Europe.# Tomography of the Crust and Upper Mantle in Southeast + Crust and Upper Mantle in Southeast n Region.# P - Wave Veolocities in + Crust and Upper Mantle in the Aegea a Region.# 3-D Veolocity Structure Crust and Upper Mantle of Aegean Se + n region From Deep Seismic Sounding + Crust and Upper Mantle of the Aegea rn Mediterranean Sea Deduced from G + Crust and Upper Mantle of the Easte stern Turkey# Evidence for Dynamic + Crust During Active Extension of We + Knowledge of the Mediterranean on Santorini and Milos, Aegean Sea, + Crust# Geophysical Contribution to Crust in Calc - Alkaline Volcanism Crust of the Western Mediterranean Ridge from Deep Seismic Data and Gr anism of Geothermal Fluids in Sefer + Crust Structure and Convection Mech and Dynamics of the Mediterranean-A + #Crust-Mantle Evolution, Structure + Crust.# A Seismological Study of No rmal Faulting in the Demirci, Alaşe raverse Oceanic Crust. # Why the Lg Phase does not T Turkey. # Late Cenozoic Crustal and Basin Formation in West + Beneath Calkidiki (North Greece).# Crustal and Upper Mantle Structure of North - Western Turkey.# A Study + of the Aegean Arc from Travel Time + Crustal and Upper Mantle Structure #Crustal and Upper Mantle Structure #Crustal Deformatin in Western Turk ey: A Structural and Paleomagnetic tion to Central Greece# A Formulati Crustal Deformation and its Applica mulation in the Marmara Sea Region. Crustal Deformation and Strain Accu munation in the Marmara Sea Region, + Crustal deformation and Strain Accu nd Surrounding Area# A Detailed Stu Crustal Deformation in the Aegean a Corinth (Central Greece) as Determi + Crustal Deformation in the Gulf of Sea Region, Northwestern Anatolia# Crustal Deformation in the Marmara Crustal Deformation in the Marmara Sea Region, NW Anatolia, Inferred f + gean Trough - North Anatolian Fault + Crustal Deformation in the North Ae ey as Deduced from Major Earthquake + Crustal Deformation in Western Turk #Crustal Deformations in the Medite rranean Area Computed from SLR and and Volcanism in West Turkey.# Late + Crustal Extension, Basin Formation Crustal Extension, Naxsos, Cyclades , Greece.# The P-T-t Path Associate + gean Region. #Crustal Fracture Pattern of the Ae astern Mediterranean Inferred from + Crustal Motion in the Central and E an Region Determined from Laser Ran + #Crustal Motions in the Mediterrane strial Geodetic Methods. # Determina + Crustal Movement in Turkey by Terre + ica-Eurasia Plate Collision Zone# G + Crustal Movements in the Arabia-Afr + Crustal Movements in Turkey# Activi ties for the Determination of Italian Region Using Local and Regi + Crustal P - Wave Tomography of the editerranean# Gravity Anomalies and + Crustal Shortening in the Eastern M Crustal Structure along N - S Direc + tion in Western Turkey from Burdur + #Crustal Structure and Possible Ani + sotrophy in Turkey from Seismic Sur #Crustal Structure Beneath Turkey. urope.# Preliminary Results of an I + Crustal Structure in Southeastern E + diterranean Sea.# Gravity Anomalies + Crustal Structure in the Eastern Me + #Crustal Structure in Turkey hquake Data. 1. Simultaneous Least + #Crustal Structure Modeling of Eart + #Crustal Structure Modeling of Eart + hquake Data. 2. Simultaneous Least + #Crustal Structure of the Aegean Se + a and the Hellenides Obtained from a and the Islands Evia and Crete, G + nean Sea, Part II: Phase Velocity a + #Crustal Structure of the Aegean Se + #Crustal Structure of the Mediterra + rean Sea by Surface Waves, Part I: #Crustal Structure of the Mediterra ia# Heat Flow, Seismicity and the Crustal Structure of Western Anatol + #Crustal Structure of Western Turke + y from Rayleigh Wave Dispersion. the Gravity Anomalies of W Turkey a + Crustal Structure# Some Remarks on + #Crustal Strucute of the Eastern Me + diterranean Inferred from Rayleigh + Finite Strain and Fault Movements + Crustal Thickening, Paleomagnetism, + g Lithosphere in Greece from Gravit + se of an Accurate Two - Point Ray T + Crustal Thickness and the Subductin + Crustal Tomography of Greece with u +

Armiio R + 1996 Le Meur, H.+ 1997 Benda, L.+ 1979 Benda, L.+ 1990 Dumont, J. F.+ 1979 Edel, J. B.+ 1992 Westawav, R. 1994 Angelier, J. 1977 Sarı, C.+ 1985 Yoğurtcuoğlu, A. 1986 Utku, M. 1997 Patzak, M.+ Van der Voo, R. 1994 1968 Mauritsch, R.+ Drooger, C. W.+ Taymaz, T.+ 1991 1973 1990 Angelier, J. 1981 Chabalier, J. B.+ 1992 Hatzfeld, D.+ 1992 ъаі, С.+ 1996 Taymaz, T. 1996 Meulenkamp, J. J.+ 1988 Meulenkamp, J. E.+ 1988 Makris, J.+ 1977 Valet, J. P.+ 1981 Valente, J. P.+ 1982 Angelier, J.+ 1982 Allen, C. R. 1975 Cassinis, G.+ 1935 Cassinis, G. 1941 Şengör, A. M. C. Şengör, A. M. C. 1986 1987 De Voogd, B.+ 1992 Voord 1992 Needham, H. D.+ 1973 Jovilet, L.+ 1994 Sachpazi, M.+ Drakatos, G.+ 1997 1991 Papazachos, C. B. 1994 Papazachos, C. B.+ 1995 Papazachos, C. B.+ 1995 Ligdas, C. N. 1990 Drakatos, G.+ 1991 Makris, J. 1978 Makris, J.+ 1984 Westaway, R. 1994 Morelli, C. 1985 Barton, M.+ 1983 Truffert, C.+ 1993 Esder, T. 1990 Mueller, S.+ 1993 Eyidoğan, H.+ 1985 Zhang, T.+ Sevitoğlu, G.+ 1995 1991 Christodoulou, A.+ 1988 Nacioğlu, A.+ 1981 Jacoby, W. R.+ Zanchi, A.+ 1982 1990 Papazachos, B. C.+ 1992 1996 Straub, C. Straub, C.+ 1997 Papazachos, B. C.+ 1996 Tselentis, G. -A.+ 1986 Straub, C.+ 1994 Straub C + 1995 Kiratzi, A. A. 1991 Eyidoğan, H. 1988 Noomen, R.+ 1995 Seyitoğlu, G. 1992 1989 Buick, I. S.+ Kronberg, P.+ 1978 Smith, D. E.+ 1994 Noomen, R.+ 1993 1993 Deniz. R.+ Reilinger, R. E.+ 1997 1997 Aksoy, A.+ Alessandrini, B.+ 1995 . Rabinowitz, P. D.+ 1970 Ezen, Ü. 1991 Mindevalli, O. Y.+ 1989 Canitez, N.+ Papazachos, B. C.+ 1980 1966 Woodside, J. M.+ 1970 Canitez, N.+ 1982 1976 Crosson, R. 1976 Crosson, R. Makris, J. 1975 1977 Makris. J.+ Payo, G. 1969 1967 Payo, G. 1590 Alptekin, Ö.+ 1991 Ezen, Ü. Oral, M. B. 1987 Cloetingh, S.+ 1980 McKenzie, D. P.+ 1983 Tsokas, G. N.+ 1997 Drakatos, G.+ 1997

Aegean Regions# Back Arcs Basins an + Crustal Velocity in the Ionian and ics of Late-Orogenic Extension in t + #Crustal-Scale Geometry and Kinemat + (Greece): Deformation and P-T Path Crystalline Units# Attic Peninsula iations in Miocene Granitoids from cture, Metamorphism, Magmatism. # Th + ası,# Edremit - Susurluk Bölgesinin + Recent Revisions to the Geomagnetic + ons and the 1908 Messina Turbidity ds - ATH as Inferred from the Analy Contribution a I etude Geologique d + Extension Ductile et Sedimentaires iew.# Eclogites Associated with Hig + nd the Reconstruction of the Synmet orphic Core Complexes of Cordillera amorphic Evolution of a Dismembered Above and Below a Blueshist Belt ssociated with Crustal Extension, N Terrane of Late Cretaceous Age.# т Metamorphic Rocks of the Island of a).# Uplift and Exhumation of High-Juxtaposition of Blueschists and G Implications for Miocene Extension ın Sismik Yöntemlerle Araştırılması c Studies in # Geodynamic Evolution of Turkey an + ogeanticlines of the Eastern Medite + nın Belirlenmesi.# Yüzey Dalgası Or + sparta Büklümünün Kuzey Kesiminde imindeki Allokton Metamorfik Biriml + onuçları.# Anaximander Wore Cözüm Vöntemi ile Yeraltı Voč + Paleosismik Yöntemlerle Yaşlandırıl kiye ve Civarındaki Depremlere ait celenmesi.# Istanbul (ITÜ) Deprem I + nmesi.# Ardışık Filtre Tekniği ile n Yararlanarak İstanbul Civarında Y an Yararlanarak Anadolu ve Cıvarınd + de Beyşehir (Turque).# Recherches + Egeen.# L Evolution Structure de 1 + entation Neogene iens (Cephalonie, Greece) - Donnees. + Reserches Geologiques Paros),# Extension Ductile et Sedi + niques: Observations par Submersibl Büklümünün Kuzey Kesiminde D - B 18. Marz 1953.# Makroseismische Unt + Crust and Upper Mantle in SE Europe + ic Arc Deduced from Geophysical rn Mediterranean Region: Deduced Fr + st of the Western Mediterranean Rid + plex, SW Turkey.# Fossil and K-Ar # Neogene Palynological and Isotop + Island of Syros (Greece).# Dating M + th Aegean# Palaemagnetic ean Seas# Rewiev of Heatflow y and Cyprus based on Palaeomagneti + asion of Satellite Laser Ranging an asion of Satellite Laser Ranging an + ean Arc: geochemical and geochronol in the Aegean Defined by Teleseism rkey.# Stratigraphic and Radiometri n Sea, Preliminary results# Geochro + ean Sea# Geochronological diterranean.# New n Mediterranean Basin from Seismic ntary Strata and Basement in the Le of the Crust and Upper Mantle of t ing Geological and Geomorphological cdsf 123213sdfdsfd 12321 32432432 d tion of the Aegean Sea Seismic Refl atolia: Regional Stress Orientation s Interior: Analysis of the Global s and the Subducting Lithosphere in y Map from ESSA, Coast and Geodetic Estimation of Hypocenter and Veolc Estimation of Hypocenter and Veolc phy of the Italian Region Using Loc ain Release Rates in the Patraikosc: Some New Elements from DSS the Eastern Mediterranean Basin fr + y Using Macroseismic East Mediterranean Ridge: A Synthe + Europe, Catalogue of Heat Flow Dens + ur Gelogie des Raumnes Zwischen ycladic Area: 39Ar/40Ar Data from M + he Front of Modern Convergent Margi + ey# The Strain Pattern in the Weste namic Model of the Hellenic Arc ical Properties and State of the Cr + eismicity Data# Active Tectonics of es of Crustal Deformation in Wester gean Region.# Some Aspects of the E Crustal Deformation in the North Ae + kmece (Istanbul) Sığ Deniz Sismiği da Yapılan Taşocağı Patlatmalarında

Crystallization# O-Sr Isotropic Var Crytalline Belt: Stratigraphy, Stru + Curie Nokta Derinliklerinin Saptanm #Current Plate Motions Current Plate Motions.# Effects of Current.# Ionian Sea Submarine Cany Curves for the Path Dodecanse Islan + Cyclades (Grece): I ile de Paros.# Cyclades (iles de Naxos et Paros).# Cyclades Archipelago, Greece, a rev Cyclades# Listric Normal Faulting a Cyclades, Aegean Sea, Greece# Metam Cyclades, Greece).# The Tectono-Met + Cyclades, Greece.# Low-angle Faults Cyclades, Greece.# The P-T-t Path A Cyclades, Greece: Witness to a Lost + Cycladic Area: 39Ar/40Ar Data from Cycladic Blueschist Belt (Aegean Se Cycladic Blueschist Belt.# Tectonic + Cycladic Massif, Greece, and Their Çıkışı Pliyo-Kuvaterner Oluşukların + Cyprus and Biga Peninsula # Magneti + Cyprus based on Palaeomagnetic Data Cyprus Outher Ridges).# Evolving Mi Cıvarında Kabuk ve Üst Manto Yapısı + D - B Daralma için bazı Veriler.# I Dağları (Menderes Masifi) Güney Kes + Dağları Jeofizik Araştırmaları ve S + Dağılımının Saptanması.# Yinelemeli + daki Bazı Kirectası fav Sevlerinin + Dalgaları Üzerine İncelemeler.# Tür + Dalgalarında Girişim Olaylarının İn + Dalgalarmin Dispersivonumum Incele + Dalgalarının Genlik Spektrumlarında + Dalgası Ortam Tepki Fonksiyonlarınd + dans de la Taurus Occidental au sud 4 Dans le Carde Geodynamique de I Arc Dans le Fosse Nord egeen.# La Sedim + Dans le Ouaternaire des Eivages Jon + dans le Taurus Lycien Occidental.# dans les Cyclades (iles de Naxos et dans les Fosses de Subduction Helle Daralma için bazı Veriler.# Isparta das Nordwest Anatolische Beben vom Data (in Greek).# Structure of the Data# A Dynamic Model of the Hellen Data# Active Tectonics of the Easte Data and Gravity Modelling# The Cru Data for the Age of the Antalya Com Data from Gördes Basin, West Turkey Data from Metamorphic Rocks of the data from Tertiary Units of the Nor Data From the Mediterranean and Aeg + Data# Geodynamic Evolution of Turke Data in the Aegean Region# A Compar Data in the Aegean Region# A Compar data# Inner arc volcanism in NW Aeg Data# Intermediate Depth Seismicity Data of the Neogene in Northwest Tu Data on Granitic Rocks of the Aegea Data on Recent Magmatism of the Aeg Data on the Bottom Relief of the Me Data on the Structure of the Easter Data on the Structure of the Sedime Data# Physical Properties and State + data Processing Techniques for Mapp Data qwwqewq qwewqewqe 123213213 ds Data# Reorganization and Interpreta Data# Seismotectonics of Western An Data Set. # Heat Loss from the Earth Data# Study of the Crustal Thicknes Data, 1961 - 1967.# World Seismicit Data. 1. Simultaneous Least Squares Data. 2. Simultaneous Least Squares Data.# 3-D Crustal P - Wave Tomogra Data.# Average Regional Seismic Str Data.# Ionian Basin and Calabria Ar Data.# New Data on the Structure of Data.# On Magnitude Determination b Data.# Strain Distribution over the Data: Turkey.# Geothermal Atlas of Datca-Mugla-Dalaman Cay# Beitrage z #Dating Metamorphic Events in the C day Plate Motions.# Present -Decate.# Tectonic Processes along t + Deduced from a Microearthquake Surv Deduced from Geophysical Data# A Dy Deduced from Geophysical Data# Phys Deduced From GPS, Neotectonic and S Deduced from Major Earthquakes# Rat + Deduced from Observations in the Ae + Deduced from Seismicity.# Rates of Değerlendirilmesi# Yedikule-Büyükçe + Değerlendirilmesi.# Anadolu Kavağın +

Alessandrini, B.+ 1997 Gautier, P.+ Kessel, G. 1994 1990 Altherr, R.+ 1988 Dürr, S.+ 1978 Hisarlı M 1095 DeMets, C.+ 1990 DeMets, C.+ 1994 Rvan, W. B. F.+ 1965 Kalogeras, I. S.+ 1993 Robert, E. 1982 Gautier. P.+ 1990 Okrusch, M.+ 1990 Ridley, J. Lister, G. S.+ 1984 1984 Katzır, Y.+ 1996 Avigad, D + 1989 Buick, I. S.+ 1989 Patzak, M.+ 1994 Maluski, H.+ 1987 Avigad, D.+ 1991 Avigad, D. 1993 Morris, A.+ 1996 Alpar, B.+ 1998 1977 Ergün, M. Lauer, J. P. 1984 Stride. A. H.+ 1977 Osmansahin, I. 1989 Boray, A.+ 1985 Candan, 0.+ 1992 Ermin. M + 1998 Sarı, C.+ 1985 Barka, A. A.+ 1997 Canitez, N. 1969 Ezen, Ü. 1979 Canitez, N. 1075 Kenar, Ö. 1977 Osmanşahin, I. 1989 Monod, O. 1977 1992 Sorel, D. Lalechos, N.+ 1977 Mercier, J. L.+ 1972 Graciansky, P. C. 1972 Gautier, P.+ 1990 Le Pichon X.+ 1980 Boray, A.+ 1985 Ketin, I.+ 1953 Papazachos, C. B. 1994 Makris, J. 1976 Barka, A. A.+ 1997 1993 Truffert, C.+ Yilmaz, P. O. 1984 Sevitoğlu, G.+ 1994 Maluski, H.+ 1987 Kondopoulou, D.+ 1984 Erickson, A. J.+ Lauer, J. P. 1977 1984 1994 Jackson, J.+ 1994 Jackson, J.+ Innocenti, F.+ 1979 Hatzfeld, D.+ 1992 1974 Benda, L.+ 1976 Altherr, R.+ Fytikas, M.+ 1976 Goncharov, V. P.+ 1963 Sancho, J.+ 1973 Moskalenko, V. N. 1966 1984 Makris, J.+ Astaras, TH.+ 1990 Francalanci, L.+ 1990 1996 Saatcılar, R.+ 1993 Zanchi, A.+ Pollack, H. N.+ 1993 Tsokas, G. N.+ 1997 Barazangi, M.+ 1969 1976 Crosson. R. 1976 Crosson, R. Alessandrini, B.+ 1995 1990 Papazachos, B, C.+ 1991 Ferrucci, F.+ Sancho, J.+ 1973 Galanopoulos, A. 1961 Le Pichon, X.+ 1982 Tezcan, A. K.+ 1991 1978 Kaaden, G.+ Maluski, H.+ 1987 Minster, J. B.+ 1978 1984 von Huene, R. Hatzfeld, D.+ 1990 1976 Makris, J. Makris, J.+ 1984 Barka, A. A.+ 1997 Evidožan, H. 1988 Berckhemer, H. 1977 1991 Kiratzi, A. A. 1994 Kurt, H. Gürbüz, C.+ 1985

Yoğurtcuoğlu, A. 1986 Arslan, F. 1984 Greber, E. 1997 Van der Hilst, R. D.+ 1997 Truffert, C.+ 1993 Zielhuis, A.+ 1994 Voord 1992 De Voogd, B.+ 1992 Makris, J. Papazachos, B. C.+ 1978 1978 Agarwal, N. K.+ 1976 Ginzburg, A.+ Babuska, V.+ 1987 1987 Caputo, R.+ 1970 Caputo, M.+ 1970 Papazachos, B. C.+ 1997 Pollack, M. H. 1951 Hatzfeld, D.+ 1992 Nalbant, S. S. 1996 Zanchi, A.+ 1990 Wdowinski, S.+ 1989 Wdowinski, S.+ 1989 Amorese, D. 1993 Papazachos, B. C.+ 1992 Kessel, G. 1990 Straub C 1996 Straub, C.+ 1997 Smith, A. G. 1971 McKenzie, D. P.+ 1991 Ridley, J. 1984 Barrier, E.+ 1982 Faure, M.+ 1988 Morris, A. 1995 Babbucci, D.+ 1997 Curtis. A.+ 1995 Curtis, A.+ 1997 Angelier, J. 1981 Billiris, H.+ 1991 England, P. C.+ 1985 Jackson, J.+ 1984 Papazachos, B. C.+ 1996 Eyidoğan, H.+ 1985 Jackson, J. 1993 Robbins, J.+ 1995 Tselentis, G. -A.+ 1986 Straub, C.+ 1994 Straub, C.+ 1995 Jackson, J.+ 1988 Pondrelli, S.+ 1995 Kiratzi, A. A. 1991 Evidoğan, H. 1988 1993 Zanchi, A.+ Thatcher, W. 1995 Lyberis, N.+ 1982 Underhill, J. R. 1989 Chaumllon, E.+ 1996 1981 Ferentinos, G.+ Barka, A. A.+ 1984 Kondopoulou, D. P.+ 1990 1989 Ekström, G.+ 1991 Roussos, N.+ Walcott, R. I. 1984 Vilotte, J. P.+ 1982 1972 Mercier, J. L.+ 1989 Kissel, C.+ 1995 Noomen, R.+ 1984 Kissel, C.+ Kissel, C.+ 1983 Zanchi, A.+ 1993 Bozkurt, E.+ 1997 1992 Jackson, J.+ McKenzie, D. P.+ 1983 England, P. C.+ 1989 Cassinis, G. 1941 1935 Cassinis, G.+ Zielhuis, A. 1992 Spakman, W.+ 1987 Spakman, W. 1988 1991 Spakman, W. S.+ 1998 Demirel, Becker-Platen, D.+ 1977 1969 Ketin, I.+ Eyidoğan, H.+ 1985 1981 Yılmaz, Y. Paraskevopoulos, G. M. 1956 Trikkalinos, T. K. 1947 Barka, A. A. 1991 1996 Yilmaz, B. 1994 Kurt, H. 1998 Senöz, M. Güneysu, A. C. 1598 Alpar, B.+ 1998 Eryılmaz, M.+ 1998 1998 Güneysu, A. C. 1943 Pinar, N. Eryılmaz, M. 1996 Küleli, H. S.+ 1993

Değişimi.# Deprem Odak Mekanizması Değişimler.# Düzpinar (Manisa) Mios + #Deep Circulation of CO2-Rich Paleo + Deep mantle Circulation from Global Deep Seismic Data and Gravity Model + #Deep Seismic Expression of an Anci + Deep Seismic Sounding in the Basins Deep Seismic Soundings in the Basin Deep Seismic Soundings# The Crust a #Deep Structure and Tectonics of th Deep Structure of the Aegean Region Deep Structure of the Central and S #Deep Structure of the Lithosphere #Deep Structure of the Mediterranea #Deep Structure of the Mediterranea Deep Velocity Structure of the Hell Deep Water of the Eastern Mediterra + Defined by Teleseismic Data# Interm + Deformasyon ve Gerilme Alanlarının + Deformatin in Western Turkey: A Str + Deformation Above Subduction Zones: + deformation Above Subduction Zones: + Deformation Acruelle de la Terminat + Deformation and its Application to Deformation and P-T Path of the Cry Deformation and Strain Accumulation deformation and Strain Accumunation Deformation and the Oceanic Areas o + #Deformation and Volcanism in Weste Deformation Associated With Bluesch Deformation d un Segment de I Arc H + Deformation Ductile du Granite Mioc Deformation During Palaeogene Thrus Deformation Events in the Central-E + Deformation Extracted from 100 Year Deformation Extracted from 100 Year Deformation Horizontale et Mouvemen + Deformation in Central Greece from Deformation in Convergent, Divergen Deformation in Greece and Iran# Rot + Deformation in the Aegean and Surro Deformation in the Continental Crus Deformation in the Eastern Mediterr #Deformation in the Eastern Mediter Deformation in the Gulf of Corinth Deformation in the Marmara Sea Regi Deformation in the Marmara Sea Regi Deformation in the Mediterranean an Deformation in the Mediterranean Ar Deformation in the North Aegean Tro Deformation in Western Turkey as De Deformation in Western Turkey.# Con Deformation# Microplate Versus Cont Deformation of a segment of arc; th Deformation of the Hellenide Forela #Deformation of the Western Mediter Deformation on the North Flank and Deformation Patterns in the Convex-Deformation Patterns in the South A Deformation# Seismic Strain Rates i Deformation Zone# Structure of the Deformation.# The Kinematics of the Deformation: Simple Mechanical Mode #Deformations en Compression Dans 1 Deformations in the Aegean Area# Pa Deformations in the Mediterranean A Deformations of the Aegean Area# Pa Deformations of the Aegean Area. # P #Deformazione Continentale Recente Deformed Grains in the Augen Gneiss Deforming Aegean Sea Region Determi Deforming Zone, # The Relationship B Defprmation of the Continents.# Act del R. Sommergible Des Ganeys, Anno del R. Sommergible Vettor, Pisani A Delay - Time and Waveform Inversion Delay Time Tomography.# Imaging Alg Delay Time Tomography. # Upepr Mantl #Delay-Time Tomography of the Upper Deltalarmm Gravite Modellemesi.# dem Jungtertiar der Turkei.# Litho-Demirci ve 28 Mart 1969 Alaşehir -Demirci, Alaşehir and Gediz Earthqu + den Bir Örnek# Atlantik Tip Bir Kıt den Chemismus und die provinzialen den Tektonischen Bau der Insel Naxo Denemesi.# Istanbul un Depremselliğ + Deniz Jeolojisi ve Kuvaterner Evrim + Deniz Sismiği Verilerinin Değerlend + Denizaltı Havzaları.# Kuzey Anadolu + Denizaltı ve Kıyı Jeomorfolojisi.# + Denizi Çıkışı Pliyo-Kuvaterner Oluş + Denizi Fay Tektoniği ve Çökel Kalm + Denizi Güneyinin Denizaltı ve Kıyı + Denizi Havzasının Sismik Jeoloji ve + Denizi nde Anadolu nun Doğal Üzantı + Denizi nde Anadolu nun Doğal Uzanım +

of the Eastern Mediterranean Sea (s of the Eastern Mediterranean Sea nd Upper Mantle of the Aegean regio + e Eastern Mediterranean. # Teleseismic P-Wave Traveltime Res + outhern Levant Continental Margin.# + Beneath the Territory of Bulgaria. n Bagin n Basin. enic Area Obtained by Robust Nonlin nean Sea. # The Sources of the ediate Depth Seismicity in the Aege + Modellenmesi.# Depremlerin Oluşturd uctural and Paleomagnetic Approach# Aplication to the Andes and the Ae Application to the Andes and the A ion Nord - Occidentale de I Arc Ege Central Greece# A Formulation for R stalline Units# Attic Peninsula (Gr in the Marmara Sea Region, NW Anat + in the Marmara Sea Region, NW Anat + f the Tethys, Mediterranean, and At rn Turkey and the Aegean ist facies Metamorphism on the Aege + ellenique Externe: Les Iles de Kass ene de Mykonos (Cyclades, Greece).# ting and Basin Closure in Eastern C astern Mediterranean Region Since t s of Geodetic Displacement Measurem + s of Geodetic Displacement Measurem + ts Verticaux: I extension Egeenne, 1900 to 1988# Geodetic Determinatio + t, and Srtike-Slip Environmentals: ational Mechanism of Active unding Area# A Detailed Study of th + t.# A Seismological Study of Normal + anean# Rates of Active ranean. (Central Greece) as Determined from + on, Northwestern Anatolia# Global P + on, NW Anatolia, Inferred from GPS + d Middle East# The Relationship Bet ea Estimated by Moment Tensor Summa ugh - North Anatolian Fault Deduced + duced from Major Earthquakes# Rates + tinental inuum Descriptions of Active Tecton + e Strait of Kythira, Hellenic arc, nd, Western Greece.# Late Cenozoic ranean Ridge: Importance of Messini Floor of the Sporades Basin off the + Northwards Arc of the North Anatoli + egean Volcanic Arc: the Case of Mel n Regions of Distributed Continenta Central North Aegean Trough: an Act + Plate Boundary Through New Zealand l of Continental Collusion. # Numeri + e Quaternaire des Eivages Ioniens (+ leomagnetic Evidence for Rotational rea Computed from SLR and GPS obser + laeomagnetic Evidence of Miocene an + aleomagnetic Evidence of Miocene an + in Anatolia Occidentale. es of Southern Menderes Massif (Wes + ned from the Moment Tensors of Eart + etween Strain Rates, Crustal Thicke + ive 1935.# La Crociera Gravimetra nno, 1931.# La Croceira Gravimetric + .# S - Wave Below Europe from orithms, Accuracy and Resolution in + Mantle Below Europe, the Mediterra + Aşağı Meriç ve Enez und Biostratigraphische Deutung Rad + Sarıgöl Depremleri Hakkında Makrosi + akes of 1969-70 in Western Turkey: + a Kenarmın Pasifik Tip Bir Kıta Ke Verhaltnisse der tertiaren und quar + s# Beitrage zur Erforschung des Tek + ini Oluşturan Tektonik Yapılar ve I i# Marmara Denizi nde, Büyük Çekmec + irilmesi# Yedikule-Büyükçekmece (Is Fayı (Levha Sınırı) Uzantılarının Marmara Denizi Güneyinin uklarmın Sismik Yöntemlerle Araştı + lığı.# Ege Jeomorfolojisi.# Marmara Meteorolojisi# Marmara sının Saptanmasında Kullanılan Yerb + ı# Ege

Cözümleri Açısından Türkiye Tektoni +

waters in a Seismically Active Zone +

ling# The Crust of the Western Medi +

en Omurgalı faunası Hipparionlarınd +

Tomography# Evidence for

ent Plate Boundary in Europe.

em Arastirmasinin Sonuçları.# Marma + yetik Yöntemlerle Araştırılması# Eg Manyetik Yöntemlerle Araştırılması + lı Sığ Sismik Etüdü Raporu.# Marmar + ayının Çökelme İstifleri ve Tektoni + ısal İliskileri.# Ege vi Volkanizması# Akdeniz ve Ege anım Açısından Ege rmik Enerji Aramaları Rezistivite E + gy Field of Turkey. # Present Status + eothermal Model of tlas of Europe, Catalogue of Heat F + eneration and Mineralogical Constit + armara Denizi ve Çevresindeki Mikro er# Türkiye nin Genel Tektonik Duru + e Iliskisi# Marmara Bölgesi nin inin Tarihsel מות lemmesi.# Anadolu nun Tektonik Yapı + Açısından Türkiye Tektonik Birimler + ik Yüzey Dalgalarında Girişim Olayl + Etüdü# Adapazar üzey Dalgalar: Üzerine Incelemeler. lemler.# 23 Mart 1969 Demirci ve 28 n ve Gerilme Alanlarının Modellenme + t Tansör Ters Çözümüyle Türkiye taloğu (1963 - 1990)# Türkiye ve Ya + taloğu# Türkiye ve Yakın Çevresi Bunların Aktif Tektonik ile İliski + Güneybatı Anadolu ve Yakın Çevresin + Santralı Yeri ve Cevresinin ürkiye nin Yapılar ve İstanbul İçin bir Mikro rc.# Space and Time Distribution of ned by Teleseismic Data# Intermedia rplate Earthquakes and their Implic gean Area Determined by Waveform Mo ution Recente de la Courbure Sud-He odynamique de I Arc Egeen.# L Evolu Mantels im Östlichen Mittelmeer Ab + Chemismus und die provinzialen Ver schung des Tektonischen Baues Griec + Östlichen Mittelmeer Abgeleitet au + nd Geotektonische Stellung des Mend esteine des agaischen Raumes und de phische Deutung Radiometrischer Alt leri ile Saros ve Gökova Grabenleri + t - Susurluk Bölgesinin Curie Nokta rge Earthquakes# Regional Stresses mic Intensity.# A Tomography Image aphy.# Preliminary Objective Region barten Gebieten# Über den Chemismus Pour une Population de Failles.# S uction Palinipastique des Taurides de Failles.# Sur une Methode Simpl s.# Contribution a I etude Geologiq se Structurale de I Arc Egeen Exter ditectonique, Neotectonique.# Des T oklin Transformation in Migmatiten eece) - Donnees Neotectoniques et S + ien dans les Fosses de Subduction H + Mediterraneenne (Mediterranee Orie a Gravimetra del R. Sommergible # Paleogeographie, Orogenese, Meta + ekronisch - Mechanischen Folgerunge en und Seine Equivalente in der Mit + Evolution telmeer Abgeleitet aus Geophysikali + laman Cay# Beitrage zur Gelogie izontale et Mouvements Verticaux: I + chtonie des Bey Gağları Orientaux, Leur Signification par Rapport aux s. II. Uber den Tektonischen Bau de n Macedonie (Grece).# Paleogeograph ational Potential Energy# An Analog esults.# Sea-Beam, Multi-Beam Echoormation# Microplate Versus Continu n Faults in the Gediz and Büyük Men e,# Late Miocene Ductile Extension tiary Continental Extension in the olling North Aegean Extension.# A M ades Islands, Greece).# Structure a orphic Core Complex# Late Cenozoic es in Western Crete from Digital Th es in Western Crete from Digital Th ozani-Greva, (Greece) Earthquake of Vidences for East-West Extension in 1 Deformation in the Aegean and Sur lihli Bölgesinin Jeotermik Enerji Y + kes in the Central Aleutian Subduct + Data.# On Magnitude

malarının Ön Sonuçlar.# Marmara

)-Marmara Ereğlisi (Tekirdağ) Kıyı + Denizi nde, Büyük Çekmece (İstanbul + Denizi Sismik Yansma Profili Çalış + Denizi ve Çevresindeki Mikro - Depr + Denizi ve Çevresinin Gravite ve Man + Denizi ve Ege Bölgesinin Gravite ve + Denizi Izmit Körfezi, Yüksek Ayırım + Denizi, Türkiye.# Saros Körfezi Dol + Denizinde Jeotermal Olasılık ve Yap + Denizindeki Pliyo-Kuvaterner Ada Ya + Denizinin Jeolojik Yapısı# Doğal Uz + #Denizli - Buldan - Pamukkale Jeote + Denizli - Kızıldere Geothermal Ener + Denizli, Sarayköy - Buldan Area.# G + Density Data: Turkey.# Geothermal A Density, Seismic Velocities, Heat G Deprem Araştırmasının Sonuçları.# M + Deprem Bölgeleri Arasındaki İlişkil + Deprem Etkinliği ve Aktif Tektonikl + Deprem Kataloğu. # Türkiye ve Cevres + Deprem Kataloğu.# Türkiye ve Civarı + Deprem Mekanizmaları Açısından Irde + #Deprem Odak Mekanizması Çözümleri Deprem Istasyonunda Kaydedilen Sism + Depremi.# 12 Mayıs 1971 Burdur Depreminin Jeolojik ve Meteorolojik + Depremlere ait Fundamental Moddan Y + Depremleri Hakkında Makrosismik Göz + Depremleri Izahlı Kataloğu. # Türkiv + #Depremlerin Oluşturduğu Deformasyo + Depremlerinin Analizi# Sismik Momen + Depremlerinin Odak Mekanizmaları Ka + Depremlerinin Odak Mekanizmaları Ka Depremlerinin Odak Mekanizmaları ve Depremselliği# Göller Bölgesinin Depremselliği ve Aktif Tektoniği.# Depremselliği.# Akkuyu Nükleer Güç Depremselliği.# Batı ve Güneybatı T + Depremselliğini Oluşturan Tektonik Depth Earthquakes in the Hellenic A + Depth Seismicity in the Aegean Defi + Depths of Intercontinental and Inte Depths of the Earthquakes of the Ae Depuis le Miocene Superieur: I Evol Depuis le Miocene, Dans le Carde Ge der Aufbau der Krute and des Oberen + der benachbarten Gebieten# Über den der Insel Naxos# Beitrage zur Erfor der Krute and des Oberen Mantels im + der Mittleren Aegaeis# Über Alter u der tertiaren und quartaren Ergussg + der Troas im Mai 1881.# Reise in der Turkei.# Litho-und Biostratigra #Derin Elektrik Özdirenç ve MT Veri + Derinliklerinin Saptanması,# Edremi + Derived from Focal Mechanisms of La Derived from Inversion of Macroseis + Derived from Surface - Wave Tolmogr + des agaischen Raumes und der benach des Axes Principaux des Contraintes + des Bey Gağları Orientaux, Reconstr + des Contraintes Pour une Population des Cyclades (Grece): I ile de Paro + des Dinarides aux Taurides.# Esquis des Dinarides; Paleotectonique, Tar des Eğrigöz-Massivs# Orthoklas-Mikr des Eivages Ioniens (Cephalonie, Gr des Formations Attribuees au Messin + des Fronts de Formation de la Ridge + Des Ganeys, Anno, 1935.# La Crocier des Hellenides en Macedonie (Grece) des Letzten Dezenniums.# Über die T des Menderes Kristallins/SW-Anatoli des Menderes-Massivs# Petrologische des Oberen Mantels im Östlichen Mit des Raumnes Zwischen Datca-Mugla-Da des Relations Entre Deformation Hor des Taurides Occidentales.# L al Lo #Des Tectoniques Superposees et de des Tektonischen Baues Griechenland + des Zones Internes des Hellenides e + Describe the Contribution of Gravit Description, Evaluation and First R + Descriptions of Active Tectonic Def Detachment Faulting and Accomodatio Detachment Faulting, Mykonos, Greec + Detachment Faults Formed During Ter Detachment in Southern Rodope Contr Detachment on Naxos and Paros (Cycl Detachment System and Rhodope Metam Detailed Analysis of Microearthquak Detailed Analysis of Microearthquak + Detailed Seismological Study# The K Detailed Study of a Normal Fault, E + Detailed Study of the Active Crusta + Detay Jeoloji Etüdü.# Alaşehir - Sa + #Detection and Location of Earthqua Determination by Using Macroseismic +

Yilmaz, B. 1996 Cetin, S.+ 1998 Eyidoğan, H.+ 1998 Genç, H. T.+ Genç, H. T.+ 1996 1996 Özhan, G.+ 1985 Saner, S. 1985 Ercan, A.+ 1998 Ercan, T. Arpat, E. 1980 1976 Turgay, I.+ 1980 Şimşek, Ş. 1985 Simsek, S. 1985 Tezcan, A. K.+ 1991 Rvbach, L.+ 1982 Eyidoğan, H.+ 1998 Ketin, I. 1969 Üçer, B. S. 1990 Soysal, H.+ 1981 Ergin, K.+ 1967 Kalafat, D. 1995 Yoğurtçuoğlu, A. 1986 Ezen, Ü. 1979 Erinç, S.+ 1971 Fouche, M.+ 1943 Canitez, N. 1969 Ketin, I.+ 1969 Pinar, N.+ 1952 Nalbant, S. S. 1996 Utku, M. 1997 Özçep, T.+ Öncel, A. O.+ 1995 1995 Alptekin, Ö. 1978 Yılmaztürk, A. 1986 Kalafat, D. 1988 Alptekin, Ö.+ 1977 1979 Alkan, G. Barka, A. A. 1991 Comninakis, P. E.+ 1980 Hatzfeld, D.+ 1992 Chen, W. P.+ 1983 Kiratzi, A. A.+ 1991 1977 Angelier, J. Sorel, D. 1992 Stobbe, C. 1980 Paraskevopoulos, G. M. 1956 Trikkalinos, T. K. 1947 Stobbe, C. 1980 Dürr, S. 1975 Paraskevopculos, G. M. 1956 Schliemann, H. 1881 Becker-Platen, D.+ 1977 Çağlar, İ.+ 1996 Hisarlı, M. 1995 1991 Udias, A.+ Stavrakakis, G. N.+ Martinez, M. D.+ 1997 1997 Paraskevopoulos, G. M. 1956 1979 Angelier, J.+ Ricou, L. E.+ 1979 Angelier, J.+ 1979 1982 Robert, E. Aubouin, J.+ 1976 Aubouin, J. 1973 1972 Dora, 0. Ö. Mercier, J. L.+ 1972 Le Pichon, X.+ 1980 1995 Chaumillon, E.+ Cassinis, G. 1941 Mercier, J. L. Ketin, I. 1966 1948 Dürr, S. 1975 1977 Dora, O. Ö. Stobbe, C. 1980 Kaaden, G.+ 1978 1981 Angelier, J. Ricou, L. E.+ 1979 Aubouin, J. 1973 Trikkalinos, T. K. 1947 Mercier, J. L. 1966 1997 Hatzfeld. D.+ 1979 Renard, V.+ 1995 Thatcher, W. 1995 Emre, T.+ Lee, J.+ 1993 Lister, G. S.+ 1989 1993 Sokoutis, D.+ 1993 Gautier, P.+ Dinter, D. A.+ 1993 Chabalier, J. B.+ 1992 Hatzfeld, D.+ 1992 Hatzfeld, D.+ 1997 1988 Lyon-Caen, H.+ Papazachos, B. C.+ 1996 Ünal, A.+ Frohlich, C.+ 1970 1982 1961 Galanopoulos, A.

es Contraintes Pour une Population + Determination des Axes Principaux d + ecce and the Surrounding Area# Towa + Determination for Earthquakes in Gr + in Turkey by Terrestrial Geodetic M + #Determination of Crustal Movement + Determination of Crustal Movements in Turkev# Activities for the ity Zones beneath Greece and Surrou + Determination of High and Low Veloc s in Geothermal Areas of Northweste Determination of Recharge Condition + s of Gradient Drilling.# Geology of Determination of Reservoirs by Mean + es and Motions from Lageos Laser Ra #Determination of Station Coordinat + on in Central Greece from 1900 to 1 Determination of Tectonic Deformati + the Eastern Mediterranean# The W Determination of the Geokinematics Central Greece With Respect Europe: Determination of the Kinematics of Determination of the Strain in Gree ce in the Interval 1900 - 1988 (Abs al Velocity Anomalies Under a Seism #Determination of Three - Dimension + r Larger Earthquakes of 1959 - 1962 Determination P- Nodal Solutions fo ity in the Peloponnesus region by P Determinations.# A Study of Seismic eismic Moments and Focal Depths of Determined by Waveform Modeling. # S + GEOS.# Crustal Motions in the Medit Determined from Laser Ranging to LA rustal Deformation in the Gulf of C + Determined from Seismicity# Rates C of Earthquakes# The Horizontal Velo + Determined from the Moment Tensors mmungen aus dem Jungtertiar der Tur + Deutung Radiometrischer Altersbesti Develop into a New Marine Theatre.# + Offshore Greece may Development in Turkey.# Geothermal Energy Basin: Tectonics and Sedimentation + Development in Weste Turkey, Gördes uring the Barrovian-Style M2 Metamo + Development of Marble Assemblages D + tern Greece.# Structural Development of Neogene Bains in Wes the Sea of Crete: A Synthesis# The + rmal Energy in Turkey. # Present Sta + dere Geothermal Energy Field of Tur he North Anatolian Fault Zone Acros Oblique Fault Zone of the North Aeg Mechanischen Folgerunges aus Grosse reas# A Catalogue of Focal Mechanis dthe Brezi Sizmogien Vlore Aegean Basin Accelerate the rate of ertiaren und quartaren Ergussgestei + en# über runges aus Grossen Anatolischen Erd + he South Aegean Volcanic Arc: the C Examples from the Central and Sou all in Regions of Low Angle Normal Walls in Regions of Low-Angle Norma ms.# A Detailed Analysis of Microea # A Detailed Analysis of Microearth nd der Aufbau der Krute and des Obe with Earthquakes in the Mediterrane ucture Beneath the Aegean Region an of the Upper Mantle Beneath Southea r a Seismic Array Using First P - A + ctober 1, 1995, re Model with Implications for Seis + tructurale de I Arc Egeen Externes; .# Paleomagnetic Results from South nonian Basin and the Surrounding Mo ctonique, Neotectonique.# Des Tecto ty Field of Greece# P-wave Travel Time Residual rdur Earthquake of 12 May 1971.# Su he Aegean# First Palaeomagnetic Res le İlgili Calışmalara Katkısı# Türk # Lateral Variations of Attenuation n the Stabro Trench, East Mediterra ological Research in the Alps# Seco + des, Greece).# The Tectono-Metamorp ure along N - S Direction in Wester + ecanse Islands - ATH as Inferred fr + ea# Shear-wave Velocity Models from + ed in Athens. Possible Anisotrophy in Turkey from + estern Turkey from Rayleigh Wave e Eastern Mediterranean Inferred fr + ık Filtre Tekniği ile Asya, Avrupa d Regional Components of Western ae nd Regional Components of Western A the Area of Greece.# Attenuation o + anian Plateaus.# Lateral Variations # Seismic Strain Rates in Regions 0 + ian Fault Associated with the Large ation. # Neogene and Quaternary Volc + Seismic Velocity its Relation to Aegean Region.# Sei + bolite Facies Metamorphism, Naxsos in the Mediterranean.# Tectonic Fra cal Depth Earthquakes in the Hellen of Turkey) as Inferred from MT Surv anean Ridge: A Synthesis Incorporat nary Volcanic Rocks from Central an + e Mediterranean and Surrounding Ar entals: Analytical and Approximate zibe) Şiddeti Ölçmeleri (4 Pandüllü + Map of Rhodes Island (Greece) Expla + hos, Rhodes).# Sur la Geologie de I from the Analysis of the Rayleigh + lanılan Yerbilimleri Kriterleri.# E + in Jeolojik Yapısı

Development of the Hellenic Arc and + Development Possibilities of Geothe + Developments of the Denizli - Kızıl + Dextral Strike - Slip Motion from t + Dextral Strike-Slip Fault into the + Dezenniums.# Über die Tekronisch -Diagrams for Turkey and Adjoining A Diber.# Termeti I 30 Nendorit 1967 #Did the Onset of Extension in the die provinzialen Verhaltnisse der t die Smirgelgesteine Sudwest-Anatoli die Tekronisch - Mechanischen Folge Different Deformation Patterns in t #Different Foreland Basins in Italy Differential Streching of Hanging W Differential Stretching of banging Digital Three - Component Seismogra Digital Three-Component Seismograms #Dil Physikalischen Etgenschaften u Dimension, and Stresses Associated Dimensional Seismic Attenuation Str Dimensional Seismic Velocity Image Dimensional Velocity Anomalies Unde Dinar Earthquake, SW Turkey.# The O Dinar, Earthquake (Ms=6.1): a Ruptu Dinarides aux Taurides.# Esquisse S Dinarides, Albanides and Hellenides Dinarides. # Neotectonics of the Pan Dinarides; Paleotectonique, Tardite Dipping Plate in Greece.# The Gravi Dipping Plate in the Aegean Arc in Direction in Western Turkey from Bu Directions and Tectonic Models in t Diri Fay Haritası ve Aktif Tektonik + Discontinuities in the Lithosphere. #Discovery of an Anoxic Basin withi Discussion About Perspectives of Ge #Discussion on the Antalya Nappes. Dismembered Ophiolite (Tinos, Cycla + Dispersion and Upper Crustal Struct + #Dispersion Curves for the Path Dod + Dispersion in the Broader Aegean Ar + #Dispersion of Surface Waves Record + Dispersion. # Crustal Structure and Dispersion.# Crustal Structure of W Dispersion.# Crustal Strucute of th Dispersiyonunun Incelenmesi.# Ardış + Displacement Measurements# Local an + Displacement Measurements.# Local a Distance for Shallow Earthquakes in Distances Across the Turkish and Ir + Distributed Continental Deformation Distribution Along the North Anatol Distribution and Geotectonic Implic Distribution in the Aegean Region# Distribution in Western Turkey and Distribution of Fluids During Amphi Distribution of Miocene Evaporites Distribution of the Intermediate Fo Distribution on Gölpazarı (NW part + Distribution over the East Mediterr Distrubution in tertiary and Quater + #Distrubution of Seismic Foci in th Divergent, and Srtike-Slip Environm + #Divarbakır ve Padova Yer Çekim (Ca + Dodecanese Islands. IX. Geological + Dodecanese Meridonal (Kasos, Karpat + Dodecanse Islands - ATH as Inferred + Doğal Uzantısı,# Ege Doğal Uzantısının Saptanmasında Kul + #Doğal Uzanım Açısından Ege Denizin + lu nun Doğal Uzanımı# Ege Denizi nde Anado +

Angelier, J.+ 1979 Papazachos, B. C.+ 1997 Deniz, R.+ 1993 Aksoy, A.+ 1997 Drakatos, G. 1989 Eisenlohr, T.+ 1997 Eşder, T.+ 1975 Noomen, R.+ 1991 Billiris, H.+ 1991 Wilson, P.+ 1993 Le Pichon, X.+ 1995 Billiris, H. et al. 1989 Aki, K.+ 1976 Hodgsom, J. H.+ 1965 Leydecker, G.+ 1978 Kiratzi, A. A.+ Noomen, R.+ 1991 1993 Tselentis, G. -A.+ 1986 Jackson, J.+ Becker-Platen, D.+ 1992 1977 West, J. Simsek, S. 1973 1990 Seyitoğlu, G.+ 1994 Baker, J.+ 1994 Brooks, M.+ 1988 Angelier, J.+ 1982 Şimşek, Ş. 1995 Simsek, S. 1985 Reilinger, R. E.+ 1995 Mercier, J. L.+ 1991 Ketin, I. 1948 Canitez, N.+ 1967 Sulstarova, E.+ 1969 Kastens, K. 1990 Paraskevopoulos, G. M. 1956 Önay, T. S. 1949 Ketin, I. 1948 Kondopoulou, D. P.+ 1990 De Alteriis, G. 1995 Şengör, A. M. C. 1986 Sengör, A. M. C. 1987 Chabalier, J. B.+ 1992 Hatzfeld, D.+ 1992 Stobbe, C. 1980 North, R. D. 1977 Hashida, R.+ 1988 Hovland, J.+ 1981 Aki, K.+ 1976 Eyidoğan, H.+ 1996 Pinar, A. 1998 Aubouin, J.+ 1976 Mauritsch. H. J.+ 1995 Horvath, F. 1984 Aubouin, J. 1973 Gregersen, S.+ 1984 Gregersen, S. 1977 Ezen, Ü. 1991 Morris. A.+ 1996 Şaroğlu, F.+ 1997 Molnar, P.+ 1969 Jongsma, D.+ 1983 Schmid, S. M.+ 1996 Şenel, M. 1983 Katzır, Y.+ 1996 Ezen, Ü. 1991 Kalogeras, I. S.+ 1993 Kalogeras, I. S.+ 1996 Papazachos, B. C.+ 1967 Mindevalli, O. Y.+ 1989 Ezen, Ü. 1991 Cloetingh, S.+ 1980 Canıtez, N. Curtis, A.+ 1975 1995 Curtis, A.+ 1997 Drakopoulos, J. 1978 Kandinsky-Cade, K.+ 1981 Ekström, G.+ 1989 1996 Barka, A. A. Innocenti, F.+ 1981 1995 Küleli, H. S.+ Küleli, H. S.+ 1997 Buick, I. S.+ 1991 1973 Mulder, C. J. Comninakis, P. E.+ 1980 Çağlar, İ. 1995 1982 Le Pichon, X.+ Innocetti, F.+ 1977 Papazachos, B. C. 1973 1985 England, P. C.+ Elbek, Y. 1963 Mutti, E.+ 1,970 1970 Aubouin, J.+ Kalogeras, I. S.+ 1993 1992 Görür, N.+ 1996 Ervilmaz, M. 1976 Arpat, E. Küleli, H. S.+ 1993

on Yelpaze Çökelleri ve Gdiz Graben + lileri matikliği İçin Olasılı Bir Mekanizm + tigrafisi ve Tektoniği.# Orta ey Kanadının Jeolojisi ve Petrograf + hy the Lg Phase Güneyindeki Metamorfitlerin Petrog + onik Yerleşimi, Kuzey Ege Denizi, T + # Deformations en Compression Dans + activities magmatiques Egeennes de Neogene de I Egee: la Deformation D tlantik Tip Bir Kıta Kenarının Pasi Ağda Yatay Hareketlerin Araştırılm graphy of the Europe - Mediterranea in Southwestern Turkey.# Active No ihisar Geothermal Area, Western Ana dsfdsfdsfds olopipolpi# Tertiaryuaternary Alkaline Magmatism of the a Arc: Some New Elements from # Termeti I 30 Nendorit 1967) Entre Salihli et Alaşehir.# Etude + ades, Greece).# Donnees Nouvelles s Poinconnement et Ecrasement Ridge ension in the Aegean Region from th os (Cyclades, Greece).# Donnees Nou nes dans les Cyclades (iles de Naxo ulting, Mykonos, Greece,# Late Mioc Turkey# Evidence for Dynamic Coupli ism, Naxsos (Greece).# The Nature a tion of Retreating Subduction Bound h Application to the Tibetian Plate Rotation of Vertical Shear?# Fault in Closure in Eastern Central Greec on in the Northern Colorado River R orphic Event, Naxos, Greece# Textur ectonic Regimes in the Aegean Basin t Terrane: Sifnos (Cyclades), Greec the Menderes Massif).# Menderes Ma ysical Surveys in the Mediterranean Yorumlarda Kullanılması# Menderes M Arasındaki İlişkiler# Türkiye nin Manyetik Haritasına Uygulanması.# faunas: Hipparionlarında Odontoloji rol Kaynaklı Manyetoteullürik (CSAM + eminin Gelisimi Üzerine doğusunun Oluşumu Üzerine egion and Rotation of Turkey.# Pale + es with Isostatic Compensation in t + educed from Geophysical Data# A in Southern Aegean Sea.# Static and + n the Mediterranean Region.# Struct + e Region# Crust-Mantle Evolution, S + ts from the Ductile Crust# 3D-Kinem + ates Computed from SLR and GPS obse lobal Data Set.# Heat Loss from the + Distribution on Gölpazarı (NW part + l with Implications for Seismotecto aphic Provinces of the Eastern Medi ult Geometry in Turkey and its Infl d Surrounding Area, 1881 - 1980. the Interval 1913-1970.# An ast Squares Estimation of Hypocente + ast Squares Estimation of Hypocente + vity Around the western Extension o + ectonics of the Marmara Sea Region is of of the 13 May 1995 Kozani-Grevena (+ eir Tectonic Implication. # Focal Me + n Hellenic Arc Relative to the Plat + n Hellenic Arc Relative to the Plat + Reigon.# The 1962.# Computer Re-evaluation of + ic Implications of a Review of Euro + nic Trench Near Crete tic sea and Western Greece: Implica + Wave Dispersion and Upper Crustal from a Detailed Seismological Stud ossible Asperity within the Normal + Gediz (Turkey) durnu Valley, West Anatolia, Turkey + - Marmara aros eliminary Report for the Şarköy-Mür + to Area, Eastern Tuekey. ctonic Aspects of the Gediz, Turkey -Pacific Convergent Belt.# Long-ter + tions Between General Tectonic Feat + nce for Transform Faulting in the I + Ynthesis of Seismological and Geolo + 13.10.1997 (Ms=6.6) Western Hellen + 1, 1995, Dinar mal Fault, Evidences for East-West + ty in the Upper Mantle Beneath the on the Mid-Oceanic Ridges.# Mechani + for the Mechanical Properties of th +

Doğru Kalınlaşan Neojen Yaşlı Alüvy + #Doğu Akdeniz Bölgesi Gravite Anoma + Özelçi, F. Doğu Ege Bölgelerinin Yapısı ve Mag + Kaya, O. Doğu Ege Çöküntüsünün (Neojen) Stra Kaya, O. Doğusunda Kalan Menderes Masifi Gun + does not Traverse Oceanic Crust.# W + Doku İçerisindeki Gelişimleri# Çine + Dolayının Çökelme İstifleri ve Tekt + Saner, S. Donnees Neotectoniques et Sismiques + Donnees nouvelles et Synthese# Les #Donnees Nouvelles sur / extension Dönüşümüne Türkiye den Bir Örnek# A Yilmaz, Y. dorukcan Vadisinde Kurulan Jeodezik Down to 1400km. # Travel - Time Tomo Drainage Patterns and Sedimentation + Paton, S. Drilling.# Geology of Izmir ~ Sefel dscdsf 123213sdfdsfd 12321 32432432 dsfdsfdsfds olopipolpi# Tertiary- Q + DSS Data.# Ionian Basin and Calabri + dthe Brezi Sizmogien Vlore - Diber. + du Graben de Gediz (W de I Anatolie Emre, T. du Granite Miocene de Mykonos (Cvcl du Systeme Alpin en Mediterraneane; Ductile Crust# 3D-Kinematics of Ext Ductile du Granite Miocene de Mykon + Ductile et Sedimentaires Mio-Plioce Ductile Extension and Detachment Fa Lee, J.+ During Active Extension of Western During Amphibolite Facies Metamorph During Continental Collusion# Evolu During Continental Convergence, wit + During Continental Extension: Block During Palaeogene Thrusting and Bas During Tertiary Continental Extensi During the Barrovian-Style M2 Metam During the Cenozoic.# Extensional T During the Exhumation of a Blueshis During the Neotectonic Evolution of During the Period 1961-1964.# Geoph + Durumları ve Bunların Petrojenetik + Durumu ile Başlıca Deprem Bölgeleri + Ketin, l. Düzenlenmesi ve Ege Bölgesi Havadar + #Düzpinar (Manisa) Miosen Omurgalı Yücel, M. Düşey Elektrik Sondaj (DES) ve Kont + Düsünceler# Ege Bölgesi Graben Sist + Düşünceler.# Çanakkale Boğazı Kuzey + Dykes and Tuffs from the Mesudiye R + Dynamic Coupling of Surface Process + Dynamic Model of the Hellenic Arc D + Dynamic Properties of Upper Mantle Dynamics of Faulting, # The Dynamics of Subducted Lithosphere i + Dynamics of the Mediterranean-Alpin + Early Miocene tothe Present, Insigh + #Earth Rotation and Station Coordin Earth s Interior: Analysis of the G + Earth. # Seismicity of the Earth.# The Electrical Conductivity + Çağlar, I. Earthquake (Ms=6.1): a Rupture Mode + Earthquake Activity in the Physiogr + Pinar, A. Earthquake Activity# Strike-Slip fa #Earthquake Catalogue for Turkey an Earthquake Catalogue for Turkey for Earthquake Data. 1. Simultaneous Le Earthquake Data. 2. Simultaneous Le Lio, Y.+ Earthquake Fault# Microseismic Acti Earthquake Fault Plane Solution.# T Earthquake Focal Mechanism.# Analys Earthquake# Geodetic Investigation Earthquake in Western Turkey and th #Earthquake Locations in Izland Arc #Earthquake Locations in the Wester #Earthquake Locations in the Wester Earthquake Mechanism of the Balkan Earthquake Mechanism Solutions 1922 Earthquake Mechanism.# Seismotecton #Earthquake Mechanisms in the Helle #Earthquake Mechanisms of the Adria Earthquake of 12 May 1971.# Surface Earthquake of 13 May 1995 Revisited Earthquake of 18 November 1992: A P Earthquake of 1970 March 28th. # The + Earthquake of 22 July 1967.# The Mu Earthquake of 9 August 1912.# The S Ateş, R.+ Earthquake of 9th August, 1912.# Pr + #Earthquake of August 19, 1966, Var Earthquake of March 1970.# Seismote Earthquake Prediction in the Circum Earthquake regions of Turkey.# Rela Earthquake Sequence of 1983.# Evide Earthquake Sequence, SW Turkey: a S + Earthquake# Source Inversion of the Earthquake, SW Turkey.# The October + Earthquake: Detailed Study of a Nor + Earthquakes and lateral Inhomogenei + Earthquakes and Nature of Faulting Chen, W. P.+ Earthquakes and their Implications

Yağmurlu, F 1997 1973 1982 1979 Başarır, E. 1970 Zhang, T.+ 1995 Başarır, E. 1975 1985 Mercier, J. L.+ Bellon, H.+ 1972 1979 Faure, M.+ 1988 1981 Öztürk, E.+ 1987 Spakman, W.+ 1993 1992 Eşder, T.+ 1975 Francalanci, L.+ 1990 Francalanci, L.+ 1990 Ferrucci, F.+ 1991 Sulstarova, E.+ 1969 1990 Faure, M.+ 1988 Tapponnier, P. 1977 Jovilet, L.+ 1994 Faure, M.+ 1988 Gautier, P.+ 1990 1993 Westawav, R. 1994 Buick, I. S.+ 1991 Royden, L. H. 1993 England, P + 1989 Westaway, R.+ 1993 Morris, A. 1995 Lister, G. S.+ Baker, J.+ 1989 1994 Mercier, J. L.+ 1989 Avigad, D.+ 1992 Sözbilir, H.+ 1996 Allan, T. D.+ Dora, O. Ő. 1965 1975 1969 Sanver, M. 1975 1984 Arslan, F. 1995 Arpat E.+ 1969 Demirbaŭ, E.+ 1998 Orbay, N.+ 1979 Westaway, R. 1994 Makris, J. 1976 Tassos, T. S. 1984 1951 Anderson, E. M. Wortel, M. J. R.+ 1992 Mueller, S.+ 1993 Jovilet, L.+ 1994 1995 Noomen, R.+ Pollack, H. N.+ 1993 Gutenberg, B.+ 1954 1995 1998 Galanapoulos, A. G. 1968 Barka, A. A.+ Ayhan, E.+ 1988 1987 1975 Tezuçan, L.+ Crosson, R. 1976 1976 Crosson, R. 1991 Evans, R.+ 1985 Pektaş, A. R. 1998 Clarke, P. J.+ 1997 Alptekin, Ö 1973 Engdahl, E. R.+ 1982 Papadopoulos, T.+ Papadopoulos, T.+ 1988 1988 Ritsema, A. R. 1974 Wickens, A. J.+ 1967 Ritsema, A. R. 1969 Taymaz, T.+ 1990 Baker, C.+ Ezen, Ü. 1997 1991 Hatzfeld, D.+ 1997 1996 Hatzfeld, D.+ 1970 Ambraseys, N. N.+ Ambraseys, N. N.+ 1969 Ambraseys, N. N.+ 1987 1976 Wallace, R. E. 1968 Ambraseys, N. N.+ 1972 Papazachos, B. C.+ 1996 Ketin, I. Scordilis, E.+ 1968 1985 1992 taymaz, T.+ 1998 Barış, Ş.+ Eyidoğan, H.+ 1996 Lyon-Caen, H.+ 1988 1996 Taymaz, T. Sykes, L. R. 1967

1983

c Implications# Rupture Process and + c Implications# Rupture Process and + n Sea.# An Interference Phenomenon + n Sea.# An Interference Phenomenon unding Area# Toward a Homogeneous M ce Parameters Estimation of Time and Magnitude Predictable Mode + Attenuation of Intensities with Di + Subduction Zone Using Island and O ault Zone (Turkey)# Source Paramete + pace and Time Distribution of the I + d Middle East.# Seismic Moment, Sou + er - Determination P- Nodal Solutio urkey: Implications for the Nature rmined by Waveform Modeling. # Seism 67.# Slip Distribution Along the No Fastern Turkey, Caucasus and the H mation in Western Turkey as Deduced g the Eurasia-Africa Plate Boundary Field in the Deforming Aegean Sea 1 Model.# Determination of Three on and Magnitude - Intensity Relati + Aegean rld.# Plate Kinematics: the America + Source Parameters of Large Earthqu is Incorporating New Sea-Beam Data. n Anoxic Basin within the Stabro Tr hwestern Turkey)# First Paleomagnet Short-period Sn and Lo in the Midd graphic Information System (GSI)# M e Motions and Seismic Moment Tensor ormal-fault Scarps in the Hellenic Arc# The 1986 Kalamata (South Pelo sion, and Stresses Associated with hosphere in the Central nd Lesbos Island)# Geochronology an + ressional Regime: a Review# Compari tic Evidence from Mesozoic Carbonat the Carpathian Orocline as an Exam labrian and Cyprus Outher Ridges).# lenic Arc and Trenc System: A Kev t + lenic Arc and Trench System: A Key mple# Land-Locked Oceanic Basins an ismic Reflection Data. # New Data on + ollision Zone# Coherent Plate Motio + the vidence Concerning Compressional Te + alies and Crustal Shortening in the + Rayleigh Wave Dispersion.# Crustal Satellite Laser Ranging Measuremen + alibration of Sporomorph Associatio + omorph Associations and Event Strat egional tectonics of the ive Deformation in the onstraints an Age and Total Offset sparta Angle: Its Importance in the Isparta Angle: its Importance in th + ed From GPS, Neotectonic and Seismi + ction, Collision, and Arc Jumping# ction, Collision, and Arc Jumping.# + Cruise)# Two-Ship Deep Seismic Sou + Cruise).# Two - Ship Deep Seismic nterpretation# An Aeromagnetic Surv + nterpretation. # An Aeromagnetic Sur + rom Geophysical Data# Physical Prop tive Constraints by Using Anoxic Ba + try of the Anomalies and Inferred Crustal Str + Anomalies in the elocities of Rayleigh Waves in Sout + rces of the Deep Water of the odetic Determination of the Kinemat + Medlas Project Preliminary Result o + tation of Gravity Anomalies in the aphic Correlations in the Eastern M + ure and Tectonics of the in the Studies in the Aegean Sea and in t + surements in the Seismic Studies in the sical Profiles in the ake Activity in the Physiographic P + Unconsolidated Sediments in the Distribution and Geotectonic Impli + 1 Review# The Tectonics of the st 19, 1966, Varto Area, ndu - Kush Regions. # Focal Mechanis + c Patterns in the sical Features of the Greek Island iption, Evaluation and First Result + de Blueschist in the Cyclades Archi + ution Tectonique du Systeme Alpin e + irilmesi.# Anadolu Kavağında Yapıla ound-Table Discussion About Perspec e Nokta Derinliklerinin Saptanması. + n Transformation in Migmatiten des Rheology on Large-Scale Continenta +

Earthquakes and Their Seismotectoni + Earthquakes and Their Seismotectoni + Earthquakes in and around the Aegea + Earthquakes in and around the Aegea + Earthquakes in Greece and the Surro + Earthquakes in Marmara Region# Sour + Earthquakes in the Aegean Area.# A Earthquakes in the Area of Greece.# Earthquakes in the Central Aleutian + Earthquakes in the East Anatolian F Earthquakes in the Hellenic Arc. # S + Earthquakes in the Mediterranean an + Earthquakes of 1959 - 1962.# Comput Earthquakes of 1969-70 in Western T + Earthquakes of the Aegean Area Dete Earthquakes of the Period 1939 - 19 Earthquakes of the Persian Plateau, Earthquakes# Rates of Crustal Defor Earthquakes# Regional Stresses Alon Earthquakes# The Horizontal Velocit + Earthquakes. 1. A Homogenous Initia + Earthquakes. # Intensity - Attenuati Earthquakes. # Source Parameters of East Africa, and the Rest of the Wo East Anatolian Fault Zone (Turkey)# East Mediterranean Ridge: A Synthes East Mediterranean.# Discovery of a East of the Isparta Reentrant (Sout East# Propagation Characterstics of East Tectonics: Applications of Geo East# The Relationship Between Plat + #East-West Extension and Holocene N East-West Extension in the Hellenic + East. # Seismic Moment, Source Dimen Easten Mediterranean Area.# The Lit Eastern Aegean Sea (West Anatolia a Eastern Anatolia Formed under a Cop + Eastern Central Greece: Palaeomagne #Eastern European Alpine System and + Eastern Mediterranean (Hellenic, Ca + Eastern Mediterranean Area# The Hel Eastern Mediterranean Area# The Hel Eastern Mediterranean as a Case Exa Eastern Mediterranean Basin from Se Eastern Mediterranean Continental C Eastern Mediterranean# Evolution of Eastern Mediterranean# Geological E Eastern Mediterranean# Gravity Anom + Eastern Mediterranean Inferred from + Eastern Mediterranean Inferred from Eastern Mediterranean Neogene, 5, C + Eastern Mediterranean Neogene. Spor Eastern Mediterranean Ophiolites# R Eastern Mediterranean# Rates of Act + Eastern Mediterranean Region# New C Eastern Mediterranean Region# The I Eastern Mediterranean Region.# The Eastern Mediterranean Region: Deduc Eastern Mediterranean Region: Subdu + Eastern Mediterranean Reigon: Subdu + Eastern Mediterranean Sea (Pasiphae Eastern Mediterranean Sea (Pasiphae + Rastern Mediterranean Sea and Its I + Eastern Mediterranean Sea and its I Eastern Mediterranean Sea Deduced f Eastern Mediterranean Sea- Quantita + Eastern Mediterranean Sea.# Bathyme Eastern Mediterranean Sea.# Gravity + Eastern Mediterranean Sea.# Gravity Eastern Mediterranean Sea. # Phase V Eastern Mediterranean Sea.# The Sou + Eastern Mediterranean Tectonics# Ge + Eastern Mediterranean# The Wegener-Eastern Mediterranean.# An Interpre + Eastern Mediterranean.# Biostratigr Eastern Mediterranean.# Deep Struct Eastern Mediterranean.# Deformation Eastern Mediterranean.# Geophysical + Eastern Mediterranean.# Gravity Mea Eastern Mediterranean.# Preliminary Eastern Mediterranean.# Some Geophy Eastern Mediterranean. # The Earthqu Eastern Mediterranean.# Thicness of Eastern Mediterranean. Time - Space eastern Mediterranean: A Geophysica + Eastern Tuekey.# Earthquake of Augu Eastern Turkey, Caucasus and the Hi Easternmost Mediterranean.# Tectoni + Eastrn Mediterranean Ridge.# Geophy Echo-Sounding in Jean Charot. Descr #Eclogites Associated with High Gra + Ecrasement Ridge - Plastique. # Evol + Edilen Sismilk Kayıtların Değerlend + Editorial Remarks and Result of a R + #Edremit - Susurluk Bölgesinin Curi + Eğrigöz-Massivs# Orthoklas-Mikrokli + #Effects of a Temperature-Dependent +

Pinar, A. 1995 Pinar, A. 1995 Ezen, Ü. 1988 Ezen ü 1983 Papazachos, B. C.+ 1997 Ergin, M.+ 1990 Papazachos, B. C 1992 Drakopoulos, J. 1978 Frohlich, C.+ 1982 Tavmaz. T.+ 1991 Comminakis, P. E.+ 1980 North, R. D. 1977 Hodasom, J. H.+ 1965 Eyidoğan, H.+ 1985 Kiratzi, A. A.+ Barka, A. A. 1991 1996 Nowroozi, A. A. 1972 Evidoğan, H. 1988 Udias, A.+ 1991 Jackson, J.+ 1992 Aki, K.+ 1976 Ambraseys, N. N. 1985 Brooks, M.+ 1990 Chase, C. G. 1978 T.+ Taymaz, 1991 Le Pichon, X + 1982 Jongsma, D.+ 1983 Kissel, C.+ 1993 Rodgers, A. J.+ 1997 Şeber, D.+ 1997 Jackson, J.+ 1988 Armijo, R.+ 1992 Lyon-Caen, H.+ 1988 North, R. D. 1977 Calganile, G.+ 1982 Borsi, S.+ 1972 1990 Morris. A. 1995 Burchfiel, B. C. 1980 Stride, A. H.+ 1977 Le Pichon, X.+ 1979 Le Pichon, X.+ 1979 Le Pichon, X. 1982 Sancho, J.+ 1973 Oral, M. B.+ 1995 Woodside, J. M. 1975 Rvan, W. B. F.+ 1982 Rabinowitz, P. D.+ 1970 Cloetingh, S.+ 1980 Smith, D. E.+ 1994 Benda, L.+ 1979 Benda, L.+ 1990 Dilek, Y.+ 198? Jackson. J. 1993 Barka, A. A.+ 1988 Barka, A.+ 1995 Barka, A. A.+ 1996 Barka, A. A.+ 1997 Rotstein, Y.+ 1982 Rotstein, Y.+ 1982 De Voogd, B.+ 1992 Voord 1992 Vogt, P. R.+ 1969 Vogt, P. R.+ 1969 Makris, J.+ 1984 Jongsma, D. 1987 Emery, K. O.+ 1966 Woodside, J. M.+ 1970 Woodside, J. M. 1968 Papazachos, B. C. 1969 Pollack, M. H. 1951 Le Pichon, X.+ 1995 Wilson, P.+ 1993 Harrison, J. C. 1955 Benda, L.+ 1990 Papazachos, B. C.+ 1978 1995 Robbins, J.+ 1975 Morelli, C.+ Cooper, R. I. B.+ Lort, J. M.+ 1952 1974 Wong, H. K.+ 1971 Galanapoulos, A. G. 1968 Wong, H. K.+ 1969 Innocenti, F.+ 1981 Lort, J. M. 1971 Wallace, R. E. 1968 Nowroozi, A. A. Kempler, D. 1972 1994 Papazachos, B. C.+ 1969 Renard, V.+ 1979 Okrusch, M.+ 1990 Tapponnier, P. 1977 Gürbüz, C.+ 1985 Schmid, S. M.+ 1996 Hisarlı, M. 1995 Dora, O. Ö. 1972 Sonder, L. J.+ 1989

Geomagnetic Reversal Time Scale on + #Effects of Recent Revisions to the + DeMets, C.+ ması# Batı Anadolu, Trakya ve Ege Adalarındaki Senozoyik Volkaniz + Ercan, T. liği İçin Olasılı Bir Mekanizma# Ege Bölgelerinin Yapısı ve Magmatik + Te + Kava. O leomagnetik Verilerle Incelenmesi. #Ege Bölgesi Genişleme Rejiminin Pa Orbay, N.+ simi Üzerine Düsünceler #Ege Bölgesi Graben Sisteminin Geli + Arpat, E.+ sına Uygulanması.# İki Boyutlu Alça + Ege Bölgesi Havadan Manyetik Harita Sanver M rmik Yapısı. #Ege Bölgesi nde Yerkabuğunun Jeote Ilkışık, O. M. le Üç Boyutlu Modellenmesi #Ege Bölgesi nin Sismik Tomografi i Kuleli, H. S. Ercan, T.+ tlerinin Petrolojisi ve Plaka Tekto + Ege Bölgesindeki Yeri# Uşak Volkani Yöntemlerle Araştırılması# Ege Deni + Ege Bölgesinin Gravite ve Manyetik Genç, H. T.+ e Üç Boyutlu Modellenmesi. #Ege Bölgesinin Sismik Tomografi il Küleli, H. S. fisi ve Tektoniği.# Orta Doğu Ege Çöküntüsünün (Neojen) Stratigra Kaya, O. Oluşuklarının Sismik Yöntemlerle Ar + Ege Denizi Çıkışı Pliyo-Kuvaterner Alpar, B.+ Kalınlığı #Ege Denizi Fay Tektoniği ve Çökel Eryilmaz, M.+ zantısınım Saptanmasında Kullanılan + #Ege Denizi nde Anadolu nun Doğal U Eryilmaz, M. 28000 #Ege Denizi nde Anadolu nun Doğal U + Küleli, H. S.+ e Manyetik Yöntemlerle Arastırılmas + #Ege Denizi ve Çevresinin Gravite v Genc. H. T.+ te ve Manyetik Yöntemlerle Araştırı #Ege Denizi ve Ege Bölgesinin Gravi Genc, H. T.+ Ege Denizi, Türkiye.# Saros Körfezi + Dolayının Çökelme İstifleri ve Tek + Saner, S. e Yapısal Iliskileri. #Ege Denizinde Jeotermal Olasilık v Ercan, A.+ a Yayı Volkanizması# Akdeniz ve Ege Denizindeki Plivo-Kuvaterner Ad + Ercan, T. 1 Uzanım Açısından Ege Denizinin Jeolojik Yapısı# Doğa + Arpat. E. #Ege Doğal Uzantısı. #Ege nin Neotektonik Evrimini Yonet + Görür, N.+ en Etkenler Şengör, A. M. C. Ege Yöresi# Yitme Zonlarında Volkan + i 121 i 12 -Pe, G. G.+ rc Concave Zagro -Taurique et les A + Ege: Collision et Arc Induits.# L A + Brunn, J. H. icite.# La Neotectonique Plio-Quate Egge et ses Relations Avec la Seism + Mercier, J. L.+ Mercier, J. L.+ cite# La Neotectonique Plio-Quatern + Egee et ses Relations Avec la Sismi + Egee# Structure et Evolution Recent e de la Mer Martin, ь. nite Miocene de Mykonos (Cyclades, Egee: la Deformation Ductile du Gra + Faure, M.+ donal (Kasos, Karpathos, Rhodes).# + Egee: Regard sur le Dodecanese Meri Aubouin, J.+ Egee: Subduction et Expansion .# Ne + Angelier, J.+ tectonique Horizontale et Verticale Egee: Subduction et Expansion.# Neo + Angelier, J.+ Greece).# Sismotectonique et Egeen (Iles Ioniennes, Acarnanie, E + Amorese, D. Mercier, J. L.+ ses Relations Avec la Sismicite# La Egeen Externe et de la mer Egee et Relations Avec la Seismicite.# La Egeen Externe et la mer Egee et ses Mercier, J. L.+ aurides.# Esquisse Structurale de I Egeen Externes: des Dinarides aux T Aubouin, J.+ Grece Nord Occidentale Depuis le M + Egeen.# L Evolution Structure de la + Sorel, D. Egeen.# La Neotectonique de I Arc Mercier, J. L.+ ns le Fosse Nord egeen.# La Sedimentation Neogene Da Lalechos, N.+ Dumont, J. F.+ Martin, C. monte Senestres Recents a T extremi + Egeen # Sur I existence de Coulisse + ttenuation Sous le Pelaponnese.# Ge Egeene Structure en Vitesse et en A + Crete et la Surrection de I arc He Egeenne, la Subsidence de la mer de Angelier, J. et leurs cadres geodynamiques. Don Eggennes de L Oligocene a nos jours + Bellon, H.+ Egeens Depuis le Miocene Superieur: I Evolution Recente de la Courbure Angelier, J. werestörungen im Östlichen Mittelme Einem Askania - Seegravimeter.# Sch + Einen Askania - Sea Gravimeter.# Sc + Fleischer, U. hwerestörungen un Östhicken Mittelm Eleischer, V.) - Donnees Neotectoniques et Sismi Eivages Ioniens (Cephalonie, Greece + Mercier, J. L.+ # Hydrogeological Investigation of Eksidere Thermal Waters (NW Turkey) + Yalçm, T. Gürbüz, C.+ Elde Edilen Sismilk Kavıtların Değe + rlendirilmesi.# Anadolu Kavağında Y ğunun Yapısının İncelenmesi.# Sente Eldesi ile Batı Anadolu da Yer Kabu Horasan, G. A.+ n on Gölpazarı (NW part of Turkey) Electrical Conductivity Distributio + Çağlar, I. Çağlar, I.+ e Saros ve Gökova Grabenlerinin Mod Elektrik Özdirenc ve MT Verileri il + Elektrik Sondaj (DES) ve Kontrol Ka ynaklı Manyetoteullürik (CSAMT) Etü Yücel, M. ntinental Crust in Calc - Alkaline Element Evidence for the Role of Co + Barton. M.+ Kasapoğlu, K. E.+ Element Models# Tectonic Consequenc + es of the Collision of the Arabian Elementaire Applique a I etude d un + Carey, E.+ e Population de Failles.# Analyse T Richter, C. F. #Elementary Seismology. Elements from DSS Data. # Ionian Bas + Ferrucci, F.+ in and Calabria Arc. Some New EMP and TEM-AEM Study of Margarite, + Feenstra, A. Muscovite and Paragonite in Polyme + Emplacement Ages of some Ophiolites + Hypes, A. J.+ in the Othris Region (Eastern Cent Hayward, A. B. Emplacement of the Lycian Nappes an + d the Antalya Complex, SW Turkey.# en Attenuation Sous le Pelaponnese. Martin, C. # Geometric et Cinematique de la Su Martin, C. Mercier, J. L.+ en Compression Dans le Quaternaire des Eivages Ioniens (Cephalonie, Gr Mercier, J. L. en Macedonie (Grece).# Paleogeograp 4 hie, Orogenese, Metamorphisme et Ma en Mediterraneane; Poinconnement et + Tapponnier, P. Ecrasement Ridge - Plastique. # Evo Martin, C. en Vitesse et en Attenuation Sous 1 + e Pelaponnese.# Geometric et Cinema Hatzfeld, D.+ Energy# An Analog Experiment for th e Aegean to Describe the Contributi + Energy Development in Turkey. # Geot + Şimşek, Ş. Şimşek, Ş. hermal Energy Field of Turkey. # Present St + atus and Future Developments of the + energy in Turkey.# The Research of T + Energy in Turkey.# Present Status a + C.+ Erentöz, hermomineral Resources and Geotherm + Şimşek, Ş. nd Future Development Possibilities Şahin, H.+ Enerji Aramaları Rezistivite Etüdü Ön Raporu.# Aydın - Germecik - Bozk Turgay, I.÷ Enerji Aramaları Rezistivite Etüdü. # Denizli - Buldan - Pamukkale Jeot enerji Olanakları.# Gediz Vadisi nd + Karamanderesi, I. H.+ e Genç Tektonik Olaylar ve Buna Bağ Ünal, A.+ Enerji Yönünden Detay Jeoloji Etüdü + .# Alaşehir - Salihli Bölgesinin Je Enez Deltalarmin Gravite Modelleme + Demirel, S.+ si.# Aşağı Meriç ve Yılmaz, P. O. Enigma.# The Alakır Çay Unit, Antal + ya Complex: a Tectonic Simşek, Ş. Enrgey in Turkey.# Importance of Ge + othermal Angelier, J. Entre Deformation Horizontale et Mo + uvements Verticaux: I extension Ege + Entre Salihli et Alaşehir.# Etude G + Emre, T. eologique et Structural du Graben d + Eisenlohr, T.+ #Environmental Isotope Study and 2- + D-Model-Ling of Cold and Thermal Ka 4 England, P. C.+ Environmentals: Analytical and Appr oximate Solutions for a Thin Viscou Van der Voo, R. Eocene Pose Positions from Northeas + tern Turkey.# Jurassic, Cretaceous -Noomen, R.+ 95L02 and SSC (DUT) 95C02 + .# Earth Rotation and Station Coord + EOP (DUT) Eosen Tektoniği.# Orta Torosların P Akay, E.+ Epicenter Data, 1961 - 1967.# World + Barazangi, M.+ Seismicity Map from ESSA, Coast an + Epicentre Map of Turkey and Surroun + Ergin, K. Amorese, D. ding Area.# On Epire, Greece).# Sismotectonique et + Deformation Acruelle de la Termina + Aubouin, J.+ #Equisse de la Geologic de la Grece + Dürr, S. Equivalente in der Mittleren Aegaei s# über Alter und Geotektonische St + Erdbeden des Letzten Dezenniums.# Ü + Erdek Bay of Marmara Sea.# Active F + Ketin, l. ber die Tekronisch - Mechanischen F Kavukçu, S. ault Investigation in Izmit Bay, Ba + Yilmaz, B. Ereğlisi (Tekirdağ) Kıyı Kesiminin + Deniz Jeolojisi ve Kuvaterner Evrim + Trikkalinos, T. K. Erforschung des Tektonischen Baues Griechenlands. II. Uber den Tektoni -Paraskevopoulos, G. M. und der benachbarten Gebieten# Übe + Ergussgesteine des agaischen Raumes + Sandwell, D. T.+ ERS-1 Geosat and Seasat Reveals New +

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apısal İlişkileri: Karakaya, İç Tor + mm Erzincan Batısındaki (KD Türki + igation on the North Anatolian Faul + in Marmara: A Plate Boundary in an genic Collapse# The Cause of N-S Ex + ike-Slip faulting and related Basin + n Externes: des Dinarides aux Tauri icenter Data, 1961 - 1967.# World S twork Across the Kephalonia Fault Z n# Seismic Deformation in the Medit the Marmara Sea Region, Northweste # Effects of Recent Revisions to th ation and its Application to Centra a Region# Source Parameters ty Parameters.# Crustal Structure M + ty Parameters.# Crustal Structure M Sediments in the Aegean Grabens by tructural du Graben de Gediz (W de o -Taurique et les Arcs Convexes Ta ene Structure en Vitesse et en Atte Avec la Sismicite# La Neotectonique t aux Modeles Geophsiques: I exampl nation Nord - Occidentale de I Arc c Hellenique Externe: Les Iles de K volution Tectonique du Systeme Alpi et L Arc Concave Zagro -Taurique et le se.# Geometric et Cinematique de la + # Structure et ontale et Verticale de I Egee: Subd + et ntale et Verticale de I Egee: Subdu + toniques.# L expansion Oceanique Ac tion d'un Segment de I Arc Helleniq c la Seismicite.# La Neotectonique e.# Analyse Quantitative des Relati et e: Collision et Arc Induits.# L Arc orogenese Alpine.# Les Zones Helle ees nouvelles et Synthese# Les acti s Hellenides en Macedonie (Grece).# n Egeenne, la Subsidence de la mer Elementaire Applique a I etude d un + dimentaires Mio-Pliocenes dans les les Cyclades (iles de Naxos et Par # La Neotectonique Plio-Quaternair + La Neotectonique Plio-Quaternaire et ression Dans le Quaternaire des Eiv de I Anatolie) Entre Salihli et Al + et ques Egeennes de L Oligocene a nos istorie et. et Expansion .# Neotectonique Horiz + et et Expansion.# Neotectonique Horizo ute and des Oberen Mantels im Östli + ini Yoneten isi# Marmara Bölgesi nin Deprem Analyse Theorique et Numerique d u + e); I ile de Paros. # Contribution a + Graben de Gediz (W de I Anatolie) E + ve Meteorolojik - Bozköy Jeotermal Enerji Aramaları + k Ayrımlı Sığ Sismik Körfezi, Yüksek Ayırımlı Sığ Sismi + in Jeotermik Enerji Yönünden Detay lanın Jeofizik Düşey Elektrik Sonda e Jeotermik Enerji Aramaları Rezist + hli (Manisa ili) Arası Gediz Nehri it and Tectonics of the Gloria Faul zoic Tethys# Subduction Beneath zoic Tethys, # Subduction Beneath ed from Focal Mechanisms of Large E + ion Zone.# A Tomographic Image of t + els# Tectonic Consequences of the C + cale P - Veolocity Structures in th + e P-Velocity Structures in the of to 1400km.# Travel - Time Tomograph + a.# Phase Velocities of Rayleigh Wa + aps of Gravimetric Data (in Greek).# Struc + rm Inversion.# 5 - Wave Below nd Body Waves. # The Gross Features Upper Mantle in Southeast ity Data: Turkey. # Geothermal Atlas + las of Minor# Delay-Time Tomography of th + ateral Variations of P Velocity in an Ancient Plate Boundary in low in Lithosphere - Asthenosphere System + Investigation of Crustal Structure + graphic Studies of the Upper Mantle . c Velocity Image of the Upper Mantl + d Upper Mantle in Southeast diterranean Tectonics# Geodetic Det + athian Orocline as an Example of Co + micity of the

Erzincan Batısındaki (KD Türkiye) Y + Erzincan Kenetleri.# Üç Kenet Kuşağ + Erzincan Refahiye.# Tectonic Invest + Esasları# Türkiye nin Neotektoniğin + Escape tectonic Regime.# The Sea of Escape VS Back-Arc Spreading VS Oro + Escape: Turkey as a Case Study# Str + #Esquisse Structurale de I Arc Egee ESSA, Coast and Geodetic Survey, Ep #Establishent of a Permanent GPS Ne + Estimated by Moment Tensor Summatio Estimates of Crustal Deformation in + Estimates of Current Plate Motions. + Estimation of Active Crustal Deform Estimation of Earthquakes in Marmar + Estimation of Hypocenter and Veolci + Estimation of Hypocenter and Veolci #Estimation of the Thickness of the et Alaşehir.# Etude Geologique et S et Arc Induits.# L Arc Concave Zagr + et Cinematique de la Subduction Ege et de la mer Egee et ses Relations et de Leur Signification par Rappor et Deformation Acruelle de la Termi et Deformation d un Segment de I Ar Ecrasement Ridge - Plastique, # E et Ege: Collision et Arc Induits.# + et en Attenuation Sous le Pelaponne Evolution Recente de la Mer Egee + Expansion .# Neotectonique Horiz + et Expansion. # Neotectonique Horizo et Fossile; ses Implications Geotec + et Karpathos.# Structure et Deforma et la mer Egee et ses Relations Ave la Surrection de I arc Helleniqu + et les Arcs Convexes Taurique et Eg et Leur Extension. Reflexions sur I et leurs cadres geodynamiques. Donn + et Magmatisme des Zones Internes de et Mouvements Verticaux. T extensio et Numerique d un Modele Mecanique et Paros).# Extension Ductile et Se et Sedimentaires Mio-Pliocenes dans + et ses Relations Avec la Seismicite + ses Relations Avec la Sismicite# et Sismiques. # Deformations en Comp + Structural du Graben de Gediz (W + et Synthese# Les activities magmati + Topologie de la Neo - Tethys.# H + Verticale de I Egee: Subduction et Verticale de I Egee: Subduction Etgenschaften und der Aufbau der Kr Etkenler# Ege nin Neotektonik Evrim + Etkinliği ve Aktif Tektonikle Ilişk + etude d une Population de Failles.# + etude Geologique des Cyclades (Grec + #Etude Geologique et Structural du Etüdü# Adapazar Depreminin Jeolojik + Etüdü Ön Raporu. # Aydın - Germecik Etüdü Raporu.# Gemlik Körfezi Yükse + Etüdü Raporu, # Marmara Denizi Izmit + Etüdü.# Alaşehir - Salihli Bölgesin + Etüdü.# Aydın - Imamkçy Jeotermal A + Etüdü.# Denizli - Buldan - Pamukkal + Etüdüne Ait Rapor.# Turgutlu - Sali + Eurasia - North America Plate Circu + Eurasia in Connection with the Meso -Eurasia in Connection with the Meso Eurasia-Africa Plate Boundary Deriv + Eurasian - African - Arabian Collis + Eurasian Plates: Finite Element Mod + Euro - Mediterranean Area.# Large S + Euro-Mediterranean Area# Large-Scal + Europe (1:5.0 Mio).# Heat Flow Map Europe - Mediterranean Mantle Down Europe and Eastern Mediterranean Se Europe and North Africa. # Isogram M + Europe by Inversion of Seismic and Europe from Delay - Time and Wavefo Europe from Seismic Surface Waves a Europe# Heat Flow Map of Europe# Tomography of the Crust and + Europe, Catalogue of Heat Flow Dens + Europe, Sheet Sophia.# Geotermal At Europe, the Mediterranean, and Asia Europe.# A Study of Large Scale L Europe.# Deep Seismic Expression of Europe.# Fault Tectonics and Heat F Europe.# Physical Properties of the + Europe.# Preliminary Results of an + Europe.# Seismic Anisotropy in Tomo 4 Europe.# Threa - Dimensional Seismi + Europe.# Tomography of the Crust an + Europe: Implications for Eastern Me + European Alpine System and the Carp + European Area. Part I. Prague# Seis + European Area.# Seismicity of the

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emotectonic Implications of a Revie + Attenuation and Magnitude - Intensi + Criteria for Beam, Multi-Beam Echo-Sounding in J + f the Western Mediterranean Ridge: ectonic Framework and Distribution oment Tensor Inversion of the 1983 editerranean.# Biostratigraphic Cor Izotopic Development of Marble Asse erranean Region Since the Middle Mi OAr Data from Metamorphic Rocks of Zone in the Mudurnu Valley, Wester Refractional Seismic Experiments.# ncept in the Southern Sector of the terpretation of the Southern Sector + ectonics in the Eastern Mediterrane se Rotation of Northern Greece Prio e Rotation of the Western Taurides Assimilation and Fractional Crystal on Along the Hellenic Arc, Greece.# on Along the Hellenic Arc, Southern + ation of the External Albanides# Pa + ck Rotation within the San Andreas on from Global Tomography Patterns in the South Aegean Volcan + urface Processes with Isostatic Com ex, Detachment Faulting and Accomod + enses of Adjacent Blocks in Northea + Zone of Albania.# First Paleomagne s in the Aegean Area# Paleomagnetic + Below Southern Spain.# The P - Wave Events on the North Anatolian Fault l Crust in Calc - Alkaline Volcanis + the Ionian Sea: the Cephalonia Isl + of Dextral Strike - Slip Motion fro Rotational Deformation During Palae ult Plane Solution. # Tectonics of t + r Clockwise Rotation of the Ionian c Schist in the Southhern Menderes Beneath Thessaloniki.# Seismotecton + tational Deformations of the Aegean + tational Deformations of the Aegean + on of the Menderes Massif# New n Turkey, 1, Observational n the Hellenic Arc# The 1986 Kalama + of Neotectonic Basin Across the He + of Seismicity: Akyazı/Adapazarı (Po -Structure of the Lithosohere and Up + Structure of the Lithosphere and Up + rologische e (Tinos, Cyclades, Greece).# The T + 1 Shear Zone in the Southern Mender + one, Naxsos, Greece.# The Late Alpi + stern Pacific. iddle Miocene# On the Hellenic Subd + iddle Miocene. # On the Hellenic Sub + Palaeomagnetic Measurements.# Meso ey.# Relation of Alkaline Volcanism from Observations in the Aegean Reg leomagnetic Results.# Tertiary Geod Boundaries Formed During Continent + omagnetic Reconstruction# The Terti + Evolution of the Corinth Rift and hesis Based on Continuous Reflectio + Isotopic Characterization of Aegea + amorphic Belt on Naxos (Cyclades, G rthwest Yurkey.# Geology and Tecton + ean.# Structure, Stratigraphy and ts Implications for the Late Cenozo + es and Hellenides.# Paleomagnetic R + nean ean Area# The Hellenic Arc and Tren + ean Area# The Hellenic Arc and Tren + the Late Miocene# Tectonic sics and Geodynamic Implications fo + Geophysical Aspects on the pects# Orogenic etamorphic History and Geotectonic + ew Evidence on the Geotectonic Menderes Masifi nin Neotektonik Ev + y Antalya Complex.# Microplate Tect + . h# Tectonic h, Northern Aegean Sea.# Structure + n Region# Late Cenozoic Volcanic he Atlantic to the Pamirs since the + d on Palaeomagnetic Data# Geodynami + ic Approach. # Tethian n Region# Tertiary to Qaternary n Region# Tertiary to Quaternary d-Hellenique (Grece).# Sur les Mauv + tructure et d Occidentale Depuis le Miocene, Da + pin en Mediterraneane; Poinconnemen + f the Mediterranean-Alpine Region# rgin of the Gediz Graben: Age and or Albania (U. Cretaceous-Eocene) a + stern Mediterranean (Hellenic, Cala + #Evolving Miogeanticlines of the Ea +

European Earthquake Mechanism.# Sei + European Earthquakes.# Intensity - + Evaluating Seismicity.# Geological + Evaluation and First Results.# Sea-..... Evaporite Formations# Deformation o Evaporites in the Mediterranean.# T Event of Ionian Islands (Greece)# M + Event Stratigraphy of the Eastern M + Event, Naxos, Greece# Textural and Events in the Central-Eastern Medit + Events in the Cycladic Area: 39Ar/4 Events on the North Anatolian Fault + Evia and Crete, Greece, Obtained by + #Evidence Against the Core/Cover Co #Evidence Against the Core/Cover In Evidence Concerning Compressional T + Evidence for a Large Counterclockwi Evidence for a Post-Eccene Clockwis + Evidence for an Origin by Combined + Evidence for Arc - Parallel Extensi + Evidence for Arc - Parallel Extensi + Evidence for Cenozoic Clockwise Rot Evidence for Conjugate Slip and Blo #Evidence for Deep mantle Circulati + Evidence for Different Deformation #Evidence for Dynamic Coupling of S + Evidence for Metamorphic Core Compl + Evidence for Rotation in Opposite S Evidence for Rotation of the Ionian + Evidence for Rotational Deformation + Evidence for Subducted Lithosphere Evidence for the Last Two Faulting + Evidence for the Role of Continenta #Evidence for Transform Faulting in + Evidence for Westward Continuation 4 Evidence from Mesozoic Carbonates# Evidence from Micro - Earthquake Fa Evidence from Pelagic Limestones fo + Evidence# Metamorphism of palaeozoi + Evidence of an Active Normal Fault + Evidence of Miocene and Pliocene Ro + Evidence of Miocene and Pliocene Ro + Evidence on the Geotectonic Evoluti + Evidence. # Block Rotation in Wester + Evidences for East-West Extension i Evoikos Gulfs. # A Comperative Study + Evolution and Tectonics in an Area Evolution and the Seismic Velocity Evolution and the Seismic Velocity Evolution des Menderes-Massivs# Pet Evolution of a Dismembered Ophiolit #Evolution of a Tertiary Extensiona Evolution of an Extensional Shear Z #Evolution of Arc Systems in the We Evolution of Crete Since the late M Evolution of Crete since the Late M Evolution of Greek Microplates from Evolution of Isparta Angle, SW Turk + Evolution of Marginal Seas Deduced Evolution of Northwestern Greece: P + #Evolution of Retreating Subduction + Evolution of the Aegean Arc: a Pale Evolution of the Aegean# Quaternary + Evolution of the Aegean Sea: A Synt + Evolution of the Aegean Subduction# + Evolution of the Attic-Cycladic Met + Evolution of the Biga Peninsula, No + Evolution of the central Mediterran + Evolution of the Corinth Rift and i + Evolution of the Dinarides, Albanid + #Evolution of the Eastern Mediterra + Evolution of the Eastern Mediterran + Evolution of the Eastern Mediterran + Evolution of the Hellenic Arc Since Evolution of the Hellenides# Geophy + Evolution of the Hellenides. # Some + Evolution of the Hellenides: New As Evolution of the Menderes Massif# M + Evolution of the Menderes Massif# N Evolution of the Menderes Massif) .# Evolution of the Mesozoic - Tertiar + Evolution of the North Aegean Troug + Evolution of the North Aegean Troug Evolution of the Northeastern Aegea + Evolution of the Tethys Belt from t Evolution of Turkey and Cyprus base Evolution of Turkey: a Plate Tecton + Evolution of Volcanism in the Aegea + Evolution of Volcanism in the Aegea + Evolution Recente de la Courbure Su + Evolution Recente de la Mer Egee# S Evolution Structure de la Grece Nor #Evolution Tectonique du Systeme Al + Evolution, Structure and Dynamics o Evolution, West Turkey# Northern Ma + Evolution. # Paleomagnetic Results f +

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Evrimi# Marmara Denizi nde, Büyük Ç + Evrimi# Menderes Masifi nin Kuzey k + Evrimi.# Bat: Anadolu nun Mikro Blo + Evrimi.# Gökova Körfezi nin (Güneyb + Evriminde Oluşan Supradetachment Ha + Evrimini Yoneten Etkenler# Ege nin Evvia Island)# Crustal-Scale Geomet Ewestlichen Kleinasien# Reisen und + #Examination of a Velocity Model Us example des Dinarides; Paleotectoni Example from SW Anatolia, Eşençay G + Example# Land-Locked Oceanic Basins Example of Collision Tectonics.# Ea Example of the Cycladic Blueschist Examples from the Central and South Examples from Western Turkey# Cross + Examples from Western Turkey.# Cros Examples of Geological Observations Exhumation of a Blueshist Terrane: Exhumation of High-pressure Metamor Exhumation of the Menderes Massif M + existence de Coulissements Senestre + Expansion .# Nectectonique Horizont expansion Oceanique Actuelle et Fos + Expansion of SW Anatolia Since the Expansion. # Neotectonique Horizonta Expedition (4-11 August 1995) # awa + Experiment for the Aegean to Descri + Experiment. # On Seismotectonics of Experiment.# Strain Results and Tec Experiments in the Mediterranean an + Experiments in the Mediterranean Se Experiments.# Crustal Structure of Explanation?# Aegean Paleomagnetic #Explanatory Notes for the Paleocog Explanatory Notes. # Geological Stud + Explicatives de la Carte Geologique + Exploration in Western Greece. # The Exploration of the Mediterranean Se + Explorations and Heat Flow in Turke Expression of an Ancient Plate Boun + Expression Slab Pull at Continental + Extending Aegean Crust# A First Coi Extending Orogen. # Low - Angle Norm + Extension Along the Hellenic Arc, G Extension Along the Hellenic Arc, S Extension and Detachment Faulting. Extension and Holocene Normal-fault Extension Directions and Tectonic M + #Extension Ductile et Sedimentaires + #Extension During Continental Conve Extension# Effects of a Temperature extension Egeenne, la Subsidence de + extension in Northeastern greece: S Extension in the Aegean Basin Accel + Extension in the Aegean Region from + Extension in the Central Aegean (Cy Extension in the Hellenic Arc# The Extension in the Northern Colorado Extension in the Western Mediterran extension Neogene de I Egee: la Def + Extension of the 1967 Mudurnu Earth + Extension of the Lycian Nappes (SW + Extension of the Lycian Nappes (SW Extension of Western North American + Extension of Western Turkey# Eviden Extension, Basin Formacion and Volc + Extension, Naxsos, Cyclades, Greece + Extension # A Major Oligo - Miocene + Extension. Reflexions sur I orogene + Extension: Block Rotation of Vertic + #Extensional Collapse of Orogens. Extensional Detachment on Naxos and + Extensional Regime# Late Cenozoic E Extensional Shear Zone in the South + Extensional Shear Zone, Naxsos, Gre + #Extensional Tectonic Regimes in th + Extensional Tectonic Regimes in Wes + Extensional Tectonics in West Turke + Extensional Tectonics in Western Tu #Extensional Tectonics Neogene and #Extensional-Compressional Tectonic + Extention in Bulgaria: the Northern External Albanides# Paleomagnetic E + Externe et de la mer Egee et ses Re + Externe et la mer Egee et ses Relat Externe: Les Iles de Kassos et Karp + Externes: des Dinarides aux Tauride Extracted from 100 Years of Geodeti Extracted from 100 Years of Geodeti + extremite Orientale de I arc Egeen. + Esençay Grabon# Graben Formation in + Fabric.# Global Marine Gravity Form + facies Metamorphism on the Aegean I Facies Metamorphism, Naxsos (Greece Failles.# Analyse Theorique et Nume + Failles.# Sur une Methode Simple de +

atı Yürkiye) Gec Kuvaterner vzalar ve Rift Havzaları (Supradeta + Neotektonił ry and Kinematics of Late-Orogenic Forschungen im ing 3-D Velocity Structure Techniqu + que, Tarditectonique, Neotectonique raben# Graben Formation in the Coll and Continental Collision: the Eas stern European Alpine System and th Belt (Aegean Sea). # Uplift and Exhu ern Adriatic Sea# Different Forelan -Faults and Differential Stretching s Faults and Differential Streching on Land# Recent Quaternary Tectoni Sifnos (Cyclades), Greece.# Cooling phic Terrains: The Example of the C etamorphic Core Complex of Western s Recents a I extremite Orientale d ale et Verticale de I Egee: Subduct sile; ses Implications Geotectoniqu Late Miocene.# Analyses of Fault Me le et Verticale de I Egee: Subducti XIPROBE 95 Report of the L Atalante be the Contribution of Gravitationa the Marmara Region (Turkey): Result + tonics from the Aegean GPS d Indian Ocean.# Seismic Refraction + a.# Seismic refraction the Aegean Sea and the Islands Evia + Inclination Anomalies. Is There a T raphic Atlas of Turkey from the Oli + ies on the Dodecanese Islands. IX. de la Turquie, -Faille 'Izmir'# No + Geological Results of Petroleum a.# Geophysical y.# Geothermal dary in Europe.# Deep Seismic Convergent Boundaries# The Tectoni + ncident Normal-Incidence and Wide-A al Faults in the Basin and Range Pr reece.# GPS Evidence for Arc - Para outhern Aegean Sea, Greece.# GPS Ev Mykonos, Greece. # Late Miocene Duct Scarps in the Hellenic Arc# East-W in the Aegean# First Palaeoma odels Mio-Pliocenes dans les Cyclades (i rgence, with Application to the Tib -Dependent Rheology on Large-Scale la mer de Crete et la Surrection d + trymon Valley Detachment System and erate the rate of Growth of the Med the Early Miocene tothe Present, I clades and Evvia Island) # Crustal-S 1986 Kalamata (South Peloponnesus) River Region, U.S.A.# The Origin of + ean Ridge Accretionary Complex# Spa ormation Ductile du Granite Miocene quake Fault# Microseismic Activity Turkey) into the Southeastern Aegea Turkey) into the Southeastern Aegea Cordillera.# A Physical Model for ce for Dynamic Coupling of Surface anism in West Turkey.# Late Cenozoi .# The P-T-t Path Associated with C Detachment in Southern Rodope Cont + se Alpine.# Les Zones Hellenides In al Shear?# Fault and Bed Rotation D + Paros (Cyclades Islands, Greece).# xtention in Bulgaria: the Northern ern Menderes Massif, Western Turkey ece,# The Late Alpine Evolution of e Aegean Basins During the Cenozoic tern Anatolia# Magmatic Activities v.# Timing of Cenozoic

ekmece (Istanbul)-Marmara Ereğlisi +

anadmın Stratigrafisi ve Tektonik

klarının Paleomagnetizması ve Genç

rkey: Tectonic Escape VS Back-Arc S Quaternary Sequences at the Western s Associated with the Aegean Arc: C Part of the Aegean Extensional Reg vidence for Cenozoic Clockwise Rota lations Avec la Sismicite# La Neote ions Avec la Seismicite.# La Neotec athos.# Structure et Deformation d s.# Esquisse Structurale de I Arc E + c Displacement Measurements# Local Displacement Measurements.# Local # Sur I existence de Coulissements the Collisional Belts: An Example ERS-1 Geosat and Seasat Reveals Ne sland of Syros# The Significance of).# The Nature and Distribution of

rique d un Modele Mecanique Element + Determination des Axes Principaux +

inental Extension: Block Rotation o + rthquake Activity in the Iznik-Meke + thouskes of the Period 1939 - 1967. tectonic Evidence of an Active Norm train Analysis Along the North Anat es of Crustal Deformation in the No fluence on Earthquake Activity# Str f the North Aegean Trough (W. Turke andurma Bay and Erdek Bay of Marmar e Continuation of the North Anatoli W Anatolia Since the Late Miocene.# the western Extension of the 1967 Zone # The Relationship Between Str . Implications for Incompatible Str the Marmara Sea Region of Turkey: (Greece)# The Galaxidi Earthquake geismic Evidence for Conjugate Sli urope. t Tectonic Along the Active Nea Anc + Tectonics Along the Active Nea Anc + straints# Late Cenozoic Rotations A ers of Large Earthquakes in the Eas + and North - Central Greece.# GPS Ev + e.# Tectonic Investigation on the N estern Turkey.# Geological Evidence + North Western Turkey.# Late Holocen + gh (W. Turkey and Greece): Timing, tures of the Anatolian f a Permanent GPS Network Across th + of the North Anatolian y of the North Anatolian ics of the Eastern Mediterranean Re + icity and Rate of Slip Along Major + nsion in the Hellenic Arc# The 1986 rn Aegean and its Geodynamic Implic + asia - North America Plate Circuit ween the Sea of Marmara Basin and t + n Patterns in the Convex-Northwards + the Gediz and Büvük Menderes Grabe + n in Zones of Tectonic Escape: Turk + the Synmetamorphic Structural Pile ian Fault Zone in the Mudurnu Valle + ern Turkey, # Active Normal view. # Active Normal ing Area # Orientation of Active ctonic Stress Field and Seismic nd Gediz Earthquakes of 1969-70 in halonia Island Earthquake Sequence c Study in the Western Part of the # Mechanism of Earthquakes and Natu + imentation in Southwestern Turkey.# + ocene Ductile Extension and Detachm + key# Cross-Faults and Differential h Examples from Western Turkey.# Cr + Belt - Tinos Island, Cyclades, Gree + f Hanging Wall in Regions of Low An + nental Extension in the Northern Co + nce: Nappe Tectonics in an Extendin + res Grabens, Western Anatolia# Fiel + eismic arlock and Big Pine k Değişimler.# Düzpinar (Manisa) Mi + gili Çalışmalara Katkısı# Türkiye D + ünde Yerkabuğu Hareketlerinin Jeode + Ege Denizi elenmesi# Kuzey Anadolu elenmesi.# Kuzey Anadolu kit Vadisi Kesiminde Kuzey Anadolu + rle Yaşlandırılması# Batı Anadolu d + esi# lzmit Körfezi nin Yapısı ve Ku + zmit Körfez Geçişindeki Tektonik De + ik Kolları Üzerinde Paleosismik Ara + gions of Turkey.# Relations Between rea, N.Greece.# Land-Sat data Proce + ical and Tectonic e# Some Characteristic d Eastrn Mediterranean Ridge.# Geop + nosphere System in Europe from Seis + sifinde Petroloji ve Bunların Petrojenetik Yorumlarda K + rea of Greece. # Tectonic Stress e Complex, Detachment Faulting and + e Ionian Islands: Result Inferred f + cing the Velocity and Stress egion Determined from the Moment Te + Upper Miocene Section in Crete# Rel + # The Gravity d Future Developments of the Denizl + icrostructural Evidence# Metamorphi + Afrika da Yüzey Dalgalarının Disper + gesi Havadan Manyetik Haritasına Uy + ultiple Mica Generations.# An EMP a + sequences of the Collision of the A +

#Fault and Bed Rotation During Cont + Fault and Surrounding Area# Microea + Fault Associated with the Large Ear + Fault Beneath Thessaloniki.# Seismo + Fault by Using Geodetic Methods.# S + Fault Deduced from Seismicity.# Rat + fault Geometry in Turkey and its In + Fault into the Oblique Fault Zone o + Fault Investigation in Izmit Bay, B Fault Kinematics and Rotations.# Th + Fault Mechanisms and Expansion of S + Fault# Microseismic Activity Around + Fault Movements within a Deforming Fault# Neotectonics of the Pontides Fault Plane Solution.# Tectonics of Fault System of the Gulf of Corinth + Fault System, Southern California.# + #Fault Tectonics and Heat Flow in E + Fault Zane (Central Greece).# Recen + Fault Zone (Central Greece)# Recent + Fault Zone (Greece); Structural Con + Fault Zone (Turkey)# Source Paramet + Fault Zone Across the North Aegean + Fault Zone Between Erzincan Refahiy Fault Zone in the Mudurnu Valley, W Fault Zone in the Orhangazi Plain, + Fault Zone of the North Aegean Trou + Fault Zone# Some Characteristic Fea Fault Zone, Greece.# Establishent o + Fault Zone.# Seismotectonic Aspects + Fault Zone. # The Paleomagnetic Stud + Fault Zone: Implications for Tecton + Fault Zones.# Seismic Moment, Seism + Fault, Evidences for East-West Exte + Fault-Plane Solutions in the Southe + Fault.# Closure of the Africa - Eur + Fault.# Structural Relationship Bet + Fault.# The North Anatolian Faulth Zone# Neotectonic Deformatio + Faulting and Accomodation Faults in + faulting and related Basin Formatio + Faulting and the Reconstruction of + Faulting Events on the North Anatol + Faulting in Central Greece and West + Faulting in Central Greece: An Over + Faulting in Northern Turkey.# Activ Faulting in the Aegean and Surround + Faulting in the Area of Greece. # Te + Faulting in the Demirci, Alaşehir a + Faulting in the Ionian Sea: the Cep + faulting Mechanisms.# A Microseismi + Faulting on the Mid-Oceanic Ridges. + Faulting, Drainage Patterns and Sed Faulting, Mykonos, Greece.# Late Mi + Faulting. # The Dynamics of Faulting: Examples from Western Tur Faulting: Tectonic Implications wit + Faults Above and Below a Blueshist + Faults and Differential Streching o Faults Formed During Tertiary Conti + Faults in the Basin and Range Provi + Faults in the Gediz and Büyük Mende Faults in the Hellenic Arc# Large S + Faults of Turkey.# Active Faults, California, # San Andreas, G + faunas: Hipparionlarında Odontoloji + Fay Haritası ve Aktif Tektonikle Il + Fay Kuşağının Gerede - Çerkeş Bölüm + Fay Tektoniği ve Çökel Kalınlığı.# Fay Zonu nun Batı Uzantılarının Inc + Fay Zonu nun Batı Uzantılarının İnc + Fay Zonunun Tektonik Özelliği.# Kel + fay Şevlerinin Paleosismik Yöntemle + Fayı (KAF) ile Ilişkisinin Irdelenm + Fayı (Levha Sınırı) Uzantılarınım I + Fayı nın Sapanca-İzmit ve Geyve-İzn + Features and the Main Earthquake re + Features in the Central macedonia A + Features of the Aegean Arc# Geophys Features of the Anatolian Fault Zon + Features of the Greek Island Arc an + Features of the Lithosphere - Asthe Feldispat Incelemeleri# Menderes Ma + Feldispatların Yapısal Durumları ve + Field and Seismic Faulting in the A + #Field Evidence for Metamorphic Cor + Field in Northwestern Greece and th + Field in the Aegean Region# Reprodu Field in the Deforming Aegean Sea R + Field Intensity and Reversals from + Field of a Dipping Plate in Greece. + Field of Turkey. # Present Status an Field, Petrographic, Textural and M + Filtre Tekniği ile Asya, Avrupa ve + Filtrelerir. Düzenlenmesi ve Ege Böl + Fine-Scale Mica Interlayering and M + Finite Element Models# Tectonic Con +

Westaway, R.+ 1993 Angagi, M. T. 1997 Barka, A. A. 1996 Hatzidimitriou, P.+ 1992 Eren, K. 1983 Kiratzi, A. A. 1991 Barka, A. A.+ 1988 Mercier, J. L.+ 1991 Kavukçu, S. Mercier, J. L.+ 1991 1991 Angelier, J.+ 1981 Lio, Y.+ 1991 McKenzie, D. P.+ 1983 Şengör, A. M. C.+ 1983 Evans, R.+ 1985 Hatzfeld, D.+ 1996 Nicholson, C.+ 1986 Meier, R.+ Caputo, R. 1977 1990 Caputo, R.+ 1990 Simeakis, K.+ 1989 Taymaz, T.+ 1991 Reilinger, R. E.+ 1995 Tatar, Y. Ikeda, Y.+ 1978 1991 Ikeda, Y.+ 1989 Mercier J L + 1991 Ambraseys, M. N. 1970 Peter, Y.+ 1997 Barka, A. A. 1981 Orbay, N. 1979 Barka, A. A.+ 1988 1968 Brune, J. N. Lyon-Caen, H.+ 1988 Hatzfeld, D.+ 1993 Argus, D. F.+ 1989 Ergün, M.+ 1995 Barka, A. A. 1992 Barka, A. A.+ Emre, T.+ 1984 1995 Şengör, A. M. C.+ 1985 Riđley, J. Ikeda, Y.+ 1984 1991 Roberts, S. C. 1988 Roberts, S. C.+ Allen, C. R. 1991 1969 Papazachos, B. C.+ 1992 Papazachos, B. C.+ 1969 Evidoğan. H.+ 1985 Scordilis, E.+ 1985 Rigo, A.+ 1995 Sykes, L. R. 1967 Paton, S. 1992 Lee, J.+ 1993 Anderson, E. M. 1951 Şengör, A. M. C. 1987 Şengör, A. M. C. 1986 Avigad, D.+ 1989 Şengör, A. M. C. 1986 Lister, G. S.+ 1989 Wernicke, B. 1981 1995 Emre, T.+ Papazachos, B. C. 1996 Şaroğlu, F.+ Hill, M. L.+ 1987 1953 Arslan, F. 1984 Şaroğlu, F.+ 1997 197.4 Uğur, E. Eryılmaz, M.+ 1998 Kıyak, Ü 1986 Kıyak, Ü. 1986 Seymen, I 1975 Barka, A. A.+ 1997 Akgün, M.+ 1995 1998 Senöz, M. Barka, A. A. 1993 1968 Ketin, L. Astaras, TH.+ 1990 Papazachos, B. C.+ Ambraseys, M. N. 1971 1970 Papazachos, B. C.+ 1969 Panza, G.F.+ 1980 Dora, O. Ö. 1981 Dora, O. Ö. 1975 Papazachos, B. C.+ 1969 Emre, T.+ Kahle, H.-G.+ 1995 1995 Cianetti, S.+ 1997 1992 Jackson, J.+ 1996 Laj, C.+ Gregersen, S.+ 1984 1985 Şimşek, Ş. Bozkurt, E. 1996 Canitez, N. 1975 1975 Sanver, M. Feenstra, A. 1996 Kasapoğlu, K. E.+ 1983

ithin a Deforming Zone.# The Relati + Finite Strain and Fault Movements w + nd Wide-Angle Approach to Studying + Earthquakes. 1. A Homogenous Initia + the Cycladic Massif, Greece, and Th + Post-Eocene Clockwise Rotation of + otation of the Ionian Zone of Alban + io-Pliocene Series of the Hellenic + tudy# The Hellenic Subduction Benea + m Echo-Sounding in Jean Charot. Des + in off the North Aegean Trough.# Gr + North Aegean Trough. # Gravity Indu + an Cordillera, the Hellenides, and + al Studies, Their Present Status an + mal Studies, Their Present Status a + mal Atlas of Europe, Catalogue of H + d Heat lack Sea. # The Measurement and Inte + tions and Heat at at at Heat ructure of Western Anatolia# Heat tamorphism, Naxsos (Greece).# The N + ea# The Crust Structure and Convect + nean Island Arc Setting in Modern a + aр .# An Approach to the Origin enic Arc. # Space and Time Distribut + nd Interplate Earthquakes and their + the Aegean Area Determined by Wavef + and Adjoining Areas# A Catalogue o + estern Turkey and their Tectonic Im + quake the Persian Plateau, Eastern Turke + es# Regional Stresses Along the Eur + ounding Area and its Tectonic Impli n Erdbeden des Letzten Dezenniums.# + olu ve Civarinda Kabuk ve Üst Manto from the Central and Southern Adria ozoic Deformation of the Hellenide s New Tectonic Fabric.# Global Mari + ome Permian Red Sandstones in the Gulf of Korinth (Central Gr + key.# Late Cenozoic Crustal Extensi + ne (Mediterranee Orientale).# Varia + An Example from SW Anatolia, Eşenç 4 ozoic Crustal and Basin pe: Turkey as a Case Study# Strike- + estern Anatolia. dans les Fosses de Subduction Helle + ern Mediterranean Ridge: Importance + omagnetic Study of the Neogene # Evolution of Retreating Subductio + Extension in the Northern Colorado + a Review# Comparison of Young Volc + of Active Crustal Deformation and + en# Reisen und Neogene Dans le bservations par Submersible.# Impor + f the Antalya Complex, SW Turkey. iques.# L expansion Oceanique Actue + otropic Variations in Miocene Grani + on.# Crustal ectonic Evolution.# Paleomagnetic R + ne Evaporites in the Mediterranean. + uguer Anomaly Mao of Ionian and Aeg + at Regional Distances Across the Tu ment Measurements# Local and Region + ment Measurements.# Local and Regio nation of Tectonic Deformation in C mic Velocity Constrains in the Thes # The Kozani-Greva (Greece) Earthqu Strain Pattern in the Western Helle Seismotectonics of the Marmara Reg 71.# Surface Wave Dispersion and Up

Ree Distrubution in tertiary and Qu + Paleomagnetic Study of the Tertiar graphy of a Lower-Middle Triassic B e Western Mediterranean Ridge Accre + Modelling# The Crust of the Western ust and Upper Mantle of the Aegean rsion.# S - Wave Below Europe

mograms.# A Detailed Analysis of Mi + grams# A Detailed Analysis of Micro + labria Arc: Some New Elements

geneity in the Upper Mantle Beneath + Y, Epicenter Data, 1961 - 1967 # Wo + hquakes# Regional Stresses Along th + a# Seismotectonics of Western Anato +

del of the Hellenic Arc Deduced perties and State of the Crust and + tructure of the Aegean Sea and the + r Deep mantle Circulation

ogene Palynological and Isotopic Ag + from Gördes Basin, West Turkey.# Ne +

First Coincident Normal-Incidence a + First P - Arrival Times from Local #First Palaeomagnetic Results from + #First Paleomagnetic Evidence for a #First Paleomagnetic Evidence for R + #First Paleomagnetic Results from M + First Result of a Microearthquake S First Results. # Sea-Beam, Multi-Bea Flank and Floor of the Sporades Bas + Floor of the Sporades Basin off the + Floor Spreading Theory.# The Canadi + Flow Contouring in Turkey# Geotherm + Flow Contouring in Turkey. # Geother + Flow Density Data: Turkey.# Geother + Flow in Europe. # Fault Tectonics an + Flow in the Aegean Sea# Heat Flow in the Mediterranean and the B + Flow in Turkey.# Geothermal Explora + Flow Map fo Greece. # Preliminary He + Flow Map of Europe (1:5.0 Mio).# He + Flow Map of Europe# Heat Flow Map of Northwest Anatolia.# He + Flow Pattern of Western Anatolia.# Flow, Seismicity and the Crustal St + Fluids During Amphibolite Facies Me + Fluids in Seferihisar Geothermal Ar Flysch Sedimentation in a Mediterra + fo Greece.# Preliminary Heat Flow M + fo Volcanic Rocks of Western Turkey + Focal Depth Earthquakes in the Hell + #Focal Depths of Intercontinental a + Focal Depths of the Earthquakes of Focal Mechanism Diagrams for Turkey + #Focal Mechanism of Earthquake in W + Focal Mechanism. # Analysis of Earth + #Focal Mechanisms of Earthquakes of + Focal Mechanisms of Large Earthquak + Foci in the Mediterranean and Surr + Folgerunges aus Grossen Anatolische + Fonksiyonlarından Yararlanarak Anad + Foreland Basins in Italy: Examples Foreland, Western Greece.# Late Cen Form ERS-1 Geosat and Seasat Reveal + form NW Turkey.# The Magnetism of S + Formation and Associated Seismicity + Formation and Volcanism in West Tur + Formation de la Ridge Mediterraneen + Formation in the Collisional Belts: + Formation in West Turkey.# Late Cen + Formation in Zones of Tectonic Esca + #Formation of the Grabens in Southw + Formations Attribuees au Messinien Formations# Deformation of the West + Formations of the Aegean Area# Pale -Formed During Continental Collusion + Formed During Tertiary Continental + Formed under a Copressional Regime: + Formulation for Reliable Estimation + Forschungen im Ewestlichen Kleinasi + Fosse Nord egeen. # La Sedimentation + Fosses de Subduction Helleniques: 0 + #Fossil and K-Ar Data for the Age o + Fossile; ses Implications Geotecton + Fractional Crystallization# O-Sr Is + Fracture Pattern of the Aegean Regi + Frame of the Alpine-Mediterranean T + Framework and Distribution of Mioce + Free-air Gravity Anomaly, S,mple Bo + Frequency Seismic Wave Propagation + from 100 Years of Geodetic Displace from 100 Years of Geodetic Displace + from 1900 to 1988# Geodetic Determi + from a 3-D Tomographic Study.# Seis + from a Detailed Seismological Study from a Microearthquake Survey# The from a Microseismic Experiment.# On from Burdur Earthquake of 12 May 19 from Central and Western Anatolia# from Chalkidiki (Northern Greece).# from Chios (Greece).# Magnetostrati from Compression to Extension in th + from Deep Seismic Data and Gravity From Deep Seismic Soundings# The Cr from Delay - Time and Waveform Inve + from Digital Three - Component Seis + from Digital Three-Component Seismo from DSS Data.# Ionian Basin and Ca + from Earthquakes and lateral Inhomo + from ESSA, Coast and Geodetic Surve + from Focal Mechanisms of Large Eart + from Geophysical and Geological Dat + from Geophysical Data# A Dynamic Mo + from Geophysical Data# Physical Pro from Geophysical Survey.# Crustal S + from Global Tomography# Evidence fo +

McKenzie, D. P.+ 1983 Sachpazi, M.+ 1997 Aki, K.+ 1976 Morris, A.+ 1996 Kissel, C.+ 1993 Speranza, F.+ 1992 Lai. C.+ 1982 Hatzfeld D + 1989 Renard, V.+ 1979 Ferentinos, G.+ 1981 Ferentinos, G.+ 1981 Dercourt, J. 1972 Tezcan, A. K. 1979 Tezcan, A. K. 1977 Tezcan, A. K.+ 1991 Meier, R.+ 1977 Jongsma, D. 1974 Erickson, A. J 1970 Tezcan, A. K. 1995 Fytikas, M. D.+ 1977 Cermak, V. 1978 Cermak, V. 1979 llkışık, O. M. 1989 llkışık, O. M. 1990 Alptekin, Ö.+ 1990 Buick, I. S.+ Eşder, T. 1991 1990 Stanley, D. J. 1974 Fytikas, M. D.+ 1977 Yılmaz, Y. 1989 Comninakis, P. E.+ 1980 Chen, W. P.+ 1983 Kiratzi, A. A.+ 1991 Canitez, N.+ 1967 Alptekin, Ö. 1973 Pektas, A. R. 1998 Nowroozi, A. A. 1972 Udias. A.+ 1991 Papazachos, B. C. 1973 Ketin, I. 1948 Osmansahin, I. 1989 De Alteriis, G. 1995 Underhill, J. R. 1989 1992 Sandwell, D. T.+ Gregor, C. B.+ 1964 Myrianthis, M. L. 1984 Seyitoğlu, G. 1002 Chaumillon. E.+ 1995 Ersoy, Ş. 1995 Seyitoğlu, G.+ 1991 Şengör, A. M. C.+ Dumont, J. F.+ 1985 1979 Le Pichon, X.+ 1980 Chaumllon, E.+ 1996 Kissel, C.+ 1989 Royden, L. H. 1993 Lister, G. S.+ 1989 1990 1992 Papazachos, B. C.+ Phillipson, A. 1911 Lalechos, N.+ 1977 Le Pichon, X.+ 1980 Yılmaz, P. O. 1984 Dercourt, J. 1970 1988 Altherr, R.+ Kronberg, P.+ 1978 1991 Mauritsch, R.+ J. 1973 Mulder, C. Allan, T. D.+ 1970 1981 Kandinsky-Cade, K.+ 1995 Curtis, A.+ Curtis, A.+ 1997 1991 Billiris, H.+ Ligdas, C. N.+ 1993 Hatzfeld, D.+ 1997 1990 Hatzfeld, D.+ Gürbüz, C.+ 1998 Ezen, Ü. 1991 1977 Innocetti, F.+ 1985 Kondopoulou, D. Muttoni, G.+ 1995 Lallemant, S.+ Truffert, C.+ 1994 1993 1978 Makris, J. 1992 Zielhuis, A. Chabalier, J. B.+ 1992 Hatzfeld, D.+ 1992 1991 Ferrucci, F.+ 1996 Tavmaz, T. Barazangi, M.+ 1969 1991 Udias, A.+ Zanchi, A.+ 1993 Makris, J. 1976 1984 Makris, J.+ 1975 Makris, J. Van der Hilst, R. D.+ 1997 1994 Sevitoğlu, G.+

ield in Northwestern Greece and the + from GPS Measurements# The Strain F + Kahle, H.-G.+ tal Deformation in the Marmara Sea + 1995 from GPS Measurements.# Active Crus + tal Deformation and Strain Accumula from GPS Measurements.# Recent Crus + Straub, C.+ 1995 Straub, C. v Data# Active Tectonics of the Eas From GPS, Neotectonic and Seismicit + 1996 Barka, A. A.+ 1997 stal Thickness and the Subducting L from Gravity Data# Study of the Cru Tsokas, G. N.+ nsity.# A Tomography Image of the A 1997 from Inversion of Macroseismic Inte + Stavrakakis, G. N.+ Dimensional Velocity Structure of t from Inversion of Travel Times.# 3-1997 Drakatos, G.+ s.# Determination of Station Coordi from Lageos Laser Range Observation Noomen, R.+ 1991 nic Motion in the Mediterranean Are + from Laser Ranging to LAGEOS# Tecto + Cenci, A.+ tal Motions in the Mediterranean Re 1993 from Laser Ranging to LAGEOS.# Crus + Noomen, R + from Local Earthquakes. 1. A Homoge + from Major Earthquakes# Rates of Cr + 1993 nous Initial Model.# Determination Aki, K.+ ustal Deformation in Western Turkev 1976 Eyidoğan, H. 1 Deformation During Palaeogene Thr 1988 from Mesozoic Carbonates# Rotationa + Morris, A. 1995 d of Syros (Greece) # Dating Metamo from Metamorphic Rocks of the Islan Maluski, H.+ 1987 Solution. # Tectonics of the Marmar from Micro - Earthquake Fault Plane + Evans, R.+ y Series in Crete. # Paleomagnetic R 1985 from Mio-Pliocene marine Sedimentar + y Series in Cletc. Taleonagnetic R lenic Sedimentary Arc# First Paleom etween Geothermal Parameters in the Valente, J. P.+ from Mio-Pliocene Series of the Hel Laj, C.+ 1982 from MT Survey and its Connection b Çağlar, I. 1995 Cretaceous and Eocene Pose Positi from Northeastern Turkey.# Jurassic Van der Voo, R. 1968 ion. # Some Aspects of the Evolution from Observations in the Aegean Reg Berckhemer, H. 1977 Mesozoic Evolution of Greek Micropl from Palaeomagnetic Measurements.# Turnell, H. B. 1988 se Rotation of the Ionian Zone, Wes + from Pelagic Limestones for Clockwi + Horner, F.+ Ezen, Ü. 1983 stal Structure of Western Turkey from Rayleigh Wave Dispersion.# Cru 1991 stal Strucute of the Eastern Medite from Rayleigh Wave Dispersion.# Cru Cloetingh, S.+ 1980 e Broader Aegean Area# Shear-wave V + from Rayleigh-wave Dispersion in th Kalogeras, I. S.+ ent Crustal deformation and Strain from Repeated GPS Measurements# Rec Straub, C.+ 1997 ements.# Horizontal Crustal Motion from Satellite Laser Ranging Measur Smith, D. E.+ 1994 erranean Region# Geological Informa from Satellite Surveys of the Medit Foose, R. M. 1985 Data on the Structure of the Easter + n.# Crustal Structure and Possible + from Seismic Reflection Data # New Sancho, J.+ 1973 from Seismic Surface Wave Dispersio Mindevalli, O. Y.+ 1989 Waves. # The Gross Features of the from Seismic Surface Waves and Body Panza, G.F.+ Tselentis, G. -A.+ 1980 rmation in the Gulf of Corinth (Cen + Deformation in the North Aegean Tro + from Seismicity# Rates Crustal Defo + 1986 from Seismicity.# Rates of Crustal Kiratzi, A. A. 1991 stal Deformations in the Mediterran from SLR and GPS observations.# Cru + Noomen, R.+ 1995 from SLR and GPS observations: EOP (DUT) 95L02 and SSC (DUT) 95C02.# E Noomen, R.+ 1995 from Southern Albania and their Sig nificance for the Geodynamic Evolut -Mauritsch, H. J.+ 1995 n: A Seabeam Survey of the hellenic #From Subduction to transform Motio + Le Pichon, X.+ 1979 reliminary Objective Regionalizatio from Surface - Wave Tolmography. # P Martinez, M. D.+ 1997 raben Formation in the Collisional from SW Anatolia, Esençay Graben# G Ersoy, Ş. 1995 #From Tectonic Reconstruction to Up + per Mantle Model: An Application to + De Jonge, M. R.+ 1993 gean# Palaemagnetic data from Tertiary Units of the North Ae Kondopoulou, D.+ Gilbert, L. E.+ 1984 rain Results and Tectonics from the Aegean GPS Experiment. # St 1994 igin by Combined Assimilation and F + from the Aegean: Evidence for an Or + Altherr, R.+ 1988 ave Records. # Dispersion Curves for from the Analysis of the Rayleigh W Kaloyeras, I. S.+ 1993 ce the Lias. # Geological Evolution from the Atlantic to the Pamirs sin + Dercourt, J.+ 1986 tic Sea# Different Foreland Basins from the Central and Southern Adria + De Alteriis, G. 1995 mir (W-Turkey) # Chemical and Stable from the Cesme-Seferihisar Area, Iz + Conrad, M. A.+ 1995 nd Their Implications for Miocene E from the Cycladic Massif, Greece, a + Morris, A.+ 1996 cs of Extension in the Aegean Regio + from the Ductile Crust# 3D-Kinemati + Jovilet, L.+ 1994 t. Insights from the Ductile Crust# + from the Early Miocene tothe Presen + Jovilet, L.+ 1994 of the Global Data Set.# Heat Loss + from the Earth s Interior: Analysis + Pollack, H. N.+ 1993 eas# Rewiev of Heatflow Data From the Mediterranean and Aegean S + Erickson, A. J.+ 1977 on of Turkey. # Paleomagnetism of Dy + from the Mesudiye Region and Rotati + Orbay, N.+ 1979 kes# The Horizontal Velocity Field from the Moment Tensors of Earthqua + Jackson, J.+ 1992 Seismicity and Seismotectonics of from the North Aegean Sea Network.# Barakou, Th.+ 1994 Across the North Aegean and North from the North Anatolian Fault Zone + Reilinger, R. E.+ 1995 1976 ne.# Explanatory Notes for the Pale -ones of Greece.# Paleomagnetic Resu -Lüttig, G.+ from the Oligocane to the Pleistoce + from the Pindos, Paxos and Ionian Z Marton, E.+ 1990 hanges in the State of Stress in th from the Pliocene to the Present# C Mercier, J. L.+ 1987 Bozkurt, E.+ 1995 West Turkey) # Geochemistry and Tect + from the Southern Menderes Massif (Jacoby, W. R.+ ity# Crustal and Upper Mantle Struc + from Travel Time Residuals and Grav 1982 of Quaternary Volcanic Rocks from Turkey.# A Paleomagnetic Study + Sanver, M. 1968 # Relative Geomagnetic Field Intens + from Upper Miocene Section in Crete + Lai, C.+ 1996 Şengör, A. M. C. from Western Turkey# Cross-Faults a + 1987 nd Differential Stretching of hangi Şengör, A. M. C. 1986 and Differential Streching of Hangi from Western Turkey.# Cross Faults + Front of Modern Convergent Margins - Research of the Past Decate. # Tec von Huene, R. 1984 Hirn, A.+ 1996 Front with Coincident Normal Incide nce and Wide-Angle Seismics# A Tran Chaumillon, E.+ 1995 Fronts de Formation de la Ridge Med + iterraneenne (Mediterranee Oriental Üzerine Incelemeler.# Türkiye ve Ci Fundamental Moddan Yüzey Dalgaları + Canitez, N. 1969 Şimşek, Ş. Future Development Possibilities of Geothermal Energy in Turkey.# Pres 1985 Kizildere Geothermal Energy Field + Future Developments of the Denizli Şimşek, Ş. Ricou, L. E.+ Gağları Orientaux, Reconstruction P + 1979 alinipastique des Taurides Occident + Hatzfeld, D.+ 1992: A Possible Asperity within th Galaxidi Earthquake of 18 November + Ganeys, Anno, 1935.# La Crociera Gr + Garlock and Big Pine Faults, Califo + Cassinis, G. 1941 avimetra del R. Sommergible Des H511 M. L.+ rnia.# San Andreas, Gelişimi.# Salihli Güneyinde Üste D + Yağmurlu, F. Gdiz Grabeni nin Tektonosedimenter Gebieten# Über den Chemismus und di + Geç Kuvaterner Evrimi.# Gökova Körf + Paraskevopoulos, G. M. 1956 e provinzialen Verhaltnisse der ter + Uluğ, A.+ ezi nin (Güneybatı Yürkiye) Geçişindeki Tektonik Denizaltı Havz + Senöz, M. aları.# Kuzey Anadolu Fayı (Levha S + Geçişli Filtrelerin Düzenlenmesi ve Sanver, M. Ege Bölgesi Havadan Manyetik Harit + Ambraseys, N. N.+ 1970 Gediz (Turkey) Earthquake of 1970 M + arch 28th.# The Gediz (W de I Anatolie) Entre Salih + li et Alașehir.# Etude Geologique e + Emre, T. Emre, T.+ Gediz and Büyük Menderes Grabens, W + estern Anatolia# Field Evidence for Filiz S + Gediz Basin (on the Aegean Region o + f Turkey)# High Boron Content in th Eyidoğan, H.+ Gediz Earthquakes of 1969-70 in Wes + tern Turkey: Implications for the N + Emre, T. Gediz Graben (Salihli-Alaşehir).# G + ediz Grabeninin (Salihli-Alaşehir) TT. Gediz Graben).# Gediz Grabeninin Je Emre, olojisi ve Tektoniği (Geology of th Yusufoğlu, H. Gediz Graben: Age and Evolution, We + st Turkey# Northern Margin of the #Gediz Grabeninin (Salihli-Alaşehir + Emre, T.) Tektoniği (Tectonics of the Gediz + Emre, T. #Gediz Grabeninin Jeolojisi ve Tekt + oniği (Geology of the Gediz Graben) + Karamanderesi, I. H. Gediz Nehri Güneyinin Jeoloji, Hidr + oloji ve Jeotermik Etüdüne Ait Rapo Karamanderesi, I. H.+ #Gediz Vadisi nde Genç Tektonik Ola + ylar ve Buna Bağlı Jeotermal enerji + Abdüsselamoğlu, Ş. #Gediz ve Yakın Çevresinin Jeolojis + i ve Yapısal Özelliği. 1970.# Seismotectonic Aspects of th + Ambraseys, N. N.+ Gediz, Turkey, Earthquake of March Gülen, L. Arpat, E.+ Gedynamic Evolution of the Aegean S + ubduction# Isotopic Characterizatio + Gelişimi Üzerine Düşünceler# Ege Bö + lgesi Graben Sisteminin Orbay, N.+ Gelișimi.# Bat: Anadolu nun Paleoma + gnetismas: ve Tektonik

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Yağmurlu, F. 1987 Başarır, E. 1975 Kaaden, G.+ 1978 Eisenlohr, T.+ 1997 Kurtuluş, C. 1985 Ercan, T. 1982 Erol, O. 1982 Orbay, N.+ 1995 Karamanderesi, I. H.+ 1982 Tapırdamaz, C.+ 1995 Aydın, l.+ 1995 Ketin. I. 1969 Ketin I 1968 Rybach, L.+ 1982 Papazachos, B. C. 1992 Feenstra, A. 1996 Wessel, P.+ 1995 Orbay, N.+ 1998 Orbay, N.+ 1996 Kenar, Ö. 1977 Innocenti E + 1979 Francalanci, L.+ 1990 Bozkurt, E.+ 1995 Brimen L + 1986 Innocenti, F.+ 1979 Altherr, R.+ 1976 Fvtikas. M.+ 1976 Borsi, S.+ 1972 Lenk, O. 1995 Davies. R.+ 1994 Billiris, H.+ 1991 Le Pichon, X.+ 1995 Billiris, H. et al. 1989 Curtis, A.+ 1995 Curtis, A.+ 1997 Clarke, P. J.+ 1997 Mantovani, E.+ 1995 Deniz, R.+ 1993 Eren. K. 1983 Davies, R.+ 1997 Barazangi, M.+ 1969 Meulenkamp, J. J.+ 1988 Meulenkamp, J. E.+ 1988 Mauritsch, H. J.+ 1995 Lauer, J. P. 1984 Makris. J. 1985 Hatzfeld, D.+ 1993 Spakman, W.+ 1988 Briqueu, L.+ 1986 Frizon de Lamotte, D.+ 1995 Makris, J. 1978 Kissel, C.+ 1985 Kissel, C.+ 1988 Şalk, M. 1994 Drooger, C. W.+ 1973 1995 Lenk, O. Berckhemer, H.+ 1978 Sorel, D. 1992 Bellon, H.+ 1979 Seber, D.+ 1997 Wilson, P.+ 1993 Aubouin, J.+ 1963 Astaras, TH.+ 1990 Allen, C. R. 1975 Zanchi, A.+ 1993 Ryan, W. B. F.+ 1982 Ikeda, Y.+ 1991 Dercourt, J.+ 1986 Foose, R. M. 1985 Jansen, J. B. H. 1973 1970 Mutti, E.+ Angelier, J. 1979 taymaz, T.+ 1992 Schmid, S. M.+ 1996 British Petroleum 1971 1970 Mutti, E.+ Aubouin, J.+ 1970 Egeran, N.+ 1944 Robert, E. 1982 Emre, T. Monod, O. 1990 1977 Graciansky, P. C. 1972 1965 Hersey, J. B. 1990 lztan, H.+ Okay, A. I.+ 1991 Eisenlohr, T. Biju-Duval, B.+ 1997 1974 Ryan, W. B. F.+ 1969 Hamilton, W. J.+ 1840 Brunn, J. H.+ 1971 Yılmaz, Υ. 1997 Eşder, T.+ 1975 1996 Schmid, S. M.+ Laj, C.+ Valet, J. P.+ 1996 1981 DeMets, C.+ Martin, C. 1994 1988

Gelişimleri# Çine Güneyindeki Metam + Gelogie des Raumnes Zwischen Datca- + Gemlik (Bursa) Area of Northwestern + #Gemlik Körfezi Yüksek Ayrımlı Sığ + Genç Tektoniği ve Volkanizması# Bat + Genç Tektoniğinin Jeomorfolojik Son + Genç Tektonik Evrimi.# Batı Anadolu + Genç Tektonik Olaylar ve Buna Bağlı + Genç Volkanik Kayaçlar Üzerinde Yap + Genel bir Bakış.# Türkiye Aeromagne + Genel Tektonik Durumu ile Başlıca D + General Tectonic Features and the M + Generation and Mineralogical Consti + Generation of Shallow Earthquakes i + Generations.# An EMP and TEM-AEM St + Generic Mapping Tools Released# New + Genișleme Merkezinin Paleomagnetic Genişleme Rejiminin Paleomagnetik V + Genlik Spektrumlarından Yararlanara + geochemical and geochronological da + Geochemical and Isotopic Data owwoge + #Geochemistry and Tectonic Signific + Geochemistry of Recent Magmatism in + geochronological data# Inner arc vo #Geochronological Data on Granitic + #Geochronological Data on Recent Ma + #Geochronology and Petrology of Rec + geodetic Activities for Geodynamics + Geodetic and Seismic Strain of Gree + #Geodetic Determination of Tectonic + #Geodetic Determination of the Kine + #Geodetic Determination of the Stra + Geodetic Displacement Measurements# -Geodetic Displacement Measurements. #Geodetic Investigation of the 13 M + Geodetic Measurements (VLBI, SLR) i + Geodetic Methods. # Determination of + Geodetic Methods.# Strain Analysis + #Geodetic Strain of Greece in the I Geodetic Survey, Epicenter Data, 19 + Geodynamic Evolution of Crete Since + Geodynamic Evolution of Crete since + Geodynamic Evolution of the Dinarid + #Geodynamic Evolution of Turkey and + Geodynamic Implications for the Evo + Geodynamic Implications# Microearth + Geodynamic Implications# The Hellen + Geodynamic Implications.# Isotope G + Geodynamic Implications.# Post Geodynamic Situation in Greece# Som + Geodynamical Evolution of Northwest + Geodynamical Evolution of the Aegea + Geodynamical Structures of the Aege + Geodynamics in the Mediterranean Ar 4 Geodynamics in Turkey.# Space Based + Geodynamics of the Peloponnesus.# P + Geodynamique de I Arc Egeen.# L Evo + geodynamiques. Donnees nouvelles et + Geographic Information System (GSI) + Geokinematics of the Eastern Medize + Geologic de la Grece.# Equisse de l 4 Geological and Geomorphological Fea #Geological Criteria for Evaluating + Geological Data# Seismotectonics of + #Geological Evidence Concerning Com #Geological Evidence for the Last T + #Geological Evolution of the Tethys + #Geological Information from Satell -#Geological Map of Naxos (1/50 000) + Geological Map of Rhodes Island (Gr + Geological Observations on Land# Re + Geological Observations# The 1971 M + Geological Research in the Alps# Se + Geological Results of Petroleum Exp + #Geological Studies on the Dodecane + Geologie de I Egee: Regard sur le D + Geologique de la Turquie, -Faille ' Geologique des Cyclades (Grece): I Geologique et Structural du Graben Geologiques dans de la Taurus Occid + Geologiques dans le Taurus Lycien 0 + geology and Geophysics and Geophysi + #Geology and Hydrocarbon Potential + #Geology and Tectonic Evolution of Geology and Tectonic.# The Thermal #Geology of the Mediterranean Sea B + Geology of the Mediterranean Sea# T + Geology of the Western Part of Asia + Geology of the Western Taurids. # Ou + #Geology of Western Anatolia #Geology of Izmir - Sefelihisar Geo + Geology: Editorial Remarks and Resu + Geomagnetic Field Intensity and Rev + Geomagnetic Reversal in Western Cre + Geomagnetic Reversal Time Scale on + #Geometric et Cinematique de la Sub +

oğru Kalınlaşan Neojen Yaşlı Alüvyo + Gelişimi.# Salihli Güneyinde Üste D + orfitlerin Petrografisi ve Bireysel + Mugla-Dalaman Cay# Beitrage zur Turkey# Environmental Isotope Stud + Sismik Etüdü Raporu. i Anadolumum uçları# Batı Anadolu nun nun Mikro Bloklarının Paleomagneti + Jeotermal enerji Olanakları.# Gedi + ilan Paleomagnetic Calisma Sonuclar + tik Haritalarma eprem Bölgeleri Arasındaki İlişkile + ain Earthquake regions of Turkey.# + tution.# Relationship between the P + n the Aegean Area. # A Time and Magn udy of Margarite, Muscovite and Par + Version of the Göstergesi.# Bat: Anadolu erilerle Incelenmesi.# Ege Bölgesi + k Istanbul Civarında Yerkabuğu Yapı + ta# Inner arc volcanism in NW Aegea wg gwewgewge 123213213 dscdsf 12321 + ance of Augen Gneisses from the Sou + the Aegean Arc: Sr, Nd, Hf, and O lcanism in NW Aegean Arc: geochemic Rocks of the Aegean Sea, Preliminar + qmatism of the Aegean Sea ent Volcanics in the Eastern Aegean + in Turkey.# Space Based ce in the Interval 1892 - 1992.# A + Deformation in Central Greece from matics of Central Greece With Respe in in Greece in the Interval 1900 -Local and Regional Components of W # Local and Regional Components of ay 1995 Kozani-Grevena (Greece) Ear n the Central Mediterranean Region: Crustal Movement in Turkey by Terr Along the North Anatolian Fault by nterval 1892-1992 61 - 1967.# World Seismicity Map fr + the late Middle Miocene# On the He the Late Middle Miocene.# On the H es. Albanides and Hellenides # Pale -Cyprus based on Palaeomagnetic Dat lution of the Hellenides# Geophysic quake seismicity and Fault-Plane So ic Subduction Zone: a Tomographic I eochemistry of Recent Magmatism in rtonian Westward and Southward Thru e Geophysical Considerations on the + ern Greece: Pleomagnetic Results.# n Arc: a Paleomagnetic Reconstructi + an Region# Investigation of ea: Crete as a Case Hidtory.# Strat + geodetic Activities for ostalpine lution Structure de la Grece Nord 0 + Synthese# Les activities magmatiqu + # Middle East Tectonics: Applicatio rranean# The Wegener-Medlas Project + а tures in the Central macedonia Area + Seismicity. Western Anatolia: Regional Stress + pressional Tectonics in the Eastern + wo Faulting Events on the North Ana Belt from the Atlantic to the Pami + ite Surveys of the Mediterranean Re + eece) Explanatory Notes.# Geologica cent Quaternary Tectonics in the He + ay 12 Burdur Earthquake Sequence, S + se Islands. IX. Geological Map of R + odecanese Meridonal (Kasos, Karpath Izmir'# Notes Explicatives de la Ca ile de Paros.# Contribution a I etu + de Gediz (W de I Anatolie) Entre Sa ental au sud de Beyşehir (Turque).# ccidental.# Reserches cs.# Sedimentary Basins of the Medi + of the Alaşehir (Manisa) Area, West + the Biga Peninsula, Northwest Yurke -Springs of the Armutlu Peninsula (N + asins he Tectonics and Minor# On the

thermal Area, Western Anatolia Turk + lt of a Round-Table Discussion Abou + ersals from Upper Miocene Section i + te.# Paleomagnetic Record of two Su + Estimates of Current Plate Motions. + duction Eggene Structure en Vitesse +

tline of the

Gautier, P.+ 1994 Jongsma, D. 1987 Barka, A. A.+ 1988 Eyidoğan, H.+ 1985 Astaras, TH.+ 1990 Aubouin, J. 1973 Zanchi, A.+ 1993 Papazachos, B. C.+ 1971 Makris, J. 1973 Makris, J. 1978 Morelli, C. 1985 Makris, J. 1976 Makris, J + 1984 Finetti, I.+ 1973 Papazachos, B. C.+ 1969 Ginzburg, A.+ 1987 Makris, J. 1977 Wong, H. K.+ 1971 Lort, J. M. 1971 Morelli. C.+ 1975 Yılmaztürk, A. 1989 Jongsma, D. 1975 Allan, T. D.+ 1971 Vening-Meinesz, F. A. 1954 Watson, J. A.+ 1969 Demirörer, M. 1971 Makris, J. 1975 Allan, T. D.+ 1965 Makris, J. 1985 Hersey, J. B. 1965 Hersey, J. B. 1965 Stobbe, c. 1980 Sandwell, D. T.+ 1992 Stanley, D. J. 1974 Dora, O. Ö.+ 1990 Dora, 0. Ö.+ 1995 Innocenti, F.+ 1981 Dercourt, J. 1970 Brinkman, R. 1966 Dürr, S. 1975 Hurtig, E.+ 1990 Eşder, T. Eşder, T.+ 1990 1975 1997 Eisenlohr, T.+ Tezcan, A. K.+ 1991 Simsek, S. 1990 Simsek, S. 1985 Erentöz, C.+ 1968 Şimşek, Ş. Şimşek, Ş. 1995 1988 Tezcan, A. K. Esder, T. 1995 1990 Ben, J.+ 1976 Şimşek, Ş. 1985 Cağlar, I 1995 Şimşek, Ş. 1997 Tezcan, A. K. 1979 Tezcan, A. K. 1977 Koçak, A. 1990 Higgins, M. D.+ 1996 Uğur, E. Nalbant, S. S. 1974 1996 Şahin, H.+ 1981 Barka, A. A. Ezen, Ü. 1993 1979 Brinkman, R. 1966 Pollack, H. N.+ Sandwell, D. T.+ 1993 1992 Ekström, G.+ 1997 Straub, C.+ 1994 Oral, M. B. 1994 Reilinger, R. E.+ 1997 Kahle, H.-G.+ 1993 Isacks, B. L.+ 1968 Van der Hilst, R. D.+ 1997 Argus, D. F.+ Bozkurt, E.+ 1989 1995 Bozkurt, E.+ 1997 Çağlar, I.+ 1996 1998 Uluğ. A.+ 1986 Yılmaztürk, A. 1995 Cağlar, I. 1970 Basarır. E. 1997 Yalçın, T. Seyitoğlu, G.+ 1994 1994 Sevitoğlu, G.+ Canitez, N. 1962 Şaroğlu, F.+ 1983 1998 Orbay, N.+ Ketin, I.+ 1969 Kastens, K.+ 1997 1993 Kastens, K. A.+ Reilinger, R. E.+ 1995 Gilbert, L. E.+ 1994 Oral, M. B.+ 1993 Straub, C.+ 1997 Kahle, H.-G.+ 1995

genic Extension in the Central Aege + Geometry and Kinematics of Late-Oro + Geometry and rates of Microplate Mo + Geometry in Turkey and its Influence Geometry of Deformation in the Cont + Geomorphological Features in the Ce + Geophsiques: I example des Dinaride + Geophysical and Geological Data# Se + #Geophysical and Tectonic Features + Geophysical Aspects on the Evolutio Geophysical Considerations on the G + #Geophysical Contribution to Knowle + Geophysical Data# A Dynamic Model o + Geophysical Data# Physical Properti + #Geophysical Exploration of the Med + #Geophysical Features of the Greek + #Geophysical Investigations in the #Geophysical Investigations of the + Geophysical Profiles in the Eastern + Geophysical Review# The Tectonics o + #Geophysical Studies in the Aegean + Geophysical Study of the Aegean Sea + Geophysical Study of the Hellenic A + Geophysical Study of the Mediterran + Geophysical Study.# Indonesian Arch + Geophysical Survey in the Mediterra + #Geophysical Survey of Çanakkale Tu + Geophysical Survey.# Crustal Struct + #Geophysical Surveys in the Mediter #Geophysics and Geodynamic Implicat + Geophysics and Geophysics.# Sedimen + Geophysics.# Sedimentary Basins of Geophysikalischen Messungen# Dil Ph + Geosat and Seasat Reveals New Tecto + Geosynclinal Sedimentation. # Modern + Geotectonic Evolution of the Mender + Geotectonic Evolution of the Mender + Geotectonic Implication. # Neogene a + Geotectoniques. # L expansion Oceani + #Geotektonische Gliederung von West + Geotektonische Stellung des Mendere + #Geotermal Atlas of Europe, Sheet S + Geothermal Area# The Crust Structur + Geothermal Area, Western Anatolia T Geothermal Areas of Northwestern Tu + #Geothermal Atlas of Europe, Catalo + #Geothermal Energy Development in T + Geothermal Energy Field of Turkey.# + Geothermal energy in Turkey# The Re + Geothermal Energy in Turkey. # Prese + Geothermal Enrgey in Turkey.# Impor #Geothermal Explorations and Heat F + Geothermal Fluids in Seferihisar Ge + Geothermal Gradients# Metamorphism #Geothermal Model of Denizli, Saray + Geothermal Parameters in the Earth. + #Geothermal Potential in Northweste + #Geothermal Studies, Their Present + #Geothermal Studies, Their Present + Geothermal Systems in Western Anato + Geplogical Companion to Greece and + Gerede - Çerkeş Bölümünde Yerkabuğu + Gerilme Alanlarının Modellenmesi.# Germecik - Bozköy Jeotermal Enerji Geyve-Iznik Kolları Üzerinde Paleos + Girisim Olavlarının Incelenmesi.# | + Gliederung von Westanatolien# Gecte + Global Data Set. # Heat Loss from th + #Global Marine Gravity Form ERS-1 G + Global Models of Surface Wave Propa + #Global Positioning System (GPS) Es + #Global Positioning System (GPS) Me + #Global Positioning System Measurem + Global Positioning System# Monitori + Global Tectonics.# Seismology and t + Global Tomography# Evidence for Dee + Gloria Fault. # Closure of the Afric + Gneisses from the Southern Menderes + Gneisses of Southern Menderes Massi + Gökova Grabenlerinin Modellenmesi.# + #Gökova Körfezi nin (Güneybatı Yürk + #Göller Bölgesinin Depremselliği Gölpazarı (NW part of Turkey) as In + Gölü Doğusunda Kalan Menderes Masif + Gönen and Eksidere Thermal Waters (+ Gördes Basin, West Turkey.# Neogene + Gördes Basin: Tectonics and Sedimen + Göre Kuzey Anadolu Arz Kabuğunun Ya + Görüşler.# Orta Toroslar - Orta Ana + Göstergesi.# Batı Anadolu Genişleme + Gözlemler.# 23 Mart 1969 Demirci ve + #GPS Evidence for Arc - Parallel Ex + #GPS Evidence for Arc - Parallel Ex + #GPS Evidence for Westward Continua + GPS Experiment.# Strain Results and + GPS Measurements in Western Turkey + GPS Measurements# Recent Crustal de +

North Aegean Trough Hellenides Mediterranean.# Some f the eastern Mediterranean: A sea and in the Eastern Mediterranea + and Surrounding Area: Pn Velocity rc# A Marine ean Seaf A ipelago: A nean.# The Marine zla Area. ure of the Aegean Sea and the Helle + ranean and Red Sea During the Perio ions for the Evolution of the Helle + tary Basins of the Mediterranean Se + the Mediterranean Sea in Submarine ysikalischen Etgenschaften und der nic Fabric.# Global Marine Gravity Flysch Sedimentation in a Mediterr + es Massif# Metamorphic History and es Massif# New Evidence on the nd Quaternary Volcanism in the East + que Actuelle et Fossile; ses Implic + anatolien s Kristallins/SW-Anatolien und Sein + ophia. e and Convection Mechanism of Geoth + urkey. Determination of Reservoirs + rkey# Regional Tovestigation of Col + gue of Heat Flow Density Data: Turk + urkey Present Status and Future Developm + search of Thermomineral Resources a + nt Status and Future Development Po + tance of low in Turkey. othermal Area# The Crust Structure on Naxos: Petrology and köy - Buldan Area. # The Electrical Conductivity Distr + rn Turkev Status and Contribution to Heat Flo + Status and Contribution to Heat Flo + lia# An Approach to Occurrence of t + the Aegean.# A Hareketlerinin Jeodezik Yöntemlerl + Depremlerin Oluşturduğu Deformasyon + Aramaları Rezistivite Etüdü Ön Rapo ismik Araştırmalar# Kuzey Anadolu F + stanbul (ITÜ) Deprem Istasyonunda K + ktonische e Earth s Interior: Analysis of the + eosat and Seasat Reveals New Tecton + gation# Measurements and timates of Crustal Deformation in t + asurements in Turkey (1988-1992): K + ents of Present-day Crustal Movemen + ng West Hellenic Arc Tectonics and + he New p mantle Circulation from a - Eurasia - North America Plate C + Massif (West Turkey)# Geochemistry f (Western Turkey) and their Tecton + Derin Elektrik Özdirenç ve MT Veri + iye) Gec Kuvaterner Evrimi. ferred from MT Survey and its Conne i Guney Kanadının Jeolojisi ve Petr + NW Turkey).# Hydrogeological Invest -Palynological and Isotopic Age Dat tation.# Late Cenozoic Basin Develo + pisi.# Gravite Anomalileri ve Sismo + dolu nun Güneyinin Neotektoniği ile Merkezinin Paleomagnetic 28 Mart 1969 Alaşehir - Sarıgöl De + tension Along the Hellenic Arc, Gre + tension Along the Hellenic Arc, Sou + tion of Dextral Strike - Slip Motio + Tectonics from the Aegean and their Tectonic Implications.# P +

tions in the Eastern Mediterranean +

e on Earthquake Activity# Strike-S1 -

ntral macedonia Area, N.Greece.# La +

s; Paleotectonique, Tarditectonique +

eodynamic Situation in Greece# Some +

es and State of the Crust and Upper +

Island Arc and Eastrn Mediterranean +

of the Aegean Arc

iterranean Sea.

n of the Hellenides. # Some

dge of the Mediterranean Crust

f the Hellenic Arc Deduced from

ismotectonics of Western Anatolia:

inental Crust.# A Seismological Stu

formation and Strain Accumunation i + in Northwestern Greece and the Ioni + GPS Measurements# The Strain Field + eformation in the Marmara Sea Regio + GPS Measurements.# Active Crustal D + eformation and Strain Accumulation GPS Measurements.# Recent Crustal D + ault Zone, Greece.# Establishent of GPS Network Across the Kephalonia F + ions in the Mediterranean Area Comp GPS observations.# Crustal Deformat + nd SSC (DUT) 95C02.# Earth Rotation GPS observations: EOP (DUT)- 95L02 a + ont Campaign August / September 199 #GPS Project Marmara: Report of Sec + a# Active Tectonics of the Eastern GPS, Neotectonic and Seismicity Dat + rabeninin (Salihli-Alaşehir) Tekton Graben (Salihli-Alaşehir).# Gediz G + ic Implications# Age of the Alasehi Graben (West Turkey) and its Tecton + ic Implications# The Age of the Büy Graben (West Turkey) and its Tecton + ntre Salihli et Alașehir.# Etude Ge -Graben de Gediz (W de I Anatolie) E + ismicity in the Gulf of Korinth (Ce #Graben Formation and Associated Se + 1 Belts: An Example from SW Anatoli #Graben Formation in the Collisiona + lisional Belts: An Example from SW + Graben# Graben Formation in the Col + Düşünceler# Ege Bölgesi Graben Sisteminin Gelişimi Üzerine + i ve Tektoniği (Geology of the Gedi + Graben).# Gediz Grabeninin Jeolojis + key# Northern Margin of the Gediz Graben: Age and Evolution, West Tur + vük Menderes Grabeni nin Jecelektrik Yapısı.# Bü + imi.# Salihli Güneyinde Üste Doğru Grabeni nin Tektonosedimenter Geliş + niği (Tectonics of the Gediz Graben + Geology of the Gediz Graben).# Gedi + Grabeninin (Salihli-Alasehir) Tekto + Grabeninin Jeolojisi ve Tektoniği (+ Grabenlerinin Modellenmesi.# Derin Elektrik Özdirenç ve MT Verileri il + the Gravity Anomalies# Estimation o + Grabens by 2-D and 3-D Analysis of Formation of the Grabens in Southwestern Anatolia.# + idence for Metamorphic Core Complex + Grabens, Western Anatolia# Field Ev chipelago, Greece, a review.# Eclog Grade Blueschist in the Cyclades Ar + Sefelihisar Geothermal Area, We + Gradient Drilling. # Geology of Izmi + etrology and Geothermal Gradients# Metamorphism on Naxos: P avity Measurements on a Surface Shi + Graf Sea Gravimeter.# Continuous Gr + thern Menderes Massif (Western Turk Grains in the Augen Gneisses of Sou + s, Greece).# Donnees Nouvelles sur + Granite Miocene de Mykonos (Cyclade + reliminary results# Geochronologica -Granitic Rocks of the Aegean Sea. P + e for an Origin by Combined Assimil + Granitoids from the Aegean: Evidenc + Gravimeter. # Continuous Gravity Mea + surements on a Surface Ship with th + thicken Mittelmeer Nach Messungen m + Gravimeter,# Schwerestörungen un Ös + aneys, Anno, 1935.# La Crociera Gravimetra del R. Sommergible Des G + ture of the Crust and Upper Mantle + Gravimetric Data (in Greek).# Struc + Sea Region #Gravimetric Studies of the Marmara tor, Pisani Anno, 1931.# La Croceir + Gravimetrica del R. Sommergible Vet + Analog Experiment for the Aegean to + Gravitational Potential Energy# An + Gravite Anomalileri# Doğu Akdeniz B + ölgesi Göre Kuzev Anadolu Arz Kabuğunun Y + #Gravite Anomalileri ve Sismolojive + r.# Türkive Gravite Çalışmaları ve Bazı Sonuçla + e Enez Deltalarinin Gravite Modellemesi.# Aşağı Meriç v + ştırılması# Ege Denizi ve Çevresini +
stırılması# Ege Denizi ve Ege Bölge + Gravite ve Manyetik Yöntemlerle Ara + Gravite ve Manyetik Yöntemlerle Ara + Bati Anadolu nun Yapısal Sorunların + Gravite Verileri ile Irdelenmesi.# Gravite Verileri.# Marmara Bölgesi tening in the Eastern Mediterranean + #Gravity Anomalies and Crustal Shor + stal Structure in the Eastern Medit + #Gravity Anomalies and Inferred Cru + e Thickness of the Sediments in the + Gravity Anomalies# Estimation of th + editerranean Sea. #Gravity Anomalies in the Eastern M + diterranean.# An Interpretation of + Gravity Anomalies in the Eastern Me ean.# The Regional Meaning of the B + Gravity Anomalies in the Mediterran ts Implications on the Crustal Stru + Gravity Anomalies of W Turkey and I + Gravity Anomaly Map of Greece: A Re + compilation. # The maly Mao of Ionian and Aegean Seas. + Gravity Anomaly, S, mple Bouguer Ano + tructure of the Aegean Arc from Tra + Gravity# Crustal and Upper Mantle S + Gravity Data# Study of the Crustal + Thickness and the Subducting Lithos + Greece.# The Gravity Field of a Dipping Plate in t Reveals New Tectonic Fabric.# Glo + Gravity Form ERS-1 Geosat and Seasa + #Gravity Induced Deformation on the + North Flank and Floor of the Spora + Gravity Measurements at Sea, 1936 -1959.# Pendulum n Mediterranean. #Gravity Measurements in the Easter + Gravity Measurements on a Surface S + hip with the Graf Sea Gravimeter.# Gravity Measurements.# Internationa 7 Gravity Measuremnts in the Atlantic + Ocean, Indian Ocean, Red Sea and M + Gravity Modelling# The Crust of the + Western Mediterranean Ridge from D + Grece Nord Occidentale Depuis le Mi ocene, Dans le Carde Geodynamique d + Grece.# Equisse de la Geologic de l а Greece# A Formulation for Reliable + Estimation of Active Crustal Deform + Greece and Adjacent Area.# A Catalo gue of Seismicity in sm of Active Deformation in Greece and Iran# Rotational Mechani + Greece and Surrounding Regions.# Se + ismic Tomography - Determination of + Greece and the Aegean. # A Geplogica + Greece and the Ionian Islands: Resu + 1 Companion to lt Inferred from GPS Measurements# Greece and the Surrounding Area# To + ward a Homogeneous Moment-Magnitude + Greece and Western Turkey. # Active + Normal Faulting in Central Greece Between 1890 and 1988# Seism icity and Assiciated Strain af Cent + Greece Between 1890-1988.# Seismici + ty and Associated Strain of Central + Greece from 1900 to 1988# Geodetic Determination of Tectonic Deformati + Greece from Gravity Data# Study of the Crustal Thickness and the Subdu + Greece from Inversion of Travel Tim es.# 3-Dimensional Velocity Structu + Greece in the Interval 1892 - 1992. + # A Comparison of the Geodetic and + Greece in the Interval 1892-1992# G eodetic Strain of Greece in the Interval 1900 - 1988 (Abstract).# Geodetic Determination + Greece may Develop into a New Marin e Theatre.# Offshore Greece# Metamorphic Core Complexes of Cordilleran Type in the Cyclades + Greece# P-wave Travel Time Residual + s Caused by a Dipping Plate in the + Pelagic Limestones for Clockwise R + Greece# Paleomagnetic Evidence from + Greece# Paleomagnetic Stratigrapy o + f the Miocene Volcanic Rocks of Les + Greece Prior to the Tertiary Clockw + ise Rotation.# Paleomagnetic Eviden + Greece# Some Geophysical Considerat + ions on the Geodynamic Situation in + Greece# Textural and Izotopic Devel + opment of Marble Assemblages During + Greece With Respect Europe: Implica + tions for Eastern Mediterranean Tec + Greece with use of an Accurate Two + Point Ray Tracer.# P - Wave Crust + Greece) - Donnees Neotectoniques et + Sismiques. # Deformations en Compre +

Straub, C.+ 1995 Straub, C. 1996 Peter, Y.+ 1997 Noomen, R.+ 1995 Noomen, R.+ 1995 Straub, C.+ 1992 Barka, A. A.+ 1997 т. Emre, 1992 Seyitoğlu, G.+ 1996 Seyitoğlu, G.+ 1992 Emre, 1990 Myrianthis, M. L. 1984 Ersoy, Ş. Ersoy, Ş. 1995 1995 Arpat. E.+ 1969 Emre, T. 1996 Yusufoğlu, H. 1996 Çağlar, I.+ Yağmurlu, F. 1998 1987 Emre, T. 1992 Emre T 1996 Cağlar, L.+ 1996 Sari, C.+ 1995 Dumont, J. F.+ 1979 Emre, T.+ 1995 Okrusch, M.+ 1990 Esder, T.+ 1975 Ben, J.+ 1976 Worzel, J. L 1959 Bozkurt, E.+ 1997 Faure, M.+ 1988 Altherr, R.+ 1976 Altherr, R.+ 1988 Worzel, J. L 1959 Fleischer, v. 1964 Cassinis, G. 1941 Papazachos, C. B. 1994 Klingele, E.+ 1997 Cassinis, G.+ 1935 Hatzfeld, D.+ 1997 1973 Özelci, F. Canitez, N. 1962 Akdoğan, N. 1995 Demirel, S.+ 1998 Genç, H. T.+ 1996 Genc. H. T + 1996 Akçığ, Z. 1988 Aygül, H.+ 1998 Rahinowitz, P. D.+ 1970 Woodside, J. M.+ 1970 Sarı, C.+ 1995 Woodside, J. M. 1968 Harrison, J. C. 1955 Morelli, C. 1990 Oral, M. B. 1987 Lagios, E.+ 1988 Allan, T. D.+ 1970 Jacoby, W. R.+ Tsokas, G. N.+ 1982 1997 Gregersen, S.+ 1984 Sandwell, D. T.+ 1992 Ferentinos, G.+ 1981 Worzel, J. L. 1965 Cooper, R. I. B.+ Worzel, J. L 1952 1959 Woollard, G. P.+ 1963 Girdler, R. W.+ Truffert, C.+ 1957 1993 1992 Sorel, D. Aubouin, J.+ 1963 Papazachos, B. C.+ 1992 1981 Makropoulos, K. C.+ Jackson, J.+ 1984 1989 Drakatos, G. Higgins, M. D.+ 1996 Kahle, H.-G.+ 1995 Papazachos, B. C.+ 1997 Roberts, S. C. 1988 Ambraseys, N. N.+ 1990 Ambrasevs, N. N.+ 1990 1991 Billiris, H.+ Tsokas, G. N.+ 1997 1989 Drakatos, G.+ 1994 Davies, R.+ R.+ 1997 Davies, Billiris, H. et al. 1989 1973 West, J. Lister, G. S.+ 1984 1977 Gregersen, S. 1983 Horner, F.+ Pe-Piper, G+ 1977 1992 Edel, J. B.+ 1978 Makris, J. Baker, J.+ 1994 Le Pichon, X.+ 1995 1997 Drakatos, G.+ Mercier, J. L.+ 1972

e-Scale Mica Interlayering and Mult + ty# Rates Crustal Deformation in th + trumental Data.# Average Regional S + y.# Seismic Velocity Constrains in iated Seismicity in the Gulf of Kor Active Nea Anchialos Fault Zone (C + ctrum Measurements.# Metamorphic Ev xtension Neogene de I Egee: la Defo gene and Quaternary Sequences at th and Upper Mantle Structure Beneath e Tertiary Intrusives from Chalkidi Active Nea Anchialos Fault Zane (C ation Acruelle de la Termination No Ages of some Ophiolites in the Oth of Upper Cenozoic Extensional Detac volution of a Dismembered Ophiolite Fault Kinematics and Rotations. # Th ated with High Grade Blueschist in rpretation. # A Microearthquake Stud Miocene Extension Directions and Te +ismic Experiments.# Crustal Structu elationships with Volcanics of the gment of arc: the Strait of Kythira + with Distance for Shallow Earthqua + ion of a Blueshist Terrane: Sifnos t GPS Network Across the Kephalonia allel Extension Along the Hellenic + allel Extension Along the Hellenic Continuation of Dextral Strike - S1 + of the Hellenide Foreland, Western + sion and Detachment Faulting, Mykon + Below a Blueshist Belt - Tinos Isl Activity in the Pindos, Paxos and Ionian Zones + fo f Strain Release in the Area of nt Evidence for the Role of Contine + Neogene Bains in Western Seismic Faulting in the Area of Petroleum Exploration in Western ping Plate in of an Extensional Shear Zone, Naxso + with Crustal Extension, Naxsos, Cyc + in Io>VI or M>5 for the Yars 1801-195 + ty Anomaly Map of Faulting in Central c Subduction-Continental Collision + m Mesozoic Carbonates# Rotational D iary Geodynamical Evolution of Nort + vstem and Rhodope Metamorphic Core + f Late Cretaceous Age.# The Akrotir ranean Ridge.# Geophysical Features ic Measurements. # Mesozoic Evolutio + Upper Mantle in SE Europe by Inver + n Sea) - Implications for the Struc + schen Bau der Insel Naxos# Beitrage + Asthenosphere System in Europe fro etzten Dezenniums.# Über die Tekron f Recharge Conditions in Geothermal of the Mediterrarean Sea by Surface ccretionary Complex# Rate of Outwar ccretionary Coplex?# Did the Onset ne Yapısal Bir Yaklasım (Selimiye-M + remselliği.# Akkuyu Nükleer Determined from Seismicity# Rates idi Earthquake of 18 November 1992: ons for Large Scale Normal faulting + thods.# Seismic Tomography of the raben Formation and Associated Seis + eece, and its Seismotectonic Interp + torical and Instrumental Data. # Ave + ectonic Basin Across the Hellenic A rafisi# Bafa Gölü Doğusunda Kalan M ik Birimler# Aydın Dağları (Mendere nin Depremselliği ve Aktif Tektoniğ .# Batı Kavalarm Stratigrafisi, Bursa jen Yaşlı Alüvyon Yelpaze Çökelleri + afisi ve Bireysel Index Mineralleri + olojisi.# Marmara Denizi termik Etüdüne Ait Rapor.# Turgutlu + örüşler.# Orta Toroslar - Orta Anad Pasific and Indian Oceans and the M Mart 1969 Demirci ve 28 Mart 1969 + Ir-Turgutlu-Salihli Arasında Kalan nde Yapılan Jeolojik Harita e nin Müntehap Sahalarında Maden Ka + e Normal Faulting: Tectonic Implica + le Normal Faulting: Examples from W + dorukcan Vadisinde Kurulan Jeode + Incelenmesi.# Kuzey Anadolu Fay Ku + ti Anadolu Jeoelektrik Yöresinde Yapılan Jeolojik iye Aeromagnetik Çalışmalara Katkısı# Türkiye Diri +

Greece) and the Implications of Fin + Greece) as Determined from Seismici + Greece) Based on Historical and Ins + Greece) from a 3-D Tomographic Stud + Greece)# Graben Formation and Assoc Greece)# Recent Tectonics Along the Greece) Utilizing 40Ar/39Ar Age Spe Greece).# Donnees Nouvelles sur / e Greece).# Extensional Tectonics Neo Greece).# Inversion of the Crustal Greece).# Paleomagnetic Study of th Greece).# Recent Tectonic Along the Greece).# Sismotectonique et Deform Greece).# Spreading and Emplacement + Greece).# Structure and Kinematics Greece).# The Tectono-Metamorphic E Greece): Timing, Tectonic Regimes, Greece, a review.# Eclogites Associ Greece, and its Seismotectonic Inte + Greece, and Their Implications for + Greece, Obtained by Refractional Se + Greece-Tectonic and Petrochemical R + Greece.# Active Deformation of a se Greece.# Attenuation of Intensities Greece.# Cooling During the Exhumat + Greece. # Establishent of a Permanen + Greece.# GPS Evidence for Arc - Par Greece.# GPS Evidence for Arc - Par Greece.# GPS Evidence for Westward + Greece.# Late Cenozoic Deformation Greece.# Late Miocene Ductile Exten Greece.# Low-angle Faults Above and + Greece.# On Mapping of the Seismic Greece.# Paleomagnetic Results from Greece.# Preliminary Heat Flow Map Greece.# Space and Time Variation o Greece.# Sr-isotope and Trace Eleme Greece.# Structural Development of Greece.# Tectonic Stress Field and Greece.# The Geological Results of Greece.# The Gravity Field of a Dip + Greece.# The Late Alpine Evolution Greece.# The P-T-t Path Associated Greece. # The Seismotectonic Regime #Greece: A Catalogue of Shocks with + Greece: A Recompilation.# The Gravi Greece: An Overview.# Active Normal Greece: Implications for the Oceani + Greece: Palaeomagnetic Evidence fro Greece: Pleomagnetic Results.# Tert + greece: Strymon Valley Detachment S + Greece: Witness to a Lost Terrane o Greek Island Arc and Eastrn Mediter Greek Microplates from Palaeomagnet + #Greek Tectonics and Seismicity. Greek).# Structure of the Crust and + Greenschist in Sifnos Island (Aegea + Griechenlands, II. Uber den Tektoni + Gross Features of the Lithosphere -Grossen Anatolischen Erdbeden des L + Groundwater for the Determination o + Group Velocity. # Crustal Structure Growth of the Mediterranean Ridge A Growth of the Mediterranean Ridge A Grubu Kavaların Temel-Örtü İlişkisi + Güç Santralı Yeri ve Çevresinin Dep + Gulf of Corinth (Central Greece) as + Gulf of Corinth (Greece) # The Galax + Gulf of Corinth (Greece): Implicati Gulf of Corinth: A Comparison of Me Gulf of Korinth (Central Greece) # G Gulf of Pataras Region, Westeern Gr Gulfs (Central Greece) Based on His Gulfs.# A Comperative Study of Nect + Guney Kanadının Jeolojisi ve Petrog + Güney Kesimindeki Allokton Metamorf + #Güneybatı Anadolu ve Yakın Çevresi + Güneybatı Türkiye nin Depremselliği + Güneyi,# Jura Öncesi Bloklu Tortul + Güneyinde Üste Doğru Kalınlaşan Neo + Güneyindeki Metamorfitlerin Petrogr + Güneyinin Denizaltı ve Kıyı Jeomorf + Güneyinin Jeoloji, Hidroloji ve Jeo + Güneyinin Neotektoniği ile İlgili G + H.M.S. Challanger in the Atlantic, Hakkında Makrosismik Gözlemler.# 23 + Hakkında Ön Sonuçlar# Ödemiş-Bayınd + Hakkında Rapor# Bodrum-Muğla Yöresi + Hakkında İstikşaf Programı.# Türkiy + Hanging Wall in Regions of Low Angl + hanging Walls in Regions of Low-Ang + Hareketlerin Araştırılması.# Akyazı + Hareketlerinin Jeodezik Yöntemlerle + Harita Çalışmaları ve Örnekler.# Ba + Harita Hakunda Rapor# Bodrum-Muğla + Haritalarına Genel bir Bakış.# Türk + Haritası ve Aktif Tektonikle İlgili +

Feenstra. A 1996 Tselentis, G. -A.+ Papazachos, B. C.+ 1986 1990 Ligdas, C. N.+ 1993 Myrianthis, M. L. 1984 Caputo, R.+ 1990 Wijbrans, J. R.+ 1988 Faure, M.+ 1988 Brooks, M.+ 1982 Christodoulou, A.+ 1988 Kondopoulou, D. 1985 Caputo, R. 1990 Amorese, D. 1993 Hynes, A. J.+ 1972 Gautier, P.+ 1993 Katzır, Y.+ 1996 Mercier, J. L.+ 1991 Okrusch, M + 1990 Melis, N. S.+ 1989 Morris, A.+ 1996 Makris. J.+ 1977 Nicholls, L. A. 1971 Lyberis, N.+ 1982 Drakopoulos J 1978 Avigad, D.+ 1992 Peter, Y.+ 1997 Kastens, K.+ 1997 Kastens, K. A.+ 1993 Reilinger, R. E.+ 1995 Underhill, J. R. 1989 Lee, J.+ 1993 Avigad, D + 1989 Galanopoulos, A. 1963 Marton, E.+ 1990 Fytikas, M. D.+ 1977 Delibasis, N.+ 1965 Barton, M.+ 1983 Brooks, M.+ 1988 Papazachos B, C + 1969 British Petroleum 1971 Gregersen, S.+ 1984 Buick, I. S. Buick, I. S.+ 1991 1989 Galanapoulos, A. G. 1967 Galanopoulos, A. 1960 Lagios, E.+ 1988 Roberts, S. C.+ 1991 Baker, C.+ 1997 Morris, A. 1995 Kissel, C.+ 1985 Dinter, D. A.+ Patzak, M.+ 1993 1994 Papazachos, B. C.+ 1969 Turnell, H. B. 1988 Makropoulos, K.+ 1984 Papazachos, C. B. 1994 Avigad, D. 1993 Trikkalinos, T. K. 1947 Panza, G.F.+ 1980 Ketin, l. 1948 Eisenlohr. T.+ 1997 Payo, G. Kastens, K. A. 1967 1991 Kastens, K. 1990 Öztürk, A.+ 1983 Alptekin, Ö.+ 1977 1986 Tselentis, G. -A.+ Hatzfeld, D.+ 1996 1995 Rigo, A.+ Le Meur, H.+ 1997 Myrianthis, M. L. 1984 Melis, N. S.+ Papazachos, B. C.+ 1989 1990 Papanikolaou, D. J.+ 1988 Başarır, E. Candan, O.+ Kalafat, D. 1970 1992 1988 Alkan, G. 1979 1989 Kaya, 0.+ Yağmurlu, F. 1987 1975 Başarır, E. Güneysu, A. C. 1998 Karamanderesi, I. H. 1971 1983 Şaroğlu, F.+ Gaskell, T. F + 1958 Ketin, I.+ 1969 Evirgen, M. M. 1977 Flügel, N.+ 1954 Hutchison, R. D.+ 1962 Şengör, A. M. C. Şengör, A. M. C. 1986 1987 1987 Öztürk, E.+ Uğur, E. 1974 1995 Şardar, S. 1954 Flügel, N.+ Aydın, l.+ 1995 Şaroğlu, F.+ 1997

Haritası.# Türkiye Isı Akısı Tezcan, A. K.+ u Alçak Geçişli Filtrelerin Düzenle + 1989 Haritasına Uygulanması,# İki Boyutl + ması.# Iki Boyutlu Alçak Geçişli Fi + tachment Basin and Rİft Basin Sdeve + Sanver, M. Havadan Manyetik Haritasına Uygulan + 1975 Sanver, M. 1975 Havzalar ve Rift Havzaları (Suprade + Sözbilir, H.+ d RIft Basin Sdevelopment During th + 1996 Havzaları (Supradetachment Basin an + Sözbilir, H.+ ha Smiri) Uzantılarının İzmit Körf + 1996 Havzaları.# Kuzey Anadolu Fayı (Lev + Şenöz, M. 1998 Havzalarının Jeolojisi.# Uşak Yöres + indeki Neojen Ercan, T.+ olojisi# Marmara Denizi 1978 Havzasının Sismik Jeoloji ve Meteor + Pinar, N. thermal Studies, Their Present Stat + 1943 Heat Flow Contouring in Turkey# Geo + othermal Studies, Their Present Stat + othermal Atlas of Europe, Catalogue + Tezcan, A. K. 1979 Heat Flow Contouring in Turkey.# Ge + Tezcan, A. K. 1977 Heat Flow Density Data: Turkey.# Ge + Tezcan, A. K.+ 1991 cs and Heat Flow in Europe. # Fault Tectoni + Meier, R.+ 1977 #Heat Flow in the Aegean Sea Jongsma, D. 1974 the Black Sea.# The Measurement and + Heat Flow in the Mediterranean and + Erickson, A. J. 1970 plorations and Heat Flow in Turkey. # Geothermal Ex + Tezcan, A. K. 1995 Heat Flow Map fo Greece.# Prelimina + ry Fytikas, M. D.+ 1977 #Heat Flow Map of Europe Cermak, V. 1979 #Heat Flow Map of Europe (1:5.0 Mio + 1 Cermak, V. 1978 #Heat Flow Map of Northwest Anatoli + a. İlkışık, O. M. 1989 lia. #Heat Flow Pattern of Western Anato + Ilkışık, O. M. 1990 tal Structure of Western Anatolia #Heat Flow, Seismicity and the Crus + Alptekin, Ö+ 1990 Heat Generation and Mineralogical C onstitution. # Relationship between + Rybach, L.+ 1982 r: Analysis of the Global Data Set. #Heat Loss from the Earth s Interio + Pollack, H. N.+ 1993 Heatflow Data From the Mediterranea + n and Aegean Seas# Rewiev of Erickson, A. J.+ 1977 Hellenic Arc# A Marine Geophysical Study of the Jongsma, D. 1975 A Synthesis# The Tectonic Developme + Hellenic Arc and the Sea of Crete: Angelier, J.+ 1982 y to the Neotectonic Evolution of t + Hellenic Arc and Trenc System: A Ke + Le Pichon, X.+ 1979 ey to the Neotectonic Evolution of + Hellenic Arc and Trench System: A K Le Pichon, X.+ 1979 w Structure of the Pliny and Strabo + Hellenic Arc# Bathymetry and Shallo Jongsma, D. 1977 rthquake Survey# The Strain Pattern + Hellenic Arc Deduced from a Microea + Hatzfeld, D.+ 1990 al Data# A Dynamic Model of the Hellenic Arc Deduced from Geophysic Makris, J. 1976 nd Holocene Normal-fault Scarps in + Hellenic Arc# East-West Extension a Armijo, R.+ 1992 in the Hellenic Arc# Large Seismic Faults Papazachos, B. C. 1996 Hellenic Arc Relative to the Plate Boundary# Earthquake Locations in t + Papadopoulos, T.+ Papadopoulos, T.+ 1988 Hellenic Arc Relative to the Plate Boundary.# Earthquake Locations in 1988 # Tectonic Evolution of the Hellenic Arc Since the Late Miocene + Angelier, J. 1978 n Arc Tectonics (WHAT A CAT) Using + Hellenic Arc Tectonics and Calabria + Kahle, H.-G.+ 1993 uth Peloponnesus) Earthquake: Detai + Hellenic Arc# The 1986 Kalamata (So + Lvon-Caen, H.+ 1988 mation of a segment of arc: the Str + Hellenic arc, Greece.# Active Defor + Lyberis, N.+ 1982 Hellenic Arc, Greece.# GPS Evidence for Arc - Parallel Extension Along + Kastens, K.+ 1997 Greece.# GPS Evidence for Arc - Par + Hellenic Arc, Southern Aegean Sea, Kastens, K. A.+ 1993 a Young Submerged Chain Associated + Hellenic Arc. # Mediterranean Ridge: + Finetti, I. 1976 ibution of the Intermediate Focal D + Hellenic Arc. # Space and Time Distr + Comminakis, P. E.+ 1980 1 Observations on Land# Recent Quat + Hellenic Arc: Examples of Geologica Angelier, J. 1979 Hellenic Arc: the Messiniakos, Argo + likos, Saronikos and Southern Evoik + Papanikolaou, D. J.+ 1988 nlinear Inversion of Travel Times# + Hellenic Area Obtained by Robust No + Papazachos B C + 1997 on of the 13.10.1997 (Ms=6.6) Weste + Hellenic Earthquake# Source Inversi 1998 Barış, Ş.+ eomagnetic Results from Mio-Pliocen + Hellenic Sedimentary Arc# First Pal Laj, C.+ 1982 opponnesus: First Result of a Microe + Hellenic Subduction Beneath the Pel + Hatzfeld, D.+ 1989 odynamic Evolution of Crete Since t + Hellenic Subduction Zone and the Ge + Meulenkamp, J. J.+ 1988 odynamic Evolution of Crete since t + Hellenic Subduction Zone and the Ge + Meulenkamp, J. E.+ 1988 Spakman, W.+ Huchon, P.+ phic Image and its Geodynamic Impli + Hellenic Subduction Zone: a Tomogra + 1988 Beam and Submersible Observations# 1982 Hellenic Trenc: A Synthesis of Sea- + ake Mechanisms in the Hellenic Trench Near Crete# Earthqu + 1990 Taymaz, T.+ e Traveltime Residuals from Earthou + Hellenic Trench near Crete# S-P-Way + Taymaz, T. 1996 hellenic Trench System# From Subduc + Le Pichon, X.+ 1979 tion to transform Motion: A Seabeam + Hellenic Trench. # Active Tectonics in the Le Pichon, X.+ 1981 # Late Cenozoic Deformation of the + Hellenide Foreland, Western Greece. Underhill, J. R. 1989 Mercier, J. L. 1966 aleogeographie, Orogenese, Metamorp + Hellenides en Macedonie (Grece).# P Makris, J. Hellenides# Geophysical Investigati -1977 ons of the ic Implications for the Evolution o + Hellenides# Geophysics and Geodynam + Makris, J. 1985 Brunn, J. H. 1960 Hellenides Internes et Leur Extensi + Hellenides Obtained from Geophysica + on. Reflexions sur I orogenese Alpi + 1 Survey.# Crustal Structure of the + Makris, J. 1975 Hellenides, and the Sea - Floor Spr + Dercourt, J. 1972 eading Theory. # The Canadian Cordil + 1974 #Hellenides. Hellenides.# Isostatic Studies in t Smith, A. G.+ Chailas, S.+ 1992 he Hellenides.# Paleomagnetic Results Mauritsch, H. J.+ 1995 from Southern Albania and their Sig + 1973 Hellenides.# Some Geophysical Aspec + Makris, J. ts on the Evolution of the Bernoulli, D.+ 1974 Hellenides. # The Palinspastic Probl + em of the Jacobshagen, V. 1994 Hellenides: New Aspects# Orogenic E + volution of the 1974 Hellenids# The Balkanids as an Inst + Boccaletti, M.+ ance of Back-Arc Trust Belt: Possib + 1007 Hellenique Externe: Les Iles de Kas + Barrier, E.+ sos et Karpathos.# Structure et Def Angelier, J. Hellenique. # Analyse Quantitative d + 1981 es Relations Entre Deformation Hori + 1980 Le Pichon, X.+ rsible.# Importance des Formations + Helleniques: Observations par Subme + Briqueu, L.+ 1986 Hf, and O Isotopic Ratios in the La + vas of Milos and Santorini - Geodyn + Hidroloji ve Jeotermik Etüdüne Ait Karamanderesi, I. H. 1971 Rapor.# Turgutlu - Salihli (Manisa + 1973 Hidtory.# Stratigraphic Contributio + Drooger, C. W.+ ns to Geodynamics in the Mediterran + Kandinsky-Cade, K.+ 1981 Frequency Seismic Wave Propa + gation at Regional Distances Across + High -1960 #High Alumina Basalt Kuno, H. Drakatos, G. 1989 High and Low Velocity Zones beneath + Greece and Surrounding Regions.# S + 1995 #High Boron Content in the Aquifer Filiz, Ş.+ Systems of the Gediz Basin (on the + Okrusch, M.+ High Grade Blueschist in the Cyclad + 1990 es Archipelago, Greece, a review.# 1972 Ninkovich, D.+ High Potash Volcanoes# Mediterranea + n Island Arcs and Origin of 1991 Avigad, D.+ High-pressure Metamorphic Terrains: + The Example of the Cycladic Bluesc + Smith, A. D.+ 1995 in the Sea of Marmara (Northwest Tu + #High-resolution Seismic Profiling Jackson, J.+ Nowroozi, A. A. 1984 Himalayan Belt Between Western Turk + ey and Pakistan# Active Tectonics o + 1972 Hindu - Kush Regions.# Focal Mechan + isms of Earthquakes of the Persian + Arslan, F. 1984 mler.# Düzpinar (Manisa) Miosen Omu + Average Regional Seismic Strain Rel + Hipparionlarında Odontolojik Değişi + 1990 Papazachos, B. C.+ Historical and Instrumental Data.# 1995 Ambraseys, N. N.+ historical Review, 1500 - 1800.# Se + ismicity of Turkey and Adjacent Are + Ambraseys, N. N. 1975 Historical Seismicity and Tectonics + .# Studies in 1987 Marcoux, J. Dora, O. Ö.+ #Historie et Topologie de la Neo -Tethys. 1990 History and Geotectonic Evolution o + f the Menderes Massif# Metamorphic Waldron, J. W. F. 1984 History of the Antalya Complex in t + he Isparta Angle, Southwest Turkey. + 1984 Le Pichon, X.+ Ikeda, Y.+ Armijo, R.+ History of the North Aegean Trough# + 1989 Subsidence Holocene Activity of the North Anat + olian Fault Zone in the Orhangazi P + 1992 Holocene Normal-fault Scarps in the + Hellenic Arc# East-West Extension +

ation of Three - Dimensional Veloci + entral and Eastern Mediterranean In forming Aegean Sea Region Determine T extension Egeenne, la Subsidenc Subduction et Expansion .# Neotect Subduction et Expansion.# Neotecto ermal Water Well: Impact of Precipi ir (Manisa) Area, Western Turkey# G he Gönen and Eksidere Thermal Water # Crustal Structure Modeling of Ear + # Crustal Structure Modeling of Ear of Seismicity in the Peloponnesus gien Vlore - Diber.# Termeti I ir # Etude Geologique et Structural + т nie, Epire, Greece).# Sismotectonig + Ι ee et ses Relations Avec la Sismici т et ses Relations Avec la Seismicite + aux Taurides.# Esquisse Structural + de la Grece Nord Occidentale Depui ulissements Senestres Recents a T e + т de Kassos et Karpathos.# Structure + tive des Relations Entre Deformatio + ranite Miocene de Mykonos (Cyclades + ridonal (Kasos, Karpathos, Rhodes). + т т Neotectonique Horizontale et Vertic eotectonique Horizontale et Vertica + Ι # Analyse Theorique et Numerique d + т ece); I ile de Paros.# Contribution + Sud-Hellenique (Grece).# Sur les Ma + Ι nique, Tarditectonique, Neotectonig + т res Recents a I extremite Orientale + de la mer de Crete et la Surrection + т n.# Sur I existence de Coulissement + т tude Geologique des Cyclades (Grece + т enides Internes et Leur Extension. an Area. Part re of the Mediterrarean Sea by Surf + ers of Turkey Aegean Region. ducted Lithosphere Below Southern S + nün Kuzey Kesiminde D - B Daralma nsel Naxos# Beitrage zur Erforschun + .# Crustal Structure of the Mediter Dalgalarının Dispersiyonunun Incel + apısının İncelenmesi # Sentetik Sis + ntonun Yapısı.# Yapay Sismogram Mod daki Ilişkiler# Türkiye nin Genel T de Geologique des Cyclades (Grece): + odellenmesi.# Derin Elektrik Özdire + lgesi nin Sismik Tomografi ölgesinin Sismik Tomografi ptanması,# Yinelemeli Ters Cözüm Yö + Orta Anadolu nun Güneyinin Neote + mlerinin Odak Mekanizmalar: ve Bunl + Körfezi nin Yapısı ve Kuzey Anadolu + Yapısal Sorunlarının Gravite Verile ture et Deformation d un Segment de oloji, Hidroloji ve Jeotermik Etüdü + nd Forschungen ürkei).# Lithostratigraphisce Under + aus Geophysikalischen Messungen# Di + gen mit Einem Askania - Seegravimet + ns# The Hellenic Subduction Zone: a Derived from Inversion of Macrosei outheastern Europe. # Three - Dimens rasian - African - Arabian Collisio esolving Power of Tomographic he Interpretation of Large-Scale Se + esolution in Delay Time Tomography. Along a NNW-SSE Transeci. # Neogene rge Thermal Water System# Hydraulic c Foci in the Mediterranean and Sul rthquake in Western Turkey and thei y Volcanism in the Eastern Mediterr smic Attenuation Structure Beneath raben (West Turkey) and its Tectoni ean Tectonics# Geodetic Determinati tures Along the North Anatolian Fau faulting Mechanisms.# A Microseism + SW Turkey# Source Inversion of the he Hellenides# Geophysics and Geody perties of the Lithosphere.# Focal metry of Deformation in the Contine tion-Continental Collision Transiti he Cycladic Blueschist Belt # Tecto ansion Oceanique Actuelle et Fossil icity and Fault-Plane Solutions in n Earthquake Mechanism.# Seismotect erlayering and Multiple Mica Genera + re# Some Remarks on the Gravity Ano + pectra of Some Major Turkish Earthq + Menderes Graben (West Turkey) and i on Zone: a Tomographic Image and it tern Turkey.# Cross Faults and Diff + of Recent Magmatism in the Aegean +

ination for Earthquakes in Greece a +

Homogeneous Moment-Magnitude Determ + Homogenous Initial Model.# Determin + #Horizontal Crustal Motion in the C + Horizontal Velocity Field in the De Horizontale et Mouvements Verticaux Horizontale et Verticale de I Egee: Horizontale et Verticale de I Egee: #Hydraulic Level Variations in a Th Hydrocarbon Potential of the Alaseh + #Hydrogeological Investigation of t Hypocenter and Veolcity Parameters. Hypocenter and Veolcity Parameters. Hypocenter Determinations. # A Study 30 Nendorit 1967 dthe Brezi Sizmo Anatolie) Entre Salihli et Alaşeh + Arc Egeen (Iles Ioniennes, Acarna arc Egeen Externe et de la mer Eg + I Arc Egeen Externe et la mer Egee Arc Egeen Externes: des Dinarides Arc Egeen.# L Evolution Structure + Arc Egeen. # La Neotectonique de arc Egeen.# Sur I existence de Co + Arc Hellenique Externe: Les Iles arc Hellenique. # Analyse Quantita + Egee: la Deformation Ductile du G Egee: Regard sur le Dodecanese Me Egee: Subduction et Expansion .# Egee: Subduction et Expansion.# N etude d une Population de Failles etude Geologique des Cyclades (Gr + Evolution Recente de la Courbure example des Dinarides; Paleotecto existence de Coulissements Senest 4 extension Egeenne, la Subsidence extremite Orientale de I arc Egee ile de Paros. # Contribution a I e + orogenese Alpine.# Les Zones Hell Prague# Seismicity of the Europe т. Group Velocity.# Crustal Structu + #IAH Map of Mineral and Thermal Wat + Iberian Peninsula: Evidence for Sub için bazı Veriler.# Isparta Büklümü + II. Uber den Tektonischen Bau der I + II: Phase Velocity and Travel Times + ile Asya, Avrupa ve Afrika da Yüzey + ile Batı Anadolu da Yer Kabuğunun Y + ile Batı Türkiye de Kabuk ve Üst Ma + ile Başlıca Deprem Bölgeleri Arasın + ile de Paros. # Contribution a I etu + ile Saros ve Gökova Grabenlerinin M + ile Üç Boyutlu Modellenmesi# Ege Bö ile Üç Boyutlu Modellenmesi.# Ege B + Yeraltı Yoğunluk Dağılımının Sa + ile ile Ilgili Görüşler.# Orta Toroslar + llişkileri.# Batı Anadolu Depre + ile ile Ilişkişinin Irdelenmesi# Izmit + ile Irdelenmesi.# Bat: Anadolu nun Iles de Kassos et Karpathos.# Struc + ili) Arası Gediz Nehri Güneyinin Je + im Ewestlichen Kleinasien# Reisen u im Kanozoikum Südwest Anatoliens (T + im Mai 1881.# Reise in der Troas im Östlichen Mittelmeer Abgeleitet im Östlichen Mittelmeer Nach Messun + Image and its Geodynamic Implicatio + Image of the Aegean Region (Greece) + Image of the Upper Mantle Beneath S + Image of the Upper Mantle in the Eu + Images in the Aegean Area# On the R Images in the Aegean Sea Area# On t #Imaging Algorithms, Accuracy and R Imbricate Systems of Thrust Sheets Impact of Precipitation on the Çeki Implication# Distrubution of Seismi Implication.# Focal Mechanism of Ea + Implication.# Neogene and Quaternar Implication. # Three Dimensional Sei Implications# Age of the Alaşehir G + Implications for Eastern Mediterran + Implications for Incompatible Struc Implications for Large Scale Normal Implications for Seismotectonics in Implications for the Evolution of t Implications for the Mechanical Pro Implications for the Nature and Geo + Implications for the Oceanic Subduc Implications for the Structure of t Implications Geotectoniques.# L exp + Implications# Microearthquake seism Implications of a Review of Europea + Implications of Fine-Scale Mica Int + Implications on the Crustal Structu Implications# Rupture Process and S Implications# The Age of the Büyük Implications# The Hellenic Subducti Implications with Examples from Wes Implications.# Isotope Geochemistry +

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C. 1986 Briqueu, L.+ 1986 tward and Southward Thrusting in th + of 1988 and 1990 GPS Measurements i + astern Mediterranean Region# New Co pectra of Some major Turkish Earthq + es au Messinien dans les Fosses de he Eastern Mediterranean Region# Th he Eastern Mediterranean Region.# T + Turkey. ormations# Deformation of the Weste + A Transverse of the Ionian Islands in Western Anatolia, Turkey.# South ectonic Explanation?# Aegean Paleom + orth Anatolian Fault# Neotectonics train Distribution over the East Me eki Gelişimleri# Çine Güneyindeki M nean Sea. # Submarine Gravity Measur xperiments in the Mediterranean and + Sea 1950 - 1953.# Seismic Measurem + ithosphere Beneath the Sunda Arc. cal Study. ank and Floor of the Sporades Basin + ique et les Arcs Convexes Taurique astern Mediterranean Sea.# Gravity Strain Field in Northwestern Greec tive Crustal Deformation in the Mar cent Crustal Deformation and Strain nection between Geothermal Paramete ion.# Crustal Strucute of the Easte ents# Recent Crustal deformation an ng Measurements.# Horizontal Crusta ayleigh Wave Records.# Dispersion C trike-Slip fault Geometry in Turkey of the Mediterranean Region# Geolog st Tectonics: Applications of Geogr eneath the Aegean and the Hellenic rc: geochemical and geochronologica ng des Tektonischen Baues Griechenl -Kinematics of Extension in the Aeg ssible Relation with the Hellenids# 1 Seismic Strain Release Rates in t ow Earthquakes in the Area of Greec ude - Intensity Relationships for N Miocene Section in Crete# Relative stern European Earthquakes.# Intens S,mple Bouguer Anomaly Mao of Ion he Aegean Region (Greece) Derived f es of Lithospheric thquakes and their Implications for + h Wave Trains Associated with the E + Wave Trains Associated with the Ea + ta Set.# Heat Loss from the Earth s erations.# An EMP and TEM-AEM Study + he Aegean Defined by Teleseismic Da s in the Hellenic Arc.# Space and T e (Grece).# Paleogeographie, Orogen + ons sur I orogenese Alpine.# Les Zo + plications for the Mechanical Prope vey of the Eastern Mediterranean Se in the Eastern Mediterranean.# An Mediterranean and the Black Sea.# T tic Measurements (VLBI, SLR) in the ic Tomography Images in the Aegean ismic Reflection Data# Reorganizati or of the Menderes Massif, West Tur Study in the Gulf of Pataras Region rvey of the Eastern Mediterranean S + of the Geodetic and Seismic Strain + of Greece in the eodetic Determination of the Strain + Catalogue for Turkey for the e Greece may Develop North Aegean Trough (W. Turkey and s.# The Extension of the Lycian Nap + s.# The Extension of the Lycian Nap + anical Model of Continental Collusi n Greece).# Paleomagnetic Study of # A Tomography Image of the Aegean + " Data (in Greek).# Structure of th) Western Hellenic Earthquake# Sour fallinia Event of Ionian Islands (G Mantle Structure Beneath Calkidiki nar, Earthquake (Ms=6.1): a Rupture Deep Velocity Structure of the Hell + sional Velocity Structure of the No + rom Delay - Time and Waveform a Bay and Erdek Bay of Marmara Sea. + or the Determination of Recharge Co + in Southeastern Europe.# Preliminar + ctures of the Aegean Region zani-Grevena (Greece) Earthquake# -G + dere Thermal Waters (NW Turkey).# H + n Fault Zone Between Erzincan Refah + # Magnetotelluric Trough# Geophysical des Region# Magnetotelluric eophysical

Implications.# Post - Tortonian Wes + Implications.# Preliminary Results Implications for Tectonics of the E + Implications# Rupture Process and S + #Importance des Formations Attribue Importance in the Neotectonics of t + Importance in the Neotectonics of t #Importance of Geothermal Enrgey in Importance of Messinian Evaporite F + Incidence and Wide-Angle Seismics# incipient Metamorphic Core Complex Inclination Anomalies. Is There a T Incompatible Structures Along the N Incorporating New Sea-Beam Data.# S Index Minerallerinin Doku Icerisind + Indian Ocean, Red Sea and Mediterra + Indian Ccean.# Seismic Refraction E Indian Oceans and the Mediterranean Indonesia.# The Slab of Subducted L #Indonesian Archipelago: A Geophysi Induced Deformation on the North Fl Induits.# L Arc Concave Zagro -Taur Inferred Crustal Structure in the E Inferred from GPS Measurements# The Inferred from GPS Measurements.# Ac + Inferred from GPS Measurements. # Re + Inferred from MT Survey and its Con Inferred from Rayleigh Wave Dispers + Inferred from Repeated GPS Measurem + Inferred from Satellite Laser Rangi Inferred from the Analysis of the R Influence on Earthquake Activity# S Information from Satellite Surveys Information System (GSI)# Middle Ea Inhomogeneity in the Upper Mantle B #Inner arc volcanism in NW Aegean A Insel Naxos# Beitrage zur Erforschu + Insights from the Ductile Crust# 3D + Instance of Back-Arc Trust Belt: Po Instrumental Data.# Average Regiona + Intensities with Distance for Shall + #Intensity - Attenuation and Magnit Intensity and Reversals from Upper Intensity Relationships for Northwe Intensity, Free-air Gravity Anomaly Intensity. # A Tomography Image of t Interaction in the Aegean Area# Mod + Intercontinental and Interplate Ear Interference Phenomenon in Rayjleig Interference Phenomenon in Rayleigh Interior: Analysis of the Global Da Interlayering and Multiple Mica Gen #Intermediate Depth Seismicity in t + Intermediate Focal Depth Earthquake #International Gravity Measurements Internes des Hellenides en Macedoni Internes et Leur Extension, Reflexi Interplate Earthquakes and their Im Interpretation# An Aeromagnetic Sur + Interpretation of Gravity Anomalies Interpretation of Heat Flow in the Interpretation of Large Scale Geode Interpretation of Large-Scale Seism + Interpretation of the Aegean Sea Se -Interpretation of the Southern Sect Interpretation.# A Microearthquake Interpretation. # An Aeromagnetic Su Interval 1892 - 1992.# A Comparison Interval 1892-1992# Geodetic Strain + Interval 1900 - 1988 (Abstract).# G + Interval 1913-1970.# An Earthquake + into a New Marine Theatre.# Offshor into the Oblique Fault Zone of the into the Southeastern Aegean Island into the Southeastern Aegean Island + Intraplate Deformation: Simple Mech + Intrusives from Chalkidiki (Norther Inversion of Macroseismic Intensity Inversion of Seismic and Gravimetri Inversion of the 13.10.1997 (Ms=6.6 Inversion of the 1983 January 17 Ka #Inversion of the Crustal and Upper + Inversion of the October 1, 1995 Di Inversion of Travel Times# P and S Inversion of Travel Times.# 3-Dimen Inversion.# S - Wave Below Europe f Investigation in lzmit Bay, Bandırm + Investigation of Cold Groundwater f + Investigation of Crustal Structure + #Investigation of Geodynamical Stru Investigation of the 13 May 1995 Ko + Investigation of the Gönen and Eksi + Investigation on the North Anatolia Investigations in the Aegean Region Investigations in the North Aegean + Investigations in the Western Touri + Investigations of the Hellenides# G +

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ree - Dimensional Velocity Anomalie + # Greece: A Catalogue of Shocks wi s Basins and P-wave Crustal Velocit + , Total Magnetic Intensity, Free-ai + e New Elements from DSS Data. sor Inversion of the 1983 January 1 + t Normal Incidence and Wide-Angle S m GPS Measurements# The Strain Fiel he 1908 Messina Turbidity Current. Western raction and Seismic Reflection Meas + arthquake Sequence of 1983. # Eviden + omagnetic Evidence for Rotation of agnetic Evidence from Pelagic Limes tic Results from the Pindos, Paxos) # Sismotectonique et Deformation ees Neotectoniques et Sismiques. # D + e Deformation in Greece and Velocities Beneath Turkey and eath Continental Collision Zones: t. + ns in High - Frequency Seismic Wave + egean Paleomagnetic Inclination Ano + the Structure of the Cycladic B + for Geological Studies on the Dodecane + Stations.# Detection and Location Ridge.# Geophysical Features of th + cient Geosynclinal Sedimentation.# + sh Volcanoes# Mediterranean asalt Magma Types Across Continenta + # Evidence for Transform Faulting i + etamorphic Events in the Cycladic A + f Deformation Associated With Blues Witness to a Lost Terrane of Late C ic Evidence for Different Deformati + Kinematics of Late-Orogenic Extens + y of Recent Volcanics in the Easter e Faults Above and Below a Blueshis + ersion of the 1983 January 17 Kafal + Analysis of the Rayleigh Wave Recor ained by Refractional Seismic Exper + l Incidence and Wide-Angle Seismics +
nematics of Upper Cenozoic Extensio + es Island (Greece) Explanatory Note an Nappes (SW Turkey) into the Sout + an Nappes (SW Turkey) into the Sout + easurements# The Strain Field in No frica. Crust During Active Extension of W + s. matism in the Aegean Arc: Sr. Nd. H + Cold and Thermal Karst Within the + West Turkey. # Neogene Palynologic + Waters from the Çeşme-Seferihisar n Magmatism and Gedynamic Evolution 213213 dscdsf 123213sdfdsfd 12321 3 + os and Santorini - Geodynamic Impli nitoids from the Aegean: Evidence f + zoic Paleorift. tructural History of the Antalya Co + of Alkaline Volcanism and Active e Neotectonics of the Eastern Medit + e Neotectonics of the Eastern Medit + D - B Daralma için bazı Veriler. Geodynamic Implications, # Post key)# First Paleomagnetic Evidence onal Seismicity Data.# 3-D Crustal d Southern Adriatic Sea# Different A Formulation for Reliable Estimati + arameters in the Earth. # The Electr + arthquake seismicity and Fault-Plan llenic Subduction Zone: a Tomograph + ucture# Some Remarks on the Gravity + of the Eastern Mediterranean Region of the Eastern Mediterranean Region + y# Strike-Slip fault Geometry in Tu + Survey of the Eastern Mediterranea + c Survey of the Eastern Mediterrane smic Velocity Distribution in Weste + A Microearthquake Study in the Gul + ion of Seismic Foci in the Mediterr mensional Seismic Attenuation Struc + he Alaşehir Graben (West Turkey) an + of the Büyük Menderes Graben (West + oic Evolution of the Aegean# Quater + (Greece) Explanatory Notes. # Geolo + in mblages During the Barrovian-Style + an Islands (Greece)# Moment Tensor e of Cenosoic Petrographic Province n and First Results. # Sea-Beam, Mul +

n# Seismic

aştırılması.# Akyazı - dorukcan Vad + Kuzey Anadolu Fay Kuşağının Gerede + rnekler.# Bat: Anadolu

Investigations of the Marmara Regio + Initial Model.# Determination of Th + Io>VI or M>5 for the Yars 1801-1958 + Ionian and Aegean Regions# Back Arc Ionian and Aegean Seas.# Bathymetry #Ionian Basin and Calabria Arc: Som + Ionian Islands (Greece)# Moment Ten Ionian Islands Front with Coinciden Ionian Islands: Result Inferred fro + #Ionian Sea Submarine Canyons and t Ionian Sea.# A Seismic Study of the Ionian Sea.# Results of Seismic Ref Ionian Sea: the Cephalonia Island E Ionian Zone of Albania. # First Pale Ionian Zone, Western Greece# Paleom + Ionian Zones of Greece.# Paleomagne Ioniennes, Acarnanie, Epire, Greece + Ioniens (Cephalonie, Greece) - Donn + Iran# Rotational Mechanism of Activ Iran.# The Uppermost Mantle P Wave Iranian Plateau. # Pn Velocities Ben + Iranian Plateaus.# Lateral Variatio Is There a Tectonic Explanation?# A Island (Aegean Sea) - Implications Island (Greece) Explanatory Notes.# Island and Ocean Bottom Seismograph Island Arc and Eastrn Mediterranean + Island Arc Setting in Modern and An + Island Arcs and Origin of High Pota Island Arcs# Lateral Variation of B Island Earthquake Sequence of 1983. Island of Syros (Greece).# Dating M Island of Svros# The Significance o + Island of Tinos, Cyclades, Greece: Island# Paleomagnetic and Neotecton Island)# Crustal-Scale Geometry and + Island) # Geochronology and Petrolog + Island, Cyclades, Greece.# Low-angl Islands (Greece) # Moment Tensor Inv + Islands - ATH as Inferred from the Islands Evia and Crete, Greece, Obt Islands Front with Coincident Norma Islands, Greece).# Structure and Ki Islands. IX. Geological Map of Rhod Islands.# The Extension of the Lyci + Islands.# The Extension of the Lyci + Islands: Result Inferred from GPS M #Isogram Maps of Europe and North A Isostatic Compensation in the Lower #Isostatic Studies in the Hellenide + #Isotope Geochemistry of Recent Mag Isotope Study and 2-D-Model-Ling of Isotopic Age Data from Gördes Basin + Isotopic Characteristics of Thermal #Isotopic Characterization of Aegea Isotopic Data gwwgewg gwewgewge 123 Isotopic Ratios in the Lavas of Mil Isotropic Variations in Miocene Gra #Isparta Angle (W. Taurids): A Meso Isparta Angle, Southwest Turkey.# S Isparta Angle, SW Turkey.# Relation Isparta Angle: Its Importance in th + Isparta Angle: its Importance in th + #Isparta Büklümünün Kuzey Kesiminde Isparta Re-entrant (Taurus, Turkey) + Isparta Reentrant (Southwestern Tur + Isi Akısı Haritası.# Türkiye Italian Region Using Local and Regi + Italy: Examples from the Central an + its Application to Central Greece# its Connection between Geothermal P + its Geodynamic Implications# Microe + its Geodynamic Implications# The He Its Implications on the Crustal Str + Its Importance in the Neotectonics its Importance in the Neotectonics its Influence on Earthquake Activit Its Interpretation# An Aeromagnetic + its Interpretation.# An Aeromagneti its Relation to Aegean Region.# Sei its Seismotectonic Interpretation.# Tectonic Implication# Distrubut its its Tectonic Implication. # Three Di its Tectonic Implications# Age of t + its Tectonic Implications# The Age its Implications for the Late Cenoz IX. Geological Map of Rhodes Island + Izland Arcs.# Earthquake Locations + Izotopic Development of Marble Asse January 17 Kafallinia Event of Ioni + Japan and Surrounding Areas# Origin + Jean Charcot Cruise # North Aegean + Jean Charot. Description, Evaluatio Jeodezik Ağda Yatay Hareketlerin Ar + Jeodezik Yöntemlerle Incelenmesi.# + Jeoelektrik Harita Çalışmaları ve Ö + Grabeni nin Jeoelektrik Yapısı.# Büyük Menderes +

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Jeofizik Araştırmaları ve Sonuçları + Jeofízik Düşey Elektrik Sondaj (DES + Jeoloji Etüdü.# Alaşehir - Salihli + Jeoloji ve Meteorolojisi# Marmara D + Jeoloji, Hidroloji ve Jeotermik Etü + Jeolojik Harita Hakkında Rapor# Bod + Jeolojik ve Meteorolojik Etüdü# Ada + Jeolojik Yapısı# Doğal Uzanım Açısı + Jeolojisi# Orta Sakarya Jeolojisi ve Kuvaterner Evrimi# Mar + Jeolojisi ve Petrografisi# Bafa Göl + Jeolojisi ve Tektoniği (Geology of Jeolojisi ve Volkanitlerin Petroloj + Jeolojisi ve Yapısal Özelliği.# Ged + Jeolojisi.# Uşak Yöresindeki Neojen + Jeomorfolojik Sonuçları# Batı Anado + Jeomorfolojisi.# Marmara Denizi Gün + Jeotermal Alanın Jeofizik Düşey Ele + Jeotermal Enerji Aramaları Rezistiv + Jeotermal enerji Olanakları.# Gediz Jeotermal Olasılık ve Yapısal Ilişk + Jeotermik Enerji Aramaları Rezistiv + Jeotermik Enerji Yönünden Detay Jeo + Jeotermik Etüdüne Ait Rapor.# Turgu + Jeotermik Yapısı.# Ege Bölgesi nde + jours et leurs cadres geodynamiques + Jugoslavia.# Contemporary Tectonic July 1967.# The Mudurnu Valley, Wes + Jumping# Seismotectonics of the Bou + Jumping.# Seismotectonics of the So Jungtertiar der Turkei.# Litho-und + #Jura Öncesi Bloklu Tortul Kayaları + #Jurassic, Cretaceous and Eocene Po Juxtaposition of Blueschists and Gr K-Ar Data for the Age of the Antaly + Kabuğunun Yapısı.# Gravite Anomalil + Kabuğunun Yapısının İncelenmesi.# S + Kabuk ve Üst Manto Yapısının Araştı + Kabuk ve Üst Manto Yapısının Belirl + Kabuk ve Üst Mantonun Yapısı, # Yapa + Kafallinia Event of Ionian Islands + Kalamata (South Peloponnesus) Earth + Kalan Bölgenin (Menderes Masifi) Me + Kalan Menderes Masifi Gunev Kanadın + Kalınlaşan Neojen Yaşlı Alüvyon Yel + Kalınlığı.# Ege Denizi Fay Tektoniğ + Kanadının Jeolojisi ve Petrografisi + Kanadının Stratigrafisi ve Çekirdek + kanadının Stratigrafisi ve Tektonik + Kanozoikum Südwest Anatoliens (Türk + Kaplıcaları.# Türkiye Maden Suları + Karakaya, İç Toros ve Erzincan Kene Karpathos, Rhodes).# Sur la Geologi + Karpathos.# Structure et Deformatio + Karst Within the Gemlik (Bursa) Are + Kassos et Karpathos.# Structure et Kataloğu (1963 - 1990)# Türkiye ve Kataloğu# Türkiye ve Yakın Çevresi Kataloğu.# Türkiye Depremleri İzahl + Kataloğu.# Türkiye ve Çevresinin Ta + Kataloğu.# Türkiye ve Civarmın Dep + Katkısı# Türkiye Diri Fay Haritası Kavağında Yapılan Taşocağı Patlatma + Kavaclar Üzerinde Yapılan Paleomagn + Kayalarm Stratigrafisi, Bursa Güne + Kayaların Temel-Örtü İlişkisine Yap + Kaydedilen Sismik Yüzey Dalgalarınd + Kaynaklarının Kıymetlendirilmesi Ha + Kaynaklı Manyetoteullürik (CSAMT) E + Kayıtların Değerlendirilmesi.# Anad + Kcira Section, Albania# Magnetobios + #Kelkit Vadisi Kesiminde Kuzey Anad + Kenarma Dönüşümüne Türkiye den Bir + Kenarının Pasifik Tip Bir Kıta Kena + Kenet Kuşağının Erzincan Batısındak + Kenetleri.# Üç Kenet Kuşağmın Erzi + Kephalonia Fault Zone, Greece.# Est + Kesiminde D - B Daralma için baz: V + Kesiminde Kuzey Anadolu Fay Zonunun + Kesimindeki Allokton Metamorfik Bir Kesiminin Deniz Jeolojisi ve Kuvate Key to the Neotectonic Evolution of Key to the Neotectonic Evolution of Kimyasal, Izotopik ve Radyometrik V + Kinematics and Rotations.# The Cont + Kinematics of Central Greece With R Kinematics of Late-Orogenic Extensi Kinematics of the Africa-Arabia-Eur + Kinematics of the Plate Boundary Th + Kinematics of Upper Cenozoic Extens Kinematics: the Americas, East Afri + Kireçtaşı fay Şevlerinin Paleosismi + Kleinasien# Reisen und Forschungen Knowledge of the Mediterranean Crus + Kolları Üzerinde Paleosismik Araştı + Kontrol Kaynaklı Manyetoteullürik (+ Körfez Geçişindeki Tektonik Denizal +

.# Anaximander Dağları ve Kontrol Kaynaklı Manyetoteullü + Bölgesinin Jeotermik Enerji Yönünde + enizi Havzasının Sismik düne Ait Rapor.# Turgutlu - Salihli + rum-Muğla Yöresinde Yapılan pazar Depreminin ndan Ege Denizinin mara Denizi nde, Büyük Çekmece (İst + ü Doğusunda Kalan Menderes Masifi G + the Gediz Graben).# Gediz Grabenini + isi# Usak Yöresinin iz ve Yakın Çevresinin Havzalarının lu nun Genc Tektoniğinin eyinin Denizaltı ve Kıyı ktrik Sondaj (DES) ve Kontrol Kayna + ite Etüdü Ön Raporu, # Avdın - Germe + Vadisi nde Genç Tektonik Olaylar v ileri.# Ege Denizinde ite Etüdü.# Denizli - Buldan - Pamu + loji Etüdü.# Alaşehir - Salihli Böl + tlu - Salihli (Manisa ili) Arası Ge + Yerkabuğunun Donnees nouvelles et Synthese# Le + Properties of Some Active Zones in t Anatolia, Turkey, Earthquake of 2 ndary of Anatolia, Eastern Mediterr + uthern Boundary of Anatolia, Easter + Biostratigraphische Deutung Radiome n Stratigrafisi, Bursa Günevi. se Positions from Northeastern Turk + eenschist in Sifnos Island (Aegean a Complex, SW Turkey.# Fossil and eri ve Sismolojiye Göre Kuzey Anado + entetik Sismogram Eldesi ile Batı A + rılması, # Batı Türkive de enmesi.# Yüzey Dalgası Ortam Tepki y Sismogram Modelleme Tekniği ile B (Greece) # Moment Tensor Inversion o quake: Detailed Study of a Normal F tamorfizması Hakkında Ön Sonuçlar# m Jeolojisi ve Petrografisi# Bafa paze Cökelleri ve Gdiz Grabeni nin i ve Cökel # Bafa Gölü Doğusunda Kalan Mendere + Örtü İlişkisi.# Menderes Masifinin Evrimi# Menderes Masifi nin Kuzey ei).# Lithostratigraphisce Undersuc + ve tleri.# Üç Kenet Kuşağının Erzincan + e de I Egee: Regard sur le Dodecane + n d un Segment de I Arc Hellenique + a of Northwestern Turkey# Environme Deformation d un Segment de I Arc H + Yakın Cevresi Depremlerinin Odak Me + Depremlerinin Odak Mekanizmaları rihsel Deprem rem

larından Elde Edilen Sismilk Kayıtl + etic Çalışma Sonuçları.# Trakya da yi # Jura Öncesi Bloklu Tortul ısal Bir Yaklaşım (Selimiye-Muğla)# + a Girişim Olaylarmın Incelenmesi.# + kkında İstikşaf Program.# Türkiye tüdü.# Aydın - İmamkçy Jeotermal Al + olu Kavağında Yapılan Taşocağı Patl + tratigraphy of the Spathian to Anis 4 olu Fay Zonunun Tektonik Özelliği. Örnek# Atlantik Tip Bir Kıta Kenar rına Dönüşümüne Türkiye den Bir Örn + i (KD Türkiye) Yapısal İlişkileri: ncan Batısındaki (KD Türkiye) Yapıs ablishent of a Permanent GPS Networ + eriler.# Isparta Büklümünün Kuzey Tektonik Özelliği.# Kelkit Vadisi + imler# Aydın Dağları (Menderes Masi + rner Evrimi# Marmara Denizi nde, Bü + the Eastern Mediterranean Area# Th + the Eastern Mediterranean Area# Th + erilerin Yorumu# Batı Anadolu Senoz inuation of the North Anatolian Dex + espect Europe: Implications for Eas + on in the Central Aegean (Cyclades asia Plate Collision Zone, Ph.D. Th + rough New Zealand: a Comparison of + ional Detachment on Naxos and Paros + ca, and the Rest of the World. # Pla + k Yöntemlerle Yaşlandırılması# Bat! + im Ewestlichen t# Geophysical Contribution to rmalar# Kuzey Anadolu Fayı nın Sapa + CSAMM) Etüdü.# Aydın - İmamkçy Jeot +

ti Havzalari.# Kuzey Anadolu Fayi (+

ve Aktif Tektonikle Ilgili Çalışmal +

ısı.# Saros Körfezi Bölgesinin Tektoniği ve Yap + ve Tektonik Yerleşimi, Kuzey Ege D + Körfezi Dolayının Çökelme İstifleri + Kuvaterner Evrimi.# Gökova Körfezi nin (Güneybatı Yürkiye) Geç + Körfezi nin Yapısal ve Sismolojik Ö + zellikleri# Izmit Fayı (KAF) ile Ilişkisinin Irdelen + Körfezi nin Yapısı ve Kuzey Anadolu + tüdü Raporu.# Gemlik Körfezi Yüksek Ayrımlı Sığ Sismik E + Etüdü Raporu.# Marmara Denizi Izmi + Körfezi, Yüksek Ayırımlı Sığ Sismik + rmation and Associated Seismicity i + Korinth (Central Greece) # Graben Fo + 13 May 1995 Revisited from a Detai + Kozani-Greva (Greece) Earthquake of + Geodetic Investigation of the 13 M + Kozani-Grevena (Greece) Earthquake# + Equivalente in der Mittleren Aegaei + Kristallins/SW-Anatolien und Seine nun Doğal Uzantısının Saptanmasınd + Kriterleri.# Ege Denizi nde Anadolu + lichen Mittelmeer Abgeleitet aus Ge Krute and des Oberen Mantels im Öst + Ege Denizi nde Anadolu nun Doğal Kullanılan Yerbilimleri Kriterleri, + kali Feldispatların Yapısal Durumla 4 Kullanılması# Menderes Masifinde Al + lerin Araştırılması.# Akyazı - doru Kurulan Jeodezik Ağda Yatay Hareket + Earthquakes of the Persian Plateau, + Kush Regions.# Focal Mechanisms of de, Büyük Çekmece (İstanbul)-Marmar + Kuvaterner Evrimi# Marmara Denizi n + nin (Güneybatı Yürkiye) Geç Kuvaterner Evrimi.# Gökova Körfezi + # Gravite Anomalileri ve Sismolojiy + Kuzey Anadolu Arz Kabuğunun Yapısı. + - Cerkes Bölümünde Yerkabuğu Harek + #Kuzey Anadolu Fay Kuşağının Gerede + antilarinin Incelenmesi #Kuzey Anadolu Fay Zonu nun Batı Uz + #Kuzey Anadolu Fay Zonu nun Bat: Uz + antılarının Incelenmesi. Özelliği.# Kelkit Vadisi Kesiminde + sinin Irdelenmesi# İzmit Körfezi ni + Kuzey Anadolu Fay Zonunun Tektonik + Kuzey Anadolu Fayı (KAF) ile llişki + Uzantılarının İzmit Körfez Geçişind + #Kuzey Anadolu Fayı (Levha Sınırı) #Kuzey Anadolu Fayı nın Sapanca-Izm + it ve Geyve-Iznik Kolları Üzerinde + örfezi Dolayının Cökelme İstifleri Kuzey Ege Denizi, Türkiye.# Saros K + kirdek Örtü Ilişkisi.# Menderes Mas + Kuzey Kanadının Stratigrafisi ve Çe + ktonik Evrimi# Menderes Masifi nin Kuzey kanadının Stratigrafisi ve Te + bazı Veriler.# Isparta Büklümünün Kuzey Kesiminde D - B Daralma için + Paleomagnetic Sonuclar #Kuzeybat: Anadolu nun Tektoniği ve + nceler.# Çanakkale Boğazı Kuzeydoğusunun Oluşumu Üzerine Düşü + Türkiye) Yapısal İlişkileri: Karaka + Kuşağının Erzincan Batısındaki (KD + Yerkabuğu Hareketlerinin Jeodezik + Kuşağının Gerede - Çerkeş Bölümünde + Kuşağının Varlığı# Menderes masifi + nin Batısında Paleo-Melanj n Bir Örnek# Atlantik Tip Bir Kıta Kıta Kenarına Dönüşümüne Türkiye de + Kenarına Dönüşümüne Türkiye den Bi + Kıta Kenarının Pasifik Tip Bir Kıta + ive Deformation of a segment of arc + Kythira, Hellenic arc. Greece. # Act + f Program. # Türkiye nin Müntehap S + Kıymetlendirilmesi Hakkında İstiksa + i Güneyinin Denizaltı ve Kıyı Jeomorfolojisi.# Marmara Deniz uvaterner Evrimi# Marmara Denizi nd + Kıyı Kesiminin Deniz Jeolojisi ve K + f Turkey. # Present Status and Futur + Kizildere Geothermal Energy Field o + entaux, Reconstruction Palinipastiq + #L al Lochtonie des Bey Gağları Ori + es Arcs Convexes Taurique et Ege: C + #L Arc Concave Zagro -Taurique et 1 + L Asie.# La Tectonique de L Atalante Expedition (4-11 August + 1995).# ANAXIPROBE 95 Report of the + Nord Occidentale Depuis le Miocene, + #L Evolution Structure de la Grece Fossile; ses Implications Geotecton + #L expansion Oceanique Actuelle et + dres geodynamiques. Donnees nouvell + L Oligocene a nos jours et leurs ca -Faille 'Izmir'# Notes Explicatives + la Carte Geologique de la Turquie, + # Sur les Mauvements Egeens Depuis + la Courbure Sud-Hellenique (Grece). + mmergible Vettor, Pisani Anno, 1931 + ergible Des Ganeys, Anno, 1935. #La Croceira Gravimetrica del R. So + #La Crociera Gravimetra del R. iocene de Mykonos (Cyclades, Greece + la Deformation Ductile du Granite M + la Geologic de la Grece. # Equisse d + • la Geologie de I Egee: Regard sur l + e Dodecanese Meridonal (Kasos, Karp + Miocene, Dans le Carde Geodynamiqu + la Grece Nord Occidentale Depuis le + la Grece. # Equisse de la Geologic d + 0 la mer de Crete et la Surrection de + I arc Hellenique. # Analyse Ouantit + a Seismicite. # La Neotectonique Pli + la mer Egee et ses Relations Avec 1 + la mer Egee et ses Relations Avec 1 + a Sismicite# La Neotectonique Plio- + la Mer Egee# Structure et Evolution + Recente de la Neo - Tethys. # Historie et Topol + ogie de #La Neotectonique de I Arc Egeen. de I arc Egeen Externe et de la mer + de I Arc Egeen Externe et la mer Eg + #La Neotectonique Plio-Ouaternaire #La Neotectonique Plio-Quaternaire la Ridge Mediterraneenne (Mediterra + nee Orientale).# Variation Laterale + osse Nord egeen. #La Sedimentation Neogene Dans le F + la Seismicite.# La Neotectonique Pl + io-Quaternaire de I Arc Egeen Exter + la Sismicite# La Neotectonique Plio + -Quaternaire de I arc Egeen Externe + itesse et en Attenuation Sous le Pe + la Subduction Egeene Structure en V + la Subsidence de la mer de Crete et + la Surrection de I arc Hellenique. + Analyse Quantitative des Relations + la Surrection de I arc Hellenique.# + la Taurus Occidental au sud de Beys + ehir (Turque).# Recherches Geologiq + #La Tectonique de L Asie. la Termination Nord - Occidentale d + la Turquie, -Faille 'lzmir'# Notes + e I Arc Egeen (Iles Ioniennes, Acar + Explicatives de la Carte Geologique + etermination of Station Coordinates + Lageos Laser Range Observations.# D LAGEOS# Tectonic Motion in the Medi + terranean Area from Laser Ranging t + iterranean Region Determined from L LAGEOS. # Crustal Motions in the Med + lake manyes to Istanbul, Turkey# Ai + rbone Magnetometer Profile Results Land# Recent Quaternary Tectonics i + n the Hellenic Arc: Examples of Geo + #Land-Locked Oceanic Basins and Con + tinental Collision: the Eastern Med + #Land-Sat data Processing Technique + s for Mapping Geological and Geomor + Large - Scale Lateral Variations of + P Velocity in the Upper Mantle Ben Large Counterclockwise Rotation of + Northern Greece Prior to the Tertia + Large Earthquakes in the East Anato + lian Fault Zone (Turkey) # Source Pa + Large Earthquakes of the Period 193 + 9 - 1967 # Slip Distribution Along + Large Earthquakes# Regional Stresse + s Along the Eurasia-Africa Plate Bo + Large Scale Geodetic Measurements (+ VLBI, SLR) in the Central Mediterra + Large Scale Normal faulting Mechani + sms.# A Microseismic Study in the W + #Large Scale P - Veolocity Structur + es in the Euro - Mediterranean Area + #Large Seismic Faults in the Hellen + ic Arc Large-Scale Continental Extension# + Effects of a Temperature-Dependent + #Large-Scale P-Velocity Structures +

in the Euro-Mediterranean Area es in the Aegean Sea Area# On the I + Sari, C + 1995 Saner, S. 1985 Uluğ, A.+ 1998 Koral, H.+ 1995 Akgün, M.+ 1995 Kurtulus, C. 1985 Özhan, G.+ 1985 Myrianthis, M. L. 1984 Hatzfeld, D.+ 1997 Clarke, P. J.+ 1997 Dürr, S. 1975 Eryılmaz, M. 1996 Stobbe, C. 1980 Eryılmaz, M. 1996 Dora, O. Ö. 1975 Öztürk. E + 1987 Nowroczi, A. A. 1972 Yilmaz, B. 1996 17110 4 + 1998 Canitez, N. 1962 Uğur, E 1974 Kıvak, Ü. 1986 Kıyak, Ü. 1986 Sevmen, 1. 1975 Akgün, M.+ 1995 Senöz, M. 1998 Barka, A. A. 1993 Saner, S. 1985 Erdoğan, B. 1993 Erdoğan, B.+ 1992 Boray, A.+ 1985 lşseven, T.+ 1995 Demirbağ, E.+ 1998 Koçyiğit, A. 1990 Uğur, E. 1974 Candan, 0.+ 1989 Yılmaz, Y. 1981 Yilmaz, Y. 1981 Lyberis, N.+ 1982 Hutchison, R. D.+ 1962 Güneysu, A. C. 1998 Yilmaz, B. 1996 Şimşek, Ş. 1985 Ricou, L. E.+ 1979 Brunn, J. H. 1976 Argand, E. 1924 Woodside, J. M. 1995 Sorel, D. 1992 Dercourt, J. 1970 Bellon, H.+ 1979 Egeran, N.+ 1944 Angelier, J. 1977 Cassinis, G.+ 1935 Cassinis, G. 1941 1988 Faure, M.+ Aubouin, J.+ 1963 Aubouin, J.+ 1970 Sorel, D. 1992 Aubouin, J.+ 1963 Angelier, J. 1981 1976 Mercier, J. L.+ Mercier, J. L.+ 1977 Martin, L. 1987 Marcoux, J. 1987 Mercier, J. L.+ 1979 Mercier, J. L.+ 1977 1976 Mercier, J. L.+ Chaumillon, E.+ 1995 1977 Lalechos, N.+ Mercier, J. L.+ 1976 Mercier, J. L.+ 1977 Martin, C. 1988 Angelier, J. 1981 Angelier, J. 1981 1977 Monod. O. Argand, E. 1924 Amorese, D. Egeran, N.+ 1993 1944 Noomen, R.+ 1991 Cenci, A.+ 1993 Noomen, R.+ 1993 W. B. 1977 Agocs, Angelier, J. 1979 х. 1982 Le Pichon, Astaras, TH.+ 1990 Romanowicz, B. A. 1980 1992 Edel. J. B.+ Taymaz, T.+ 1991 Barka, A. A. 1996 1991 Udias, A.+ Mantovani, E.+ 1995 Rigo, A.+ 1995 1989 Granet, M.+ Papazachos, B. C. 1996 Sonder, L. J.+ 1989 1989 Granet, M.+ 1997

Papadopoulos, G. A.

Large-Scale Seismic Tomography Imag +

Somm +

Computer - Determination P- Nodal + Larger Earthquakes of 1959 - 1962.# + Laser Range Observations. # Determin + Laser Ranging and Seismicity Data i + ation of Station Coordinates and Mo + n the Aegean Region# A Comparasion + n the Aegean Region# A Comparasion Laser Ranging and Seismicity Data i + ntal Crustal Motion in the Central Laser Ranging Measurements. # Horizo otion in the Mediterranean Area fro Laser Ranging to LAGEOS# Tectonic M + otions in the Mediterranean Region + Laser Ranging to LAGEOS.# Crustal M + th Anatolian Fault Zone in the Mudu + Last Two Faulting Events on the Nor + onal Shear Zone, Naxsos, Greece.# T Late Alpine Evolution of an Extensi + Weste Turkey, Gördes Basin: Tecton + #Late Cenozoic Basin Development in + #Late Cenozoic Crustal and Basin Fo + rmation in West Turkey. asin Formation and Volcanism in Wes + #Late Cenozoic Crustal Extension, B + ellenide Foreland, Western Greece. #Late Cenozoic Deformation of the H + an# Quaternary Evolution of the Cor + Late Cenozoic Evolution of the Aege + stern greece: Strymon Valley Detach + #Late Cenozoic extension in Northea + a: the Northern Part of the Aegean + #Late Cenozoic Extention in Bulgari + North Aegean Trough Fault Zone (Gre + #Late Cenozoic Rotations Along the f the Northeastern Aegean Region #Late Cenozoic Volcanic Evolution o + Unit on the Island of Tinos, Cyclad + Late Cretaceous Age.# The Akrotiri + h Anatolian Fault Zone in the Orhan #Late Holocene Activity of the Nort + c Subduction Zone and the Geodynami late Middle Miocene# On the Helleni + ic Subduction Zone and the Geodynam + Late Middle Miocene.# On the Hellen + Detachment Faulting, Mykonos, Gree + #Late Miocene Ductile Extension and + the Hellenic Arc Since the Late Miocene# Tectonic Evolution of + charisms and Expansion of SW Anatol + Late Miocene.# Analyses of Fault Me + a-Level Changes# High-resolution Se Late Qaternary Sedimentation and Se + ral Aegean (Cyclades and Evvia Isla Late-Orogenic Extension in the Cent + lateral Inhomogeneity in the Upper Mantle Beneath the Aegean and the H + Types Across Continental Margins an + #Lateral Variation of Basalt Magma ency Seismic Wave Propagation at Re #Lateral Variations in High - Frequ in the Upper Mantle and Discontinui + #Lateral Variations of Attenuation + the Upper Mantle Beneath Western E + Lateral Variations of P Velocity in + la Ridge Mediterraneenne (Mediterr + Laterale des Fronts de Formation de + Lavas of Milos and Santorini - Geod + ynamic Implications.# Isotope Geoch + n.# L Evolution Structure de la Gre + le Carde Geodynamique de I Arc Egee + pathos, Rhodes).# Sur la Geologie d + le Dodecanese Meridonal (Kasos, Kar + ion Neogene Dans le Fosse Nord egeen.# La Sedimentat + ecente de la Courbure Sud-Helleniqu + le Miocene Superieur: I Evolution R + que de I Arc Egeen. # L Evolution St + le Miocene, Dans le Carde Geodynami + le Pelaponnese.# Geometric et Cinem + atique de la Subduction Egeene Stru + (Cephalonie, Greece) - Donnees Neot + le Quaternaire des Eivages Ioniens + ches Geologiques dans le Taurus Lycien Occidental.# Reser 1953 Mars 18. #Le Tremblement de Terre de Venice + ter and Veolcity Parameters.# Crust + Least Squares Estimation of Hypocen + Least Squares Estimation of Hypocen ter and Veolcity Parameters.# Crust + rmation in Convergent, Divergent, a + #Length Scales for Continental Defo + s de L Oligocene a nos jours et leu + #Les activities magmatiques Eggenne + Collision et Arc Induits.# L Arc Co + les Arcs Convexes Taurique et Ege: s).# Extension Ductile et Sedimenta + les Cyclades (iles de Naxos et Paro + s: Observations par Submersible.# I + les Fosses de Subduction Hellenique + tructure et Deformation d un Segmen Les Iles de Kassos et Karpathos.# S cene Superieur: I Evolution Recente + les Mauvements Egeens Depuis le Mio + eur Extension. Reflexions sur I oro + #Les Zones Hellenides Internes et L + etrology of Recent Volcanics in the Lesbos Island)# Geochronology and P igrapy of the Miocene Volcanic Rock + Lesbos, Greece# Paleomagnetic Strat + nisch - Mechanischen Folgerunges au + Letzten Dezenniums.# Über die Tekro + ogenese Alpine.# Les Zones Hellenid + Leur Extension. Reflexions sur I or -Modeles Geophsiques: I example des Leur Signification par Rapport aux + leurs cadres geodynamiques. Donnees + Levant Continental Margin.# The Dee + nouvelles et Synthese# Les activit + p Structure of the Central and Sout + ure of the Sedimentary Strata and B + Levant Sea. # New Data on the Struct + anean Ridge, Levantine Sea - Site 130.# Mediterr + Well: Impact of Precipitation on t + Level Variations in a Thermal Water -Characterstics of Short-period Sn a + Lg in the Middle East# Propagation Lg Phase does not Traverse Oceanic Crust. # Why the Tethys Belt from the Atlantic to th + Lias.# Geological Evolution of the Light of New Geochemical and Isotop'+ ic Data qwwqewq qwewqewqe 123213213 + Limestones for Clockwise Rotation o + f the Ionian Zone, Western Greece# Linked Seismometer Network Spanning + the Marmara Sea and the Seismicity List of Major Deformation Events in the Central-Eastern Mediterranean #Listric Normal Faulting and the Re + construction of the Symmetamorphic ung Radiometrischer Altersbestimmun #Litho-und Biostratigraphische Deut + Lithosohere and Upper Mantle: The M editerranean Region# Regional Scale + Lithosphere - Asthenosphere System + in Europe from Seismic Surface Wave + Lithosphere - Asthenosphere System in Europe.# Physical Properties of Lithosphere and Upper Mantle. # Regi onal Scale Tectonic Evolution and t + Lithosphere Below Southern Spain.# The P - Wave Velocity Structure of + Indonesia.# The Slab of Subducted Lithosphere Beneath the Sunda Arc, Lithosphere Beneath the Territory o f Bulgaria.# Deep Structure of the + Lithosphere in Greece from Gravity Data# Study of the Crustal Thicknes + Lithosphere in the Aegean Region# 3 + -D Structure of the Mediterranean Area.# The Lithosphere in the Central - Easten + Lithosphere in the Mediterranean Re + gion.# Structure and Dynamics of Su + #Lithosphere Structure of Tibet and + Western North America: Mechanism o + Lithosphere.# Focal Depths of Inter + continental and Interplate Earthqua + Lithosphere.# Lateral Variations of Attenuation in the Upper Mantle an Lithosphere.# Uniform - Sense Norma + 1 Simple Shear of the Continental Lithospheric Interaction in the Aeg + ean Area# Modes of #Lithostratigraphisce Undersuchunge + n im Kanozoikum Südwest Anatoliens #Local and Regional Components of W + estern aegean Deformation Extracted + #Local and Regional Components of W + estern Aegean Deformation Extracted + Local and Regional Seismicity Data. + # 3-D Crustal P - Wave Tomography o + Local Earthquakes. 1. A Homogenous Initial Model. # Determination of Th + Location of Earthquakes in the Cent + ral Aleutian Subduction Zone Using + Locations in Izland Arcs. # Earthqua + ke Locations in the Western Hellenic A + rc Relative to the Plate Boundary# + Locations in the Western Hellenic A + rc Relative to the Plate Boundary.# +

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, Reconstruction Palinipastique des + and of the Marmara Region. ics of the Plate Boundary Through N + the Circum-Pacific Convergent Belt lysis of the Global Data Set. # Heat # The Akrotiri Unit on the Island # Toward Understanding of Sn: Norma asin and Range Province: Nappe Tect Implications with Examples from We nd Surrounding Regions.# Seismic To Blueshist Belt - Tinos Island, Cyc from Western Turkey# Cross-Faults of Western Turkey# Evidence for Dy ion from Chios (Greece).# Magnetost Southeastern Aegean Islands.# The E Southeastern Aegean Islands.# The E ex, SW Turkey. # Miocene Clastic Sed giques dans le Taurus A Catalogue of Shocks with Io>VI + # Textural and Izotopic Development data Processing Techniques for Map , Orogenese, Metamorphisme et Magma + termination by Using hy Image of the Aegean Region (Gree + lantic, Pasific and Indian Oceans a esi Hakkında İstiksaf Program. # Tü + Ve ins and Island Arcs# Lateral Variat + ic Rocks# Origine of Primary Basalt + moressional and Extensional Tectoni n Western Turkey# Relationship Betw izma# Tersiyer Sırt Yitmesi: Doğu E a nos jours et leurs cadres geodyn f the Aegean Subduction# Isotopic C orphism and Related . Hf, and O Isotopic Ratios in the + onological Data on Recent natolian Area: A Petrological Study + 11ine Belt: Stratigraphy, Structure + fik Ögeleri# Batı Anadolu Neojen ellenides en Macedonie (Grece).# Pa + y Anomaly, S, mple Bouguer Anomaly M + a Peninsula tones form NW Turkey.# The hian to Anisian (Lower to Middle Tr + anyes to Istanbul, Turkey# Airbone + dle Triassic Boundary Section from the Aegean Region the Western Tourides Region for Northwestern European Earthqua + croseismic Data.# On eration of Shallow Earthquakes in t + Relations Between General Tectonic + tral-Eastern Mediterranean Region S Deformation in Western Turkey as D + Seismicity and Rate of Slip Along Southern Rodope Controlling North Seismotectonic Implications# Ruptu Seismotectonic Implications# Ruptu + das Nordwest Anatolische Beben vo 9 Demirci ve 28 Mart 1969 Alaşehir 1 Stages and the Radiometric Scale. eleitet aus Geophysikalischen Messu + ithosphere.# Lateral Variations of + and Asia Minor# Delay-Time Tom ean, Evidence for Subducted Lithosphere + Three - Dimensional Seismic Veloc + ismic Anisotropy in Tomographic Stu ellenic Trench near Crete# S-P-Wave + Wave Attenuation in the Upper tudy of Large - Scale Lateral Varia + graphy# Evidence for Deep me Tomography of the Europe - Medit + Seismic and Gravimetric Data (in G + phy of the Crust and Upper aphy of the Crust and Upper tic and Dynamic Properties of Upper + ave Veolocities in the Crust and Up -Arabian Collision Zone.# A Tomograp + Alpine - Mediterranean Region.# Fr locity Structure Beneath the Crust eolocity Structure Beneath the Crus ep Seismic Soundings# The Crust and + Sea Deduced from Geophysical Data# + rkey and Iran. # The Uppermost (North Greece). # Inversion of the C + Collision Belt. # Tomographic Mappi + Turkey. # A Study of Crustal and Up + from Travel Time Residuals and Grav olution and the Seismic Velocity St + egional Scale Tectonic Evolution an + I Türkiye de Kabuk ve Üst y Dalgasi Ortam Tepki Fonksiyonları + odelleme Tekniği ile Batı Türkiye d + Magnetometer Profile Results lake

Lochtonie des Bey Gağları Orientaux + #Long - Term Seismicity of Istanbul + Long Term Deformation.# The Kinemat + #Long-term Earthquake Prediction in + Loss from the Earth s Interior: Ana + Lost Terrane of Late Cretaceous Age 4 Love Waves in an Oceanic Structure. + #Low - Angle Normal Faults in the B Low Angle Normal Faulting: Tectonic + Low Velocity Zones beneath Greece a + #Low-angle Faults Above and Below a + Low-Angle Normal Faulting: Examples Lower Crust During Active Extension + Lower-Middle Triassic Boundary Sect + Lycian Nappes (SW Turkey) into the Lycian Nappes (SW Turkey) into the Lycian Nappes and the Antalya Compl + Lycien Occidental.# Reserches Geolo M>5 for the Yars 1801-1958.# Greece M2 Metamorphic Event, Naxos, Greece macedonia Area, N.Greece.# Land-Sat Macedonie (Grece). # Paleogeographie + Macroseismic Data. # On Magnitude De + Macroseismic Intensity.# A Tomograp Made by H.M.S. Challanger in the At + Maden Kaynaklarının Kıymetlendirilm + Maden Suları ve Kaplıcaları,# Türki + Magma Types Across Continental Marg + Magmas and Classification of Basalt + #Magmatic Activities of Cenozoic Co Magmatics and Tectonic Activities i Magmatikliği İçin Olasılı Bir Mekan + magmatiques Egeennes de L Oligocene Magmatism and Gedvnamic Evolution o + Magmatism in Plate Tectonics# Metam + Magmatism in the Aegean Arc: Sr, Nd Magmatism of the Aegean Sea# Geochr + Magmatism of the Aegean- Western A + Magmatism.# The Median Aegean Cryta Magmatismasının Yapısal ve Petrogra + Magmatisme des Zones Internes des H + Magnetic Intensity, Free-air Gravit + #Magnetic Studies in Cyprus and Big Magnetism of Some Permian Red Sands + #Magnetobiostratigraphy of the Spat Magnetometer Profile Results lake m #Magnetostratigraphy of a Lower-Mid + #Magnetotelluric Investigations in #Magnetotelluric Investigations in Magnitude - Intensity Relationships + Magnitude Determination by Using Ma Magnitude Predictable Model for Gen Mai 1881.# Reise in der Troas im Main Earthquake regions of Turkey.# Major Deformation Events in the Cen 4 Major Earthquakes# Rates of Crustal + Major Fault Zones. # Seismic Moment. Major Oligo - Miocene Detachment in Major Turkish Earthquakes and Their major Turkish Earthquakes and Their #Makroseismische Untersuchungen Übe Makrosismik Gözlemler.# 23 Mart 196 Mammal Zones, Marine and Continenta Mantels im Östlichen Mittelmeer Abg Mantle and Discontinuities in the L Mantle Below Europe, the Mediterran + Mantle Below the Iberian Peninsula: -Mantle Beneath Southeastern Europe. Mantle Beneath Southern Europe. # Se Mantle Beneath the Aegean and the H -Mantle Beneath the Aegean.# Seismic Mantle Beneath Western Europe. # A S mantle Circulation from Global Tomo + Mantle Delay Time Tomography. # Upep Mantle Down to 1400km.# Travel - Ti Mantle in SE Europe by Inversion of + Mantle in Southeast Europe# Tomogra Mantle in Southeast Europe. # Tomogr Mantle in Southern Aegean Sea.# Sta Mantle in the Aegean Region.# P - W Mantle in the Eurasian - African -Mantle Model: An Application to the + Mantle of Aegean Sea Region# 3-D Ve + Mantle of Aegean Sea Region.# 3-D V Mantle of the Aegean region From De + Mantle of the Eastern Mediterranean + Mantle P Wave Velocities Beneath Tu + Mantle Structure Beneath Calkidiki + Mantle Structure beneath the Alpine Mantle Structure of North - Western + Mantle Structure of the Aegean Arc + Mantle. # Regional Scale Tectonic Ev Mantle: The Mediterranean Region# R + Manto Yapısının Araştırılması.# Bat + Manto Yapısının Belirlenmesi.# Yüze + Mantonun Yapısı.# Yapay Sismogram M + manyes to Istanbul, Turkey# Airbone +

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Manyetik Haritasına Uygulanması.# | + Ege Denizi ve Çevresinin Gravite v + Sanver, M. 1975 Manyetik Yöntemlerle Araştırılması# + Ege Denizi ve Ege Bölgesinin Gravi + Genç, H. T.+ Genç, H. T.+ 1996 Manyetik Yöntemlerle Araştırılması# + 1996 dın - İmamkçy Jeotermal Alanın Jeof + Manyetoteullürik (CSAMT) Etüdü.# Ay + Yücel, M. Mao of Ionian and Aegean Seas.# Bat + 1995 hymetry, Total Magnetic Intensity, + Allan, T. D + 1970 ow urvey, Epicenter Data, 1961 - 1967. + Map fo Greece. # Preliminary Heat Fl + Fytikas, M. D.+ 1977 Map from ESSA, Coast and Geodetic S Barazangi, M.+ Map of Europe (1:5.0 Mio).# Heat Fl + 1969 Cermak, V. 1978 Map of Europe# Heat Flow Cermak, V 1979 e Gravity Anomaly Map of Greece: A Recompilation. # Th + Lagios, E.+ Map of Mineral and Thermal Waters o + 1988 f Turkey Aegean Region.# IAH Canik, B.+ 1983 Map of Naxos (1/50 000).# Geologica Jansen, J. B. H. 1973 Map of Northwest Anatolia. # Heat Fl ow Ilkışık, O. M. 1989 natory Notes.# Geological Studies o + Map of Rhodes Island (Greece) Expla + Mutti. E.+ 1970 # On Epicentre Map of Turkey and Surrounding Area. Ergin, K. 1966 ical Features in the Central macedo + Mapping Geological and Geomorpholog Astaras, TH.+ 1990 Greece.# On Mapping of the Seismic Activity in Galanopoulos, A. 1963 Mapping of the Upper Mantle Structu re beneath the Alpine Collision Bel Spakman, W. 1989 of the Generic Mapping Tools Released# New Version Wessel, P.+ 1995 sogram Maps of Europe and North Africa.# I de Bruyn, J. W. 1955 vian-Style M2 Metamorphic Event, Na + Marble Assemblages During the Barro Baker, J.+ 1994 of the Gediz, Turkey, Earthquake o + March 1970. # Seismotectonic Aspects Ambraseys, N. N.+ 1972 March 28th. # The Gediz (Turkey) Ear + thouake of 1970 Ambraseys, N. N.+ 1970 in Polymetamorphic Metabauxites of + Margarite, Muscovite and Paragonite Margin of the Axios Basin (Northern Feenstra, A. 1996 Greece).# Extensional Tectonics Ne + Brooks. 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T.+ 1969 d Seasat Reveals New Tectonic Fabri + Marine Gravity Form ERS-1 Geosat an 1992 s, Marine and Continental Stages an + Marine Microfossils and Mammal Zone Benda, L.+ 1979 # Paleomagnetic Results from Mio-Pl marine Sedimentary Series in Crete. + Valente, J. P.+ 1982 y Develop into a New Marine Theatre.# Offshore Greece ma West, J. 1973 Marmara (Northwest Turkey): Late Qa ternary Sedimentation and Sea-Level + Smith, A. D.+ 1995 an Fault. # Structural Relationship + Marmara Basin and the North Anatoli + Ergün, M.+ 1995 #Marmara Bölgesi Gravite Verileri. Aygül, H.+ 1998 ği ve Aktif Tektonikle Iliskisi #Marmara Bölgesi nin Deprem Etkinli + Üçer, B. S. 1990 ve Kıvı Jeomorfolojisi. #Marmara Denizi Güneyinin Denizaltı + Güneysu, A. C. 1998 eoloji ve Meteorolojisi #Marmara Denizi Havzasmın Sismik J + Pmar. N. 1943 (Istanbul) - Marmara Ereğlisi (Tekird + #Marmara Denizi nde, Büyük Çekmece Yılmaz, B. 1996 ili Çalışmalarının Ön Sonuçlar. #Marmara Denizi Sismik Yansma Prof + Cetin. S.+ 1998 ro - Deprem Araştırmasmın Sonuçlar + Eyidoğan, H.+ #Marmara Denizi ve Cevresindeki Mik + 1998 Özhan, G.+ ek Ayırımlı Sığ Sismik Etüdü Raporu + #Marmara Denizi Izmit Körfezi, Yüks 1985 # The Saros -Ambraseys, N. N.+ Marmara Earthquake of 9 August 1912 + 1987 MARMARA Poly-Project# Synthesis of Pfister, M.+ the 1997 om a Microseismic Experiment.# On S + Marmara Region (Turkey): Results fr Gürbüz, C.+ 1998 Marmara Region# Neotectonics of the + Barka, A. A. 1997 ücer. B.+ ons of the Marmara Region# Seismic Investigati + 1997 stimation of Earthquakes in Marmara Region# Source Parameters E Ergin, M.+ 1990 Marmara Region. # Long - Term Seismi + city of Istanbul and of the Ambraseys, N. N.+ 1991 1985 estern Turkey.# The MARNET Radio Li + Marmara Sea and the Seismicity of W + Ücer. S. B.+ Marmara Sea Region# Gravimetric Stu + Klingele, E.+ 1997 dies of the ectonics of the Marmara Sea Region of Turkey. # Neot + Crampin, S.+ 1986 1975 Marmara Sea Region of Turkey.# The + Crampin, S.+ Seismicity of the 1985 vidence from Micro - Earthquake Fau + Marmara Sea Region of Turkey: New E Evans, R.+ atolia# Global Positioning System (+ Marmara Sea Region, Northwestern An Straub, C.+ 1994 ferred from GPS Measurements.# Acti + Marmara Sea Region, NW Anatolia, In Straub, C.+ 1995 Straub, C. 1996 Marmara Sea Region, NW Anatolia, In + ferred from GPS Measurements. # Rece + Marmara Sea Region, NW Anatolia, In Straub, C.+ 1997 ferred from Repeated GPS Measuremen + 1990 Marmara Sea.# Active Fault Investig + Kavukcu, S. ation in Izmit Bay, Bandurma Bay an + Wong, H. K.+ 1995 ape tectonic Regime.# The Sea of Marmara: A Plate Boundary in an Esc + Marmara: Report of Secont Campaign Straub, C.+ 1992 August / September 1992.# GPS Proje + 1985 MARNET Radio Linked Seismometer Net + Ücer. S. 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Ö. 1975 Masifinde Alkali Feldispatlarm Yap + Isal Durumları ve Bunların Petrojen + Dora, O. Ö. 1981 Masifinde Petroloji ve Feldispat In + celemeleri# Menderes 1993 Masifinin Kuzey Kanadının Stratigra + Erdožan, B. fisi ve Çekirdek Örtü İlişkisi.# Me + 1995 Bozkurt, E.+ and Tectonic Significance of Augen + Massif (West Turkey)# Geochemistry 1997 Massif (Western Turkey) and their Bozkurt, E.+ ectonic Significance# Microstructur Massif Metamorphic Core Complex of + Verge, N. J. 1993 Western Anatolia.# The Exhumation o + Dora, O. Ö.+ 1990 Massif# Metamorphic History and Geo tectonic Evolution of the Menderes + 1995 Massif# New Evidence on the Geotect + Dora, O. Ö.+ onic Evolution of the Menderes 1996 Massif) # Menderes Masifi nin Neote + Sözbilir, H.+ ktonik Evriminde Oluşan Supradetach + 1996 Morris, A.+ Massif, Greece, and Their Implicati + ons for Miocene Extension Direction + 1993 Massif, West Turkey. # Evidence Agai + Bozkurt, E.+ nst the Core/Cover Interpretation o + Bozkurt, E.+ 1996 Massif, Western Turkey.# Evolution + of a Tertiary Extensional Shear Zon + Bozkurt, E.+ 1992 Massif.# Evidence Against the Core/ Cover. Concept in the Southern Secto + 1992 Erdoğan, B. 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ki Boyutlu Alçak Geçişli Filtreleri +

SW Turkey: a Synthesis of Seismolog + May 12 Burdur Earthquake Sequence, + and Upper Crustal Structure along N + May 1971.# Surface Wave Dispersion rthquake# Geodetic Investigation of + Seismological Study# The Kozani-Gre + re.# Offshore Greece alies in the Mediterranean.# The Re + y of Izmir - Sefelihisar Geothermal + eat Flow in the Mediterranean and t + tral Mediterranean Region: Constrai + Surface Wave Propagation Pendulum Gravity ranean.# Gravity sults of Seismic Refraction and Sei + ranean Sea.# Seismic Refraction Kinematics of the Africa-Arabia-Eu + their Tectonic Implications.# Preli + mponents of Western aegean Deformat ger in the Atlantic, Pasific and In + Movements in the Arabia-Africa-Eur the Graf Sea Gravimeter. # Continuo ation and Strain Accumunation in th orthwestern Greece and the Ionian I mation in the Marmara Sea Region, N otion in the Central and Eastern Me omponents of Western Aegean Deforma f Greek Microplates from Palaeomagn + n of the Attic-Cycladic Metamorphic mation and Strain Accumulation in t Indian Ocean, Red Sea and Mediterra etude d une Population de Failles.# lusion.# Numerical Modelling of Int phere.# Focal Depths of Intercontin n Anatolischen Erdbeden des Letzten djoining Areas# A Catalogue of Foca + Greece and Iran# Rotational Turkey and their Tectonic Implicati + e of Faulting on the Mid-Oceanic Ri + eferihisar Geothermal Area# The Cru + e Earthquake ve Study. # Lithosphere Structure of + omputer Re-evaluation of Earthquake + Focal ions of a Review of European Earthq + olia Since the Late Miocene. # Analy + ear Crete# Earthquake rsian Plateau, Eastern Turkey, Cauc + gional Stresses Along the Eurasia-A + Western Greece: Implications for th n the Western Part of the Gulf of C tigraphy, Structure, Metamorphism, and Cyprus Outher Ridges).# Evolvin + ev of Heatflow Data From the ismic Refraction Experiments in the + Relationship Between Plate Motions smic Moment, Source Dimension, and e Period 1961-1964.# Geophysical Su and its Tectonic Implication# Dist he Measurement and Interpretation o R and GPS observations.# Crustal De ent Tensor Summation# Seismic Defor ng to LAGEOS# Tectonic Motion in th + c and Trenc System: A Key to the Ne c and Trench System: A Key to the N Veolocity Structures in the Euro + nd Seismotectonic Studies in the e in the Central - Easten Hidtory.# Stratigraphic Contributi + nd-Locked Oceanic Basins and Contin + of the rface - Wave Tolmography.# Prelimin + flection Data. # New Data on the Str + the e of the Zone# Coherent Plate Motions in th + ntribution to Knowledge of the tern Concerning Compressional Tectonics d Crustal Shortening in the Eastern + h Wave Dispersion.# Crustal Strucut + te Laser Ranging Measurements.# Hor + Modern and Ancient Geosynclinal Se + in of High Potash Volcanoes # Travel - Time Tomography of the on of Sporomorph Associations, Mari + ssociations and Event Stratigraphy + tectonics of the Eastern rmation in the Eastern ics of the m Laser Ranging to LAGEOS.# Crustal +
formation from Satellite Surveys of + ts an Age and Total Offset of the N + cs of the Mediterranean Region# Regional Scal + e Tectonic Evolution and the Seismi + Mediterranean Region Since the Midd + le Miocene# Tentative List of Major +

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May 1995 Kozani-Grevena (Greece) Ea + May 1995 Revisited from a Detailed + may Develop into a New Marine Theat Mayıs 1971 Burdur Depremi.# 12 Meaning of the Bouguer Gravity Anom + Means of Gradient Drilling.# Geolog + Measurement and Interpretation of H + Measurements (VLBI, SLR) in the Cen #Measurements and Global Models of Measurements at Sea, 1936 - 1959.# Measurements in the Eastern Mediter Measurements in the Ionian Sea.# Re Measurements in the Western Mediter Measurements in Turkey (1988-1992): Measurements in Western Turkey and Measurements# Local and Regional Co Measurements Made by H.M.S. Challan + Measurements of Present-day Crustal + Measurements on a Surface Ship with Measurements# Recent Crustal deform + Measurements# The Strain Field in N Measurements.# Active Crustal Defor Measurements.# Horizontal Crustal M Measurements.# International Gravit Measurements.# Local and Regional C Measurements. # Mesozoic Evolution o Measurements.# Metamorphic Evolutio Measurements. # Recent Crustal Defor Measuremnts in the Atlantic Ocean, Mecanique Elementaire Applique a I Mechanical Model of Continental Col Mechanical Properties of the Lithos + Mechanischen Folgerunges aus Grosse Mechanism Diagrams for Turkey and A Mechanism of Active Deformation in Mechanism of Earthquake in Western #Mechanism of Earthquakes and Natur Mechanism of Geothermal Fluids in S Mechanism of the Balkan Reigon. # Th + Mechanism of Uplift and a Comperati Mechanism Solutions 1922 - 1962.# C Mechanism.# Analysis of Earthquake Mechanism. # Seismotectonic Implicat Mechanisms and Expansion of SW Anat Mechanisms in the Hellenic Trench N + Mechanisms of Earthquakes of the Pe Mechanisms of Large Earthquakes# Re Mechanisms of the Adriatic sea and Mechanisms. # A Microseismic Study i Median Aegean Crytalline Belt: Stra Mediterranean (Hellenic, Calabrian Mediterranean and Aegean Seas# Rewi Mediterranean and Indian Ocean.# Se Mediterranean and Middle East# The Mediterranean and Middle East.# Sei Mediterranean and Red Sea During th + Mediterranean and Surrounding Area + Mediterranean and the Black Sea. # T Mediterranean Area Computed from SL Mediterranean Area Estimated by Mom + Mediterranean Area from Laser Rangi Mediterranean Area# The Hellenic Ar Mediterranean Area# The Hellenic Ar Mediterranean Area, # Large Scale P Mediterranean Area.# Surface Wave a Mediterranean Area.# The Lithospher Mediterranean Area: Crete as a Case + Mediterranean as a Case Example# La + #Mediterranean Backarc Basins Mediterranean Basin# Deep Structure + Mediterranean Basin Derived from Su + Mediterranean Basin from Seismic Re Mediterranean Basin# Seismicity of Mediterranean Basin.# Deep Structur Mediterranean Continental Collision Mediterranean Crust# Geophysical Co + Mediterranean# Evolution of the Eas + Mediterranean# Geological Evidence Mediterranean# Gravity Anomalies an Mediterranean Inferred from Rayleig Mediterranean Inferred from Satelli Mediterranean Island Arc Setting in + #Mediterranean Island Arcs and Orig + Mediterranean Mantle Down to 1400km Mediterranean Neogene. 5. Calibrati Mediterranean Neogene. Sporomorph A + Mediterranean Ophiolites# Regional Mediterranean# Rates of Active Defo + Mediterranean Region# Active Tecton + Mediterranean Region Determined fro Mediterranean Region# Geological In + Mediterranean Region# New Constrain + Mediterranean Region# Plate Tectoni +

ngle: Its Importance in the Neotect + Mediterranean Region# The Isparta A + Barka, A.+ c Reconstruction to Upper Mantle Mo + Mediterranean Region.# From Tectoni + 1995 De Jonge, M. R.+ Wortel, M. J. R.+ d Dynamics of Subducted Lithosphere -Mediterranean Region. # Structure an + 1993 Angle: its Importance in the Neotec + Mediterranean Region.# The Isparta + 1992 Barka, A. A.+ d Uncertainties# Tectonic Interpret + Mediterranean Region: Constrains an + 1996 Mantovani, E.+ GPS, Neotectonic and Seismicity Dat Mediterranean Region: Deduced From 1995 Barka, A. A.+ ollision, and Arc Jumping# Seismote + Mediterranean Region: Subduction, C 1997 ollision, and Arc Jumping.# Seismote + Rotstein, Y.+ Mediterranean Reigon: Subduction, C + 1982 mplex# Rate of Outward Growth of th -Rotstein, Y.+ 1982 Mediterranean Ridge Accretionary Co + Kastens, K. A. mplex# Spatial Transition from Comp 1991 Mediterranean Ridge Accretionary Co + Lallemant, S.+ plex?# Did the Onset of Extension i + Mediterranean Ridge Accretionary Co 1994 ic Data and Gravity Modelling# The Kastens, K. 1990 Mediterranean Ridge from Deep Seism + Truffert, C.+ 1993 - Site 130. #Mediterranean Ridge, Levantine Sea + Ryan, W. B. F.+ eatures of the Greek Island Arc and + Mediterranean Ridge.# Geophysical F 1973 Papazachos, B. C.+ corporating New Sea-Beam Data.# Str + 1969 Mediterranean Ridge: A Synthesis In + Le Pichon, X.+ rged Chain Associated with the Hell #Mediterranean Ridge: a Young Subme + 1982 Finetti, I. 1976 Messinian Evaporite Formations# Def + Mediterranean Ridge: Importance of Chaumllon, E.+ 1996 # Two-Ship Deep Seismic Soundings i + Mediterranean Sea (Pasiphae Cruise) De Voogd, B.+ 1992 Two - Ship Deep Seismic Sounding + Mediterranean Sea (Pasiphae Cruise) . # Vooad 1992 smic Measurements Made by H.M.S. Ch + Mediterranean Sea 1950 - 1953.# Sei Gaskell, T. 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P.+ 1990 tectonic Evidence for Different Def + 1992 ts Tectonic Implications# The Age o + Menderes Graben (West Turkey) and i + Seyitoğlu, G.+ 1998 Çağlar, l.÷ pısı.# Büyük Menderes Grabeni nin Jeoelektrik Ya + Emre, T.+ 1995 Menderes Grabens, Western Anatolia# Field Evidence for Metamorphic Cor + 1983 ü llişkisine Yapısal Bir Yaklaşm (+ nd Seine Equivalente in der Mittler + #Menderes Grubu Kayaların Temel-Ört + Öztürk, A.+ Dürr, S. 1975 Menderes Kristallins/SW-Anatolien u + Başarır, E. 1970 Menderes Masifi Guney Kanadının Jeo + lojisi ve Petrografisi# Bafa Gölü D + 1989 Candan, 0.+ #Menderes masifi nin Batısında Pale + o-Melanj Kuşağının Varlığı 1992 Erdoğan, B.+ #Menderes Masifi nin Kuzey kanadını + n Stratigrafisi ve Tektonik Evrimi + Sözbilir, H.+ 1996 #Menderes Masifi nin Neotektonik Ev + riminde Oluşan Supradetachment Havz + Dora, O. Ö. 1975 #Menderes Masifinde Alkali Feldispa + tların Yapısal Durumları ve Bunları + Dora, O. Ö. 1981 #Menderes Masifinde Petroloji ve Fe + ldispat Incelemeleri Erdoğan, B. 1993 #Menderes Masifinin Kuzey Kanadmın + Stratigrafisi ve Çekirdek Örtü İli + 1995 hemistry and Tectonic Significance + d their Tectonic Significance# Micr + Menderes Massif (West Turkey)# Geoc + Bozkurt, E.+ Menderes Massif (Western Turkey) an + Menderes Massif Metamorphic Core Co + Bozkurt, E.+ 1997 Verge, N. J. 1993 mplex of Western Anatolia.# The Exh + Dora, O. Ö.+ 1990 Menderes Massif# Metamorphic Histor + y and Geotectonic Evolution of the Dora, 0. Ö.+ 1995 Menderes Massif# New Evidence on th + e Geotectonic Evolution of the Sözbilir, H.+ 1996 Menderes Massif).# Menderes Masifi + nin Neotektonik Evriminde Oluşan Su + 1993 Menderes Massif, West Turkey.# Evid + Bozkurt, E.+ Bozkurt, E.+ ence Against the Core/Cover Interpr + 1996 Volution of a Tertiary Extensional + Menderes Massif, Western Turkey.# E +

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Menderes Massif.# Evidence Against Menderes Massif.# Problem of Core-M + #Menderes Massif: A Cordilleran Typ + Menderes Massif: an incipient Metam + Menderes Massif: Field, Petrographi + Menderes Migmatite Complex (SW-Turk Menderes-Massivs# Petrologische Evo mer de Crete et la Surrection de I mer Egee et ses Relations Avec la S mer Egee et ses Relations Avec la S Mer Egee# Structure et Evolution Re Meriç ve Enez Deltalarının Gravite Meridonal (Kasos, Karpathos, Rhodes + Merkezinin Paleomagnetic Göstergesi Mesozoic - Tertiary Antalya Complex + Mesozoic - Tertiary Tethyan, Contin + Mesozoic Carbonates# Rotational Def #Mesozoic Evolution of Greek Microp + Mesozoic Organization of the Taurid + Mesozoic Paleorift.# Isparta Angle Mesozoic Tethys# Subduction Beneath Mesozoic Tethys.# Subduction Beneat + Messina Turbidity Current.# Ionian Messiniakos, Argolikos, Saronikos a Messinian Evaporite Formations# Def + Messinien dans les Fosses de Subduc + Messungen# Dil Physikalischen Etgen + Messungen mit Einem Askania - Seegr + Messungen mit Einen Askania - Sea G + Mesudiye Region and Rotation of Tur + Metabauxites of Naxsos (Cyclades, G + Metamorfik Birimler# Aydın Dağları Metamorfitlerin Petrografisi ve Bir + Metamorfizması Hakkında Ön Sonuçlar + Metamorphic Basement Rocks of NW Ap + Metamorphic Belt on Naxos (Cyclades + Metamorphic Core Complex in Western + Metamorphic Core Complex in Western + Metamorphic Core Complex# Late Ceno Metamorphic Core Complex of Western + Metamorphic Core Complex, Detachmen + Metamorphic Core Complexes and Deta #Metamorphic Core Complexes of Cord Metamorphic Event, Naxos, Greece# T + Metamorphic Events in the Cycladic #Metamorphic Evolution of the Attic #Metamorphic History and Geotectoni + Metamorphic Rocks of the Island of + Metamorphic Terrains: The Example o #Metamorphism and Related Magmatism + #Metamorphism of palaeozoic Schist #Metamorphism on Naxos: Petrology a Metamorphism on the Aegean Island o + Metamorphism, Magmatism.# The Media + Metamorphism, Naxsos (Greece).# The Metamorphisme et Magmatisme des Zon + Meteorolojik Etüdü# Adapazar Deprem -Meteorolojisi# Marmara Denizi Havza Methode Simple de Determination des + Methods. # Determination of Crusual -Methods.# Seismic Tomography of the Methods.# Strain Analysis Along the + Mica Generations.# An EMP and TEM-A + Mica Interlayering and Multiple Mic Micro - Earthquake Fault Plane Solu + #Microearthquake Activity in the Iz + #Microearthquake seismicity and Fau Microearthquake Study in the Gulf o Microearthquake Study# The Hellenic + Microearthquake Survey# The Strain Microearthquakes in Western Crete f Microearthquakes in Western Crete f + Microfossils and Mammal Zones, Mari Microplate Motions in the Eastern M + #Microplate Tectonics and Evolution + #Microplate Versus Continuum Descri Microplates from Palaeomagnetic Mea #Microseismic Activity Around the w -Microseismic Experiment.# On Seismo Microseismic Study in the Western P Microstructural Evidence# Metamorph + #Microstructures of Deformed Grains + Mid-Oceanic Ridges.# Mechanism of E Middle East# Propagation Characters + #Middle East Tectonics: Application + Middle East# The Relationship Betwe Middle East.# Seismic Moment, Sourc + Middle Miocene# On the Hellenic Sub + Middle Miocene# Tentative List of M Middle Miocene.# On the Hellenic Su Middle Triassic) Kçira Section, Alb + Migmatite Complex (SW-Turkey) # On P Migmatiten des Egrigöz-Massivs# Ort + Mikro - Bolgelendirme Denemesi.# ls + Mikro - Deprem Araştırmasının Sonuç + Mikro Bloklarının Paleomagnetizması Milos and Santorini - Geodynamic Im +

the Core/Cover Concept in the South + antle Boundary of e Metamorphic Core Complex in Weste +

orphic Core Complex in Western Anat + c, Textural and Microstructural Evi + ev)# On Petrology, Age and Structur lution des arc Hellenique.# Analyse Quantitati + eismicite.# La Neotectonique Plio-Q +

ismicite# La Neotectonique Plio-Qua + cente de la Modellemesi.# Asağı

),# Sur la Geologie de I Egee: Rega + .# Batı Anadolu Genişleme

Microplate Tectonics and Evoluti + ental Margin. # The SW Segment of th + ormation During Palaeogene Thrustin + lates from Palaeomagnetic Measureme es: One or Several Ocean Basins?# T + (W. Taurids): A

Eurasia in Connection with the

h Eurasia in Connection with the Sea Submarine Canyons and the 1908 nd Southern Evoikos Gulfs.# A Compe ormation of the Western Mediterrane tion Helleniques: Observations par schaften und der Aufbau der Krute a avimeter.# Schwerestörungen im Östl ravimeter.# Schwerestörungen un Öst + key.# Paleomagnetism of Dykes and T reece) and the Implications of Fine (Menderes Masifi) Günev Kesimindeki + eysel Index Minerallerinin Doku Içe Ödemiş-Bayındır-Turgutlu-Salihli atolia# Petrology of the Pre-Liassi Greece) Utilizing 40Ar/39Ar Age S + Anatolia, Turkey.# Southern Mender + Turkey.# Menderes Massif: A Cordil + zoic extension in Northeastern gree Anatolia.# The Exhumation of the M t Faulting and Accomodation Faults chment Faults Formed During Tertiar. illeran Type in the Cyclades. Aegea extural and Izotopic Development of Area: 39Ar/40Ar Data from Metamorph + -Cycladic Metamorphic Belt on Naxos + c Evolution of the Menderes Massif Syros (Greece).# Dating Metamorphic +

f the Cycladic Blueschist Belt (Aeg + in Plate Tectonics in the Southhern Menderes Massif: F nd Geothermal Gradients f Svros# The Significance of Deform + n Aegean Crytalline Belt: Stratigra Nature and Distribution of Fluids es Internes des Hellenides en Maced + inin Jeolojik ve

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Axes Principaux des Contraintes Po + Movement in Turkey by Terrestrial G + Gulf of Corinth: A Comparison of North Anatolian Fault by Using Geo EM Study of Margarite, Muscovite an + a Generations.# An EMP and TEM-AEM + tion.# Tectonics of the Marmara Sea nik-Mekece Fault and Surrounding Ar + lt-Plane Solutions in the Southern f Pataras Region, Westeern Greece, Subduction Beneath the Peloponnesu Pattern in the Western Hellenic Arc + rom Digital Three - Component Seism + rom Digital Three-Component Seismog ne and Continental Stages and the R editerranean Sea- Quantitative Cons + of the Mesozoic - Tertiary Antalya + ptions of Active Tectonic Deformati surements.# Mesozoic Evolution of G estern Extension of the 1967 Mudurn + tectonics of the Marmara Region (Tu art of the Gulf of Corinth (Greece) ism of palaeozoic Schist in the Sou in the Augen Gneisses of Southern arthquakes and Nature of Faulting o tics of Short-period Sn and Lg in t s of Geographic Information System

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tanbul un Depremselliğini Oluşturan
ları.# Marmara Denizi ve Çevresinde
 ve Genç Tektonik Evrimi.# Batı Ana +
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plications.# Isotope Geochemistry o +

ope and Trace Element Evidence for y Aegean Region.# IAH Map of lisimleri# Çine Güneyindeki Metamor + onship between the Petrophysical Pr Upper Mantle Below Europe, the Med + n Part of Asia .0 ies in Crete.# Paleomagnetic Result + Sedimentary Arc# First Paleomagnet + es de Naxos et Paros).# Extension D ormations of the Aegean Area# Palae ormations of the Aegean Area. # Pale ted to the Emplacement of the Lycia e).# Donnees Nouvelles sur / extens pe Controlling North Aegean Extensi + hment Faulting, Mykonos, Greece.# nean.# Tectonic Framework and Distr ctonic Models in the Aegean# First tern Crete.# Paleomagnetic Record o Evidence for an Origin by Combined Zone and the Geodynamic Evolution oastal Part of West Anatolia. Geomagnetic Field Intensity and Rev nte de la Courbure Sud-Hellenique (+ Hellenic Arc Since the Late formation Events in the Central-Eas + m the Ductile Crust# 3D-Kinematics reece# Paleomagnetic Stratigrapy of de I Arc Egeen. # L Evolution Struc sms and Expansion of SW Anatolia Si n Zone and the Geodynamic Evolution terranean (Hellenic, Calabrian and rında Odontolojik Değişimler.# Düzp Schwerestörungen im Östlichen Mitt # Schwerestörungen un Östhicken Mit alischen Messungen# Dil Physikalisc Askania - Seegravimeter.# Schweres Askania - Sea Gravimeter.# Schwere eotektonische Stellung des Menderes lemeler.# Türkiye ve Civarındaki De tern North American Cordillera.# A thouskes in the Aegean Area, # A Tim merical Modelling of Intraplate Def + ove Subduction Zones: Aplication to ove Subduction Zones: Application t + Area.# Geothermal rom Geophysical Data# A Dynamic Technique.# Examination of a Veloci + ectonics in SW Turkey# Source Inver + mensional Velocity Anomalies Under al Deformation in Convergent, Diver - Mediterranean Region.# From Tect + ue a I etude d une Population de Fa Dinarides; Paleotectonique, Tardite ultaneous Least Squares Estimation ultaneous Least Squares Estimation 1 Depths of the Earthquakes of the de Kabuk ve Üst Mantonun Yapısı.# Y + eltalarının Gravite k Tomografi ile Üc Boyutlu uğu Deformasyon ve Gerilme Alanları + enç ve MT Verileri ile Saros ve Gök + k Tomografi ile Üç Boyutlu Simple Mechanical Model of Contin + Mediterranean Ridge from Deep Seis n in the Broader Aegean Area# Shear + agnetic Results from the Cycladic M + Structure.# Toward Understanding of Measurements and Global e Collision of the Arabian and Eura + imentation.# Modern Flysch Sediment h of the Past Decate. # Tectonic Pro editerranean Island Arc Setting in + in the Aegean Area e Depremlerinin Analizi# Sismik 3 January 17 Kafallinia Event of Io + formation in the Mediterranean Area + Horizontal Velocity Field in the De tive Deformation in the Mediterrane Along Major Fault Zones.# Seismic ses Associated with Earthquakes in Earthquakes in Greece and the Surro thquakes of the Aegean Area Determi nics and Calabrian Arc Tectonics (W Zones in the Aegean Region.# A Note gean Sea lt Zone Across the North Aegean and + editerranean Inferred from Satellit + om Laser Ranging to LAGEOS# Tectoni lenic Trench System# From Subductio and the Rates of Active Deformatio + ervations.# Determination of Statio + n Continental Collision Zone# Coher + n Sea- Quantitative Constraints by Motions in the Mediterranean Region + Determined from Laser Ranging to L +

Milos, Aegean Sea, Greece.# Sr-isot + Mineral and Thermal Waters of Turke + Minerallerinin Doku İçerisindeki Ge + Mineralogical Constitution.# Relati + Mineure, Premiere Partie.# Asie Minor# Delay-Time Tomography of the + Minor# On the Geology of the Wester + Mio).# Heat Flow Map of Europe (1:5 Mio-Pliocene marine Sedimentary Ser Mio-Pliocene Series of the Hellenic Mio-Pliocenes dans les Cyclades (il Miocene and Pliocene Rotational Def Miocene and Pliocene Rotational Def #Miocene Clastic Sedimentation Rela Miocene de Mykonos (Cyclades, Greec Miocene Detachment in Southern Rodo Miocene Ductile Extension and Detac Miocene Evaporites in the Mediterra Miocene Extension Directions and Te Miocene Geomagnetic Reversal in Wes Miocene Granitoids from the Aegean: Miocene# On the Hellenic Subduction #Miocene Reference Section of the C Miocene Section in Crete# Relative Miocene Superieur: I Evolution Rece Miocene# Tectonic Evolution of the Miocene# Tentative List of Major De Miocene tothe Present, Insights fro Miocene Volcanic Rocks of Lesbos, G Miocene, Dans le Carde Geodynamique Miccene.# Analyses of Fault Mechani Miocene.# On the Hellenic Subductio + Miogeanticlines of the Eastern Medi Miosen Omurgalı faunası Hipparionla + mit Einem Askania - Seegravimeter.# + mit Einen Askania - Sea Gravimeter. + Mittelmeer Abgeleitet aus Geophysik Mittelmeer Nach Messungen mit Einem + Mittelmeer Nach Messungen mit Einen Mittleren Aegaeis# Über Alter und G Moddan Yüzey Dalgaları Üzerine İnce + Model for Cenozoic Extension of Wes Model for Generation of Shallow Ear Model of Continental Collusion. # Nu + Model of Continental Deformation Ab Model of Continental deformation Ab Model of Denizli, Sarayköy - Buldan Model of the Hellenic Arc Deduced f Model Using 3-D Velocity Structure Model with Implications for Seismot Model.# Determination of Three - Di Model.# Length Scales for Continent Model: An Application to the Alpine Modele Mecanique Elementaire Appliq Modeles Geophsiques: I example des Modeling of Earthquake Data, 1. Sim + Modeling of Earthquake Data, 2, Sim + Modeling.# Seismic Moments and Foca Modelleme Tekniği ile Batı Türkiye + Modellemesi.# Aşağı Meriç ve Enez D + Modellenmesi# Ege Bölgesi nin Sismi Modellenmesi.# Depremlerin Oluşturd + Modellenmesi, # Derin Elektrik Özdir + Modellenmesi, # Ege Bölgesinin Sismi Modelling of Intraplate Deformation Modelling# The Crust of the Western Models from Rayleigh-wave Dispersio Models in the Aegean# First Palaeom Models of Love Waves in an Oceanic Models of Surface Wave Propagation# Models# Tectonic Consequences of th Modern and Ancient Geosynclinal Sed Modern Convergent Margins - Researc #Modern Flysch Sedimentation in a M #Modes of Lithospheric Interaction Moment Tansör Ters Çözümüyle Türkiy #Moment Tensor Inversion of the 198 Moment Tensor Summation# Seismic De Moment Tensors of Earthquakes# The Moment Tensors, and the Rates of Ac Moment, Seismicity and Rate of Slip Moment, Source Dimension, and Stres Moment-Magnitude Determination for Moments and Focal Depths of the Ear #Monitoring West Hellenic Arc Tecto Morphology and Activity of Seismic #Morphology and Structure of the Ae Motion from the North Anatolian Fau Motion in the Central and Eastern M Motion in the Mediterranean Area fr Motion: A Seabeam Survey of the hel + Motions and Seismic Moment Tensors, + Motions# Current Plate Motions from Lageos Laser Range Obs + Motions in the Eastern Mediterranea + Motions in the Eastern Mediterranea +

Barton, M.+ 1983 Canik, B.+ 1983 Başarır, E. 1975 Rybach, L. 1982 Tchihatcheff, P. 1853 Spakman, W. 1991 Hamilton, W. J.+ 1840 Cermak, V. 1978 Valente, J. P.+ 1982 Laj, C.+ 1982 Gautier. P.+ 1990 Kissel, C.+ 1984 Kissel, C.+ 1983 Havward, A. B. 1984 Faure, M.+ 1988 Sokoutis, D.+ 1993 Lee J + 1993 Mulder, C. J. 1973 Morris, A.-1996 Valet, J. P.+ 1981 Altherr, R.+ 1988 Meulenkamp, J. J.+ 1988 Kava. O 1981 Laj, C.+ 1996 Angelier, J. 1977 Angelier, J. 1978 Babbucci, D.+ 1997 Jovilet, L.+ 1994 Pe-Piper G+ 1977 Sorel, D. 1992 Angelier, J.+ 1981 Meulenkamp, J. E.+ Stride, A. H.+ 1989 1977 Arslan, F. 1984 Fleischer, U. 1964 Fleischer, V. 1964 Stobbe, C. 1980 Fleischer, U. 1964 Fleischer, V. 1964 Dürr, S. 1975 Canitez, N. 1969 1987 Sonder, L. J.+ Papazachos, B. C. 1992 Vilotte, J. P.+ Wdowinski, S.+ 1982 1989 Wdowinski, S.+ 1989 Şimşek, Ş. 1985 Makris, J. 1976 Drakatos, G.+ 1988 Pmar, A. Aki, K.+ 1998 1976 England, P. C.+ 1985 De Jonge, M. R.+ 1993 Carey, E.+ 1974 1973 Aubouin, J. Crosson, R. 1976 1976 Crosson, R. Kiratzi, A. A.+ 1991 Horasan, G. A.+ 1998 1998 Demirel, S.+ Kuleli, H. s. 1992 Nalbant, S. S. 1996 1996 Cağlar, 1.+ Küleli, H. S. 1992 Vilotte, J. P.+ 1982 Truffert, C.+ 1993 Kalogeras, I. S.+ 1996 Morris, A.+ 1996 1977 Stephens, C.+ 1997 Ekström, G.+ Kasapoğlu, K. E.+ 1983 1974 Stanley, D. J. 1984 von Huene, R. Stanley, D. J. 1974 Papazachos, B. C.+ 1977 Utku, M. 1997 Kiratzi, A. A.+ 1991 1995 Pondrelli, S.+ 1992 Jackson, J.+ Jackson, J.+ 1988 1968 Brune, J. N. 1977 North, R. D. Papazachos, B. C.+ 1997 1991 Kiratzi, A. A.+ 1993 Kahle, H.-G.+ Karnik, V. 1972 Maley, T. S.+ 1971 Reilinger, R. E.+ 1995 Smith, D. E.+ 1994 1993 Cenci, A.+ Le Pichon, X.+ 1979 Jackson, J.+ 1988 1990 DeMets, C.+ Noomen, R.+ 1991 Oral, M. B.+ 1995 1987 Jongsma, D.

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nd Dinarides.# Neotectonics of the + geenne, la Subsidence de la mer de + eodetic Methods.# Determination of + sia Plate Collision Zone# Global Po + Region.# The African - Adriatic Pro + the Determination of Crustal

The Relationship Between Strain Ra + n Geothermal Parameters in the Eart + benlerinin Modellennesi.# Derin Ele + mic Activity Around the western Ext + ey, Earthquake of 22 July 1967.# Th + ological Evidence for the Last Two + arot. Description, Evaluation and F in a Convergent Zone# Aegean and Su + and TEM-AEM Study of Margarite, Mus + rmm Kymetlendirilmesi Hakkunda I +

amorphic Metabauxites of Naxsos (Cy + s Nouvelles sur / extension Neogene + ile Extension and Detachment Faulti + n Turkey: Tectonic Escape VS Back-A + Techniques for Mapping Geological + Seegravimeter.# Schwerestörungen im + gen.# Low - Angle Normal Faults in + stern Aegean Islands.# The Extensio + stern Aegean Islands.# The Extensio + strukey.# Miocene Clastic Sedimentat +

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40Ar/39Ar Age Spectrum Measurements + Greece).# Structure and Kinematics + Tektonischen Baues Griechenlands. +

et Sedimentaires Mio-Pliocenes dan + c Development of Marble Assemblages + dients# Metamorphism on

mplications of Fine-Scale Mica Inte + stribution of Fluids During Amphibo + t Path Associated with Crustal Exte + olution of an Extensional Shear Zon + e Lavas of Milos and Santorini - Ge + agtammasında Kullanılan Yerbilimler +

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ph Associations, Marine Microfossil + ogic Subdivision of the Turkish d Event Stratigraphy of the Eastern +

and Central Aegean Region.

k Yöresindeki etrografik Ögeleri# Batı Anadolu eri ve Gdiz Grabeni nin Tektonosedi +

tive Tectonics of the Eastern Medit + ic Arc: the Messiniakos, Argolikos, + n the Convex-Northwards Arc of the + Deformation Patterns in the South A + n Mediterranean Area# The Hellenic + n Mediterranean Area# The Hellenic + s Massif).# Menderes Masifi nin Ne + rocesses on the Northhern Slope of + ranean Region# The Isparta Angle: I + ranean Region.# The Isparta Angle: +

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cale de I Egee: Subduction et Expan + cale de I Egee: Subduction et Expan + arc Egeen Externe et de la mer Ege + Arc Egeen Externe et la mer Egee e + erposees et de Leur Signification p + mations en Compression Dans le Quat +

Motions.# Effects of Recent Revisio + Motions.# Present - day Plate Mountain Belts: Alps, Carpathians a + Mouvements Verticaux: I extension E + Movement in Turkey by Terrestrial G Movements in the Arabia-Africa-Eura + Movements in the Carpatho - Balkan Movements in Turkey# Activities for Movements within a Deforming Zone.# MT Survey and its Connection betwee MT Verileri ile Saros ve Gökova Gra Mudurnu Earthquake Fault# Microseis Mudurnu Valley, West Anatolia, Turk Mudurnu Valley, Western Turkey.# Ge Multi-Beam Echo-Sounding in Jean Ch Multiplate and Continuum Tectonics Multiple Mica Generations.# An EMP Müntehap Sahalarında Maden Kaynakla Muscovite and Paragonite in Polymet + Mykonos (Cyclades, Greece).# Donnee Mykonos, Greece.# Late Miocene Duct N - S Direction in Western Turkey f N-S Extensional Tectonics in Wester N.Greece.# Land-Sat data Processing Nach Messungen mit Einem Askania -Nach Messungen mit Einen Askania Nappe Tectonics in an Extending Oro Nappes (SW Turkey) into the Southea + Nappes (SW Turkey) into the Southea Nappes and the Antalya Complex, SW Nappes.# Discussion on the Antalya Nature and Distribution of Fluids D Nature and Geometry of Deformation Nature of Faulting on the Mid-Ocean + Naxos (1/50 000).# Geological Map o Naxos (Cyclades, Greece) Utilizing Naxos and Paros (Cyclades Islands. Naxos# Beitrage zur Erforschung des Naxos et Paros).# Extension Ductile Naxos, Greece# Textural and Izotopi Naxos: Petrology and Geothermal Gra Naxsos (Cyclades, Greece) and the 1 Naxsos (Greece). # The Nature and Di Naxsos, Cyclades, Greece.# The P-T-Naxsos, Greece.# The Late Alpine Ev Nd, Hf, and O Isotopic Ratios in th nde Anadolu nun Doğal Uzantısının S + nde Anadolu nun Doğal Uzanımı# Ege nde Genç Tektonik Olaylar ve Buna B + nde Yerkabuğunun Jeotermik Yapısı, # + nde, Büyük Çekmece (İstanbul)-Marma Nea Anchialos Fault Zane (Central G Nea Anchialos Fault Zone (Central G a Nea Santa Rhyolites and Comparison Near Crete# Earthquake Mechanisms i near Crete# S-P-Wave Traveltime Res Nehri Güneyinin Jeoloji, Hidroloji Nendorit 1967 dthe Brezi Sizmogien Neo - Tethys. # Historie et Topologi Neogene and Quaternary Sequences at #Neogene and Quaternary Volcanism i Neogene Bains in Western Greece.# S Neogene Dans le Fosse Nord egeen.# Neogene de I Egee: la Deformation D Neogene Formations of the Aegean Ar Neogene in Northwest Turkey.# Strat #Neogene Palynological and Isotopic #Neogene Thrust Belt in Western Tau #Necgene Volcanism of the Northern #Necgene Volcanism of the Northern Neogene. 5. Calibration of Sporomor Neogene. # Principles of the Palynol Neogene. Sporomorph Associations an Neojen Havzalarının Jeolojisi.# Uşa + Neojen Magmatismasının Yapısal ve P + Neojen Yaşlı Alüvyon Yelpaze Çökell Neotectonic and Seismicity Data# Ac Neotectonic Basin Across the Hellen + #Neotectonic Deformation Patterns i Neotectonic Evidence for Different Neotectonic Evolution of the Easter Neotectonic Evolution of the Easter Neotectonic Evolution of the Mender #Nectectonics and the Sedimentary P Neotectonics of the Eastern Mediter Neotectonics of the Eastern Mediter #Neotectonics of the Marmara Region #Neotectonics of the Marmara Sea Re #Neotectonics of the Pannonian Basi #Neotectonics of the Pontides: Impl + Neotectonique de I Arc Egeen.# La #Neotectonique Horizontale et Verti #Neotectonique Horizontale et Verti + Neotectonique Plio-Quaternaire de I + Neotectonique Plio-Quaternaire de I + Neotectonique. # Des Tectoniques Sup Neotectoniques et Sismiques. # Defor +

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in Neotektoniğinin Esasları# Türkiye n + Neotektonik Evriminde Oluşan Suprad + Neotektonik Evrimini Yoneten Etkenl + Network Across the Kephalonia Fault Network Spanning the Marmara Sea an Network.# Seismicity and Seismotect + New Aspects# Orogenic Evolution of New Bathymetric Chart and Physiogra #New Constraints an Age and Total O 4 #New Data on the Bottom Relief of t #New Data on the Structure of the E #New Data on the Structure of the S + New Elements from DSS Data.# Ionian New Evidence from Micro - Earthquak #New Evidence on the Geotectonic Ev New Geochemical and Isotopic Data q New Global Tectonics.# Seismology a New Marine Theatre. # Offshore Greec + New Sea-Beam Data.# Strain Distribu New Tectonic Fabric.# Global Marine #New Version of the Generic Mapping + New Zealand: a Comparison of Short + nin (Güneybatı Yürkiye) Geç Kuvater + nin Batısında Paleo-Melanj Kuşağını + nin Deprem Etkinliği ve Aktif Tekto + nin Depremselliği.# Batı ve Güneyba + nin Genel Tektonik Durumu ile Baslı + nin Jeoelektrik Yapısı.# Büyük Mend + nin Kuzey kanadının Stratigrafisi v + nin Müntehap Sahalarında Maden Kavn + nin Neotektoniğinir. Esasları# Türki + nin Neotektonik Evriminde Oluşan Su + nin Neotektonik Evrimini Yoneten Et + nin Sismik Tomografi ile Üç Boyutlu + nin Tektonosedimenter Gelişimi.# Sa + nin Yapısal ve Sismolojik Özellikle + nin Yapısı ve Kuzey Anadolu Fayı (K + NNW-SSE Transeci.# Neogene Thrust B Nodal Solutions for Larger Barthous Nokta Derinliklerinin Saptanması.# + Nonlinear Inversion of Travel Times Nord - Occidentale de I Arc Egeen (Nord egeen.# La Sedimentation Neoge + Nord Occidentale Depuis le Miocene, + Nordwest Anatolische Beben vom 18. Normal Fault Beneath Thessaloniki.# Normal Fault System of the Gulf of Normal Fault, Evidences for East-We Normal Faulting and the Reconstruct + Normal Faulting in Central Greece a Normal Faulting in Central Greece: Normal Faulting in the Demirci. Ala + Normal faulting Mechanisms.# A Micr + Normal Faulting, Drainage Patterns + Normal Faulting: Examples from West + Normal Faulting: Tectonic Implicati + Normal Faults in the Basin and Rang Normal Incidence and Wide-Angle Sei + Normal Models of Love Waves in an 0 + Normal Simple Shear of the Continen Normal-fault Scarps in the Hellenic + Normal-Incidence and Wide-Angle App + North - Central Greece from Inversi North - Central Greece.# GPS Eviden North - Western Turkey.# A Study of + North Aegean and North - Central Gr North Aegean Extension.# A Major Ol + North Aegean# Palaemagnetic data fr + North Aegean region: A Tectonics Pa North Aegean Sea Network.# Seismici + #North Aegean Sea Trough: 1972 Jean + North Aegean Sea. Preliminary Resul + North Aegean Trough (W. Turkey and North Aegean Trough - North Anatoli + North Aegean Trough Fault Zone (Gre North Aegean Trough# Geophysical In + North Aegean Trough# Subsidence His + North Aegean Trough# Tectonic Evolu North Aegean Trough, Northern Aegea North Aegean Trough. # Gravity Induc + North Aegean Trough: an Active Stri + North Africa.# Isogram Maps of Euro North America Plate Circuit and Tec + North America.# Two Slow Surface Wa + North America: Mechanism of Uplift North American Cordillera.# A Physi + North Anatolian Dextral Strike-Slip + North Anatolian Fault Associated wi North Anatolian Fault by Using Geod + North Anatolian Fault Deduced from + North Anatolian Fault# Neotectonics North Anatolian Fault Zone Across t + North Anatolian Fault Zone Between + North Anatolian Fault Zone in the M North Anatolian Fault Zone in the 0 +

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etachment Havzalar ve Rift Havzalar er# Ege nin Zone, Greece.# Establishent of a P +

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Gravity Form ERS-1 Geosat and Seas +

Tools Released and Long Term Deformation. # The Kin +

ner Evrimi.# Gökova Körfezi n Varlığı# Menderes masifi

nikle Ilişkisi# Marmara Bölgesi

tı Türkiye ca Deprem Bölgeleri Arasındaki Iliş +

eres Grabeni e Tektonik Evrimi# Menderes Masifi + aklarının Kıymetlendirilmesi Hakkın +

ye pradetachment Havzalar ve Rift Havz +

kenler# Ege Modellenmesi# Ege Bölgesi

lihli Güneyinde Üste Doğru Kalınlaş + ri# Izmit Körfezi

AF) ile Ilişkisinin Irdelenmesi# Iz + elt in Western Taurides. The Imbric + kes of 1959 - 1962.# Computer - Det + Edremit - Susurluk Bölgesinin Curie + # P and S Deep Velocity Structure o + Iles Ioniennes, Acarnanie, Epire, G + ne Dans le Fosse

Dans le Carde Geodynamique de I Ar + Marz 1953.# Makroseismische Untersu + Seismotectonic Evidence of an Acti Corinth (Greece) # The Galaxidi Eart + st Extension in the Hellenic Arc# T + ion of the Synmetamorphic Structura + nd Western Turkey.# Active An Overview.# Active

schir and Gediz Earthquakes of 1969 + oseismic Study in the Western Part and Sedimentation in Southwestern T + ern Turkev# Cross-Faults and Differ + ons with Examples from Western Turk + e Province: Nappe Tectonics in an E + smics# A Transverse of the Ionian I + ceanic Structure.# Toward Understan + tal Lithosphere.# Uniform - Sense

Arc# East-West Extension and Holoc + roach to Studying the Extending Aeg + on of Travel Times.# 3-Dimensional 4 ce for Westward Continuation of Dex + Crustal and Upper Mantle Structure + eece.# GPS Evidence for Westward Co + igo - Miocene Detachment in Souther om Tertiary Units of the

padox?# The ty and Seismotectonics of the North +

Charcot Cruise. ts from the North Aegean Sea Networ +

Greece): Timing, Tectonic Regimes, + an Fault Deduced from Seismicity.# +

ece); Structural Constraints# Late

vestigations in the tory of the

tion of the

n Sea.# Structure and Evolution of +
ed Deformation on the North Flank a + ke-Slip Deformation Zone# Structure + pe and tonics of the Gloria Fault. # Closur +

ves Across and a Comperative Study.# Lithosphe + cal Model for Cenozoic Extension of +

Fault into the Oblique Fault Zone + th the Large Earthquakes of the Per + etic Methods.# Strain Analysis Alon + Seismicity. # Rates of Crustal Defor + of the Pontides: Implications for + he North Aegean and North - Central + Erzincan Refahiye.# Tectonic Invest + udurnu Valley, Western Turkey.# Geo + rhangazi Plain, North Western Turke +

tectonic Aspects of the North Anatolian Fault Zone.# Seismo +

Tatar, Y. Ikeda, Y.+

leomagnetic Study of the North Anatolian Fault Zone.# The Pa + tions for Tectonics of the Eastern + North Anatolian Fault Zone: Implica + Relationship Between the Sea of Mar + North Anatolian Fault.# Structural North Anatolian Fault.# The tonic Deformation Patterns in the C + North Anatolian Faulth Zone# Neotec + North and Central Aegean Sea.# Acti + ve Tectonics of the es Basin off the North Aegean Troug + North Flank and Floor of the Sporad + e Activity of the North Anatolian F North Western Turkey.# Late Holocen + olia# Paleomagnetic Evidence for Ro + Northeastern Aegea and Western Anat nozoic Volcanic Evolution of the Northeastern Aegean Region# Late Ce + Detachment System and Rhodope Meta + Northeastern greece: Strymon Valley + taceous and Eocene Pose Positions f + Northeastern Turkey.# Jurassic, Cre + cs of the Northern Aegean Area# Seismotectoni + Evolution of the North Aegean Trou + Northern Aegean Sea.# Structure and + Neogene Volcanism of the # Neogene Volcanism of the Northern and Central Aegean Region# Northern and Central Aegean Region. .A.# The Origin of Metamorphic Core + Northern Colorado River Region, U.S. ry Clockwise Rotation. # Paleomagnet + Northern Greece Prior to the Tertia + n: Age and Evolution, West Turkey #Northern Margin of the Gediz Grabe onal Regime# Late Cenozoic Extentio + Northern Part of the Aegean Extensi Northern Turkey.# Active Faulting i n in (the Aegean Sea)# Neotectonics a + Northhern Slope of the Sporades Bas Northwest Anatolia.# Heat Flow Map of d Radiometric Data of the Neogene i + Northwest Turkey.# Stratigraphic an + onic Evolution of the Biga Peninsul + Northwest Yurkey. # Geology and Tect ioning System (GPS) Estimates of Cr + Northwestern Anatolia# Global Posit + Intensity - Attenuation and Magnit + Northwestern European Earthquakes.# Islands: Result Inferred from GPS M Northwestern Greece and the Ionian esults.# Tertiary Geodynamical Evol + Isotope Study and 2-D-Model-Ling of + Northwestern Greece: Pleomagnetic R Northwestern Turkey# Environmental ential in Northwestern Turkey# Geothermal Pot tigation of Cold Groundwater for th + Northwestern Turkey# Regional Inves + Northwestern Turkey)# Deep Circulat ion of CO2-Rich Paleowaters in a Se + Evolution and Tectonics in an Area + Northwestern Turkey) # Stratigraphic ques. Donnees nouvelles et Synthese nos jours et leurs cadres geodynami not Traverse Oceanic Crust. # Why th + e Lq Phase does of Seismic Zones in the Aegean Reg + Note on the Morphology and Activity #Notes Explicatives de la Carte Geo logique de la Turquie, -Faille 'Izm of Turkey from the Oligocane to the Notes for the Paleocographic Atlas odecanese Islands. IX. Geological M + es magmatiques Egeennes de L Oligoc + Notes.# Geological Studies on the D nouvelles et Synthese# Les activiti I Egee: la Deformation Ductile du Nouvelles sur / extension Neogene d + within the Normal Fault System of t + November 1992: A Possible Asperity inin Depremselliği # Akkuvu Nükleer Güç Santralı Yeri ve Çevres Deformation: Simple Mechanical Mode + #Numerical Modelling of Intraplate Numerique d un Modele Mecanique Ele mentaire Applique a I etude d une P + nun Aktüel Tektoniği.# Batı Anadolu + Kuzey Anadolu Fay Zonu nun Batı Uzantılarının İncelenmesi# + # Kuzey Anadolu Fay Zonu nun Batı Uzantılarının İncelenmesi. Kullanılan Yerbilimleri Kriterleri + nun Doğal Uzantısının Saptanmasında nadolu nun Doğal Uzanımı# Ege Denizi nde A + Sonuçları# Batı Anadolu nun Genç Tektoniğinin Jeomorfolojik + li Görüşler.# Orta Toroslar - Orta + nun Güneyinin Neotektoniği ile ||gi + ması ve Genç Tektonik Evrimi.# Batı + nun Mikro Bloklarının Paleomagnetiz + nun Paleomagnetismas: ve Tektonik G elişimi.# Batı Anadolu çlar.# Kuzeybatı Anadolu nun Tektoniği ve Paleomagnetic Sonu anizmalar: Açısından İrdelenmesi.# nun Tektonik Yapılarının Deprem Mek + rileri ile Irdelenmesi.# Bati Anado nun Yapısal Sorunlarının Gravite Ve + hronological data# Inner arc volcan NW Aegean Arc: geochemical and geoc NW Anatolia# Petrology of the Pre-L + NW Anatolia, Inferred from GPS Meas + iassic Metamorphic Basement Rocks o urements, # Active Crustal Deformati + urements.# Recent Crustal Deformati NW Anatolia, Inferred from GPS Meas GPS Measurements# Recent Crustal d NW Anatolia, Inferred from Repeated + c Volcanics in the Biga Peninsula, NW Turkey# Petrology of the Cenozoi NW Turkey. # The Magnetism of Some P ermian Red Sandstones form lları Üzerinde Paleosismik Araştırm + nın Sapanca-İzmit ve Geyve-İznik Ko + O Isotopic Ratios in the Lavas of M + ilos and Santorini - Geodynamic Imp #0-Sr Isotropic Variations in Mioce ne Granitoids from the Aegean: Evid + Oberen Mantels im Östlichen Mittelm + eer Abgeleitet aus Geophysikalische Objective Regionalization of the Me + diterranean Basin Derived from Surf ean Trough (W. Turkey and Greece): Oblique Fault Zone of the North Aeg Observational Evidence.# Block Rota tion in Western Turkey. Observations in the Aegean Region.# Some Aspects of the Evolution of M Observations on Land# Recent Ouater nary Tectonics in the Hellenic Arc: Observations par Submersible.# Impo rtance des Formations Attribuees au Tectonics of the Hell enic Trenc: A Synthesis of Sea-Beam Observations# Observations# The 1971 May 12 Burdu r Earthquake Sequence, SW Turkey: a observations.# Crustal Deformations in the Mediterranean Area Computed Observations.# Determination of Sta tion Coordinates and Motions from L SC (DUT) 95C02.# Earth Rotation and observations: EOP (DUT) 95L02 and S Obtained by Refractional Seismic Ex periments, # Crustal Structure of th Obtained by Robust Nonlinear Invers ion of Travel Times# P and S Deep V + Crustal Structure of the Aegean Sea + Obtained from Geophysical Survey.# Occidental au sud de Beyşehir (Turq ue).# Recherches Geologiques dans d Occidental.# Reserches Geologiques dans le Taurus Lycien Occidentale de I Arc Egeen (Iles Io + niennes, Acarnanie, Epire, Greece). + Occidentale Depuis le Miocene, Dans le Carde Geodynamique de I Arc Ege Occidentale.# Deformazione Continen + tale Recente in Anatolia Occidentales.# L al Lochtonie des B + ey Gağları Orientaux, Reconstructio + Occurrence of the Geothermal System s in Western Anatolia# An Approach ation of the Taurides: One or Sever Ocean Basins?# The Mesozoic Organiz Ocean Bottom Seismograph Stations.# + Detection and Location of Earthqua Ocean, Indiar Ocean, Red Sea and Me diterranean Sea.# Submarine Gravity Ocean, Red Sea and Mediterranean Se a.# Submarine Gravity Measuremnts i Ocean.# Seismic Refraction Experime + nts in the Mediterranean and Indian Oceanic Areas of the Tethys, Medite + rranean, and Atlantic.# Alpine Defo + Oceanic Basins and Continental Coll + ision: the Eastern Mediterranean as +

Orbay, N. 1979 Barka, A. A.+ 1988 Ergün, M.+ 1995 Barka, A. A. 1992 Barka, A. A.+ 1984 Taymaz, T.+ 1991 Ferentinos, G.+ 1981 Ikeda, Y.+ 1989 Kissel, C + 1987 Seyitoğlu, G.+ 1992 Dinter, D. A.+ 1993 Van der Voo, R. 1968 Papazachos, B. C. 1976 Brooks, M.+ 1980 Manetti P + 1979 Fytikas, M.+ 1979 Lister, G. S.+ Edel, J. B.+ 1989 1992 Yusufoğlu, H. 1996 Burchfiel, B. C.+ 1997 Allen, C. R. 1969 Roslyakov, A. G.+ 1997 llkisk, O. M. 1989 Benda I. + 1974 Okay, A. I.+ 1991 Straub, C.+ 1994 Ambrasevs, N. N. 1985 Kahle, H.-G.+ 1995 Kissel, C.+ 1985 Eisenlohr. T.+ 1997 Simsek, S. 1997 Eisenlohr, T.+ 1997 Greber, E. 1997 Greber, E. 1997 Bellon, H.+ 1979 Zhang, T.+ Karnik, V. 1995 1972 Egeran, N.+ 1944 Lüttig, G.+ 1976 Mutti, E.+ 1970 Bellon, H.+ 1979 Faure M.+ 1988 Hatzfeld, D.+ 1996 Alptekin, Ö.+ 1977 Vilotte, J. P.+ 1982 Carey, E.+ 1974 Kocaefe, S. S.+ 1982 Kıyak, Ü. Kıyak, Ü. 1986 1986 Eryilmaz, M. 1996 Küleli, H. S.+ 1993 Erol, O. 1982 Şaroğlu, F.+ 1983 Orbay, N.+ 1995 Orbay, N.+ 1993 Isseven, T.+ 1995 Kalafat, D. 1995 1988 Akçığ, Z. Innocenti, F.+ 1979 Genc, S. C. 1995 Straub, C.+ 1995 Straub, C. 1996 Straub, C.+ 1997 1990 Ertürk, 0.+ Gregor, C. B.+ 1964 Barka, A. A. 1993 1986 Briqueu, L.+ Altherr, R.+ 1988 Stobbe. C. 1980 Martinez, M. D.+ 1997 Mercier, J. 1991 L.+ Westaway, R. 1990 Berckhemer, H. 1977 1979 Angelier, J. Le Pichon, X.+ 1980 1982 Huchon, P.+ taymaz, T.+ 1992 Noomen. R.+ 1995 1991 Noomen, R.+ 1995 Noomen, R.+ Makris. J.+ 1977 Papazachos, B. C.+ 1997 Makris, J. 1975 1977 Monod, 0. Graciansky, P. C. 1972 Amorese, D. 1993 Sorel, D. 1992 1993 Zanchi, A.+ Ricou, L. E.+ 1979 Koçak, A: 1990 Ricou, L. E.+ 1984 Frohlich, C.+ 1982 Girdler, R. W.+ 1957 1957 Girdler, R. W.+ 1953 Gaskell, J. F.+ Smith, A. G. 1971 Le Pichon, X. 1982

Zhang, T.+ 1995 Stephens, C.+ 1977 Baker, C.+ 1997 Dercourt, J. 1970 Gaskell, T. F.+ 1958 Pinar, A. 1998 Eyidoğan, H.+ 1996 Özçep, T.+ Öncel, A. O.+ 1995 1995 Alptekin, Ö. 1978 Yoğurtcuoğlu, A. 1986 Evirgen, M. M. 1977 Arslan, F. 1984 Ferentinos, G + 1981 Barka, A. A.+ 1988 West, J. 1973 Savascin, M. Y 1982 Karamanderesi, I. H.+ 1982 Kava, O. 1982 Ercan, A.+ 1998 Karamanderesi, I. H.+ 1982 Ezen, Ü 1979 Elbek, Y. 1963 Sokoutis, D.+ 1993 Lüttig, G.+ 1976 Bellon, H.+ 1979 Sözbilir, H.+ 1996 Barka, A. A. 1991 Nalbant, S. S. 1996 Alpar, B.+ 1998 Demirbağ, E.+ 1998 Arslan, F. 1984 Worzel, J. L 1959 Schmid, S. M.+ 1996 Mascle. J.+ 1990 Barka, A. A.+ 1988 Ergin, K. 1966 DeMets, C.+ 1994 Çağlar, İ. 1995 Altherr, R,+ 1976 Papazachos, B. C.+ 1990 Angelier, J. 1979 Sonder, L. J.+ 1099 Galanopoulos, A. 1961 Galanopoulos, A. 1963 Wijbrans, J. R.+ 1988 Gautier, P.+ 1993 Ben, J.+ 1976 Lauer, J. P. 1984 Schuling, R. D. 1962 Sahin, H.+ 1981 . Fytikas, M.+ 1976 1983 Barton, M.+ Gürbüz, C.+ 1998 Evirgen, M. M. 1977 1998 Cetin, S.+ Ridley, J. 1984 Senel, M. 1983 Goncharov, V. P.+ 1963 Greber, E.+ 1997 Oral, M. B. 1987 Wilson, P.+ 1993 Mutti, E.+ 1970 Makris, J. 1973 1978 Makris, J. Hamilton, W. J.+ 1840 Dora, O. Ö.+ 1995 Oral, M. B. 1987 Meulenkamp, J. J.+ 1988 Meulenkamp, J. E.+ 1988 1997 Panadopoulos, G. A. Patzak, M.+ 1994 Sykes, L. R. 1967 1972 Karnik, V. 1978 Tatar, Y. Ikeda, Y.+ 1991 Ferentinos. G.+ 1981 Roslyakov, A. G.+ 1997 Ligdas, C. N.+ 1991 1973 Sancho, J.+ Moskalenko, V. N. 1966 1923 Leaf, W. 1961 Wist. G. Kaya, O.+ 1989 Ricou, L. E.+ 1984 1990 Kastens, K. Katzir, Y.+ 1996 Hynes, A. J.+ 1972 198? Dilek, Y.+ Kissel, C.+ 1987 Ricou, L. E.+ 1984 1989 Ikeda, Y.+ Dumont, J. F.+ 1979 Chaumillon, E.+ 1995 1993 Zanchi, A.+ Papazachos, B. C.+ 1992 1979 Ricou, L. E.+

Oceanic Crust.# Why the Lg Phase do + Oceanic Crust. # Why the Ly Fhase up + Oceanic Structure. # Toward Understa + Oceanic Subduction-Continental Coll + Oceanique Actuelle et Fossile; ses Oceans and the Mediterranean Sea 19 October 1, 1995 Dinar, Earthquake (October 1, 1995, Dinar Earthquake, Odak Mekanizmaları Kataloğu (1963 Odak Mekanizmaları Kataloğu# Türkiy + Odak Mekanizmaları ve Bunların Akti + Odak Mekanizması Çözümleri Açısında + #Ödemiş-Bayındır-Turgutlu-Salihli A + Odontolojik Değişimler.# Düzpinar (+ off the North Aegean Trough. # Gravi Offset of the North Anatolian Fault + #Offshore Greece may Develop into a + Ögeleri# Bat: Anadolu Neojen Magmat + Olanakları.# Gediz Vadisi nde Genc + Olasılı Bir Mekanizma# Tersiyer Sır + Olasılık ve Yapısal İlişkileri.# Eg + Olaylar ve Buna Bağlı Jeotermal ene + Olaylarının İncelenmesi.# İstanbul Ölçmeleri (4 Pandüllü Sterneck Ciha + Oligo - Miocene Detachment in South + Oligocane to the Pleistocene.# Expl + Oligocene a nos jours et leurs cadr Oluşan Supradetachment Havzalar ve + Oluşturan Tektonik Yapılar ve İstan + Oluşturduğu Deformasyon ve Gerilme Oluşuklarının Sismik Yöntemlerle Ar + Oluşumu Üzerine Düşünceler.# Çanakk + Omurgal: faunas: Hipparionlarında 0 + on a Surface Ship with the Graf Sea + on Alpine Geology: Editorial Remark + on Continuous Reflection Profiles# on Earthquake Activity# Strike-Slip + #On Epicentre Map of Turkey and Sur + on Estimates of Current Plate Motio + on Gölpazarı (NW part of Turkey) as + on Granitic Rocks of the Aegean Sea + on Historical and Instrumental Data on Land# Recent Quaternary Tectonic on Large-Scale Continental Extensio + #On Magnitude Determination by Usin + #On Mapping of the Seismic Activity on Naxos (Cyclades, Greece) Utilizi on Naxos and Paros (Cyclades Island + on Naxos: Petrology and Geothermal on Palaeomagnetic Data# Geodynamic #On Petrology, Age and Structure of Ön Raporu.# Aydın - Germecik - Bozk on Recent Magmatism of the Aegean S + on Santorini and Milos, Aegean Sea, + #On Seismotectonics of the Marmara Ön Sonuçlar# Ödemiş-Bayındır-Turgut + Ön Sonuclar.# Marmara Denizi Sismik + on the Aegean Island of Syros# The on the Antalya Nappes.# Discussion on the Bottom Relief of the Mediter on the Çekirge Thermal Water System on the Crustal Structure# Some Rema on the Determination of the Geokine on the Dodecanese Islands. IX. Geol on the Evolution of the Hellenides. on the Geodynamic Situation in Gree + #On the Geology of the Western Part on the Geotectonic Evolution of the on the Gravity Anomalies of W Turke + #On the Hellenic Subduction Zone an + #On the Hellenic Subduction Zone an #On the Interpretation of Large-Sca on the Island of Tinos, Cyclades, G on the Mid-Oceanic Ridges.# Mechani on the Morphology and Activity of S on the North Anatolian Fault Zone B on the North Anatolian Fault Zone i on the North Flank and Floor of the + on the Northhern Slope of the Spora + #On the Resolving Power of Tomograp on the Structure of the Eastern Med + on the Structure of the Sedimentary + on the Troad.# Strabo #On the Vertical Circulation of the + Öncesi Bloklu Tortul Kayaların Stra + One or Several Ocean Basins?# The M + Onset of Extension in the Aegean Ba + Ophiolite (Tinos, Cyclades, Greece) Ophiolites in the Othris Region (Ea Ophiolites# Regional tectonics of t Opposite Senses of Adjacent Blocks + Organization of the Taurides: One o + Orhangazi Plain, North Western Turk + Orientale de I arc Egeen.# Sur I ex + Orientale).# Variation Laterale des + Orientation from Geophysical and Ge + #Orientation of Active Faulting in + Orientaux, Reconstruction Palinipas +

es not Traverse nding of Sn: Normal Models of Love + ision Transition# Earthquake Mechan Implications Geotectoniques.# L exp + 50 - 1953.# Seismic Measurements Ma + Ms=6.1): a Rupture Model with Impli SW Turkey.# The 1990)# Türkiye ve Yakın Cevresi De + e ve Yakın Çevresi Depremlerinin f Tektonik ile İlişkileri.# Batı An n Türkiye Tektonik Birimlerinin Bic + rasında Kalan Bölgenin (Menderes Ma Manisa) Miosen Omurgalı faunası Hip ty Induced Deformation on the North + Zone: Implications for Tectonics o + New Marine Theatre. ismasının Yapısal ve Petrografik Tektonik Olaylar ve Buna Bağlı Jeot + t Yitmesi: Doğu Ege Bölgelerinin Ya + e Denizinde Jeotermal rji Olanakları.# Gediz Vadisi nde G + (ITTI) Deprem Istasvonunda Kavdedile + ziyle).# Diyarbakır ve Padova Yer Ç ern Rodope Controlling North Aegean anatory Notes for the Paleocographi + es geodynamiques. Donnees nouvelles + Rift Havzaları (Supradetachment Bas bul Join bir Mikro - Bölgelendirme Alanlarının Modellenmesi.# Depremle aştırılması.# Çanakkale Boğazı Ege ale Boğazı Kuzeydoğusunun dontolojik Değişimler.# Düzpinar (M + Gravimeter.# Continuous Gravity Me s and Result of a Round-Table Discu Shallow structure and Recent Evolut + fault Geometry in Turkey and its I + rounding Area. ns.# Effects of Recent Revisions to + Inferred from MT Survey and its Co + Preliminary results# Geochronolog + # Average Regional Seismic Strain s in the Hellenic Arc: Examples of n# Effects of a Temperature-Depende + g Macroseismic Data. in Greece. ng 40Ar/39Ar Age Spectrum Measureme + s, Greece).# Structure and Kinemati + Gradients# Metamorphism Evolution of Turkey and Cyprus base + the Menderes Migmatite Complex (SW + öy Jeotermal Enerji Aramaları Rezis + ea# Geochronological Data Greece.# Sr-isotope and Trace Elem + Region (Turkey): Results from a Mic lu-Salihli Arasında Kalan Bölgenin + Yansıma Profili Çalışmalarının Significance of Deformation Associa + ranean.# New Data # Hydraulic Level Variations in a T + rks on the Gravity Anomalies of W T + matics of the Eastern Mediterranean + ogical Map of Rhodes Island (Greece + # Some Geophysical Aspects ce# Some Geophysical Considerations + of Asia Minor Menderes Massif# New Evidence and Its Implications on the Crust + d the Geodynamic Evolution of Crete d the Geodynamic Evolution of Crete + le Seismic Tomography Images in the reece: Witness to a Lost Terrane of sm of Earthquakes and Nature of Fau + eismic Zones in the Aegean Region # + etween Erzincan Refahiye.# Tectonic n the Mudurnu Valley, Western Turke Sporades Basin off the North Aegea + des Basin (the Aegean Sea)# Neotect + hic Images in the Aegean Area iterranean Basin from Seismic Refle + Strata and Basement in the Levant + Mediterranean Sea. tigrafisi, Bursa Güneyi.# Jura esozoic Organization of the 'Fauride + sin Accelerate the rate of Growth o .# The Tectono-Metamorphic Evolutio + stern Central Greece).# Spreading a + he Eastern Mediterranean in Northeastern Aegea and Western A +

r Several Ocean Basins 7% The Messor + ey.# Late Holocene Activity of the + istence de Coulissements Senestres + Fronts de Formation de la Ridge Me +

ological Data# Seismotectonics of W + the Aegean and Surrounding Area. tique des Taurides Occidentales.# L +

Fractional Crystallization# O-Sr I + Origin by Combined Assimilation and + Altherr. R.+ Origin fo Volcanic Rocks of Western + Turkey. # An Approach to the Yılmaz, Y diterranean Island Arcs and Origin of High Potash Volcanoes# Me s and Detachment Faults Formed Duri + Ninkovich, D.+ Origin of Metamorphic Core Complexe + Lister, G. S.+ estern Turkey# An Approach to Origin of Young Volcanic Rocks of W Şengör, A. M. C. estern Turkey. # An Approach to the Origin of Young Volcanic Rocks of W Yilmaz, Y. rovinces of Japan and Surrounding A #Origine of Cenosoic Petrographic P + Kuno, H. #Origine of Primary Basalt Magmas a + Örnek# Atlantik Tip Bir Kıta Kenarı + nd Classification of Basaltic Rocks Kushiro, I.+ nın Pasifik Tip Bir Kıta Kenarına D + Harita Çalışmaları ve Yılmaz, Y. Şardar, S. Örnekler.# Bat: Anadolu Jeoelektrik + Tectonics.# Eastern European Alpin + Orocline as an Example of Collision + Burchfiel, B. C. Orogen.# Low - Angle Normal Faults in the Basin and Range Province: Na + ides Internes et Leur Extension. Re + Wernicke, B. Brunn, J. H. orogenese Alpine.# Les Zones Hellen + sme des Zones Internes des Hellenid + Orogenese, Metamorphisme et Magmati + Mercier, J. L. nics #Orogenic Andesites and Plate Tecto Gill. J Extensional Tectonics in Western T + Orogenic Collapse# The Cause of N-S + Sevitoğlu. G.+ es: New Aspects #Orogenic Evolution of the Hellenid + Jacobshagen, V. Orogens.# Extensional Collapse of Dewey, J F Carpatho - Balkan Region. # The Afri + Orogeny and Plate Movements in the + Channell, J. E. T.+ niği ile İlgili Görüşler.# Orta Tor + Orta Anadolu nun Güneyinin Neotekto + Şaroğlu, F.+) Stratigrafisi ve Tektoniği. #Orta Doğu Ege Çöküntüsünün (Neojen + Kava. O #Orta Sakarya Jeolojisi Altınlı, I. E. üpevinin Negtektoniği ile Ugili Gö + #Orta Toroslar - Orta Anadolu nun G + Şaroğlu, F.+ ği. #Orta Torosların Post Eosen Tektoni + Akav. E.+ lanarak Anadolu ve Cıvarında Kabuk Ortam Tepki Fonksiyonlarmdan Yarar + Osmanşahin, I. in Migmatiten des Egrigöz-Massiva #Orthoklas-Mikroklin Transformation + Dora, O. Ö. Kuzey Kanadının Stratigrafisi ve Çe Örtü İlişkisi.# Menderes Masifinin + Erdožan, B. Östhicken Mittelmeer Nach Messungen + mit Einen Askania - Sea Gravimeter Fleischer, V. Geophysikalischen Messungen# Dil P Östlichen Mittelmeer Abgeleitet aus + Stobbe, C. mit Einem Askania - Seegravimeter. Östlichen Mittelmeer Nach Messungen + Fleischer, U. ce).# Spreading and Emplacement Age + Othris Region (Eastern Central Gree + Outher Ridges).# Evolving Miogeanti + Hynes, A. J.+ clines of the Eastern Mediterranean + Stride, A. H.+ #Outline of the Geology of the West + ern Taurids. Brunn, J. H.+ Ridge Accretionary Complex# Rate o + Outward Growth of the Mediterranean + Kastens, K. A. A Synthesis Incorporating New Sea-B over the East Mediterranean Ridge: + Le Pichon, X.+ ne: the Aegean Arc from the Pliocen + Overriding Plate of a Subduction Zo Mercier, J. L.+ n Central Greece: An Overview.# Active Normal Faulting i olopipolpi# Tertiary- Quaternary Al + Roberts, S. C.+ kaline Magmatism of the Aegean- We + Francalanci, L.+ e Gökova Grabenlerinin Modellenmesi + Özdirenç ve MT Verileri ile Saros v + Caélar, I.+ Abdússelamoğlu, Ş. n Jeolojisi ve Yanısal Özelliği.# Gediz ve Yakın Çevresini + Kuzey Anadolu Fay Zonunun Tektonik Özelliği.# Kelkit Vadisi Kesiminde + Seymen, I. sal ve Sismolojik Özellikleri# Izmit Körfezi nin Yapı + Koral, H.+ P - Arrival Times from Local Earthq +
 P - Veolocity Structures in the Eur + uakes. 1. A Homogenous Instial Mode + Aki, K.+ o - Mediterranean Area. # Large Scal + Granet. M.+ with use of an Accurate Two - P + #P - Wave Crustal Tomography of Gre + ece Drakatos, G.+ P - Wave Tomography of the Italian Region Using Local and Regional Sei + Alessandrini, B.+ # Teleseismic P - Wave Transmission Trough Slabs. Sleep, N. H. Mantle Below the Iberian Peninsula: + P - Wave Velocity Structure of the Blanco, M. J.+ and Upper Mantle in the Aegean Regi + #P - Wave Veolocities in the Crust Ligdas, C. N. the Hellenic Area Obtained by Robu + #P and S Deep Velocity Structure of Papazachos, B. C.+ dan Yararlanarak İstanbul Civarında + P Dalgalarının Genlik Spektrumların + Kenar, Ö. ath Western Europe.# A Study of Lar + P Velocity in the Upper Mantle Bene Romanowicz, B. A. d Iran.# The Uppermost Mantle quakes of 1959 - 1962.# Computer - + Chen, C. Y.+ P Wave Velocities Beneath Turkey an + Hodgsom, J. H.+ P- Nodal Solutions for Larger Earth + Attic Peninsula (Greece): Deformati + P-T Path of the Crystalline Units# Kessel, G. Extension, Naxsos, Cyclades, Greece + Buick, I. S.+ P-T-t Path Associated with Crustal editerranean Area# Large-Scale P-Velocity Structures in the Euro-M + Granet, M.+ P-wave Crustal Velocity in the Ioni Alessandrini, B.+ an and Aegean Regions# Back Arcs Ba + d by a Dipping Plate in the Aegean + #P-wave Travel Time Residuals Cause Gregersen, S. Agarwal, N. K.+ p Structure of the Aegean Region# T + P-Wave Traveltime Residuals and Dee + Karig, D. E. Pacific.# Evolution of Arc Systems in the Western lçmeleri (4 Pandüllü Sterneck Cihaz + Padova Yer Çekim (Cazibe) Şiddeti Ö Elbek, Y. Jackson, J.+ lpine Himalayan Belt Between Wester + Pakistan# Active Tectonics of the A Kondopoulou, D.+ #Palaemagnetic data from Tertiary U nits of the North Aegean Palaeogene Thrusting and Basin Clos Morris, A. ure in Eastern Central Greece: Pala + Lauer, J. P. Palaeomagnetic Data# Geodynamic Evo + lution of Turkey and Cyprus based o Morris, A. ic Carbonates# Rotational Deformati + Palaeomagnetic Evidence from Mesozo + #Palaeomagnetic Evidence of Miocene Kissel, C.+ and Pliocene Rotational Deformatio + Palaeomagnetic Measurements.# Mesoz + Turnell, H. B. oic Evolution of Greek Microplates Morris, A.+ Palaeomagnetic Results from the Cyc + Greece, and Their Imp ladic Massif, palaeozoic Schist in the Southhern Bozkurt, E. Menderes Massif: Field, Petrographi + deres masifi nin Batısında Paleo-Melanj Kuşağının Varlığı# Men + Candan. 0.+ Lüttig, G.+ Paleocographic Atlas of Turkey from + the Oligocane to the Pleistocene.# + Channell, J. E. T.+ Paleogeographic Premise for Alpine + Orogeny and Plate Movements in the + Mercier, J. L. #Paleogeographie, Orogenese, Metamo + rphisme et Magmatisme des Zones Int Kondopoulou, D. P.+ #Paleomagnetic and Neotectonic Evid + ence for Different Deformation Patt Paleomagnetic Approach# Crustal Def + Zanchi, A.+ ormatin in Western Turkey: A Struct Tapırdamaz, C.+ rakya da Genç Volkanik Kayaçlar Üze Paleomagnetic Çalışma Sonuçları.# T + Edel, J. B.+ #Paleomagnetic Evidence for a Large + Counterclockwise Rotation of North Kissel, C.+ Paleomagnetic Evidence for a Post-E + ocene Clockwise Rotation of the Wes #Paleomagnetic Evidence for Cenozoi + Speranza, F.+ c Clockwise Rotation of the Externa Kissel, C.+ #Paleomagnetic Evidence for Rotatio + n in Opposite Senses of Adjacent Bl Speranza, F.+ Paleomagnetic Evidence for Rotation + of the Ionian Zone of Albania.# Fi #Paleomagnetic Evidence for Rotatio + Kissel, C.+ nal Deformations in the Aegean Area Horner, F.+ #Paleomagnetic Evidence from Pelagi + c Limestones for Clockwise Rotation + #Paleomagnetic Evidence of Miocene + Kissel, C.+ and Pliocene Rotational Deformation + Paleomagnetic Göstergesi.# Batı Ana + Orbay, N.+ Beck Jr, M. E.+ dolu Genişleme Merkezinin Paleomagnetic Inclination Anomalies + Is There a Tectonic Explanation?# + Kissel, C.+ Paleomagnetic Reconstruction# The T + ertiary Geodynamical Evolution of t Valet, J. P.+ #Paleomagnetic Record of two Succes sive Miocene Geomagnetic Reversal i #Paleomagnetic Results for Albania + Mauritsch, R.+ (U. Cretaceous-Eccene) and their Te Valente, J. P.+ #Paleomagnetic Results from Mio-Pli + ocene marine Sedimentary Series in + Laj, C.+ Paleomagnetic Results from Mio-Plio cene Series of the Hellenic Sedimen + Mauritsch, H. J.+ #Paleomagnetic Results from Souther + n Albania and their Significance fo Marton, E.+ Isseven, T.+ #Paleomagnetic Results from the Pin + dos, Paxos and Ionian Zones of Gree + Paleomagnetic Sonuçlar.# Kuzeybatı Anadolu nun Tektoniği ve Pe-Piper, G+ #Paleomagnetic Stratigrapy of the M + iocene Volcanic Rocks of Lesbos, Gr +

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olcanic Rocks from Turkey. # A Paleomagnetic Study of Quaternary V + Formations of the Aegean Area #Paleomagnetic Study of the Neogene + Paleomagnetic Study of the North An + atolian Fault Zone # The y Intrusives from Chalkidiki (North + #Paleomagnetic Study of the Tertiar + # Ege Bölgesi Genişleme Rejiminin Paleomagnetik Verilerle Incelenmesi + #Paleomagnetism of Dykes and Tuffs from the Mesudiye Region and Rotati + yolites and Comparison with the Pel + #Paleomagnetism of the Nea Santa Rh ault Movements within a Deforming Z + Paleomagnetism, Finite Strain and F + imi.# Bat: Anadolu nun Paleomagnetisması ve Tektonik Geliş + Paleomagnetizması ve Genç Tektonik + Paleorift.# Isparta Angle (W. Tauri + Evrimi.# Bati Anadolu nun Mikro Blo + ds): A Mesozoic dolu Fayı nın Sapanca-Izmit ve Geyv + Paleosismik Araştırmalar# Kuzey Ana + ması# Batı Anadolu daki Bazı Kireçt + eotectonique.# Des Tectoniques Supe + Paleosismik Yöntemlerle Yaşlandırıl + Paleotectonique, Tarditectonique, N + Zone (Kuzguncuk/Adapazarı, Northwe Paleowaters in a Seismically Active + tales.# L al Lochtonie des Bey Gağl + Palinipastique des Taurides Occiden + des # Tho Palinspastic Problem of the Helleni + ish Neogene. # Principles of the Palynologic Subdivision of the Turk + from Gördes Basin, West Turkey.# N + Palynological and Isotopic Age Data Evolution of the Tethys Belt from t + Pamirs since the Lias.# Geological + Rezistivite Etüdü.# Denizli - Bul + Pamukkale Jeotermik Enerji Aramalar + #Panaroma of the Mediterranean Sea. rbakır ve Padova Yer Çekim (Cazibe) Pandüllü Sterneck Cihaziyle).# Diya + iye Baz Cazibe Şebekesi (4 Pandüllü Sterneck Cihaziyle).# Türk + Mountain Belts: Alps, Carpathians Pannonian Basin and the Surrounding Papadox?# The North Aegean region: A Tectonics : I example des Dinarides; Paleotec + par Rapport aux Modeles Geophsiques + rmations Attribuees au Messinien da + par Submersible. # Importance des Fo auxites of Naxsos (Cyclades, Greece Paragonite in Polymetamorphic Metab + ic Arc, Greece. # GPS Evidence for A + Parallel Extension Along the Hellen + ic Arc, Southern Aegean Sea, Greece + Parallel Extension Along the Hellen s in Marmara Region# Source Parameters Estimation of Earthquake + rical Conductivity Distribution on + Parameters in the Earth. # The Elect + Source Parameters of Aegean Earthquakes.# the East Anatolian Fault Zone (Turk + Parameters of Large Earthquakes in ling of Earthquake Data. 1. Simulta + Parameters.# Crustal Structure Mode + ling of Earthquake Data. 2. Simulta + Structure and Kinematics of Upper C + Parameters.# Crustal Structure Mode -Paros (Cyclades Islands, Greece).# entaires Mio-Pliocenes dans les Cyc + Paros).# Extension Ductile et Sedim + ogique des Cyclades (Grece): I ile Paros. # Contribution a I etude Geol + uropean Area. Part I. Prague# Seismicity of the E + ructure of the Mediterrarean Sea by .+ Part I: Group Velocity.# Crustal St + Times.# Crustal Structure of the Me + Part II: Phase Velocity and Travel + of the Western Part of Asia Minor# On the Geology me# Late Cenozoic Extention in Bulg + Part of the Aegean Extensional Regi +): Implications for Large Scale Nor Part of the Gulf of Corinth (Greece -Survey and its Connection between + part of Turkey) as Inferred from MT + erence Section of the Coastal Part of West Anatolia. # Miocene Ref + Partie. # Asie Mineure, Premiere editerranean Sea 1950 - 1953.# Seis + Pasific and Indian Oceans and the M + ismicity Around the Pasific# Andesitic Volcanism and Se + ümüne Türkiye den Bir Örnek# Atlant + Pasifik Tip Bir Kıta Kenarına Dönüs + ong the Front of Modern Convergent Past Decate. # Tectonic Processes al d its Seismotectonic Interpretation + Pataras Region, Westeern Greece, an + ion, Naxsos, Cyclades, Greece.# The + Path Associated with Crustal Extens + Path Dodecanse Islands - ATH as Inf erred from the Analysis of the Rayl + Path of the Crystalline Units# Atti + c Peninsula (Greece): Deformation a k Kayıtların Değerlendirilmesi.# An + Patlatmalarmdan Elde Edilen Sismil + Patraikos-Saronikos Gulfs (Central Greece) Based on Historical and Ins + Pattern in the Western Hellenic Arc + Deduced from a Microearthquake Sur + Pattern of the Aegean Region. # Crus + tal Fracture Pattern of Western Anatolia.# Heat Flow western Turkey. # Active Normal Faul + Patterns and Sedimentation in South + Patterns in the Convex-Northwards A + rc of the North Anatolian Faulth Zo Patterns in the Easternmost Mediter ranean.# Tectonic ic Arc: the Case of Melos Island# P + Patterns in the South Aegean Volcan + Paxos and Ionian Zones of Greece.# Paleomagnetic Results from the Pind + Pelagic Limestones for Clockwise Ro 4 tation of the Ionian Zone, Western Pelagonian Permotriassic.# Paleomag netism of the Nea Santa Rhyolites a + Pelaponnese.# Geometric et Cinemati + que de la Subduction Egeene Structu + Peloponnesus region by Precise Hypo center Determinations.# A Study of Peloponnesus) Earthquake: Detailed Study of a Normal Fault, Evidences cs of the Peloponnesus. # Postalpine Geodynami + Peloponnesus: First Result of a Mic 4 roearthquake Study# The Hellenic Su + #Pendulum Gravity Measurements at S ea, 1936 - 1959. Peninsula (Greece): Deformation and + P-T Path of the Crystalline Units# + Peninsula (NW Turkey) and their Rel + ationship to Geology and Tectonic.# + Peninsula, Northwest Yurkey.# Geolo gy and Tectonic Evolution of the Bi + Peninsula, NW Turkey# Petrology of the Cenozoic Volcanics in the Biga Peninsula. # Magnetic Studies in Cyp + rus and Biga Peninsula: Evidence for Subducted L ithosphere Below Southern Spain.# T Period 1939 - 1967.# Slip Distribut ion Along the North Anatolian Fault + Period 1961-1964.# Geophysical Surv + eys in the Mediterranean and Red Se + Permanent GPS Network Across the Ke phalonia Fault Zone, Greece.# Estab + ey.# The Magnetism of Some Permian Red Sandstones form NW Turk + Permotriassic.# Paleomagnetism of t + he Nea Santa Rhyolites and Comparis + Persian Plateau, Eastern Turkey, Ca ucasus and the Hindu - Kush Regions + Perspectives of Geological Research + in the Alps# Second Workshop on Al -Peru-North Bolivia# Extensional-Com + pressional Tectonics Associated wit + Petrochemical Relationships with Vo + lcanics of the Aegean Region# Santo + Petrografik Ögeleri# Batı Anadolu N + eojen Magmatismasının Yapışal ve Petrografisi# Bafa Gölü Doğusunda K + alan Menderes Masifi Guney Kanadını + Petrografisi ve Bireysel Index Mine + rallerinin Doku İçerisindeki Gelişi + Petrographic Provinces of Japan and + Surrounding Areas# Origine of Ceno + Petrographic, Textural and Microstr + Petrojenetik Yorumlarda Kullanılmas + uctural Evidence# Metamorphism of p + # Menderes Masifinde Alkali Feldis + Petroleum Exploration in Western Gr + eece.# The Geological Results of

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Petrological Study in the Light of + #Petrologische Evolution des Mender Petrology and Geothermal Gradients# + Petrology of Recent Volcanics in th #Petrology of the Cenozoic Volcanic #Petrology of the Pre-Liassic Metam + Petrology, Age and Structure of the + Petroloji ve Feldispat Incelemeleri Petrolojisi# Uşak Yöresinin Jeoloji + Petrolojisi ve Plaka Tektoniği Açıs Petrophysical Properties, Density, Ph.D. Thesis# Global Positioning Sy Phase does not Traverse Oceanic Cru #Phase Velocities of Rayleigh Waves Phase Velocity and Travel Times.# C 4 Phenomenon in Rayjleigh Wave Trains Phenomenon in Rayleigh Wave Trains Physical Model for Cenozoic Extensi + #Physical Properties and State of t #Physical Properties of the Lithosp Physikalischen Etgenschaften und de Physiographic Provinces of the East Physiography of the Mediterranean S Piercing Points# The Geometry and r 4 Pile of the Cyclades# Listric Norma Pindos, Paxos and Ionian Zones of G Pine Faults, California, # San Andre Pisani Anno, 1931.# La Croceira Gra Plain, North Western Turkey.# Late Plaka Tektoniği Açısından Ege Bölge + Plane Solution. # Tectonics of the M + Plastique.# Evolution Tectonique du Plate Boundary Derived from Focal M Plate Boundary# Earthquake Location + Plate Boundary in an Escape tectoni Plate Boundary in Europe.# Deep Sei + Plate Boundary Processes?# Are Svst + Plate Boundary Through New Zealand: Plate Boundary. # Earthquake Locatio Plate Circuit and Tectonics of the Plate Collision Zone# Global Positi Plate Collision Zone, Ph.D. Thesis# Plate in Greece.# The Gravity Field Plate in the Aegean Arc in Greece# #Plate Kinematics: the Americas, Fa Plate Motions and Seismic Moment Te Plate Motions# Current Plate Motions in the Eastern Medite Plate Motions.# Effects of Recent R + Plate Motions.# Present - day Plate Movements in the Carpatho - B + Plate of a Subduction Zone: the Aeg + Plate Tectonic Approach.# Tethian E #Plate Tectonic Situation in the An Plate Tectonics# Metamorphism and R + #Plate Tectonics of the Mediterrane Plate Tectonics# Orogenic Andesites Plateau, Eastern Turkey, Caucasus a Plateau. # Extension During Continen + Plateau.# Pn Velocities Beneath Con Plateaus.# Lateral Variations in Hi Plates.# Seismic Travel-tTime Resid + Plates: Finite Element Models# Tect Pleistocene.# Explanatory Notes for Pleomagnetic Results. # Tertiary Geo Pliny and Strabo Trenches, South of Plio-Quaternaire de I arc Egeen Ext Plio-Quaternaire de I Arc Egeen Ext + Pliocene Rotational Deformations of Pliocene Rotational Deformations of Pliocene to the Present# Changes in + Pliyo-Kuvaterner Ada Yayı Volkanizm + Pliyo-Kuvaterner Oluşuklarının Sism + #Pn Velocities Beneath Continental Pn Velocity Variations# A Geophysic Pn-Waves in the Aegean and Surround Poinconnement et Ecrasement Ridge - + Point Ray Tracer.# P - Wave Crustal Points# The Geometry and rates of M Poly-Project# Synthesis of the MARM Polymetamorphic Metabauxites of Nax + Pontides: Implications for Incompat Population de Failles. # Analyse The Population de Failles.# Sur une Met + Positioning System (GPS) Estimates Positioning System (GPS) Measuremen Positioning System Measurements of Positioning System# Monitoring West Positions from Northeastern Turkey. Possibilities of Geothermal Energy Possible Anisotrophy in Turkey from Possible Asperity within the Normal Possible Relation with the Hellenid #Post - Tortonian Westward and Sout Post Eosen Tektoniği.# Orta Torosla Post-Eocene Clockwise Rotation of t +

#Postalpine Geodynamics of the Pelo +

New Geochemical and Isotopic Data q + es-Massivs Metamorphism on Naxos: e Eastern Aegean Sca (West Anatolia +

s in the Biga Peninsula, NW Turkey orphic Basement Rocks of NW Anatoli + Menderes Migmatite Complex (SW-Tur + # Menderes Masifinde si ve Volkanitlerin ından Ege Bölgesindeki Yeri# Uşak V + seismic Velocities, Heat Generation + stem (GPS) Measurements in Turkey (+ st.# Why the Lg in Southeastern Europe and Eastern + rustal Structure of the Mediterrane -Associated with the Earthquakes in Associated with the Earthquakes in on of Western North American Cordil he Crust and Upper Mantle of the Ea here - Asthenosphere System in Euro r Aufbau der Krute and des Oberen M + ern Mediterranean.# The Earthquake ea.# A New Bathymetric Chart and ates of Microplate Motions in the R + 1 Faulting and the Reconstruction o + reece.# Paleomagnetic Results from as, Garlock and Big vimetrica del R. Sommergible Vettor Holocene Activity of the North Anat sindeki Yeri# Uşak Volkanitlerinin armara Sea Region of Turkey: New Ev Systeme Alpin en Mediterraneane; P echanisms of Large Earthquakes# Reg s in the Western Hellenic Arc Relat c Regime.# The Sea of Marmara: A smic Expression of an Ancient ematic Variations in Thrust Belt St + a Comparison of Short and Long Ter + ns in the Western Hellenic Arc Rela + Gloria Fault.# Closure of the Afric oning System Measurements of Presen Global Positioning System (GPS) Me + of a Dipping P-wave Travel Time Residuals Caused + st Africa, and the Rest of the Worl + nsors, and the Rates of Active Defo + rranean Continental Collision Zone# + evisions to the Geomagnetic Reversa + alkan Region.# The African - Adriat + ean Arc from the Pliocene to the Pr + volution of Turkey: a atolian-Aegean Region elated Magmatism in an Region and nd the Hindu - Kush Regions. # Focal + tal Convergence, with Application t + tinental Collision Zones: the Turki + gh - Frequency Seismic Wave Propaga uals and onic Consequences of the Collision + the Paleocographic Atlas of Turkey dynamical Evolution of Northwestern the Hellenic Arc# Bathymetry and S erne et de la mer Egee et ses Relat erne et la mer Egee et ses Relation the Aegean Area# Palaeomagnetic Ev the Aegean Area. # Paleomagnetic Ev + the State of Stress in the Overrid ası# Akdeniz ve Ege Denizindeki ik Yöntemlerle Araştırılması.# Çana + Collision Zones: the Turkish - Iran al Study of the Aegean Sea and Surr ing Area# Travel times of Plastique.# Evolution Tectonique d + Tomography of Greece with use of a icroplate Motions in the Eastern Me + ARA sos (Cyclades, Greece) and the Impl + ible Structures Along the North Ana orique et Numerique d un Modele Mec hode Simple de Determination des Ax + of Crustal Deformation in the Marma ts in Turkey (1988-1992): Kinematic Present-day Crustal Movements in th + Hellenic Arc Tectonics and Calabri + # Jurassic, Cretaceous and Eocene P in Turkey.# Present Status and Futu + Seismic Surface Wave Dispersion.# + Fault System of the Gulf of Corint s# The Balkanids as an Instance of hward Thrusting in the Core of the + rin he Western Taurides Thrust Belt Eas + ponnesus.

and Arcs and Origin of High Potash Volcanoes# Mediterranean Isl + ent for the Aegean to Describe the Potential Energy# An Analog Experim + eothermal Potential in Northwestern Turkey# G + Area, Western Turkey# Geology and H + Potential of the Alaşehir (Manisa) + r une Methode Simple de Determinati + Aegean Area# On the Resolving Pour une Population de Failles.# Su + Power of Tomographic Images in the rkey.# Jurassic, Cretaceous and Eoc Poşe Positions from Northeastern Tu + Prague# Seismicity of the European Area. Part I cks of NW Anatolia# Petrology of th + Pre-Liassic Metamorphic Basement Ro + 1 Water System# Hydraulic Level Var Precipitation on the Çekirge Therma + A Study of Seismicity in the Pelop Shallow Earthquakes in the Aegean Precise Hypocenter Determinations.# Predictable Model for Generation of + nvergent Belt. # Long-term Earthquak + Prediction in the Circum-Pacific Co + #Preliminary Heat Flow Map fo Greec ion of the Mediterranean Basin Deri + #Preliminary Objective Regionalizat Mürefte Earthquake of 9th August, 1 + #Preliminary Report for the Şarköy- + tion of the Geokinematics of the Ea Preliminary Result on the Determina + Preliminary Results from the North Aegean Sea Network.# Seismicity and + al Data on Granitic Rocks of the Ae + Preliminary results# Geochronologic + 90 GPS Measurements in Western Turk + #Preliminary Results of 1988 and 19 + ation of Crustal Structure in South + #Preliminary Results of an Investig + Eastern Mediterranean #Preliminary Seismic Studies in the + Premiere Partie.# Asie Mineure, e Movements in the Carpatho - Balka + Premise for Alpine Orogeny and Plat + #Present - day Plate Motions. ress in the Overriding Plate of a S + Present# Changes in the State of St + Present Status and Contribution to + Heat Flow Contouring in Turkey# Geo + Heat Flow Contouring in Turkey.# Ge + Present Status and Contribution to #Present Status and Future Developm + ent Possibilities of Geothermal Ene + ents of the Denizli - Kızıldere Geo + #Present Status and Future Developm + Crust# 3D-Kinematics of Extension i Present, Insights from the Ductile + Present-day Crustal Movements in th + e Arabia-Africa-Eurasia Plate Colli + Aroud Adapazarı Region. #Preview Results about Query Blasts + ation of Basaltic Rocks# Origine of + Primary Basalt Magmas and Classific + Population de Failles.# Sur une Me + Principaux des Contraintes Pour une + ivision of the Turkish Neogene. #Principles of the Palynologic Subd ation.# Paleomagnetic Evidence for + Prior to the Tertiary Clockwise Rot + s: Submarine Accretionary Prism.# Continental Margin Tectonic + Menderes Massif. #Problem of Core-Mantle Boundary of inspastic Problem of the Hellenides. # The Pal + urkish Earthquakes and Their Seismo + Process and Spectra of Some Major T + urkish Earthquakes and Their Seismo + Process and Spectra of Some major T Convergent Margins - Research of t Processes along the Front of Modern + the Sporades Basin (the Aegean Sea Processes on the Northhern Slope of + on in the Lower Crust During Active Processes with Isostatic Compensati + ns in Thrust Belt Style Related to Processes?# Are Systematic Variatio + eological and Geomorphological Feat + Processing Techniques for Mapping G + nbul, Turkey# Airbone Magnetometer Profile Results lake manyes to Ista + an.# Some Geophysical ent Evolution of the Aegean Sea: A + Profiles in the Eastern Mediterrane Profiles# Shallow structure and Rec + # Marmara Denizi Sismik Yansma Profili Çalışmalarının Ön Sonuçlar. + rthwest Turkey): Late Qaternary Sed + Profiling in the Sea of Marmara (No + alarında Maden Kaynaklarının Kıymet Program.# Türkiye nin Müntehap Sah + ampaign August / September 1992.# G etermination of the Geokinematics o Project Marmara: Report of Secont C + Project Preliminary Result on the D + ise for Alpine Orogeny and Plate Mo Promotory as a Paleogeographic Prem + cross the Turkish and Iranian Plate + Propagation at Regional Distances A + t-period Sn and Lg in the Middle Ea + #Propagation Characterstics of Shor 1 Models of Surface Wave Propagation# Measurements and Globa + nd Upper Mantle of the Eastern Medi + Properties and State of the Crust a + Properties of Some Active Zones in Jugoslavia.# Contemporary Tectonic henosphere System in Europe.# Physi Properties of the Lithosphere - Ast + Properties of the Lithosphere. # Foc + al Depths of Intercontinental and I + Properties of Upper Mantle in South ern Aegean Sea. # Static and Dynamic + ties, Heat Generation and Mineralog Properties, Density, Seismic Veloci + Province: Nappe Tectonics in an Ext ending Orogen.# Low - Angle Normal Areas# Origine of Cenosoic Petrogra Provinces of Japan and Surrounding Provinces of the Eastern Mediterran ean.# The Earthquake Activity in th + provinzialen Verhaltnisse der terti + aren und quartaren Ergussgesteine d daries# The Tectonic Expression Sla + Pull at Continental Convergent Boun Qaternary Evolution of Volcanism in the Aegean Region# Tertiary to Oaternary Sedimentation and Sea-Lev el Changes# High-resolution Seismic + noxic Basins as Piercing Points# Th Quantitative Constraints by Using A + Quantitative des Relations Entre De formation Horizontale et Mouvements + hen Raumes und der benachbarten Geb phalonie, Greece) - Donnees Neotect quartaren Ergussgesteine des agaisc Quaternaire des Eivages Ioniens (Ce + Quaternary Alkaline Magmatism of th e Aegean- Western Anatolian Area: h Rift and its Implications for the + #Ouaternary Evolution of the Corint + Quaternary Evolution of Volcanism i n the Aegean Region# Tertiary to Quaternary Sequences at the Western Margin of the Axios Basin (Norther + Quaternary Tectonics in the Helleni c Arc: Examples of Geological Obser + Quaternary Volcanic Rocks from Cent + Quaternary Volcanic Rocks from Turk + ral and Western Anatolia# Ree Distr + ey.# A Paleomagnetic Study of Quaternary Volcanism in the Eastern + Mediterranean. Time - Space Distri + Query Blasts Aroud Adapazarı Region + .# Preview Results about qwewqewqe 123213213 dscdsf 123213sd fdsfd 12321 32432432 dsfdsfdsfds oI + gwwgewg gwewgewge 123213213 dscdsf 123213sdfdsfd 12321 32432432 dsfdsf + R. Sommergible Des Ganeys, Anno, 19 + 35.# La Crociera Gravimetra del 1931.# La Croceira Gravimetrica de + R. Sommergible Vettor, Pisani Anno, Radio Linked Seismometer Network Sp anning the Marmara Sea and the Seis Radiometric Data of the Neogene in Northwest Turkey.# Stratigraphic an Radiometric Scale.# Biostratigraphi c Correlations in the Eastern Medit + Radiometrischer Altersbestimmungen + aus dem Jungtertiar der Turkei.# Li + Radyometrik Verilerin Yorumu# Bati + Anadolu Senozoik Volkanitlerine Ait Range Observations. # Determination + of Station Coordinates and Motions Range Province: Nappe Tectonics in Ranging and Seismicity Data in the an Extending Orogen.# Low - Angle N +

Aegean Region# A Comparasion of Sat +

Ninkovich, D.+ 1972 Hatzfeld, D.+ 1997 Şimşek, Ş. 1007 H.+ lztan, 1990 Angelier, J.+ Ligdas, C. N.+ 1979 1991 Van der Voo, R. 1968 Karnik, V. Genç, Ş. C. 1968 1995 Greber, E.+ 1997 Leydecker, G.+ 1978 Papazachos, B. C. 1992 Papazachos, B. C.+ 1996 Fytikas, M. D.+ 1977 Martinez, M. D.+ 1997 Ates, R.+ 1976 Wilson, P + 1993 Barakou, Th.+ 1094 Altherr, R.+ 1976 Oral, M. B.+ 1993 Papazachos, B. C.+ 1966 Lort, J. M.+ 1974 Tchihatcheff, P. 1853 Channell, J. E. T.+ 1976 Minster, J. B.+ 1978 Mercier, J. L.+ 1987 Tezcan, A. K. 1979 Tezcan, A. K. 1977 Simsek, S. 1995 Simsek, S. 1985 Jovilet, L.+ 1994 Reilinger, R. E.+ 1997 Gürbüz, C.+ 1980 Kushiro, I.+ 1963 Angelier, J.+ 1979 Benda, L. 1971 Edel, J. B.+ 1992 Moore, J. C.+ 1987 Erdoğan, B. 1992 Bernoulli, D.+ 1974 Pinar, A. 1995 Pinar, A. 1995 von Huene, R. 1984 Roslyakov, A. G.+ 1997 Westaway, R. 1994 Royden, L.+ 1989 Astaras, TH.+ Agocs, W. B. 1990 1977 Wong, H. K.+ 1971 Mascle, J.+ 1990 Cetin, S.+ 1998 Smith, A. D.+ 1995 Hutchison, R. D.+ 1962 1992 Straub, C.+ P.+ Wilson, 1993 Channell, J. E. T.+ 1976 Kandinsky-Cade, K.+ 1981 Rodgers, A. J.+ 1997 Ekström, G.+ 1997 1984 Makris, J.+ Arsovsky, M. 1970 Suhadolc, P.+ 1990 1983 Chen, W. P.+ Tassos, T. S. 1984 Rybach, L.+ 1982 Wernicke, B. 1981 Kuno, H. 1959 Galanapoulos, A. G. 1968 Paraskevopoulos, G. M. 1956 Royden, L. H. 1993 Fytikas, M.+ 1984 Smith, A. D.+ 1995 Jongsma, D. 1987 Angelier, J. 1981 1956 Paraskevopoulos, G. M. 1972 Mercier, J. L.+ Francalanci, L.+ 1990 1996 Armijo, R.+ Fytikas, M.+ 1984 Brooks, M.+ 1982 1979 Angelier, J. Innocetti, F.+ 1977 Sanver, M. 1968 1981 Innocenti, F.+ Gürbüz, C.+ 1980 Francalanci, L.+ 1990 1990 Francalanci, L.+ Cassinis, G. 1941 Cassinis, G.+ 1935 1985 Ücer, S. B.+ Benda, L.+ 1974 Benda, L.+ 1979 1977 Becker-Platen, D.+ 1985 Ercan, T.+ Noomen, R.+ 1991 1981 Wernicke, B. Jackson, J.+ 1994

Jackson, J.+ 1994 Smith, D. E.+ 1994 Cenci, A.+ 1993 Noomen, R.+ 1993 Flügel, N.+ 1954 Karamanderesi, T. H 1971 Sahin, H + 1981 Kurtulus, C. 1985 Özhan, G.+ 1985 Aubouin, J. 1973 Kastens, K. 1990 Kastens, K. A. 1991 Brune, J. N. 1968 Tselentis, G ~A + 1006 Ekström, G.+ 1989 Papazachos, B. C.+ 1990 Jackson. J 1003 Jackson, J.+ 1988 Kiratzi, A. A. 1991 Eyidoğan, H. 1988 Jongsma, D. 1987 McKenzie, D. P.+ 1983 Briqueu, L.+ 1986 Paraskevopoulos, G. M. 1956 Kaaden, G.+ 1978 Drakatos. G.+ 1997 Ezen, Ü. 1988 Ezen, Ü 1991 Cloetingh, S.+ 1980 Kalogeras, I. S.+ 1993 Ezen, Ü 1983 Papazachos, B. C. 1969 Kalogeras, I. S.+ 1996 Frizon de Lamotte, D.+ 1995 Wickens, A. J.+ 1967 Straub, C. 1996 Straub, C.+ 1997 Mascle, J.+ 1990 Briqueu, L.+ 1986 Fytikas, M.+ 1976 Angelier, J. 1979 DeMets, C.+ 1994 1990 Caputo, R. Caputo, R.+ 1990 Borsi, S.+ 1972 Angelier, J. 1977 Martin, L. 1987 Zanchi, A.+ 1993 Dumont, J. F.+ 1979 Eisenlohr, T.+ 1997 Monod, O. 1977 Lagios, E.+ 1988 Ridley, J. 1984 Ricou, L. E.+ 1979 Kissel, C.+ 1988 De Jonge, M. R.+ 1993 Valet, J. P.+ 1981 Papazachos, B. C.+ 1967 Kalogeras, I. S.+ 1993 Gregor, C. B.+ 1964 Girdler, R. W.+ 1957 Allan, T. D.+ 1965 Innocetti, F.+ 1977 Kissel, C.+ 1993 Tatar, Y. 1978 Kaya, O. 1981 Saatçılar, R.+ 1996 Sancho, J.+ 1973 1974 Hinz, K. Mascle, J.+ 1990 Brunn, J. H. 1960 1974 Hinz, K. Gaskell, J. F.+ 1953 Gaskell, J. F.+ 1953 Fahlquist, D. A. 1963 1977 Makris, J.+ ___, u.+ Aubouin, J.+ 1970 Galanapoulos, A. G. 1967 Burchfiel, B. C.+ 1997 Wong, H. K.+ 1995 1990 1989 Mercier, J. L.+ Savasçın, M. Y. 1990 Mercier, J. L.+ 1991 Hynes, A. J.+ 1972 1997 Stavrakakis, G. N.+ 1998 Gürbüz, C.+ Ligdas, C. N.+ 1990 1991 Drakatos, G.+ 1994 Jackson, J.+ Jackson, J.+ 1994 1994 Jackson, J. McKenzie, D. P. 1972 1988 Hashida, R.+ Orbay, N.+ 1979 1980 Udias, A. 1978 Leydecker, G.+

Ranging and Seismicity Data in the Ranging Measurements. # Horizontal C + Ranging to LAGEOS# Tectonic Motion + Ranging to LAGEOS.# Crustal Motions + Rapor# Bodrum-Muğla Yöresinde Yapıl + Rapor.# Turgutlu - Salihli (Manisa + Raporu.# Aydın - Germecik - Bozköy Raporu.# Gemlik Körfezi Yüksek Ayrı Raporu.# Marmara Denizi Izmit Körfe + Rapport aux Modeles Geophsiques: 1 rate of Growth of the Mediterranean #Rate of Outward Growth of the Medi + Rate of Slip Along Major Fault Zone #Rates Crustal Deformation in the G Rates in Regions of Distributed Con + Rates in the Patraikos-Saronikos Gu + #Rates of Active Deformation in the Rates of Active Deformation in the #Rates of Crustal Deformation in th + #Rates of Crustal Deformation in We + rates of Microplate Motions in the + Rates, Crustal Thickening, Paleomag Ratios in the Lavas of Milos and Sa Raumes und der benachbarten Gebiete + Raumnes Zwischen Datca-Mugla-Dalama + Ray Tracer.# P - Wave Crustal Tomog Rayjleigh Wave Trains Associated wi Rayleigh Wave Dispersion.# Crustal Rayleigh Wave Dispersion.# Crustal Rayleigh Wave Records.# Dispersion Rayleigh Wave Trains Associated wit Rayleigh Waves in Southeastern Euro + Rayleigh-wave Dispersion in the Bro + Re-entrant (Taurus, Turkey). Geodyn + Re-evaluation of Earthquake Mechani + #Recent Crustal Deformation and Str #Recent Crustal deformation and Str + Recent Evolution of the Aegean Sea: + Recent Magmatism in the Aegean Arc: Recent Magmatism of the Aegean Sea# #Recent Quaternary Tectonics in the + Recent Revisions to the Geomagnetic #Recent Tectonic Along the Active N + #Recent Tectonics Along the Active Recent Volcanics in the Eastern Aeg Recente de la Courbure Sud-Hellenig + Recente de la Mer Egee# Structure e Recente in Anatolia Occidentale.# D Recents a I extremite Orientale de Recharge Conditions in Geothermal A + #Recherches Geologiques dans de la Recompilation.# The Gravity Anomaly Reconstruction of the Synmetamorphi + Reconstruction Palinipastique des T Reconstruction# The Tertiary Geodyn + Reconstruction to Upper Mantle Mode + Record of two Successive Miocene Ge Recorded in Athens.# Dispersion of Records.# Dispersion Curves for the + Red Sandstones form NW Turkey, # The + Red Sea and Mediterranean Sea.# Sub Red Sea During the Period 1961-1964 + #Ree Distrubution in tertiary and Q Reentrant (Southwestern Turkey) # Fi Refahiye.# Tectonic Investigation o + Reference Section of the Coastal Pa + Reflection Data# Reorganization and Reflection Data. # New Data on the S + Reflection Measurements in the Ioni + Reflection Profiles# Shallow struct Reflexions sur I orogenese Alpine.# + Refraction and Seismic Reflection M Refraction Experiments in the Medit + refraction Experiments in the Medit Refraction Measurements in the West + Refractional Seismic Experiments.# Regard sur le Dodecanese Meridonal Regime in Greece. # The Seismotecton + Regime# Late Cenozoic Extention in Regime.# The Sea of Marmara: A Plat Regime: a Review# Comparison of You + Regimes in the Aegean Basins During + Regimes in Western Anatolia# Magmat Regimes, Fault Kinematics and Rotat + Region (Eastern Central Greece).# S + Region (Greece) Derived from Invers Region (Turkey): Results from a Mic + Region# 3-D Structure of the Lithos + Region# 3-D Velocity Structure Bene Region# A Comparasion of Satellite Region# A Comparasion of Satellite Region# Active Tectonics of the Aeg Region# Active Tectonics of the Med + Region and its Tectonic Implication + Region and Rotation of Turkey. # Pal +

Aegean Region# A Comparasion of Sat + rustal Motion in the Central and Ea + in the Mediterranean Area from Lase + in the Mediterranean Region Determ + an Jeolojik Harita Hakkında ili) Arası Gediz Nehri Güneyinin Je +

ili) Arasi Gediz Nenri Guneyinin Je + Jeotermal Enerji Aramaları Rezistiv + mlı Sığ Sismik Etüdü

zi, Yüksek Ayırımlı Sığ Sismik Etüd + example des Dinarides; Paleotectoni + Ridge Accretionary Coplex?# Did th + terranean Ridge Accretionary Comple + s.# Seismic Moment, Seismicity and + ulf of Corinth (Central Greece) as + tinental Deformation# Seismic Strai + lfs (Central Greece) Based on Histo + Eastern Mediterranean

Mediterranean and Middle East# The + e North Aegean Trough - North Anato + stern Turkey as Deduced from Major + Eastern Mediterranean Sea- Quantita + netism, Finite Strain and Fault Mov + ntorini - Geodynamic Implications.# + n# Über den Chemismus und die provi +

n Cay# Beitrage zur Gelogie des raphy of Greece with use of an Accu + th the Earthquakes in and around th +

Structure of Western Turkey from Structure of the Eastern Mediterrane + Curves for the Path Dodecanse Islan + h the Earthquakes in and around the + pe and Eastern Mediterranean Sea.# + ader Aegean Area# Shear-wave Veloci + amic Implications.# Post - Tortonia + sm Solutions 1922 - 1962.# Computer + ain Accumulation in the Marmara Sea + ain Accumulation in the Marmara Sea + ain Accumulation in the Marmara Sea + Sr, Nd, Hf, and O Isotopic Ratios +

Geochronological Data on Hellenic Arc: Examples of Geologic + Reversal Time Scale on Estimates o + ea Anchialos Fault Zane (Central Gr + Nea Anchialos Fault Zone (Central G + ean Sea (West Anatolia and Lesbos I + ue (Grece).# Sur les Mauvements Ege + t Evolution

eformazione Continentale

I arc Egeen.# Sur I existence de Co + reas of Northwestern Turkey# Region + Taurus Occidental au sud de Beysehi + Map of Greece: A c Structural Pile of the Cyclades# +

aurides Occidentales.# L al Lochton + amical Evolution of the Aegean Arc: + 1: An Application to the Alpine - M + omagnetic Reversal in Western Crete +

Surface Waves Path Dodecanse Islands - ATH as In + Magnetism of Some Permian

marine Gravity Measuremnts in the A + .# Geophysical Surveys in the Medit + uaternary Volcanic Rocks from Centr + rst Paleomagnetic Evidence for a Po + n the North Anatolian Fault Zone Be + rt of West Anatolia.# Miocene

Interpretation of the Aegean Sea S + tructure of the Eastern Mediterrane + an Sea.# Results of Seismic Refract + ure and Recent Evolution of the Aeg + Les Zones Hellenides Internes et L + easurements in the Ionian Sea.# Res + errahean and Indian Ocean.# Seismic +

erranean Sea.# Seismic ern Mediterranean Sea.# Seismic Crustal Structure of the Aegean Sea +

(Kasos, Karpathos, Rhodes).# Sur la + ic Bulgaria: the Northern Part of the +

e Boundary in an Escape tectonic ng Volcanic Association of Western +

the Cenozoic.# Extensional Tectoni + ic Activities of Cenozoic Compressi + ions.# The Continuation of the Nort + preading and Emplacement Ages of so + ion of Macroseismic Intensity.# A T + roseismic Experiment.# On Seismotec +

phere in the Aegean ath the Crust and Upper and Mantle + Laser Ranging and Seismicity Data i + Laser Ranging and Seismicity Data i + ean

iterranean

.# Three Dimensional Seismic Attenu + Region and its Tectonic Implication + eomagnetism of Dykes and Tiffs from + Region and Rotation of Turkey.# Pal + iterranean.# Seismic Stresses in th + Region Azores - Spain - Western Med + inations.# A Study of Seismicity in + region by Precise Hypocenter Determ + ucture and Dynamics of the Mediterr + Region# Crust-Mantle Evolution, Str + g to LAGEOS. # Crustal Motions in th + Mueller, S.+ Region Determined from Laser Rangin + 1993 ensors of Earthquakes# The Horizont + Region Determined from the Moment T + Noomen, R.+ 1993 Jackson, J.+ The Crust and Upper Mantle of the 1992 region From Deep Seismic Soundings# + Makris, J. Present, Insights from the Ductile + Region from the Early Miocene tothe + 1978 Satellite Surveys of the Mediterra + Jovilet, L.+ 1994 Region# Geological Information from + Foose, R. M. Marmara Sea Region# Gravimetric Studies of the + 1985 al Structures of the Aegean Klingele, E.+ Region# Investigation of Geodynamic + 1997 Salk. M. ution of the Northeastern Aegean 1994 Region# Late Cenozoic Volcanic Evol + Seyitoğlu, G.+ ons in the Aegean Region# Magnetotelluric Investigati + 1992 Ilkışık, O. M.+ ons in the Western Tourides Region# Magnetotelluric Investigati + 1996 Ilkisik, O. M. 1990 rthern and Central Aegean Region# Neogene Volcanism of the No Manetti, P.+ 1979 Region# Neotectonics of the Marmara + Barka, A. A. Total Offset of the North Anatolian 1997 Region# New Constraints an Age and + Barka, A. A.+ 1988 nt in the Aquifer Systems of the Ge + Region of Turkey)# High Boron Conte Filiz, Ş.+ 1995 the Marmara Sea Region of Turkey. # Neotectonics of + Crampin, S.+ f the Marmara Sea 1986 Region of Turkey.# The Seismicity o + Crampin, S.+ 1975 Micro - Earthquake Fault Plane Sol + Region of Turkey: New Evidence from + Evans, R.+ 1985 Region# Plate Tectonic Situation in + the Amatolian-Aegean Mueller, S.+ 1997 terranean Region# Plate Tectonics of the Medi + McKenzie, D. P. 1970 lution and the Seismic Velocity Str + Region# Regional Scale Tectonic Evo De Jonge, M. R.+ 1994 d Stress Field in the Aegean Region# Reproducing the Velocity an + Cianetti, S.+ 1997 ectonic and Petrochemical Relations + Region# Santorini Volcano, Greece-T + Nicholls, L. A. 1971 Region# Seismic Investigations of t + Region# Seismic Velocity Distributi + he Marmara Üçer, B.+ 1997 on in the Aegean Küleli, H. S.+ 1995 ics of the Bursa Region# Seismicity and Seismotecton + Sellami, S.+ 1997 the Aegean Region# Seismicity and Tectonics of Kuleli, H. S. 1997 he Aegean Region# Seismotectonic Studies of t + Dadaşbilge, G. 1997 ntative List of Major Deformation E + Region Since the Middle Miocene# Te + Babbucci, D.+ 1997 n of Earthquakes in Marmara Region# Source Parameters Estimatio Ergin, M.+ 1990 me Residuals and Deep Structure of + Region# Teleseismic P-Wave Travelti + Agarwal, N. K.+ 1976 tion of Volcanism in the Aegean Region# Tertiary to Qaternary Evolu + Fytikas, M.+ 1984 ution of Volcanism in the Aegean Region# Tertiary to Quaternary Evol + Fytikas, M.+ 1984 rtance in the Neotectonics of the E + Region# The Isparta Angle: Its Impo + Barka, A.+ 1995 smicity Data.# 3-D Crustal P - Wave + Region Using Local and Regional Sei + Alessandrini, B.+ 1995 pine-Himalayan Belt: the Aegean Sea + Region) # Active Tectonics of the Al + McKenzie, D. P. 1978 al Positioning System (GPS) Estimat + Region, Northwestern Anatolia# Glob + Straub, C.+ 1994 GPS Measurements. # Active Crustal D Region, NW Anatolia, Inferred from + Straub. C.+ 1995 GPS Measurements. # Recent Crustal D + Region, NW Anatolia, Inferred from Straub, C. 1996 Repeated GPS Measurements# Recent C + Region, NW Anatolia, Inferred from Straub, C.+ 1997 orphic Core Complexes and Detachmen + Region, U.S.A. # The Origin of Metam + Lister, G. S.+ Melis, N. S.+ 1989 ismotectonic Interpretation.# A Mic + Region, Westeern Greece, and its Se + 1989 neath the Crust and Upper Mantle of + Region.# 3-D Veolocity Structure Be Drakatos, G.+ 1991 nd Activity of Seismic Zones in the + Region. # A Note on the Morphology a + Karnik, V. 1972 Region.# Active Tectonics of the Ad + riatic Anderson, H.+ 1987 Region.# Crustal Fracture Pattern o f the Aegean Kronberg, P.+ 1978 on to Upper Mantle Model: An Applic + 1993 Region.# From Tectonic Reconstructi + De Jonge, M. R.+ rmal Waters of Turkey Aegean Region.# IAH Map of Mineral and The + Canik, B.+ 1983 Ambraseys, N. N.+ Istanbul and of the Marmara Region. # Long - Term Seismicity of 1991 orthern and Central Aegean Region.# Neogene Volcanism of the N + Fytikas, M.+ 1979 e Crust and Upper Mantle in the Aeg + Region. # P - Wave Veolocities in th + Ligdas, C. N. 1990 y Blasts Aroud Adapazarı Region.# Preview Results about Quer Gürbüz, C.+ 1980 ion in Western Turkey and its Relat + Region.# Seismic Velocity Distribut + Küleli, H. S.+ 1997 ion of Marginal Seas Deduced from 0 + Region. # Some Aspects of the Evolut + Berckhemer, H. 1977 Subducted Lithosphere in the Medite + Region.# Structure and Dynamics of Wortel, M. J. R.+ 1992 Region.# The African - Adriatic Pro + motory as a Paleogeographic Premise + Channell, J. E. T.+ 1976 ortance in the Neotectonics of the + Region.# The Isparta Angle: its Imp + Barka, A. A.+ 1996 orth Aegean region: A Tectonics Papadox?# The N + Pavlides, S. B.+ 1994 inuum Tectonics in a Convergent Zon + Dewey, J. F.+ Mantovani, E.+ Region: Complex Multiplate and Cort + 1979 Region: Constrains and Uncertaintie + 1995 s# Tectonic Interpretation of Large + Barka, A. A.+ Rotstein, Y.+ 1997 ic and Seismicity Data# Active Tect + Arc Jumping# Seismotectonics of the + Region: Deduced From GPS, Neotecton + Region: Subduction, Collision, and + 1982 Curtis, A.+ Curtis, A.+ an Deformation Extracted from 100 Y Regional Components of Western aege + 1995 1997 an Deformation Extracted from 100 Y Regional Components of Western Aege + Regional Distances Across the Turki + Kandinsky-Cade, K.+ 1981 sh and Iranian Plateaus. # Lateral V #Regional Investigation of Cold Gro + Eisenlohr, T.+ 1997 undwater for the Determination of R 1990 vity Anomalies in the Mediterranean + Regional Meaning of the Bouguer Gra + #Regional Scale Tectonic Evolution + Morelli, C. De Jonge, M. R.+ 1994 and the Seismic Velocity Structure De Jonge, M. R.+ and the Seismic Velocity Structure #Regional Scale Tectonic Evolution 1994 Papazachos, B. C.+ 1990 es in the Patraikos-Saronikos Gulfs Regional Seismic Strain Release Rat + Alessandrini, B.+ 1995 Regional Seismicity Data.# 3-D Crus + tal P - Wave Tomography of the Ital + Zanchi, A.+ 1993 Regional Stress Orientation from Ge + ophysical and Geological Data# Seis + Udias, A.+ 1991 #Regional Stresses Along the Eurasi + a-Africa Plate Boundary Derived fro #Regional tectonics of the Eastern Dilek, Y.+ 1982 Mediterranean Ophiolites Martinez, M. D.+ Regionalization of the Mediterranea 1997 n Basin Derived from Surface - Wave + McKenzie, D. P. 1978)# Active Tectonics of the Alpine-H + Regions (Tectonics of Aegean Region + Regions# Active Tectonics of the Al + McKenzie, D. P. 1978 pine-Himalayan Belt: the Aegean Sea + 1997 Alessandrini, B.+ Regions# Back Arcs Basins and P-wav + e Crustal Velocity in the Ionian an + Ekström, G.+ 1989 Regions of Distributed Continental + Deformation# Seismic Strain Rates i + Regions of Low Angle Normal Faultin Şengör, A. M. C. 1986 g: Tectonic Implications with Examp Regions of Low-Angle Normal Faultin + Şengör, A. M. C. 1987 g: Examples from Western Turkey# Cr + Ketin, l. 1968 regions of Turkey.# Relations Betwe + en General Tectonic Features and th + Nowroozi, A. A. 1972 Regions.# Focal Mechanisms of Earth + quakes of the Persian Plateau, East + 1989 Regions.# Seismic Tomography - Dete + Drakatos, G. rmination of High and Low Velocity Ritsema, A. R. 1974 Reigon. # The Earthquake Mechanism o + f the Balkan Rotstein, Y.+ 1982 Reigon: Subduction, Collision, and + Arc Jumping.# Seismotectonics of th + Schliemann, H. 1881 #Reise in der Troas im Mai 1881. 1911 #Reisen und Forschungen im Ewestlic + Phillipson, A. hen Kleinasien 1996 Rejiminin Paleomagnetik Verilerle | + Orbay, N.+ ncelenmesi.# Ege Bölgesi Genişleme + Grbay, N.+ Şengör, A. M. C.+ 1985 related Basin Formation in Zones of + Tectonic Escape: Turkey as a Case Miyashiro, A. 1972 Related Magmatism in Plate Tectonic + s# Metamorphism and Royden, L.+ 1989 Related to Plate Boundary Processes + ?# Are Systematic Variations in Thr + Hayward, A. B. 1984 Related to the Emplacement of the L + ycian Nappes and the Antalya Comple + Hayward, A. D. Yağmuroğlu, F.+ Küleli, H. S.+ 1997 #Relation of Alkaline Volcanism and + Active Tectonism within the Evolut + 1997 Relation to Aegean Region.# Seismic + Velocity Distribution in Western T + Boccaletti, M.+ 1974 lkanids as an Instance of Back-Arc + Relation to Aegean Region.* Seisite + eotectonique Plio-Quaternaire de I + Relations Avec la Seismicite.# La N + 1976 Mercier, J. L.+

tectonique Plio-Quaternaire de I ar + Relations Avec la Sismicite# La Neo + Features and the Main Earthquake r + #Relations Between General Tectonic + tale et Mouvements Verticaux: I ext + Relations Entre Deformation Horizon + Tectonic Activities in Western Tur #Relationship Between Magmatics and + Relationship Between Plate Motions + and Seismic Moment Tensors, and the + Crustal Thickening, Paleomagnetism, Relationship Between Strain Rates, ical Properties, Density, Seismic V #Relationship between the Petrophys mara Basin and the North Anatolian Relationship Between the Sea of Mar + c.# The Thermal Springs of the Armu + Relationship to Geology and Tectoni + pean Earthquakes, # Intensity - Atte + Relationships for Northwestern Euro + Aegean Region# Santorini Volcano, Relationships with Volcanics of the ty and Reversals from Upper Miocene + #Relative Geomagnetic Field Intensi thouske Locations in the Western He + Relative to the Plate Boundary# Ear rthquake Locations in the Western H Relative to the Plate Boundary.# Ea + ce and Time Variation of Strain Release in the Area of Greece.# Spa nikos Gulfs (Central Greece) Based + Release Rates in the Patraikos-Saro c Mapping Tools Released# New Version of the Generi + al Deformation and its Application + Reliable Estimation of Active Crust Relief of the Mediterranean.# New D ata on the Bottom Discussion About Perspectives of G + Remarks and Result of a Round-Table W Turkey and Its Implications on t Remarks on the Gravity Anomalies of of the Aegean Sea Seismic Reflectio #Reorganization and Interpretation rustal deformation and Strain Accum + Repeated GPS Measurements# Recent C quake of 9th August, 1912.# Prelimi September 1992.# GPS Project Marmar Report for the Şarköy-Mürefte Earth Report of Secont Campaign August / (4-11 August 1995).# ANAXIPROBE 95 + Report of the L Atalante Expedition + s Field in the Aegean Region #Reproducing the Velocity and Stres op on Alpine Geology: Editorial Rem + Research in the Alps# Second Worksh Research of the Past Decate.# Tecto + nic Processes along the Front of Mo + and Geothermal energy in Turkev# T + Research of Thermomineral Resources us Lycien Occidental. #Reserches Geologiques dans le Taur lling.# Geology of Izmir - Sefelihi + Aegean Region# Teleseismic P-Wave + Reservoirs by Means of Gradient Dri + Residuals and Deep Structure of the Upper Mantle Structure of the Aegea Residuals and Gravity# Crustal and el-tTime Residuals and Plates.# Seismic Trav + Residuals Caused by a Dipping Plate + in the Aegean Arc in Greece# P-way + ral Inhomogeneity in the Upper Mant Residuals from Earthquakes and late + .# Imaging Algorithms, Accuracy and Resolution in Delay Time Tomography + es in the Aegean Area# On the Turkev# The Research of Thermominer + Resolving Power of Tomographic Imag Resources and Geothermal energy in stern Mediterranean Tectonics# Geod + Respect Europe: Implications for Ea s: the Americas, East Africa, and t Rest of the World. # Plate Kinematic + ts# The Strain Field in Northwester + Result Inferred from GPS Measuremen The Hellenic Subduction Beneath the + Result of a Microearthquake Study# About Perspectives of Geological Re Result of a Round-Table Discussion Geokinematics of the Eastern Medite + Result on the Determination of the apazarı Region.# Preview Results about Query Blasts Aroud Ad + an GPS Experiment.# Strain Results and Tectonics from the Aege + Eccene) and their Tectonic Signific + Results for Albania (U. Cretaceousent.# On Seismotectonics of the Mar + Results from a Microseismic Experim + dimentary Series in Crete.# Paleoma -Results from Mio-Pliocene marine Se the Hellenic Sedimentary Arc# Firs Results from Mio-Pliocene Series of heir Significance for the Geodynami + reece, and Their Implications for M + Results from Southern Albania and t + Results from the Cycladic Massif, G etwork # Seismicity and Seismotecto Results from the North Aegean Sea N Ionian Zones of Greece.# Paleomagne Results from the Pindos, Paxos and ranitic Rocks of the Aegean Sea, Pr results# Geochronological Data on G + rkey# Airbone Magnetometer Profile Results lake manyes to Istanbul, Tu + ements in Western Turkey and their Results of 1988 and 1990 GPS Measur + tal Structure in Southeastern Europ Results of an Investigation of Crus + Western Greece. # The Geological Results of Petroleum Exploration in + Seismic Reflection Measurements in + #Results of Seismic Refraction and -Sounding in Jean Charot. Descripti Results.# Sea-Beam, Multi-Beam Echo + lution of Northwestern Greece: Pleo + Results. # Tertiary Geodynamical Evo + Retreating Subduction Boundaries Fo + rmed During Continental Collusion# Reveals New Tectonic Fabric. # Globa + 1 Marine Gravity Form ERS-1 Geosat gnetic Record of two Successive Mio Reversal in Western Crete.# Paleoma + Reversal Time Scale on Estimates of + Current Plate Motions.# Effects of in Crete# Relative Geomagnetic Fi Reversals from Upper Miocene Sectio + c Association of Western and Easter Review# Comparison of Young Volcani + Review of European Earthquake Mecha nism.# Seismotectonic Implications Review# The Tectonics of n Mediterranean: A Geophysical Review, 1500 - 1800.# Seismicity of + Turkey and Adjacent Areas, A histo + review.# Eclogites Associated with High Grade Blueschist in the Cyclad Revisions to the Geomagnetic Revers Time Scale on Estimates of Curre -Revisited from a Detailed Seismolog + ical Study# The Kozani-Greva (Greec + #Rewiev of Heatflow Data From the M editerranean and Aegean Seas Rezistivite Etüdü Ön Raporu.# Aydın + - Germecik - Bozköy Jeotermal Ener + Rezistivite Etüdü.# Denizli - Bulda + n - Pamukkale Jeotermik Enerji Aram -Rheology on Large-Scale Continental Extension# Effects of a Temperatur Rhodes Island (Greece) Explanatory Notes.# Geological Studies on the D + Rhodes).# Sur la Geologie de I Egee + : Regard sur le Dodecanese Meridona + ate Cenozoic extension in Northeast + Rhodope Metamorphic Core Complex# L Rhyolites and Comparison with the P elagonian Permotriassic.# Paleomagn -Ridge - Plastique. # Evolution Tecto + nique du Systeme Alpin en Mediterra + Ridge Accretionary Complex# Rate of + Outward Growth of the Mediterranea + Ridge Accretionary Complex# Spatial + Transition from Compression to Ext Ridge Accretionary Coplex?# Did the + Onset of Extension in the Aegean B + Ridge from Deep Seismic Data and Gr + avity Modelling# The Crust of the W + Ridge Mediterraneenne (Mediterranee + Ridge, Levantine Sea - Site 130.# M + Orientale).# Variation Laterale de + editerranean Ridge.# Geophysical Features of the + Greek Island Arc and Eastrn Medite + Ridge: A Synthesis Incorporating Ne w Sea-Beam Data.# Strain Distributi -Ridge: a Young Submerged Chain Asso + ciated with the Hellenic Arc.# Medi + Ridge: Importance of Messinian Evap + orite Formations# Deformation of th + Ridges).# Evolving Miogeanticlines + of the Eastern Mediterranean (Helle + Ridges. # Mechanism of Earthquakes a + nd Nature of Faulting on the Mid-Oc +

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ate Cenozoic Evolution of the Aegea + Rift and its Implications for the L $\scriptscriptstyle +$ in and RIft Basin Sdevelopment Duri + Metamorphic Core Complexes and Det + Rift Havzaları (Supradetachment Bas + River Region, U.S.A.# The Origin of + P and S Deep Velocity Stru Robust Nonlinear Inversion of Trave + Rock Association# Characteristic an + Times# 1 d tectonic Setting of the Shoshonit olia# Ree Distrubution in tertiary Rocks from Central and Western Anat + Study of Quaternary Volcanic Rocks from Turkey.# A Paleomagnetic + tic Stratigrapy of the Miocene Volc + the Pre-Liassic Metamorphic Basemen + Rocks of Lesbos, Greece# Paleomagne + Rocks of NW Anatolia# Petrology of + v results# Geochronological Data on Rocks of the Aegean Sea, Preliminar + e),# Dating Metamorphic Events in t Rocks of the Island of Syros (Greec h to Origin of Young Volcanic Rocks of Western Turkey# An Approac + ch to the Origin fo Volcanic Rocks of Western Turkey.# An Approa + ch to the Origin of Young Volcanic Rocks of Western Turkey.# An Approa gmas and Classification of Basaltic Rocks# Origine of Primary Basalt Ma + ension.# A Major Oligo - Miocene De + Rodope Controlling North Aegean Ext + Alkaline Volcanism on Santorini an -Role of Continental Crust in Calc mouted from SLR and GPS observation Rotation and Station Coordinates Co on: Block Rotation of Vertical Shea + Rotation During Continental Extensi + cent Blocks in Northeastern Aegea a + Rotation in Opposite Senses of Adja + rvational Evidence.# Block Rotation in Western Turkey, 1, Obse o the Tertiary Clockwise Rotation.# + Paleomagnetic Evidence for Cenozoi + Rotation of Northern Greece Prior t + Rotation of the External Albanides# + nia.# First Paleomagnetic Evidence Rotation of the Ionian Zone of Alba + n Greece# Paleomagnetic Evidence fr Rotation of the Ionian Zone, Wester + rust Belt East of the Isparta Reent + Rotation of the Western Taurides Th + of Dykes and Tuffs from the Mesudi Rotation of Turkey. # Paleomagnetism + and Bed Rotation During Continental Rotation of Vertical Shear?# Fault + lt System, Southern California.# Se Rotation within the San Andreas Fau or a Large Counterclockwise Rotatio Rotation # Paleomagnetic Evidence f eogene Thrusting and Basin Closure #Rotational Deformation During Pala + an Area# Paleomagnetic Evidence for Rotational Deformations in the Aege + an Area# Palaeomagnetic Evidence of + Rotational Deformations of the Aege an Area. # Paleomagnetic Evidence of Rotational Deformations of the Aege + ormation in Greece and Iran #Rotational Mechanism of Active Def + ough Fault Zone (Greece); Structura + North Anatolian Dextral Strike-Sli + Rotations Along the North Aegean Tr Rotations. # The Continuation of the + ctives of Geological Research in th Round-Table Discussion About Perspe + Seismotectonics in SW Turkey# Sour + Rupture Model with Implications for e Major Turkish Earthquakes and The #Rupture Process and Spectra of Som + e major Turkish Earthquakes and The + #Rupture Process and Spectra of Som + Rift Basin Sdevelopment During the + Nectectonic Evolution of the Mender + Time and Waveform Inversion. #S - Wave Below Europe from Delay - + llenic Area Obtained by Robust Nonl + S Deep Velocity Structure of the He + Burdur Earthquake of 12 May 1971.# S Direction in Western Turkey from Data Set.# Heat Loss from the Earth s Interior: Analysis of the Global n and Aegean Seas.# Bathymetry, Tot Earthquakes and lateral Inhomogene S.mple Bouquer Anomaly Mao of Ionia + #S-P-Wave Traveltime Residuals from + metlendirilmesi Hakkında İstikşaf P Sahalarında Maden Kaynaklarının Kıy + Sakarya Jeolojisi# Orta Salihli (Manisa ili) Arası Gediz Ne + hri Günevinin Jeoloji, Hidroloji ve Yönünden Detay Jeoloji Etüdü.# Ala Salihli Bölgesinin Jeotermik Enerji + Salihli et Alaşehir.# Etude Geologi + #Salihli Güneyinde Üste Doğru Kalın + que et Structural du Graben de Gedi lasan Neojen Yaslı Alüvvon Yelpaze California.# Seismic Evidence for C + San Andreas Fault System, #San Andreas, Garlock and Big Pine + Sandstones form NW Turkey.# The Mag + Faults, California. netism of Some Permian Red Santa Rhyolites and Comparison with the Pelagonian Permotriassic. # Pal + # Isotope Geochemistry of Recent M + Santorini - Geodynamic Implications + eece.# Sr-isotope and Trace Element + Santorini and Milos, Aegean Sea, Gr + #Santorini Tephra #Santorini Volcano, Greece-Tectonic + and Petrochemical Relationships wi elliği.# Akkuyu Nükleer Güç Santralı Yeri ve Çevresinin Deprems + Sapanca-Izmit ve Geyve-Iznik Kollar + 1 Üzerinde Paleosismik Araştırmalar + Saptanması # Edremit - Susurluk Böl + gesinin Curie Nokta Derinliklerinin + Saptanması, # Yinelemeli Ters Çözüm + Yöntemi ile Yeraltı Yoğunluk Dağılı + Saptanmasında Kullanılan Yerbilimle + ri Kriterleri.# Ege Denizi nde Anad + Sarayköy - Buldan Area.# Geothermal + Model of Denizli, s.# A Comperative Study of Neotecto + ust 1912.# The ve Yapısı tifleri ve Tektonik Yerlesimi. Kuze + lenmesi.# Derin Elektrik Özdirenç v smik Gözlemler.# 23 Mart 1969 Demir + ity Data in the Aegean Region# A Co + ity Data in the Aegean Region# A Co s.# Horizontal Crustal Motion in th + ean Region# Geological Information SLR) in the Central Mediterranean R + ity in the Upper Mantle Beneath Wes + A Microseismic Study in the Western + Motions.# Effects of Recent Revisi + he Euro - Mediterranean Area.# Larg + ismic Velocity Structure of the Lit ismic Velocity Structure of the Lit ns in the Eastern Mediterranean Neo + in Convergent, Divergent, and Srtik st Extension and Holocene Normal-fa ssif: Field, Petrographic, Textural elmeer Nach Messungen mit Einem Ask + elmeer Nach Messungen mit Einen Ask + Evolution of the Menderes Massif). nd Gravimetric Data (in Greek).# St + p Seismic Soundings in the Basins o + Deep Seismic Sounding in the Basins + d)# Geochronology and Petrology of +

Saronikos and Southern Evoikos Gulf + Saros - Marmara Earthquake of 9 Aug + #Saros Körfezi Bölgesinin Tektoniği #Saros Körfezi Dolayının Çökelme İs + Saros ve Gökova Grabenlerinin Model + Sarıgöl Depremleri Hakkında Makrosi + Satellite Laser Ranging and Seismic + Satellite Laser Ranging and Seismic + Satellite Laser Ranging Measurement Satellite Surveys of the Mediterran + Scale Geodetic Measurements (VLBI, Scale Lateral Variations of P Veloc Scale Normal faulting Mechanisms.# Scale on Estimates of Current Plate + Scale P - Veolocity Structures in t Scale Tectonic Evolution and the Se + Scale Tectonic Evolution and the Se + Scale.# Biostratigraphic Correlatio Scales for Continental Deformation Scarps in the Hellenic Arc# East-We + Schist in the Southhern Menderes Ma + #Schwerestörungen im Östlichen Mitt + #Schwerestörungen un Östhicken Mitt + Sdevelopment During the Neotectonic + SE Europe by Inversion of Seismic a + Sea (Pasiphae Cruise)# Two-Ship Dee + Sea (Pasiphae Cruise).# Two - Ship + Sea (West Anatolia and Lesbos Islan + Sea - Floor Spreading Theory.# The + Canadian Cordillera, the Hellenides +

Southern

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e, Levantine Sea - Site 130.# Mediterranean Ridg + nts Made by H.M.S. Challanger in th + Sea 1950 - 1953.# Seismic Measureme + iterranean Sea# A Geophysical Study of the Med + n.# Geophysical Studies in the Aege + Sea and in the Eastern Mediterranea + magnetic Survey of the Eastern Medi + omagnetic Survey of the Eastern Med + Sea and Its Interpretation# An Aero + Sea and its Interpretation.# An Aer ne Gravity Measuremnts in the Atlan + Sea and Mediterranean Sea.# Submari + ty Variations# A Geophysical Study Sea and Surrounding Area: Pn Veloci + ics of Aegean Region)# Active Tecto + Sea and Surrounding Regions (Tecton + Tectonics of the Alpine-Himalayan + Sea and Surrounding Regions# Active + m Geophysical Survey.# Crustal Stru Sea and the Hellenides Obtained fro + Greece, Obtained by Refractional S + urkey. # The MARNET Radio Linked Sei + Sea and the Islands Evia and Crete, + Sea and the Seismicity of Western T + s for the Oceanic Subduction-Contin sea and Western Greece: Implication + Large-Scale Seismic Tomography Imag + Sea Area# On the Interpretation of anean Sea Basins# Geology of the Mediterr + Velocity.# Crustal Structure of th + Sea by Surface Waves, Part I: Group + Physical Properties and State of th Sea Deduced from Geophysical Data# + taly. Examples from the Central and + Sea# Different Foreland Basins in T + eophysical Surveys in the Mediterra + Sea During the Period 1961-1964.# G + t Magmatism of the Aegean Sea# Geochronological Data on Recen + Measurements on a Surface Ship wit + Sea Gravimeter. # Continuous Gravity + Sea Gravimeter.# Schwerestörungen u + n Östhicken Mittelmeer Nach Messung + Sea# Heat Flow in the Aegean sics and Geophysics.# Sedimentary B + Sea in Submarine geology and Geophy + e Aegean Sea# Morphology and Structure of th + tectonics of the North Aegean Sea. Sea Network. # Seismicity and Seismo + onic Development of the Hellenic Ar Sea of Crete: A Synthesis# The Tect + Late Oaternary Sedimentation and Se + Sea of Marmara (Northwest Turkey): Anatolian Fault. # Structural Relati + Sea of Marmara Basin and the North an Escape tectonic Regime.# The Sea of Marmara: A Plate Boundary in Beneath the Crust and Upper and Man + Sea Region# 3-D Velocity Structure + nt Tensors of Earthquakes# The Hori + Sea Region Determined from the Mome the Marmara Sea Region# Gravimetric Studies of + Sea Region of Turkey. # Neotectonics + Sea Region of Turkey. # The Seismici + of the Marmara ty of the Marmara from Micro - Earthquake Fault Plane + Sea Region of Turkey: New Evidence Global Positioning System (GPS) Est + Sea Region, Northwestern Anatolia# + rom GPS Measurements.# Active Crust + rom GPS Measurements.# Recent Crust + Sea Region, NW Anatolia, Inferred f Sea Region, NW Anatolia, Inferred f rom Repeated GPS Measurements# Rece + Sea Region, NW Anatolia, Inferred f + e Beneath the Crust and Upper Mantl + Sea Region.# 3-D Veolocity Structur + Sea Seismic Reflection Data# Reorga + nization and Interpretation of the + Messina Turbidity Current.# Ionian + Sea Submarine Canyons and the 1908 Sea# The Aegean he Mediterranean Sea# The Tectonics and Geology of t + e.# North Aegean Sea Trough: 1972 Jean Charcot Cruis + re of the Cycladic Blueschist Belt. + Sea) - Implications for the Structu + ary Processes on the Northhern Slop Sea)# Neotectonics and the Sediment + h-pressure Metamorphic Terrains: Th + Sea), # Uplift and Exhumation of Hig + Measurements at Sea. 1936 - 1959. # Pendulum Gravity exes of Cordilleran Type in the Cyc + Sea, Greece# Metamorphic Core Compl + Parallel Extension Along the Hell + Sea, Greece.# GPS Evidence for Arc Element Evidence for the Role of Co + Sea. Greece # Sr-isotope and Trace avel Times.# Crustal Structure of t + Sea, Part II: Phase Velocity and Tr logical Data on Granitic Rocks of t + Sea, Preliminary results# Geochrono ing Anoxic Basins as Piercing Point + Sea- Quantitative Constraints by Us + Tectonics of the Hellenic Trenc + Sea-Beam and Submersible Observatio + ns# over the East Mediterranean Ridge: Sea-Beam Data.# Strain Distribution in Jean Charot. Description, Evalu + #Sea-Beam, Multi-Beam Echo-Sounding + Seismic Profiling in the Sea of Mar + Sea-Level Changes# High-resolution Sea.# A New Bathymetric Chart and P + hysiography of the Mediterranean Sea.# A Seismic Study of the Wester + n Ionian lzmit Bay, Bandırma Bay and Erdek + Sea. # Active Fault Investigation in + Sea.# Active Tectonics of the North and Central Aegean Sea.# An Interference Phenomenon in + Rayjleigh Wave Trains Associated w + Rayleigh Wave Trains Associated wi + Sea, # An Interference Phenomenon in + Sea.# Bathymetry of the Eastern Med + iterranean e Mediterranean Sea.# Geophysical Exploration of th + d Crustal Structure in the Eastern + Sea.# Gravity Anomalies and Inferre + Sea.# Gravity Anomalies in the East + ern Mediterranean Sea.# New Data on the Structure of the Sedimentary Strata and Basement + Sea.# On the Vertical Circulation o + f the Mediterranean Sea.# Panaroma of the Mediterranean + Sea, # Phase Velocities of Rayleigh + Waves in Southeastern Europe and Ea + orth Aegean Sea Network. # Seismicit + Sea. Preliminary Results from the N + Sea.# Results of Seismic Refraction + and Seismic Reflection Measurement + Sea.# Seismic refraction Experiment + s in the Mediterranean Sea. # Seismic Refraction Measuremen + ts in the Western Mediterranean Sea.# Speculations Concerning Botto + m Circulation in the Mediterranean Sea.# Static and Dynamic Properties + of Upper Mantle in Southern Aegean + Sea.# Structure and Evolution of th + e North Aegean Trough, Northern Aeg + Sea.# Submarine Gravity Measuremnts + in the Atlantic Ocean, Indian Ocea + Sea.# The Measurement and Interpret + ation of Heat Flow in the Mediterra + Sea.# The Sources of the Deep Water + of the Eastern Mediterranean Sea: A Synthesis Based on Continuou + Reflection Profiles# Shallow stru + Sea: the Cephalonia Island Earthqua ke Sequence of 1983.# Evidence for Seabeam Survey of the hellenic Tren + ch System# From Subduction to trans Seas Deduced from Observations in t + he Aegean Region.# Some Aspects of + Seas# Rewiev of Heatflow Data From the Mediterranean and Aegean Seas.# Bathymetry, Total Magnetic I + ntensity, Free-air Gravity Anomaly, + Seasat Reveals New Tectonic Fabric. + # Global Marine Gravity Form ERS-1 #Second Workshop on Alpine Geology: + Editorial Remarks and Result of a Secont Campaign August / September + 1992.# GPS Project Marmara: Report Section from Chios (Greece).# Magne + tostratigraphy of a Lower-Middle Tr + Section in Crete# Relative Geomagne + tic Field Intensity and Reversals f + Anatolia.# Miocene Reference Section of the Coastal Part of West +

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raphy of the Spathian to Anisian (L + Section, Albania# Magnetobiostratig + Sector of the Menderes Massif, West + Turkey. # Evidence Against the Core + dence Against the Core/Cover Concep + Sector of the Menderes Massif. # Evi s Cyclades (iles de Naxos et Paros) + Sedimentaires Mio-Pliocenes dans le + c Results from Mio-Pliocene Series Sedimentary Arc# First Paleomagneti + anean Sea in Submarine geology and #Sedimentary Basins of the Mediterr ern Slope of the Sporades Basin (th + Sedimentary Processes on the Northh + magnetic Results from Mio-Pliocene Sedimentary Series in Crete.# Paleo + the Levant Sea. # New Data on the St. + Sedimentary Strata and Basement in # High-resolution Seismic Profiling + Sedimentation and Sea-Level Changes land Arc Setting in Modern and Anci Sedimentation in a Mediterranean Is + y.# Active Normal Faulting, Drainag + Sedimentation in Southwestern Turke Nord egeen. # La Sedimentation Neogene Dans le Fosse ement of the Lycian Nappes and the + Sedimentation Related to the Emplac + Development in Weste Turkey, Görde + Sedimentation.# Late Cenozoic Basin entation in a Mediterranean Island Sedimentation.# Modern Flysch Sedim + 2-D and 3-D Analysis of the Gravity + Sediments in the Aegean Grabens by + ean.# Thicness of Unconsolidated Sediments in the Eastern Mediterran Östlichen Mittelmeer Nach Messunge + Seegravimeter.# Schwerestörungen im + n Anatolia Turkey. Determination of + Sefelihisar Geothermal Area, Wester + ust Structure and Convection Mechan + Seferihisar Geothermal Area# The Cr : Les Iles de Kassos et Karpathos.# + Segment de I Arc Hellenique Externe ra, Hellenic arc, Greece.# Active D + segment of arc: the Strait of Kythi key as a Mesozoic - Tertiary Tethya + Segment of the Antalya Complex, Tur + Aegaeis# Über Alter und Geotektonis + Seine Equivalente in der Mittleren ping of the Seismic Activity in Greece.# On Map + eek).# Structure of the Crust and U + Seismic and Gravimetric Data (in Gr + Studies of the Upper Mantle Beneath + #Seismic Anisotropy in Tomographic al Times from Local Earthquakes, 1. + Seismic Array Using First P - Arriv + th the Aegean Region and its Tector + Seismic Attenuation Structure Benea + The Crust of the Western Mediterra + Seismic Data and Gravity Modelling# ranean Area Estimated by Moment Ten #Seismic Deformation in the Mediter + n and Block Rotation within the San + #Seismic Evidence for Conjugate Sli ture of the Aegean Sea and the Isla + Seismic Experiments # Crustal Struc ate Boundary in Europe.# Deep Seismic Expression of an Ancient Pl + ece.# Tectonic Stress Field and Seismic Faulting in the Area of Gre Large Seismic Faults in the Hellenic Arc# nd Surrounding Area and its Tecton + Seismic Foci in the Mediterranean a + ara Region #Seismic Investigations of the Marm + Challanger in the Atlantic, Pasif + #Seismic Measurements Made by H.M.S es of Active Deformation in the Med + Seismic Moment Tensors, and the Rat e of Slip Along Major Fault Zones. #Seismic Moment, Seismicity and Rat + and Stresses Associated with Earthq + #Seismic Moment, Source Dimension, f the Earthquakes of the Aegean Are + #Seismic Moments and Focal Depths o mara (Northwest Turkey): Late Qater Seismic Profiling in the Sea of Mar + tion and Interpretation of the Aege + Seismic Reflection Data# Reorganiza + on the Structure of the Eastern Med + Seismic Reflection Data.# New Data the Ionian Sea.# Results of Seismic + Seismic Reflection Measurements in ection Measurements in the Ionian S + Seismic Refraction and Seismic Refl the Mediterranean and Indian Ocean. + #Seismic Refraction Experiments in the Mediterranean Sea. #Seismic refraction Experiments in the Western Mediterranean Sea. #Seismic Refraction Measurements in he Eastern Mediterranean Sea (Pasip + Seismic Sounding in the Basins of t the Eastern Mediterranean Sea (Pasi + Seismic Soundings in the Basins of Seismic Soundings# The Crust and Up per Mantle of the Aegean region Fro + erval 1892 - 1992.# A Comparison of + Seismic Strain of Greece in the Int Distributed Continental Deformatio + #Seismic Strain Rates in Regions of + Patraikos-Saronikos Gulfs (Central + Seismic Strain Release Rates in the + #Seismic Stresses in the Region Ar.o + res - Spain - Western Mediterranean + terranean.# Preliminary Seismic Studies in the Eastern Medi + Sea.# A Seismic Study of the Western Ionian + Seismic Surface Wave Dispersion.# C + rustal Structure and Possible Aniso + Seismic Surface Waves and Body Wave + s.# The Gross Features of the Litho + of High and Low Velocity Zones ben + #Seismic Tomography - Determination + Seismic Tomography Images in the Ae gean Sea Area# On the Interpretatio + #Seismic Tomography of the Gulf of Corinth: A Comparison of Methods. #Seismic Travel-tTime Residuals and + Plates. Seismic Velocities, Heat Generation + and Mineralogical Constitution.# R + Thessaloniki and Chalkidiki Areas #Seismic Velocity Constrains in the + #Seismic Velocity Distribution in t + #Seismic Velocity Distribution in W + he Aegean Region estern Turkey and its Relation to A + Seismic Velocity Image of the Upper + Mantle Beneath Southeastern Europe + Seismic Velocity Structure of the L + ithosohere and Upper Mantle: The Me + Seismic Velocity Structure of the L ithosphere and Upper Mantle.# Regio + #Seismic Wave Attenuation in the Up per Mantle Beneath the Aegean. Seismic Wave Propagation at Regiona + 1 Distances Across the Turkish and + Seismic Zones in the Aegean Region. # A Note on the Morphology and Acti + Seismically Active Zone (Kuzguncuk/ Adapazari, Northwestern Turkey) # De + Seismicite.# La Neotectonique Plio- + Quaternaire de I Arc Egeen Externe + #Seismicity and Assiciated Strain a f Central Greece Between 1890 and 1 + #Seismicity and Associated Strain o f Central Greece Between 1890-1988. seismicity and Fault-Plane Solution + s in the Southern Aegean and its Ge + Seismicity and Rate of Slip Along M + ajor Fault Zones # Seismic Moment, #Seismicity and Seismotectonics of + #Seismicity and Seismotectonics of + the Bursa Region the North Aegean Sea. Preliminary R + #Seismicity and Tectonics of the Ae + gean Region Seismicity and Tectonics.# Studies in Historical Seismicity and the Crustal Structur + e of Western Anatolia# Heat Flow, Seismicity Around the Pasific# Ande + sitic Volcanism and Seismicity Data# Active Tectonics o + f the Eastern Mediterranean Region: + Seismicity Data in the Aegean Regio + n# A Comparasion of Satellite Laser + Seismicity Data in the Aegean Regio + n# A Comparasion of Satellite Laser + Seismicity Data.# 3-D Crustal P - W + ave Tomography of the Italian Regio + Seismicity in Greece and Adjacent A + rea.# A Catalogue of Seismicity in the Aegean Defined by + Teleseismic Data# Intermediate Dep + Central Greece)# Graben Formation a + Seismicity in the Gulf of Korinth (+ on by Precise Hypocenter Determinat + Seismicity in the Peloponnesus regi +

Muttoni, G.+ 1996 Bozkurt, E.+ 1993 Bozkurt, E + 1992 Gautier, P.+ 1990 Lai, C.+ 1982 Hersev, J. B. 1965 Roslyakov, A. G.+ 1997 Valente, J. P.+ 1982 Moskalenko, V. N. 1966 Smith, A. D.+ 1995 Stanley, D. J. 1974 Paton, S. 1992 Lalechos, N.+ 1977 Hayward, A. B. 1984 Sevitoğlu. G + 1994 Stanley, D. J. 1974 Sarı, C.+ 1995 Wong, H, K + 1969 Fleischer, U. 1964 Eşder, T.+ 1975 Esder, T. 1990 Barrier, E.+ 1982 Lyberis, N.+ 1982 Robertson, A. H. F.+ 1984 Dürr. S. 1975 Galanopoulos, A 1963 Papazachos, C. B. 1994 Plomerova, J. 1997 Aki, K.+ 1976 Hashida, R.+ 1988 Truffert, C + 1993 Pondrelli, S.+ 1995 Nicholson, C.+ 1986 Makris, J.+ 1977 Zielhuis, A.+ 1994 Papazachos, B. C.+ 1969 Papazachos, B. C. 1996 Papazachos, B. C. 1973 Üçer, B.+ 1997 Gaskell, T. F.+ 1958 Jackson, J.+ 1988 Brune, J. N. North, R. D. 1968 1977 Kiratzi, A. A.+ 1991 Smith, A. D.+ 1995 Saatçılar, R.+ 1996 Sancho, J.+ 1973 Hinz, K. 1974 Hinz, K. 1974 Gaskell, J. F.+ 1953 Gaskell, J. F + 1953 Fahlquist, D. A. 1963 Voogd 1992 De Voogd, B.+ 1992 Makris, J. 1978 Davies, R.+ 1994 Ekström, G.+ 1989 Papazachos, B. C.+ 1990 Udias, A. 1980 Lort, J. M.+ 1974 1986 Makris, J.+ Mindevalli, O. Y.+ 1989 Panza, G.F.+ 1980 G. 1989 Drakatos, Papadopoulos, G. A. 1997 Le Meur, H.+ 1997 Davies, D.+ 1969 1982 Rybach, L.+ Ligdas, C. N.+ 1993 Küleli, H. S.+ 1995 Küleli, H. S.+ 1997 Hovland, J.+ 1981 De Jonge, M. R.-1994 De Jonge, M. R.+ 1994 Delibasis, N. D. 1982 Kandinsky-Cade, K.+ 1981 1972 Karnik, V. Greber, E. Mercier, J. L.+ 1997 1976 Ambraseys, N. N.+ 1990 1990 Ambraseys, N. N.+ Hatzfeld, D.+ 1993 Brune, J. N. 1968 1997 Sellami, S.+ Barakou, Th.+ 1994 Kuleli, H. S. 1997 1975 Ambraseys, N. N. Alptekin, Ö.+ 1990 Diskinson, W. R.+ 1967 1997 Barka, A. A.+ Jackson, J.+ 1994 1994 Jackson, J.+ 1995 Alessandrini, B.+ 1981 Makropoulos, K. C.+ Hatzfeld, D.+ Myrianthis, M. L. 1992 1984 Leydecker, G.+ 1978

unding Area art I. Praque n of Turkey.# The sin Areas, A historical Review, 1500 -MARNET Radio Linked Seismometer Net + armara Region. # Long - Term on in the Gulf of Corinth (Central r Evaluating mation in the North Aegean Trough des, Northwestern Turkey) # Stratigr + n Islands Front with Coincident Nor + Microearthquakes in Western Crete f Microearthquakes in Western Crete d Location of Earthquakes in the Ce ations# The 1971 May 12 Burdur Eart + ing in the Demirci, Alaşehir and Ge + va (Greece) Earthquake of 13 May 19 + onics rmara Sea and the Seismicity of Wes + z, Turkey, Earthquake of March 1970 + h Anatolian Fault Zone ve Normal Fault Beneath Thessalonik + eview of European Earthquake Mechan e Process and Spectra of Some Major + e Process and Spectra of Some major + icroearthquake Study in the Gulf of ho erranean Area.# Surface Wave and an Region e Inversion of the October 1, 1995 Anatolia, Eastern Mediterranean Re + # Seismicity and on (Turkey): Results from a Microse + Sea. Preliminary Results from the + gean Area undary of Anatolia, Eastern Mediter + a: Regional Stress Orientation from + entale de I arc Egeen.# Sur I exist + myasal, Izotopik ve Radyometrik Ver u, Trakya ve Ege Adalarındaki ntinental Lithosphere.# Uniform astern Aegea and Western Anatolia# Anadolu da Yer Kabuğunun Yapısının a: Report of Secont Campaign August nsform Faulting in the Ionian Sea: Seismological and Geological Obser the Axios Basin (Northern Greece).# ults from Mio-Pliocene marine Sedim + Arc# First Paleomagnetic Results fr + expansion Oceanique Actuelle et Fo La Nectectonique Plic-Quaternaire d Neotectonique Plio-Quaternaire de terior: Analysis of the Global Data nclinal Sedimentation. # Modern Flys ciation# Characteristic and tectoni Organization of the Taurides: One rea.# A Time and Magnitude Predicta Greece.# Attenuation of Intensities tion of the Aegean Sea: A Synthesis Strabo Trenches, South of the Helle + e.# Uniform - Sense Normal Simple Massif, Western Turkey.# Evolution + te Alpine Evolution of an Extension yleigh-wave Dispersion in the Broad ng Continental Extension: Block Rot + tinental Deformation in Convergent, + urope, eogene Thrust Belt in Western Tauri + asins of the Eastern Mediterranean Continuous Gravity Measurements on 1801-1958.# Greece: A Catalogue he Kinematics of the Plate Boundary e East# Propagation Characterstics nean# Gravity Anomalies and Crustal teristic and tectonic Setting of th During the Exhumation of a Blueshi ations for the Structure of the Cyc + pine-Mediterranean Tectonic Evoluti + lution of the Dinarides, Albanides formed Grains in the Augen Gneisses + the Southern Menderes Massif (West ted With Blueschist facies Metamorp es Geophsiques: I example des Dinar incipaux des Contraintes Pour une P tal Collusion. # Numerical Modelling + hosphere, # Uniform - Sense Normal on of Hypocenter and Veolcity Param + on of Hypocenter and Veolcity Param + he Hellenic Subduction Zone and the + the Hellenic Subduction Zone and th +

olution of the Hellenic Arc Since the Late Miocene# Tectonic Ev +

Geodetic Survey, Epicenter Data, 1 + Seismicity Map from ESSA, Coast and + #Seismicity of the Aegean and Surro + #Seismicity of the Earth. #Seismicity of the European Area. #Seismicity of the European Area. P + Seismicity of the Marmara Sea Regio + #Seismicity of the Mediterranean Ba + #Seismicity of Turkey and Adjacent + Seismicity of Western Turkey. # The Seismicity of Istanbul and of the M + Seismicity# Rates Crustal Deformati + Seismicity.# Geological Criteria fo + Seismicity.# Greek Tectonics and Seismicity.# Rates of Crustal Defor + Seismicity: Akyazı/Adapazarı (Ponti + Seismics# A Transverse of the Ionia + Seismograms# A Detailed Analysis of + Seismograms.# A Detailed Analysis o Seismograph Stations. # Detection an + Seismological and Geological Observ + Seismological Study of Normal Fault Seismological Study# The Kozani-Gre #Seismology and the New Global Tect + Seismology.# Elementary Seismometer Network Spanning the Ma + #Seismotectonic Aspects of the Gedi + #Seismotectonic Aspects of the Nort #Seismotectonic Evidence of an Acti #Seismotectonic Implications of a R Seismotectonic Implications# Ruptur Seismotectonic Implications# Ruptur + Seismotectonic Interpretation.# A M + Seismotectonic Regime in Greece.# T + Seismotectonic Studies in the Medit + #Seismotectonic Studies of the Aege + Seismotectonics in SW Turkey# Sourc #Seismotectonics of the Boundary of Seismotectonics of the Bursa Region + Seismotectonics of the Marmara Regi + Seismotectonics of the North Aegean #Seismotectonics of the Northern Ae + #Seismotectonics of the Southern Bo + #Seismotectonics of Western Anatoli Senestres Recents a I extremite Ori + Senozoik Volkanitlerine Ait Yeni Ki + Senozoyik Volkanizması# Batı Anadol + Sense Normal Simple Shear of the Co + Senses of Adjacent Blocks in Northe + #Sentetik Sismogram Eldesi ile Batı + September 1992.# GPS Project Marmar + Sequence of 1983. # Evidence for Tra + Sequence, SW Turkey: a Synthesis of Sequences at the Western Margin of Series in Crete # Paleomagnetic Res Series of the Hellenic Sedimentary ses Implications Geotectoniques.# L ses Relations Avec la Seismicite.# ses Relations Avec la Sismicite# La Set. # Heat Loss from the Earth s In Setting in Modern and Ancient Geosy Setting of the Shoshonite Rock Asso + Several Ocean Basins?# The Mesozoic Shallow Earthquakes in the Aegean A Shallow Earthquakes in the Area of #Shallow structure and Recent Evolu Shallow Structure of the Pliny and + Shear of the Continental Lithospher Shear Zone in the Southern Menderes Shear Zone, Naxsos, Greece.# The La #Shear-wave Velocity Models from Ra Shear?# Fault and Bed Rotation Duri + Sheet Model.# Length Scales for Con Sheet Sophia.# Geotermal Atlas of E + Sheets Along a NNW-SSE Transeci.# N Ship Deep Seismic Sounding in the B Ship with the Graf Sea Gravimeter.# Shocks with Io>VI or M>5 for the Ya Short and Long Term Deformation. # T + Short-period Sn and Lg in the Middl + Shortening in the Eastern Mediterra Shoshonite Rock Association# Charac Sifnos (Cyclades), Greece.# Cooling Sifnos Island (Aegean Sea) - Implic Significanca in the Frame of the Al Significance for the Geodynamic Evo + Significance# Microstructures of De Significance of Augen Gneisses from + Significance of Deformation Associa + Signification par Rapport aux Model + Simple de Determination des Axes Pr Simple Mechanical Model of Continen + Simple Shear of the Continental Lit + Simultaneous Least Squares Estimati Simultaneous Least Squares Estimati Since the late Middle Miocene# On t + since the Late Middle Miocene.# On +

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f Fault Mechanisms and Expansion of + Since the Late Miocene.# Analyses o + on of the Tethys Belt from the Atla + since the Lias.# Geological Evoluti + Since the Middle Miocene# Tentative + List of Major Deformation Events i + aternaire de I arc Egeen Externe et + Sismicite# La Neotectonique Plio-Qu + si# Yedikule-Büyükçekmece (Istanbul + Sismiği Verilerinin Değerlendirilme + i Yüksek Ayrımlı Sığ Sismik Etüdü Raporu.# Gemlik Körfez + i Izmit Körfezi, Yüksek Ayırmlı Sı + Sismik Etüdü Raporu.# Marmara Deniz + rmara Denizi Havzasının Sismik Jeoloji ve Meteorolojisi# Ma + #Sismik Moment Tansör Ters Çözümüyl + e Türkiye Depremlerinin Analizi #Sismik P Dalgalarının Genlik Spekt + rumlarından Yararlanarak İstanbul C + ellenmesi# Ege Bölgesi nin Sismik Tomografi ile Üç Boyutlu Mod + ellenmesi.# Ege Bölgesinin Sismik Tomografi ile Üç Boyutlu Mod + Sismik Yansma Profili Çalışmaların + m Ön Sonuçlar.# Marmara Denizi Canakkale Boğazı Ege Denizi Cıkışı + Sismik Yöntemlerle Araştırılması.# laylarının Incelenmesi.# İstanbul (+ Sismik Yüzey Dalgalarında Girişim O + i.# Anadolu Kavağında Yapılan Taşoc + Sismilk Kayıtların Değerlendirilmes + Sismiques. # Deformations en Compres + sion Dans le Quaternaire des Eivage + a Yer Kabuğunun Yapısının İncelenme + Sismogram Eldesi ile Bat: Anadolu d + Türkiye de Kabuk ve Üst Mantonun + Sismogram Modelleme Tekniği ile Bat + Sismolojik Özellikleri# Izmit Körfe + zi nin Yapısal ve Kabuğunun Yapısı.# Gravite Anomalil + Sismolojiye Göre Kuzey Anadolu Arz uelle de la Termination Nord - Occi + #Sismotectonique et Deformation Acr + ler# Ege Bölgesi Graben Sisteminin Gelişimi Üzerine Düsünce + antine Sea -Site 130.# Mediterranean Ridge, Lev al Considerations on the Geodynamic + Situation in Greece# Some Geophysic + egion# Plate Tectonic Situation in the Anatolian-Aegean R + 30 Nendorit 1967 dthe Brezi th the Sunda Arc, Indonesia.# The Sizmogien Vlore - Diber.# Termeti I Slab of Subducted Lithosphere Benea Boundaries# The Tectonic Expressio Slab Pull at Continental Convergent + ission Trough Slabs.# Teleseismic P - Wave Transm mic Moment, Seismicity and Rate of + San Andreas Fault System, Southern + Slip Along Major Fault Zones, # Seis Slip and Block Rotation within the Anatolian Fault Associated with the + #Slip Distribution Along the North n Fault Zone Across the North Aegea + Slip Motion from the North Anatolia gean Sea)# Neotectonics and the Sed + Slope of the Sporades Basin (the Ae + Slow Surface Waves Across North Ame + rica.# Two SLR and GPS observations.# Crustal Deformations in the Mediterranean A + 95L02 and SSC (DUT) 95C02.# Earth + SLR and GPS observations: BOP (DUT) + egion: Constrains and Uncertainties SLR) in the Central Mediterranean R + Über die Smirgelgesteine Sudwest-Anatolien# gation Characterstics of Short-peri + Sn and Lg in the Middle East# Propa + Sn: Normal Models of Love Waves in + an Oceanic Structure.# Toward Under + Sea Region of Turkey: New Evidence + Solution.# Tectonics of the Marmara evaluation of Earthquake Mechanism + Solutions 1922 - 1962.# Computer Re + Solutions for a Thin Viscous Sheet Model.# Length Scales for Continent + - 1962.# Computer - Determina + Solutions for Larger Earthquakes of d its Geodynamic Implications# Micr + Solutions in the Southern Aegean an ontemporary Tectonic Properties of + Some Active Zones in Jugoslavia.# C arginal Seas Deduced from Observati + #Some Aspects of the Evolution of M #Some Characteristic Features of th + e Anatolian Fault Zone olution of the Hellenides #Some Geophysical Aspects on the Ev + #Some Geophysical Considerations on the Geodynamic Situation in Greece + #Some Geophysical Profiles in the E + astern Mediterranean. Their Seismotectonic Implications# + Some Major Turkish Earthquakes and + Some major Turkish Earthquakes and Their Seismotectonic Implications# onian Basin and Calabria Arc: Some New Elements from DSS Data.# I + n (Eastern Central Greece).# Spread + some Ophiolites in the Othris Regio + Some Permian Red Sandstones form NW Turkey.# The Magnetism of ies of W Turkey and Its Implication + #Some Remarks on the Gravity Anoma? # La Crociera Gravimetra del R. Sommergible Des Ganeys, Anno, 1935. + 31.# La Croceira Gravimetrica del R + Sommergible Vettor, Pisani Anno, 19 + Sondaj (DES) ve Kontrol Kaynaklı Ma + nvetoteullürik (CSAMT) Etüdü.# Avdı + Sonuçlar# Ödemiş-Bayındır-Turgutlu- + Salihli Arasında Kalan Bölgenin (Me + Sonuçlar. # Kuzeybati Anadolu nun Te + ktoniği ve Paleomagnetic Sonuçlar.# Marmara Denizi Sismik Ya + nsıma Profili Çalışmalarının Ön Sonuçlar.# Türkiye Gravite Çalışmal + arı ve Bazı Sonuçları# Bat: Anadolu nun Genc Te + ktoniğinin Jeomorfolojik Sonuçları.# Anaximander Dağları Jeo + fizik Araştırmaları ve sindeki Mikro - Deprem Araştırmasm + Sonuçları.# Marmara Denizi ve Çevre + Sonuçları.# Trakya da Genç Volkanik + Kayaçlar Üzerinde Yapılan Paleomag + Sophia.# Geotermal Atlas of Europe, + Sheet Sorunlarının Gravite Verileri ile | + rdelenmesi.# Batı Anadolu nun Yapıs + Sounding in the Basins of the Easte + rn Mediterranean Sea (Pasiphae Crui + Soundings in the Basins of the East ern Mediterranean Sea (Pasiphae Cru Soundings# The Crust and Upper Mant le of the Aegean region From Deep S + Source Dimension, and Stresses Asso + ciated with Earthquakes in the Medi + #Source Inversion of the 13.10.1997 (Ms=6.6) Western Hellenic Barthqua + #Source Inversion of the October 1, 1995 Dinar, Earthquake (Ms=6.1): a + #Source Parameters Estimation of Ea + rthquakes in Marmara Region #Source Parameters of Aegean Earthq uakes. #Source Parameters of Large Earthqu akes in the East Anatolian Fault Zo + Sources of the Deep Water of the Ea + stern Mediterranean Sea.# The Cinematique de la Subduction Egeene + of Melos Island# Paleomagnetic and + Sous le Pelaponnese.# Geometric et + South Aegean Volcanic Arc: the Case South of the Hellenic Arc# Bathymet + ry and Shallow Structure of the Pli South Peru-North Bolivia# Extension al-Compressional Tectonics Associat + Southeast Europe# Tomography of the Crust and Upper Mantle in Southeast Europe.# Tomography of th + e Crust and Upper Mantle in Southeastern Aegean Islands.# The E xtension of the Lycian Nappes (SW T + Southeastern Aegean Islands. # The E xtension of the Lycian Nappes (SW T + Southeastern Europe and Eastern Med + iterranean Sea.# Phase Velocities o + Southeastern Europe.# Preliminary R + esults of an Investigation of Crust Southeastern Europe.# Three - Dimen sional Seismic Velocity Image of th + Southern Adriatic Sea# Different Fo + reland Basins in Italy: Examples fr + Implications# Microearthquake seism + Southern Aegean and its Geodynamic + Southern Aegean Sea, Greece.# GPS E + vidence for Arc - Parallel Extensio + Southern Aegean Sea.# Static and Dy + namic Properties of Upper Mantle in +

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Angelier, J.+ 1981 Dercourt, J.+ 1986 Babbucci. D + 1997 Mercier, J. L.+ 1977 Kurt, H 1994 Kurtulus C 1985 Özhan, G.+ 1985 Pinar, N. 1943 Utku, M. 1997 Kenar, Ö. 1977 Kuleli, H. S. 1992 Küleli, H. S. 1992 Cetin, S.+ 1998 Alpar, B.+ Ezen, Ü. 1998 1979 Gürbüz, C.+ 1985 Mercier, J. L.+ 1972 Horasan, G. A + 1995 Horasan, G. A.+ 1998 Koral, H.+ 1995 Canitez, N. 1962 Amorese. D 1993 Arpat, E.+ 1969 Rvan, W. B. F.+ 1973 Makris. J 1978 Mueller, S.+ 1997 Sulstarova, E.+ 1969 Widiyantoro, S.+ 1996 Royden, L. H. 1993 Sleep, N. H. 1973 Brune, J. N. 1968 Nicholson, C.+ 1986 Barka, A. A. 1996 Reilinger, R. E.+ 1995 Roslyakov, A. G.+ 1997 Press. F.+ 1952 Noomen, R.+ 1995 Noomen, R.+ 1995 Mantovani. E.+ 1995 Önay, T. S. 1949 Rodgers, A. J.+ 1997 Stephens, C.+ 1977 Evans, R.+ 1985 Wickens, A. J.+ 1967 England, P. C.+ 1985 Hodgsom, J. H.+ 1965 Hatzfeld, D.+ 1993 Arsovsky. M. 1970 Berckhemer, H. 1977 Ambraseys, M. N. 1970 Makris, J. 1973 Makris, J. 1978 Wong, H. K.+ 1971 Pinar, A. 1995 1995 Pinar, A. Ferrucci. F.+ 1991 1972 Hynes, A. J.+ Gregor, C. B.+ 1964 Oral, M. B. 1987 Cassinis. G. 1941 Cassinis, G.+ 1935 Yücel. M. 1995 Evirgen, M. M. Isseven, T.+ 1977 1995 Çetin, S.+ 1998 1995 Akdoğan, N. 1982 Erol. O. Ergün, M.+ 1998 1998 Evidovan. H.+ Tapırdamaz, C.+ 1995 1990 Hurtig, E.+ 1988 Akcię, Z. Voogd 1992 De Voogā, B.+ 1992 1978 Makris, J. North, R. D. 1977 Barış, Ş.+ 1998 1998 Pinar, A. Ergin, M.+ 1090 Brooks, M.+ 1990 1991 Tavmaz, T.+ Pollack, M. H. 1951 Martin, C. 1988 1990 Kondopoulou, D. P.+ Jongsma, D. 1977 Mercier, J. L. 1981 Papazachos, C. B.+ 1995 Papazachos, C. B.+ 1995 Bernoulli, D.+ 1974 1974 Bernoulli, D.+ Papazachos, B. C. 1969 Papazachos, B. C.+ 1966 1981 Hovland, J.+ De Alteriis, G. 1995 1993 Hatzfeld, D.+ Kastens, K. A.+ Tassos, T. S. 1993 1984

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ance for the Geodynamic Evolution o + ern Mediterranean Reigon: Subductio + nce for Conjugate Slip and Block Ro y in Tomographic Studies of the Upp ive Study of Neotectonic Basin Acro The Deep Structure of the Central # ey)# Geochemistry and Tectonic Sign urkey) and their Tectonic Significa urkey.# Evolution of a Tertiary Ext ient Metamorphic Core Complex in We egean Extension.# A Major Oligo - M sif. West Turkey.# Evidence Against + sif.# Evidence Against the Core/Cov ity Structure of the Mantle Below t etrographic, Textural and Microstru the Isparta Re-entrant (Taurus, Tur ry of the Antalya Complex in the Is f the Grabers in Faulting, Drainage Patterns and Se + Intermediate Focal Depth Earthquak + Release in the Area of Greece. r Geodynamics in Turkey. Implication.# Neogene and Quaternar smic Stresses in the Region Azores ture of the Mantle Below the Iberia The MA ismicity of Western Turkey.# e Triassic) Kçira Section, Albania# n to Extension in the Western Medit makes and Their Seismotectonic Imp quakes and Their Seismotectonic Imp Evolution of the Attic-Cycladic Me culation in the Mediterranean Sea. bul Civarında Yerkabuğu Yapısı.# Si otectonics and the Sedimentary Proc Trough. # Gravity Induced Deformati tratigraphy of the Eastern Mediterr rofossils and Mammal Zones, Marine some Ophiolites in the Othris Regio dillera, the Hellenides, and the Se Cause of N-S Extensional Tectonics W Turkey) and their Relationship to d Veolcity Parameters.# Crustal Str d Veolcity Parameters.# Crustal Str n the Lavas of Milos and Santorini nce for the Role of Continental Cru cal and Approximate Solutions for a d Station Coordinates Computed from Thermal Waters from the Çeşme-Sefer Discovery of an Anoxic Basin withi Biostratigraphic Correlations in th late of a Subduction Zone: the Aege of the Eastern Mediterranean Sea D oper Mantle in Southern Aegean Sea. m Lageos Laser Range Observations.# LR and GPS observations: EOP (DUT) f Earthquakes in the Central Aleuti Contouring in Turkey# Geothermal w w Contouring in Turkey.# Geothermal bilities of Geothermal Energy in Tu he Denizli - Kızıldere Geothermal E W-Anatolien und Seine Equivalente i Padova Yer Çekim (Cazibe) Şiddeti azibe Şebekesi (4 Pandüllü nic Arc# Bathymetry and Shallow Str Sea Region, NW Anatolia, Inferred f Sea Region. NW Anatolia. Inferred f and 1988# Seismicity and Assicia atolian Fault by Using Geodetic Met Deforming Zone.# The Relationship Mediterranean Ridge: A Synthesis In and the Ionian Islands: Result Inf 00 - 1988 (Abstract).# Geodetic Det 90-1988.# Seismicity and Associated 92 - 1992.# A Comparison of the Geo 92-1992# Geodetic nic Arc Deduced from a Microearthqu + ted Continental Deformation# Seismi aleomagnetism, Finite Strain and Fa e.# Space and Time Variation of os-Saronikos Gulfs (Central Greece) + the Aegean GPS Experiment. eece.# Active Deformation of a segm + ea.# New Data on the Structure of t + kisi.# Menderes Masifinin Kuzey Kan oğu Ege Çöküntüsünün (Neojen) enderes Masifi nin Kuzey kanadının + Öncesi Bloklu Tortul Kayaların of the Neogene in Northwest Turkey + dynamics in the Mediterranean Area: + ics in an Area of Seismicity: Akyaz + entral Mediterranean.# Structure, ranean.# Biostratigraphic Correlati + sm, Magmatism.# The Median Aegean C + Rocks of Lesbos, Greece# Paleomagn +

S of Low Angle Normal Faulting: Tec + Streching of Hanging Wall in Region + n the Area of Greece.# Tectonic Stress Field and Seismic Faulting i +

Southern Albania and their Signific + Southern Boundary of Anatolia, East + Southern California.# Seismic Evide + Southern Europe.# Seismic Anisotrop Southern Evoikos Gulfs. # A Comperat + Southern Levant Continental Margin. + Southern Menderes Massif (West Turk Southern Menderes Massif (Western T Southern Menderes Massif, Western T #Southern Menderes Massif: an incip Southern Rodope Controlling North A Southern Sector of the Menderes Mas + Southern Sector of the Menderes Mas Southern Spain.# The P - Wave Veloc Southhern Menderes Massif: Field, P Southward Thrusting in the Core of Southwest Turkey. # Structural Histo Southwestern Anatolia. # Formation o Southwestern Turkey.# Active Normal #Space and Time Distribution of the #Space and Time Variation of Strain #Space Based geodetic Activities fo Space Distribution and Geotectonic Spain - Western Mediterranean.# Sei Spain.# The P - Wave Velocity Struc Spanning the Marmara Sea and the Se Spathian to Anisian (Lower to Middl #Spatial Transition from Compressio Spectra of Some Major Turkish Earth + Spectra of Some major Turkish Earth + Spectrum Measurements. # Metamorphic #Speculations Concerning Bottom Cir Spektrumlarından Yararlanarak İstan + Sporades Basin (the Aegean Sea) # Ne Sporades Basin off the North Aegean Sporomorph Associations and Event S Sporomorph Associations, Marine Mic #Spreading and Emplacement Ages of Spreading Theory # The Canadian Cor Spreading VS Orogenic Collapse# The Springs of the Armutlu Peninsula (N Squares Estimation of Hypocenter an Squares Estimation of Hypocenter an + Sr, Nd, Hf, and O Isotopic Ratios i #Sr-isotope and Trace Element Evide Srtike-Slip Environmentals: Analyti SSC (DUT) 95C02.# Earth Rotation an Stable Isotopic Characteristics of Stabro Trench, East Mediterranean.# Stages and the Radiometric Scale.# State of Stress in the Overriding P State of the Crust and Upper Mantle #Static and Dynamic Properties of U Station Coordinates and Motions fro Station Coordinates Computed from S Stations.# Detection and Location o Status and Contribution to Heat Flo Status and Contribution to Heat Flo + Status and Future Development Possi -Status and Future Developments of t Stellung des Menderes Kristallins/S + Sterneck Cihaziyle).# Diyarbakır ve + Sterneck Cihaziyle).# Türkiye Baz C + #Strabo on the Troad. Strabo Trenches, South of the Helle + Strain Accumulation in the Marmara Strain Accumunation in the Marmara Strain af Central Greece Between 18 #Strain Analysis Along the North An Strain and Fault Movements within a #Strain Distribution over the East + Strain Field in Northwestern Greece Strain in Greece in the Interval 19 Strain of Central Greece Between 18 Strain of Greece in the Interval 18 Strain of Greece in the Interval 18 + Strain Pattern in the Western Helle + Strain Rates in Regions of Distribu Strain Rates, Crustal Thickening, P + Strain Release in the Area of Greec + Strain Release Rates in the Patraik #Strain Results and Tectonics from Strait of Kythira, Hellenic arc, Gr Strata and Basement in the Levant S Stratigrafisi ve Çekirdek Örtü Iliş Stratigrafisi ve Tektoniĝi.# Orta D Stratigrafisi ve Tektonik Evrimi# M + Stratigrafisi, Bursa Güneyi.# Jura #Stratigraphic and Radiometric Data + #Stratigraphic Contributions to Geo + #Stratigraphic Evolution and Tecton + Stratigraphy and Evolution of the c + Stratigraphy of the Eastern Mediter + Stratigraphy, Structure, Metamorphi + Stratigrapy of the Miocene Volcanic + Streching of Hanging Wall in Region +

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Reproducing the Velocity and Stress Field in the Aegean Region# + Subduction Zone: the Aegean Arc fr + and Geological Data# Seismotectoni + late Boundary Derived from Focal Me s in the Mediterranean and Middle E + Western Mediterranean.# Seismi in ons of Low-Angle Normal Faulting: E + Anatolian Fault Zone Across the No + ture of the Central North Aegean Tr + ey and its Influence on Earthquake Fault Zone of the North Aegean Trou + asin Formation in Zones of Tectonic + ch# Crustal Deformatin in Western T + ic Rotations Along the North Aegean + Bains in Western Greece I Anatolie) Entre Salihli et Alașe + Complex in the Isparta Angle, South + stric Normal Faulting and the Recon + e Sea of Marmara Basin and the Nort + des Dinarides aux Taurides.# Esqu Western Turkey from Burdur Earthqua + of Geothermal Fluids in Seferihisar + d Lithosphere in the Mediterranean erranean-Alpine Region# Crust-Mantl + th Aegean Trough, Northern Aegean S + Cenozoic Extensional Detachment on in Turkey from Seismic Surface Wave he Aegean Sea: A Synthesis Based on + ern Mediterranean.# Deep Greece).# Inversion of the Crustal and its Tectonic Implication. # Thr ion Belt. # Tomographic Mapping of t + er and Mantle of Aegean Sea Region# + er Mantle of Aegean Sea Region.# 3- + ale Depuis le Miocene, Dans le Card + ion Sous le Pelaponnese.# Geometric + ent de I Arc Hellenique Externe: Le + la Mer Egee Preliminary Results of an Investiga + ean Sea.# Gravity Anomalies and Inf + ta. 1. Simultaneous Least Squares E + ta. 2. Simultaneous Least Squares E + # A Study of Crustal and Upper Man + avel Time Residuals and Gravitv# Cr + eseismic P-Wave Traveltime Residual Hellenides Obtained from Geophysic + Islands Evia and Crete, Greece, Ob + logy and rn Levant Continental Margin.# The ean Trough: an Active Strike-Slip D + antle in SE Europe by Inversion of + t Belt.# Tectonic Juxtaposition of ean Basin from Seismic Reflection D + ined by Robust Nonlinear Inversion + per Mantle: The Mediterranean Regio per Mantle.# Regional Scale Tectoni + h the Territory of Bulgaria.# Deep + Aegean Region# 3-D berian Peninsula: Evidence for Subd + n# Deep n.# Deep Part II: Phase Velocity and Travel + by Surface Waves, Part I: Group Vel + Complex (SW-Turkey) # On Petrology, eece from Inversion of Travel Times renches, South of the Hellenic Arc# and Basement in the Levant Sea.# N + h America: Mechanism of Uplift and + Flow, Seismicity and the Crustal yleigh Wave Dispersion.# Crustal ity Anomalies of W Turkey and Its I + f a Velocity Model Using 3-D Veloci + # The Median Aegean Crytalline Belt + the central Mediterranean. ion of Sa: Normal Models of Love Waves in + n Fault# Neotectonics of the Pontid + ean Area.# Large Scale P - Veolocit + n Area# Large-Scale P-Velocity vestigation of Geodynamical an Inferred from Ravleigh Wave Disp + d Rhodope Metamorphic Core Complex# + a.# Magnetic nd Tectonics. e Eastern Mediterranean.# Geophysic + n,# Preliminary Seismic ic Surface Wave and Seismotectonic otectonic Gravimetric Southern Europe.# Seismic Anisotro + IX. Geological Map of Rhodes Island + ontribution to Heat Flow Contouring + ontribution to Heat Flow Contouring + d Thermal Karst Within the Gemlik (+ Study and 2-D-Model-Ling of Cold an + Westeern Greece, and its Seismote + Study in the Gulf of Pataras Region +

Stress in the Overriding Plate of a + Stress Orientation from Geophysical + Stresses Along the Burasia-Africa P Stresses Associated with Earthquake + Stresses in the Region Azores - Spa + Stretching of hanging Walls in Regi Strike - Slip Motion from the North + Strike-Slip Deformation Zone# Struc + #Strike-Slip fault Geometry in Turk + Strike-Slip Fault into the Oblique #Strike-Slip faulting and related B Structural and Paleomagnetic Approa + Structural Constraints# Late Cenozo #Structural Development of Neogene Structural du Graben de Gediz (W de #Structural History of the Antalya Structural Pile of the Cyclades# Li #Structural Relationship Between th + Structurale de I Arc Egeen Externes Structure along N - S Direction in + Structure and Convection Mechanism #Structure and Dynamics of Subducte Structure and Dynamics of the Medit + #Structure and Evolution of the Nor + #Structure and Kinematics of Upper Structure and Possible Anisotrophy structure and Recent Evolution of t + Structure and Tectonics of the East Structure Beneath Calkidiki (North + Structure Beneath the Aegean Region + Structure beneath the Alpine Collis Structure Beneath the Crust and Upp Structure Beneath the Crust and Upp + Structure Beneath Turkey.# Crustal Structure de la Grece Nord Occident + Structure en Vitesse et en Attenuat + #Structure et Deformation d un Segm #Structure et Evolution Recente de + Structure in Southeastern Europe.# Structure in the Eastern Mediterran Structure in Turkey# Crustal Structure Modeling of Earthquake Da + Structure Modeling of Earthquake Da Structure of North - Western Turkey Structure of the Aegean Arc from Tr + Structure of the Aegean Region# Tel Structure of the Aegean Sea and the + Structure of the Aegean Sea and the + Structure of the Aegean Sea# Morpho Structure of the Central and Southe + #Structure of the Central North Aeg + #Structure of the Crust and Upper M Structure of the Cycladic Blueschis + Structure of the Eastern Mediterran + Structure of the Hellenic Area Obta + Structure of the Lithosohere and Up Structure of the Lithosphere and Up + Structure of the Lithosphere Benea: + Structure of the Lithosphere in the Structure of the Mantle Below the I + Structure of the Mediterranean Basi Structure of the Mediterranean Basi Structure of the Mediterranean Sea, Structure of the Mediterrarean Sea Structure of the Menderes Migmatite Structure of the North - Central Gr Structure of the Pliny and Strabo T Structure of the Sedimentary Strata Structure of Tibet and Western Nort + Structure of Western Anatolia# Heat + Structure of Western Turkey from Ra Structure# Some Remarks on the Grav Structure Technique.# Examination o + Structure, Metamorphism, Magmatism. #Structure, Stratigraphy and Evolut Structure.# Toward Understanding of Structures Along the North Anatolia + Structures in the Euro - Mediterran Structures in the Euro-Mediterranea + Structures of the Aegean Region# In Strucute of the Eastern Mediterrane Strymon Valley Detachment System an Studies in Cyprus and Biga Peninsul + #Studies in Historical Seismicity a Studies in the Aegean Sea and in th + Studies in the Eastern Mediterranea + Studies in the Hellenides.# Isostat Studies in the Mediterranean Area.# + Studies of the Aegean Region# Seism + Studies of the Marmara Sea Region# Studies of the Upper Mantle Beneath + Studies on the Dodecanese Islands. Studies, Their Present Status and C Studies, Their Present Status and C + Study and 2-D-Model-Ling of Cold an +

Cianetti, S.+ 1997 Mercier, J. L.+ 1987 Zanchi, A.+ 1993 Udias, A.+ 1991 North, R. D 1977 Udias, A. 1980 Sengör, A. M. C. 1987 Reilinger, R. E.+ 1995 Roussos, N.+ 1991 Barka, A. A.+ 1988 Mercier, J. L.+ 1991 Şengör, A. M. C.+ 1985 Zanchi, A.+ 1990 Simeakis, K.+ 1989 Brooks, M.+ 1988 Emre. T. 199n Waldron, J. W. F. 1984 Ridley, J. 1984 1995 Ermin. M.+ Aubouin, J.+ 1976 Ezen, Ü. 1991 Esder, T. 1000 Wortel, M. J. R.+ 1992 Mueller, S.+ 1993 Brooks. M + 1980 Gautier. P.+ 1993 Mindevalli, O. Y.+ 1989 Mascle, J.+ 1990 Papazachos, B. C.+ 1978 Christodoulou, A.+ 1988 Hashida, R.+ 1988 Spakman, W. 1989 Drakatos, G.+ 1991 Drakatos, G.+ 1991 Canitez, N.+ 1980 Sorel, D. 1992 Martin. C. 1988 Barrier, E.+ 1982 Martin, L. 1987 Papazachos, B. C.+ 1966 Woodside, J. M.+ 1970 Canitez, N.+ 1982 Crosson. R. 1976 Crosson, R. 1976 Nacioglu, A.+ 1001 Jacoby, W. R.+ Agarwal, N. K.+ 1982 1976 1975 Makris, J. Makris, J.+ 1977 Maley, T. S.+ 1971 1987 Ginzburg, A.+ Roussos. N.+ 1991 Papazachos, C. B. 1994 1993 Avigad, D. Sancho, J.+ 1973 Papazachos, B. C.+ 1997 De Jonge, M. R.+ 1994 De Jonge, M. R.+ 1994 Babuska, V.+ 1987 Ligdas, C. N.+ 1990 Blanco, M. J.+ 1993 Caputo, R.+ 1970 Caputo, M.+ 1970 Payo, G. 1969 Payo, G. 1967 Schuiling, R. D. 1962 Drakatos, G.+ 1989 Jongsma, D. 1977 Moskalenko, V. N. 1966 1993 Beghoul, N.+ Alptekin, Ö.+ 1990 1991 Ezen, Ü. Oral M. B. 1987 Drakatos, G.+ 1988 Dürr, S.+ 1978 Finetti. I. 1982 Stephens, C.+ 1977 Sengör, A. M. C.+ 1983 1989 Granet, M.+ 1989 Granet, M.+ 1994 Salk, M. 1980 Cloetingh, S.+ Dinter, D. A.+ 1993 1977 Ergün, M. 1975 Ambraseys, N. N. 1975 Morelli, C.+ Lort, J. M.+ 1974 1992 Chailas, S.+ 1976 Pavo, G. ______ Dađaşbilge, G. 1997 1997 Klingele, E.+ 1997 Plomerova, J. 1970 Mutti, E.+ Tezcan, A. K. 1979 1977 Tezcan, A. K. 1997 Eisenlohr, T.+ 1989 Melis, N. S.+

al and Isotopic Data gwwgewg gwewge + 1f of Corinth (Greece): Implication + East-West Extension in the Hell + for tructure of North - Western Turkey. ations of P Velocity in the Upper M + aragonite in Polymetamorphic Metaba + he Hellenic Arc: the Messiniakos, A irci, Alasehir and Gediz Earthquake + from Turkey.# A Paleomagnetic esus region by Precise Hypocenter D + tion in the Aegean and Surrounding + ding Area: Pn Velocity Variations# the Subducting Lithosphere in Gree Geophysical eophysical the Aegean Area# Paleomagnetic Zone.# The Paleomagnetic om Chalkidiki (Northern Greece), # P + Seismic ated Basin Formation in Zones of Te ath the Peloponnesus: First Result rthquake of 13 May 1995 Revisited f eophysical bet and Western North America: Mech + in the Thessaloniki and Chalkidiki + # A First Coincident Normal-Inciden + cesses?# Are Systematic Variations # Principles of the Palynologic n Spain.# The P - Wave Velocity Str + unda Arc, Indonesia.# The Slab of rranean Region.# Structure and Dyna + om Gravity Data# Study of the Crust + ection with the Mesozoic Tethys ection with the Mesozoic Tethys. First Result of a Microearthquake + Continental Collusion# Evolution o + sse et en Attenuation Sous le Pelap + nique Horizontale et Verticale de I + ique Horizontale et Verticale de I + s par Submersible.# Importance des on of Aegean Magmatism and Gedynami + eabeam Survey of the hellenic Trenc + Evolution of Crete Since the late M + Evolution of Crete since the Late M ean Bottom Seismograph Stations.# D + e and its Geodynamic Implications# + m the Pliocene to the Present# Chan + Andes and the Aegean. # A Continuum + e Andes and the Aegean# A Continuum + ing# Seismotectonics of the Boundar + ing.# Seismotectonics of the Southe + ansition# Earthquake Mechanisms of + inental Margin Tectonics: ina Turbidity Current.# Ionian Sea d Geophysics.# Sedimentary Basins o + he Atlantic Ocean. Indian Ocean. Re + Hellenic Arc.# Mediterranean Ridge + of the Hellenic Trenc: A Synthesis ions Attribuees au Messinien dans 1 + Surrection de I arc Hellenique.# A + gean Trough rsal in Western Crete.# Paleomagnet + es Geologiques dans de la Taurus Oc + uvements Egeens Depuis le Miocene S + stratigraphisce Undersuchungen im K + gesteine en he Mediterranean Area Estimated by Subducted Lithosphere Beneath the a Courbure Sud-Hellenique (Grece).# + n par Rapport aux Modeles Geophsiqu vzaları (Supradetachment Basin and la Deformation Ductile du Granite M enestres Recents a I extremite Orie + Hellenides Internes et Leur Extensi sur le Dodecanese Meridonal (Kasos, Karpathos, Rhodes).# Sur la Geolog + e Miocene Superieur: I Evolution Re + ation des Axes Principaux des Contr inary Objective Regionalization of mpensation in the Lower Crust Durin + imeter.# Continuous Gravity Measure + udies in the Mediterranean Area. Crustal Structure along N - S Direc + tructure and Possible Anisotrophy i + nts and Global Models of # Two Slow Gross Features of the Lithosphere - + Dispersion of ty.# Crustal Structure of the Medit + alyse Quantitative des Relations En +

of the Active Crustal Deformation i + Ctivity in the Iznik-Mekece Fault a + Aegean and ous Moment-Magnitude Determination +

n-Waves in the Aegean and thquake Catalogue for Turkey and

Study in the Light of New Geochemic + Study in the Western Part of the Gu + Study of a Normal Fault, Evidences + Study of Crustal and Upper Mantle S Study of Large - Scale Lateral Vari + Study of Margarite, Muscovite and P + Study of Neotectonic Basin Across t + Study of Normal Faulting in the Dem + Study of Quaternary Volcanic Rocks + Study of Seismicity in the Peloponn + Study of the Active Crustal Deforma + Study of the Aegean Sea and Surroun + #Study of the Crustal Thickness and Study of the Hellenic Arc# A Marine Study of the Mediterranean Sea# A G Study of the Neogene Formations of Study of the North Anatolian Fault Study of the Tertiary Intrusives fr Study of the Western Ionian Sea, # A Study# Strike-Slip faulting and rel Study# The Hellenic Subduction Bene + Study# The Kozani-Greva (Greece) Ea Study.# Indonesian Archipelago: A G Study.# Lithosphere Structure of Ti + Study.# Seismic Velocity Constrains Studying the Extending Aegean Crust Style Related to Plate Boundary Pro Subdivision of the Turkish Neogene. + Subducted Lithosphere Below Souther Subducted Lithosphere Beneath the S + Subducted Lithosphere in the Medite + Subducting Lithosphere in Greece fr #Subduction Beneath Eurasia in Conn + #Subduction Beneath Eurasia in Conn + Subduction Beneath the Peloponnesus Subduction Boundaries Formed During + Subduction Egeene Structure en Vite + Subduction et Expansion .# Neotecto Subduction et Expansion. # Neotecton + Subduction Helleniques: Observation + Subduction# Isotopic Characterizati Subduction to transform Motion: A S Subduction Zone and the Geodynamic Subduction Zone and the Geodynamic Subduction Zone Using Island and Oc Subduction Zone: a Tomographic Imag + Subduction Zone: the Aegean Arc fro Subduction Zones: Aplication to the Subduction Zones: Application to th + Subduction, Collision, and Arc Jump Subduction, Collision, and Arc Jump Subduction-Continental Collision Tr + Submarine Accretionary Prism.# Cont Submarine Canyons and the 1908 Mess Submarine geology and Geophysics an #Submarine Gravity Measuremnts in t Submerged Chain Associated with the Submersible Observations# Tectonics + Submersible.# Importance des Forma: Subsidence de la mer de Crete et la #Subsidence History of the North Ae Successive Miocene Geomagnetic Reve + sud de Beyschir (Turque).# Recherch Sud-Hellenique (Grece) # Sur les Ma + Südwest Anatoliens (Türkei).# Litho + Sudwest-Anatolien# Über die Smirgel Suları ve Kaplıcaları.# Türkiye Mad + Summation# Seismic Deformation in t + Sunda Arc, Indonesia.# The Slab of Superieur: I Evolution Recente de l Superposees et de Leur Significatio + Supradetachment Havzalar ve Rift Ha sur / extension Neogene de I Egee: #Sur I existence de Coulissements S sur I orogenese Alpine.# Les Zones #Sur la Geologie de I Egee: Regard sur le Dodecanese Meridonal (Kasos, #Sur les Mauvements Egeens Depuis l #Sur une Methode Simple de Determin Surface - Wave Tolmography. # Prelim + Surface Processes with Isostatic Co Surface Ship with the Graf Sea Grav #Surface Wave and Seismotectonic St + #Surface Wave Dispersion and Upper Surface Wave Dispersion.# Crustal S Surface Wave Propagation# Measureme Surface Waves Across North America. Surface Waves and Body Waves.# The Surface Waves Recorded in Athens.# Surface Waves, Part I: Group Veloci Surrection de I arc Hellenique.# An Surrounding Area# A Detailed Study Surrounding Area# Microearthquake A + Surrounding Area# Seismicity of the Surrounding Area# Toward a Homogene Surrounding Area# Travel times of P + Surrounding Area, 1881 - 1980.# Ear +

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Surrounding Area.# On Epicentre Map + Ergin K 1966 Papazachos, B. C.+ 1992 Yılmaztürk, A. 1989 Kuno. H 1959 Horvath, F. 1984 Dewey, J. F.+ 1979 McKenzie, D. P. 1978 McKenzie, D. P. 1978 Drakatos, G. 1989 Çağlar, I. 1995 Watson, J. A.+ 1969 Demirörer, M. 1971 Vogt, P. R.+ 1969 Vogt, P. R.+ 1969 Le Pichon, X.+ 1979 Hatzfeld, D.+ 1990 Barazangi, M.+ 1060 Makris, J. 1975 Allan, T. D.+ 1965 Foose, R. M. 1985 Hisarlı, M. 1995 Papazachos, B. C. 1973 Angelier, J.+ 1981 Ersoy, Ş. 1995 Robertson, A. H. F.+ 1984 Pınar, A. 1998 Yılmaz, P. O. 1984 Hayward, A. B. 1984 Yaġmuroğlu, F.+ 1997 Eyidoğan, H.+ 1996 tavmaz, T.+ 1992 Kurt. H. 1994 Kurtuluş, C. 1985 Özhan, G.+ 1985 Ridley, J. 1984 Bellon, H.+ 1979 Mascle, J.+ 1990 Le Pichon, X.+ 1982 Huchon, P.+ 1982 tavmaz. T.+ 1992 Pfister, M. 1997 Angelier, J.+ 1982 Şenöz, M. 1998 Dixon, J. E.+ 1987 Maluski, H.+ 1987 Ridley, J. 1984 Kaya, O. 1982 Straub, C.+ 1994 Oral, M. B. 1994 Şeber, D.+ 1997 Dinter, D. A.+ 1993 Burchfiel, B. C. 1980 Le Pichon, X.+ 1979 Greber, E.+ 1997 Panza, G.F.+ 1980 Suhadolc, P.+ 1990 Reilinger, R. E.+ 1997 Kahle, H.-G.+ 1993 Hatzfeld, D.+ 1996 Nicholson, C.+ 1986 Le Pichon, X.+ 1979 Le Pichon, X.+ 1979 Royden, L.+ 1989 Tapponnier, P. 1977 1974 Karig, D. E. 1990 Koçak, A. Filiz, S.+ 1995 Poisson, A. 1990 Utku, M. 1997 Aubouin, J. 1973 1981 Sovsal, H.+ Ricou, L. E.+ 1979 Kissel. C.+ 1993 Aubouin, J.+ 1976 1990 Poisson, A. 1984 Ricou, L. E.+ Poisson, A.+ 1984 1971 Brunn, J. H.+ 1976 Brunn, J. H. Graciansky, P. C. 1972 1977 Monod, O 1985 Gürbüz, C.+ Drakatos, G.+ 1988 Astaras, TH.+ 1990 1990 Savascin, M. Y.+ Caputo, R. 1990 Şengör, A. M. C.+ 1981 1983 Kasapoğlu, K. E.+ Billiris, H.+ 1991 1995 Thatcher, W. 1982 Angelier, J.+ Yılmaz, P. O. 1983 Seyitoğlu, G.+ 1996 Şengör, A. M. C.+ 1985 1994 De Jonge, M. R.+ De Jonge, M. R.+ 1994 1991 Okay, A. I.+

Surrounding Area. # Orientation of A + Surrounding Area: Pn Velocity Varia + Surrounding Areas# Origine of Cenos Surrounding Mountain Belts: Alps, C Surrounding Region: Complex Multipl + Surrounding Regions (Tectonics of A Surrounding Regions# Active Tectoni Surrounding Regions. # Seismic Tomog + Survey and its Connection between G Survey in the Mediterranean. # The M + Survey of Çanakkale Tuzla Area.# Ge + Survey of the Eastern Mediterranean Survey of the Eastern Mediterranean Survey of the hellenic Trench Syste + Survey# The Strain Pattern in the W Survey, Epicenter Data, 1961 - 1967 Survey.# Crustal Structure of the A Surveys in the Mediterranean and Re Surveys of the Mediterranean Region Susurluk Bölgesinin Curie Nokta Der + Surrounding Area and its Tectonic + SW Anatolia Since the Late Miocene. SW Anatolia, Eşençay Graben# Graben + SW Segment of the Antalya Complex, SW Turkey# Source Inversion of the SW Turkey.# Fossil and K-Ar Data fo + SW Turkey. # Miocene Clastic Sedimen + SW Turkey. # Relation of Alkaline Vo SW Turkey.# The October 1, 1995, Di 4 SW Turkey: a Synthesis of Seismolog 4 Sığ Deniz Sismiği Verilerinin Değer Sığ Sismik Etüdü Raporu.# Gemlik Kö + Sığ Sismik Etüdü Raporu.# Marmara D Synmetamorphic Structural Pile of t Synthese# Les activities magmatique + Synthesis Based on Continuous Refle + Synthesis Incorporating New Sea-Bea Synthesis of Sea-Beam and Submersib + Synthesis of Seismological and Geol + #Synthesis of the MARMARA Poly-Proj Synthesis# The Tectonic Development + Sınırı) Uzantılarının İzmit Körfez #Syros Syros (Greece). # Dating Metamorphic + Syros# The Significance of Deformat + Sırt Yitmesi: Doğu Ege Bölgelerinin + System (GPS) Estimates of Crustal D + System (GPS) Measurements in Turkey + System (GSI) # Middle East Tectonics System and Rhodope Metamorphic Core + System and the Carpathian Orocline + System# From Subduction to transfor System# Hydraulic Level Variations System in Europe from Seismic Surfa + System in Europe.# Physical Propert System Measurements of Present-day System# Monitoring West Hellenic Ar System of the Gulf of Corinth (Gree System, Southern California.# Seism System: A Key to the Neotectonic Ev + System: A Key to the Neotectonic Ev Systematic Variations in Thrust Bel Systeme Alpin en Mediterraneane; Po + Systems in the Western Pacific. # Ev Systems in Western Anatolia# An App Systems of the Gediz Basin (on the Systems of Thrust Sheats Along a NN + Tansör Ters Çözümüyle Türkiye Depre Tarditectonique, Neotectonique. # De Tarihsel Deprem Kataloğu.# Türkiye Taurides Occidentales.# L al Lochto Taurides Thrust Belt East of the Is Taurides.# Esquisse Structurale de Taurides. The Imbricate Systems of Taurides: One or Several Ocean Basi Taurids): A Mesozoic Paleorift.# Is Taurids. # Outline of the Geology of Taurique et Ege: Collision et Arc I Taurus Lycien Occidental.# Reserche + Taurus Occidental au sud de Beyşehi + Taşocağı Patlatmalarından Elde Edil + Technique.# Examination of a Veloci + Techniques for Mapping Geological a Tectonic Activities in Western Turk Tectonic Along the Active Nea Anchi + Tectonic Approach.# Tethian Evoluti #Tectonic Consequences of the Colli Tectonic Deformation in Central Gre + Tectonic Deformation# Microplate Ve + Tectonic Development of the Helleni + Tectonic Enigma.# The Alakır Çay Un + Tectonic Escape VS Back-Arc Spreadi + Tectonic Escape: Turkey as a Case S + Tectonic Evolution and the Seismic + Tectonic Evolution and the Seismic

of Turkey and ctive Faulting in the Aegean and tions# A Geophysical Study of the A + oic Petrographic Provinces of Japan + arpathians and Dinarides.# Neotecto ate and Continuum Tectonics in a Co egean Region)# Active Tectonics of cs of the Alpine-Himalavan Belt: th raphy - Determination of High and L eothermal Parameters in the Earth.# + arine Geophysical ophysical

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Sea and its Interpretation. # An Ae m# From Subduction to transform Mot estern Hellenic Arc Deduced from a # World Seismicity Map from ESSA egean Sea and the Hellenides Obtain d Sea During the Period 1961-1964.# # Geological Information from Satel inliklerinin Saptanması.# Edremit -Implication# Distrubution of Seismi # Analyses of Fault Mechanisms and Formation in the Collisional Belts Turkey as a Mesozoic - Tertiary Tet + October 1, 1995 Dinar, Earthquake (r the Age of the Antalya Complex.

tation Related to the Emplacement o + lcanism and Active Tectonism within + nar Earthquake,

ical and Geological Observations# T + lendirilmesi# Yedikule-Büyükçekmece + rfezi Yüksek Ayrımlı

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olution of Arc roach to Occurrence of the Geotherm + Aegean Region of Turkey)# High Boro W-SSE Transeci.# Neogene Thrust Bel +

mlerinin Analizi# Sismik Moment s Tectoniques Superposees et de Leu + ve Çevresinin

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nduits.# L Arc Concave Zagro -Tauri + s Geologiques dans le r (Turque).# Recherches Geologiques

en Sismilk Kayıtların Değerlendiril ty Model Using 3-D Velocity Structu nd Geomorphological Features in the ey# Relationship Between Magmatics alos Fault Zane (Central Greece).# on of Turkey: a Plate

sion of the Arabian and Eurasian Pl + ece from 1900 to 1988# Geodetic Det rsus Continuum Descriptions of Acti + c Arc and the Sea of Crete: A Synth + it, Antalya Complex: a

ng VS Orogenic Collapse# The Cause + tudy# Strike-Slip faulting and rela Velocity Structure of the Lithosphe + Velocity Structure of the Lithosphe + nsula, Northwest Yurkey.# Geology a + Tectonic Evolution of the Biga Peni +

Arc Since the Late Miocene #Tectonic Evolution of the Hellenic + gean Trough Results for Albania (U. Cretaceous- + magnetic Inclination Anomalies. Is Tectonic Explanation?# Aegean Paleo ntinental Convergent Boundaries# Th vity Form ERS-1 Geosat and Seasat R hquake regions of Turkey. # Relation Tectonic Features of the Aegean Arc # Geophysical and n of Miocene Evaporites in the Medi + of Seismic Foci in the Mediterranea ism of Earthquake in Western Turkey Tectonic Implication.# Focal Mechan ional Seismic Attenuation Structure + lasehir Graben (West Turkey) and it Tectonic Implications# Age of the A he Büyük Menderes Graben (West Turk Tectonic Implications# The Age of t from Western Turkey.# Cross Faults + Results of 1988 and 1990 GPS Measu Tectonic Implications.# Preliminary cale Geodetic Measurements (VLBI, S #Tectonic Interpretation of Large S h Anatolian Fault Zone Between Erzi + sts and Greenschist in Sifnos Islan + t Palaeomagnetic Results from the C + Tectonic Models in the Aegean# Firs an Area from Laser Ranging to LAGEO + st Mediterranean of Modern Convergent Margins - Res + #Tectonic Processes along the Front Zones in Jugoslavia. # Contemporary + Tectonic Properties of Some Active ntle Model: An Application to the A + a: A Plate Boundary in an Escape tectonic Regime.# The Sea of Marmar ns During the Cenozoic.# Extensiona + a# Magmatic Activities of Cepozoic + and Rotations. # The Continuation of Tectonic Regimes, Fault Kinematics Rock Association# Characteristic an + tectonic Setting of the Shoshonite of the Alpine-Mediterranean Tectoni + Tectonic Significanca in the Frame res of Deformed Grains in the Augen + sses from the Southern Menderes Mas + -Aegean Region# Plate Faulting in the Area of Greece. #Tectonic Units of Anatolia he Armutlu Peninsula (NW Turkey) an + obal Positioning System# Monitoring + ialos Fault Zone (Central Greece)# + cs (WHAT A CAT) Using the Global Po + zoic - Tertiary Antalya Complex.# M + rranean Sea# The Tectonics and Geology of the Medite Fault Cenozoic Basin Development in Weste + Tectonics and Seismicity.# Greek n Arc: Comparison with the Andean C + iment.# Strain Results and f the Kinematics of Central Greece + Tectonics# Geodetic Determination o ean and Surrounding Region. Complex + Akyazı/Adapazarı (Pontides, Northw + Tectonics in an Extending Orogen.# Angle Normal Faults in the Ba + Low ean# Geological Evidence Concerning + ples of Geological Observations on Active Tectonics in the Hellenic Trench.# f Cenozoic Extensional ic Escape VS Back-Arc Spreading VS + Magmatism in Plate quences at the Western Margin of th + Active Tectonics of the Aegean Region# Act ive smicity and tive View.# The elt Between Western Turkev and Paki + Tectonics of the Alpine Himalayan B elt: the Aegean Sea and Surrounding + elt: the Aegean Sea and Surrounding ean Ophiolites# Regional ean Region# New Constraints an Age + ean Region: Deduced From GPS, Neote + ean.# Deep Structure and Tectonics of the eastern Mediterran ean: A Geophysical Review# The sure of the Africa - Eurasia - Nort + Synthesis of Sea-Beam and Submersi + n of Turkey: New Evidence from Micr + on# Active on# Plate Tectonics of the North and Central Aegean Sea.# Active late n region: A Tectonics.# Eastern European Alpine System and the Carpathian Orocline + Tectonics.# Seismology and the New Global eismicity and ic Information System (GSI) # Middle + Tectonics: Submarine Accretionary P rism.# Continental Margin Tectonique de L Asie.# La terraneane; Poinconnement et Ecrase Tectoniques Superposees et de Leur Signification par Rapport aux Model + sparta Angle, SW Turkey.# Relation Tectono-Metamorphic Evolution of a Dismembered Ophiolite (Tinos, Cycla da Yüzev Dalgalarının Dispersiyonun + e Üst Mantonun Yapısı.# Yapay Sismo es aus Grossen Anatolischen Erdbede + ben).# Gediz Grabeninin Jeolojisi v + raben (Salihli-Alasehir).# Gediz Gr + Tektoniği Açısından Ege Bölgesindek + i Yeri# Uşak Volkanitlerinin Petrol + Tektoniği ve Çökel Kalınlığı.# Ege + Denizi Fay .# Kuzevbati Anadolu nun Tektoniği ve Volkanizması# Batı Ana + dolunun Genç

Angelier, J. #Tectonic Evolution of the North Ae + Lyberis, N Tectonic Evolution.# Paleomagnetic + Mauritsch, R.+ Beck Jr, M. E.+ Tectonic Expression Slab Pull at Co + Royden, L. H. Tectonic Fabric.# Global Marine Gra + Sandwell, D. T.+ Tectonic Features and the Main Eart + Ketin, I. Papazachos, B. C.+ #Tectonic Framework and Distributio + Mulder, C. J. Tectonic Implication# Distrubution + Papazachos, в. с. Alptekin, Ö. Tectonic Implication.# Three Dimens + Hashida, R.+ Seyitoğlu, G.+ Sevitoğlu, G.+ Tectonic Implications with Examples + Şengör, A. M. C. Oral, M. B.+ Mantovani, E.+ #Tectonic Investigation on the Nort + Tatar, Y #Tectonic Juxtaposition of Blueschi + Avigad, D. Morris A + #Tectonic Motion in the Mediterrane + Cenci, A.+ #Tectonic Patterns in the Easternmo + Kempler, D. von Huene, R. Arsovsky, M. Tectonic Reconstruction to Upper Ma + De Jonge, M. R.+ Wong, H. K.+ Tectonic Regimes in the Aegean Basi + Mercier, J. L.+ Tectonic Regimes in Western Anatoli + Savaşçın, M. Y. Mercier, J. L.+ Morrison, G. Mauritsch, R.+ Tectonic Significance# Microstructu + Bozkurt, E.+ Tectonic Significance of Augen Gnei + Bozkurt, E.+ Tectonic Situation in the Anatolian + Mueller, S.+ #Tectonic Stress Field and Seismic + Papazachos, B. C.+ Ketin, 1. Tectonic.# The Thermal Springs of t + Eisenlohr, T. Tectonics (WHAT A CAT) Using the Gl + Kahle, H.-G.+ Tectonics Along the Active Nea Anch + Caputo, R.+ Tectonics and Calabrian Arc Tectoni + Kahle, H.-G.+ Tectonics and Evolution of the Meso + Robertson, A. H. F. Ryan, W. B. F.+ Tectonics and Heat Flow in Europe # + Meier, R.+ Tectonics and Sedimentation.# Late + Sevitožlu. G.+ Makropoulos, K.+ Tectonics Associated with the Aegea + Mercier, J. L. Tectonics from the Aegean GPS Exper + Gilbert, L. E.+ Le Pichon, X.+ Tectonics in a Convergent Zone# Aeg + Dewey, J. F.+ Tectonics in an Area of Seismicity: + Greber. E. Wernicke, B. Tectonics in the Eastern Mediterran + Ryan, W. B. F.+ Tectonics in the Hellenic Arc: Exam + Angelier, J. Le Pichon, X.+ Tectonics in West Turkey.# Timing o + Seyitoğlu, G.+ Tectonics in Western Turkey: Tecton + Sevitoğlu, G.+ Tectonics# Metamorphism and Related + Miyashiro, A. Tectonics Neogene and Quaternary Se + Brooks, M.+ Anderson, H.+ Tectonics of the Adriatic Region.# + Jackson, J. Kuleli, H. S. Tectonics of the Aegean Region# Sei + Tectonics of the Aegean: an Alterna + Jackson, J. A.+ Jackson, J.+ Tectonics of the Alpine-Himalayan B + McKenzie, D. P. Tectonics of the Alpine-Himalayan B + McKenzie, D. P. Dilek, Y.+ tectonics of the Eastern Mediterran + Tectonics of the Eastern Mediterran + Barka, A. A.+ Tectonics of the Eastern Mediterran + Barka, A. A.+ Papazachos, B. C.+ Tectonics of the Eastern Mediterran + Lort, J. M. Tectonics of the Gloria Fault.# Clo + Argus, D. F.+ #Tectonics of the Hellenic Trenc: A + Huchon, P.+ #Tectonics of the Marmara Sea Regio + Evans, R.+ McKenzie, D. P. Tectonics of the Mediterranean Regi + McKenzie, D. P. Tectonics of the Mediterranean Regi + Taymaz, T.+ Gill. J. Tectonics# Orogenic Andesites and P + Pavlides, S. B.+ Tectonics Papadox?# The North Aegea + Burchfiel, B. C. Isacks, B. L.+ Ambraseys, N. N. Tectonics.# Studies in Historical S + Tectonics: Applications of Geograph + Şeber, D.+ Moore, J. C.+ Argand, E. Tapponnier, P. Tectonique du Systeme Alpin en Medi + Aubouin, J. Yağmuroğlu, F.+ Tectonism within the Evolution of I + Katzır, Y.+ Tekniği ile Asya, Avrupa ve Afrika 4 Tekniği ile Batı Türkiye de Kabuk v + Canitez, N. Horasan, G. A.+ Ketin, I. Tekronisch - Mechanischen Folgerung + Tektoniği (Geology of the Gediz Gra + Emre, T. Tektoniği (Tectonics of the Gediz G + Emre, T. T.+ Ercan, Eryilmaz, M.+ Isseven, T.+ Tektoniği ve Paleomagnetic Sonuçlar + Ercan, T.

1978

kın Cevresinin Depremselliği ve Akt + nün (Neojen) Stratigrafisi ve SOT 1# Bati Anadolu nun Genç i.# Deprem Odak Mekanizması Cözümle y Anadolu Fayı (Levha Sınırı) Uzant + Bölgeleri Arasındaki İlişkiler# Tür + n Kuzey kanadının Stratigrafisi ve Mikro Bloklarının Paleomagnetizması + n Paleomagnetismas: ve olu Depremlerinin Odak Mekanizmalar + ermal energi Olanakları,# Gediz Vad + esiminde Kuzey Anadolu Fay Zonunun + ir Mikro - Bölgelendirme Denemesi.# + maları Acısından İrdelenmesi # Anad + Türkiye.# Saros Körfezi Dolaymı + i . sı# Türkiye Diri Fay Haritası ve Ak + i nin Deprem Etkinliği ve Aktif eitrage zur Erforschung des Tektoni + I. Uber den Tektonischen Bau der In + Güneyinde Üste Doğru Kalınlaşan N + h Seismicity in the Aegean Defined + Trough Slabs. duals and Deep Structure of the Aeg + te and Paragonite in Polymetamorphi + aklasm (Selimive-Muğla)# Menderes arge-Scale Continental Extension# E + y 17 Kafallinia Event of Ionian Isl + on in the Mediterranean Area Estima + tal Velocity Field in the Deforming + formation in the Mediterranean and n Events in the Central-Eastern Med + k Anadolu ve Cıvarında Kabuk ve Üst + f the Plate Boundary Through New Ze + the Marmara Region. # Long ezi Sizmogien Vlore - Diber. Arc Egeen (Iles Ioniennes, Acarnan + ic Blueschist Belt (Aegean Sea).# U + e Akrotiri Unit on the Island of Ti + # Cooling During the Exhumation of remblement de rmination of Crustal Movement in Tu + ure of the Lithosphere Beneath the + nluk Dağılımının Saptanması.# Yinel + n Analizi# Sismik Moment Tansör lgelerinin Yapısı ve Magmatikliği I + ine des agaischen Raumes und der be cks from Central and Western Anatol + te Tectonics and Evolution of the M + magnetic Evidence for a Large Count he Northern Colorado River Region, the Southern Menderes Massif, Weste + Northwestern Greece: Pleomagnetic + the Aegean Arc: a Paleomagnetic Rec (Northern Greece).# Paleomagnetic n.# The SW Segment of the Antalya C + Volcanism in the Aegean Region f Volcanism in the Aegean Region Palaemagnetic data from atism of the Aegean- Western Anato + te Tectonic Approach. W Segment of the Antalya Complex, T + e Pamirs since the Lias.# Geologica + in Connection with the Mesozoic .# Alpine Deformation and the Ocean + a Neo in Connection with the Mesozoic of Marble Assemblages During the Ba + ce# Metamorphism of palaeozoic Schi + op into a New Marine al Properties of the Lithosphere.# on to Heat Flow Contouring in Turke on to Heat Flow Contouring in Turke ectonic.# The Thermal Springs of th Rupture Process and Spectra of Some Rupture Process and Spectra of Some ic Evolution of the Dinarides, Alba + Mechanism of Earthquake in Western minary Results of 1988 and 1990 GPS Frame of the Alpine-Mediterranean T + tructures of Deformed Grains in the + nsion Directions and Tectonic Model Mecanique Elementaire Applique a I he Hellenides, and the Sea - Floor an Paleomagnetic Inclination Anomal rsa) Area of Northwestern Turkey# E nsula (NW Turkey) and their Relatio + el Variations in a Thermal Water We + pitation on the Cekirge Thermal Wat + eological Investigation of the Göne + ihisar Area, Izmir (W-Turkey)# Chem +

ion.# IAH Map of Mineral and mal energy in Turkey# The Research +

Bölgesinin Tektoniği ve Yapısı.# Saros Körfezi + Tektoniği.# Batı Anadolu nun Aktüel + Tektoniği.# Batı Anadolunun Aktüel Tektoniği.# Güneybatı Anadolu ve Ya + Tektoniği.# Orta Doğu Ege Çöküntüsü + Tektoniği.# Orta Torosların Post Eo + Tektoniğinin Jeomorfolojik Sonuçlar + Tektonik Birimlerinin Biçim Değişim + Tektonik Denizaltı Havzaları.# Kuze + Tektonik Durumu ile Başlıca Deprem + Tektonik Evrimi# Menderes Masifi ni Tektonik Evrimi.# Bat: Anadolu nun + Tektonik Gelişimi.# Bat: Anadolu nu + Tektonik ile İlişkileri.# Batı Anad + Tektonik Olaylar ve Buna Bağlı Jeot Tektonik Özelliği.# Kelkit Vadisi K + Tektonik Yapılar ve İstanbul İçin b + Tektonik Yapılarının Deprem Mekaniz + Tektonik Yerleşimi, Kuzey Ege Deniz + Tektonikle İlgili Çalışmalara Katkı + Tektonikle Ilişkisi# Marmara Bölges + Tektonischen Bau der Insel Naxos# B + Tektonischen Baues Griechenlands. Tektonosedimenter Gelişimi.# Salihl + Teleseismic Data# Intermediate Dept + #Teleseismic P - Wave Transmission #Teleseismic P-Wave Traveltime Resi TEM-AEM Study of Margarite, Muscovi + Temel-Örtü Ilişkisine Yapısal Bir Y + Temperature-Dependent Rheology on L + Tensor Inversion of the 1983 Januar + Tensor Summation# Seismic Deformati + Tensors of Earthquakes# The Horizon + Tensors, and the Rates of Active De + #Tentative List of Major Deformatio + Tephra# Santorini Tepki Fonksiyonlarından Yararlanara + Term Deformation. # The Kinematics o + Term Seismicity of Istanbul and of #Termeti I 30 Nendorit 1967 dthe Br Termination Nord - Occidentale de I Terrains: The Example of the Cyclad + Terrane of Late Cretaceous Age.# Th + Terrane: Sifnos (Cyclades), Greece. Terre de Yenice 1953 Mars 18.# Le T Terrestrial Geodetic Methods. # Dete + Territory of Bulgaria.# Deep Struct + Ters Çözüm Yöntemi ile Yeraltı Yoğu Ters Çözümüyle Türkiye Depremlerini + #Tersiver Surt Yitmesi: Doğu Ege Bö + tertiaren und quartaren Ergussgeste tertiary and Quaternary Volcanic Ro Tertiary Antalva Complex. # Micropla + Tertiary Clockwise Rotation.# Paleo Tertiary Continental Extension in t Tertiary Extensional Shear Zone in #Tertiary Geodynamical Evolution of Tertiary Geodynamical Evolution of Tertiary Intrusives from Chalkidiki Tertiary Tethyan, Continental Margi #Tertiary to Qaternary Evolution of #Tertiary to Quaternary Evolution o Tertiary Units of the North Aegean# #Tertiary- Quaternary Alkaline Magm #Tethian Evolution of Turkey: a Pla Tethyan, Continental Margin.# The S Tethys Belt from the Atlantic to th Tethys# Subduction Bereath Eurasia Tethys, Mediterranean, and Atlantic Tethys. # Historie et Topologie de 1 Tethys.# Subduction Beneath Eurasia #Textural and Izotopic Development Textural and Microstructural Eviden Theatre.# Offshore Greece may Devel their Implications for the Mechanic + Their Present Status and Contributi Their Present Status and Contributi their Relationship to Geology and T Their Seismotectonic Implications# Their Seismotectonic Implications# + their Significance for the Geodynam + their Tectonic Implication.# Focal their Tectonic Implications.# Preli their Tectonic Significanca in the their Tectonic Significance# Micros Their Implications for Miocene Exte Theorique et Numerique d un Modele Theory.# The Canadian Cordillera, t There a Tectonic Explanation?# Aege Thermal Karst Within the Gemlik (Bu + Thermal Springs of the Armutlu Peni + Thermal Water System# Hydraulic Lev Thermal Water Well: Impact of Preci + Thermal Waters (NW Turkey).# Hydrog + Thermal Waters from the Cesme-Sefer Thermal Waters of Turkey Aegean Reg + Thermomineral Resources and Geother +

Sarı, C.+ 1995 Kocaefe, S. S + 1982 Kocaefe, S.+ 1976 Kalafat, D. 1988 Kava, O. 1979 Akay, E.+ 1988 Erol. O 1982 Yoğurtcuoğlu, A 1986 Şenöz, M. 1998 Ketin, I. 1969 Erdožan, B.+ 1992 Orbay, N.+ 1995 Orbay, N.+ 1993 Alptekin ö 1978 Karamanderesi, I. H.+ 1982 Seymen, I. 1975 Barka A A 1991 Kalafat, D. 1995 Saner, S. 1985 Sarožlu F + 1997 Üçer, B. S. 1990 Trikkalinos, T. K. 1947 Trikkalinos, T. K. 1947 Yağmurlu, F. 1987 Hatzfeld, D.+ 1992 Sleep, N. H. 1973 Agarwal, N. K.+ 1976 Feenstra, A. 1996 Öztürk, A.+ 1983 Sonder, L. J.+ 1989 Kiratzi, A. A.+ 1991 Pondrelli, S.+ 1995 Jackson, J.+ 1992 Jackson, J.+ 1988 Babbucci. D.+ 1997 Ninkovich, D.+ 1965 Osmansahin, I. 1989 Walcott, R. T. 1984 Ambraseys, N. N.+ 1991 Sulstarova, E.+ 1969 Amorese, D. 1993 Avigad, D.+ 1991 Patzak, M.+ 1994 Avigad, D.+ 1992 Diligan, H.+ 1955 1993 Deniz, R.+ Babuska, V.+ 1987 Sarı, C.+ 1985 Utku, M. 1997 Kava, O. 1982 Paraskevopoulos, G. M. 1956 Innocetti, F.+ 1977 Robertson, A. H. F. 1990 Edel, J. B.+ 1992 Lister, G. S.+ 1989 Bozkurt, E.+ 1996 Kissel, C.+ 1985 Kissel, C.+ 1988 Kondopoulou, D. 1985 Robertson, A. H. F.+ 1984 1984 Fytikas, M.+ 1984 Fvtikas, M.+ Kondopoulou, D.+ 1984 Francalanci, L.+ 1990 Sengör, A. M. C.+ 1981 Robertson, A. H. F.+ 1984 Dercourt, J.+ Spakman, W. 1986 1986 Smith. A. G. 1971 1987 Marcoux, J. Spakman. W. 1986 Baker, J.+ 1994 Bozkurt, E. 1996 West, J. Chen, W. P.+ 1973 1983 Tezcan, A. K. 1979 1977 Tezcan, A. K. 1997 Eisenlohr, T. Pinar, A. 1995 1995 Pinar, A. Mauritsch, H. J.+ 1995 Alptekin, Ö. 1973 1993 Oral, M. B.+ Mauritsch, R.+ 1991 Bozkurt, E.+ 1997 1996 Morris, A.+ Carey, E.+ 1974 1972 Dercourt, J. 1994 Beck Jr. M. E.+ Eisenlohr, T.+ 1997 1997 Eisenlohr, T. 1997 Greber, E.+ 1997 Greber, E.+ 1997 Yalcın, T. 1995 Conrad. M. A.+ 1983 Canik, B.+ Erentöz, C.+ 1968

Oral. M. B 1994 Ligdas, C. N.+ 1993 Hatzidimitriou, P.+ 1992 McKenzie, D. P.+ 1983 Tsokas, G. N.+ 1997 Sarı, C.+ 1995 Wong, H. K.+ 1969 England, P. C.+ 1985 Chabalier, J. B.+ 1992 Hovland, J.+ 1981 Aki, K.+ 1976 Hashida, R.+ 1988 Hatzfeld, D + 1992 Walcott, R. I. 1984 Kissel, C.+ 1993 Poisson. A. 1990 Royden, L.+ 1989 Poisson, A 1990 Morris. A. 1995 Frizon de Lamotte, D.+ 1995 Beghoul, N.+ 1993 England, P.+ 1989 Innocenti, F.+ 1981 Papazachos, B. C. 1992 Zielhuis, A. 1992 Comninakis, P. E.+ 1980 Jacoby, W. R.+ 1982 Gregersen, S. 1977 DeMets, C.+ 1994 Spakman, W.+ 1993 Spakman, W.+ 1987 Spakman, W. 1988 Delibasis, N.+ 1965 Aki, K.+ 1976 Panagiotopoulos, D. G.-1985 Papazachos, B. C.+ 1997 Drakatos, G.+ 1989 Pavo, G 1969 Seyitoğlu. G.+ 1992 Mercier, J. L.+ 1991 Avigad, D.+ 1989 Patzak, M.+ 1994 Yilmaz, Y. 1981 Yılmaz, Y. 1981 Martinez, M. D.+ 1997 Kuleli, H. S. 1992 Küleli, H. s. 1992 Spakman, W.+ 1988 Spakman. W. 1985 Ligdas, C. N.+ 1991 Spakman, W. 1989 Plomerova, J. 1997 Ligdas, C. N.+ 1993 Drakatos, G. 1989 Van der Hilst, R. D.+ 1997 Stavrakakis, G. N.+ 1997 Papadopoulos, G. A. 1997 1997 Drakatos, G.+ Papazachos, C. B.+ 1995 Papazachos, C. B.+ 1995 1993 Spakman, W.+ Le Meur, H.+ 1997 Alessandrini, B.+ 1995 1991 Spakman, W. Spakman, W.+ 1987 Spakman, W. 1988 1995 Wessel, P.+ 1987 Marcoux, J. Koçyiğit, A. 1990 1983 Sarožlu, F.+ Akay, E.+ 1988 Frizon de Lamotte, D.+ 1995 1989 Kava, O.+ Allan, T. D.+ 1970 1988 Barka, A. A.+ 1994 Jovilet, L.-1990 llkişik, O. M. Papazachos, B. C.+ 1997 1977 Stephens, C.+ Barton, M.+ 1983 1997 Drakatos, G.+ 1988 Ezen, Ü. 1983 Ü. Ezen. 1995 Tapırdamaz, C.+ 1979 Ercan, T. Poisson, A. 1990 1985 Scordilis, E.+ 1979 Le Pichon, X.+ Dora, O. ö. 1972 1997 Baker, C.+ Lallemant, S.+ 1994 Sleep, N. H. 1973 1996 Hirn, A.+ Spakman, W.+ 1993 Jacoby, W. R.÷ 1982 1977 Gregersen, S. Panagiotopoulos, D. G.+ 1985

Thessaloniki and Chalkidiki Areas (+ Thessaloniki.# Seismotectonic Evide + Thickening, Paleomagnetism, Finite Thickness and the Subducting Lithos Thickness of the Sediments in the A + #Thicness of Unconsolidated Sedimen Thin Viscous Sheet Model.# Length S Three - Component Seismograms. # A D + #Three - Dimensional Seismic Veloci + Three - Dimensional Velocity Anomal + #Three Dimensional Seismic Attenuat + Three-Component Seismograms# A Deta Through New Zealand: a Comparison o + Thrust Belt East of the Isparta Ree + Thrust Belt in Western Taurides. Th Thrust Belt Style Related to Plate Thrust Sheets Along a NNW-SSE Trans + Thrusting and Basin Closure in East Thrusting in the Core of the Ispart Tibet and Western North America: Me Tibetian Plateau. # Extension During Time - Space Distribution and Geote Time and Magnitude Predictable Mode + Time and Waveform Inversion.# S - W Time Distribution of the Intermedia Time Residuals and Gravity# Crustal + Time Residuals Caused by a Dipping Time Scale on Estimates of Current Time Tomography of the Europe - Med + Time Tomography.# Imaging Algorithm + Time Tomography.# Upepr Mantle Dela Time Variation of Strain Release in + Times from Local Earthquakes. 1. A times of Pn-Waves in the Aegean and + Times# P and S Deep Velocity Struct + Times.# 3-Dimensional Velocity Stru + Times.# Crustal Structure of the Me #Timing of Cenozoic Extensional Tec + Timing, Tectonic Regimes, Fault Kin + Tinos Island, Cyclades, Greece.# Lo Tinos, Cyclades, Greece: Witness to + Tip Bir Kıta Kenarına Dönüşümüne Tü + Tip Bir Kıta Kenarının Pasifik Tip + Tolmography. # Preliminary Objective + Tomografi ile Üç Boyutlu Modellenme + Tomografi ile Üç Boyutlu Modellenme Tomographic Image and its Geodynami + Tomographic Image of the Upper Mant + Tomographic Images in the Aegean Ar #Tomographic Mapping of the Upper M + Tomographic Studies of the Woper Ma + Tomographic Study.# Seismic Velocit Tomography - Determination of High Tomography# Evidence for Deep mantl Tomography Image of the Aegean Regi Tomography Images in the Aegean Sea Tomography of Greece with use of an + #Tomography of the Crust and Upper #Tomography of the Crust and Upper Tomography of the Europe - Mediterr Tomography of the Gulf of Corinth: Tomography of the Italian Region Us Tomography of the Upper Mantle Belo + Tomography.# Imaging Algorithms, Ac Tomography.# Upepr Mantle Delay Tim Tools Released# New Version of the + Topologie de la Neo - Tethys.# Hist + Toros ve Erzincan Kenetleri.# Üç Ke Toroslar - Orta Anadolu nun Güneyin + Torosların Post Eosen Tektoniği.# 0 + Tortonian Westward and Southward Th + Tortul Kayalarm Stratigrafisi, Bur + Total Magnetic Intensity, Free-air Total Offset of the North Anatolian tothe Present, Insights from the Du + Tourides Region# Magnetotelluric In + #Toward a Homogeneous Moment-Magnit #Toward Understanding of Sn: Normal + Trace Element Evidence for the Role + Tracer.# P - Wave Crustal Tomograph Trains Associated with the Earthqua + Trains Associated with the Earthqua #Trakya da Genç Volkanik Kayaçlar Ü Trakya ve Ege Adalarındaki Senozoyi + Transeci.# Neogene Thrust Belt in W + Transform Faulting in the Ionian Se transform Motion: A Seabeam Survey + Transformation in Migmatiten des Eğ + Transition# Earthquake Mechanisms o Transition from Compression to Exte Transmission Trough Slabs.# Telesei + Transverse of the Ionian Islands Fr + #Travel - Time Tomography of the Eu + Travel Time Residuals and Gravity# + Travel Time Residuals Caused by a D + #Travel times of Pn-Waves in the Ae

GPS) Measurements in Turkey (1988-1 + Thesis# Global Positioning System (+ Northern Greece) from a 3-D Tomogra + nce of an Active Normal Fault Benea + Strain and Fault Movements within a + phere in Greece from Gravity Data# egean Grabens by 2-D and 3-D Analys ts in the Eastern Mediterranean. cales for Continental Deformation i + etailed Analysis of Microearthquake Image of the Upper Mantle Beneat ty ies Under a Seismic Array Using Fir ion Structure Beneath the Aegean Re iled Analysis of Microearthquakes i f Short and Long Term Deformation.# ntrant (Southwestern Turkey)# First e Imbricate Systems of Thrust Sheet Boundary Processes?# Are Systematic eci.# Neogene Thrust Belt in Wester ern Central Greece: Palaeomagnetic a Re-entrant (Taurus, Turkey). Geod chanism of Uplift and a Comperative Continental Convergence, with Appl ctonic Implication.# Neogene and Qu 1 for Generation of Shallow Earthqu ave Below Europe from Delay te Focal Depth Earthquakes in the H and Upper Mantle Structure of the Plate in the Aegean Arc in Greece# Plate Motions.# Effects of Recent R iterranean Mantle Down to 1400km.# s, Accuracy and Resolution in Delay + the Area of Greece. # Space and Homogenous Initial Model. # Determin + Surrounding Area# Travel ure of the Hellenic Area Obtained b + cture of the North - Central Greece diterranean Sea, Part II: Phase Vel + tonics in West Turkey. ematics and Rotations. # The Continu + w-angle Faults Above and Below a Bl + a Lost Terrane of Late Cretaceous rkiye den Bir Örnek# Atlantik Tip B Bir Kıta Kenarına Dönüşümüne Türkiy Regionalization of the Mediterrane si# Ege Bölgesi nin Sismik si.# Ege Bölgesinin Sismik c Implications# The Hellenic Subduc + le in the Eurasian - African - Arab + ea# On the Resolving Power of antle Structure beneath the Alpine ntle Beneath Southern Europe. # Seis v Constrains in the Thessaloniki an and Low Velocity Zones beneath Gree e Circulation from Global on (Greece) Derived from Inversion + Area# On the Interpretation of Lar Accurate Two - Point Ray Tracer.# Mantle in Southeast Europe Mantle in Southeast Europe. anean Mantle Down to 1400km.# Trave A Comparison of Methods.# Seismic ing Local and Regional Seismicity D + w Europe, the Mediterranean, and As + curacy and Resolution in Delay Time 0 Generic Mapping orie et net Kuşağının Erzincan Batısındaki in Neotektoniği ile İlgili Görüşler + rta rusting in the Core of the Isparta sa Güneyi.# Jura Öncesi Bloklu Gravity Anomaly, S, mple Bouguer Ano + Fault Zone: Implications for Tecto ctile Crust# 3D-Kinematics of Exten + vestigations in the Western ude Determination for Earthquakes i + Models of Love Waves in an Oceanic + of Continental Crust in Calc - Alk + v of Greece with use of an Accurate + kes in and around the Aegean Sea.#

kes in and around the Aegean Sea.# zerinde Yapılan Paleomagnetic Çalış + k Volkanizması# Batı Anadolu, estern Taurides. The Imbricate Syst +

a: the Cephalonia Island Earthquake + of the hellenic Trench System# From + rigöz-Massivs# Orthoklas-Mikroklin f the Adriatic sea and Western Gree nsion in the Western Mediterranean + smic P - Wave

ont with Coincident Normal Incidenc + rope - Mediterranean Mantle Down to + Crustal and Upper Mantle Structure + ipping Plate in the Aegean Arc in G + gean and Surrounding Area

Structure of the Hellenic Area Obt + Travel Times# P and S Deep Velocity + Papazachos, B. C.+ Structure of the North - Central + 1997 Travel Times.# 3-Dimensional Veloci + tv Drakatos, G.+ Travel Times.# Crustal Structure of 1989 the Mediterranean Sea, Part II: Ph + Pavo, G. 1969 Seismic Travel-tTime Residuals and Plates.# + Davies, D.+ ture of the Aegean Region# Teleseis + 1969 Traveltime Residuals and Deep Struc Agarwal, N. K.+ es and lateral Inhomogeneity in the + Phase does not Traveltime Residuals from Earthquak 1976 Taymaz, T. 1996 Traverse Oceanic Crust.# Why the Lg Zhang, T.+ 1995 Mars 18.# Le Tremblement de Terre de Yenice 1953 Diligan, H.+ nic Evolution of the Eastern Medite + 1955 Trenc System: A Key to the Neotecto Le Pichon, X.+ 1979 Trenc: A Synthesis of Sea-Beam and Submersible Observations# Tectonics + Huchon, P.+ Trench Near Crete# Earthquake Mecha + 1982 nisms in the Hellenic Taymaz, T.+ ime Residuals from Earthquakes and + Trench near Crete# S-P-Wave Travelt + 1990 Taymaz, T. 1996 ransform Motion: A Seabeam Survey o Trench System# From Subduction to t + Le Pichon, X.+ 1979 onic Evolution of the Eastern Medit + Trench System; A Key to the Neotect + Le Pichon, X.+ 1979 ery of an Anoxic Basin within the S + Trench, East Mediterranean.# Discov + Jongsma, D + 1983 Trench.# Active Tectonics in the He + llenic Le Pichon, X.+ 1981 # Bathymetry and Shallow Structure Trenches, South of the Hellenic Arc + Jongsma, D. 1977 #Trenches. Fisher, R. L.+ 1963 s (Greece).# Magnetostratigraphy of + Triassic Boundary Section from Chio + Muttoni, G.+ 1995 agnetobiostratigraphy of the Spathi + Triassic) Kçira Section, Albania# M + Muttoni, G.+ 1996 Troad.# Strabo on the Leaf. W 1923 Troas im Mai 1881.# Reise in der Schliemann, H. 1881 ng, Tectonic Regimes, Fault Kinemat + ced from Seismicity.# Rates of Crus + Trough (W. Turkey and Greece): Timi + Mercier, J. L.+ 1991 Trough - North Anatolian Fault Dedu + Kiratzi, A. A. 1991 ral Constraints# Late Cenozoic Rota + Trough Fault Zone (Greece); Structu + Simeakis, K.+ 1989 in the North Aegean Trough# Geophysical Investigations + Ginzburg, A.+ 1987 Trough Slabs.# Teleseismic P - Wave Transmission Sleep. N H 1977 Le Pichon, X.+ orth Aegean Trough# Subsidence History of the N + 1984 Trough# Tectonic Evolution of the N + orth Aegean Lyberis, N. 1984 ture and Evolution of the North Aeg + Trough, Northern Aegean Sea. # Struc + Brooks. M.+ 1980 n on the North Flank and Floor of t + Trough. # Gravity Induced Deformatio Ferentinos, G.+ 1981 North Aegean Sea Trough: 1972 Jean Charcot Cruise # + Needham, H. D.+ 1973 mation Zone# Structure of the Centr + Trough: an Active Strike-Slip Defor + Roussos. N.+ 1991 the Hellenids# The Balkanids as an + 966, Varto Area, Eastern Trust Belt: Possible Relation with Boccaletti, M.+ 1974 Tuekey.# Earthquake of August 19, 1 + Wallace, R. E. 1968 Rotation of Turkey # Paleomagnetism + Tuffs from the Mesudiye Region and + Orbay, N.+ 1979 arine Canyons and the 1908 Messina Turbidity Current.# Ionian Sea Subm + #Turgutlu - Salihli (Manisa ili) Ar + Ryan, W. B. F.+ 1965 ası Gediz Nehri Günevinin Jeoloji, Karamanderesi, I. H. 1971 che Deutung Radiometrischer Altersb + Turkei.# Litho-und Biostratigraphis + Becker-Platen, D.+ 1977 he Africa-Arabia-Eurasia Plate Coll + Turkey (1988-1992): Kinematics of t Oral, M. B. 1994 ation of Crustal Movements in Turkey# Activities for the Determin + Aksoy, A.+ 1997 ineral and Thermal Waters of Turkey Aegean Region. # IAH Map of M + Canik. B.+ 1983 e Results lake manyes to Istanbul, Turkey# Airbone Magnetometer Profil Agocs, W. B. 1977 ung Volcanic Rocks of Western Turkey# An Approach to Origin of Yo + Şengör, A. M. C. 1000 ical Review, 1500 - 1800.# Seismici + Turkey and Adjacent Areas, A histor + Turkey and Adjoining Areas# A Catal + Ambraseys, N. N.+ 1995 ogue of Focal Mechanism Diagrams fo + Canitez, N.+ 1967 gnetic Data# Geodynamic Evolution o + Turkey and Cyprus based on Palaeoma + Lauer, J. P. 1084 Mercier, J. L.+ Chen, C. Y.+ c Regimes, Fault Kinematics and Rot + Turkey and Greece): Timing, Tectoni + 1991 tle P Wave Velocities Beneath Turkey and Iran.# The Uppermost Man + 1980 Crustal Structure# Some Remarks on + Turkey and Its Implications on the + Oral, M. B. 1987 ake Activity# Strike-Slip fault Geo + Turkey and its Influence on Earthqu + Barka, A. A.+ 1988 Küleli, H. S.+ Turkey and its Relation to Aegean R 1997 egion. # Seismic Velocity Distributi + Turkey and Pakistan# Active Tectoni + 1994 cs of the Alpine Himalayan Belt Bet Jackson, J.+ 1980.# Earthquake Catalogue for Turkey and Surrounding Area, 1881 - + Avhan, E.+ 1987 Turkey and Surrounding Area.# On Ep + Ergin, K. 1965 icentre Map of McKenzie, D. P.+ 1991 and Volcanism in Western Turkey and the Aegean# Deformation Turkey and their Tectonic Implicati + Turkey and their Tectonic Implicati + Alptekin, Ö. 1973 on. # Focal Mechanism of Earthquake + Oral, M. B.+ 1993 ons.# Preliminary Results of 1988 a + Şengör, A. M. C.+ 1985 Turkey as a Case Study# Strike-Slip + faulting and related Basin Formati + Robertson, A. H. F.+ hyan, Continental Margin.# The SW S Turkey as a Mesozoic - Tertiary Tet + 1984 Turkey as Deduced from Major Earthq + Eyidoğan, H. 1988 uakes# Rates of Crustal Deformation + Deniz, R.+ Şengör, A. M. C. Canıtez, N.+ 1993 Turkey by Terrestrial Geodetic Meth ods. # Determination of Crustal Move + 1987 Turkey# Cross-Faults and Differenti + al Stretching of hanging Walls in R + Turkey# Crustal Structure in 1982 Turkey# Environmental Isotope Study + Eisenlohr, T.+ 1997 and 2-D-Model-Ling of Cold and The + Turkey# Evidence for Dynamic Coupli + Westaway, R. Tezuçan, L.+ 1994 ng of Surface Processes with Isosta + 1975 An Earthquake Catalogue for Turkey for the Interval 1913-1970.# + Turkey from Burdur Earthquake of 12 1991 Ezen, Ü. May 1971.# Surface Wave Dispersion + Ezen, Ü. 1991 Turkey from Rayleigh Wave Dispersio + n.# Crustal Structure of Western Mindevalli, O. Y.+ 1989 Turkey from Seismic Surface Wave Di + spersion.# Crustal Structure and Po + 1976 Turkey from the Oligocane to the Pl Lüttig, G.+ eistocene.# Explanatory Notes for t + lztan, H.+ 1990 Turkey# Geology and Hydrocarbon Pot + ential of the Alaşehir (Manisa) Are + 1997 Turkey# Geothermal Potential in Nor + Şimşek, Ş. thwestern Turkey# Geothermal Studies, Their P 1979 Tezcan, А. К. resent Status and Contribution to H + Turkey# Northern Margin of the Gedi + 1996 Yusufoğlu, H. z Graben: Age and Evolution, West 1990 Turkey# Petrology of the Cenozoic V + Ertürk, 0.+ olcanics in the Biga Peninsula, NW + old Groundwater for the Determinati + Eisenlohr, T.+ 1997 Turkey# Regional Investigation of C Savaşçın, M. Y.+ 1990 Turkey# Relationship Between Magmat ics and Tectonic Activities in West + 1998 Pinar, A. Turkey# Source Inversion of the Oct + ober 1, 1995 Dinar, Earthquake (Ms= + Erentöz, C.+ 1968 Turkey# The Research of Thermominer al Resources and Geothermal energy 1996 Seyitoğlu, G.+ Turkey) and its Tectonic Implicatio ns# Age of the Alasehir Graben (Wes Seyitoğlu, G.+ 1992 Turkey) and its Tectonic Implicatio + ns# The Age of the Büyük Menderes G + Eisenlohr, 1997 т. Turkey) and their Relationship to G + eology and Tectonic.# The Thermal S + 1997 Bozkurt, E.+ Turkey) and their Tectonic Signific ance# Microstructures of Deformed G + 1995 Çağlar, I. Turkey) as Inferred from MT Survey and its Connection between Geotherm + Greber, E. 1997 Turkey) # Deep Circulation of CO2-Ri + ch Paleowaters in a Seismically Act + 1993 Turkey)# First Paleomagnetic Eviden Kissel, C.+ ce for a Post-Eocene Clockwise Rota + 1995 Bozkurt, E.+ Turkey)# Geochemistry and Tectonic Significance of Augen Gneisses from + Filiz. 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i nin Sismik Tomografi ile sinin Sismik Tomografi ile ndaki (KD Türkiye) Yapısal İlişkile + ik Yapılar ve İstanbul İçin bir Mik + lique a I etude d une Population de + gen mit Einen Askania - Sea Gravime + rne: Les Iles de Kassos et Karpatho + ion of Large Scale Geodetic Measure + tern Mediterranean.# Thicness of eren Mantels im Östlichen Mittelmee + den Chemismus und die provinzialen + er tertiaren und guartaren Ergussge + nasien# Reisen deres Kristallins/SW-Anatolien und + aischen Raumes und der benachbarten ren Aegaeis# Über Alter und Geotekt + ew# Comparison of Young Volcanic As + Arrival Times from Local Earthqu + of Love Waves in an Oceanic Structu + t Anatoliens (Türkei).# Lithostrati + des Axes Principaux des Contrainte + Theorique et Numerique d un Modele Methode Simple de Determination de + r of the Continental Lithosphere. es, Greece: Witness to a Lost Terra + nigma.# The Alakır Çay formation and P-T Path of the Cryst + netic data from Tertiary atolische Beben vom 18. Marz 1953.# + thosphere Structure of Tibet and We sure Metamorphic Terrains: The Exam + on# 3-D Velocity Structure Beneath nt on Naxos and Paros (Cyclades Isl Direction in Western Turkey from B the Lithosphere.# Lateral Variatio terranean, and Asia Minor# Delay-Ti urope.# Three - Dimensional Seismic Seismic Anisotropy in Tomograph the Hellenic Trench near Crete# S- + eismic Wave Attenuation in the # A Study of Large - Scale Lateral + ion of Seismic and Gravimetric Data + omography of the Crust and Tomography of the Crust and .# Static and Dynamic Properties of + P - Wave Veolocities in the Crust + can - Arabian Collision Zone.# A To to the Alpine - Mediterranean Regio 3-D Veolocity Structure Beneath th + rom Deep Seismic Soundings# The Cru + ranean Sea Deduced from Geophysical idiki (North Greece).# Inversion of + Alpine Collision Belt.# Tomographic + estern Turkey.# A Study of Crustal n Arc from Travel Time Residuals an nic Evolution and the Seismic Veloc + ion# Regional Scale Tectonic Evolut ative Geomagnetic Field Intensity a + Beneath Turkey and Iran.# The Tracer. # P - Wave Crustal Tomograph + que, # Examination of a Velocity Mod nts# The Geometry and rates of Micr Local Earthquakes. 1. A Homogenous lysis Along the North Anatolian Fau ograph Stations.# Detection and Loc Data,# 3-D Crustal P - Wave Tomogr + ude Determination by # Monitoring West Hellenic Arc Tect + Bat: Türkiye de Kabuk ve Yüzey Dalgası Ortam Tepki Ponksiyon + am Modelleme Tekniği ile Batı Türki + Alüvyon Yelpaze Çökelleri ve Gdiz G asurements.# Metamorphic Evolution + işli Filtrelerin Düzenlenmesi ve Eg + adolu Fay Zonu nun Batı nadolu Fay Zonu nun Batı eki Tektonik Denizaltı Havzaları.# + n Yerbilimleri Kriterleri.# Ege Den + ojik Yapısı# Doğal Doğal Kuzey Anadolu Fayı nın Sapanca-İzmi + şma Sonuçları.# Trakya da Genç Volk + ben Sisteminin Gelişimi zı Kuzeydoğusunun Oluşumu Varındaki Depremlere ait Fundamenta + e Plaka Tektoniği Açısından Ege Böl + m Jeolojisi. itlerin Petrolojisi Zonunun Tektonik Özelliği.# Kelkit Buna Bağlı Jeotermal enerji Olanak + ay Hareketlerin Araştırılması.# Aky + e Metamorphic Core Complex# Late Ce + hquake of 22 July 1967.# The Mudurn +

Folgerunges aus Grossen Anatolisch +

#Über die Tekronisch - Mechanischen + Üç Boyutlu Modellenmesi# Ege Bölges + Üç Boyutlu Modellenmesi.# Ege Bölge + #Üç Kenet Kuşağının Erzincan Batısı + un Depremselliğini Oluşturan Tekton + un Modele Mecanique Elementaire App + un Östhicken Mittelmeer Nach Messun + un Segment de I Arc Hellenique Exte + Uncertainties# Tectonic Interpretat Unconsolidated Sediments in the Eas + und der Aufbau der Krute and des Ob + und der benachbarten Gebieten# Über und die provinzialen Verhaltnisse d und Forschungen im Ewestlichen Klei und Geotektonische Stellung des Men und quartaren Ergussgesteine des ag und Seine Equivalente in der Mittle + under a Copressional Regime: a Revi Under a Seismic Array Using First P + Understanding of Sn: Normal Models + Undersuchungen im Kanozoikum Südwes une Methode Simple de Determination + une Population de Failles.# Analyse + une Population de Failles.# Sur une #Uniform - Sense Normal Simple Shea Unit on the Island of Tinos, Cyclad Unit, Antalya Complex: a Tectonic E Units# Attic Peninsula (Greece): De Units of Anatolia# Tectonic Units of the North Aegean# Palaemag + Untersuchungen Über das Nordwest An + #Upepr Mantle Delay Time Tomography + Uplift and a Comperative Study. # Li + #Uplift and Exhumation of High-pres Upper and Mantle of Aegean Sea Regi Upper Cenozoic Extensional Detachme + Upper Crustal Structure along N - S Upper Mantle and Discontinuities in + Upper Mantle Below Europe, the Medi + Upper Mantle Beneath Southeastern E Upper Mantle Beneath Southern Europ + Upper Mantle Beneath the Aegean and + Upper Mantle Beneath the Aegean. # S Upper Mantle Beneath Western Europe + Upper Mantle in SE Europe by Invers + Upper Mantle in Southeast Europe# T Upper Mantle in Southeast Europe.# Upper Mantle in Southern Accean Sea + Upper Mantle in the Aegean Region. # -Upper Mantle in the Eurasian - Afri + Upper Mantle Model: An Application Upper Mantle of Aegean Sea Region.# Upper Mantle of the Aegean region F + Upper Mantle of the Eastern Mediter + Upper Mantle Structure Beneath Calk Upper Mantle Structure beneath the Upper Mantle Structure of North - W + Upper Mantle Structure of the Aegea + Upper Mantle. # Regional Scale Tecto Upper Mantle: The Mediterranean Reg + Upper Miocene Section in Crete# Rel + Uppermost Mantle P Wave Velocities use of an Accurate Two - Point Ray Using 3-D Velocity Structure Techni Using Anoxic Basins as Piercing Poi + Using First P - Arrival Times from Using Geodetic Methods.# Strain Ana Using Island and Ocean Bottom Seism Using Local and Regional Seismicity Using Macroseismic Data.# On Magnit Using the Global Positioning System + Üst Manto Yapısının Araştırılması.# Üst Manto Yapısının Belirlenmesi.# + Üst Mantonun Yapısı.# Yapay Sismogr + Üste Doğru Kalınlaşan Neojen Yaşlı Utilizing 40Ar/39Ar Age Spectrum Me + Uygulanması.# İki Boyutlu Alçak Geç + Uzantılarının İncelenmesi# Kuzey An + Uzantılarının İncelenmesi.# Kuzey A + Uzantılarının İzmit Körfez Geçişind + Uzantısı.# Ege Doğal Uzantısının Saptanmasında Kullanıla Uzanım Açısından Ege Denizinin Jeol + Uzanımı# Ege Denizi nde Anadolu nun + Üzerinde Paleosismik Araştırmalar# Üzerinde Yapılan Paleomagnetic Çalı + Üzerine Düşünceler# Ege Bölgesi Gra + Üzerine Düşünceler.# Çanakkale Boğa + Üzerine Incelemeler.# Türkiye ve Ci + #Uşak Volkanitlerinin Petrolojisi v + #Uşak Yöresindeki Neojen Havzalarm + #Uşak Yöresinin Jeolojisi ve Volkan + Vadisi Kesiminde Kuzey Anadolu Fay + Vadisi nde Genç Tektonik Olaylar ve + Vadisinde Kurulan Jeodezik Ağda Yat + Valley Detachment System and Rhodop + Valley, West Anatolia, Turkey, Eart +

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Evidence for the Last Two Faulting + ormation de la Ridge Mediterraneenn + oss Continental Margins and Island + Area of Greece. # Space and Time the Aegean Sea and Surrounding Area + Impact of Precipitation on the Cek + mic Wave Propagation at Regional Di + om the Aegean: Evidence for an Orig ated to Plate Boundary Processes?# per Mantle and Discontinuities in t er Mantle Beneath Western Europe.# nda Paleo-Melanj Kuşağının uake of August 19, 1966. ision Zones: the Turkish - Iranian # The Uppermost Mantle P Wave theastern Europe and Eastern Medite + eralogical Constitution, # Relations + gean Region# Reproducing the Structure of the Mediterranean Sea + Array Using First P - Arrival Times + niki and Chalkidiki Areas (Northern + Region# Seismic rkey and its Relation to Aegean Reg + ean Sea Region Determined from the + Beneath Southeastern Europe.# Three + egions# Back Arcs Basins and P-wave + h Western Europe. # A Study of Large + tructure Technique.# Examination of + Dispersion in the Broader Aegean Ar + t and Upper and Mantle of Aegean Se + Area Obtained by Robust Nonlinear I + re and Upper Mantle: The Mediterran re and Upper Mantle. # Regional Scal + low the Iberian Peninsula: Evidence + entral Greece from Inversion of Tra ination of a Velocity Model Using 3 + Study of the Aegean Sea and Surroun + urrounding Regions.# Seismic Tomogr Mediterrarean Sea by Surface Waves ture Modeling of Earthquake Data. 1 ture Modeling of Earthquake Data. 2 Mantle in the Aegean Region. # P - W.+ st and Upper Mantle of Aegean Sea R + Mediterranean Area. # Large Scale P + taren Ergussgesteine des agaischen Kesiminde D - B Daralma için bazı lerinin Modellenmesi # Derin Elektr + dolu nun Yapısal Sorunlarının Gravi + zoik Volkanitlerine Ait Yeni Kimyas + kule-Büvükcekmece (Istanbul) Sig De + Genişleme Rejiminin Paleomagnetik s Released# New tive Tectonic Deformation# Micropla + ranean Sea.# On the tion During Continental Extension: + Expansion .# Neotectonique Horizont + Expansion.# Neotectonique Horizonta + Subsidence de la mer de Crete et la eira Gravimetrica del R. Sommergibl + an Alternative for Continental Deformation in Con + elaponnese.# Geometric et Cinematiq + it 1967 dthe Brezi Sizmogien and# Paleomagnetic and Neotectonic + Eastern Anatolia Formed under a Co + ern Aegean Region# Late Cenozoic tern Anatolia# Ree Distrubution in + omagnetic Study of Quaternary aleomagnetic Stratigrapy of the Mio n Approach to Origin of Young An Approach to the Origin fo An Approach to the Origin of Young + Turkey# Petrology of the Cenozoic (West Anatolia and Lesbos Island)# + torini Volcano, Greece-Tectonic and + in the Evolution of Isparta Angle, Pasific# Andesitic ical and geochronological data# Inn + tiary to Qaternary Evolution of tiary to Quaternary Evolution of ean. Time - Space Distribution and + ozoic Crustal Extension, Basin Form Aegean# Deformation and al Aegean Region# Neogene al Aegean Region.# Neogene egean Sea, Greece.# Sr-isotope and hemical Relationships with Volcanic + s and Origin of High Potash Paleomagnetic Çalışma Sonuçları.# T + arında esinin Jeolojisi ve zotopik ve Radyometrik Verilerin Yo + a Tektoniği Açısından Ege Bölgesind + ndeki Pliyo-Kuvaterner Ada Yayı ve Ege Adalarındaki Senozoyik Tektoniği ve

Valley, Western Turkey.# Geological + #Variation Laterale des Fronts de F + Variation of Basalt Magma Types Acr + Variation of Strain Release in the Variations# A Geophysical Study of Variations in a Thermal Water Well: Variations in High - Frequency Seis + Variations in Miocene Granitoids fr + Variations in Thrust Belt Style Rel Variations of Attenuation in the Up + Variations of P Velocity in the Upp + Varlığı# Menderes masifi nin Batısı Varto Area, Eastern Tuekey.# Earthq Velocities Beneath Continental Coll + Velocities Beneath Turkey and Iran. Velocities of Rayleigh Waves in Scu + Velocities, Heat Generation and Min + Velocity and Stress Field in the Ae Velocity and Travel Times.# Crustal Velocity Anomalies Under a Seismic + Velocity Constrains in the Thessalo Velocity Distribution in the Aegean + Velocity Distribution in Western Tu + Velocity Field in the Deforming Aeg + Velocity Image of the Upper Mantle Velocity in the Ionian and Aegean R + Velocity in the Upper Mantle Beneat Velocity Model Using 3-D Velocity S Velocity Models from Rayleigh-wave + Velocity Structure Beneath the Crus + Velocity Structure of the Hellenic Velocity Structure of the Lithosohe + Velocity Structure of the Lithosphe + Velocity Structure of the Mantle Be Velocity Structure of the North - C Velocity Structure Technique. # Exam + Velocity Variations# A Geophysical Velocity Zones beneath Greece and S + Velocity.# Crustal Structure of the + Veolcity Parameters.# Crustal Struc Veolcity Parameters.# Crustal Struc + Veolocities in the Crust and Upper Veolocity Structure Beneath the Cru + Veolocity Structures in the Euro - + Verhaltnisse der tertiaren und quar + Veriler.# Isparta Büklümünün Kuzey Verileri ile Saros ve Gökova Graben + Verileri ile Irdelenmesi.# Bat: Ana + Verileri.# Marmara Bölgesi Gravite Verilerin Yorumu# Bat: Anadolu Seno + Verilerinin Değerlendirilmesi# Yedi + Verilerle Incelenmesi.# Ege Bölgesi + Version of the Generic Mapping Tool + Versus Continuum Descriptions of Ac + Vertical Circulation of the Mediter Vertical Shear?# Fault and Bed Rota Verticale de I Egee: Subduction et Verticale de I Egee: Subduction et Verticaux: I extension Egeenne, la Vettor, Pisani Anno, 1931.# La Croc + View.# The Tectonics of the Aegean: + Viscous Sheet Model. # Length Scales Vitesse et en Attenuation Sous le P + Vlore - Diber.# Termeti I 30 Nendor + Volcanic Arc: the Case of Melos Isl Volcanic Association of Western and + Volcanic Evolution of the Northeast + Volcanic Rocks from Central and Wes Volcanic Rocks from Turkey.# A Pale + Volcanic Rocks of Lesbos, Greece# P Volcanic Rocks of Western Turkey# A Volcanic Rocks of Western Turkey.# Volcanic Rocks of Western Turkey.# Volcanics in the Biga Peninsula, NW Volcanics in the Eastern Aegean Sea Volcanics of the Aegean Region# San + Volcanism and Active Tectonism with + Volcanism and Seismicity Around the + volcanism in NW Aegean Arc: geochem + Volcanism in the Aegean Region# Ter Volcanism in the Aegean Region# Ter Volcanism in the Eastern Mediterran + Volcanism in West Turkey. # Late Cen + Volcanism in Western Turkey and the Volcanism of the Northern and Centr Volcanism of the Northern and Centr + Volcanism on Santorini and Milos, A Volcano, Greece-Tectonic and Petroc Volcanoes# Mediterranean Island Arc + Volkanik Kayaçlar Üzerinde Yapılan 🔫 Volkaniklik: Ege Yöresi# Yitme Zonl + Volkanitlerin Petrolojisi# Uşak Yör + Volkanitlerine Ait Yeni Kimyasal, I + Volkanitlerinin Petrolojisi ve Plak + Volkanizması# Akdeniz ve Ege Denizi + Volkanizması# Batı Anadolu, Trakya + Volkanizması# Batı Anadolunun Genç

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Untersuchungen Über das Nordwest A + vom 18. 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West Turkey# Northern Margin of the Core/Cover Interpretation of the So + West Turkey. # Evidence Against the and Basin Formation in West Turkey.# Late Cenozoic Crustal Extension, Basin Formation and Vol + and Isotopic Age Data from Gördes + West Turkey.# Late Cenozoic Crustal West Turkey. # Neogene Palynological West Turkey. # Timing of Cenozoic Ex tensional Tectonics in Westanatolien# Geotektonische Glied erung von cs and Sedimentation # Late Cenozoi + Weste Turkey, Gördes Basin: Tectoni onic Interpretation. # A Microearthq + Westeern Greece, and its Seismotect d from 100 Years of Geodetic Displa + d from 100 Years of Geodetic Displa + Western aegean Deformation Extracte Western Aegean Deformation Extracte + currence of the Geothermal Systems Western Anatolia# An Approach to Oc + r Metamorphic Core Complex, Detachm + Western Anatolia# Field Evidence fo Western Anatolia# Geology of Western Anatolia# Heat Flow, Seismi + city and the Crustal Structure of Western Anatolia# Magmatic Activiti + es of Cenozoic Compressional and Ex + Western Anatolia# Paleomagnetic Evi + dence for Rotation in Opposite Sens Western Anatolia# Ree Distrubution + in tertiary and Quaternary Volcanic + ion of Reservoirs by Means of Gradi + Western Anatolia Turkey. Determinat Western Anatolia, Turkey. # Southern + Menderes Massif: an incipient Meta + oda Waves in Western Anatolia, # Attenuation of C Western Anatolia.# Heat Flow Patter n of Western Anatolia.# The Exhumation o f the Menderes Massif Metamorphic C + rientation from Geophysical and Geo + Western Anatolia: Regional Stress 0 + Western Anatolian Area: A Petrologi cal Study in the Light of New Geoch + under a Copressional Regime: a Rev + Component Seismograms.# A Detailed + Western and Eastern Anatolia Formed + Western Crete from Digital Three -Western Crete from Digital Three-Co mponent Seismograms# A Detailed Ana Western Crete.# Paleomagnetic Recor d of two Successive Miocene Geomagn + Western Europe.# A Study of Large - + western Extension of the 1967 Mudur + Scale Lateral Variations of P Velo nu Earthquake Fault# Microseismic A Western Greece# Paleomagnetic Evide nce from Pelagic Limestones for Clo + Western Greece.# Late Cenozoic Defo + rmation of the Hellenide Foreland. Western Greece.# Structural Develop ment of Neogene Bains in Western Greece.# The Geological Res ults of Petroleum Exploration in Western Greece: Implications for th + e Oceanic Subduction-Continental Co + Western Hellenic Arc Deduced from a Microearthquake Survey# The Strain + Western Hellenic Arc Relative to th e Plate Boundary# Earthquake Locati Western Hellenic Arc Relative to th + e Plate Boundary.# Earthquake Locat + Western Hellenic Earthquake# Source Inversion of the 13,10,1997 (Ms=6. 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Western Part of Asia Minor# On the Geology of the Hamilton, W. J + (Greece): Implications for Large S + 1840 Western Part of the Gulf of Corinth + Rigo, A.+ f the Isparta Reentrant (Southweste + Western Taurides Thrust Belt East o + 1995 Kissel, C.+ 1993 Western Taurides. The Imbricate Sys tems of Thrust Sheets Along a NNW-S + Poisson, A. Western Taurids. # Outline of the Ge ology of the Brunn, J. H.+ luric Investigations in the Western Tourides Region# Magnetotel 1971 llkisik, O. M. 1990 in of Young Volcanic Rocks of Western Turkey# An Approach to Orig Şengör, A. M. C. Küleli, H. S.+ 1989 Western Turkey and its Relation to Tectonics of the Alpine Himalayan 1997 Western Turkey and Pakistan# Active Jackson, J.+ 1984 rmation and Volcanism in Western Turkey and the Aegean# Defo McKenzie, D. P.+ 1991 mplication.# Focal Mechanism of Ear + Western Turkey and their Tectonic I Alptekin, Ö. mplications.# Preliminary Results o + 1973 Western Turkey and their Tectonic I Oral, M. 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L 1959 inuous Gravity Measurements on a Su + with the Graf Sea Gravimeter. # Cont + an Ridge: a Young Submerged Chain A + with the Hellenic Arc.# Mediterrane Finetti, I. 1976 s an Instance of Back-Arc Trust Bel with the Hellenids# The Balkanids a Boccaletti. M + 1974 with the Large Earthquakes of the P eriod 1939 - 1967.# Slip Distributi + Barka, A. A. with the Mesozoic Tethys# Subductio Spakman, W. 1986 n Beneath Eurasia in Connection on Beneath Eurasia in Connection with the Mesozoic Tethys.# Subducti + Spakman, W. 1986 1991 Lauer, J. P.+ Paleomagnetism of the Nea Santa Rh + with the Pelagonian Permotriassic.# with use of an Accurate Two - Point Drakatos, G.+ 1997 Ray Tracer. # P - Wave Crustal Tomo + Nicholls, L. A. 1971 with Volcanics of the Aegean Region # Santorini Volcano, Greece-Tectoni within a Deforming Zone. # The Relat + 1983 McKenzie, D. P.+ ionship Between Strain Rates, Crust within the Evolution of Isparta Ang Yağmuroğlu, F.+ 1997 le, SW Turkey.# Relation of Alkalin Eisenlohr, T.+ 1997 Within the Gemlik (Bursa) Area of N orthwestern Turkev# Environmental I within the Normal Fault System of t ÷ Hatzfeld, D.+ he Gulf of Corinth (Greece)# The Ga Nicholson, C.+ 1986 within the San Andreas Fault System Southern California.# Seismic Evi Jongsma, D.+ 1983 within the Stabro Trench, East Medi terranean.# Discovery of an Anoxic 1994 Witness to a Lost Terrane of Late C + Patzak, M.+ retaceous Age. # The Akrotiri Unit o Schmid, S. M.+ 1996 Workshop on Alpine Geology: Editori + al Remarks and Result of a Round-Ta Barazangi, M.+ 1969 #World Seismicity Map from ESSA, ast and Geodetic Survey, Epicenter World. # Plate Kinematics: the Ameri + Chase, C. G. 1978 cas, East Africa, and the Rest of t Grubu Kayaların Temel-Örtü llişkis Öztürk, A.+ 1983 Yaklaşım (Selimiye-Muğla)# Menderes + Yakın Çevresi Depremlerinin Odak Me Özçep, T.+ 1995 kanizmaları Kataloğu (1963 - 1990)# + Öncel. A. 0.+ Yakın Çevresi Depremlerinin Odak Me + kanizmaları Kataloğu# Türkiye ve 1988 Kalafat, D. Yakın Çevresinin Depremselliği ve A + ktif Tektoniği.# Güneybatı Anadolu Abdüsselamoğlu, Ş. 1977 Yakın Çevresinin Jeolojisi ve Yapıs + al Özelliği.# Gediz ve Yansma Profili Çalışmalarının Ön S + Cetin, S.+ onuçlar.# Marmara Denizi Sismik Horasan, G. A.+ 1998 #Yapay Sismogram Modelleme Tekniği ile Batı Türkiye de Kabuk ve Üst Ma + Yapılan Jeolojik Harita Hakkında Ra + Flügel, N.+ 1954 por# Bodrum-Muğla Yöresinde Tapırdamaz. C.+ Yapılan Paleomagnetic Çalışma Sonuç + ları.# Trakya da Genç Volkanik Kaya + 1985 Gürbüz, C.+ Yapılan Taşocağı Patlatmalarından E + lde Edilen Sismilk Kayıtların Değer Barka, A. A. 1991 Yapılar ve İstanbul İçin bir Mikro - Bölgelendirme Denemesi.# !stanbul Yapılarının Deprem Mekanizmaları Aç + Kalafat, D. Isından İrdelenmesi.# Anadolu nun T 1983 Öztürk, A.+ Yapısal Bir Yaklaşım (Selimiye-Muğl + a)# Menderes Grubu Kayalarır. Temel- + Dora, O. Ö. 1975 Yapısal Durumları ve Bunların Petro + jenetik Yorumlarda Kullanılması# Me + 1977 Abdüsselamoğlu, S. Yapısal Özelliği.# Gediz ve Yakın Ç evresinin Jeolojisi ve 1988 Yapısal Sorunlarının Gravite Verile + Akçığ, Z. ri ile Irdelenmesi.# Batı Anadolu n + Savaşçın, M. Y. 1982 Yapısal ve Petrografik Ögeleri# Bat + ı Anadolu Neojen Magmatismasının 1995 Yapısal ve Sismolojik Özellikleri# Koral, H.+ Izmit Körfezi nin 1998 Yapısal İlişkileri.# Ege Denizinde + Ercan, A.+ Jeotermal Olasılık ve 1990 Koçyiğit, A. Yapısal İlişkileri: Karakaya, İç To + ros ve Erzincan Kenetleri.# Üç Kene + 1976 Arpat, E. Yapısı# Doğal Uzanım Açısından Ege Akgün, M.+ Denizinin Jeolojik ile Ilişkisinin Irdelenmesi# Izmit + 1995 Yapısı ve Kuzey Anadolu Fayı (KAF) + Kaya, O. 1982 Yapısı ve Magmatikliği İçin Olasılı + Bir Mekanizma# Tersiyer Sırt Yitme +

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un Jeotermik molojiye Göre Kuzey Anadolu Arz Kab + ektoniği ve ik Spektrumlarından Yararlanarak Is + Tekniği ile Batı Türkiye de Kabuk v + abuğu iye de Kabuk ve Üst Manto ası Ortam Tepki Fonksiyonlarından Y + smogram Eldesi ile Bati Anadolu da abuk ve Üst Manto Yapısının Belirle kabuğu Yapısı,# Sismik P Dalgaların e of Shocks with Io>VI or M>5 for t + Akyazı - dorukcan Vadisinde Kurulan enizindeki Pliyo-Kuvaterner Ada Yayı Bazı Kireçtaşı fay Sevlerinin Paleo + Gdiz Grabeni nin Tektonosedimenter Kenet Kuşağının Erzincan Batısında vindeki Metamorfitlerin Petrografis + mesi.# Istanbul un Depremselliğini r Sırt Yitmesi: Doğu Ege Bölgelerin urements# Local and Regional Compon + urements.# Local and Regional Compo + ığ Deniz Sismiği Verilerinin Değerl in Tektonosedimenter Gelişimi.# Sal rik Verilerin Yorumu# Bati Anadolu t de Terre de i (4 Pandüllü Sterneck Cihaziyle).# .# Sentetik Sismogram Eldesi ile Ba + ması,# Yinelemeli Ters Cözüm Yöntem i nde Anadolu nun Doğal Uzantısının isi ve Plaka Tektoniği Açısından Eg + Akkuyu Nükleer Güç Santral: öntemlerle Incelenmesi.# Kuzey Anad + rının Genlik Spektrumlarından Yarar + าเกด็ล Bölgesi nde e.# Saros Körfezi Dolayının Çökelme Yeraltı Yoğunluk Dağılımının Saptan + Yöresi sı ve Magmatikliği İçin Olasılı Bir + rin Düzenlenmesi ve Ege Bölgesi Hav + Diri Fav Haritası ve Aktif Tektoni + rta Anadolu nun Güneyinin Neotekton + ik Durumu ile Başlıca Deprem Bölgel inin Odak Mekanizmaları ve Bunların + l Olasılık ve Yapısal rzincan Kenetleri.# Üç Kenet Kuşağı + m Etkinliği ve Aktif Tektonikle Kanadının Stratigrafisi ve Cekirde + limiye-Muğla)# Menderes Grubu Kayal ezi nin Yapısı ve Kuzey Anadolu Fay üşey Elektrik Sondaj (DES) ve Kontr + Directions and Tectonic Models in t -Evolution of the Aegean# Quaternary i Depremlere ait Fundamental Moddan + troloji ve Feldispat nun Batı Uzantılarının i ile Asya, Avrupa ve Afrika da Yüz + Rejiminin Paleomagnetik Verilerle + ağının Gerede - Çerkeş Bölümünde Ye + u nun Batı Uzantılarının desi ile Batı Anadolu da Yer Kabuğu + İstasyonunda Kaydedilen Sismik Yüz inelemeli Ters Çözüm Yöntemi ile Ye ik Evrimini mının Saptanması.# Yinelemeli Ters zi ve Çevresinin Gravite ve Manyeti zi ve Ege Bölgesinin Gravite ve Man + le Boğazı Ege Denizi Çıkışı Pliyo-K nadolu daki Bazı Kireçtaşı fay Şevl + dolu Fay Kuşağının Gerede - Çerkeş + ehir - Salihli Bölgesinin Jeotermik + k: Ege akkında Rapor# Bodrum-Muğla lojisi.# Usak n Petrolojisi# Uşak asifinde Alkali Feldispatların Yapı + nitlerine Ait Yeni Kimyasal, Izotop + th the Hellenic Arc. # Mediterranean + rn and Eastern Anatolia Formed unde + key# An Approach to Origin of key.# An Approach to the Origin of sı ve Kuzey Anadolu Fayı (KAF) ile Yapılarının Deprem Mekanizmaları Aç sal Sorunlarının Gravite Verileri i + Kaydedilen Sismik Yüzey Dalgaların + # Long - Term Seismicity of # Sismik P Dalgalarının Genlik Spe + ran Tektonik Yapılar ve İstanbul İç + pisi. irme Denemesi.# Istanbul un Deprems + ter Profile Results lake manyes to + y Dalgalarında Girişim Claylarının + zey Ege Denizi, Türkiye.# Saros Kör + tehap Sahalarında Maden Kaynakların + oru.# Gemlik Körfezi Yüksek Ayrımlı Sığ Sismik Etüdü Rap +

Jecelektrik

Yapısı.# Büyük Menderes Grabeni nin + Çağlar, I.+ Yapısı.# Ege Bölgesi nde Yerkabuğun + Yapısı.# Gravite Anomalileri ve Sis + Yapısı.# Saros Körfezi Bölgesinin T + Sarı, C. Yapısı.# Sismik P Dalgalarının Genl + Kenar, Ö. Yapısı.# Yapay Sismogram Modelleme Yapısı.# İstanbul ve Civarında Yerk + Kenar, Ö. Yapısının Araştırılması.# Batı Türk + Yapısının Belirlenmesi, # Yüzev Dalg + Yapısının İncelenmesi.# Sentetik Si + Yararlanarak Anadolu ve Civarında K + Yararlanarak Istanbul Civarında Yer + Kenar, Ö. Yars 1801-1958.# Greece: A Catalogu + Yatay Hareketlerin Araştırılması.# Öztürk, E.+ Volkanizması# Akdeniz ve Ege D + Ercan, T. Yaşlandırılması# Batı Anadolu daki + Yaşlı Alüvyon Yelpaze Çökelleri ve lç Toros ve Erzincan Kenetleri # Üç + İçerisindeki Gelişimleri# Çine Güne + Başarır, E. lçin bir Mikro - Bölgelendirme Dene + İçin Olasılı Bir Mekanizma# Tersiye + Kaya, O. Years of Geodetic Displacement Meas + Curtis, A.+ Years of Geodetic Displacement Meas + Curtis, A.+ #Yedikule-Büyükçekmece (İstanbul) S + Kurt. H. Yelpaze Çökelleri ve Gdiz Grabeni n + Ya@murlu, F. Yeni Kimyasal, Izotopik ve Radyomet + Ercan. T.+ Yenice 1953 Mars 18.# Le Tremblemen Yer Çekim (Cazibe) Şiddeti Ölçmeler + Elbek, Y. Yer Kabuğunun Yapısının İncelenmesi + Yeraltı Yoğunluk Dağılımının Saptan + Sari, C.+ Yerbilimleri Kriterleri.# Ege Deniz + Ervilmaz, M. Yeri# Uşak Volkanitlerinin Petroloj + Ercan. T.+ Yeri ve Çevresinin Depremselliği.# Yerkabuğu Hareketlerinin Jeodezik Y + Uğur, E. Yerkabuğu Yapısı,# Sismik P Dalgala + Kenar, Ö. Yerkabuğu Yapısı.# İstanbul ve Civa Kenar, Ö. Yerkabuğunun Jeotermik Yapısı.# Ege Yerleşimi, Kuzey Ege Denizi, Türkiy + Saner, S. #Yinelemeli Ters Çözüm Yöntemi ile Sarı, C.+ #Yitme Zonlarında Volkaniklik: Ege Pe, G. G.+ Yitmesi: Doğu Ege Bölgelerinin Yanı + Kava, O. #lki Boyutlu Alçak Geçişli Filtrele Sanver, M. Ilgili Çalışmalara Katkısı# Türkiye + Ilgili Görüşler.# Orta Toroslar - 0 + Şaroğlu, F.+ Ilişkiler# Türkiye nin Genel Tekton + Ketin. L. Ilişkileri.# Bat: Anadolu Depremler + Iliskileri.# Ege Denizinde Jeoterma + Ercan, A.+ Ilişkileri: Karakaya, İç Toros ve E + Koçyiğit, A. Iliskisi# Marmara Bölgesi nin Depre Üçer, B. S. lliskisi.# Menderes Masifinin Kuzev + Erdoğan, B. Ilişkisine Yapısal Bir Yaklaşım (Se + Öztürk, A.+ Ilişkisinin İrdelenmesi# Izmit Körf Akgün, M.+ Imamkçy Jeotermal Alanın Jeofizik D + Yücel, M. Implications for Miocene Extension + Morris. A.+ Implications for the Late Cenozoic Armijo, R.+ Incelemeler.# Türkiye ve Civarındak + Canitez, N. Dora, O. Ö. Kıyak, Ü. Incelemeleri# Menderes Masifinde Pe + Incelenmesi# Kuzey Anadolu Fay Zonu + Incelenmesi.# Ardışık Filtre Tekniğ + Canitez, N. Incelenmesi.# Ege Bölgesi Genişleme + Orbay, N.+ Incelenmesi.# Kuzey Anadolu Fay Kus + Uğur, E. Incelenmesi.# Kuzey Anadolu Fay Zon + Kıyak, Ü. Incelenmesi.# Sentetik Sismogram E1 + Ezen, Ü. Incelenmesi.# Istanbul (ITÜ) Deprem + Yoğunluk Dağılımının Saptanması.# Sarı, C.+ Yoneten Etkenler# Ege nin Neotekton + Sari, C.+ Yöntemi ile Yeraltı Yoğunluk Dağılı + Yöntemlerle Araştırılması# Ege Deni + Yöntemlerle Araştırılması# Ege Deni + Yöntemlerle Arastırılması # Çanakka + Alpar, B.+ Yöntemlerle Yaslandırılması# Batı A + Yöntemlerle Incelenmesi.# Kuzey Ana + Uğur, E. Ünal, A.+ Yönünden Detay Jeoloji Etüdü.# Alaş + Yöresi# Yitme Zonlarında Volkanikli Pe, G. G.+ Yöresinde Yapılan Jeolojik Harita H + Ercan. T.+ Yöresindeki Neojen Havzalarının Jeo + Ercan, T.+ Yöresinin Jeolojisi ve Volkanitleri Dora, O. Ö. Yorumlarda Kullanılması# Menderes M + Yorumu# Batı Anadolu Senozoik Volka + Ercan, T.+ Finetti, I. Young Submerged Chain Associated wi + Young Volcanic Association of Weste Young Volcanic Rocks of Western Tur + Young Volcanic Rocks of Western Tur + Yılmaz, Y. Akgün, M.+ Irdelenmesi# Izmit Körfezi nin Yapı + Kalafat, D. Irdelenmesi.# Anadolu nun Tektonik Irdelenmesi.# Batı Anadolu nun Yapı + Akçığ, Z. Ezen, Ü. #lstanbul (ITÜ) Deprem Istasyonunda + Istanbul and of the Marmara Region. + Kenar, Ö. İstanbul Civarında Yerkabuğu Yapısı + #Istanbul un Depremselliğini Oluştu + Kenar, Ö. #Istanbul ve Civarında Yerkabuğu Ya Istanbul lçin bir Mikro - Bölgelend + lstanbul, Turkey# Airbone Magnetome + Ezen, Ü. İstasyonunda Kaydedilen Sismik Yüze Istifleri ve Tektonik Yerleşimi, Ku + Saner, S. Istikşaf Programı.# Türkiye nin Mün + Kurtuluş, C.

1998 llkışık, O. M. Canıtez, N. 1995 1962 1995 1977 Horasan, G. A.+ 1998 1978 Kalafat, D.+ 1987 Osmanşahin, l. 1989 Horasan, G. A.+ 1995 Osmanşahin, I. 1989 1977 Galanopoulos, A. 1960 1987 1980 Barka, A. A.+ 1997 Ya@murlu, F. 1987 Koçyiğit, A. 1990 1975 Barka, A. A. 1991 1982 1995 1997 1994 1987 1985 Diligan, H.+ 1955 1963 Horasan, G. A.+ 1995 1985 1996 1979 Alptekin, Ö.+ 1977 1974 1977 1978 Ilkisik, O. M. 1995 1985 1985 1976 1982 1975 Saroğlu, F.+ 1997 1983 1969 Alptekin, Ö. 1978 1998 1990 1990 1993 1983 1995 1995 1996 1996 1969 1981 1986 1975 1996 1974 1986 Horasan, G. A.+ 1995 1979 1985 1982 Sengör, A. M. C. 1985 Genç, H. T.+ 1996 1996 Genç, H. T.+ 1998 1997 Barka, A. A.+ 1974 1970 1976 1954 Flügel, N.+ 1978 1977 1975 1985 1976 1990 1989 Sengör, A. M. C. 1989 1995 1995 1988 1979 1991 Ambrasevs, N. N.+ 1973 1991 Barka, A. A. 1978 Barka, A. A. 1991 1977 Agocs, W. B. 1979 1985 Hutchison, R. D.+ 1962 1985

pòru.# Marmara Denizi Izmit Körfezi + tion of the Biga Peninsula, Northwe + kova Körfezi nin (Güneybatı # Türkiye ve Civarındaki Depremler + nın İncelenmesi.# İstanbul (ITÜ) De Incelenmesi.# Ardışık Filtre Tekniğ nlarından Yararlanarak Anadolu ve C le Isotopic Characteristics of Ther Western Anatolia Turkey. Determin + ay of Marmara Sea.# Active Fault In 4 enizaltı Havzaları.# Kuzey Anadolu lojik Özellikleri Anadolu Fayı (KAF) ile İlişkisinin + Sismik Etüdü Raporu.# Marmara Deniz Area# Microearthquake Activity in t orumu# Bati Anadolu Senozoik Volkan s Taurique et Ege: Collision et Arc onic Along the Active Nea Anchialos Long Term Deformation. # The Kinemat Along the Active Nea Anchialos ts# Late Cenozoic Rotations Along t tern Turkey) # Deep Circulation of C Large Earthquakes in the East Anat rth - Central Greece.# GPS Evidence : Complex Multiplate and Continuum Crete Since the late Middle Mioce f Crete since the Late Middle Mioce ctonic Investigation on the North A Eastern Mediterranean Continental surements of Present-day Crustal Mo Turkey.# Geological Evidence for t Western Turkey. # Late Holocene Acti f, Western Turkey.# Evolution of a rns in the Convex-Northwards Arc of ic Evidence for Rotation of the Ion Turkey and Greece): Timing, Tecton of the Anatolian Fault h Aegean Trough: an Active Strike-S + Seismograph Stations. # Detection an + rmanent GPS Network Across the Keph + ine Evolution of an Extensional She ing System (GPS) Measurements in Tu Evidence from Pelagic Limestones f pper Mantle in the Eurasian - Afric e North Anatolian Fault he North Anatolian Fault ain Rates, Crustal Thickening, Pale + eodynamic Implications# The Helleni the Eastern Mediterranean Region# ene to the Present# Changes in the g Regions.# Seismic Tomography - De xtension. Reflexions sur I orogenes Tectonic Properties of Some Active on the Morphology and Activity of cedonie (Grece).# Paleogeographie, ults from the Pindos, Paxos and Ion a Case Study# Strike-Slip faulting + s and the Radiometric Scale.# Biost and Rate of Slip Along Major Fault the Aegean. # A Continuum Model of C the Aegean# A Continuum Model of C u.# Pn Velocities Beneath Continent + Yitme mesi# Kuzey Anadolu Fay mesi.# Kuzey Anadolu Fay Vadisi Kesiminde Kuzey Anadolu Fay ues Griechenlands. II. Uber den Tek + tca-Mugla-Dalaman Cay# Beitrage eitrage zur Gelogie des Raumnes gust, 1912.# Preliminary Report for + ivle).# Türkive Baz Cazibe

Yaşlandırılması# Batı Anadolu daki eck Cihaziyle).# Diyarbakır ve Pado +

Yüksek Ayırımlı Sığ Sismik Etüdü Ra + Yurkey.# Geology and Tectonic Evolu + Yürkiye) Geç Kuvaterner Evrimi.# Gö + Yüzey Dalgaları Üzerine İncelemeler + Yüzey Dalgalarında Girişim Olayları + Yüzey Dalgalarının Dispersiyonunun #Yüzey Dalgası Ortam Tepki Fonksiyo + Izahlı Kataloğu. # Türkiye Depremler + Izmir (W-Turkey) # Chemical and Stab Izmir - Sefelihisar Geothermal Area + Izmit Bay, Bandırma Bay and Erdek B + Izmit Körfez Geçişindeki Tektonik D #Izmit Körfezi nin Yapısal ve Sismo + #Izmit Körfezi nin Yapısı ve Kuzey + Izmit Körfezi, Yüksek Ayırımlı Sığ Iznik-Mekece Fault and Surrounding Izotopik ve Radyometrik Verilerin Y + Zagro -Taurique et les Arcs Convexe Zane (Central Greece).# Recent Tect + Zealand: a Comparison of Short and Zone (Central Greece)# Recent Tecto Zone (Greece); Structural Constrain + Zone (Kuzguncuk/Adapazari, Northwes + Zone (Turkey) # Source Parameters of Zone Across the North Aegean and No Zone# Aegean and Surrounding Region + Zone and the Geodynamic Evolution o Zone and the Geodynamic Evolution o Zone Between Erzincan Refahiye.# Te + Zone# Coherent Plate Motions in the + Zone# Global Positioning System Mea Zone in the Mudurnu Valley, Western + Zone in the Orhangazi Plain, North + Zone in the Southern Menderes Massi + Zone# Neotectonic Deformation Patte + Zone of Albania.# First Paleomagnet + Zone of the North Aegean Trough (W. Zone# Some Characteristic Features Zone# Structure of the Central Nort + Zone Using Island and Ocean Bottom Zone, Greece.# Establishent of a Pe Zone, Naxsos, Greece. # The Late Alp + Zone, Ph.D. Thesis# Global Position + Zone, Western Greece# Paleomagnetic + Zone, # A Tomographic Image of the U + Zone.# Seismotectonic Aspects of th + Zone.# The Paleomagnetic Study of t Zone, # The Relationship Between Str + Zone: a Tomographic Image and its G + Zone: Implications for Tectonics of + Zone: the Aegean Arc from the Plioc + Zones beneath Greece and Surroundin + Zones Hellenides Internes et Leur E + Zones in Jugoslavia. # Contemporary + Zones in the Aegean Region. # A Note + Zones Internes des Hellenides en Ma + Zones of Greece.# Paleomagnetic Res + Zones of Tectonic Escape: Turkey as + Zones of the Aegean Arc# Benioff Zones, Marine and Continental Stage + Zones.# Seismic Moment, Seismicity Zones: Aplication to the Andes and Zones: Application to the Andes and + Zones: the Turkish - Iranian Platea + Zonlarında Volkaniklik: Ege Yöresi# + Zonu nun Batı Uzantılarının İncelen + Zonu nun Batı Uzantılarının İncelen + Zonunun Tektonik Özelliği, # Kelkit zur Erforschung des Tektonischen Ba + zur Gelogie des Raumnes Zwischen Da + Zwischen Datca-Mugla-Dalaman Cay# B + Sarköv-Mürefte Earthquake of 9th Au + Şebekesi (4 Pandüllü Sterneck Cihaz + Sevlerinin Paleosismik Yöntemlerle + . Şiddeti Ölçmeleri (4 Pandüllü Stern +

Özhan, G.+	1985
Okay, A. I.+	1991
Uluğ, A.+	1998
Canıtez, N.	1969
Ezen, Ü.	1979
Canitez, N.	1975
Osmanşahin, I.	1989
Pmar, N.+	1952
Conrad, M. A.+	1995
Eşder, T.+ Kanalızı G	1975
Senöz M	1990
Koral H +	1998
Akain M.+	1005
Özhan, G.+	1095
Angagi, M. T.	1997
Ercan, T.+	1985
Brunn, J. H.	1976
Caputo, R.	1990
Walcott, R. I.	1984
Caputo, R.+	1990
Simeakis, K.+	1989
Greber, E.	1997
Taymaz, T.+	1991
Rellinger, R. E.+	1995
Meulonkamp T T	1979
Meulenkamp, J. F.	1000
Tatar, Y.	1070
Oral, M. B.+	1995
Reilinger, R. E.+	1997
Ikeda, Y.+	1991
Ikeda, Y.+	1989
Bozkurt, E.+	1996
Barka, A. A.+	1984
Speranza, F.+	1992
Mercier, J. L.+	1991
Ambraseys, M. N.	1970
Roussos, N.+	1991
Potor V +	1982
Buick T S	1997
Oral. M. B.	1994
Horner, F.+	1983
Spakman, W.	1985
Barka, A. A.	1981
Orbay, N.	1979
McKenzie, D. P.+	1983
Spakman, W.+	1988
Barka, A. A.+	1988
Mercier, J. L.+	1987
Drakatos, G.	1989
Argovsky M	1970
Karnik, V	1972
Mercier, J. L.	1966
Marton, E.+	1990
Şengör, A. M. C.+	1985
Richter, I.+	1982
Benda, L.+	1979
Brune, J. N.	1968
Wdowinski, S.+	1989
Wdowinski, S.+	1989
Hearn, T. M.+	1076
re, G. G.+ Ywak ji	1986
Nyak, U. Kwak Ü	1986
Sevmen, I.	1975
Trikkalinos, T. K.	1947
Kaaden, G.+	1978
Kaaden, G.+	1978
Ates, R.+	1976
Elbek, Y.	1952
Barka, A. A.+	1997
Elbels V	1963

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