

PRELIMINARY REPORT

09/07/2012

EAST MEDITERRANEAN EARTHQUAKE

MI=6.0

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REPUBLIC OF TUKEY
PRIME MINISTRY
DISASTER AND EMERGENCY MANAGEMENT
PRESIDENCY
EARTHQUAKE DEPARTMENT

EAST MEDITERRANEAN EARTHQUAKE (MI=6.0)

An earthquake with magnitude MI=6.0 occurred at local time 16:54 on July, 09, 2012. Epicentral coordinates of the earthquake was determined as 35.7135 N - 28.8563 E with focal depth 40.45 km. The magnitude of earthquake was identified with AFAD National Seismological Observation Network and Kandilli Observatory and Earthquake Research Institute. After this earthquake, 1 earthquake were determined with magnitude 3.0 in first one hour. (Fig.1).

This earthquake was also felt in Antalya and Muğla, in wide region that Aegean, Mediterranean Region and many of the Greek Islands. It didn't caused loss of life and damage.

Focal Mechanism Solutions performed by considering first motion direction of P wave and moment tensor solution of MI=6.0 earthquake is emerged from strike slip faulting (Fig.2). The fault which caused earthquake is related to Hellenic Arc which is an arcuate tectonic feature of the eastern Mediterranean Sea related to the subduction of the African Plate beneath the Aegean Sea Palte. The Hellenic arc is one of the most active seismic zones in western Eurasia (Fig.3).

Mediterranean region has been exposed to destructive earthquakes during the historical and instrumental periods. Destructive earthquakes that occurred in the last century are given as; 04.04.1911 M:7.1, 26.06.1926 M:7.9, 27.03.1929 M:6.2, 09.02.1948 M:7.1,25.04.1957 M: 6.9, 28.04.1962 M: 6.0, 14.01.1969 M:6.0, 20.07.1996 M: 6.2 and 6.0,19.04.2000 M: 7.0,22.01.2002 M: 6.2 and 6.1, 15.07.2008 M: 6.4 and 6.1 earthquakes. Historical period earthquakes are given Table 1.

July 09, 2012 East Mediterranean Earthquake was recorded by accelerometers at 12 different locations within National Strong Ground Motion Observation Network operated by Earthquake Department at Disaster and Emergency Management Presidency of Turkey. Peak ground acceleration values recorded at Fethiye station (17.16 gal in EW direction, 14.12 gal in NS direction and 5.75 gal in up-down direction) (Table 2, Fig. 4).



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Peak ground acceleration and seismic intensity values that can be created by July, 09, 2012 East Mediterranean earthquake in the earthquake-hit area and its vicinity are estimated and the maps showing the spatial distribution of these values are prepared (Fig.5,6).

Earthquake activity of this region (and all of Turkey) has been observed in Disaster and Emergency Management Presidency, Earthquake Department Data Center Ankara 7 days/24 hours with 205 Seismic station and 371 accelerometer. Obtained results are shared with public, press and relevant authorized.

For your information.



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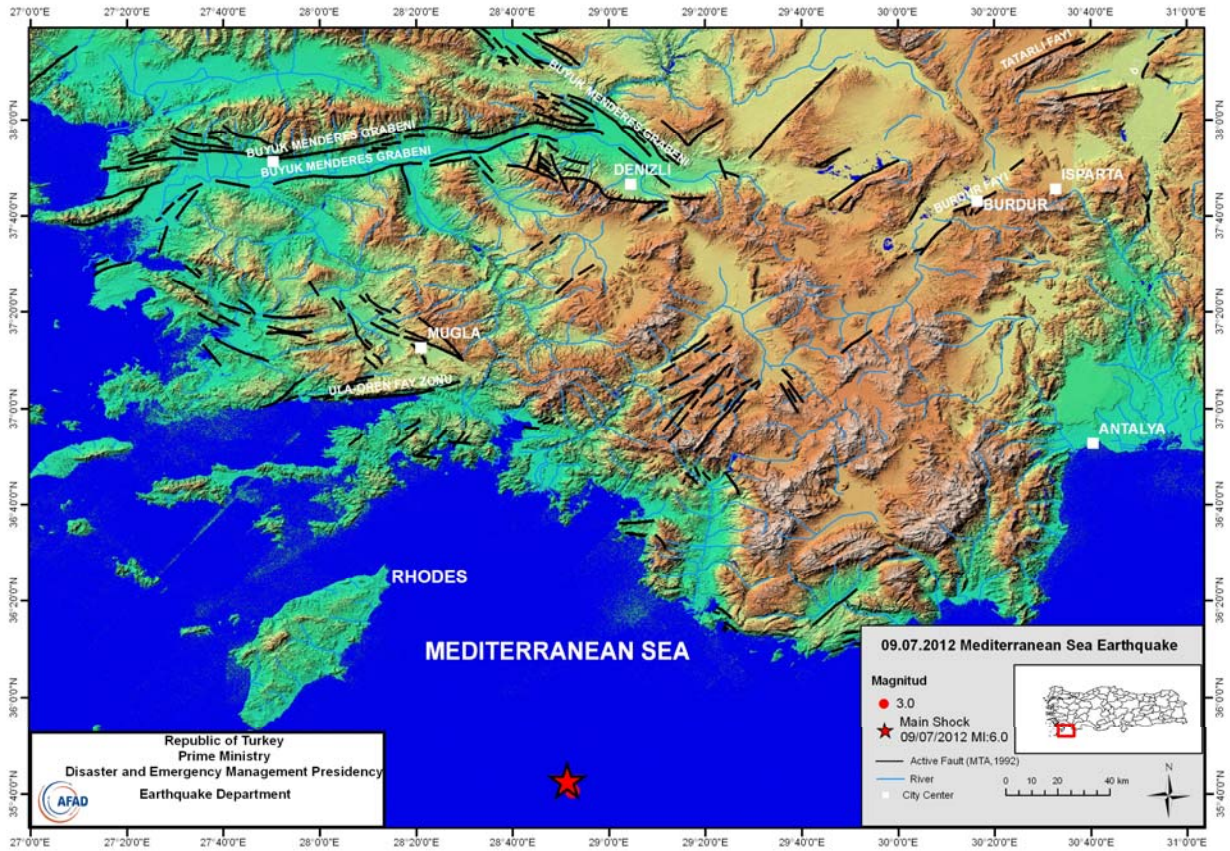
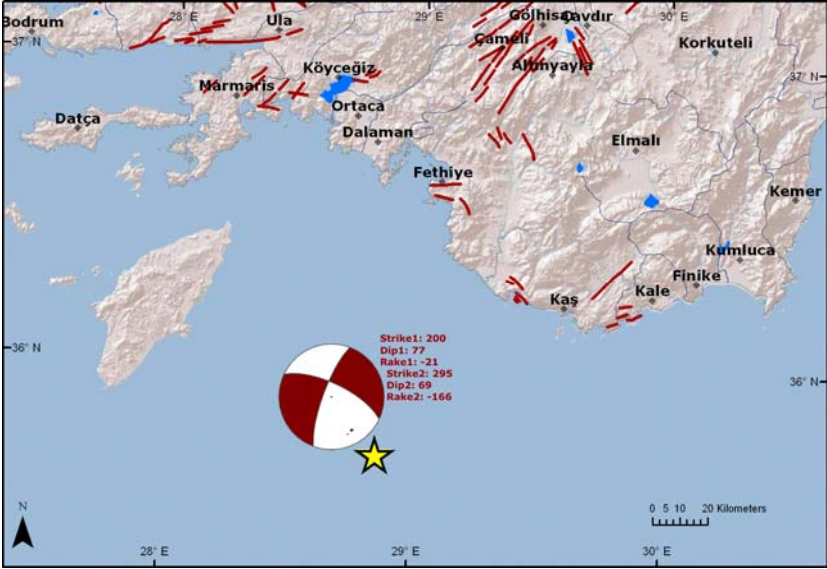


Fig. 1. 09/07/2012 East Mediterranean earthquake and aftershocks (MI=6.0)

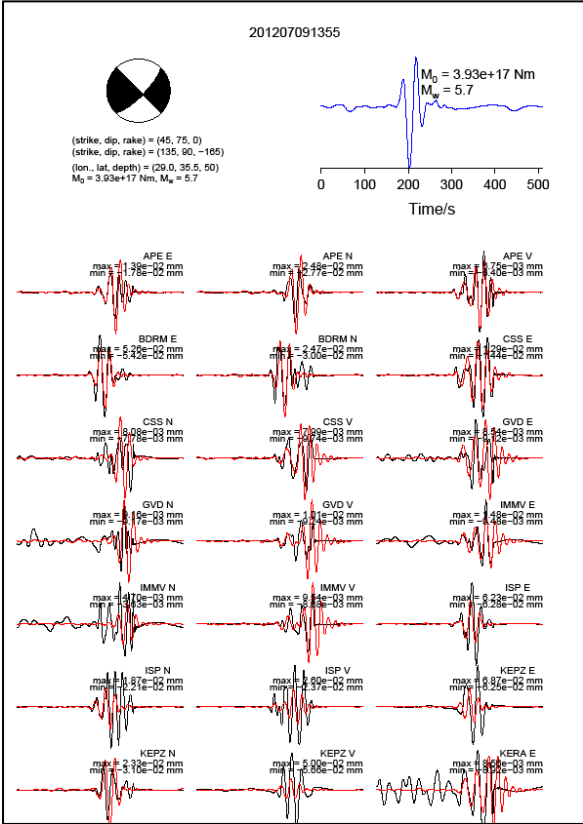


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(According to P wave first motion)



(Moment Tensor Solution with SWIFT)

Fig. 2. Focal Mechanism Solutions of East Mediterranean earthquake

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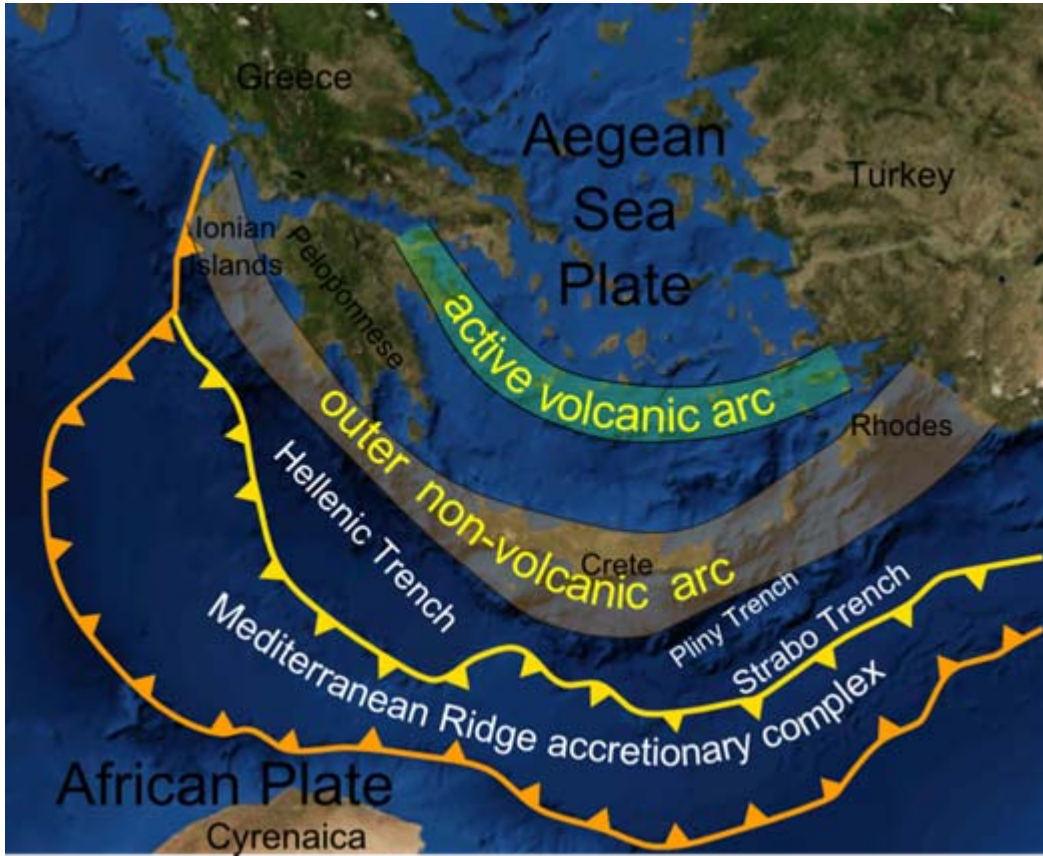


Fig. 3. Tectonic Structure of Hellenic Arc (taken from taken from various sources based on a screenshot from NASA WorldWind software)



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Beginning	Year	Month	Day	Lat.	Long.	Location	Explanations
M.S	1896			37	28	Rodos,Bodrum,Marmaris,Köyceğiz	I0=VI(8), r=240km(40,1) I=VI(20),Imax=VII(40),Kıbrıs'ta I=III-IV(3), h=i(40,1), M=4.9(20),M=7.7(40), r=283km(1)
M.S	1887			36	26	Rodos,Girit,Güneybatı Anadolu	M=6.3(1), I0>=VII?(1) 11\16.01.1866(8), 11\13.01.1866(2), M=6.8(40)
M.S	1868			36	28	Rodos Adası	908 No.lu Depremin artçısı(2)
M.S	1866			36	28	Rodos Adası	1863(8,11), I0=XI(1), 10h20m(20), h=i(1,40), r=1380km(1,40)
M.S	1863			0	0	Rodos Adası	875 Nolu depremlerle idantik olabilir.
M.S	1863			37	28	Rodos Adası ve Geniş Yöresi	36.5 N(8),27.5 E(8),35.5 N(1),26.0 E(1),I=VI(8),Lübnan'da I=VI (4), h=i(40,1),r=1450 km (1),Tsunami (1)
M.S	1856	11	13	38	26	Rodos Ad.-Ege D.	I=VI(8)
M.S	1856			36	28	Rodos,Karpatos,Kasos,Girit	I=VI(8)
M.S	1660			36	28	Rodos	03.05.1481(1,3),12.05.1481(1,2),I=IX(1)
M.S	1635			36	28	Rodos	18.12.1481(3),Tsunami
M.S	1481			36	28	Rodos,Güneybatı Anadolu,Girit	08.08.1303(3)
M.S	1481			36	28	Rodos,Güneybatı Anadolu,Girit	515 ve 516 Rodos depremleriyle idantik
M.S	1304			37	28	Rodos,Girit,Kıbrıs	515 ve 520 depremleriyle idantik olabilir
M.S	520			36	28	Rodos	516 ve 520 depremleriyle idantik olabilir
M.S	516			36	28	Rodos	36.0 N(1)
M.S	515			36	28	Rodos	
M.S	505			36	28	Rodos	
M.S	344	4	11	36	28	Rodos	
M.S	336			36	28	Rodos	
M.S	155			36	28	Rodos,Muğla,Fethiye	150(2),36.5 N(1),28.5 E(1)
M.S	138			36	28	Rodos ve İstanköy adaları	148(9),36.N(1)
M.S	115	12	13	36	28	Rodos	
M.Ö	106			36	28	Rodos	
M.Ö	185			36	28	Rodos,Kıbrıs	Bazı Anadolu Şehirleri
M.Ö	197			36	28	Rodos	
M.Ö	222			37	28	Rodos,Kıbrıs,Korint	MÖ.227(1),MÖ216(2),Tsunami(2)
M.Ö	303			36	28	Rodos	

Table 1. Historical period earthquakes of Mediterranean Region



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STATION			Latitude	Longitude	Altitude (m)	Type of Accelerometer	ACCELEROMETER VALUES (gal)			Distance $R_{\phi i}$ (km)	R_{β}	V_{S30} (m/sn)
No	CITY	TOWN					KG	DB	Düsey			
1	Muğla	Fethiye	36.62639	29.12399	3	Guralp cmg5td	14.12	17.16	5.75	109		248
2	Muğla	Marmaris	36.83942	28.24483	19	Guralp cmg5td	6.08	4.88	2.85	142		393
3	Muğla	KOYCEGIZ	36.96968	28.68675	17	Guralp cmg5td	2.37	2.83	1.74	146		372
4	Burdur	TEFENNI	37.31607	29.77900	1153	Guralp cmg5td	0.96	1.06	1.65	200		367
5	Aydın	Merkez	37.84548	27.79956	65	Guralp cmg5td	2.38	1.67	0.8	260		271
6	Antalya	Serik	36.91800	31.08760	35	Guralp cmg5td	1.8	1.39	0.72	241		
7	Antalya	Kaş	36.19510	29.64740	25	Guralp cmg5td	7.7	5.13	4.56	91		
8	Antalya	Kumluca	36.33748	30.29190	22	Guralp cmg5td	4.9	4.25	1.54	147		
9	Antalya	Elmalı	36.73700	29.92050	1095	Guralp cmg5td	1.65	1.16	0.6	151		
10	Antalya	Korkuteli	37.00070	30.35028	1303	Guralp cmg5td	0.95	1.2	0.57	198		
11	Antalya	Lara	36.87875	30.72150	47	Guralp cmg5td	1.37	2	1.02	212		
12	Antalya	Manavgat	36.78660	31.43240	4	Guralp cmg5td	0.96	1.04	0.72	259		

Table 2. Acceleration Values of East Mediterranean earthquake



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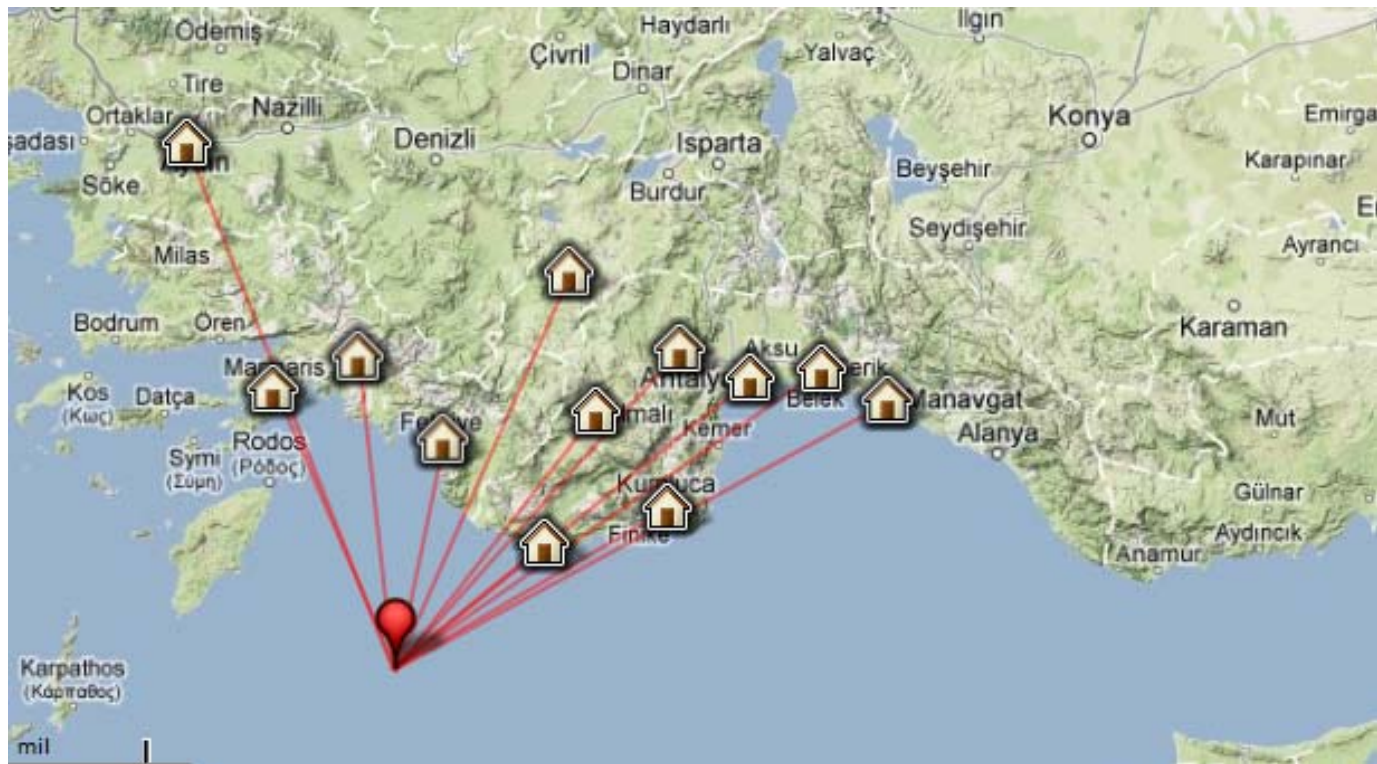


Fig.4. Distribution of the accelerometers that recorded East Mediterranean earthquake



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Fig.5. Peak Ground Acceleration Distribution of East Mediterranean Earthquake (MI=6.0)



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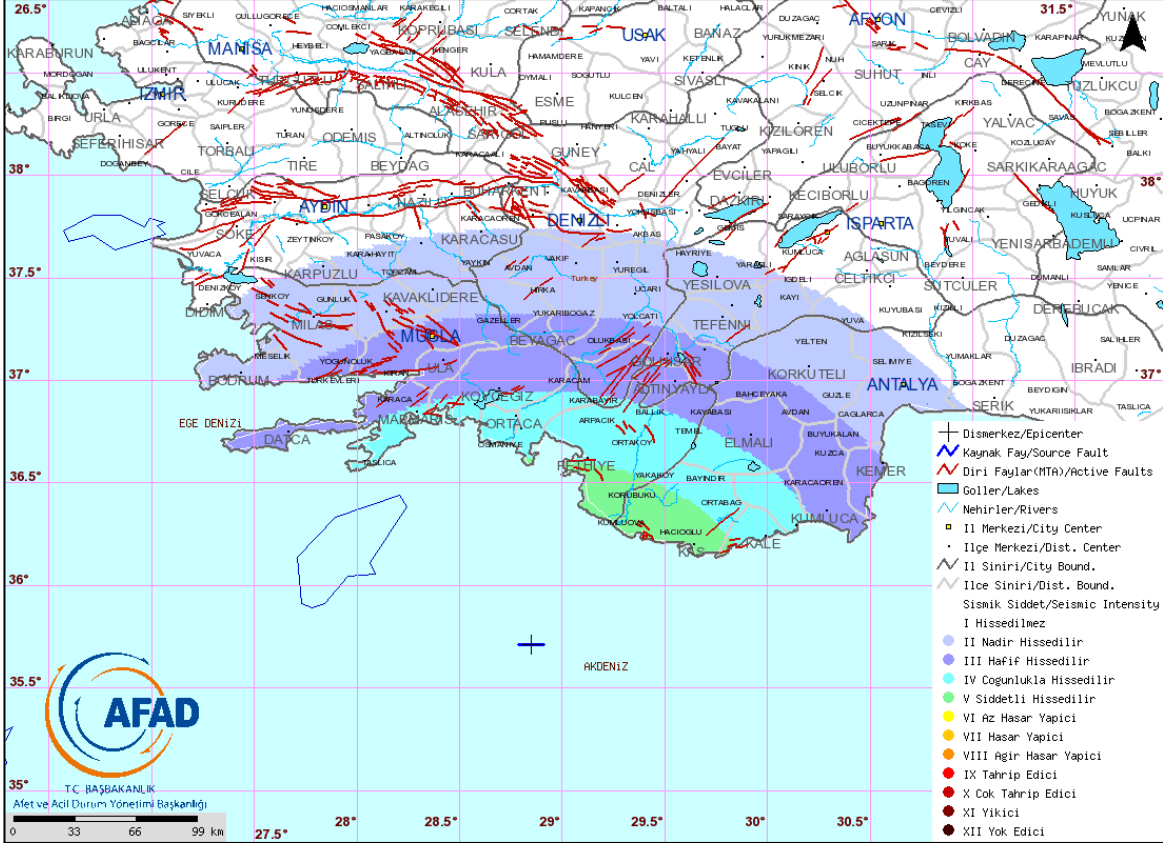


Fig.6. Seismic Intensity Map of East Mediterranean Earthquake (MI=6.0)



REFERENCES

- Arıođlu E., Arıođlu B. M., Girgin C. (2001). Dođu Marmara Depreminin Yer İvme Deđerleri Açıısından Deđerlendirilmesi, *Beton Prefabrikasyon*, 57-58, 5-15.
- Maden Tetkik ve Arama Genel M¼d¼rl¼đ¼, K¼lt¼r Sitesi, Ankara, 14-17 Ekim. Şarođlu F., Emre Ö. ve Kuşçu İ. (1992). T¼rkiye Diri Fay Haritası, 1:1,000,000 ölçekli, Maden Tetkik ve Arama Genel M¼d¼rl¼đ¼, Ankara.
- TC. Bařbakanlık AFAD Deprem Dairesi Bařkanlıđı (DDA). <http://www.deprem.gov.tr/>
- Yoshimitsu Fukushima and Teiji Tanaka, 1992, The revision of “A New Attenuation Relation for Peak Horizontal Acceleration of Strong Earthquake Ground Motion in Japan”, Abstracts The Seismological Society of Japan, 1992, Fall Meeting, B18 (in Japanese).

