REPUBLIC OF TURKEY
Prime Ministry
Disaster And Emergency Management Presidency,
Earthquake Department, Ankara - TURKEY

PRELIMINARY REPORT ON MARMARA SEA EARTHQUAKE Ml=5.1

An earthquake with magnitude Ml= 5.1 occurred at local time 20.57 on July, 25, 2011. Epicenteral coordinates of the earthquake is determined as 40.8195 N – 27.7498 E with focal depth 6.97 km. After this earthquake, 77 aftershocks were determined with magnitude range 1.6 – 3.6 between 27.07.2011-02.08.2011 (Fig 1) Earthquake epicenter and aftershocks occurred in Middle Marmara part of North Anatolian Fault Zone (Fig.2).This earthquake was also felt in neighbour provinces, Tekirdağ, Edirne, Kırklareli Bursa and İstanbul. Earthquake did not cause any damage or loss of life.

Focal mechanism solution performed by considering first motion direction of P wave of M_L= 5.1 earthquake as well as its moment tensor solution point out that this earthquake is emerged from right lateral strikeslip fault (Fig 3).

This region is a very active in terms of seismicity. Distribution of the earthquakes that occurred in Marmara Region from 1900 to present are given Fig 4 (M>4).

July 25, 2011 Marmara Sea Earthquake was recorded by accelerometers at 34 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 Tekirdağ Merkez station which is located at nearest distance (about 26.5 km) to epicenter of this earthquake are 17.61 cm/sec^2 in EW direction, 9.06 cm/sec^2 in NS direction and 5.10 cm/sec^2 in up-down direction (Table 2, Fig. 5).

Peak ground acceleration and seismic intensity values that can be created by 25 July 2011 Marmara Sea earthquake in the earthquake-hit area and its vicinity are estimated and the maps showing the spatial distribution of these values are prepared (Fig 6,7).

Earthqauke activity of this region (and all of Turkey) has been observed in Disaster and Emergency Management Presidency, Earthqauke Department Data Center Ankara 7 days/24 hours with 187 seismic station and 300 accelerometer. Obtained results are shared with public, press and relevant authorized.

For your information.

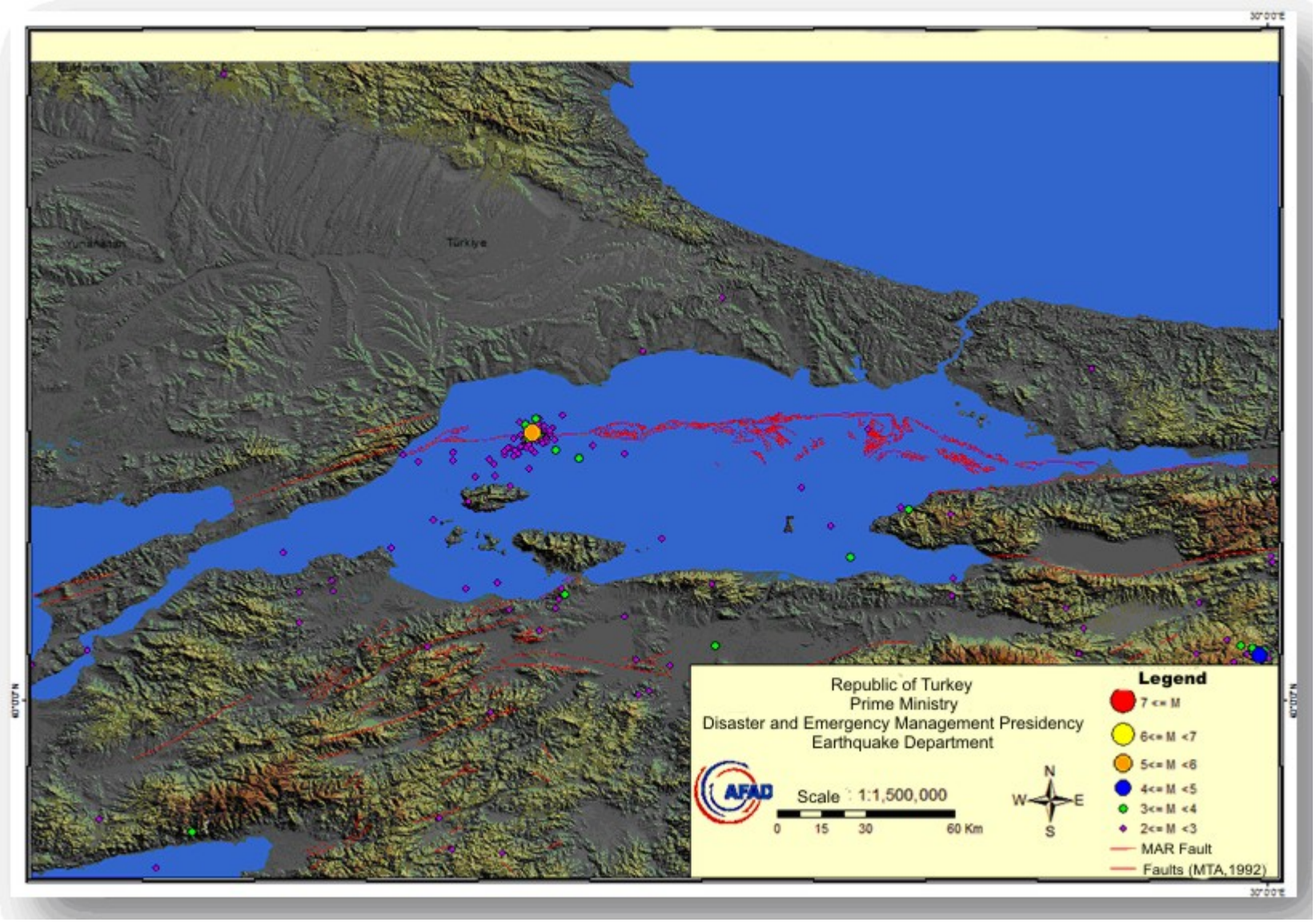


Figure 1: Marmara Sea Earthquake (Ml=5.1) and aftershocks

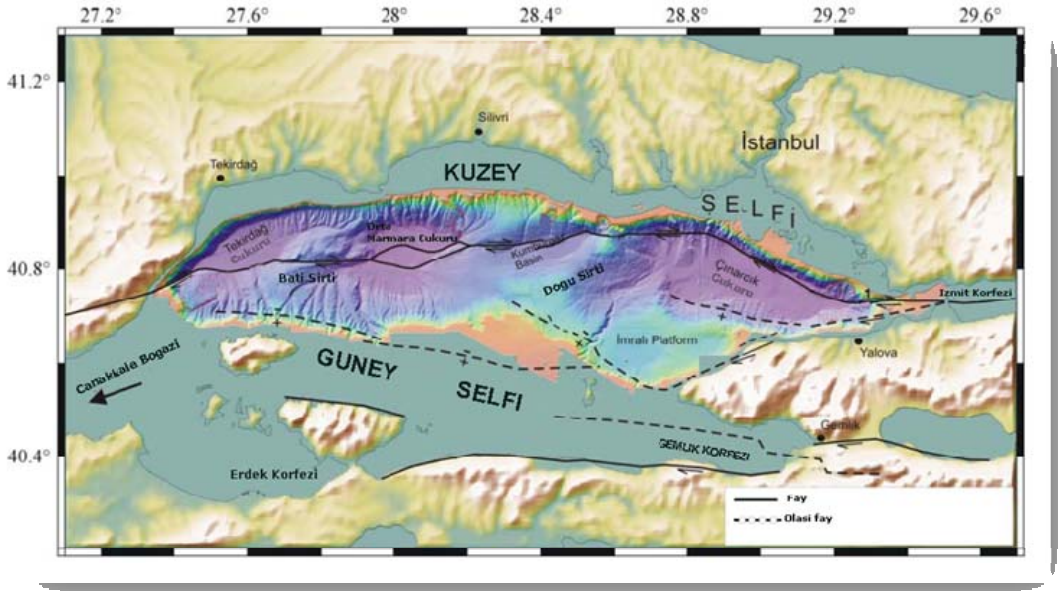


Figure 2: Tectonic Lines in Marmara Sea Region (taken from ESONET NoE - Marmara Sea Observatory)

FAULT MECHANISM OF MARMARA SEA EARTHQUAKE (Ml=5.1)

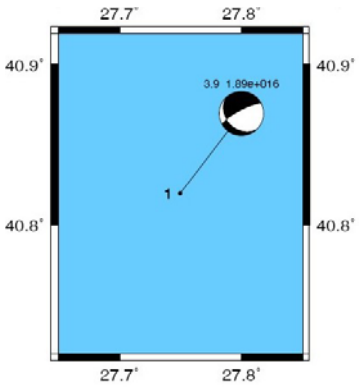
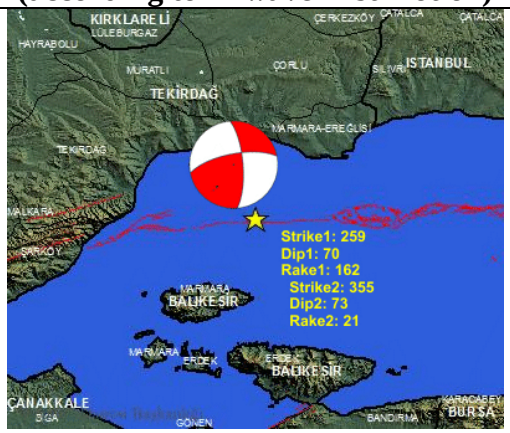
Date	Local Time	Ml	Moment Tensor Solution	Focal Mechanism Solution (according to P- wave first motion)
25.07.2011	20:57	5.1	 MOMENT TENSOR SOLUTION Trial source number :1 Source Depth (km) :2 Source time shift :3.9 Moment (N.m) :1.889e+016 Mw :4.9 DC% :76.7 CLVD% :23.3 Variance red.:0.5066 % 50.66 Mrr Mtt Mpp -6.406 11.374 -4.969 Mrt Mrp Mtp 12.129 9.970 -3.558 Exponent (Nm): 15 Strike Dip Rake 242 79 -119 Strike Dip Rake 134 31 -21	

Figure 3: Focal Mechanism and Moment Tensor Solutions (Ml=5.1)

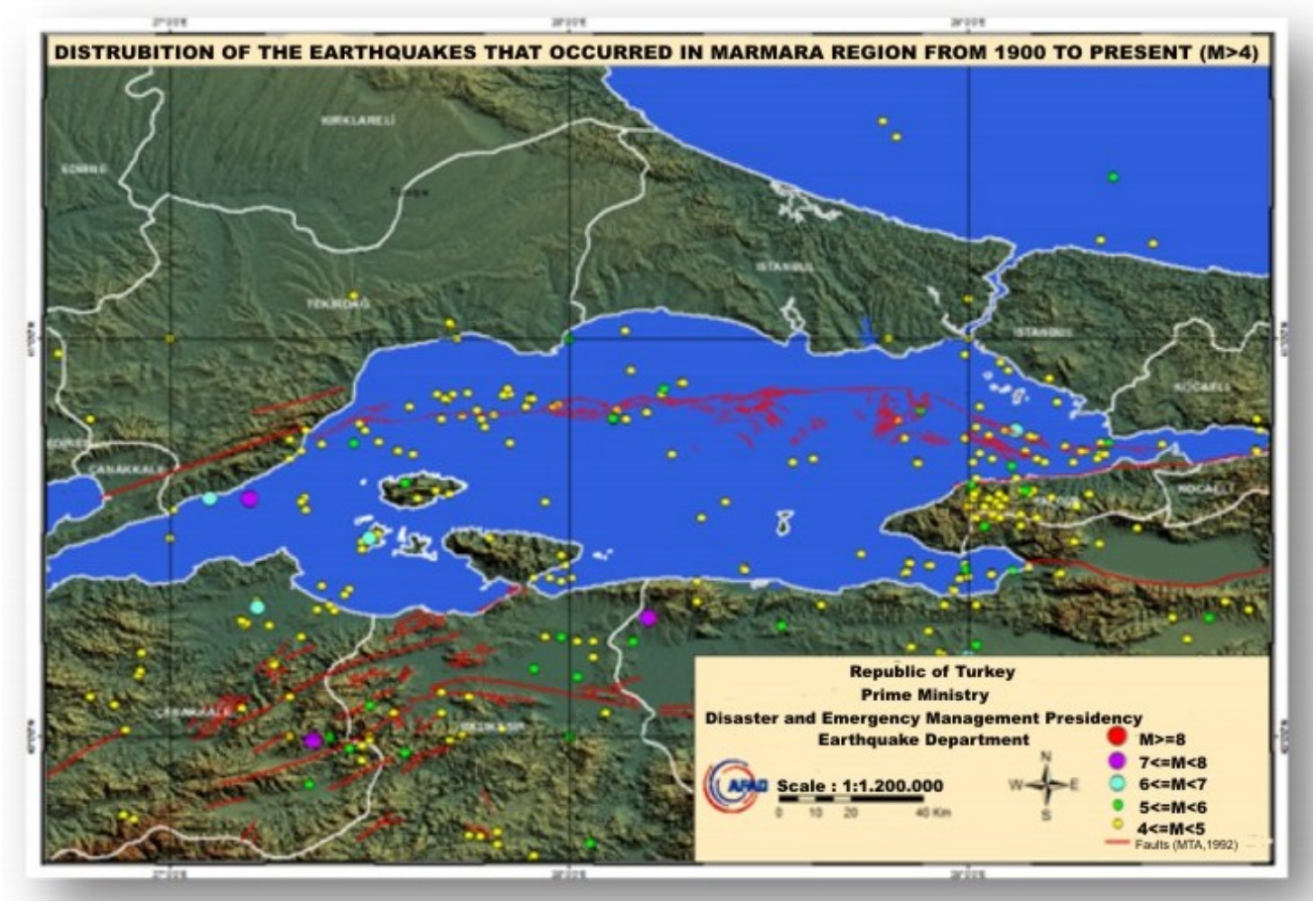


Figure 4: Marmara and Surrounding Region Earthquakes From 1900 to Present

Acceleration Values

No	STATION		EQUIPMENT TYPE	MAXIMUM ACCELERATION VALUES (gal)			Distance of Station to Epicenter R_{epi} (km)	V_{S30} (m/sn)
	CITY	TOWN		NS	EW	UD		
1	Tekirdağ	Merkez	GSR-16	9.06	**17.61**	5.10	26.5	409
2	Tekirdağ	Merkez	CMG-5TD	7.38	**11.20**	4.94	24.8	
3	İstanbul	Küçükçekmece	CMG-5TD	**13.09**	8.68	3.97	87.7	283
4	İstanbul	Silivri	CMG-5TD	2.48	**3.86**	1.57	51	639
5	İstanbul	Şile	CMG-5TD	3.12	**3.21**	1.67	160.4	
6	İstanbul	Merkez	CMG-5TD	**2.76**	2.27	1.46	108.9	595
7	İstanbul	Ümraniye	CMG-5TD	6.03	**7.56**	2.09	120.4	
8	Çanakkale	Merkez	CMG-5TD	1.98	**1.99**	0.63	137.3	192
9	Edirne	Merkez	CMG-5TD	**5.23**	4.03	1.49	135.3	
10	Balıkesir	Gönen	CMG-5TD	4.18	**4.19**	1.14	79	397
11	Balıkesir	Bandırma	CMG-5TD	**6.98**	5.51	3.58	58.1	321
12	Balıkesir	Dursunbey	CMG-5TD	**1.37**	0.79	0.78	157.4	561
13	Balıkesir	Merkez	CMG-5TD	2.20	**2.25**	0.83	129.8	456
14	Kırklareli	Merkez	CMG-5TD	**1.22**	1.22	0.62	111.3	
15	Kütahya	Emet	CMG-5TD	1.41	**1.43**	1.11	209.4	304
16	Kocaeli	Yuvacık	CMG-5TD	1.06	**1.19**	1.14	187.9	
17	Kocaeli	Gebze	CMG-5TD	1.02	0.84	**1.17**	143.2	701
18	Kocaeli	KBB Bahçe	CMG-5TD	**1.30**	1.28	0.78	305	305
19	Kocaeli	Karamürsel	CMG-5TD	1.08	**1.13**	0.87	155.8	300
20	Kocaeli	Körfez	CMG-5TD	0.83	1.50	**1.51**	167.1	300
21	Kocaeli	TAYSAD	CMG-5TD	**3.22**	2.80	0.80	139.5	
22	Kocaeli	Serbest Bölge	CMG-5TD	1.16	**1.76**	0.59	178.7	
23	Kocaeli	İzaydaş	CMG-5TD	0.36	**0.42**	0.32	191.7	
24	Kocaeli	Kandıra	CMG-5TD	**0.39**	0.38	0.22	203.3	
25	Kocaeli	KBB 5.kat	CMG-5TD	3.47	**3.67**	0.64	305	
26	Bursa	Demirtaş	ETNA	**2.00**	1.84	0.81	129.3	488
27	Bursa	Yıldırım	ETNA	**1.36**	1.28	0.60	137	459
28	Bursa	AFAD	ETNA	**2.03**	0.43	0.73	130.5	249
29	Bursa	Kurtul	ETNA	**4.63**	4.36	1.19	126.9	274

30	Bursa	Gemlik	ETNA	**4.43**	2.65	1.80	127.7	228
31	Bursa	Orhangazi	ETNA	**2.06**	4.13	0.79	135.9	
32	Bursa	Mudanya	CMG-5TD	**3.15**	3.14	1.66	112.6	
33	Bursa	Keles	CMG-5TD	**2.60**	2.11	0.80	161.5	401
34	Bursa	M.Kemalpaşa	CMG-5TD	2.71	**4.21**	1.61	103.1	

Table 2: Acceleration Values of Marmara Sea Earthquake

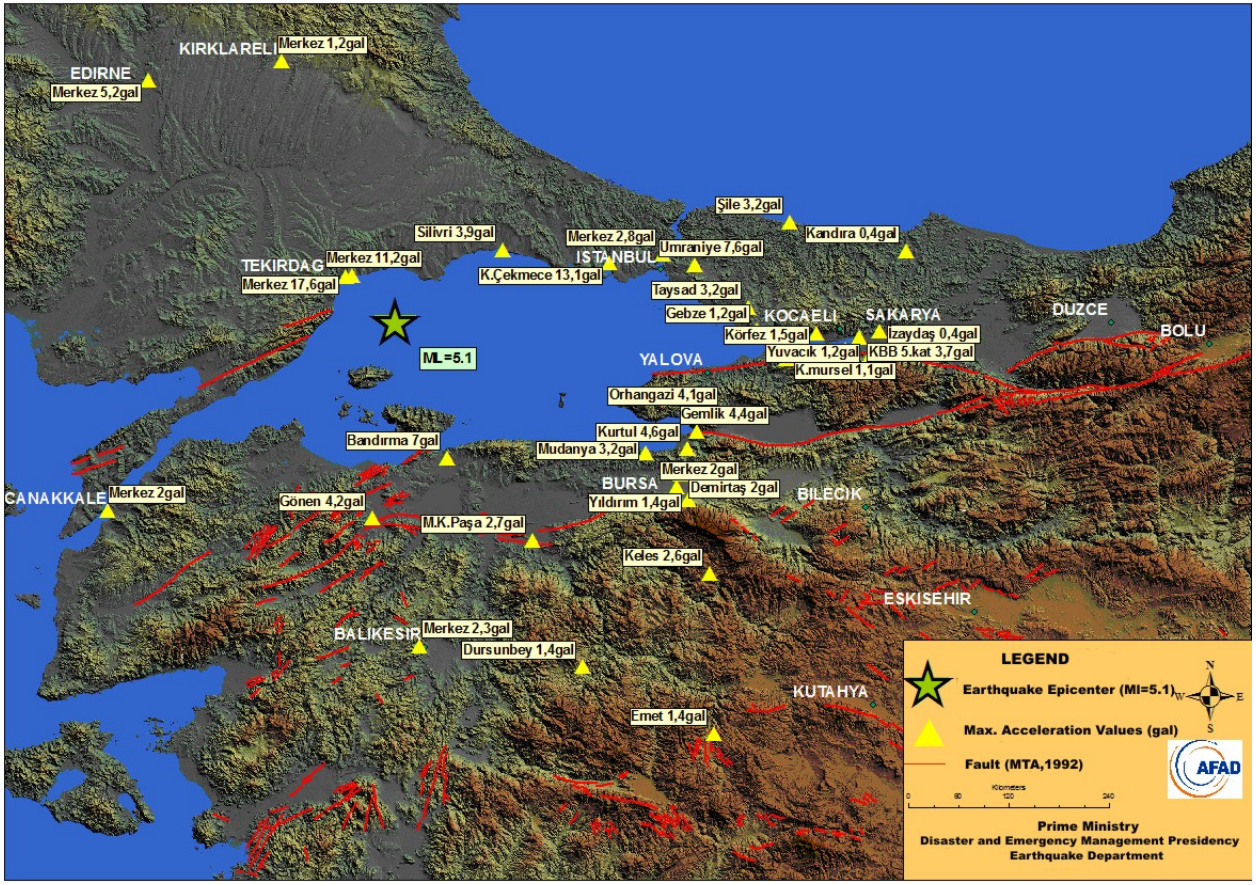


Figure 5: Acceleration Values of Marmara Sea Earthquake

Fig.6: Peak Ground Accelaration Distribution of Marmara Sea Earthqauke (Ml=5.1)(Çeken et al.2008)

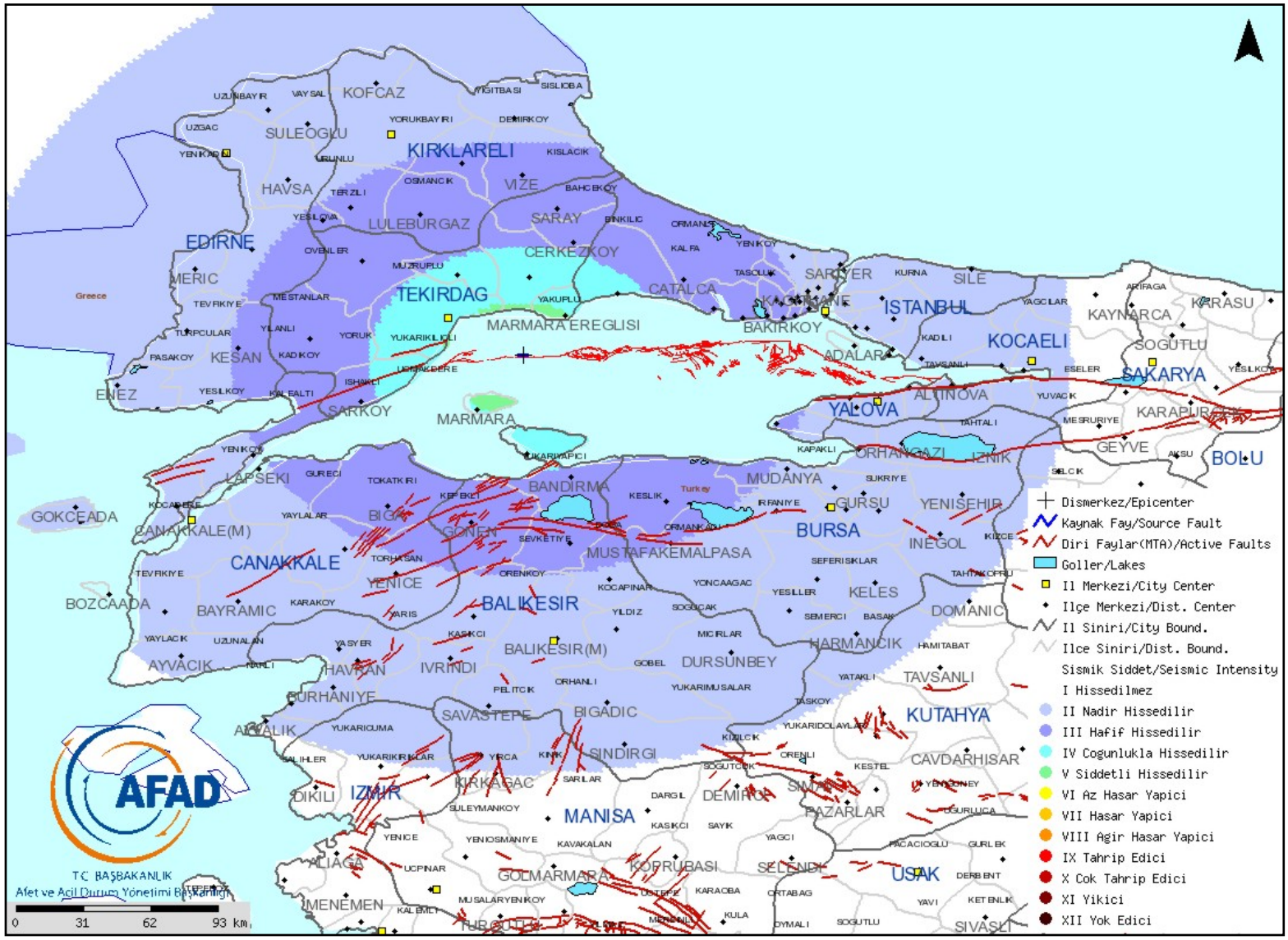


Fig.7: Seismic Intensity Map of Marmara Sea Earthquake (Ml=5.1) (Çeken et.al. 2008)