PRELIMINARY REPORT

GULF OF FETHİYE EARTHQUAKE
Ml=6.0
(Southwestern Turkey)

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

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)

An earthquake with magnitude Ml=6.0 occurred at local time 15:44 on June, 10, 2012. Epicenteral coordinates of the earthquake was determined as 36.53 N - 28.90 E with focal depth 33.77 km. The magnitude of earthquake was identified with AFAD National Seismological Observation Network and Kandilli Observatory and Earthquake Research Institute. After this earthquake, 203 earthquakes were determined with magnitude range 1.7 – 5.0 in first 20 hours (Fig.1).

This earthquake was also felt in besides Muğla, in wide region that Aegean, Mediterranean Region and many of the Greek Islands. It didn't caused loss of life but it caused slight damage to some structure.

Focal Mechanism Solutions performed by considering first motion direction of P wave and moment tensor solution of Ml=6.0 earthquake is emerged from strike slip faulting wtih thrust component (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).

Mugla-Fethiye region has been exposed to destructive earthquakes during the historical and instrumental periods. Destructive earthquakes that occurred in the last century are given as; 1926 M=7.4 Rodos, 1933 M=6.5 Kos, 1941 M=5.8 Muğla, 1957 Fethiye M=6.8 and M=7.1, 1959 Köyceğiz M=5.7, 1961 Marmaris M=6.3, 1969 Fethiye M=5.4 earthquakes (Fig.4,5).

June 10, 2012 Gulf of Fethiye Earthquake was recorded by accelerometers at 47 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 which is located at nearest distance (about 33 km) to epicenter of this earthquake are 230.06 gal in EW direction, 136.15 gal in NS direction and 66.11 gal in up-down direction (Table 1, Fig. 6,7,8,9).

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Peak ground acceleration and seismic intensity values that can be created by June,10, 2012 Gulf of Fethiye earthquake in the earthquake-hit area and its vicinity are estimated and the maps showing the spatial distribution of these values are prepared (Fig.10,11).

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.

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)

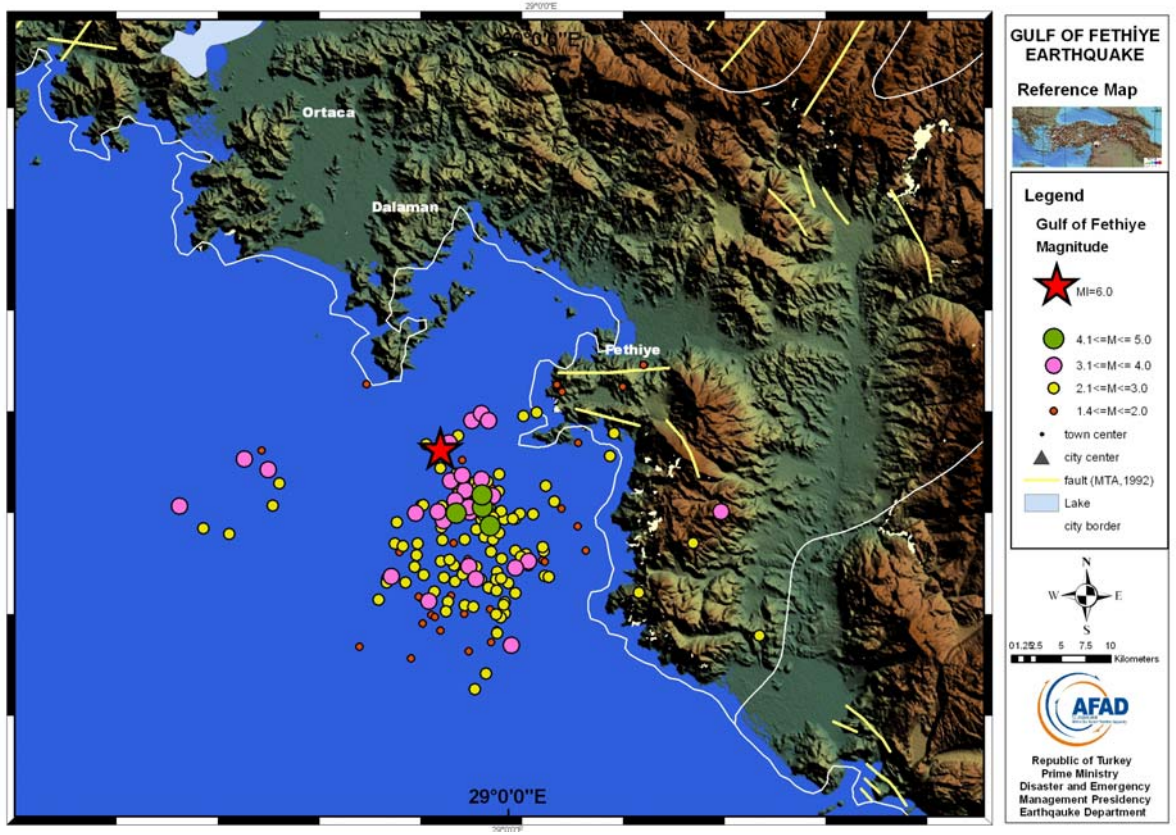
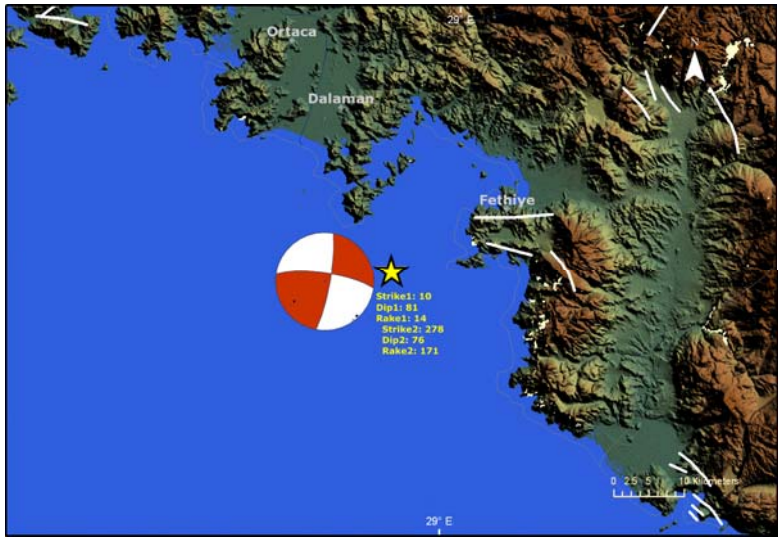
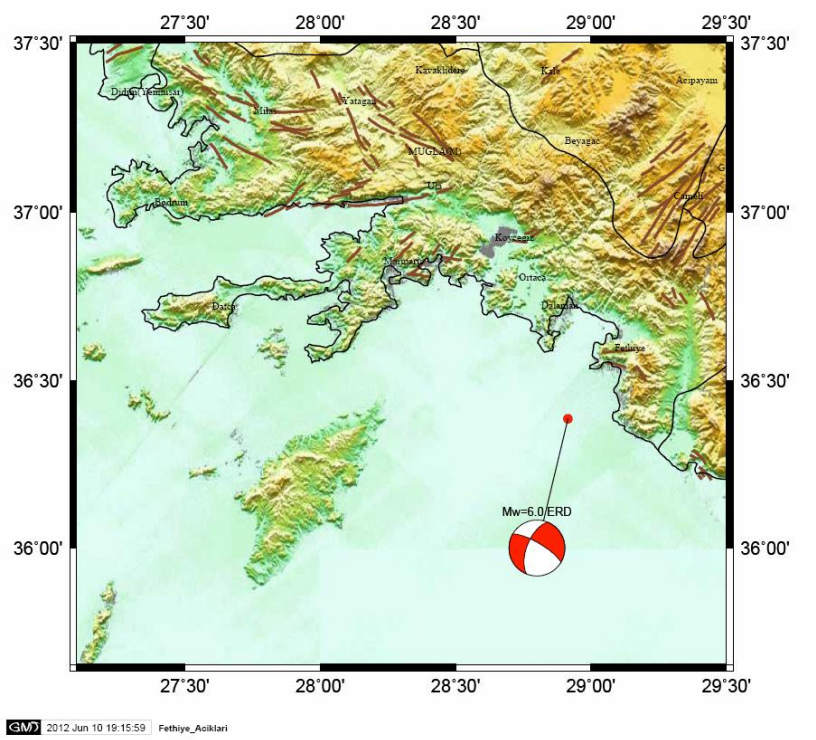


Fig. 1. 10/06/2012 Gulf of Fethiye earthquake and aftershocks (Ml=6.0)

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)



(According to P wave first motion)



(Moment Tensor Solution)

Fig. 2. Focal Mechanism Solutions of Gulf of Fethiye earthquake

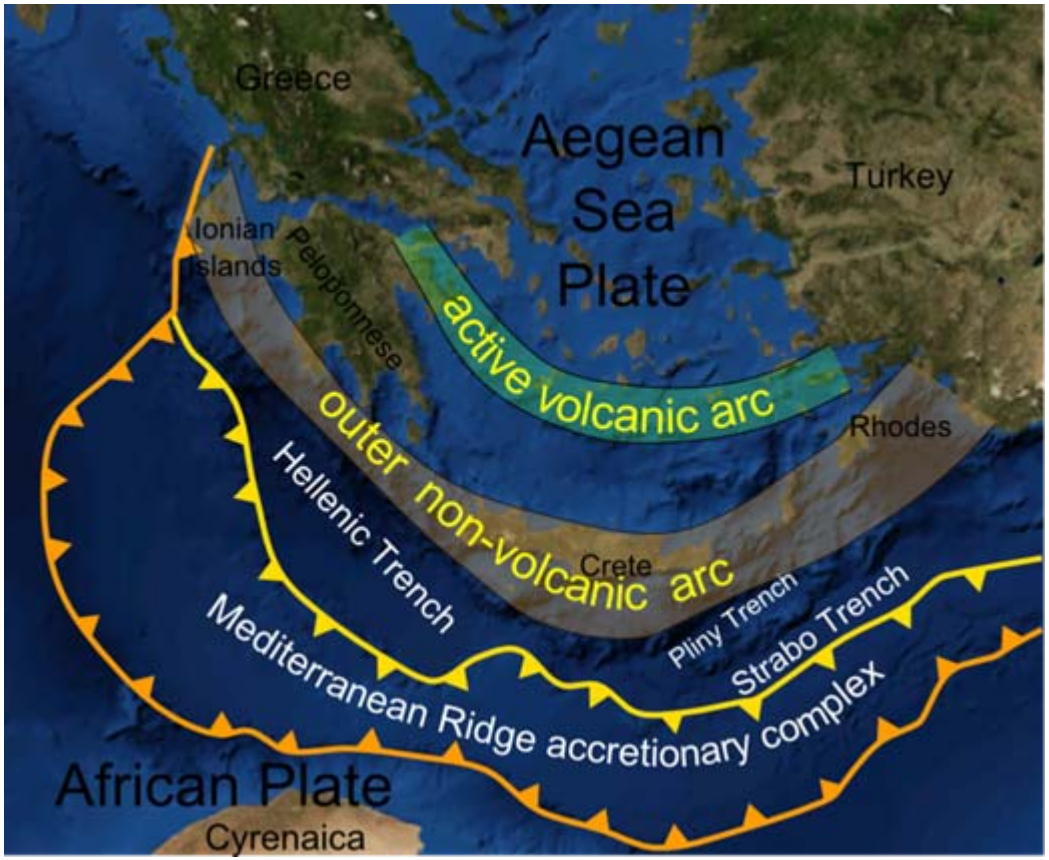


Fig. 3. Tectonic Structure of Hellenic Arc (taken from taken from various sources based on a screenshot from NASA WorldWind software)

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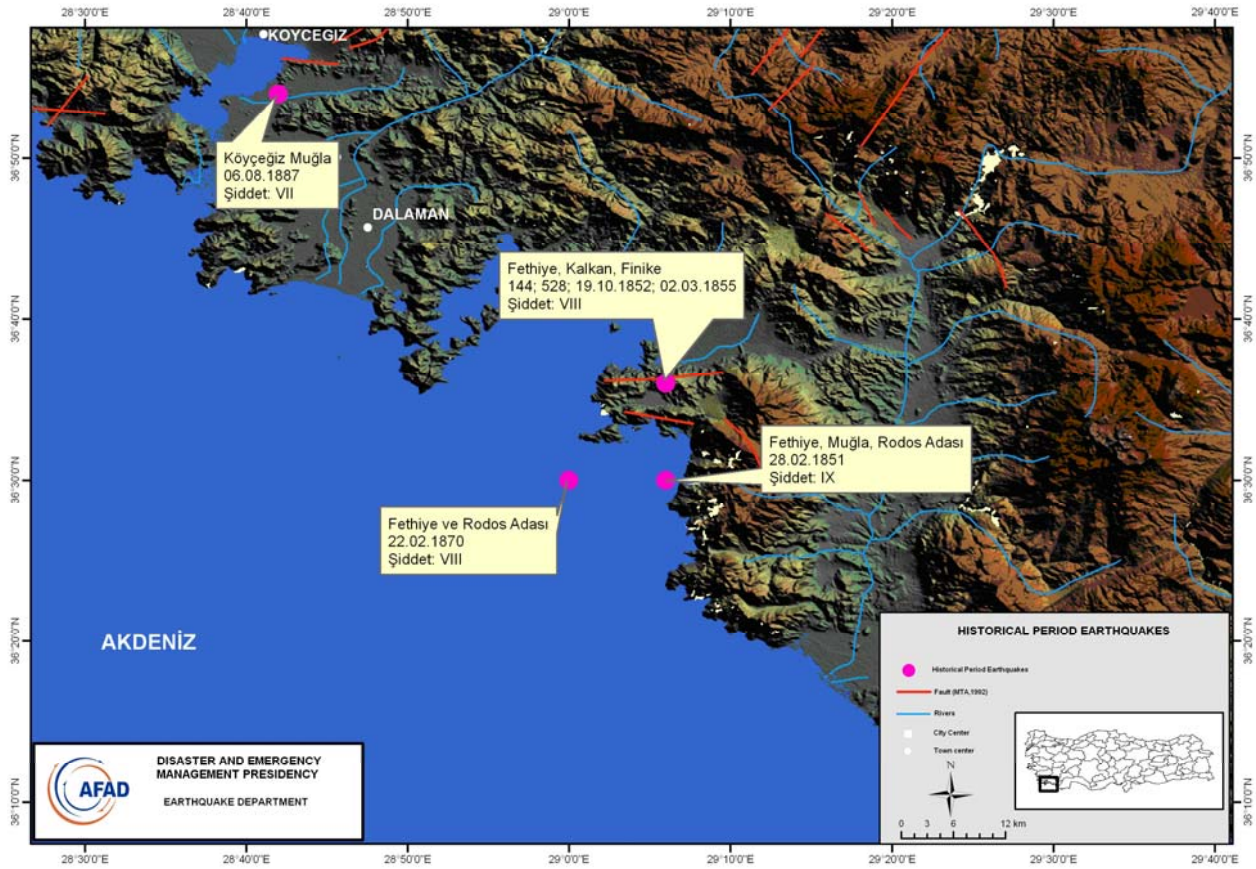

Fig. 4. Historical period earthquakes of Muğla-Fethiye Region

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)

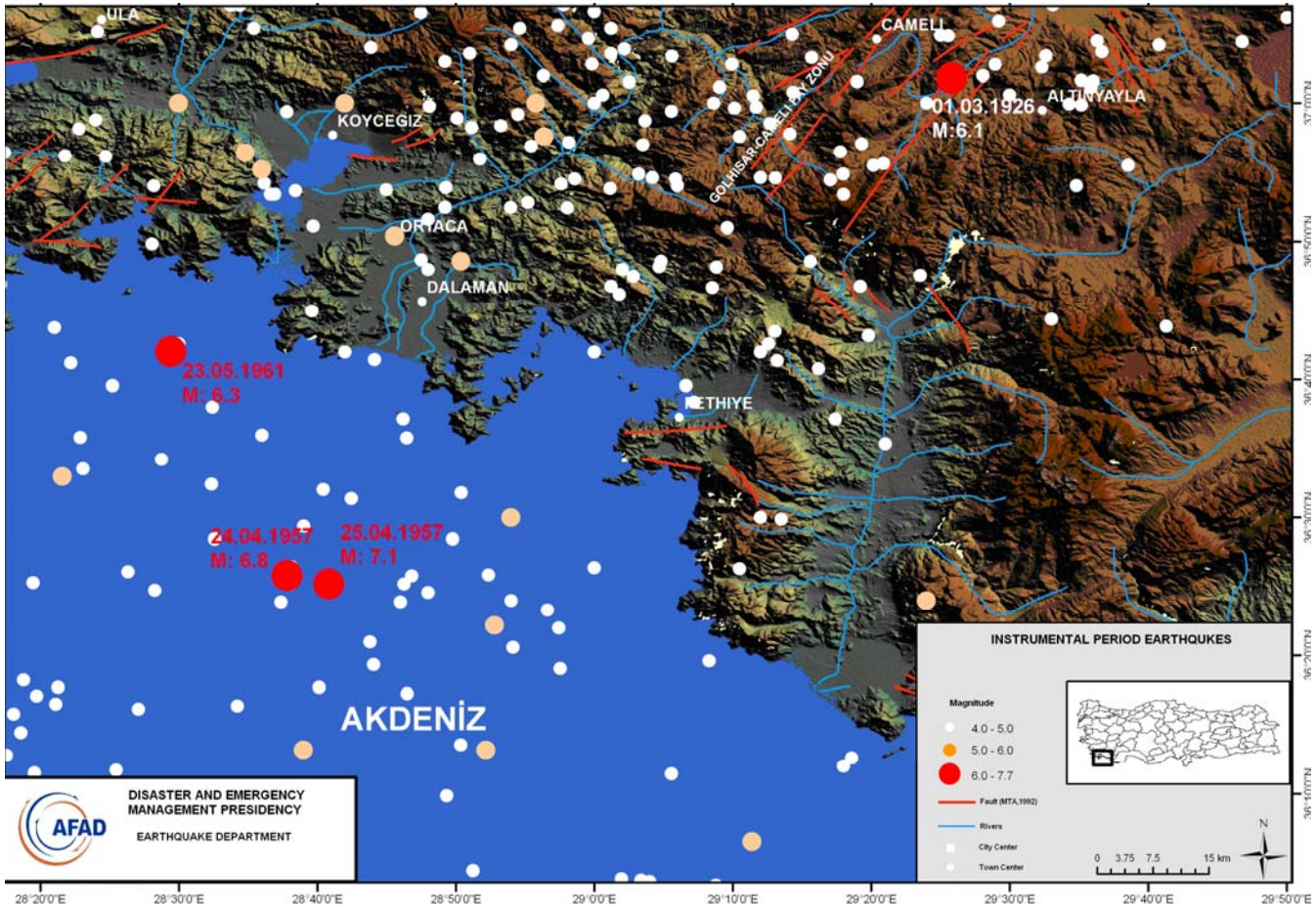

Fig. 5. Instrumental period earthquakes of Muğla-Fethiye Region

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)

N	STATION CITY	STATION TOWN	Lat	Lon	Altitude (m)	Type of Accelerometer	ACCELEROMETER VALUES (gal) NS	EW	UD	Distance R_{rup}(km)	Share Wave V_{S30} (m/sn)
1	MUĞLA	FETHİYE	36.6264	29.124	3	CMG-5TD	136.2	230.1	66.1	33	248
2	MUĞLA	KOYCEGIZ	36.9697	28.6868	17	CMG-5TD	29.72	23.93	13.3	68	372
3	ANTALYA	KAŞ	36.1951	29.6474	25	CMG-5TD	27.22	30.08	14.6	69	
4	MUĞLA	MARMARİS	36.8394	28.2448	19	CMG-5TD	18.93	19.22	11.1	78	393
5	MUĞLA	MERKEZ	37.2145	28.3561	638	CMG-5TD	23.57	23.48	13.1	105	468
6	ANTALYA	FINIKE	36.3022	30.1463	1	SM-2	49	29.5	17	111	299
7	ANTALYA	KUMLUCA	36.3375	30.2919	22	CMG-5TD	50.05	24.63	17.1	123	
8	BURDUR	TEFENNI	37.3161	29.779	1153	CMG-5TD	6.61	9.95	12	129	367
9	ANTALYA	KORKUTELİ	37.0007	30.3503	1303	CMG-5TD	8.58	8.99	3.55	145	
10	MUĞLA	BODRUM	37.033	27.44	25	CMG-5TD	4.81	5.97	4.03	149	747
11	DENİZLİ	MERKEZ_KINIKLI	37.7372	29.1006	482	CMG-5TD	7.71	9.51	6.53	151	
12	DENİZLİ	BABADAG	37.8092	28.8599	689	CMG-5TD	20.96	22.28	12.7	158	
13	DENİZLİ	MERKEZ	37.8125	29.1111	332	CMG-5TD	8.93	10.6	7.91	160	356
14	ANTALYA	MERKEZ	36.8944	30.6667	42	CMG-5TD	4.8	5.16	4.06	166	
15	ANTALYA	LARA	36.8788	30.7215	47	CMG-5TD	4.02	4.72	2.59	170	
16	DENİZLİ	SARAYKÖY	37.9325	28.9229	157	Etna	12.97	11.67	4.64	172	232
17	AYDIN	KUYUCAK	37.9115	28.4654	93	Etna	11.27	9.75	5.81	174	301
18	AYDIN	SULTANHİSAR	37.8841	28.1506	74	Etna	7.15	7.05	4.81	180	354
19	BURDUR	MERKEZ	37.7035	30.2208	874	CMG-5TD	2.8	2.57	1.97	186	294
20	AYDIN	MERKEZ	37.8455	27.7996	65	CMG-5TD	9.17	6.15	3.22	190	271
21	ANTALYA	SERİK	36.918	31.0876	35	CMG-5TD	4.27	4.12	2.73	202	
22	ISPARTA	MERKEZ	37.7839	30.5654	992	CMG-5TD	6.46	4.29	2.84	213	
23	AFYON	DİNAR	38.0599	30.1537	862	CMG-5TD	4.42	4.68	1.93	215	198
24	ANTALYA	MANAVGAT	36.7866	31.4324	4	CMG-5TD	2.09	2.41	1.29	229	
25	MANİSA	SALİHLİ	38.4831	28.1235	111	CMG-5TD	2.98	3.19	1.66	243	273
26	İZMİR	KAYNAKLAR	38.3756	27.1936	136	CMG-5TD	1.85	1.39	0.93	267	
27	İZMİR	PINARBASI	38.4213	27.2563	76	CMG-5TD	1.03	1.14	0.62	269	
28	İZMİR	YESILYURT	38.3723	27.1084	106	CMG-5TD	1.04	1.14	0.56	271	
29	İZMİR	BUCA	38.4009	27.1516	79	CMG-5TD	1.83	1.57	0.8	272	
30	İZMİR	BORNOVA	38.453	27.2244	35	CMG-5TD	2.86	2.29	1.46	273	270
31	İZMİR	ÇAMDİBİ	38.4357	27.1987	68	CMG-5TD	2.59	3.29	1.09	273	
32	İZMİR	GÜZELYALI	38.3944	27.0821	26	CMG-5TD	0.92	1.1	0.49	275	771
33	İZMİR	KONAK	38.4312	27.1435	7	CMG-5TD	3.45	4.03	1.67	275	
34	İZMİR	MANAVKUYU	38.478	27.2111	184	CMG-5TD	1.13	0.83	0.76	276	
35	İZMİR	MERKEZ	38.4584	27.1671	2	CMG-5TD	3.69	3.56	1.62	276	
36	İZMİR	BALCOVA	38.409	27.043	3	CMG-5TD	1.78	1.77	1	278	
37	İZMİR	BAYRAKLI	38.4762	27.1581	197	CMG-5TD	0.94	0.84	0.5	278	
38	İZMİR	KARSIYAKA	38.4525	27.1112	10	CMG-5TD	3.16	3.28	1.27	278	
39	İZMİR	BOSTANLI	38.4649	27.094	4	CMG-5TD	2.49	1.83	0.91	280	
40	İZMİR	MAVISEHIR	38.4679	27.0764	1	CMG-5TD	5.32	3.34	1.52	281	
41	İZMİR	GUZELBAHCE	38.3706	26.8907	17	CMG-5TD	1.82	2.14	1	283	
42	İZMİR	YAMANLAR	38.4969	27.1073	64	CMG-5TD	0.83	0.86	0.63	283	
43	İZMİR	URLA	38.3282	26.7706	76	CMG-5TD	2.4	2.35	0.99	286	
44	MANİSA	GORDES	38.9398	28.2836	670	CMG-5TD	1.17	1.12	0.57	289	629
45	KUTAHYA	EMET	39.3361	29.2491	853	CMG-5TD	1	1.04	0.41	329	304
46	İZMİR	DIKILI	39.0739	26.8883	3	CMG-5TD	2.18	1.65	0.63	346	193
47	ESKISEHIR	MERKEZ	39.7403	30.6521		CMG-5TD	0.56	0.59	0.22	401	

Table 1. Acceleration Values of Gulf of Fethiye earthquake

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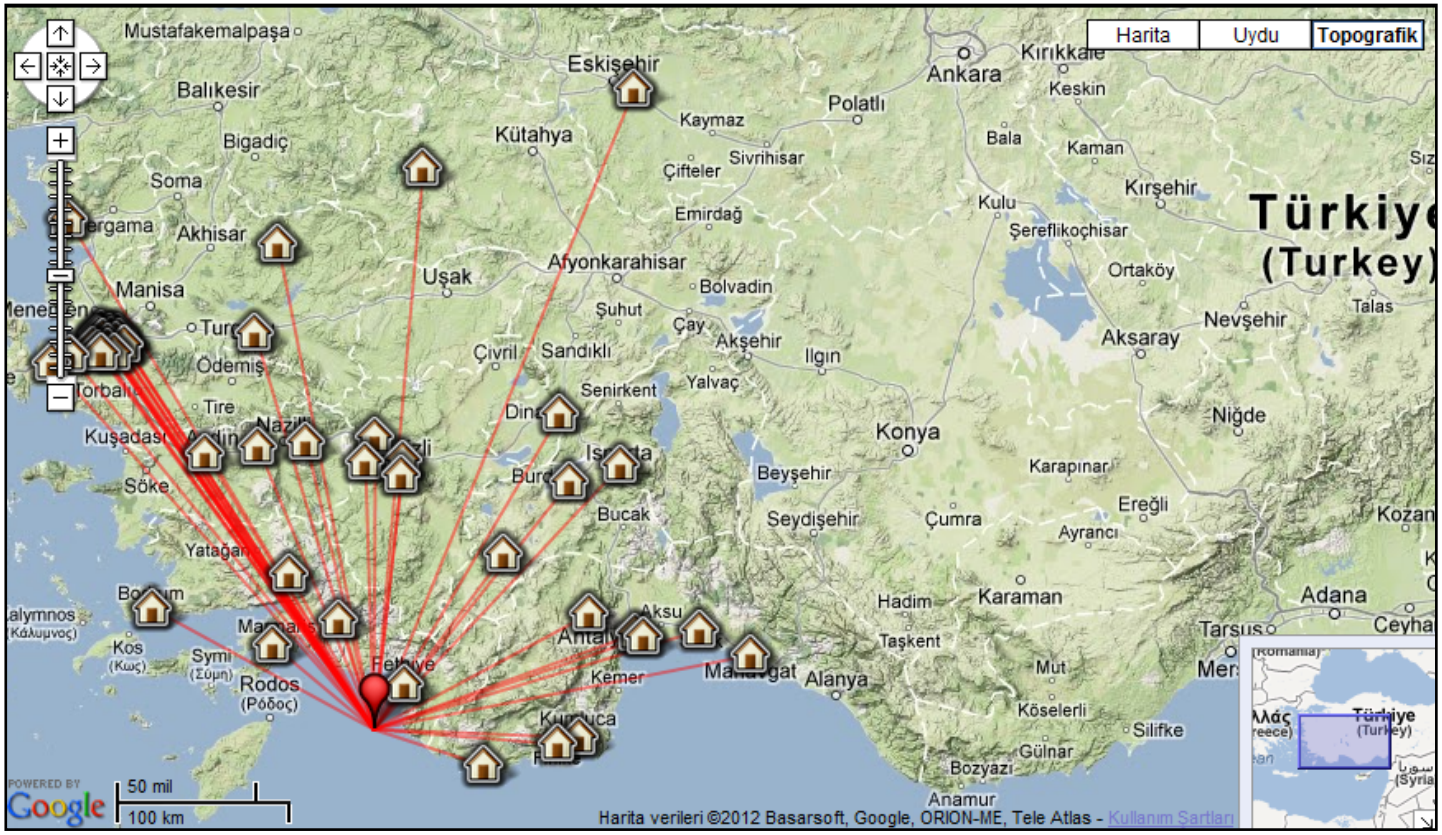
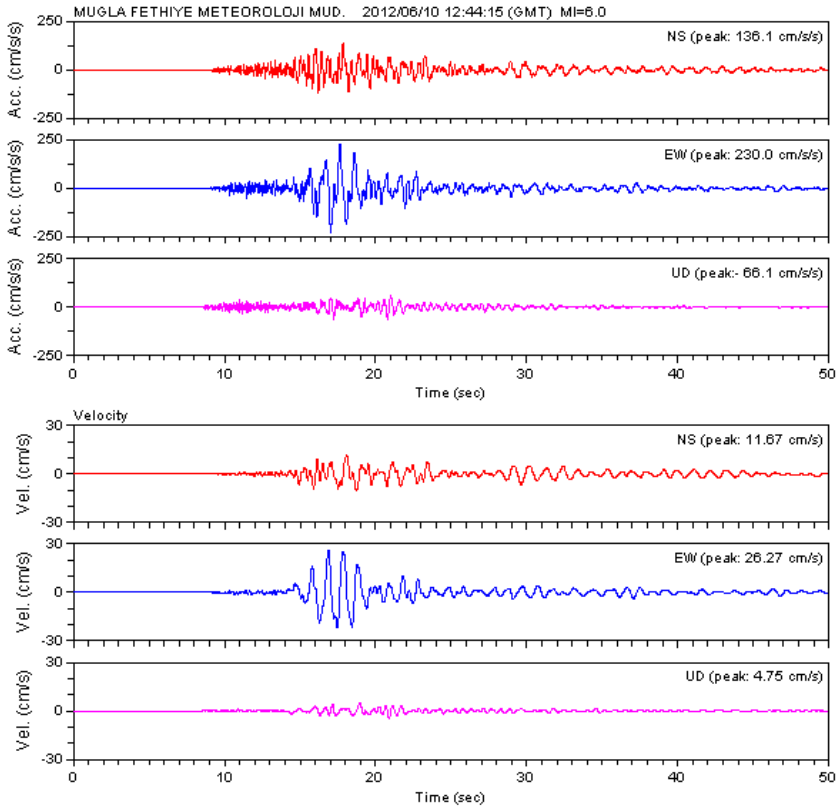
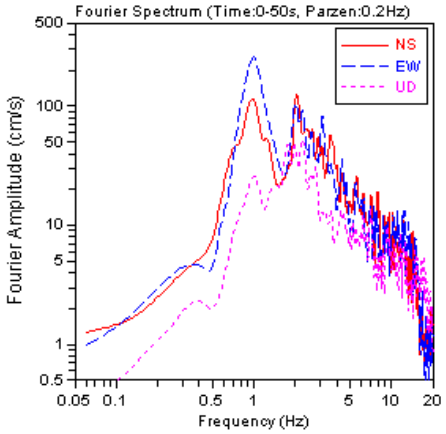


Fig.6. Distribution of the accelerometers that recorded Gulf of Fethiye earthquake

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)





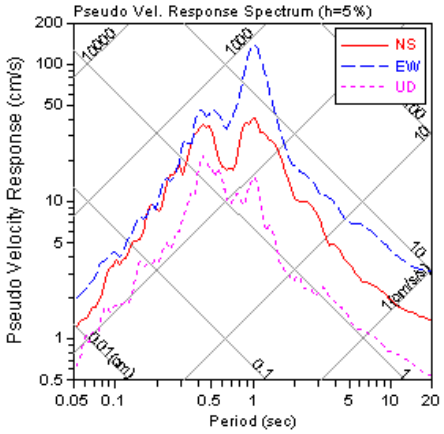
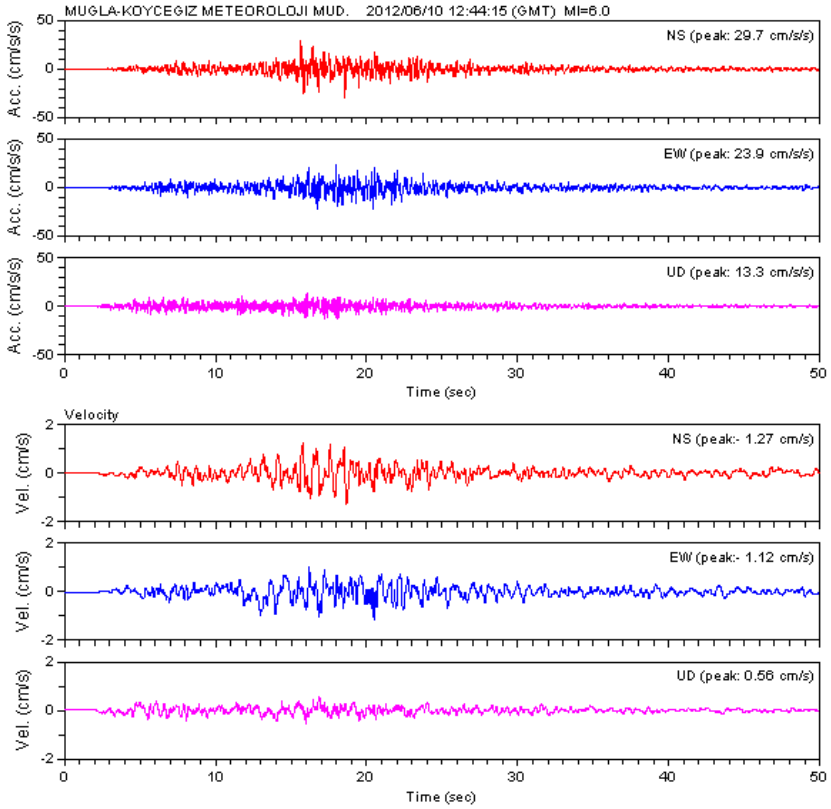
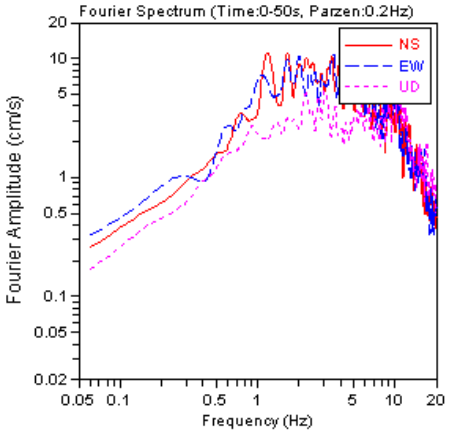


Fig.7. Wave Forms of Acceleration, Velocity, Fourier Spectrum and Response Spectrum of the Gulf of Fethiye Earthquake for Fethiye Station

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)





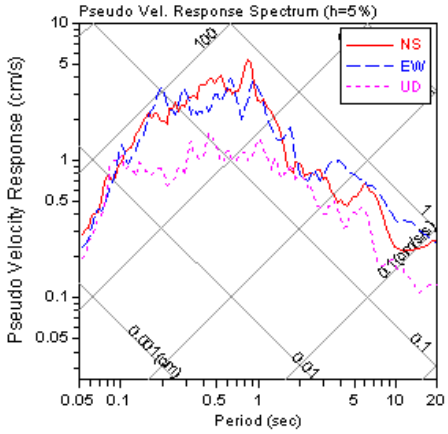
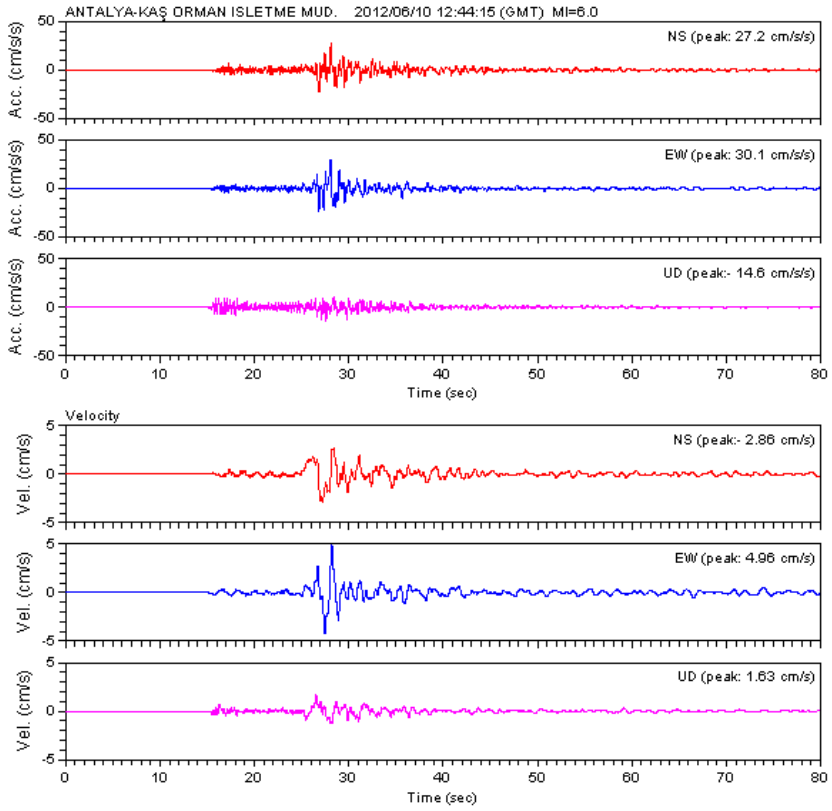
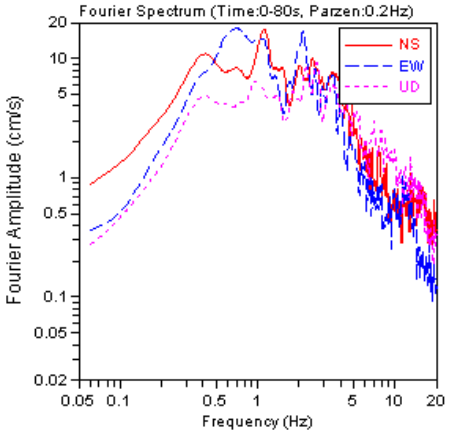


Fig.8. Wave Forms of Acceleration, Velocity, Fourier Spectrum and Response Spectrum of the Gulf of Fethiye Earthquake for Köyceğiz Station

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)





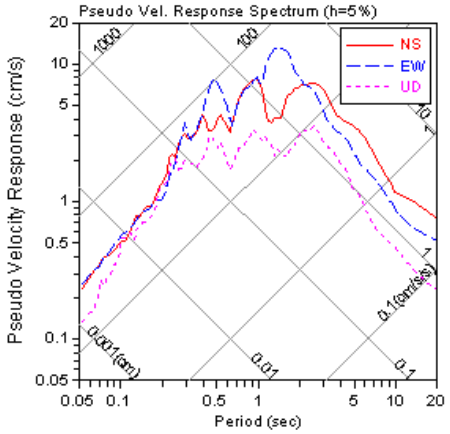


Fig.9. Wave Forms of Acceleration, Velocity, Fourier Spectrum and Response Spectrum of the Gulf of Fethiye Earthquake for Kaş Station

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)

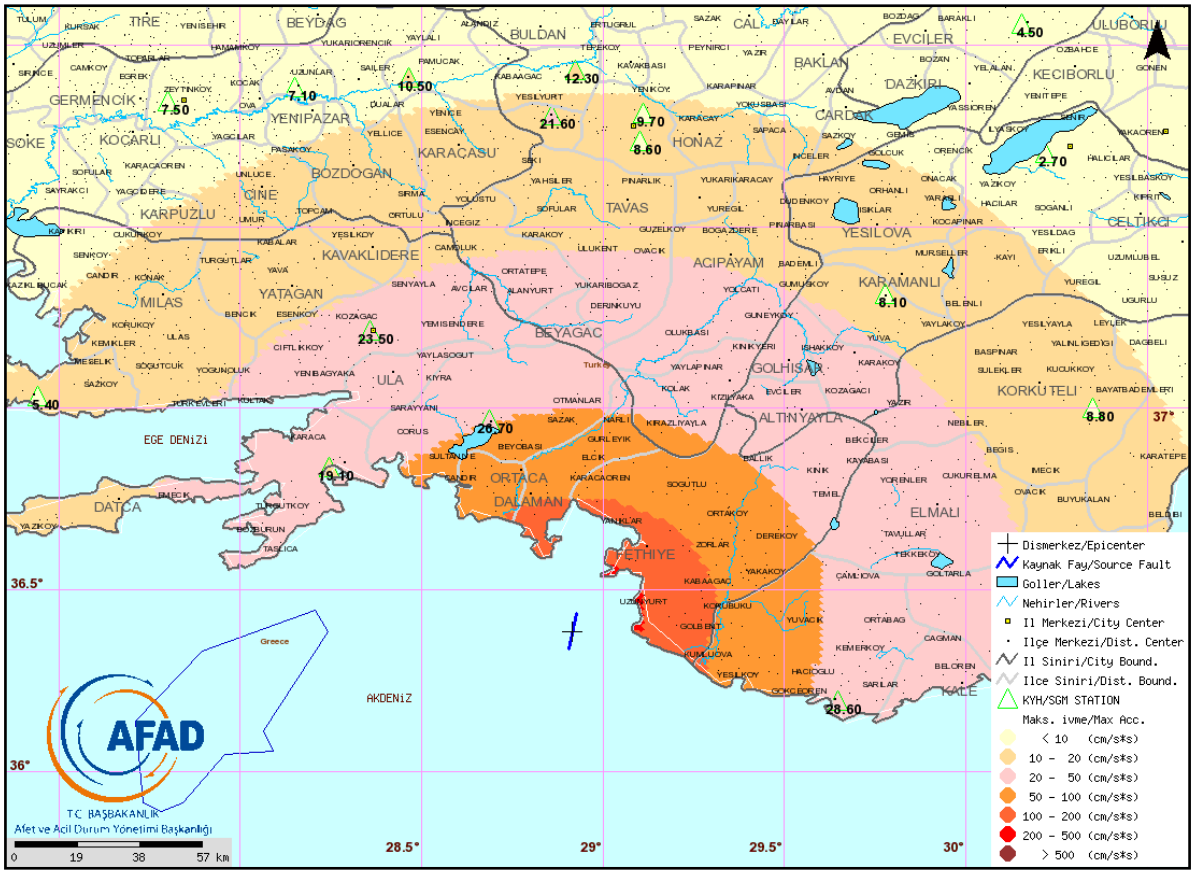


Fig.10. Peak Ground Accelaration Distribution of Gulf of Fethiye Earthqauke (Ml=6.0)

GULF OF FETHİYE EARTHQUAKE (SOUTHWESTERN TURKEY) (Ml=6.0)

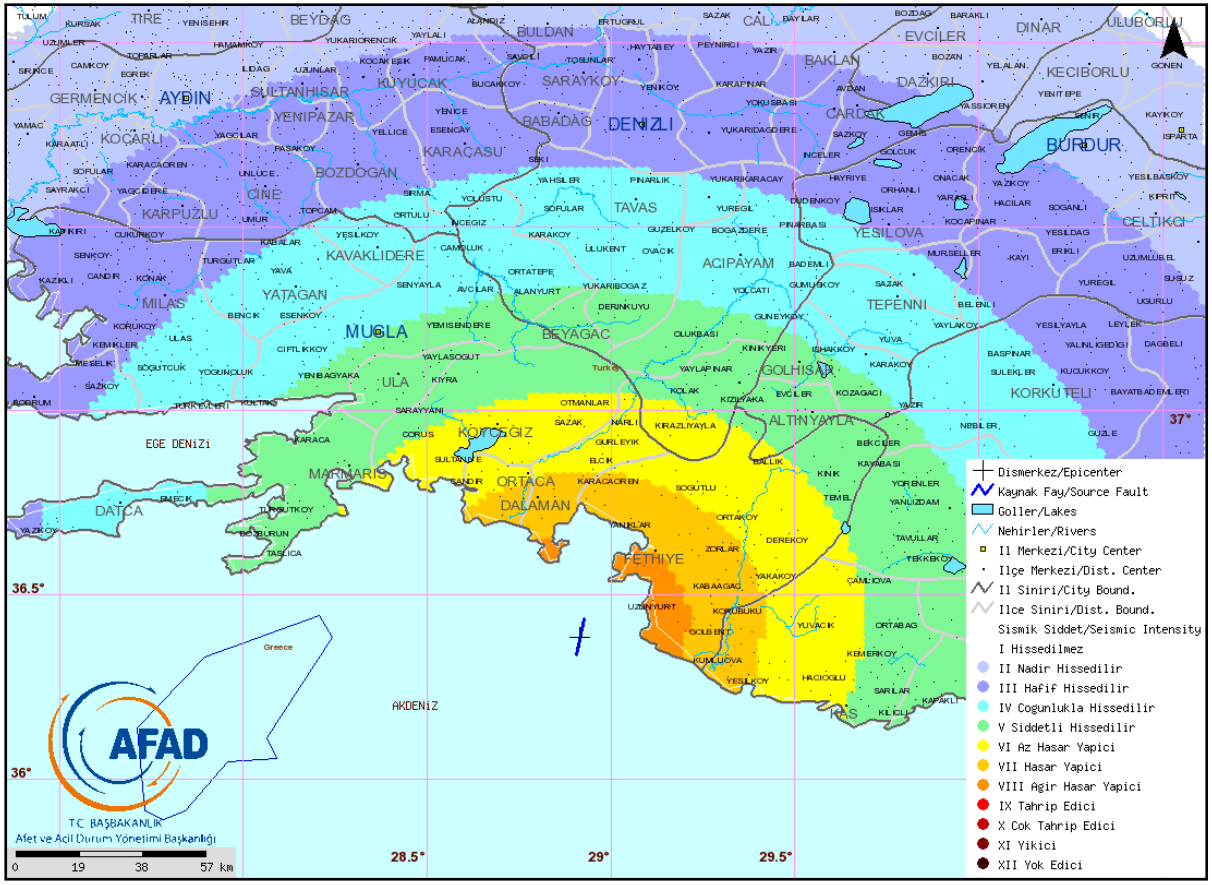


Fig.11. Seismic Intensity Map of Gulf of Fethiye Earthquake (Ml=6.0) (according to Yoshimitsu Fukushima and Teiji Tanaka, 1990) (Arıoğlu E., Arıoğlu B. M., Girgin C. (2001)

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