

PRELIMINARY REPORT

MUŞ-BULANIK EARTHQUAKE MI=5.0 (EASTERN TURKEY)



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

MUŞ-BULANIK EARTHQUAKE (EASTERN TURKEY) (MI=5.0)

An earthquake with magnitude ML=5.0 occurred at local time 13:35 on March, 26, 2012. Epicentral coordinates of the earthquake was determined as 39.2340 N - 42.2760 E with focal depth 16.96 km. After this earthquake, 39 earthquakes were determined with magnitude range 1.9 – 3.8 in the same day (Fig.1). This earthquake was also felt in neighbour provinces, Erzurum and Ağrı and it didn't caused loss of life but it caused light damaged some adobe brick structures.

Focal Mechanism Solutions performed by considering first motion direction of P wave and moment tensor solution of MI=5.0 earthquake is emerged from thrust faulting with strike slip component (Fig.2).

The amount of energy released after March, 26, 2012 earthquake (MI=5.0) is calculated as 2.8×10^{12} Joule which is equal %4 of atom bomb released to Hiroshima-Japan.

This region is effected by Muş Overlap and Malazgirit Fault Zone. Muş has been exposed to destructive earthquakes during the historical times. Destructive earthquakes that occurred in the last century are given as; 1903 M=6.3 Malazgirt, 1903 M=5.3 Bulanık, 1907 M=5.0 Muş, 1946 M=5.7 Varto-Hınıs ve 1966 M=5.6, M=6.9 Varto earthquakes (Fig.3). Moment tensor solutions of some of these earthquakes are given Fig. 4.(According to different references)

March 26, 2012 Muş Earthquake was recorded by accelerometers at 8 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 Muş-Malazgirit station which is located at nearest distance (about 24 km) to epicenter of this earthquake are 58.5 gal in EW direction, 57 gal in NS direction and 55.5 gal in up-down direction (Table 1, Fig. 5,6a,b).

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.

www.afad.gov.tr
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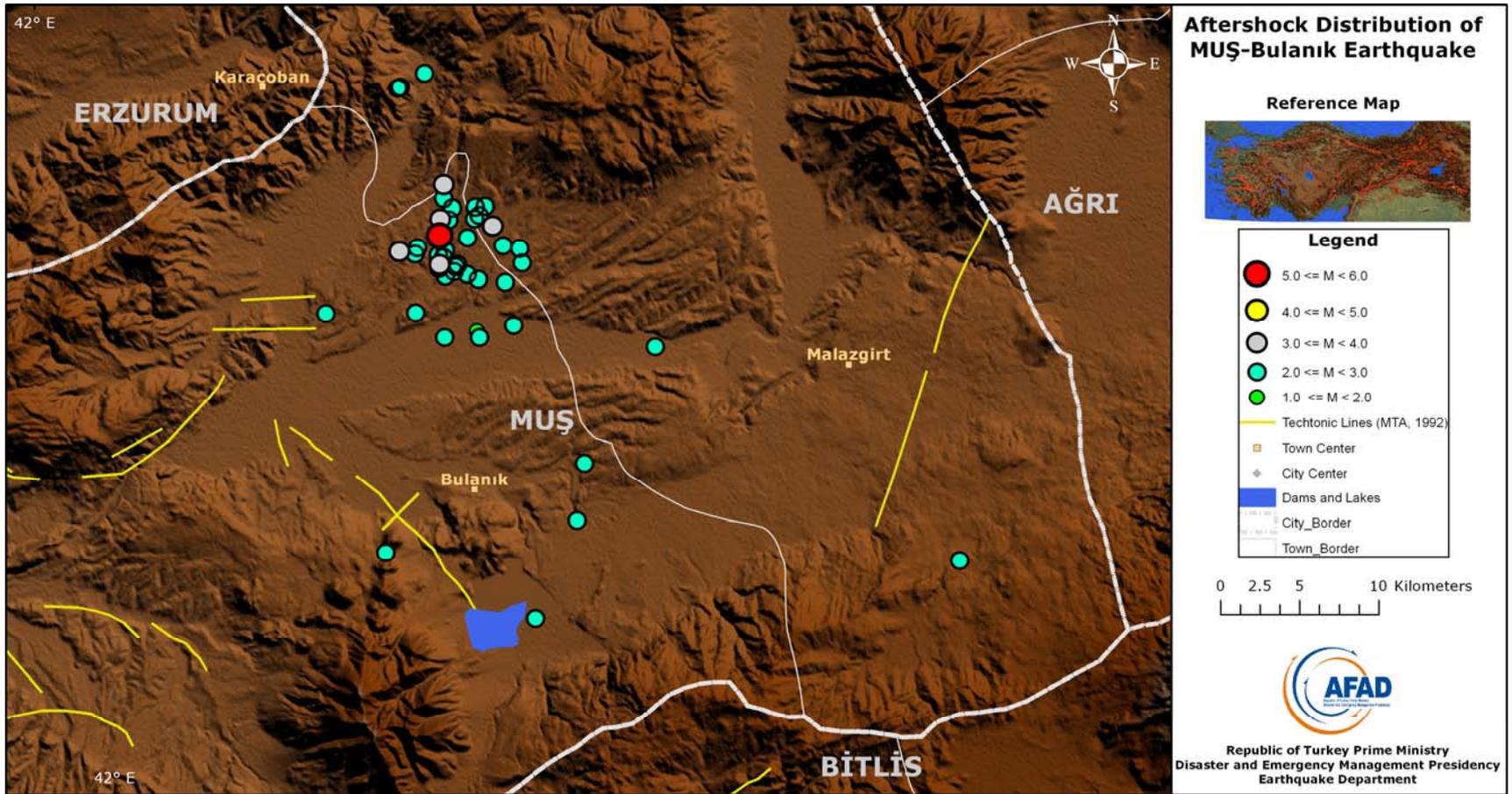


Fig.1. March, 26, 2012 Muş-Bulanik Earthquake (MI=5.0) and aftershock distribution

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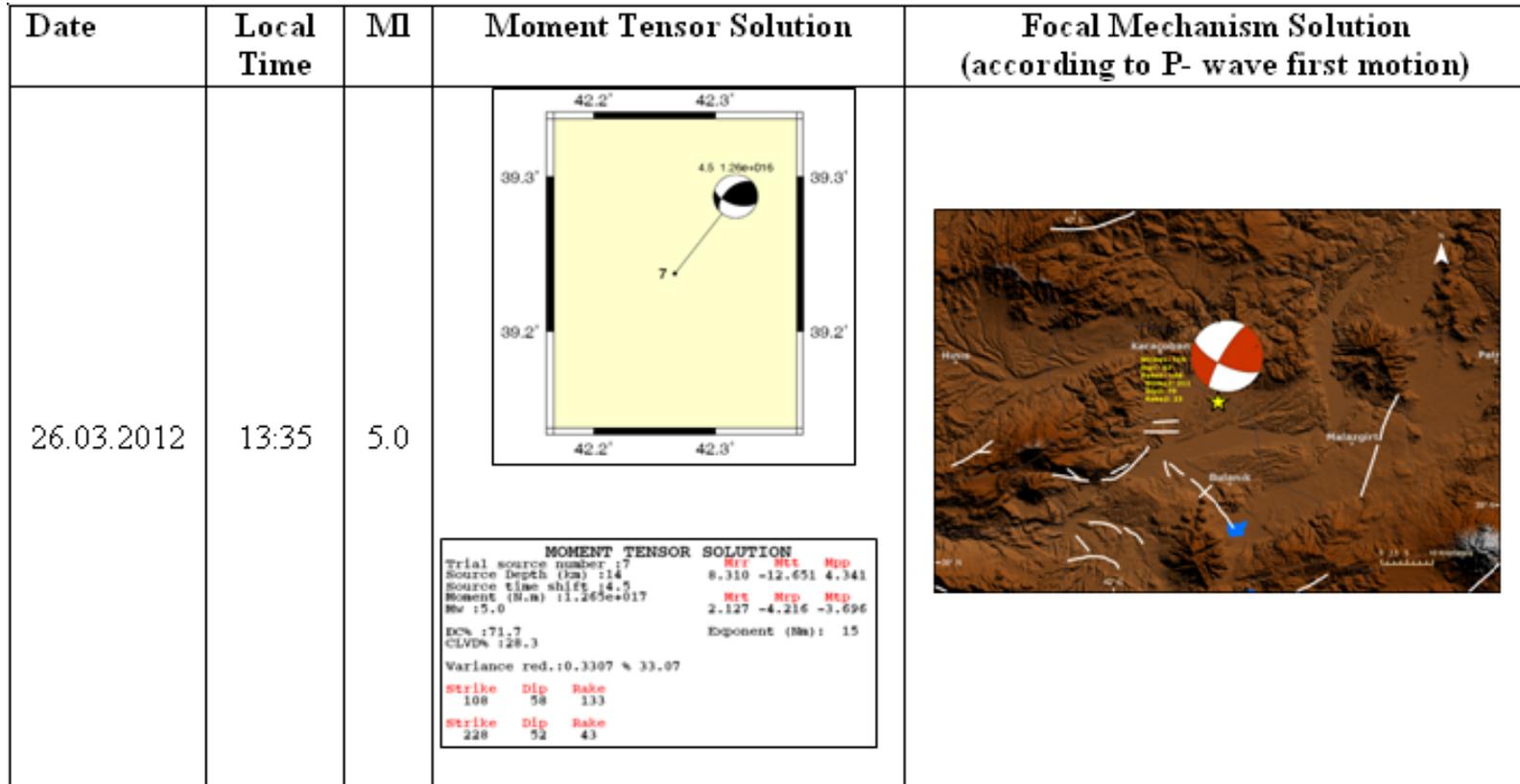


Fig.2. Focal mechanism solutions (according to p wave first motion and moment tensor)

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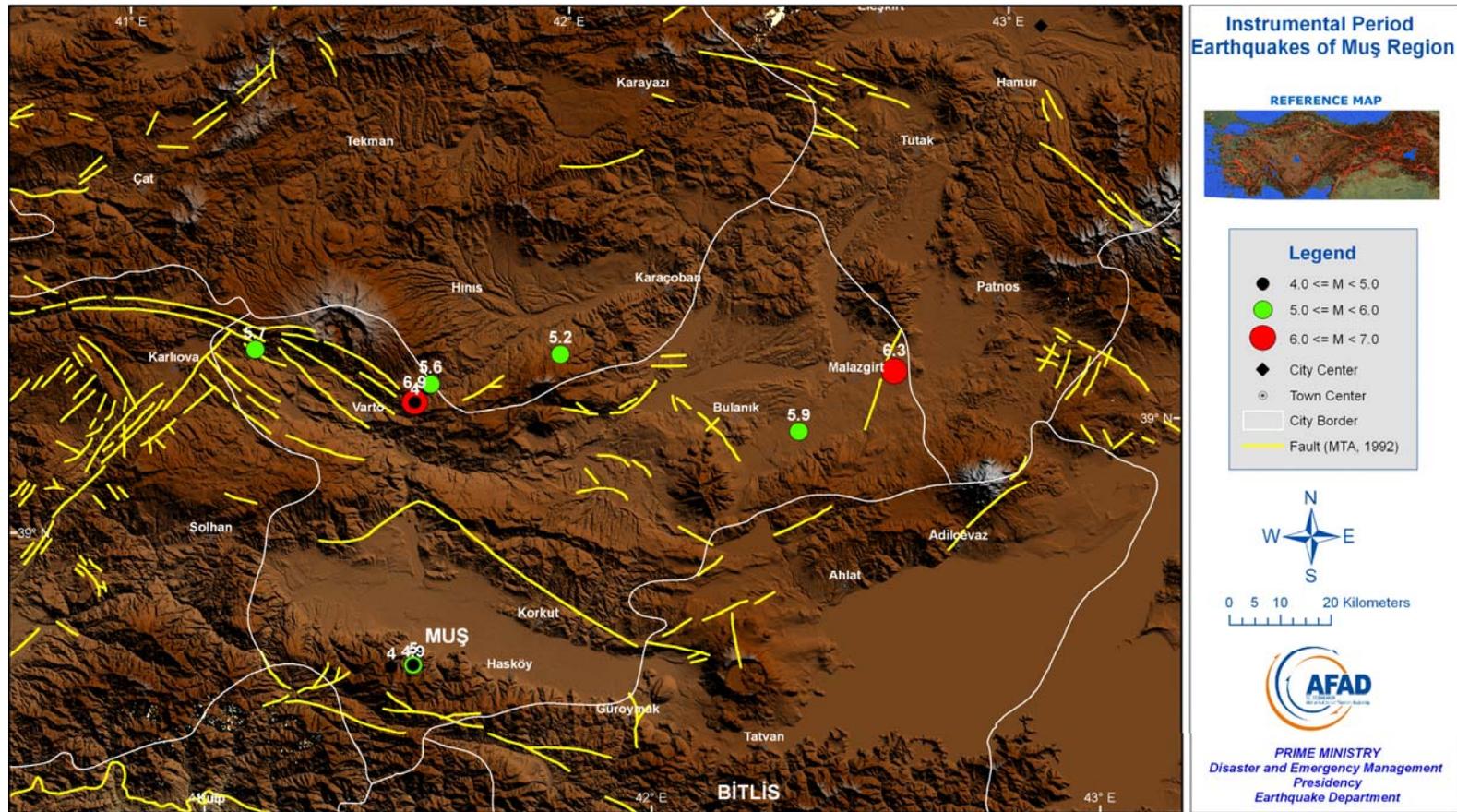


Fig.3. Distributions of the earthquakes that occurred Muş and surrounding region from 1900 to present (M>=4)

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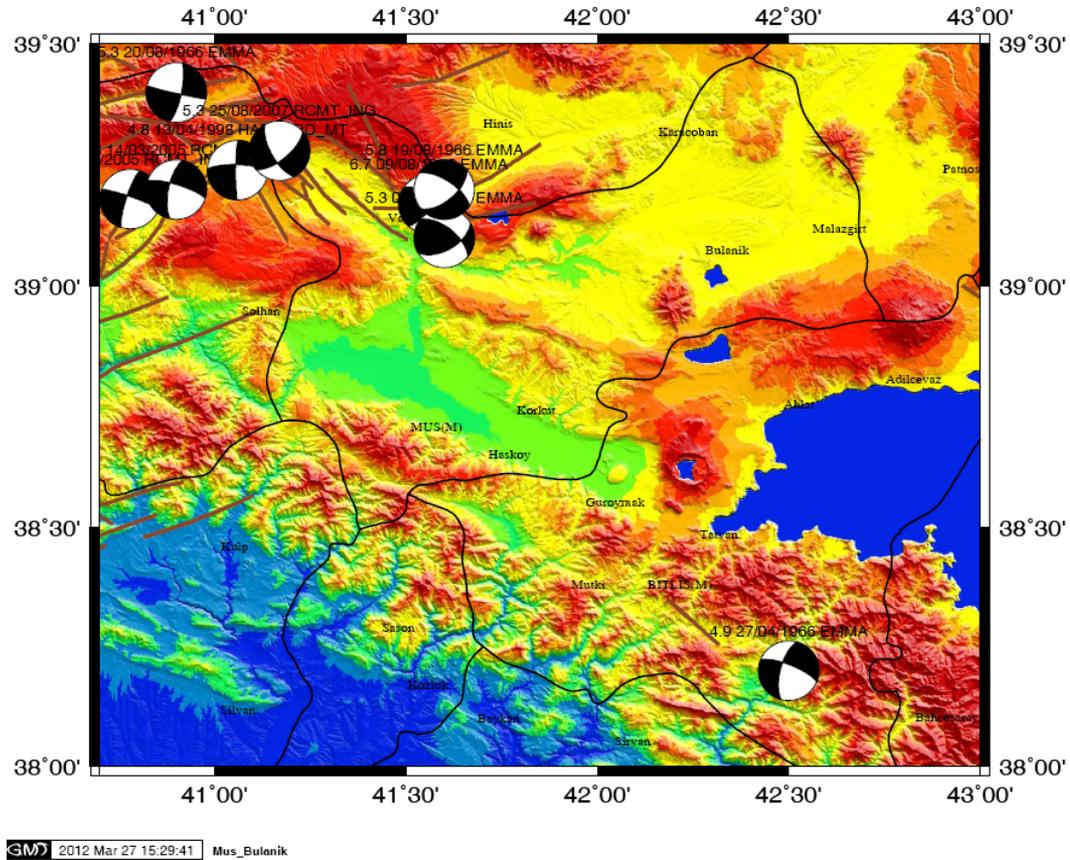


Fig.4. Moment Tensor Solutions of some earthquakes in Muş and surrounding region (1900-2007)
(Reference: EMMA, RCMT_ING, HARVARD_MT)

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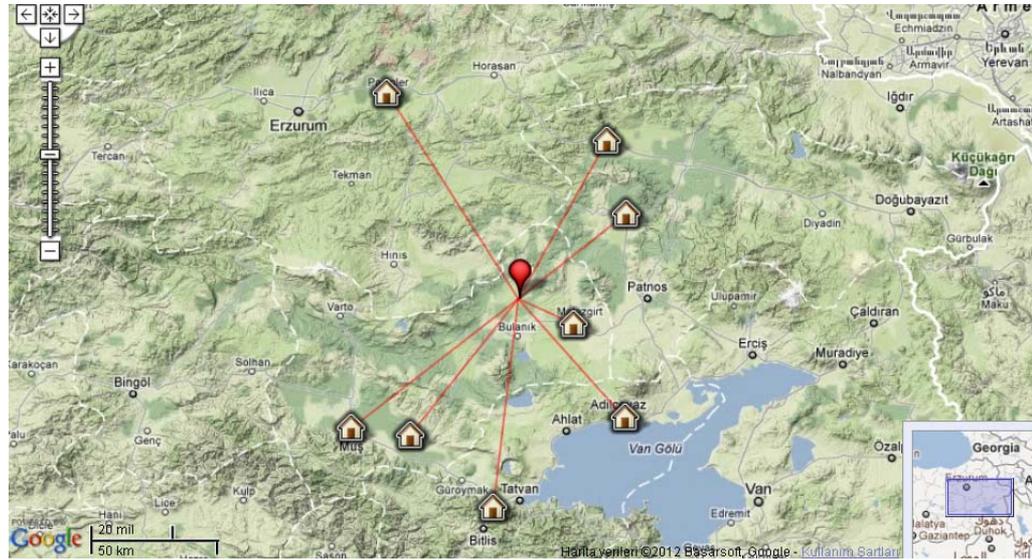


Fig.5. Distributions of the strong motion stations that recorded Muş-Bulanik Earthquake

STATION			Latitude	Longitude	Height (m)	EQUIPMENT TYPE	ACCELERATION VALUES (gal)			Distance of Station to Epicenter R_{epi} (km)	V_{z30} (m/sn)
No	CITY	TOWN					N-S	E-W	Vertical		
1	MUŞ	MALAZGIRT	39.14394	42.53072	1519	SigSa smach	57	58.5	55.5	24	311
2	MUŞ	MERKEZ	38.76111	41.50394	1303	Guralp cmg5td	4.5	4.16	1.96	85	315
3	MUŞ	KORKUT	38.73555	41.77416	1300	Guralp cmg5td	12.71	22.43	8.62	70	
4	BİTLİS	ADILCEVAZ	38.79978	42.76308	1678	Guralp cmg5td	2.66	2.35	2.04	64	
5	BİTLİS	MERKEZ	38.47440	42.15913	1794	Guralp cmg5td	3.26	4.6	1.79	85	
6	AĞRI	TUTAK	39.53882	42.77247	1565	Guralp cmg5td	11.36	10.25	4.92	54	
7	AĞRI	ELESKIRT	39.79886	42.68014	1809	Guralp cmg5td	3.34	5.72	3.43	72	
8	ERZURUM	PASINLER	39.97480	41.67225	1657	Guralp cmg5td	1.1	1.13	0.81	97	

Table 1. Acceleration values for Muş-Bulanik Earthquake

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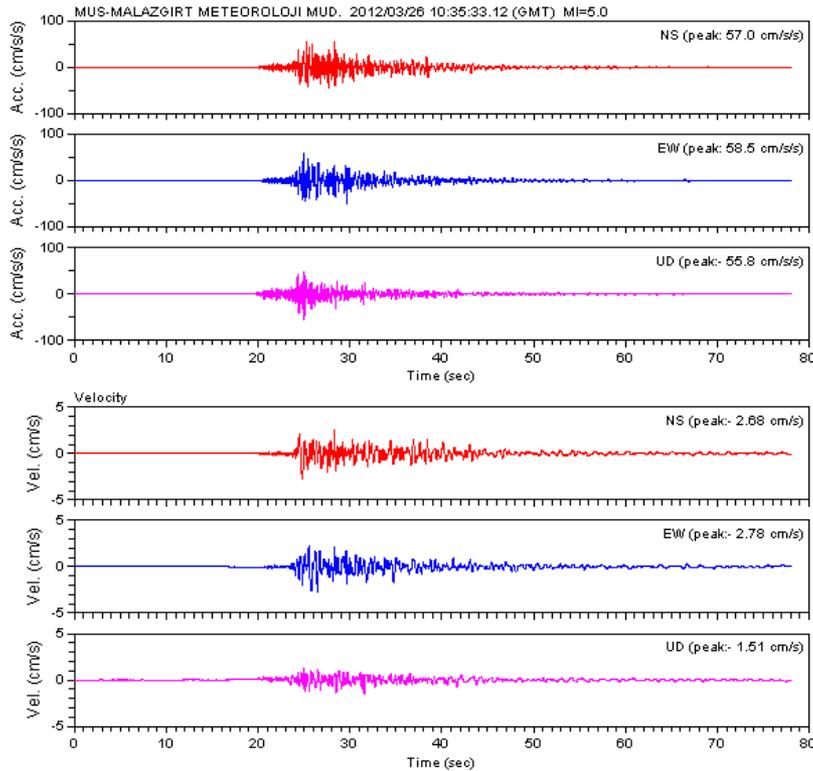
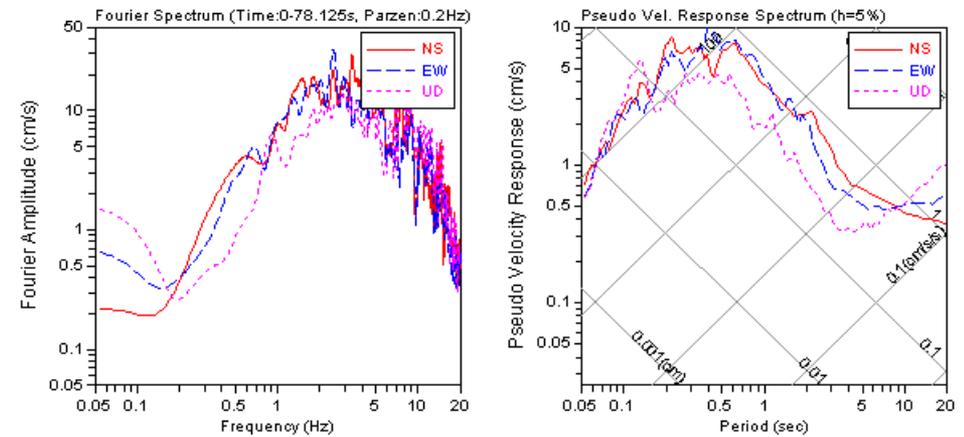


Fig.6. a) Strong motion wave forms that refer Muş-Malazgirit station



6b) Furier spectrum and Pseudo vel.response spectrum

References

- Prime Ministry, AFAD, Earthquake Department (DDA). <http://www.deprem.gov.tr/>
- Moment Tensor Catalog, EMMA, RCMT_ING, HARVARD_MT
- Şarođlu F., Emre Ö. and Kuşçu İ. (1992). Active Fault Map of Turkey, scale: 1:1,000,000, General Directorate of Mineral Research and Exploration, Ankara.