

# **PRELIMINARY REPORT ON March 8, 2010 ELAZIG EARTHQUAKES (EASTERN TURKEY)**

## ***PREPARED BY EARTHQUAKE DEPARTMENT WORKING GROUPS\****

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An earthquake with magnitude  $M_L=5.8$  occurred at local time 04:32 on March 08, 2010 at about 69 km East of Elazığ and 14 km South of Karakoçan town. Epicentral coordinates of the earthquake is determined as 38.77 N - 40.03 E with focal depth 5 km. The earthquake also was felt in the neighboring provinces of Diyarbakır, Tunceli and Bingöl.

At the same day, after this earthquake, another earthquake occurred at 09:47 (local time) in Elazığ-Palu (Eastern Turkey - Epicentral coordinates: 38.73 N, 40.01 E, Depth: 5 km). Magnitude is determined as  $M_L=5.6$  for this earthquake. These earthquakes occurred in Palu-Hazar lake segment of the East Anatolian Fault System (EAFS) (Fig. 1 and 2). According to the data were determined in DDA Ankara Center: Between the dates March 08 – 10, 183 aftershocks were determined with magnitude range 2.0– 5.0. The number of earthquakes has been decreased by time. Aftershock distributions of the Elazığ Earthquakes concentrated in an area of approximately 45 km long in NE-SW direction (Fig. 3).

After the 04:32 (Local Time)  $M_L=5.8$  and 09:47 (Local Time)  $M_L=5.6$  earthquakes, 5 larger aftershocks with magnitude  $M>4$ , are occurred in the same day. Focal depths of aftershocks vary between 1 -20 km. Moment Tensor Solutions of the larger aftershock are shown in Fig. 4. Focal Mechanism solutions show a left-lateral strike slip faulting including normal component. This result consonant with structure of EAFS. Relevant graphs with aftershocks are given in Fig. 5, 6 and 7. And maximum acceleration values and largest ground acceleration are given in Fig. 8 and 9

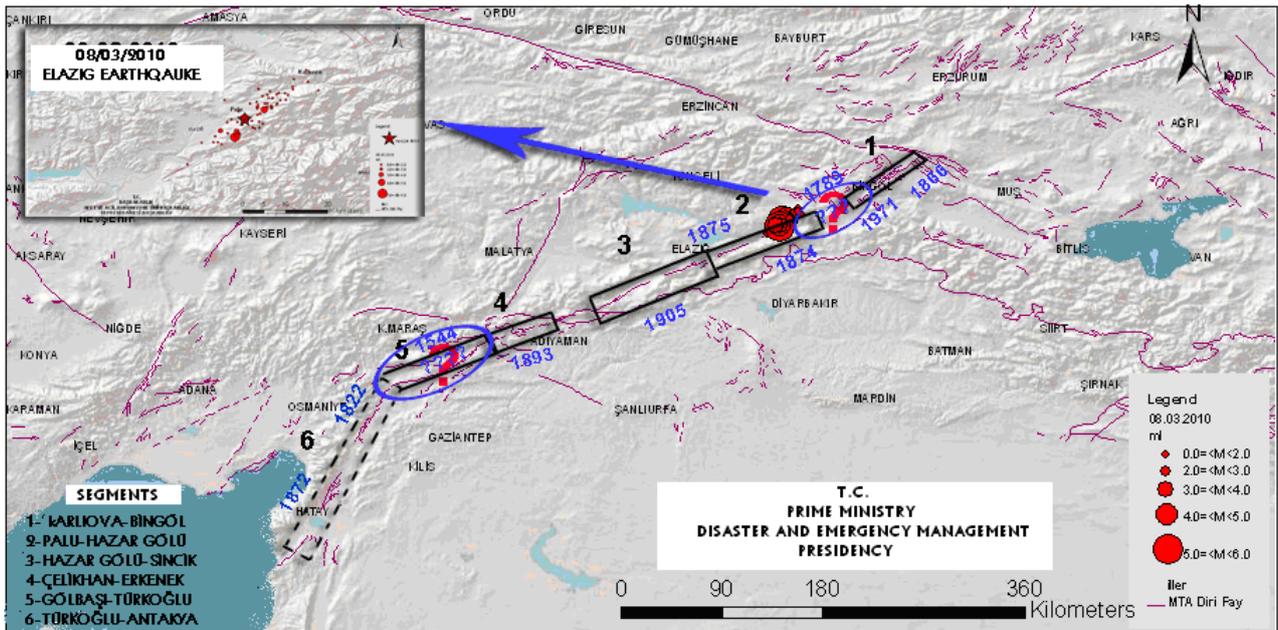
Elazığ-Kovancılar region where the earthquake occurred, join in the first and second degree earthquake zone in the Earthquake Zoning Map of Turkey. According to the statement from Presidency, 41 person died in Okçular, Yukarı Demirci, Göçmezler, Kayalık, Yukarı Kanatlı Villages where near the epicentral area, because of the heavily damaging their adobe brick house.

Earthquake activity of this region (and all of Turkey) has been observed in Earthquake Department data center Ankara 7 day/24 hours with 164 seismic station and 280 accelerometer. Obtained results has shared with public, press and relevant authorized

## **ACCELERATION VALUES OF ELAZIG-KOVANCILAR ( $M_L=5.8$ ) EARTHQUAKES**

No	Station		Equipment	NS	EW	Vertical	Distance of station
	City	District	Type	(gal)	(gal)	(gal)	to epicenter (km)
1	Adıyaman	Merkez	CMG-5TD	<b>2.50</b>	2.23	1.64	192
2	Bingöl	Merkez	CMG-5TD	<b>55.31</b>	34.26	25.50	43
3	Bingöl	Karlıova	CMG-5TD	11.58	<b>17.84</b>	8.95	102
4	Batman	Merkez	CMG-5TD	<b>7.61</b>	5.44	2.51	141
5	Diyarbakır	Merkez	CMG-5TD	3.44	5.10	3.59	95
6	Elazığ	Merkez	CMG-5TD	<b>5.56</b>	4.76	3.84	74
7	Elazığ	Palu	SM-2	<b>62.00</b>	<b>66.50</b>	<b>30.00</b>	<b>12</b>
8	Mardin	Merkez	CMG-5TD	<b>2.53</b>	2.45	1.67	172

## SEISMIC GAPS AND SEGMENTS ON EAST ANATOLIAN FAULT ZONE



**Figure 1: Segments of East Anatolian Fault Zone**

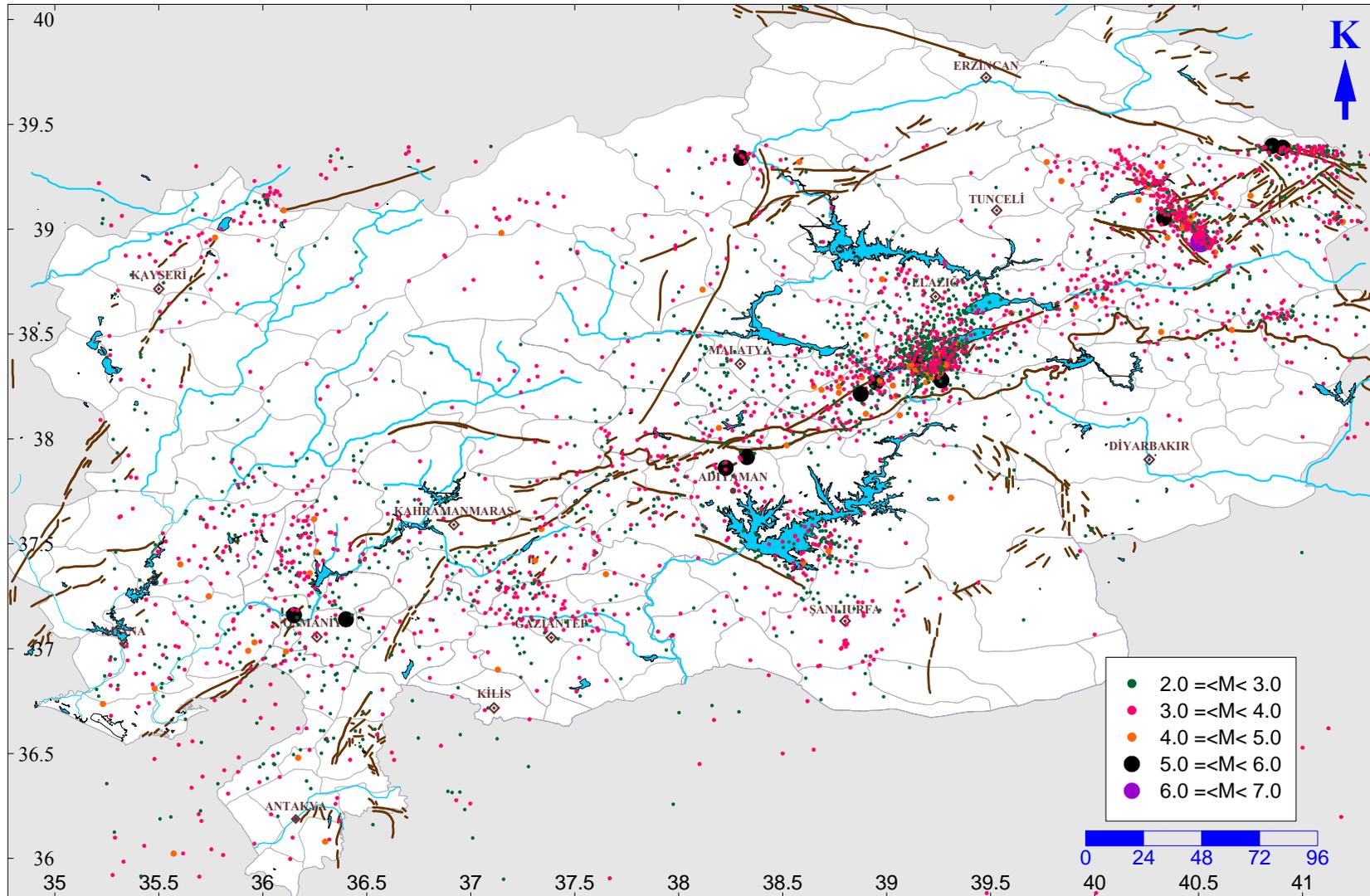
The earthquakes which occurred in historical and instrumental period in Hazar-Sincik and Palu Hazar Segment are given below

### Hazar-Sincik Segment

Historical Period	Insturmental Period
(year) 1875 M=6.7	(year) 1905 M=6.8
	2003 M=5.7
	2004 M=5.3
	2005 M=5.2
	2007 M=5.0

### Palu-Hazar Segment

Historical Period	Insturmental Period
(year) 1874 M=7.1	(year) 1910 M=5.0
	1977 M=5.1



**Figure 2: Map of over the  $M \geq 2$  magnitude earthquakes (DAD) of EAFS and surrounding region between 1900-2008 (Tectonic lines are taken from Şaroğlu vd. 1992)**

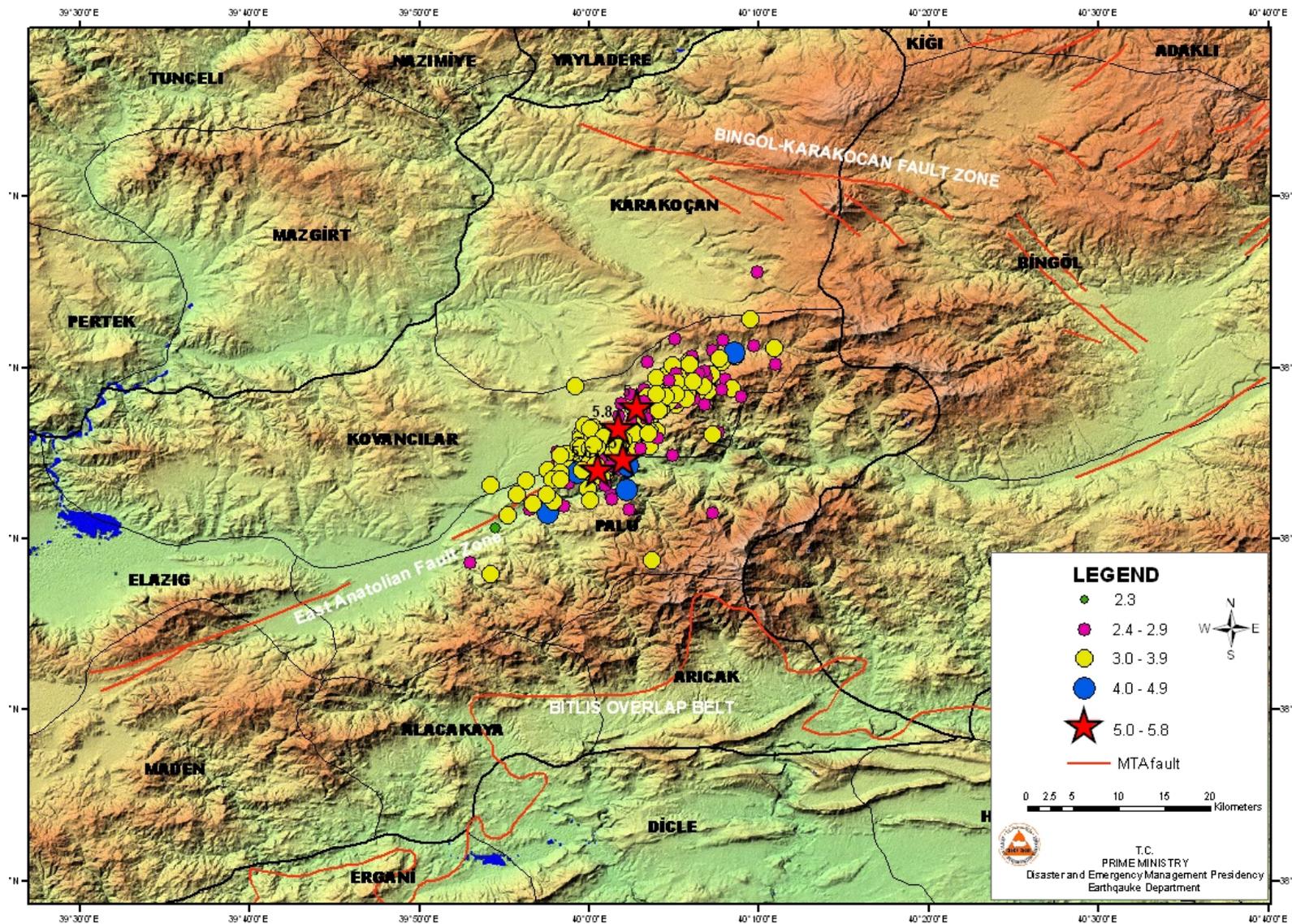


Figure 3: Aftershocks distribution of the Elazığ earthquakes (March 08-10, 2010)

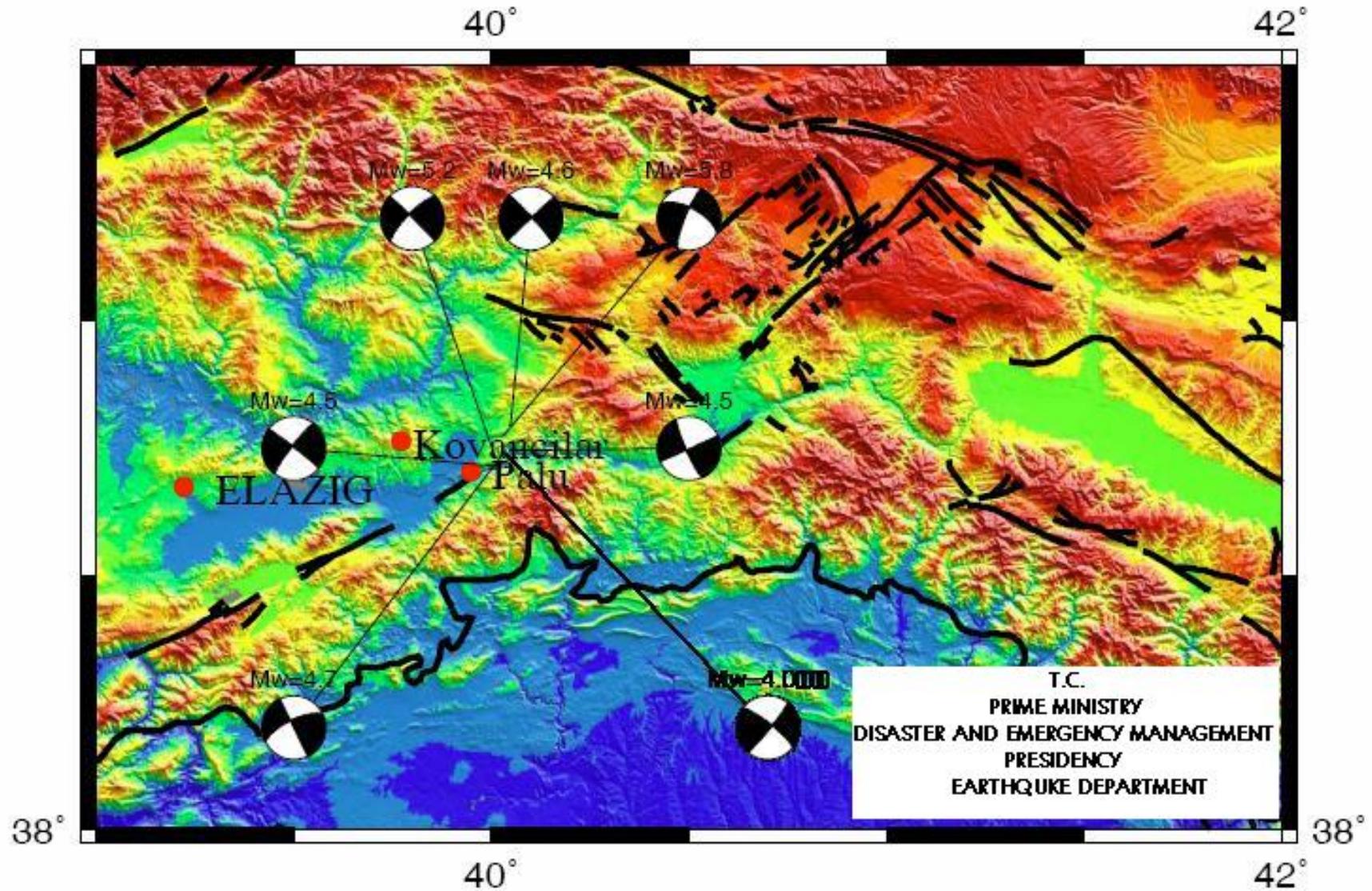


Figure 4: Moment Tensor Solutions of Elazığ-Kovancılar and Palu Earthquakes and larger aftershocks ( $M \geq 4$ )

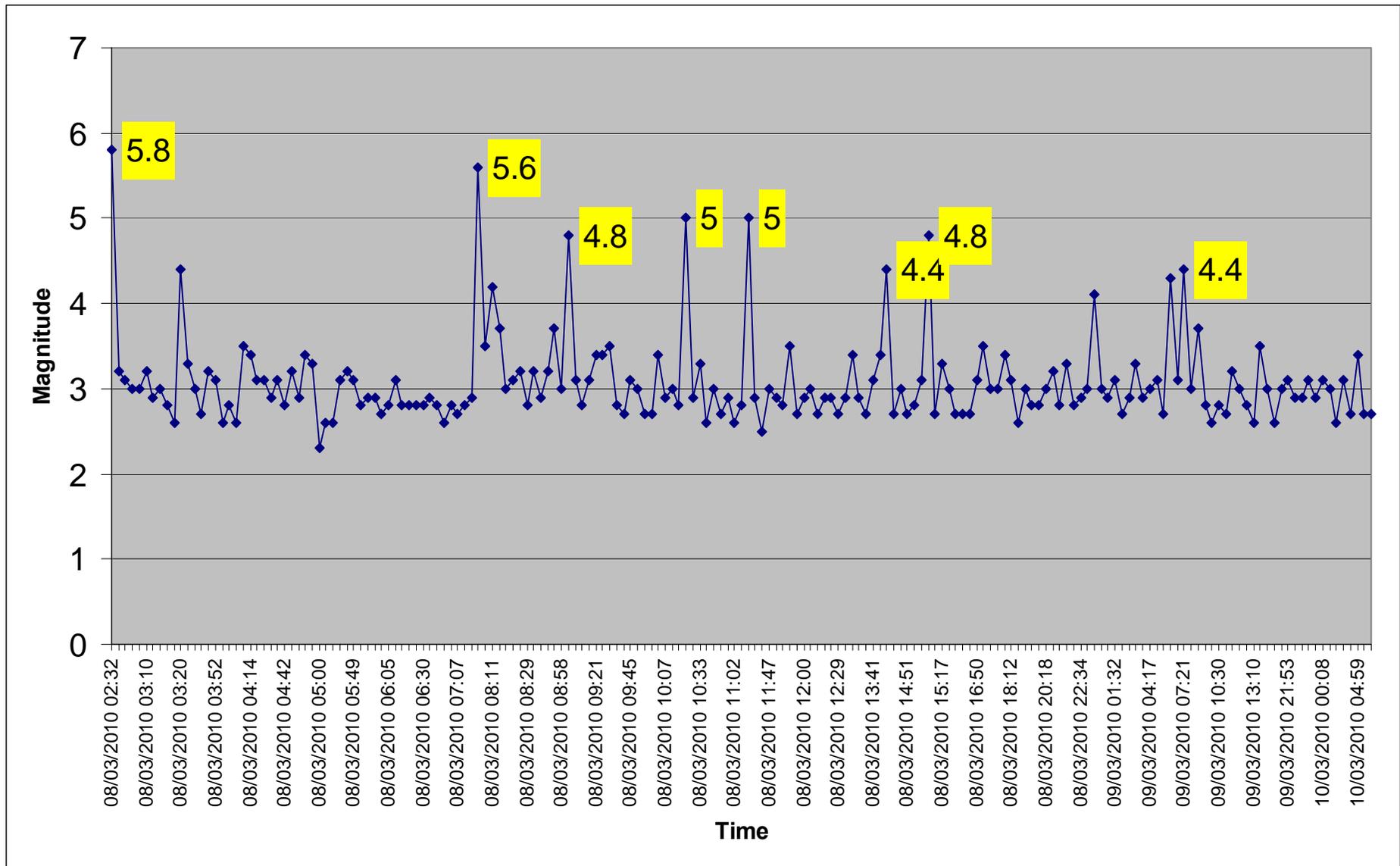


Figure 5: 08/03/2010 Elazığ-Kovancılar Earthquake (M=5.8) Time-Magnitude Graph

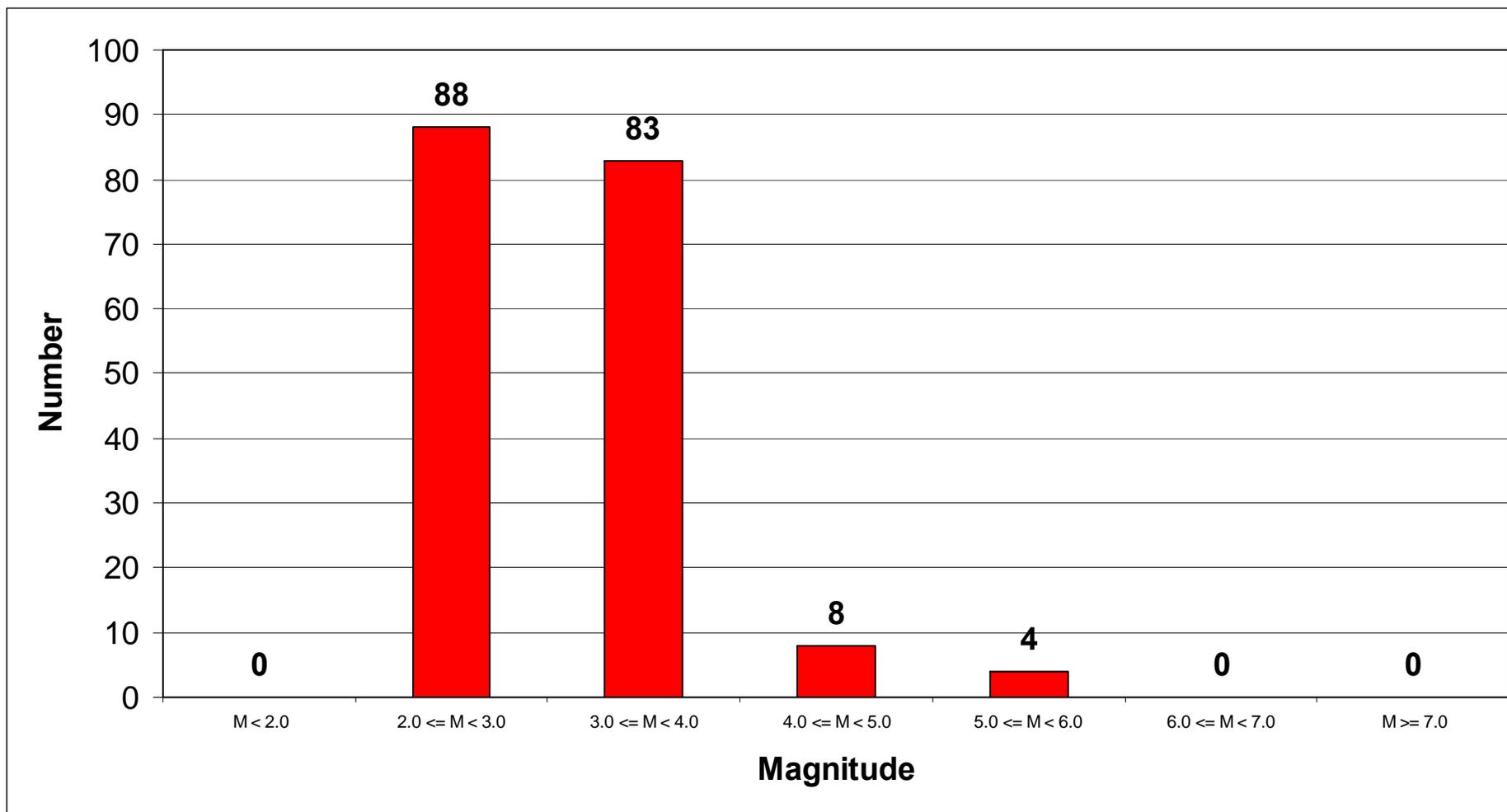


Figure 6: 08/03/2010 Elazığ-Kovancılar Earthquake (M=5.8) Magnitude-Number Graph

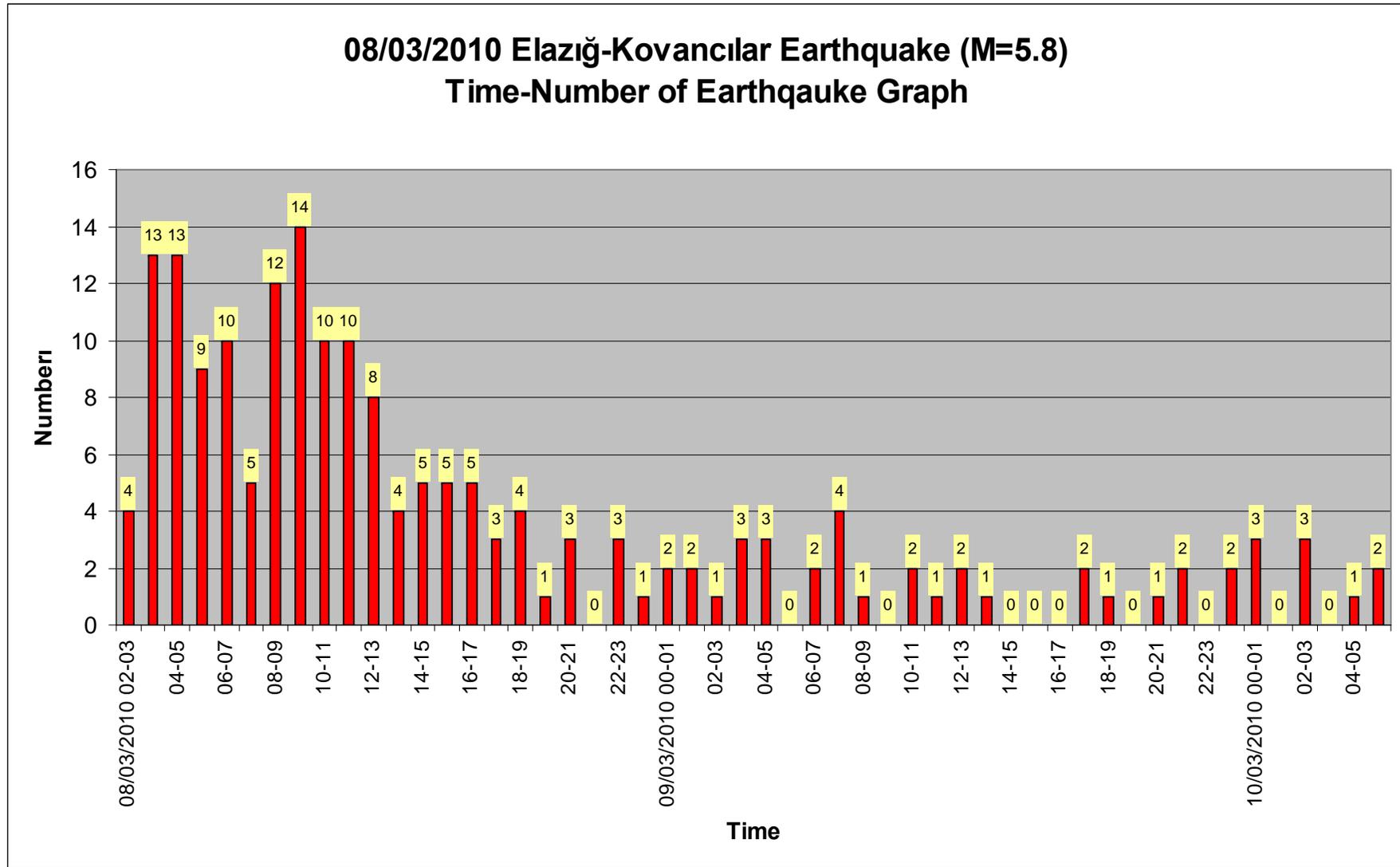
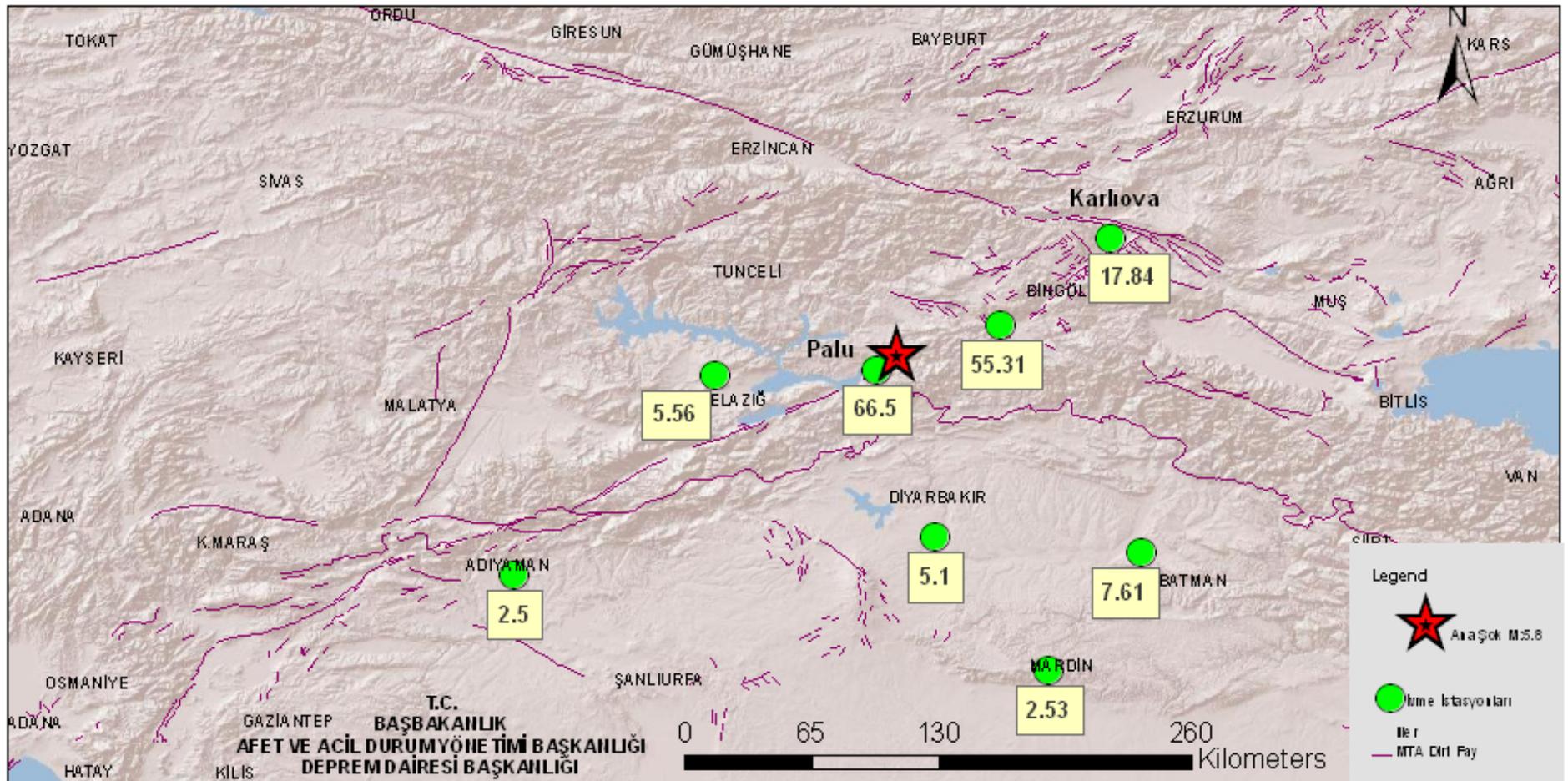


Figure 7: 08/03/2010 Elazığ-Kovancılar Earthquake (M=5.8) Time-Number of Earthquake Graph



**Figure 8: Maximum Acceleration Values of Elazığ-Kovancılar Earthquake (MI=5.8)**

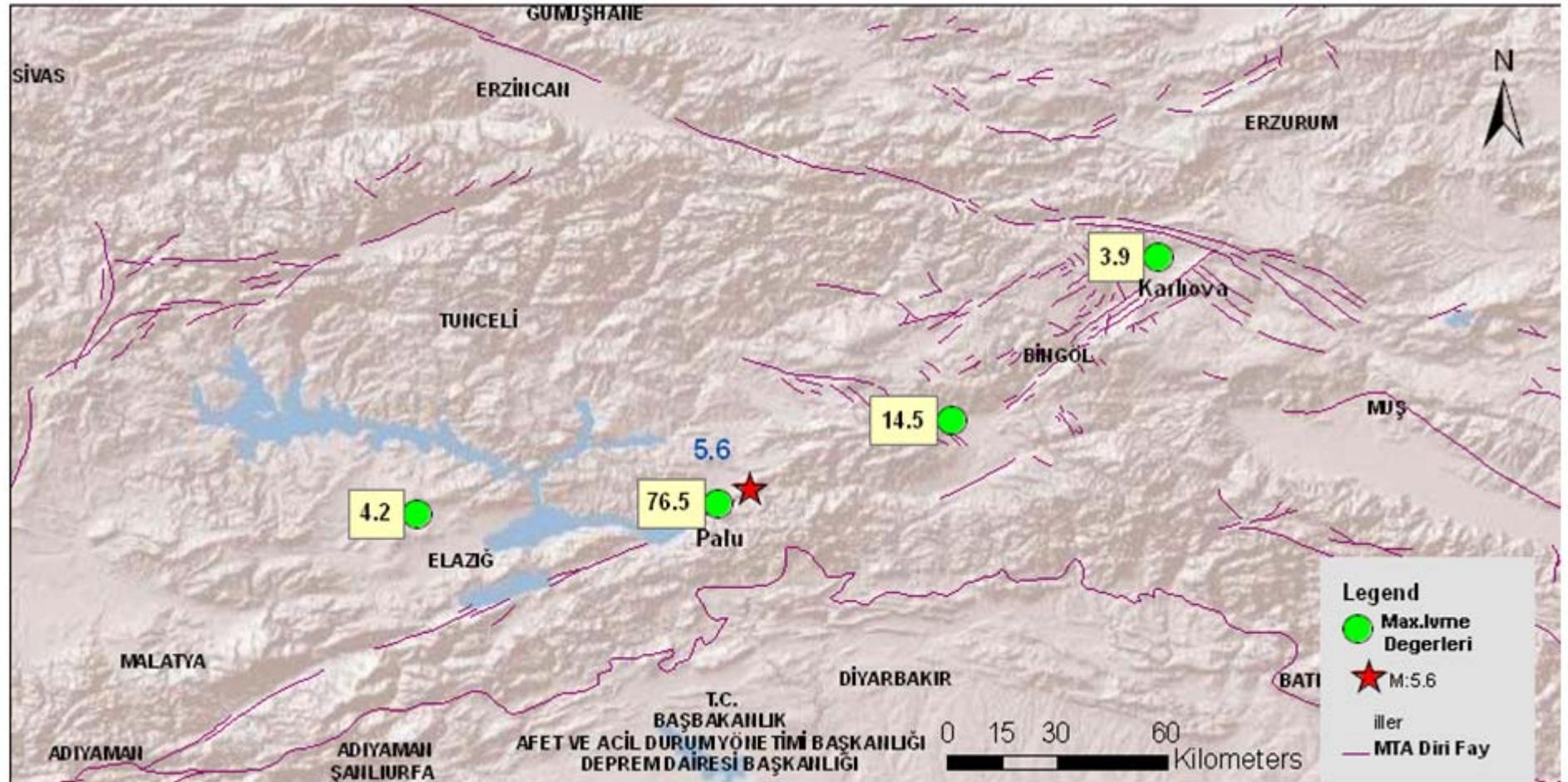


Figure 9: Maximum Acceleration Values of Elazığ-Palu Earthquake (MI=5.6)

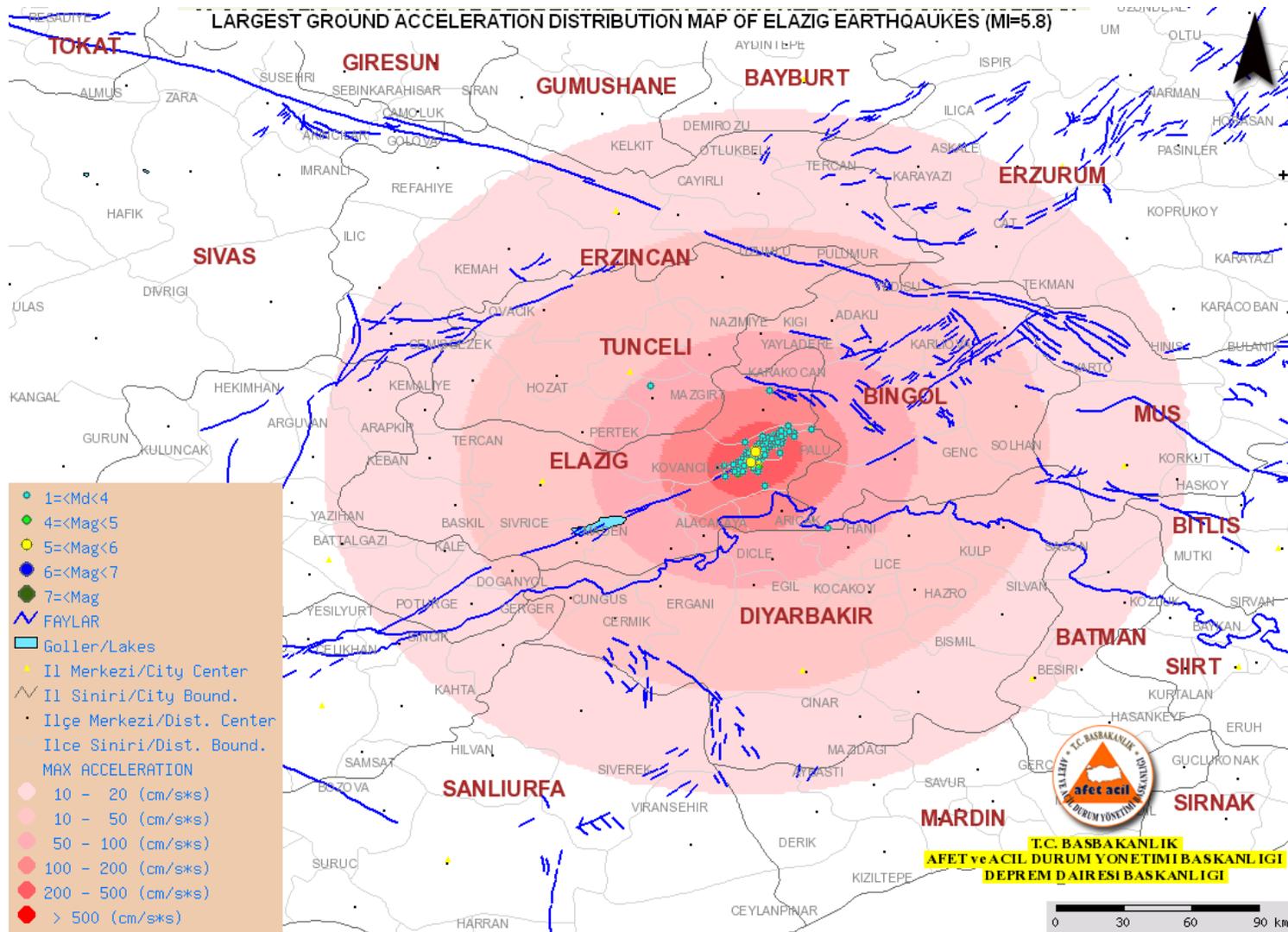


Figure 10: Largest Ground Acceleration Distribution Map of Elazığ Earthquakes (MI=5.8)