

Many seismological centers have reported the Hakkari earthquake ($M=5.5$). The parameters of the earthquake as given by KOERI, CSEM and NEIC are presented in table 1.

Origin Time (UTC)	Latitude-Longitude	Depth (km)	Magnitude	Network-Center
16:44:12.9	37.88-43.70	30	$M_l=5.5$	ISK-Turkey
16:44:17.8	37.71-43.77	13.7	$M_w=5.9$	Harvard-USA
16:44:14.9	37.70-43.65	14	$M_w=5.8$	NEIC-USA
16:44:09.9	37.50-43.80	10	$M_b=5.4$	CSEM-French

Table 1. Preliminary epicentral coordinates and magnitudes of Hakkari Earthquake.

Tectonic Setting

Generally, the tectonics of the region near this earthquake is controlled by the collision of the Arabian Plate and the Eurasian Plate (Fig 2). In the region, tectonic activity is marked by the motion of the Arabian Plate to the Eurasian Plate with 20 mm/yr in north-northwest direction and the collision is has occurred along Bitlis Zagros Thrust fault that has also caused westward displacement and counterclockwise rotaion of the Anatolian block with 20-25 mm/yr (McClusky et all., 2000). Several active faults in the region are controlled by the collision tectonic regime. The Bitlis Suture is a complex continent-continent-ocean collisional boundary that lies north of fold-and-thrust belt of the Arabian platform and extends from southeastern Turkey to the Zagros mountains in Iran (Şengör et all, 1981).

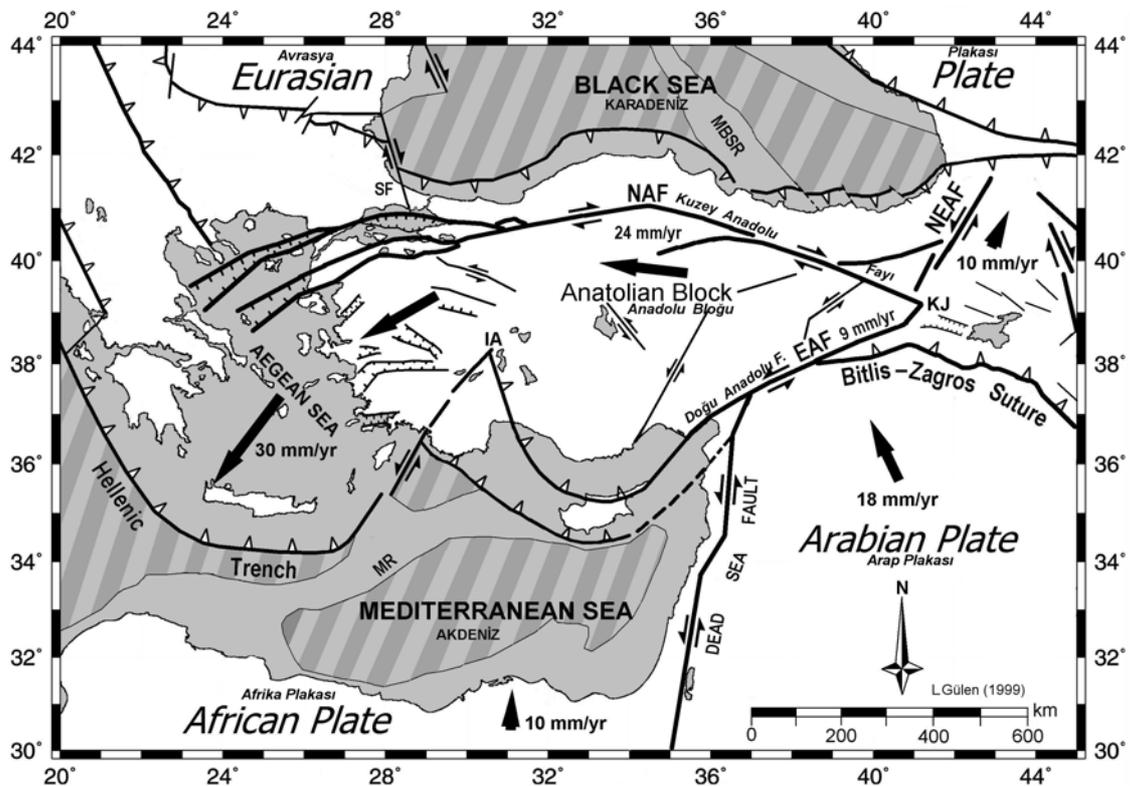


Figure 2. Simplified tektonic map of Turkey and surrounding area showing major tectonic structures (Gülen et all, 2002)

Two major earthquakes occurred in this region during the 20th century. These are the September 28, 1908 ($M_s=6.0$) Başkale-Van, and November 15, 2000 ($M_s= 5.5$) Van-Hakkari earthquakes. The epicenters of these earthquakes are close the present Hakkari earthquake ($M=5.5$). The instrumental seismicity ($M \geq 4.0$) of the region is given fig 3. A cluster centered on Karliova Triple Junction (39.5 N-40.5 E).

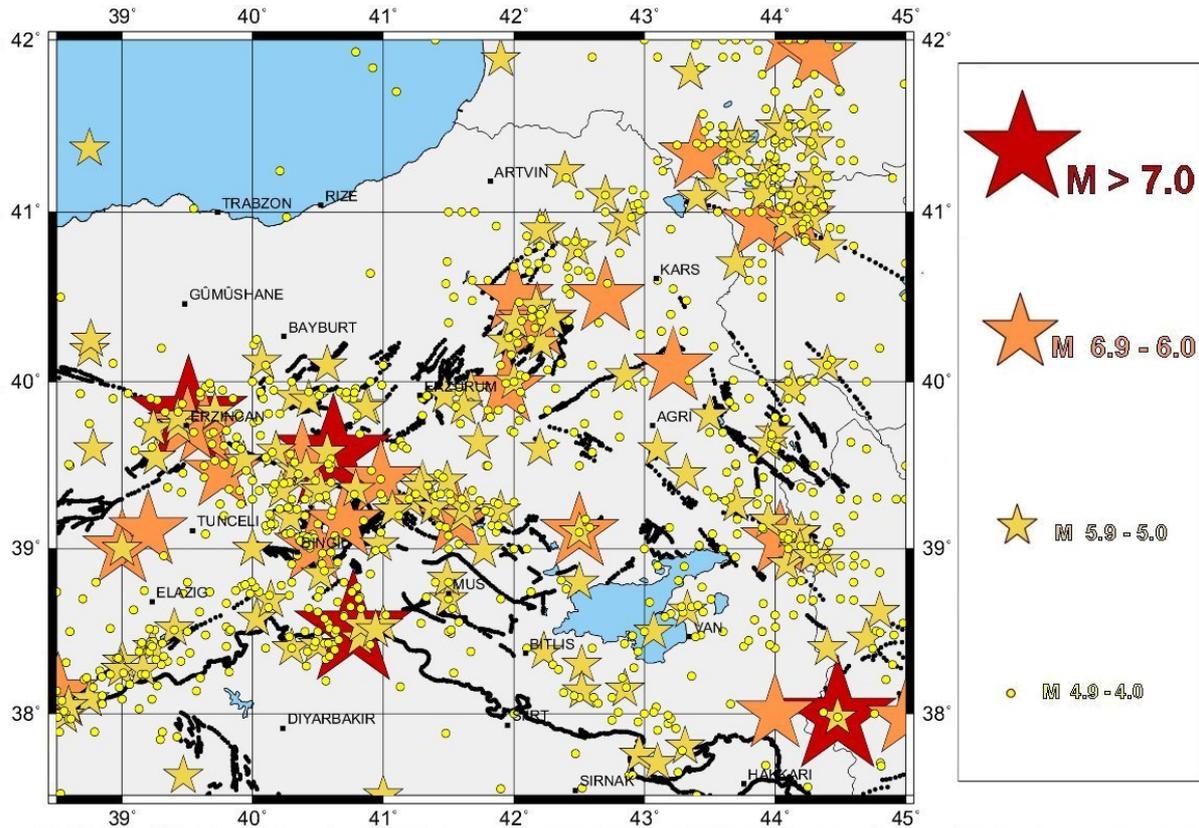


Figure 3. The instrumental seismicity of the Eastern Anatolia (1900-2005, $M \geq 4.0$)

About 1703 earthquakes were recorded between 25/01/2005-02/02/2005, by the National Earthquake Monitoring Center of Turkey (NEMC). The number of earthquakes decreased with time (Fig 4.). The arrival time difference of P-S phases of the earthquakes at the near Hakkari station is between 2.2-4.6 sec.

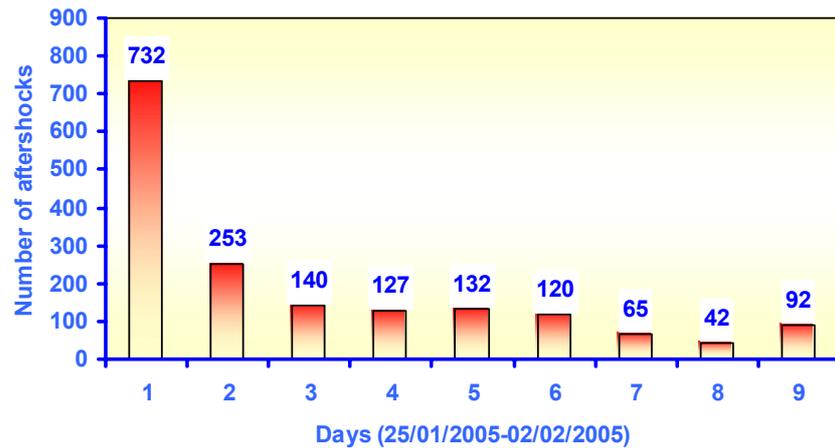


Figure 4. Number of aftershocks by day (1 refers from 25/01/2005 15:00 UTC - 26/01/2005 14:59 UTC)

The earthquakes with $M < 3.7$ took place over a large area around the epicenter of the main shock ($M=5.5$) due to lack of enough seismic stations in the region. Therefore, based on the evaluation of the earthquakes with $M \geq 3.7$, they show an alignment in W-NW/ E-SE direction (Fig. 5). These earthquakes are generally located in Hakkari- Baskale (Van)- Yüksekova (Hakkari).

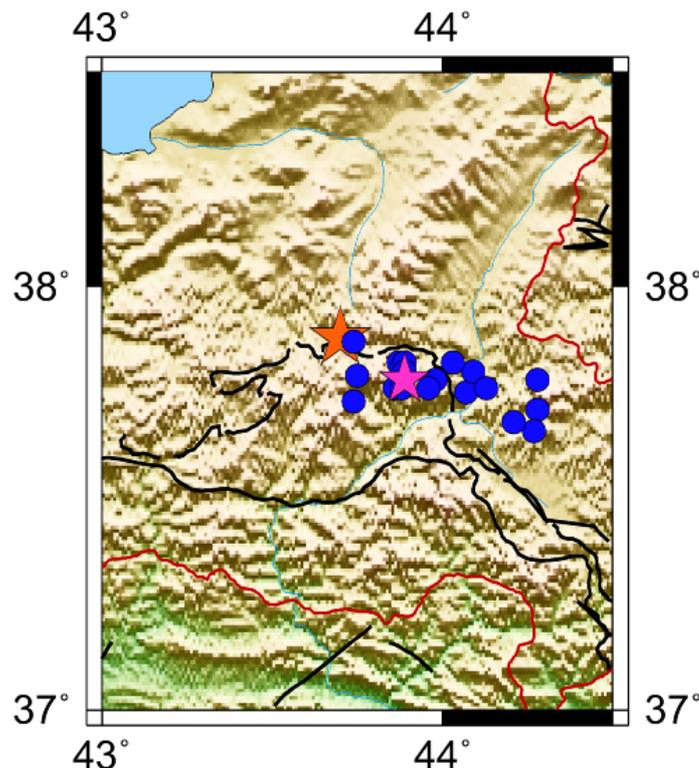


Figure 5. The distribution of earthquakes with $M \geq 3.7$ (25/01/2005-04/02/2005) (Red star indicates mainshock, Purple star indicates the biggest foreshock ($M=4.8$)).

Focal Mechanism

The fault plane solution of the main shock (M=5.5) was calculated from the method of complex body-waveform inversion developed by Kikuchi and Kanamori (1991). Focal mechanism of the main shocks indicates a thrust fault (Figure 6). The moment magnitude of its was calculated of Mw=5.6.

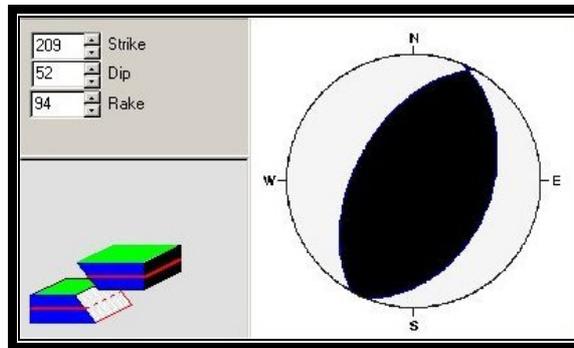
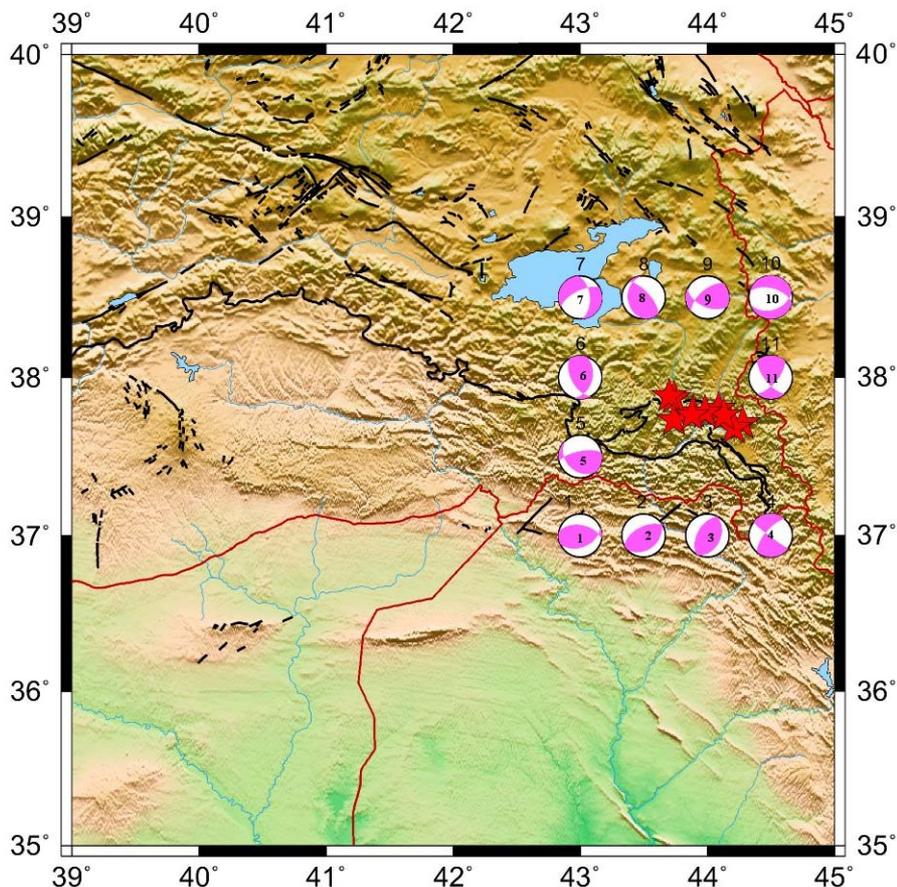


Figure 6. The focal mechanism solution of Mainshock (M=5.5)

The fault plane solutions of Hakkari earthquakes with ≥ 4.0 is given fig 7. In general, focal mechanisms of these earthquakes indicate thrust faults that is consistent with the main tectonic regime (Bitlis Zagros Thrust Fault) of the region.



Number	Latitude-Longitude	Commnet
1	37.78-43.89	Foreshock (M=4.8)
2	37.87-43.74	Foreshock (M=4.4)
3	37.88-43.70	Mainshock (M=5.5)
4	37.71-44.28	Aftershock (M=4.2)
5	37.80-44.09	Aftershock (M=4.0)
6	37.68-44.21	Aftershock (M=4.0)
7	37.76-44.13	Aftershock (M=4.0)
8	37.78-43.98	Aftershock(M=4.0)
9	37.73-43.74	Aftershock (M=4.5)
10	37.76-43.88	Aftershock (M=4.2)
11	37.79-43.75	Aftershock (M=4.6)

Figure 7. The focal mechanism solutions of earthquakes with $M \geq 4.0$ (25/01/2005-04/02/2005)

References:

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