

The 23 October 2011 Van Earthquake (Mw=7.2) : Eastern Turkey The 23 October 2011 Van Earthquake (Mw=7.2) : Eastern Turkey

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ABSTRACT

On 23 October 2011 at 13:41(local time) a strong earthquake (Mw=7.2) occurred in east of Lake Van. The earthquake destroyed the regions especially between the cities of Van and Ercis, and East of Lake Van-Lake Ercek region. It caused deaths of more than 660 people.

After the main shock 11 important earthquakes ($5.0 < M < 6.0$) were occurred in the region which have hypocentral distances of 8-38 km. from the main shock location. After the main shock 2305 aftershocks were recorded during the two week period in the region. 160 earthquakes have occurred within magnitude range of $4.0 < M_l < 4.9$ in 60 days after the mainshock. The initial rapid fault solution shows that the rupture started at 43.41 North -38.72 East coordinates. The fault that caused the Van earthquake is a reverse fault with a northward dipping fault plane. The main shock triggered mass movement, spreading, and local liquefaction. Van earthquake and aftershock fault mechanism solutions show that the region is under compression and reverse faulting is a result of this regime which is effective on the active tectonics of the region. The results of strain analysis show that the general alignment of the largest strain axis (P-compressional) has N-S (NNW/SSE) and tensional axis (T-dilatation axis) has E-W (ENE-WSW) direction. The distribution of the important earthquakes and the aftershock distribution shows that the E-W and NE-SW oriented fault segments cause the earthquake activities. After the main shock, 8 Broad Band (BB) seismic stations were established by the National Earthquake Monitoring Center (NEMC) as a temporary network in the region. The Van earthquake activity initiated and caused an increase in seismic activity of the region. This may be explained by the triggering of small faults by the Van Earthquake. The Van earthquake is a good example of compressional deformation and the activity of blind reverse faulting. b-value analysis shows the relation between the faulting type in the region and tectonic regime, the compressional regime in the region is tested by b-value and small b-value is found.

This study was supported by Bogazici University Research Projects Commission under SRP/BAP project No. 6040.

キーワード: reverse faulting, aftershock, focal mechanism, seismic activity, b-value
Keywords: reverse faulting, aftershock, focal mechanism, seismic activity, b-value