

The November 09, 2011 Edremit-Van, Turkey Earthquake (ML=5.6)

This page covers the most recent information about the November 09, 2011, Van, Turkey earthquake. It will be updated as new information and data become available.

The ML 5.6 earthquake took place on November 09, 2011 at 19:23 GMT in the province of Van, located in Eastern Turkey near Lake Van. The epicenter is in the Edremit subprovince, about 16 km to the south of the Van city center. The earthquake parameters reported by various institutions are presented in Table 1. The moment tensor solutions of USGS and GFZ are given in Table 2 and shown in Figure 1.

A significant aftershock activity is underway in the earthquake region since 23 October 2011. Figure 2 shows the aftershock activity since 23 October 2011 time for events with $M_l > 3$, with the epicenters of both events marked as appropriate. The instrumental intensity map can be seen in Figure 3.

The Edremit-Van earthquake has a dominantly strike-slip mechanism. This earthquake, as well as the event on 23 October 2011, which took place on a blind fault, did not occur on a fault previously indicated and discussed in the literature except by Koçyiğit (2002) (Figure 4).

The earthquake was recorded by six strong motion stations of the Department of Engineering (DEE) in Van and Erciş, and three strong motion stations of the National Strong Motion network (<http://kyh.deprem.gov.tr/ftpe.htm>) in Van, Muradiye and Bitlis. The report on and data of the DEE records can be reached at (http://www.koeri.boun.edu.tr/depremmuh/deprem-raporlari/Van_Eq_aftershocks1.pdf). The peak corrected accelerations, velocities and displacements are 230 cm/s^2 , 22 cm/s and 10 cm respectively. The level of recorded ground motions are comparable to the ones obtained during the previous event on 23 October. See the records and the shakemap with adjusted PGA's at;

http://www.koeri.boun.edu.tr/depremmuh/deprem-raporlari/Van_Eq_SM_31102011.pdf.

Probabilistic PGA's with a return period of 475 years can be seen in Figure 5.

25 buildings collapsed in Van center in this event. 23 of these buildings were inhabited due to previous damage caused by the earthquake on 23 October. Two buildings however, both of them hotels, were open with many people staying at the time of the earthquake. It appears that both of them had received damage on 23 October and allegedly have reports for their habitability afterwards. The earthquake caused further damage to the building stock already effected by the M7.2 event on October 23rd. 40 people lost their lives (<http://www.afad.gov.tr/>) as a result of this earthquake, most of them in the two collapsed hotels.

Table 1. The earthquake parameters reported by various institutions

Date / Time	2011 / 11/09 21:23:21(Local) (KOERI*)	2011 / 11/09 19:23:33 UTC (USGS*)	2011 / 11/09 19:23:33 UTC (EMSC*)	2011 / 11/09 19:23:37.3 UTC (GFZ*)
Latitude	38.4295N (KOERI)	38.429N (USGS)	38.42N(EMSC)	38.41N (GFZ)
Longitude	43.2342E (KOERI)	43.229E (USGS)	43.29E(EMSC)	43.35E (GFZ)
Depth	5 km (KOERI)	5 km (USGS)	6 km (EMSC)	23 km
Magnitude	5.6 (ML) KOERI	5.6 (USGS)	5.7 (Mw) (EMSC)	5.6 (Mw) (GFZ)
Location	Edremit- VAN	Eastern Turkey	Eastern Turkey	Eastern Turkey

*KOERI- Kandilli Observatory and Earthquake Research Institute

<http://www.koeri.boun.edu.tr/scripts/1st2.asp>

*USGS- United State Geological Survey

<http://earthquake.usgs.gov/earthquakes/recenteqsww/Quakes/usb0006mkw.php>

EMSC European-Mediterranean Seismological Centre

<http://www.emsc-csem.org/Earthquake/earthquake.php?id=243793>

GFZ- German Research Centre for Geosciences

<http://geofon.gfz-potsdam.de/eqinfo/event.php?id=gfz2011vzni>



Table 2. The moment tensor solutions of USGS and GFZ

USGS

(http://earthquake.usgs.gov/earthquakes/eqarchives/fm/neic_b0006mkw_fmt.php)

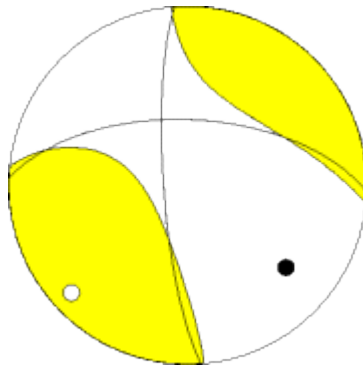
11/11/09 19:23:33.24

Epicenter: 38.429 43.229
MW 5.6

USGS MOMENT TENSOR SOLUTION

Depth 8 No. of sta: 44
Moment Tensor; Scale 10^{17} Nm
Mrr=-0.96 Mtt= 0.45
Mpp= 0.51 Mrt=-0.11
Mrp= 1.16 Mtp=-2.49
Principal axes:
T Val= 3.17 Plg=13 Azm=227
N -0.75 58 338
P -2.43 29 130

Best Double Couple: Mo= $2.9 \cdot 10^{17}$
NP1: Strike=176 Dip=79 Slip= -31
NP2: 272 60 -167



GFZ

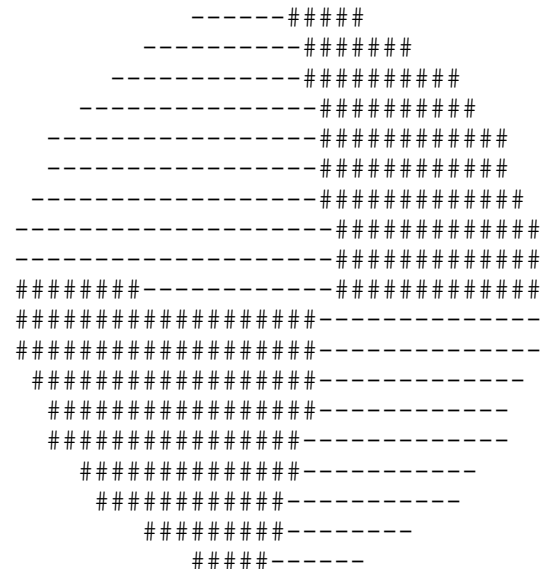
(<http://geofon.gfz-potsdam.de/geofon/alerts/gfz2011vzni/mt.txt>)

GFZ Event gfz2011vzni
11/11/09 19:23:37.33
Turkey
Epicenter: 38.41 43.35
MW 5.6

GFZ MOMENT TENSOR SOLUTION

Depth 23 No. of sta: 102
Moment Tensor; Scale 10^{17} Nm
Mrr=-0.37 Mtt=-0.07
Mpp= 0.44 Mrt=-0.69
Mrp= 0.01 Mtp=-0.07
Principal axes:
T Val= 2.91 Plg= 8 Azm=227
N -0.32 75 105
P -2.59 13 319

Best Double Couple: Mo= $2.8 \cdot 10^{17}$
NP1: Strike= 93 Dip=87 Slip=-164
NP2: 2 75 -2



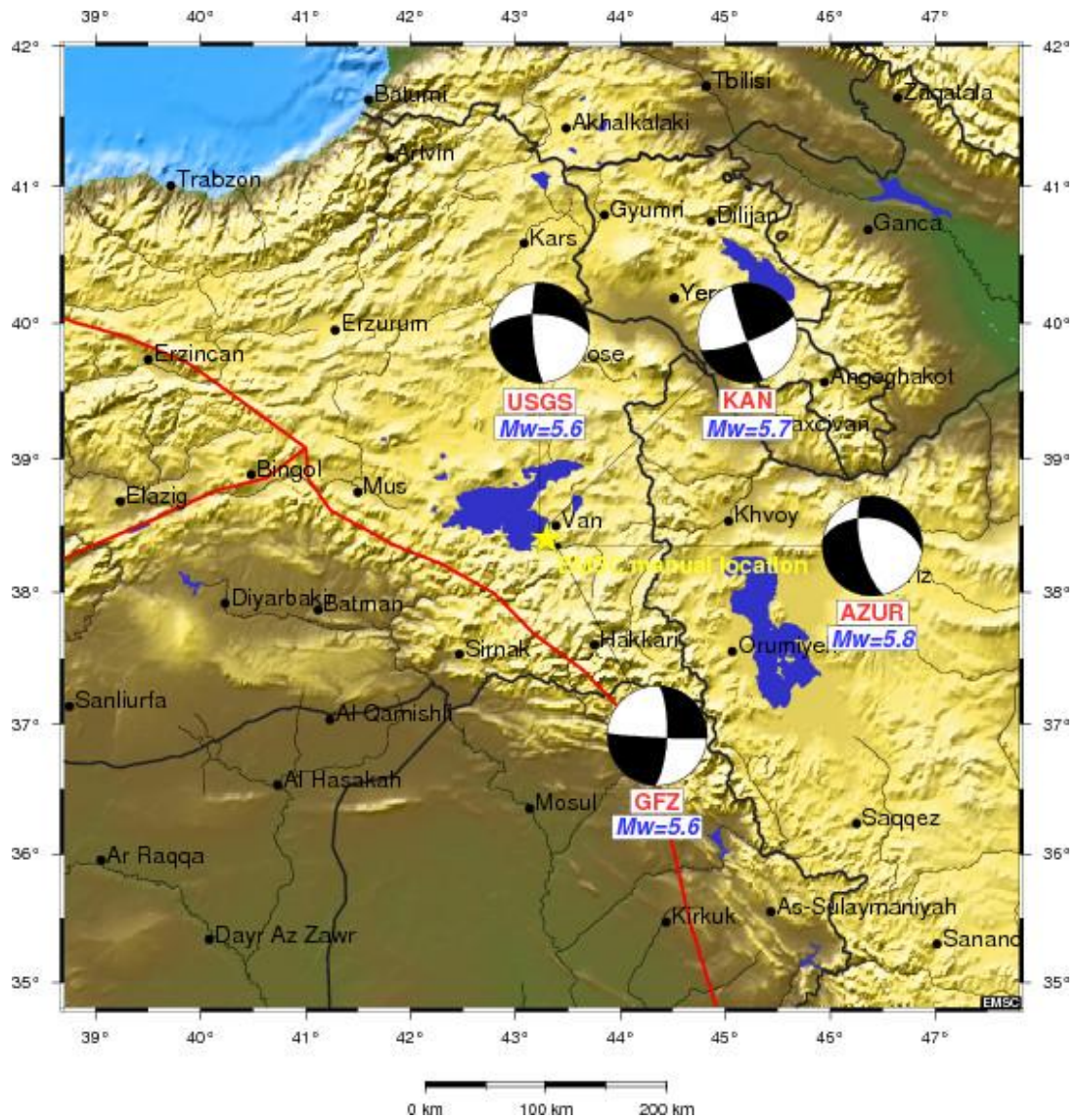


Figure 1. Edremit-Van earthquake as reported by various institutions (Source EMSC)

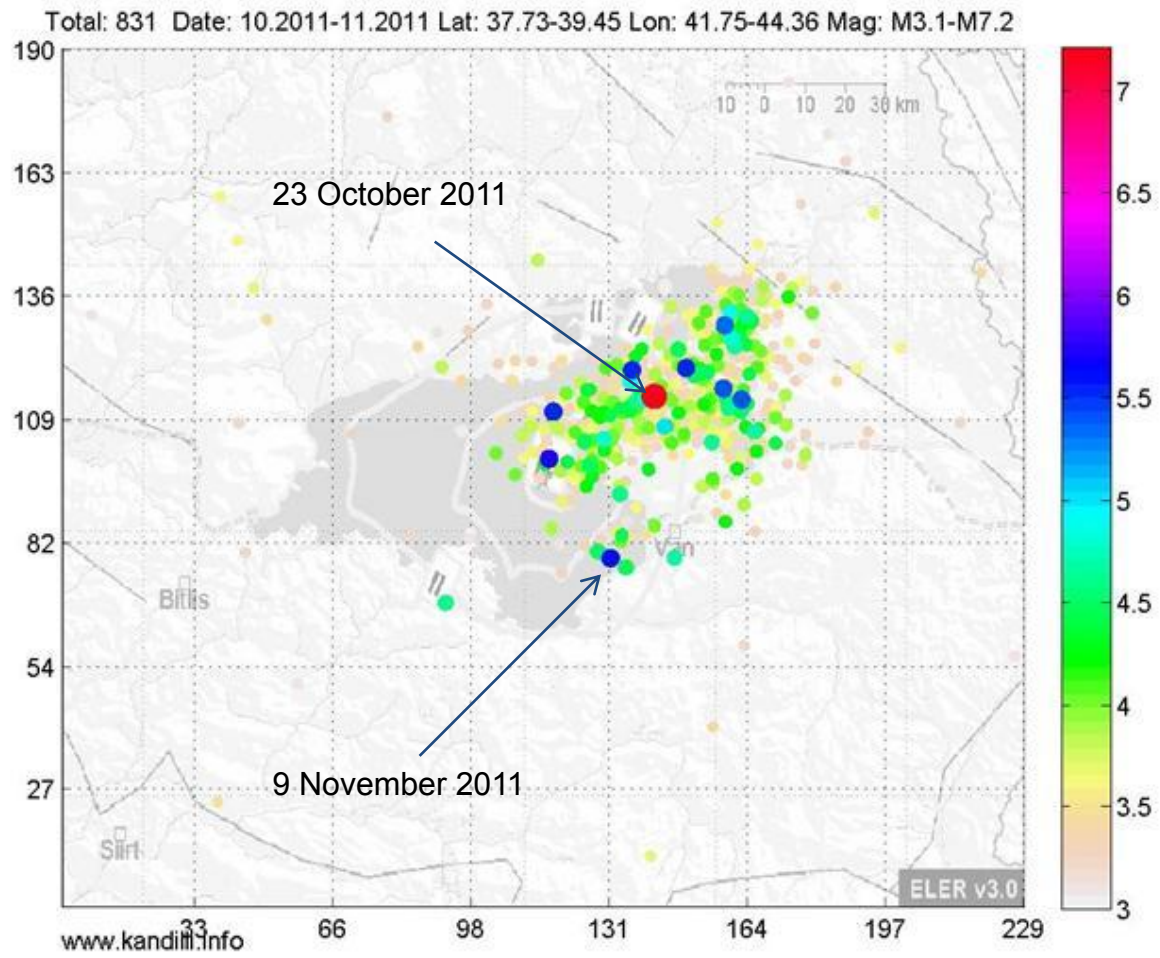


Figure 2. Aftershock activity since 23 October 2011



M5.6 Depth= 5 Lat= 38.4377 Lon= 43.2427
Map of: INTENS

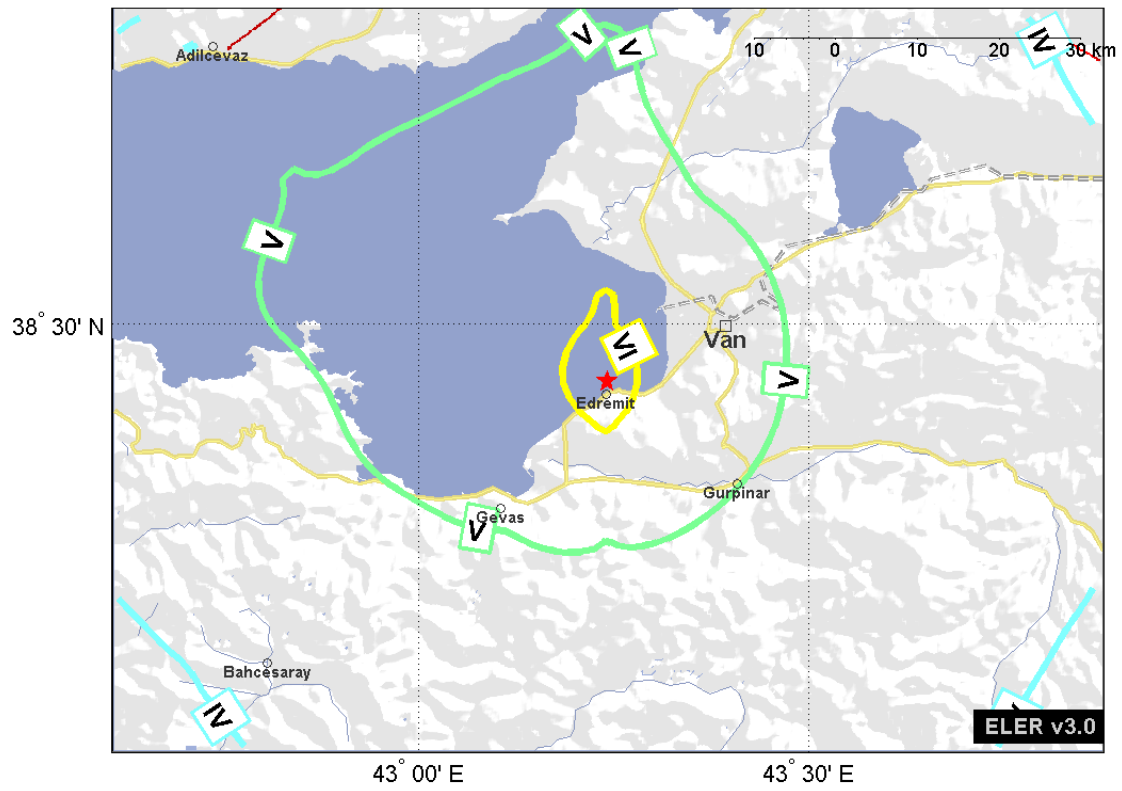


Figure 3. Instrumental intensities

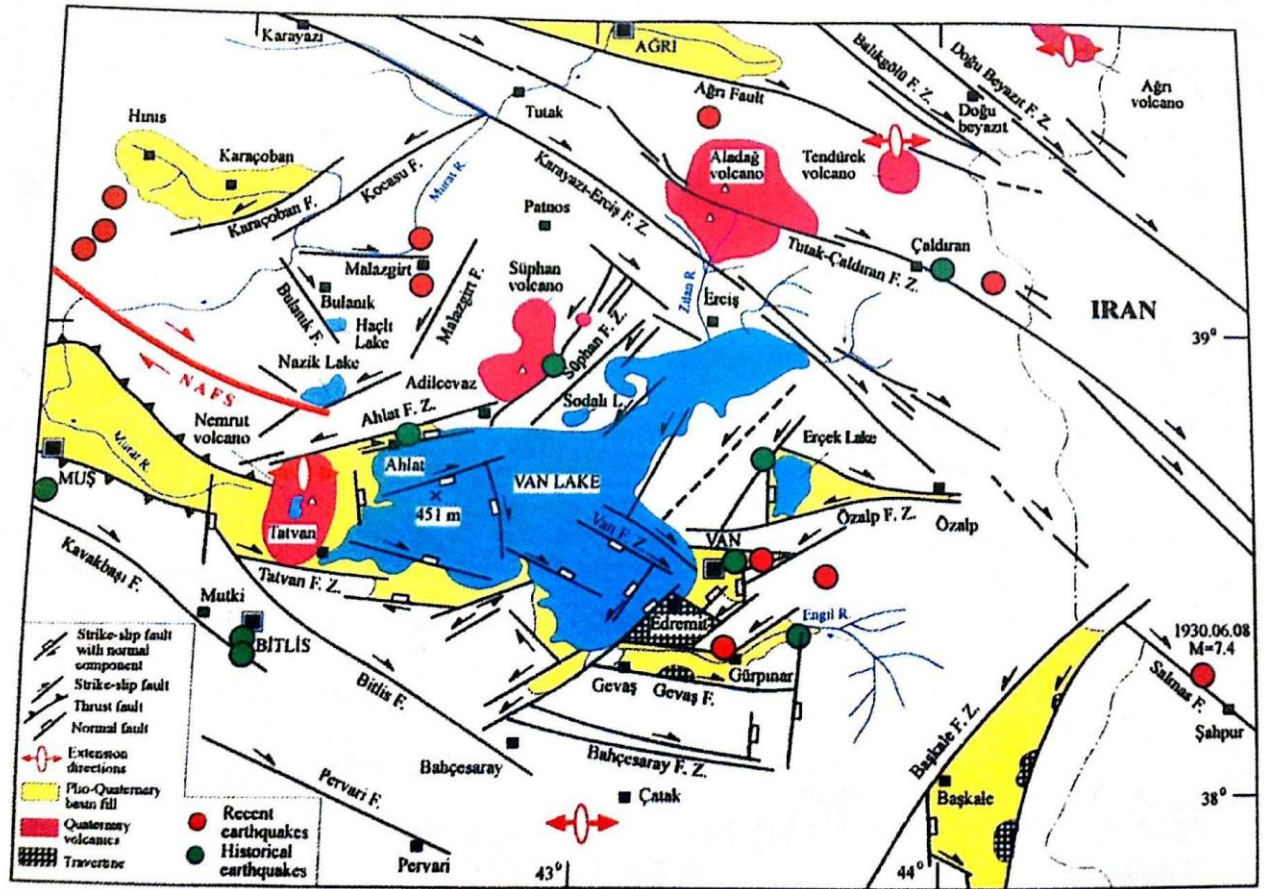


Figure 4. Regional active fault map after Koçyiğit (2002)

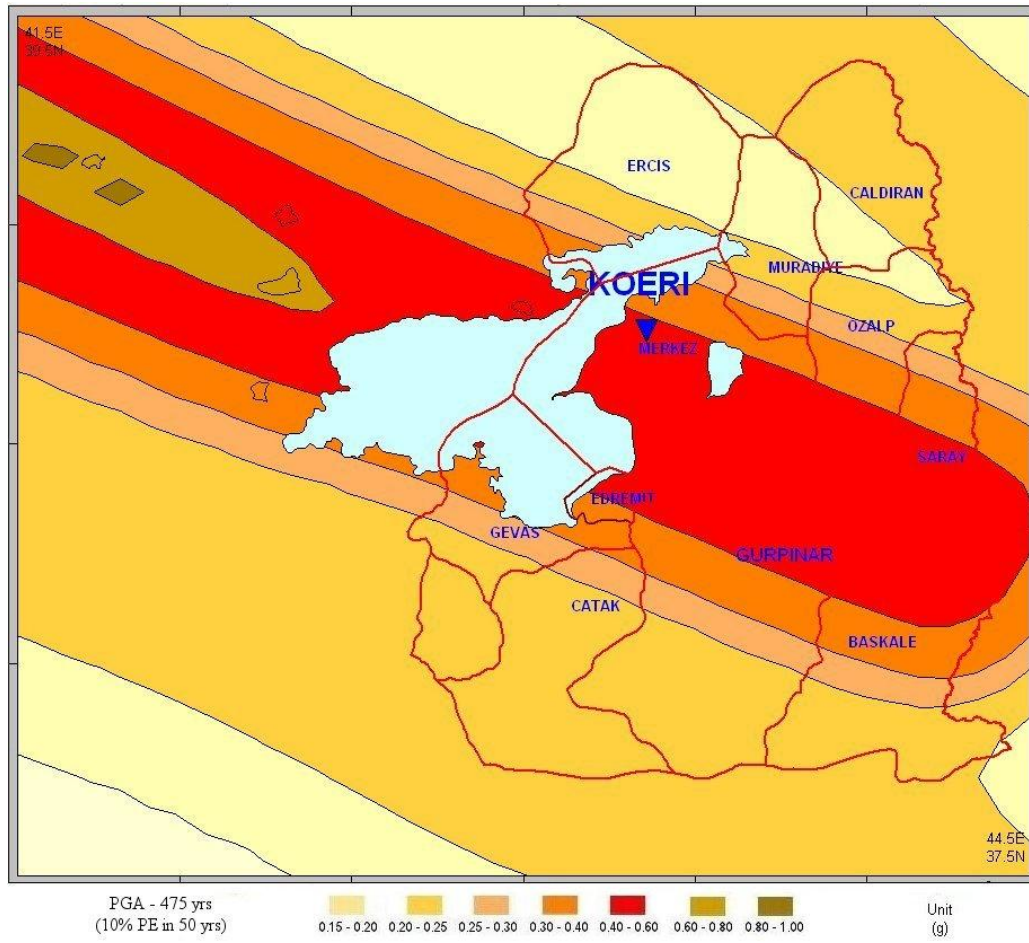


Figure 5. PGA's for a return period of 475 years

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