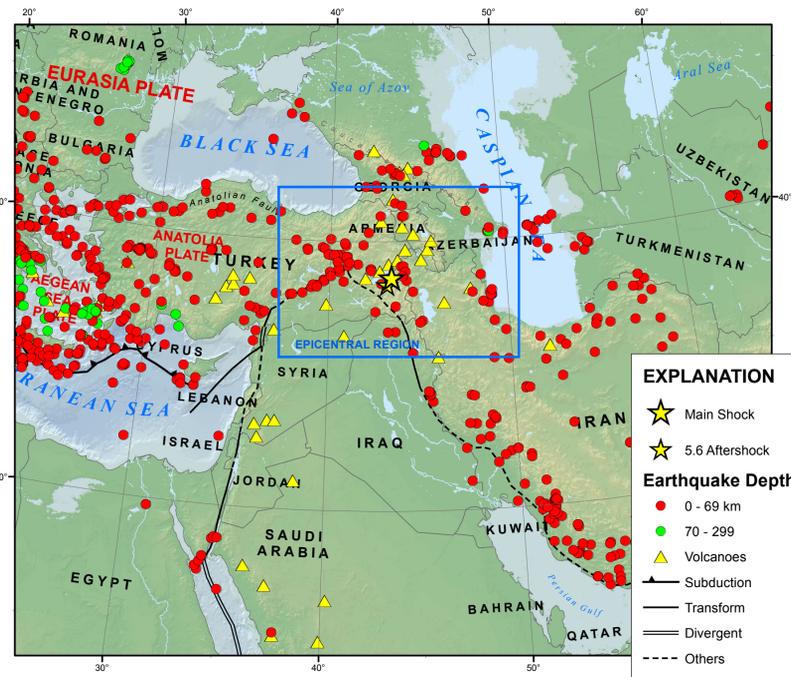


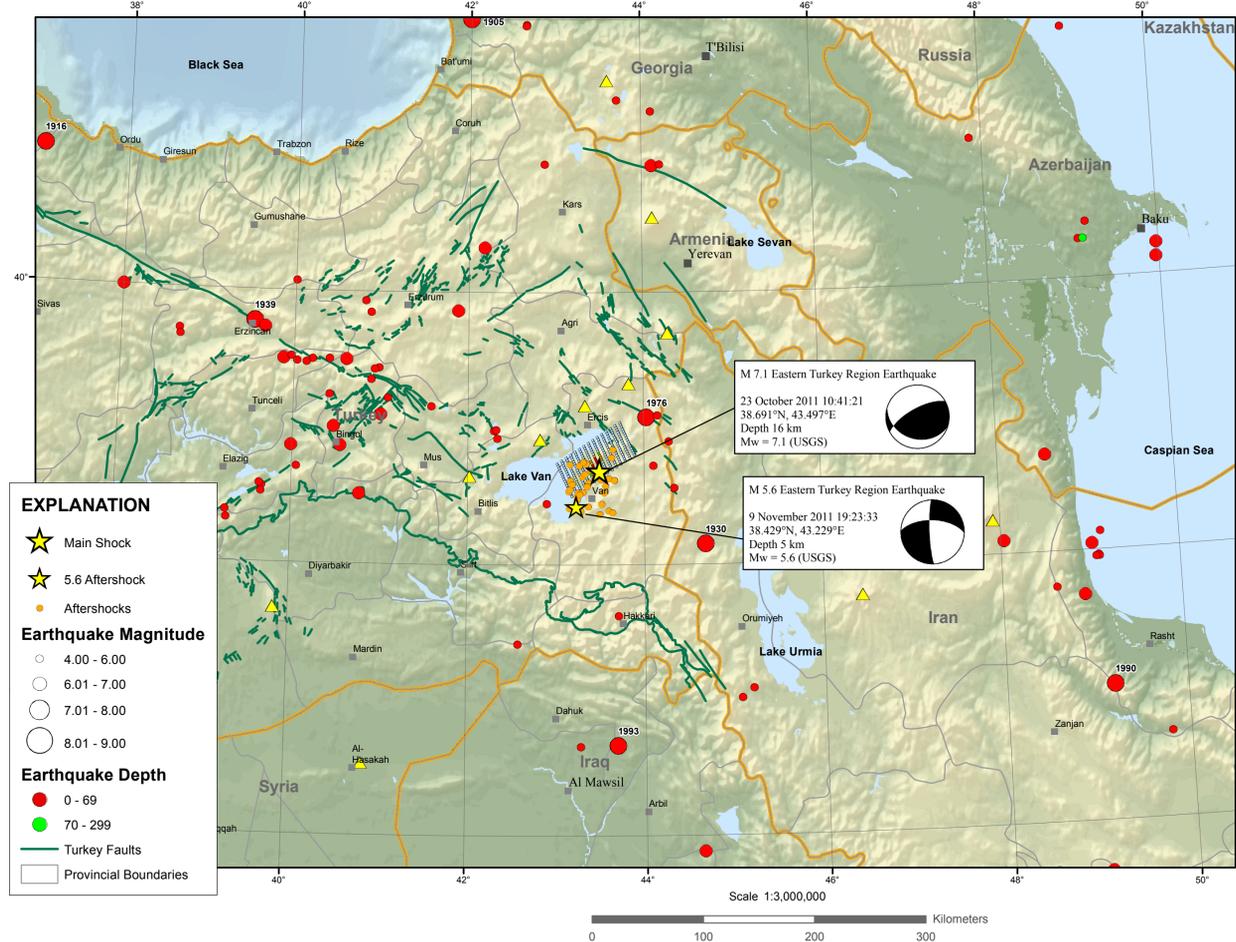
M 7.1 Eastern Turkey Region Earthquake of 23 October 2011



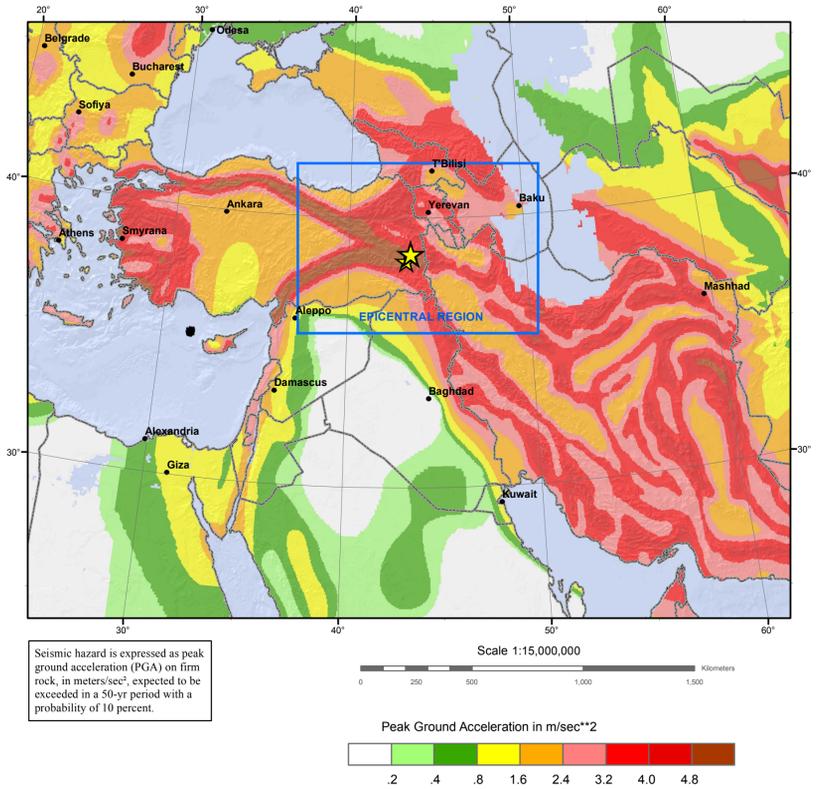
Tectonic Setting



Epicentral Region



Seismic Hazard

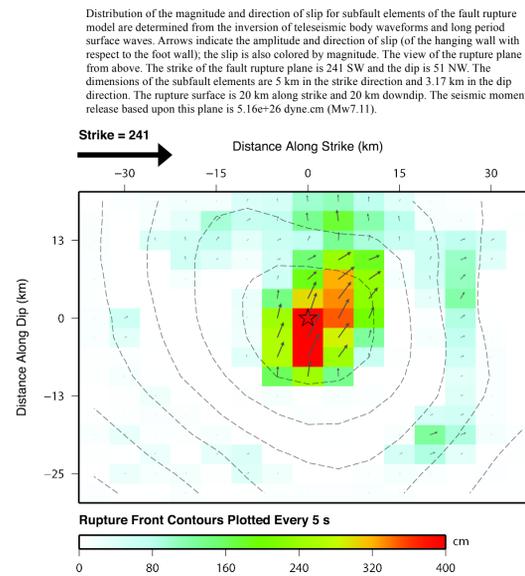


Tectonic Summary

Turkey is a tectonically active country that experiences frequent destructive earthquakes. On a broad scale, the seismotectonics of the region near the October 23, 2011 earthquake are controlled by the collision of the Arabian Plate and the Eurasian Plate, with northerly convergence of the Arabian plate at a rate of approximately 24 mm/yr. West of the October 23, 2011 earthquake the tectonics are dominated by strike-slip faulting on the East and North Anatolian fault zones. These large fault systems extend across much of central and western Turkey accommodating the western motion of the Anatolian block as it is being squeezed by the converging Arabian and Eurasian Plates. In the area of Lake Van and further east, tectonics are dominated by the Bitlis Suture Zone in eastern Turkey and Zagros fold and thrust belt of Iran. The October 23, 2011 earthquake occurred in a broad region of convergence beyond the eastern extent of Anatolian strike-slip tectonics. The focal mechanism of today's earthquake is consistent with oblique-thrust faulting similar to mapped faults in the region.

This earthquake is a reminder of the many deadly seismic events that Turkey has suffered in the recent past. The devastating Izmit earthquake of 1999 (M = 7.6) broke a section of the North Anatolian Fault 1000 km to the west of the October 23 event and killed 17,000 people, injured 50,000, and left 500,000 homeless. Approximately 70 km from the October 23, 2011 earthquake a M7.3 earthquake occurred in November 1976 destroying several villages near the Turkey and Iran border and killing several thousand people. A M7.8 earthquake struck Erzurum in 1939, killing an estimated 33,000 people.

Finite Fault Model



Significant Earthquakes Mag >= 6.5

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1905	10	21	11:01	42.000	42.000	60	7.5
1905	12	04	12:20	38.000	37.000	60	7.0
1909	02	09	11:24	40.000	38.000	60	6.8
1916	01	24	06:55	41.000	37.000	0	7.2
1924	09	13	14:34	39.864	41.876	35	6.8
1930	05	06	22:34	38.152	44.685	25	7.1
1939	12	26	23:57	39.770	39.533	35	7.8
1949	08	17	18:44	39.500	40.600	0	6.8
1954	03	28	04:47	39.100	41.000	0	6.8
1962	09	01	19:20	35.556	49.810	17.6	6.9
1971	05	22	16:44	38.868	40.542	3.6	6.7
1975	09	06	09:20	38.516	40.768	39.7	6.7
1976	11	24	12:22	39.083	44.030	9.7	7.0
1980	05	04	18:35	38.047	49.018	25	6.6
1983	10	30	04:12	40.328	42.177	15	6.6
1988	12	07	07:41	40.928	44.114	5	6.8
1990	06	20	21:00	37.001	49.186	19	7.4
1992	03	13	17:18	39.728	39.654	7	6.7
1993	01	15	12:15	36.666	43.686	42.4	7.5
2000	11	25	18:09	40.222	49.974	50	6.8
2000	11	25	18:10	40.123	49.960	37.7	6.5
2002	06	22	02:58	35.626	49.047	10	6.5
2011	10	23	10:41	38.628	43.486	20	7.1

DISCLAIMER

Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.

PAGER

USGS Earthquake Shaking Red Alert

USAID PAGER Version 5

M 7.1, EASTERN TURKEY
Origin Time: Oct 23 2011 10:41:21 UTC (13:41:21 local)
Location: 38.69°N 43.50°E Depth: 16 km

Estimated Fatalities
Estimated Economic Losses

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (x1000)	I	II-III	IV	V	VI	VII	VIII	IX	X+
ESTIMATED NUMBER	1	1	1	1	1	1	1	1	1
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	None	None	None	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy	Very Heavy

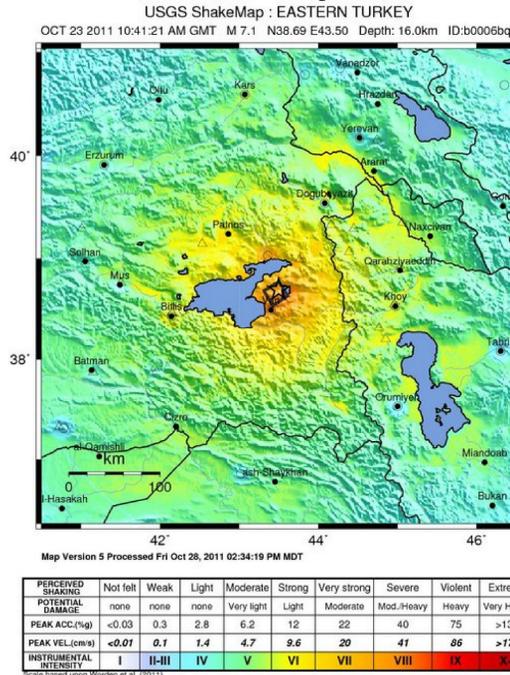
Population Exposure

Overall, the population in this region resides in structures that are a mix of vulnerable and earthquake resistant construction. The predominant vulnerable building types are unreinforced brick masonry and nonductile reinforced concrete frame construction.

Selected City Exposure

MMI City	Population
VIII Van	372K
VIII Erzurum	92K
VII Semsumayyu	7K
VII Ozalp	8K
VII Gevas	12K
VI Pinar	57K
V Batman	302K
V Siirt	114K
V Erzurum	424K
IV Gyumri	148K
IV Yerevan	1,093K

ShakeMap



DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999) and extensions (Engdahl and Villasehor, 2002)
HDF (unpublished earthquake catalog) (Engdahl, 2003)
Global Seismic Hazard Assessment Program

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)

BASE MAP
NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center
NOAA GEBCO and GLOBE Elevation Models

REFERENCES

Bird, P., 2003. An updated digital model of plate boundaries: Geochem. Geophys. Geosyst., v. 4, no. 3, pp. 1027-30.

Engdahl, E.R., and Villasehor, A., 2002. Global Seismicity: 1900 - 1999, chap. 41 of Lee, W.H.K., and others, eds., International Earthquake and Engineering Seismology, Part A: New York, N.Y., Elsevier Academic Press, 932 p.

Engdahl, E.R., Van der Hilst, R.D., and Buland, R.P., 1998. Global teleseismic earthquake relocation with improved travel times and procedures for depth determination. Bull. Seism. Soc. Amer., v. 88, p. 722-743.

Map prepared by U.S. Geological Survey
National Earthquake Information Center
28 October 2011
Map not approved for release by Director USGS