U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

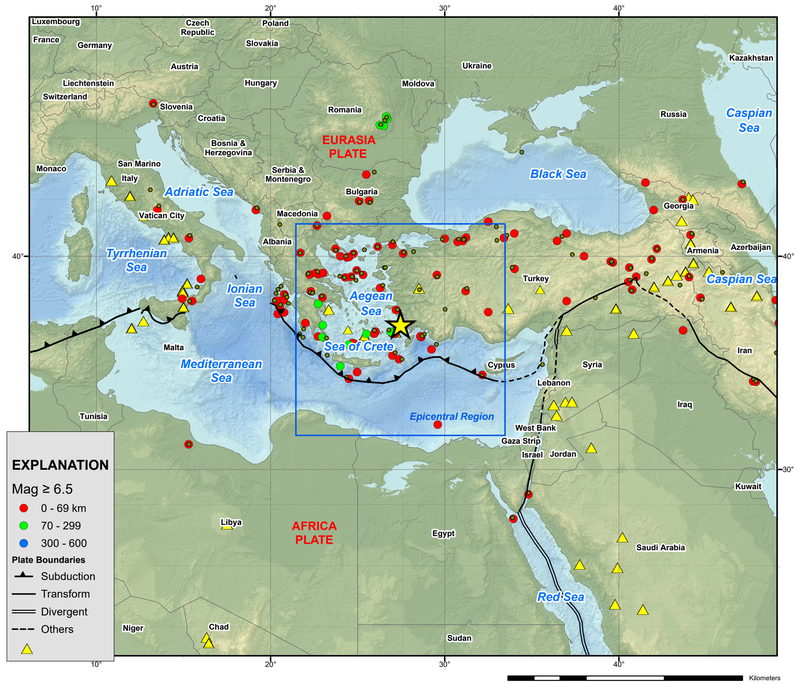
M6.6 Southwestern Turkey Earthquake of 20 July 2017

EARTHQUAKE SUMMARY MAP

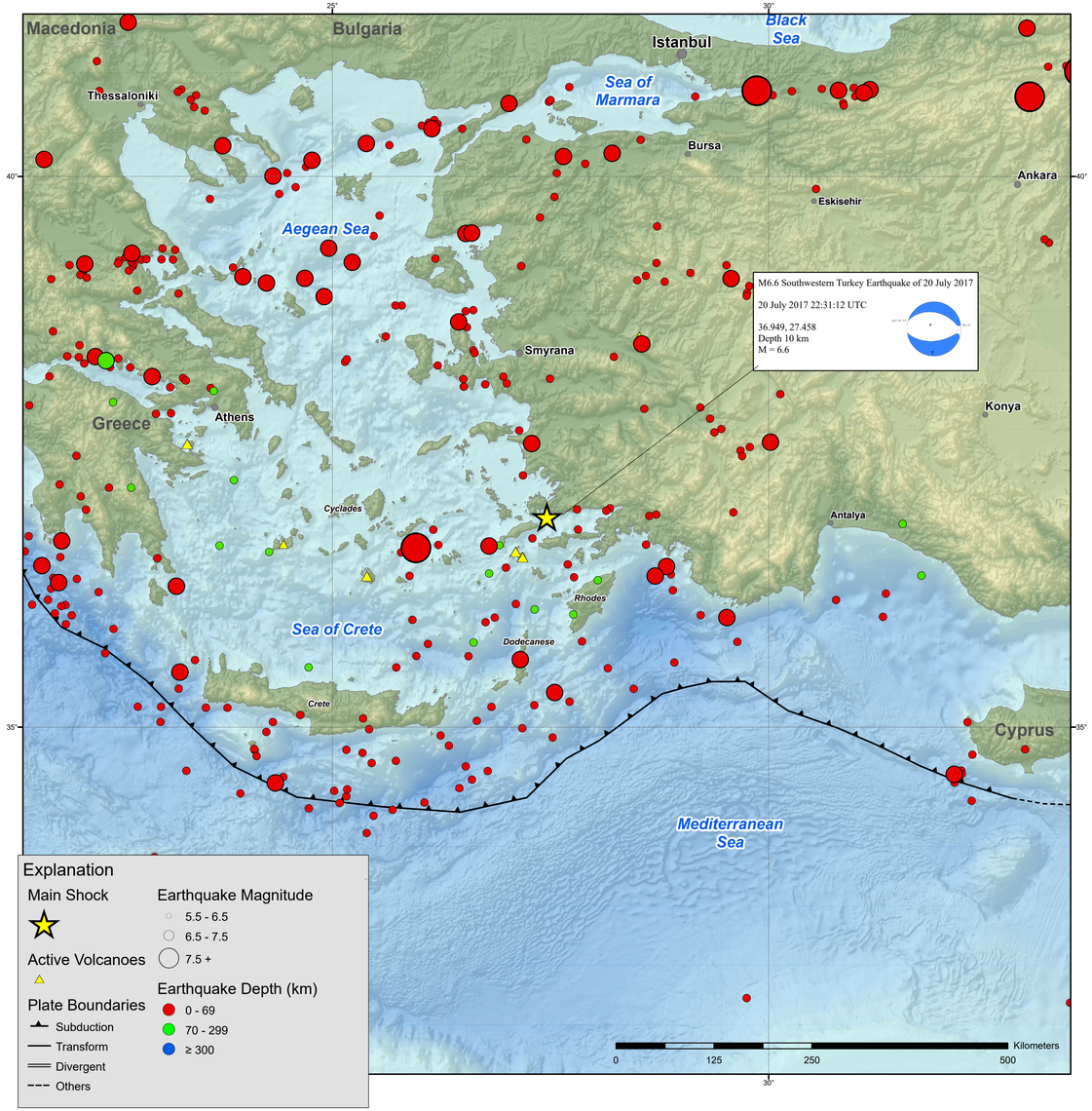
Prepared in cooperation with the Global Seismographic Network

GSN

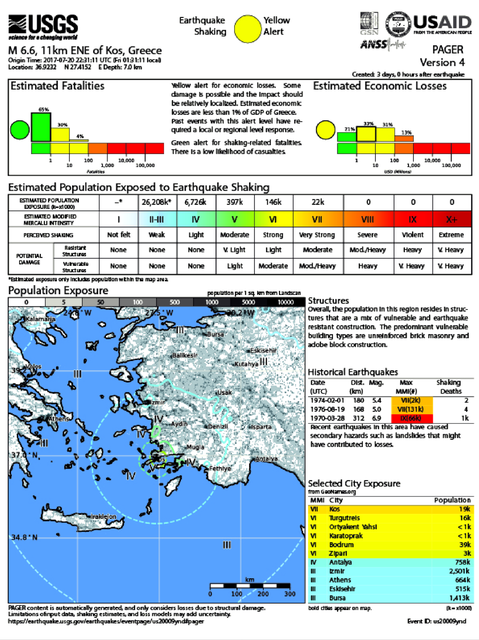
Tectonic Setting



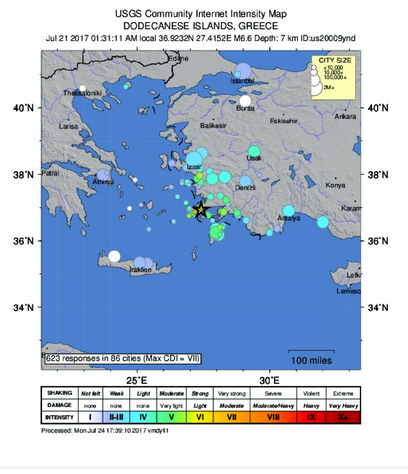
Epicentral Region



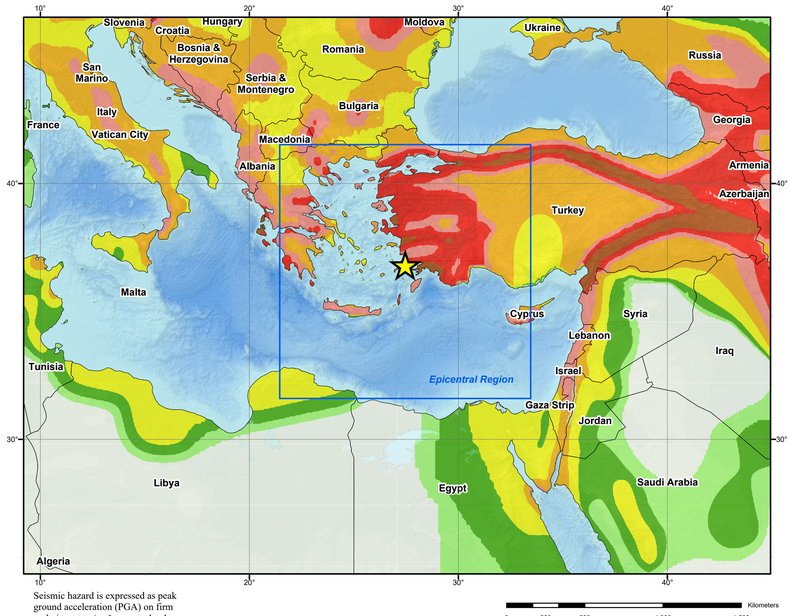
PAGER



Did You Feel It?



Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec^2, expected to be exceeded in a 50-yr period with a probability of 10 percent.

Tectonic Summary

The July 20, 2017, M 6.6 earthquake southeast of Bodrum, Turkey, occurred as the result of normal faulting at a shallow crustal depth within Eurasia plate lithosphere. The focal mechanism solution indicates that the earthquake occurred on a moderately dipping fault striking either eastward or westward. Tectonics in the region surrounding this earthquake are relatively complex; to the south, Africa (Nubia) lithosphere subducts beneath the Eurasia plate at the Hellenic Trench; to the east, the Anatolian microplate (part of Eurasia) moves as a block in a general westward direction, driving right-lateral faulting along its northern boundary, the North Anatolian Fault, and left-lateral faulting in southeast Turkey. In the central Aegean Sea region, and in southern Greece to the west and southern Turkey to the east, north-south extension dominates. In western Turkey, historic earthquakes demonstrate a mixture of transtensional and extensional faulting focal mechanism solutions. The July 20, 2017 earthquake indicates almost pure normal faulting, and is broadly consistent with past earthquakes in the region. The location of the July 20, 2017 event is about 250 km north of the closest main plate boundary, where the Africa plate moves to the north at a rate of approximately 10 mm/yr with respect to Eurasia; this earthquake is thus considered an intraplate event.

The Aegean Sea frequently experiences moderate to large earthquakes, and the region within 250 km of the June 12, 2017 earthquake has hosted 27 other M 6+ events over the preceding century. The largest was a M 7.7 earthquake in July 1956, near the island of Amorgos to the west of the July 20, 2017 event. This was the largest event of the 20th century in Greece. As a result of this event, a M 7.2 aftershock 13 minutes later, and an accompanying large tsunami, 53 fatalities, 100 injuries, and extensive damage occurred in Amorgos and nearby Santorini. In June 2017, a M 6.3 earthquake occurred 240 km to the northwest of the July 20th earthquake, causing one fatality and 12 injuries on the island of Lesbos. In the ~20 hours since the July 20, 2017 M 6.6 earthquake, 9 aftershocks of M 4.0 and larger have been recorded; the largest being a M 4.7. Early news reports from the epicentral region suggest at least 2 fatalities and many more injuries were caused by this event.

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 Villaseñor, 2002)
EHB catalog (Engdahl et al., 1998)
HDF (unpublished earthquake catalog, Engdahl, 2003)
Global Seismic Hazard Assessment Program
Volcanoes of the World (Siebert and Simkin, 2002)

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)
Ji, C., D.J. Wald, and D.V. Helmberger, Source description of the 1999 Hector Mine, California earthquake; Part I: Wavelet domain inversion theory and resolution analysis, Bull. Seism. Soc. Am., Vol 92, No. 4, pp. 1192-1207, 2002.
DeMets, C., Gordon, R.G., Argus, D.F., 2010. Geologically current plate motions, Geophys. J. Int. 181, 1-80.

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. 1027-80.

Engdahl, E.R., and Villaseñor, 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.

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.

Map updated by U.S. Geological Survey National Earthquake Information Center
24 July 2017
http://earthquake.usgs.gov/
Map not approved for release by Director USGS