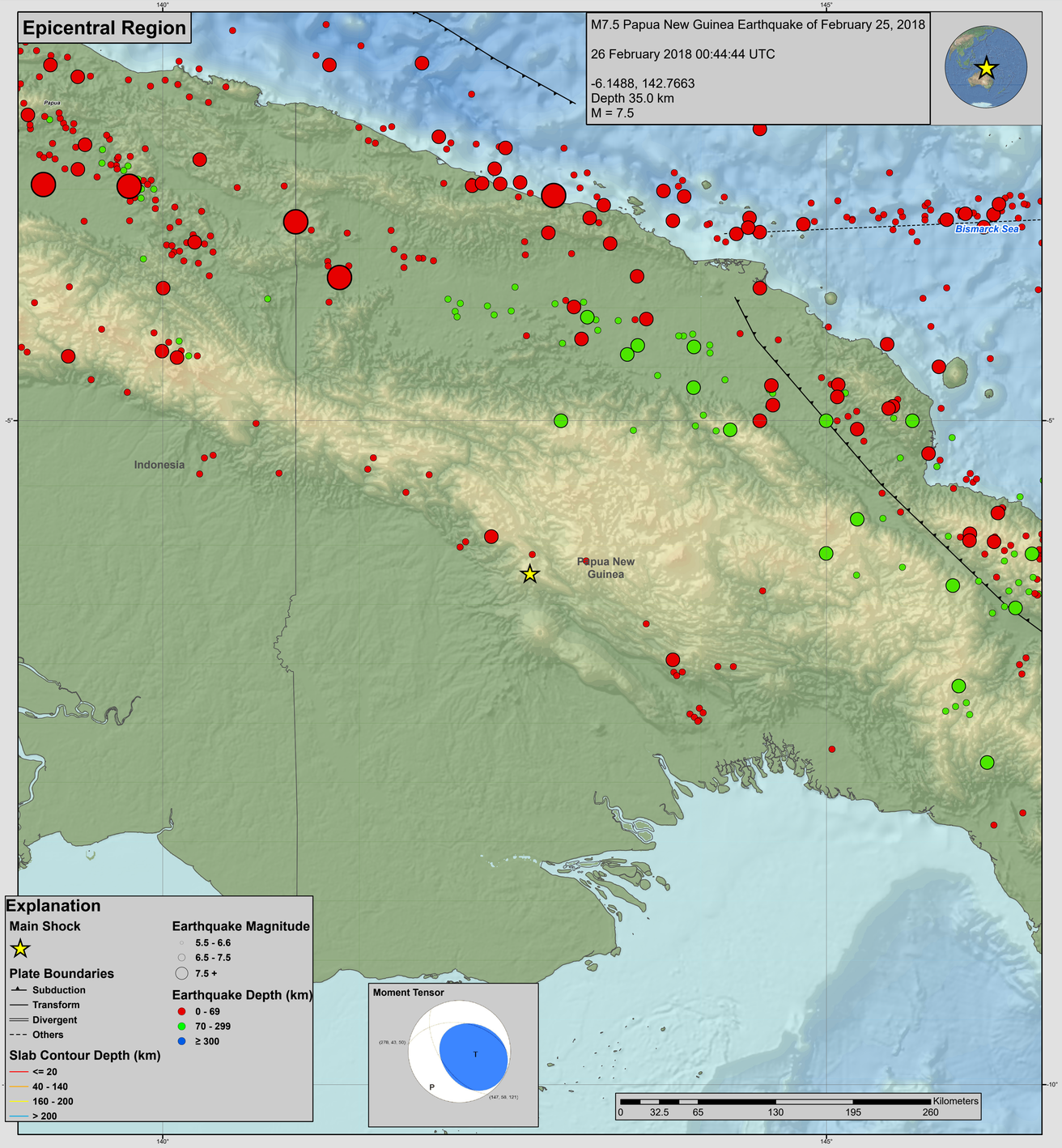
M7.5 Papua New Guinea Earthquake of February 25, 2018

U.S. Department of the Interior
U.S. Geological Survey

Earthquake Summary Map
prepared in cooperation with
the Global Seismographic Network



Tectonic Summary

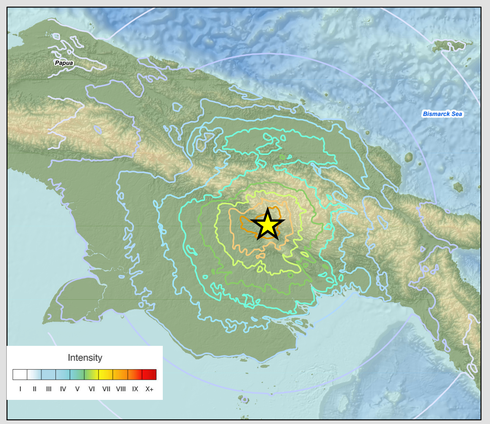
The February 25, 2018, M 7.5 earthquake occurred as the result of oblique thrust faulting at shallow a depth. Preliminary focal mechanism solutions indicate slip occurred on either a moderately dipping fault striking west-northwest, or on a moderately dipping fault striking southeast. At the location of this earthquake, the Australia plate is converging with the Pacific plate, moving towards the east-northeast with respect to Pacific lithosphere at a velocity of approximately 107 mm/yr. Earthquakes in this geographical region are generally associated with the large-scale convergence of these two major plates, and with the complex interactions of several associated microplates, most notably the South Bismarck plate, the Solomon Sea microplate, and the Woodlark plate. The location, depth, and focal mechanism solution of this earthquake are consistent with it occurring as intraplate faulting within the crust of the Australia plate.

While commonly plotted as points on maps, earthquakes of this size are more appropriately described as slip over a larger fault area. Oblique-thrust-faulting events of the size of the February 25th, 2018 earthquake are typically about 85x30 km (length x width).

Papua New Guinea experiences a high rate of seismic activity, with 23 other events of M 6+ occurring within 250 km of the February 25, 2018 earthquake over the preceding century. The closest of these was a M 6.2 earthquake in August 1993, about 17km to the north of today's earthquake. The largest was a M 7.2 event in June 1986, 230 km to the north-northeast on or near the Australia:Pacific plate boundary in the region. With the exception of a M 7.5 earthquake at intermediate depth (186 km) in eastern Papua New Guinea in February 1963 (which occurred on the subduction zone at depth), all prior M 7.5+ earthquakes in this region have been associated with the shallow subduction zone plate boundaries in northern New Guinea. The vast majority of moderate-to-large earthquakes in this region are not known to have caused significant damage or casualties, though few have been as large as today's earthquake. A M 7.1 earthquake in June 1976, 340 km to the northeast of this event, resulted in over 400 shaking related deaths. Landsliding also caused a significant number of additional fatalities in that event.

Did You Feel It?

Shakemap



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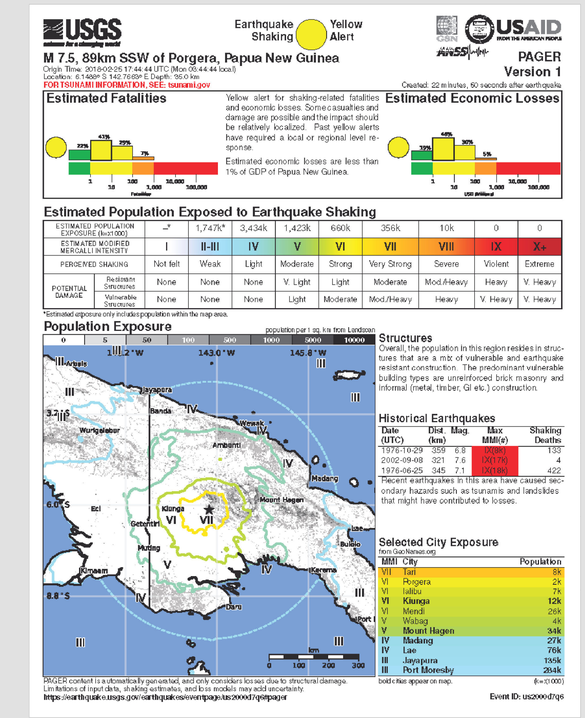
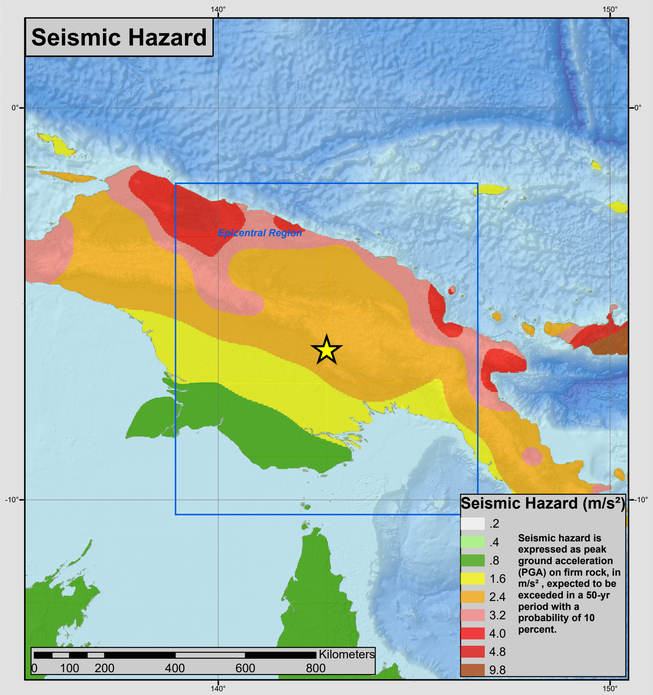


Seismic Hazard



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 Villasenor, 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 signifiance.

Map updated by U.S. Geological Survey National Earthquake Information Center
25 February 2018
http://earthquake.usgs.gov/
Map not approved for release by Director USGS