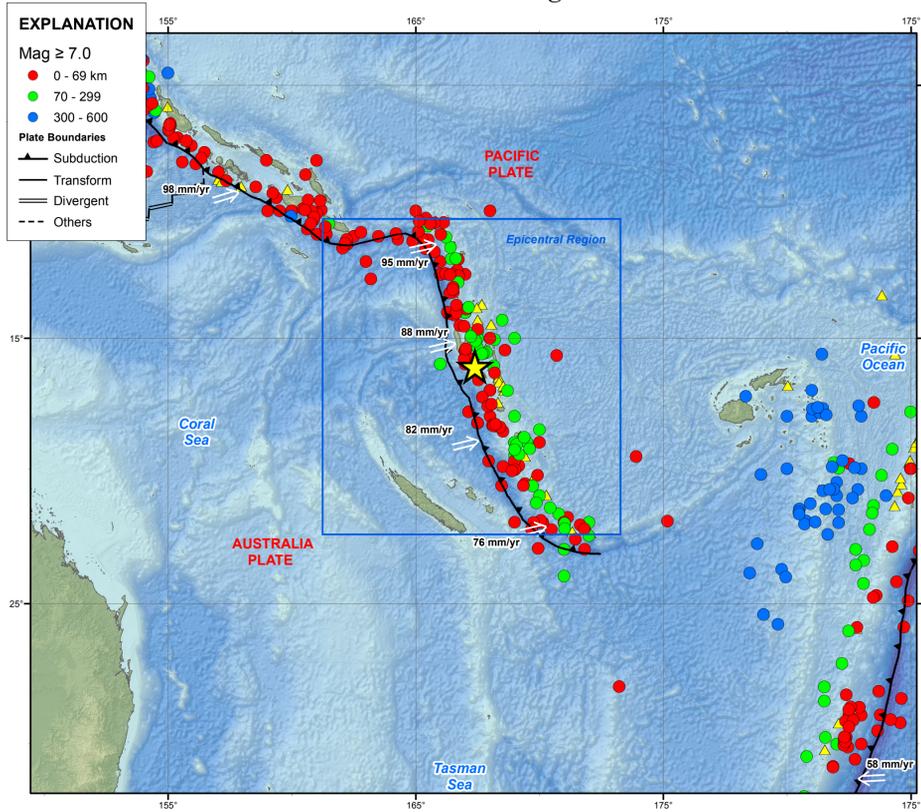


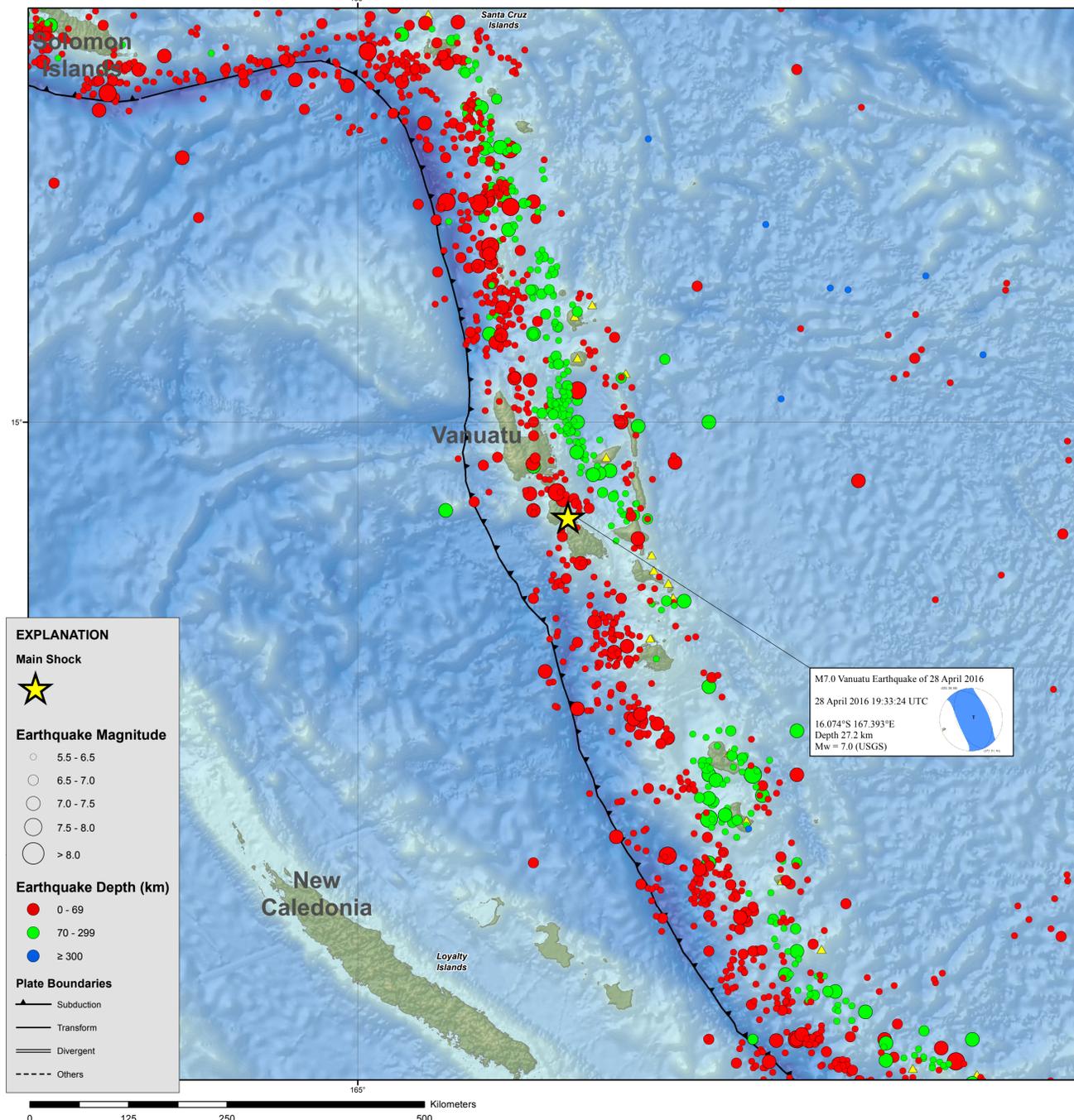
M7.0 Vanuatu Earthquake of 28 April 2016



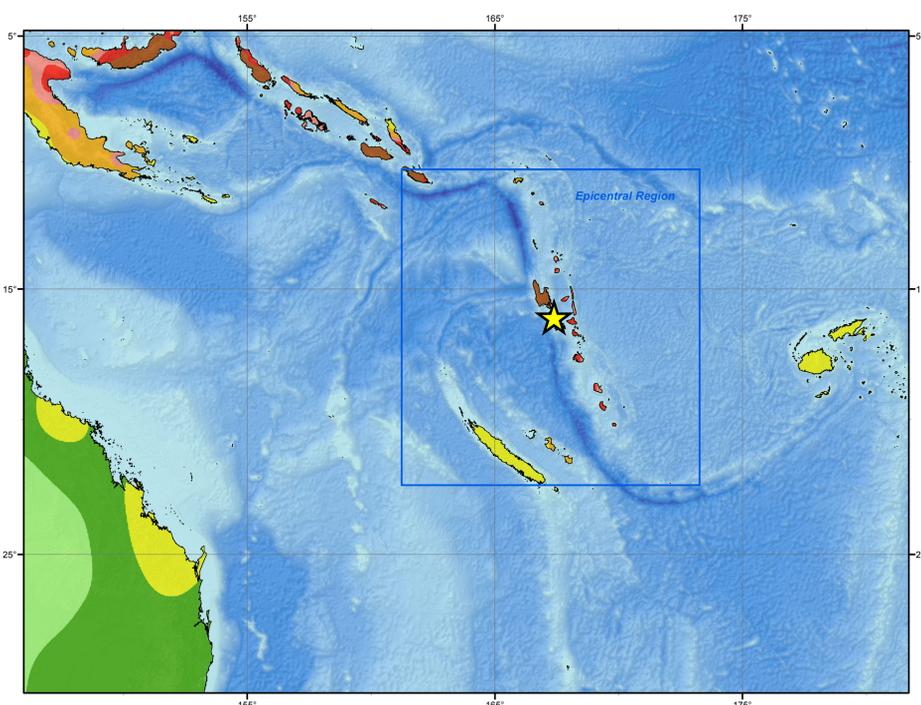
Tectonic Setting



Epicentral Region



Seismic Hazard



PAGER

USGS Earthquake Shaking **Green Alert**

M 7.0, VANUATU
Origin Time: Thu 2016-04-28 19:33:24 UTC (06:33:24 local)
Location: 16.07°S 167.39°E Depth: 27 km

Estimated Fatalities
Green alert for shaking-related fatalities and economic losses. There is a low likelihood of casualties and damage.

Estimated Economic Losses

Estimated Population Exposed to Earthquake Shaking

| ESTIMATED POPULATION EXPOSURE (N = 3,500) | I | II-III | IV | V | VI | VII | VIII | IX | X+ |
|---|----------------------------|--------|-------|----------|----------------|----------------|----------|----------|----------|
| PERCEIVED SHAKING | Not felt | Weak | Light | Moderate | Strong | Very Strong | Severe | Violent | Extreme |
| POTENTIAL DAMAGE | Resistant Structures: none | none | none | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy | V. Heavy |
| Vulnerable Structures: none | none | none | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy | V. Heavy | V. Heavy |

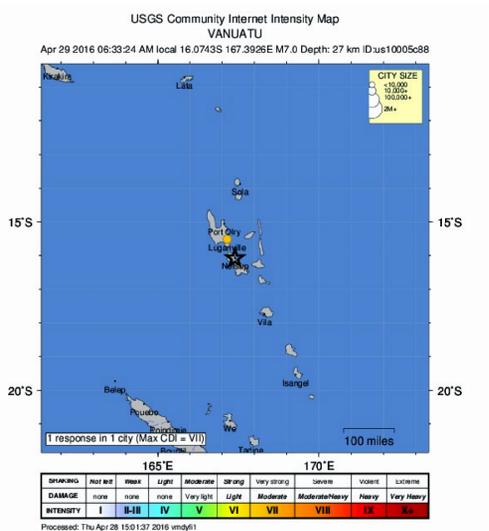
Population Exposure
population per 1 sq. km from Landsat

Selected City Exposure

| MMI City | Population |
|--------------|------------|
| VII Norsup | 3k |
| VII Lakatoro | < 1k |
| V Luganville | 13k |
| V Port-Olry | 2k |
| IV Port-Vila | 36k |
| IV Soa | 1k |

Event ID: us10005c88

Finite Fault Model



TECTONIC SUMMARY

The April 28, 2016, M 7.0 earthquake beneath the island of Melampa in the Vanuatu island chain of the southwest Pacific Ocean occurred as a result of shallow thrust faulting on or near the boundary between the Australia and Pacific plates. The preliminary location, depth and focal mechanism of the event are consistent with the earthquake having occurred on the east-dipping, thrust-fault, subduction zone interface in this region. The earthquake is located nearly 100 km to the east of the New Hebrides Trench, the bathymetric expression of the plate boundary between the Australia and Pacific plates, where lithosphere of the Australia plate subducts into the mantle beneath the North Fiji Basin. At the location of this earthquake, the Australia plate moves east-northeast with respect to the Pacific plate at a velocity of approximately 84 mm/yr.

The Vanuatu region frequently experiences large earthquakes; 23 events of M 7 or larger have occurred within 250 km of the April 28, 2016 event over the preceding century. The largest was a M 7.7 earthquake in May 1965, 130 km to the north of the April 28 event. The April 28 event also follows a sequence of moderate-sized earthquakes roughly 200 km to the northwest, the largest of which was a M 6.9 earthquake on April 3rd. To date, that sequence involved 48 events of M 4.5 or greater, including the April 3 M 6.9 event, two M 6.7 earthquakes and one M 6.4 shock. Because of the remote location of these earthquakes, few have caused any significant damage or fatalities.

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 Villasenor, 2002)
EHB catalog (Engdahl et al., 1998)
IHF (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. Helwegger. 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 ESR1, 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: Geochim. 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 significance.

Map updated by U.S. Geological Survey National Earthquake Information Center
28 April 2016
http://earthquake.usgs.gov/
Map not approved for release by Director USGS