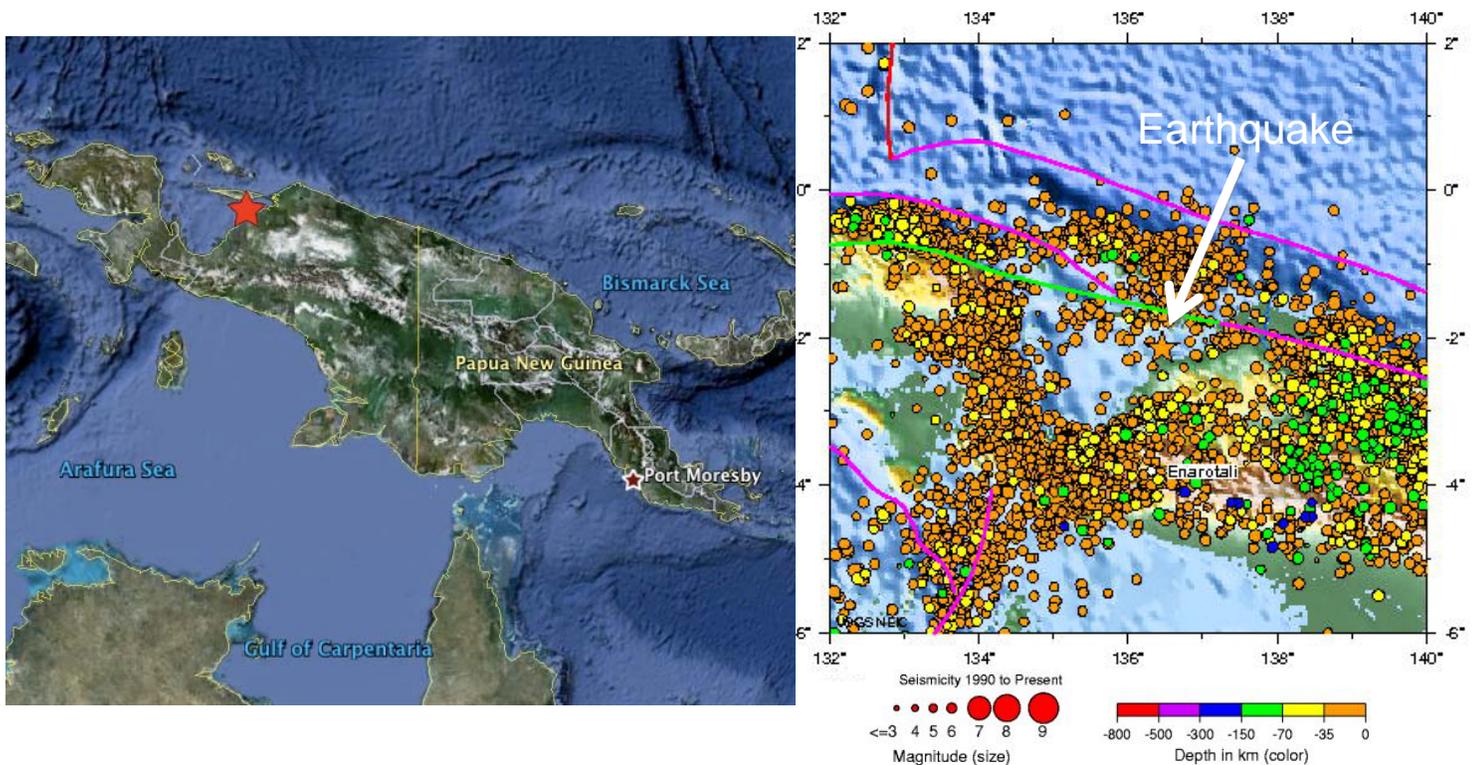


Major 7.0 Earthquake Near Papua, Indonesia
Wednesday, June 16, 2010 at 03:16:29 UTC
Tuesday, June 15, 2010 at 8:16:29 PM PDT
Epicenter: Latitude 2.141°S, 136.460°E. Depth: 29 kilometers.

A major earthquake of magnitude 7.0 occurred Tuesday evening Portland time beneath northwest Papua, Indonesia. The epicenter is indicated by the red star on left-side map below. The map on the right below shows historic earthquake activity near the epicenter (orange star) from 1990 to present. This earthquake occurred in a region that contains a complex arrangement of plate boundaries between the Pacific, Philippine, India-Australia, and Eurasian plates. The first-order plate tectonics of the Papua region involves convergence with the Pacific Plate subducting beneath Papua – New Guinea at the northern fringe of the India-Australia Plate at a rate of about 11 cm/yr. In detail, there are several convergent and transform (strike-slip) boundaries between numerous microplates, as illustrated on the historic seismicity map where purple lines are convergent boundaries and green lines are transform boundaries. The mechanism for the June 16 earthquake was strike-slip so this event is most likely related to the transform fault that cuts through the northwestern part of Papua. Fortunately strike-slip earthquakes rarely generate tsunamis and no tsunami watch or warning was issued for this earthquake.



This earthquake was preceded by a magnitude 6.4 foreshock 10 minutes prior to the magnitude 7.0. Two strong aftershocks (magnitude 5.1 and 6.2) were felt within the hour of the main shock. This earthquake sequence has shaken the region leading to the collapse of several buildings and some injuries.



The record of the June 16, 2010 Papua earthquake on the University of Portland seismometer is illustrated below. Portland is about 11,000 km (~6836 miles) from the location of this earthquake. Body waves travel through Earth's mantle from the earthquake to a distant station along paths that curve upwards because the velocity of seismic waves generally increase with depth in the mantle. While this distance is very close to the P-wave shadow zone, the first arrival is likely the direct P wave that takes 13 minutes 38 seconds to travel from the earthquake to the station. The wave labeled PP is a compressive body wave that traveled through Earth's mantle and bounced off the Earth's surface midway between the epicenter and Portland. It took about 17 minutes 41 seconds for the PP waves to travel from the earthquake to Portland. The S waves (shear body waves) travel from the earthquake through the Earth's mantle to the station in approximately 25 minutes 7 seconds, however on this record, this arrival is not clear. The (Love and Rayleigh) surface waves traveled from the earthquake to Portland around the perimeter of the Earth. Because the distance around the perimeter is longer than the distance through Earth's mantle and the speed of surface waves is slower than body waves, surface waves did not arrive in Portland until almost 42 minutes after the earthquake occurred beneath Papua, Indonesia.

