A magnitude 7.1 earthquake struck off the eastern coast of Papua New Guinea on Friday, approximately 57 km (35 miles) west of Panguna, Bougainville Island. Although Bougainville Island is geographically part of the Solomon Islands archipelago, the state of Solomon Islands is not a part of Papua New Guinea.

There were no immediate reports of damage or injuries from this earthquake.
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The entirety of Bougainville Island, with a population of 175,000 was shaken by this earthquake.

Image courtesy of the US Geological Survey
The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

25,000 people were exposed to very strong shaking, with an additional 103,000 people experiencing strong shaking from this earthquake.

The color coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table below.

*Image courtesy of the US Geological Survey*
This earthquake is shown by the blue star on the map at the right. It is a seismically active area with frequent large earthquakes.

The Australian Plate subducts at a steep angle towards the north beneath the Pacific Plate at the New Britain Trench shown below in a N-S cross section.

This earthquake occurred on or close to the subduction zone megathrust boundary between the Australian and Pacific Plates.

At the location of the earthquake, the Australian Plate moves towards the east northeast at a velocity of 102 mm/yr with respect to the Pacific Plate, and subducts beneath Bougainville Island at the New Britain Trench.

Regional tectonic complexities involving the convergence of the Australian and Pacific Plates.

The tension axis (white dot) reflects the minimum compressive stress direction. The pressure axis (black dot) reflects the maximum compressive stress direction.
The Solomon Islands occupy the center of a region that is marked by a complicated arrangement of tectonic microplates crushed between the greater Pacific and Australian Plates.

These microplates take up the overall convergence between Australia and the Pacific. The Solomon Sea plate moves slightly faster and more northeasterly with respect to the Pacific Plate than does Australia due to sea-floor spreading in the Woodlark Basin.

Regional tectonic microplates. Arrows show net plate motion relative to the Australian Plate.

Image credit: OSU; simplified from Hamilton (1979)
The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is 9916 km (6162 miles, 89.33°) from the location of this earthquake.

Following the earthquake, it took 12 minutes and 58 seconds for the compressional P waves to travel a curved path through the mantle from the earthquake to Portland, Oregon. S waves are shear waves that follow the same path through the mantle as P waves and took 23 minutes 49 seconds to arrive.

Surface waves, both Love and Rayleigh, traveled the 9916 km (6162 miles) along the perimeter of the Earth from the earthquake to the recording station.
Teachable Moments are a service of

IRIS Education & Public Outreach
and
The University of Portland