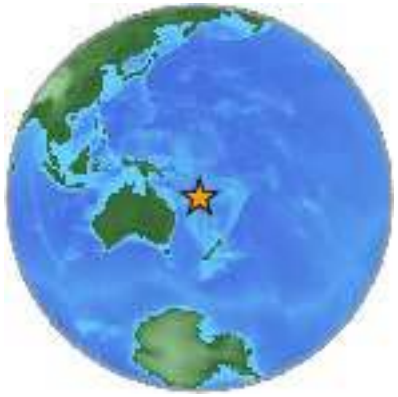
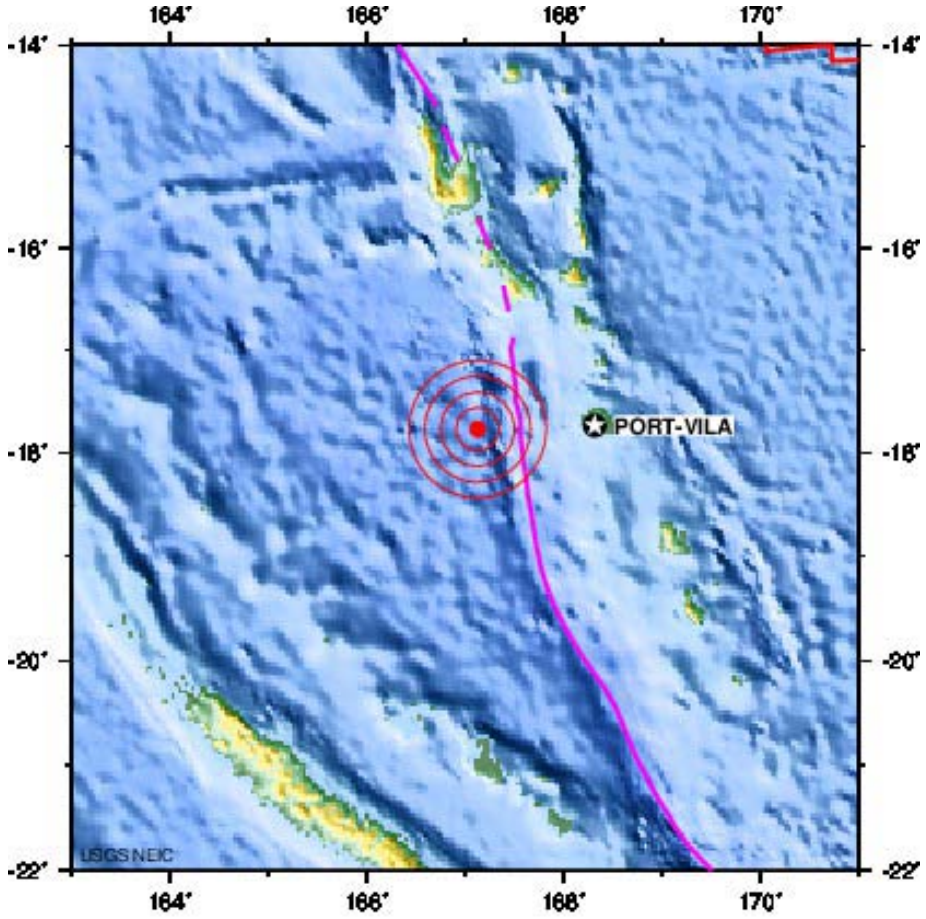
Magnitude 7.1 NEAR VANUATU

Thursday, February 2, 2012 at 13:34:40 UTC

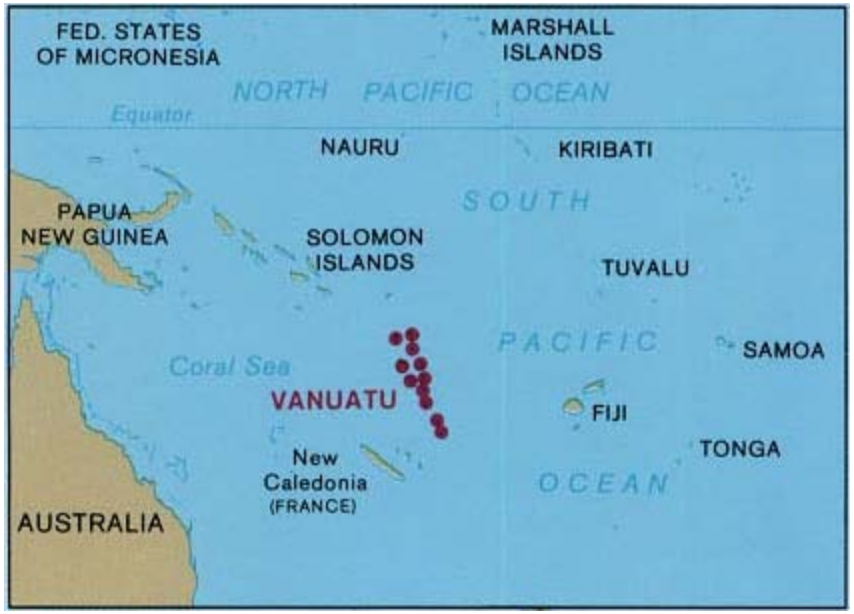


A major earthquake struck near Vanuatu in the southwest Pacific Ocean early Friday morning (12:34:40 AM) local time 124 km (77 miles) west of Port-Vila, Efate, Vanuatu.



Images courtesy of the US Geological Survey

Vanuatu is a line of volcanic islands and submarine volcanoes 1400 miles (2300 km) east of northeast Australia. There are 13 main islands, nine of which are home to active volcanoes.



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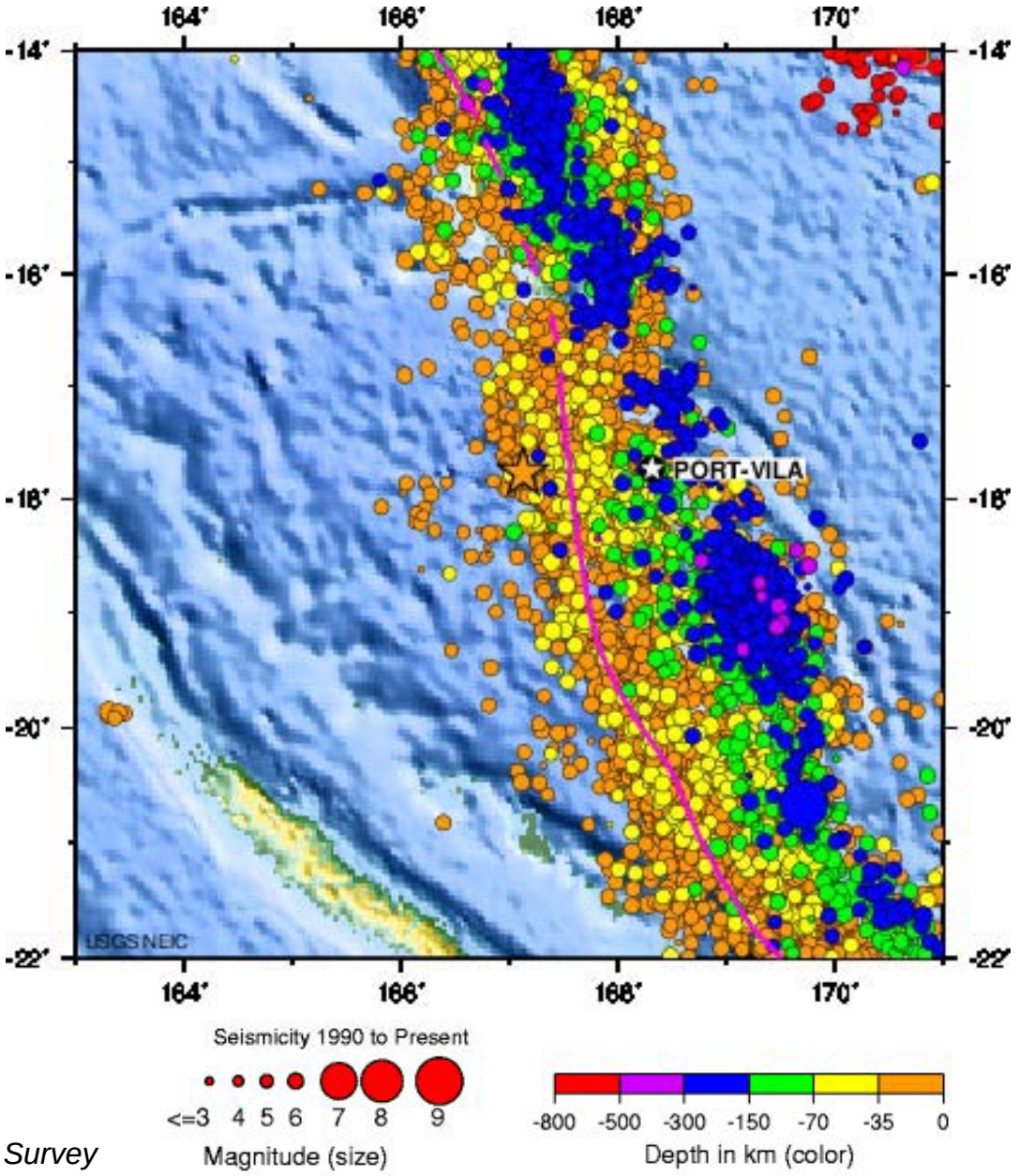
A police official in Port Vila reported that the quake was felt strongly, but there were no reports of damage. (Reuters)

“Vanuatu region is familiar with earthquakes of this size, about a dozen earthquakes of M 7 or larger have occurred within 250 km of this earthquake over the past 30 years. However, they generally occur on the megathrust interface to the east, and few have been outboard of the trench.” USGS

The earthquake (orange star) is plotted along with epicenters of earthquakes in the region since 1990.



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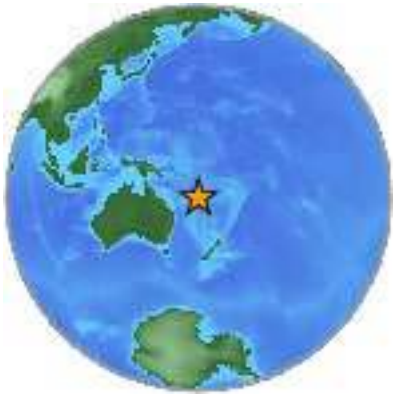

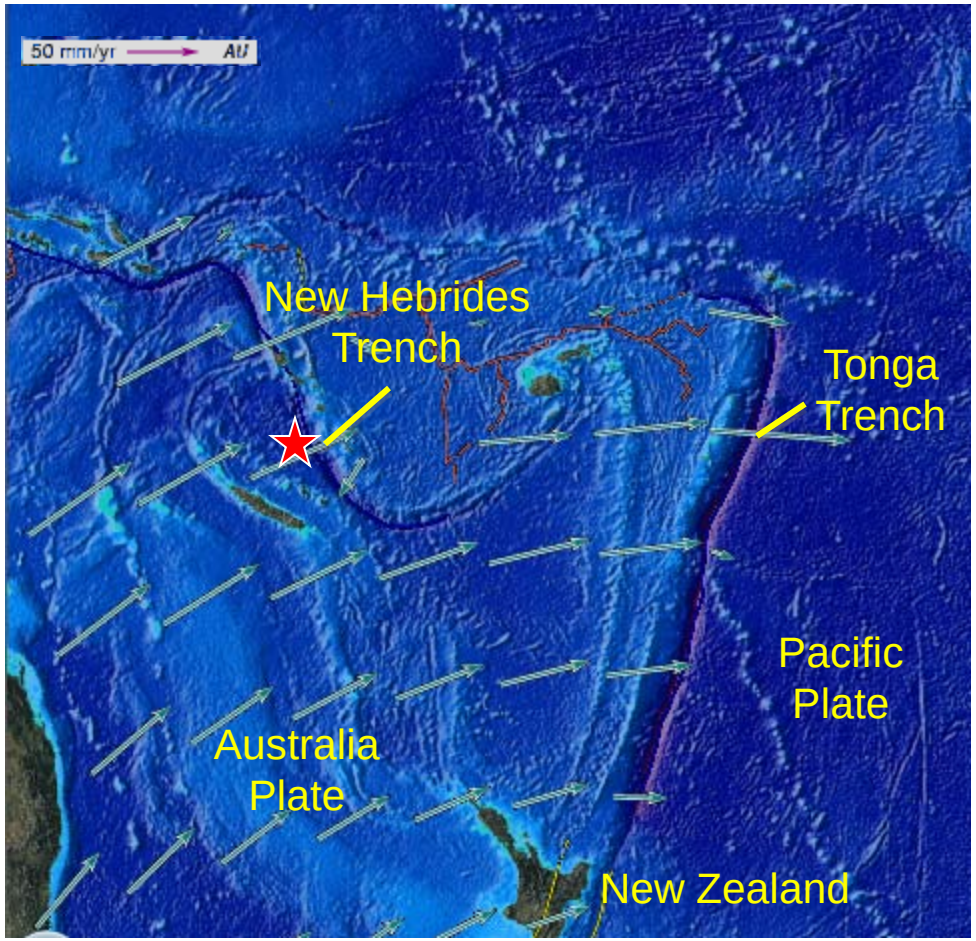

Arrows show net plate motion relative to the Pacific Plate.

The earthquake epicenter is located just 15 km to the west of the New Hebrides Trench, the bathymetric expression of the 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.

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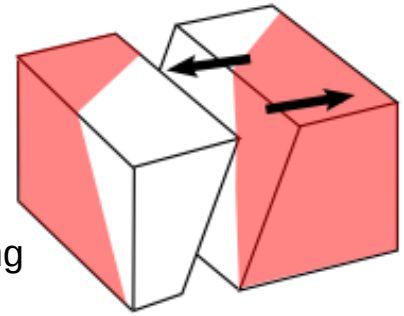
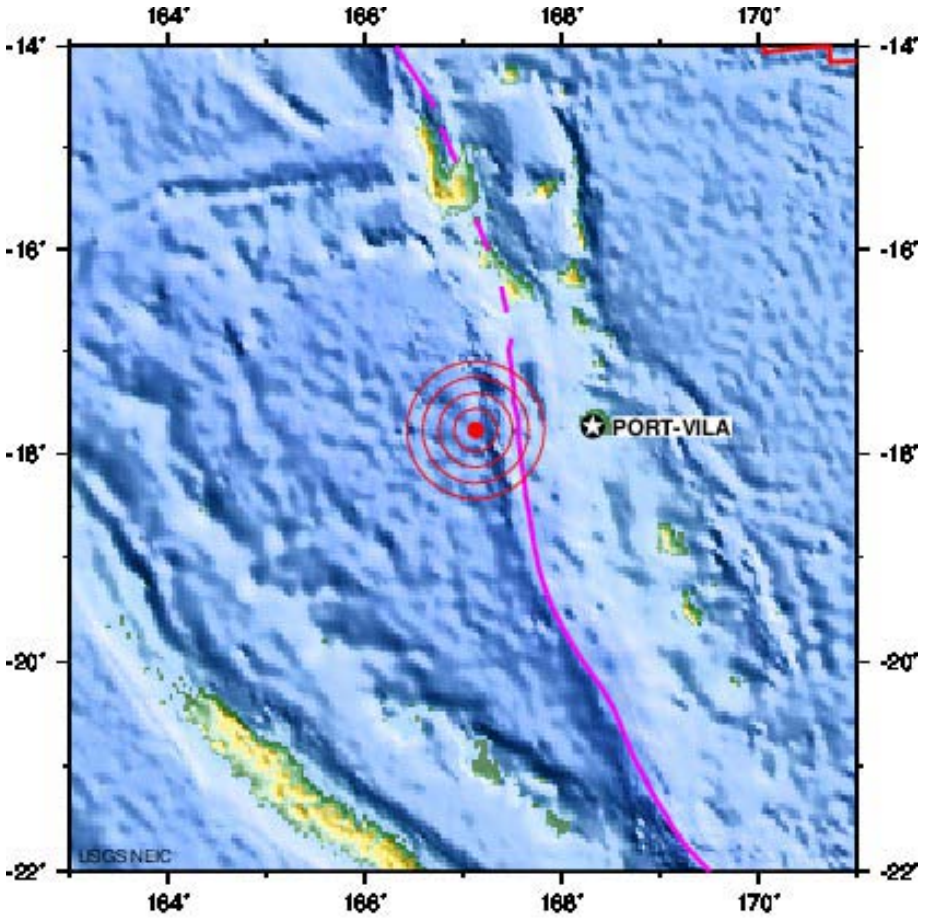
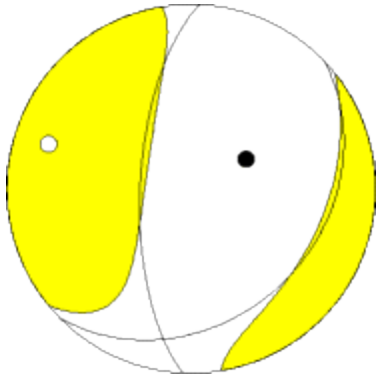
This earthquake occurred as a result of oblique-normal faulting within the lithosphere of the Australia plate 15 km to the west of the New Hebrides Trench. The normal faulting is due to extension in the outer rise (seaward of the trench) as the plate starts to bend.



Oblique-Normal Faulting





Shaded areas show quadrants of the focal sphere in which the P-wave first-motions are away from the source, and unshaded areas show quadrants in which the P-wave first-motions are toward the source. The dots represent the axis of maximum compressional strain (in black, called the "P-axis") and the axis of maximum extensional strain (in white, called the "T-axis") resulting from the earthquake.

USGS WPhase Centroid Moment Tensor Solution

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Shaking intensity scales were developed to standardize the measurements and ease comparison of different earthquakes. The Modified-Mercalli Intensity scale is a twelve-stage scale, numbered from I to XII. The lower numbers represent imperceptible shaking levels, XII represents total destruction. A value of IV indicates a level of shaking that is felt by most people.

Modified Mercalli Intensity	Perceived Shaking
X	Extreme
IX	Violent
VIII	Severe
VII	Very Strong
VI	Strong
V	Moderate
IV	Light
II-III	Weak
I	Not Felt

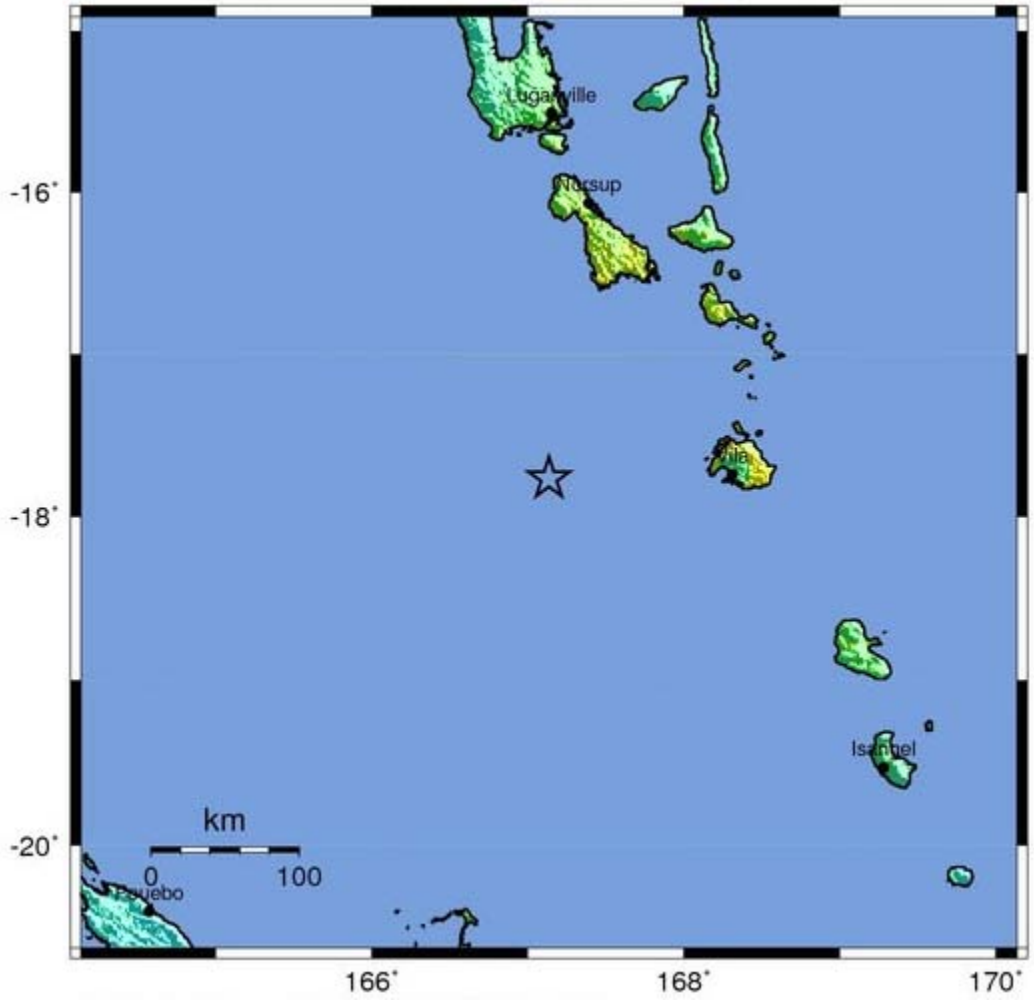

Image courtesy of the US Geological Survey

USGS Estimated shaking Intensity from M 7.1 Earthquake

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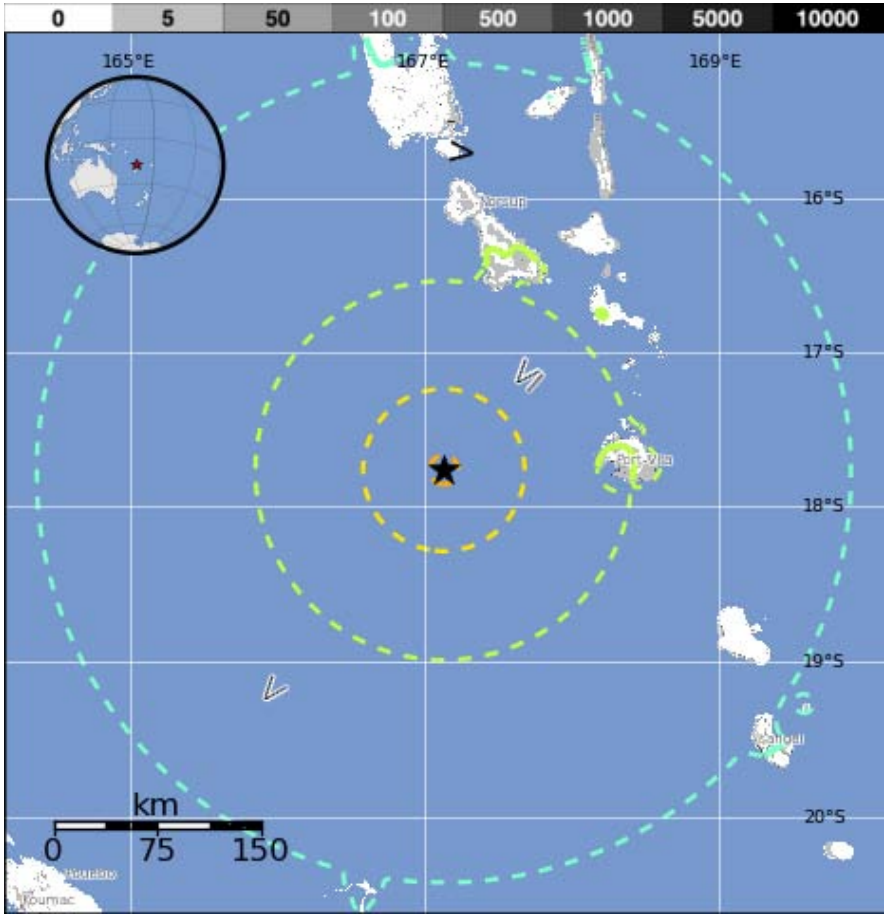
USGS PAGER
Population Exposed to Earthquake Shaking

The USGS PAGER map shows the population exposed to different Modified-Mercalli Intensity (MMI) levels. MMI describes the severity of an earthquake in terms of its effect on humans and structures and is a rough measure of the amount of shaking at a given location.

Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist.

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



Estimated Modified Mercalli Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	---*	---*	24k*	167k*	46k	0	0	0	0
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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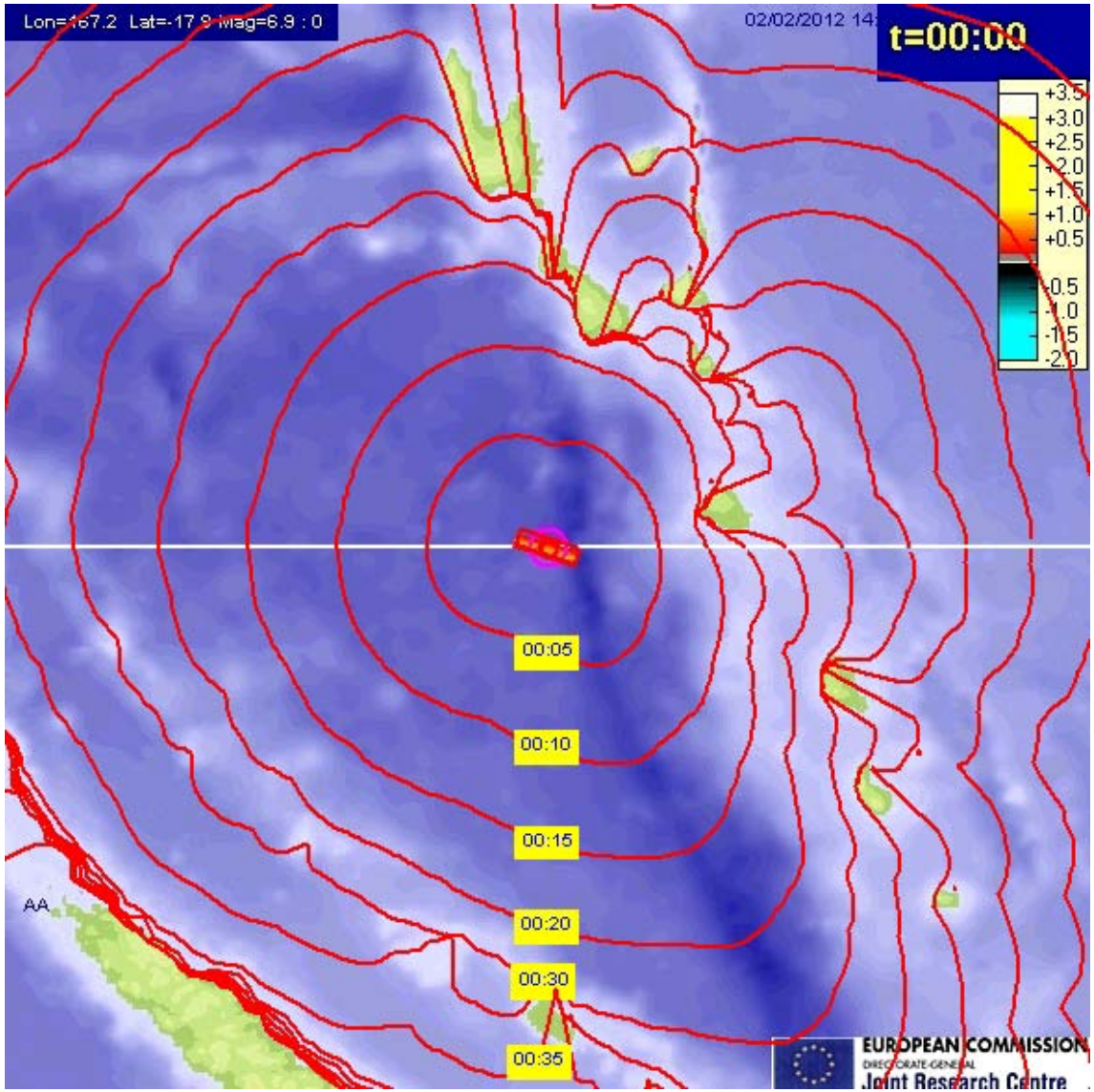
Within 7 minutes of the earthquake, NOAA's Pacific Tsunami Warning Center issued the following Tsunami Information Bulletin:

No destructive widespread tsunami threat exists based on historical earthquake and tsunami data.

However – earthquakes of this size sometimes generate local tsunamis that can be destructive along coasts located within a hundred kilometers of the earthquake epicenter.



Local tsunami wave traveling map by GDACS (data used : USGS)