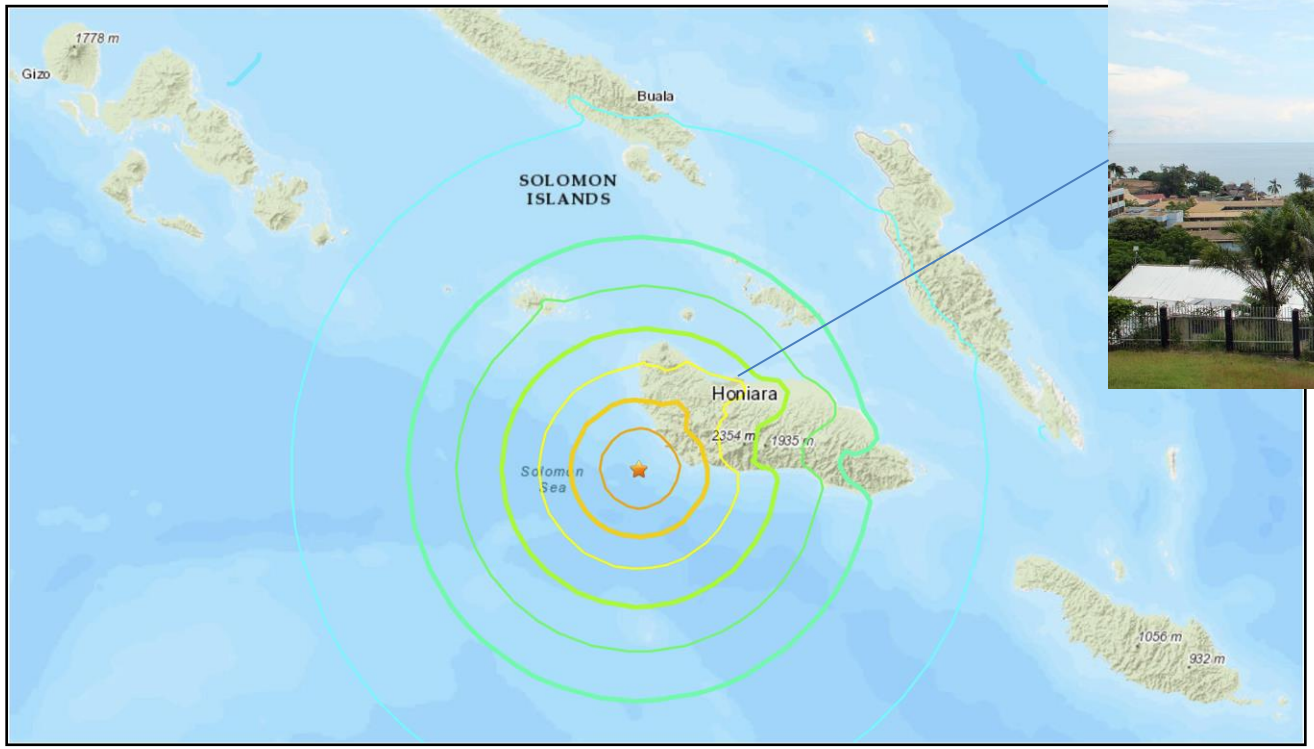
Magnitude 7.0 SOLOMON ISLANDS

Tuesday, November 22, 2022 at 02:03:07 UTC

A 7.0 magnitude earthquake struck offshore in the Solomon Islands. While there are no reports of injuries, there are reports of damage in Honiara and power is reported to be out in some areas with radio services off the air. The earthquake was followed by at least three aftershocks in the same area, the largest a magnitude 6.0.

There are no current Tsunami warnings in effect.



Honiara

Photo courtesy of Kahunapule Michael Johnson, Pukalani, HI

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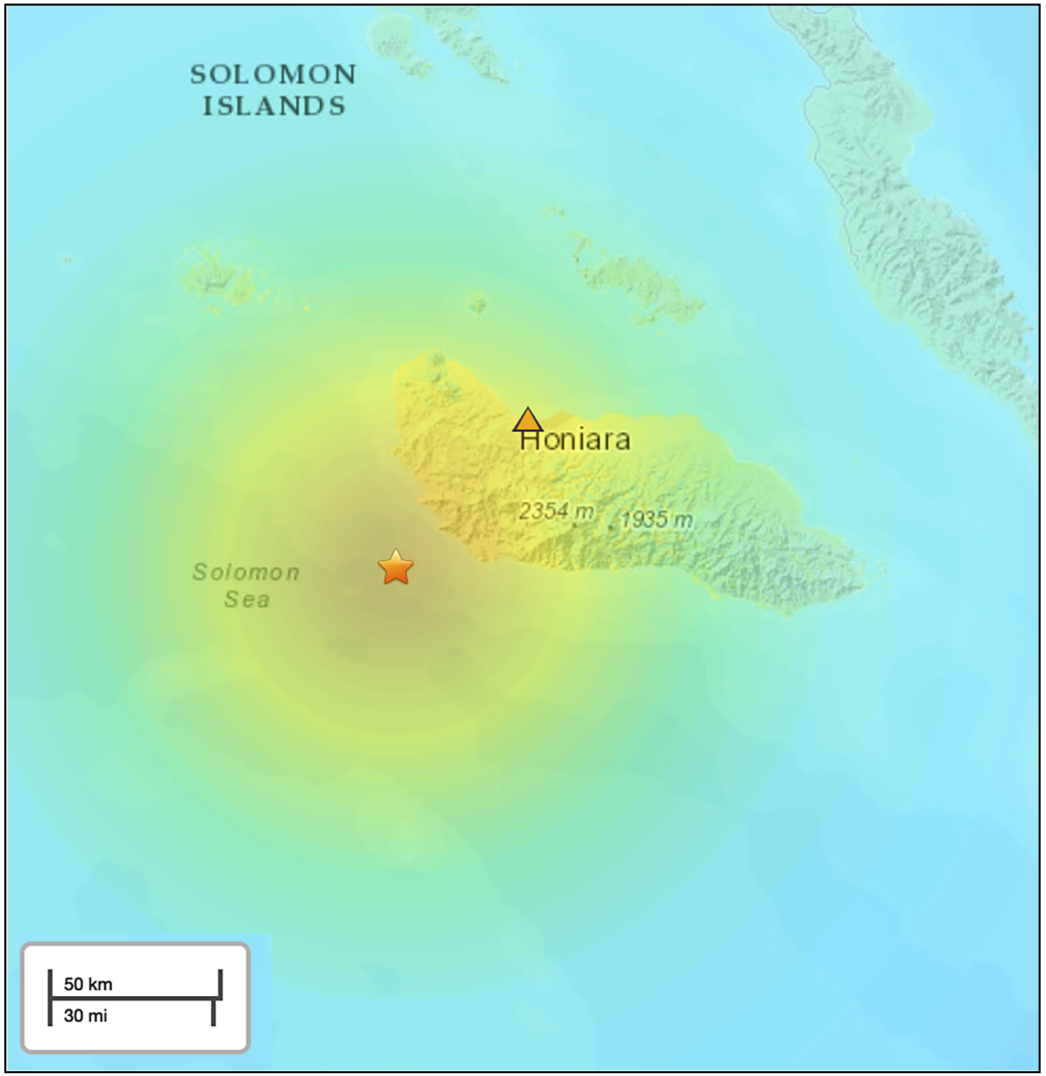
The Modified-Mercalli Intensity (MMI) scale is a ten-stage scale, from I to X, that indicates the severity of ground shaking.

Strong shaking was reported near the capital Honiara, northeast of the epicenter.

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 7.0 Earthquake

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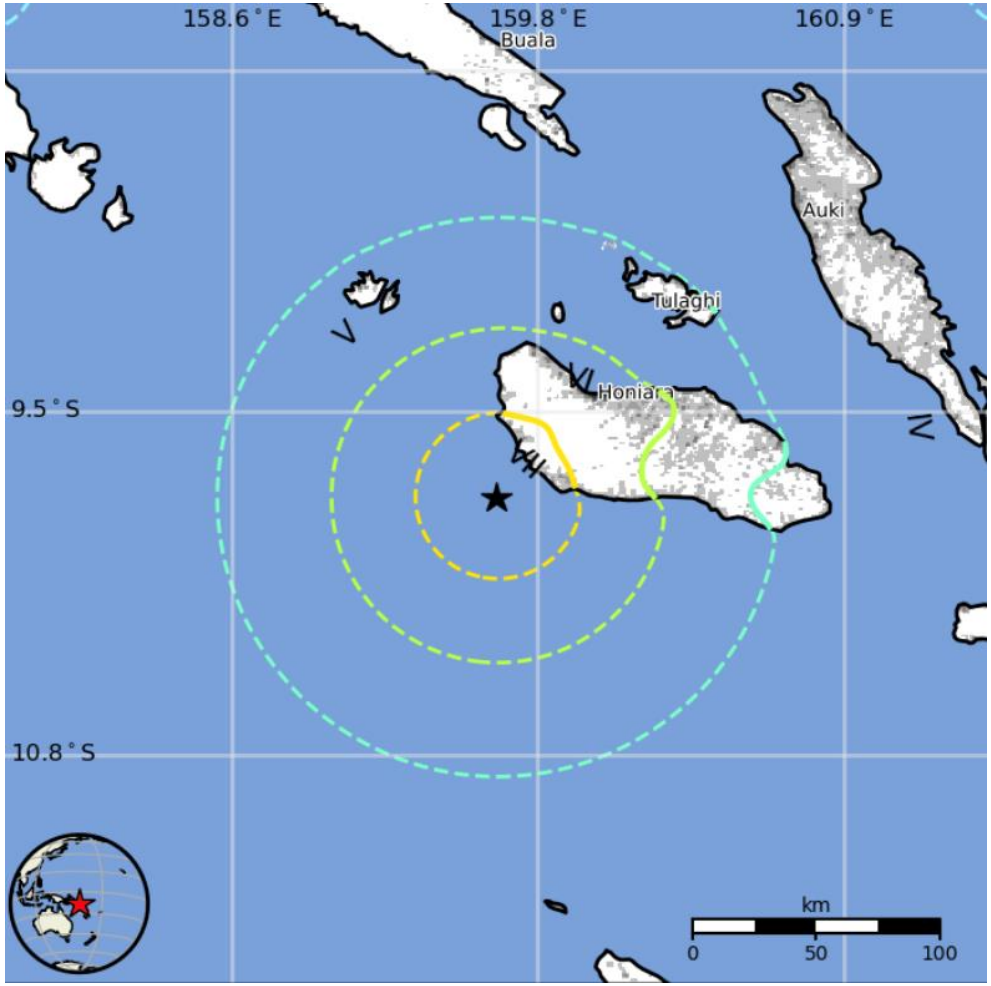
The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

The USGS approximates 12,000 people were exposed to very strong shaking from this earthquake.

MMI	Shaking	Population
I	Not Felt	0 k*
II-III	Weak	0 k*
IV	Light	214 k*
V	Moderate	78 k
VI	Strong	180 k
VII	Very Strong	12 k
VIII	Severe	0 k
IX	Violent	0 k
X	Extreme	0 k



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.

Image courtesy of the US Geological Survey

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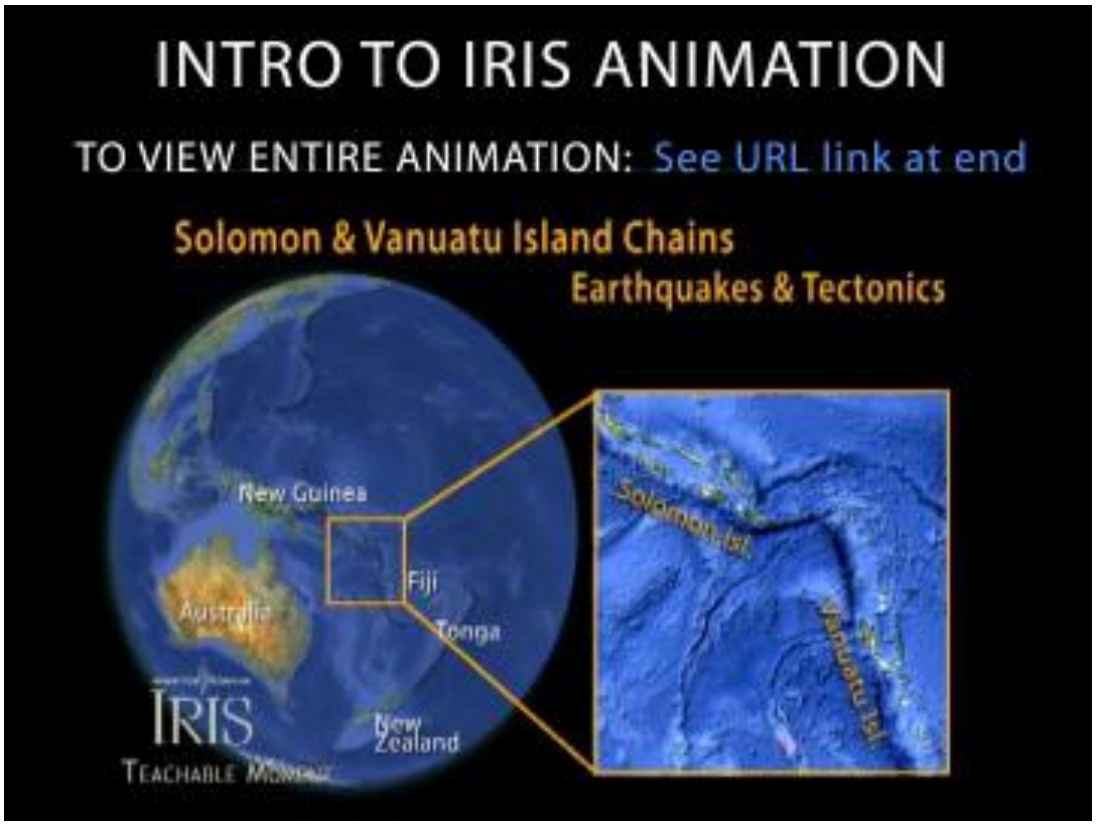
This short animation is part of a longer IRIS animation that looks at seismicity and tectonics of this region.



The full animation (URL below) looks at three areas in cross section to reveal a change from:

1) Steeply dipping subduction along the New Hebrides trench
2) Strike slip motion along the Solomon Islands
3) Shallow subduction zone to the west.

http://www.iris.edu/hq/inclass/animation/solomon__vanuatu_islands_earthquakes__tectonics

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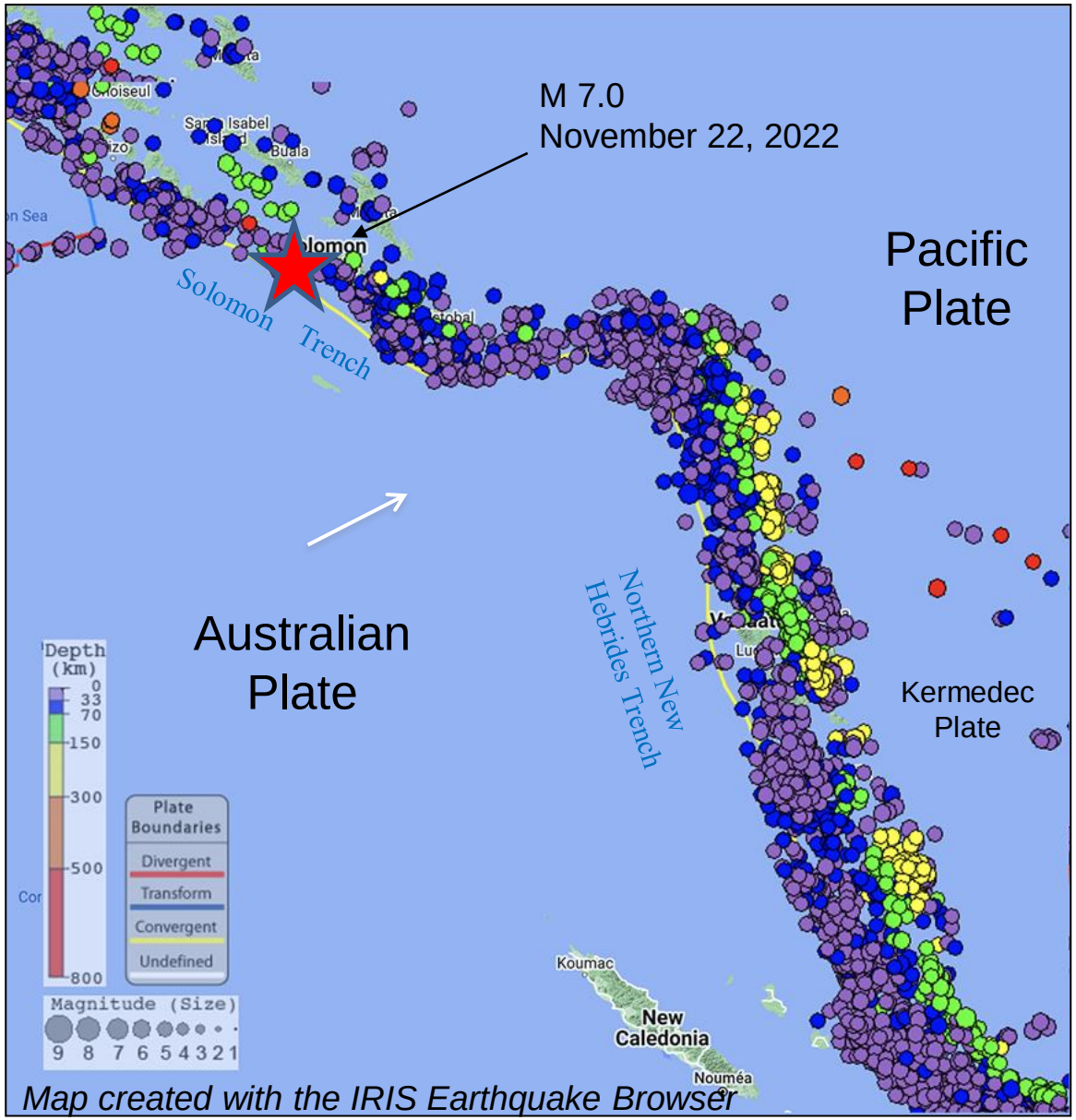
The epicenter [red star] of this earthquake is plotted on this seismicity map showing 20 years of earthquakes in the surrounding region greater than M 5.0.

Earthquake depths increase from the southwest to northeast across the Solomon Trench where the Australian Plate subducts beneath the Pacific Plate.

Across the Northern New Hebrides Trench, earthquake depths increase from west to east where the Australia Plate subducts beneath the Pacific Plate.



Map created with the IRIS Earthquake Browser

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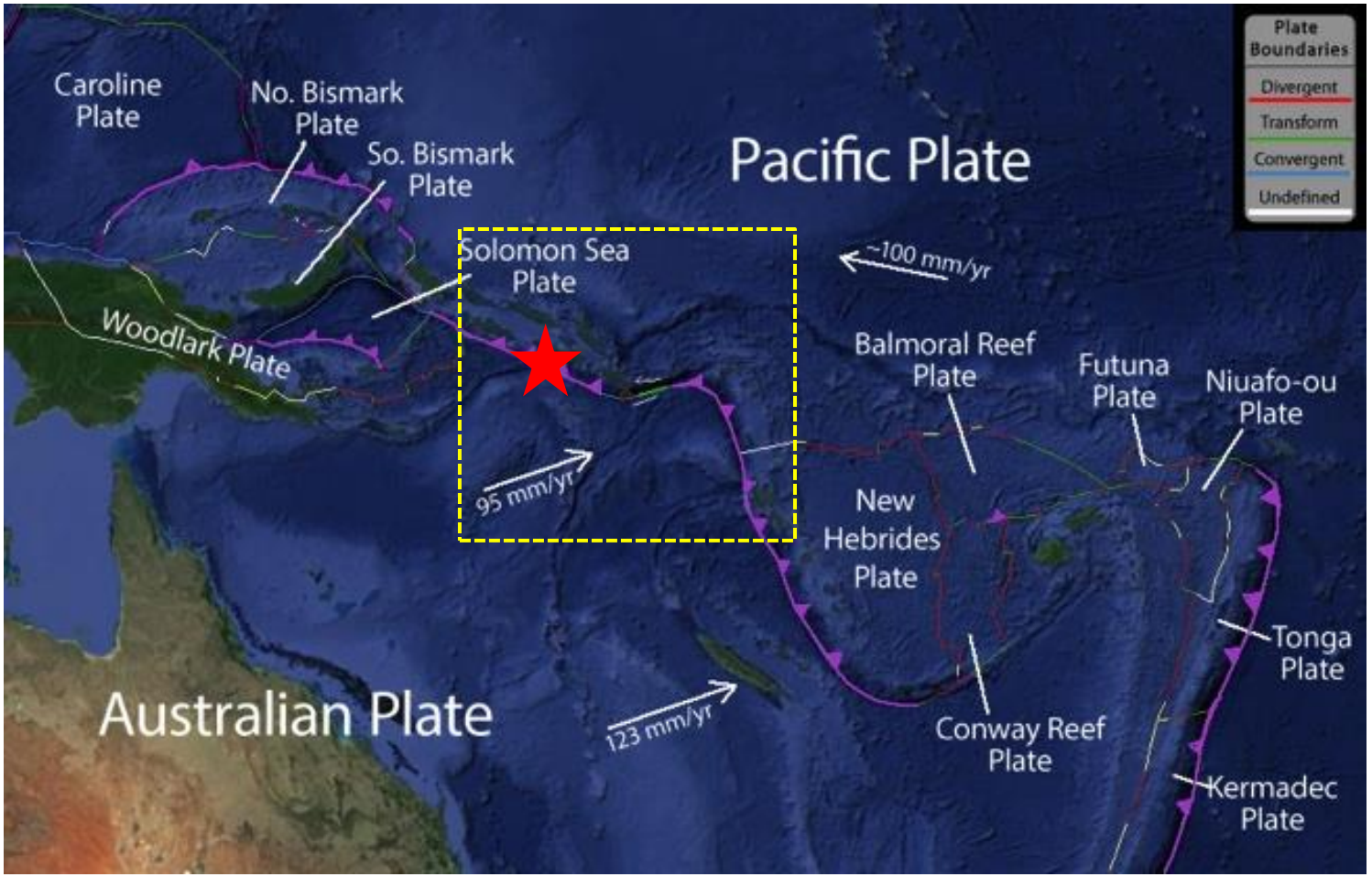
This regional map shows the complexity of major tectonic plates and microplates resulting from the convergence between the Australian and Pacific Plates. The red star indicates the epicenter of this earthquake. The location indicates that this earthquake occurred on or near the boundary where the Australian Plate subducts beneath the Solomon Islands on the overriding Pacific Plate. The rectangle outlines the map area on the next slide.



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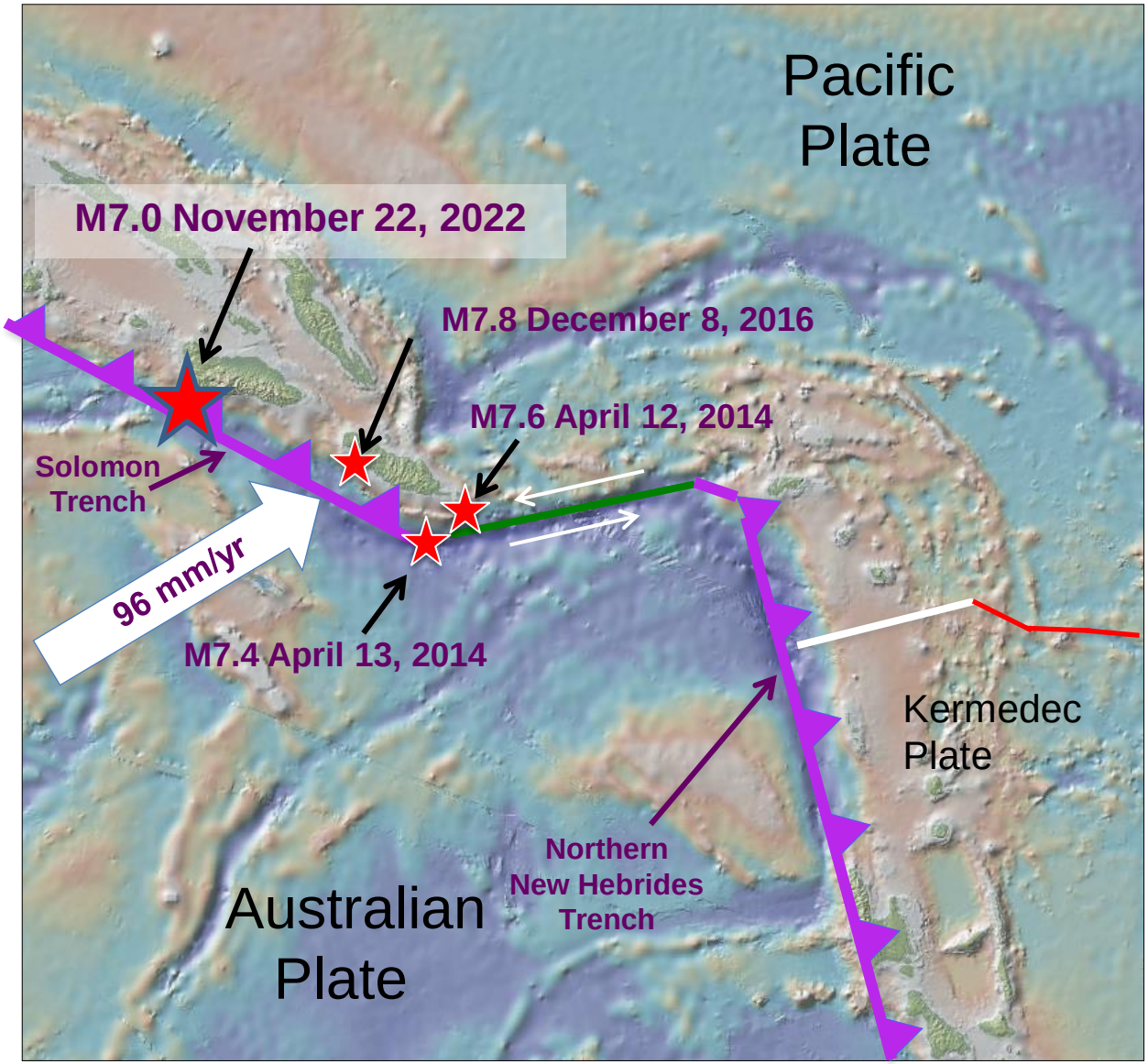

This earthquake occurred near a portion of the Australian–Pacific Plate boundary. The Australian Plate subducts beneath the Pacific Plate at the Solomon and Northern New Hebrides trenches.

The location northeast of the Solomon Trench and normal-faulting mechanism of the M7.0 November 22 earthquake indicate that it most likely occurred within the overriding Pacific Plate northwest of the M7.8 earthquake of 2016.

Two major earthquakes occurred in April 2014 on or near the left-lateral transform fault that connects convergent plate boundaries at the Solomon and Northern New Hebrides trenches.

Large arrow shows relative motion of the Australian Plate with respect to the Pacific Plate.

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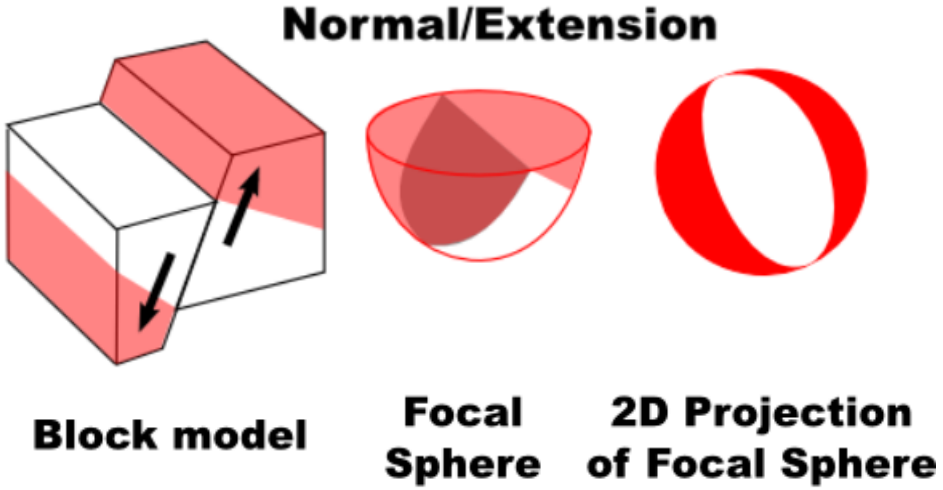
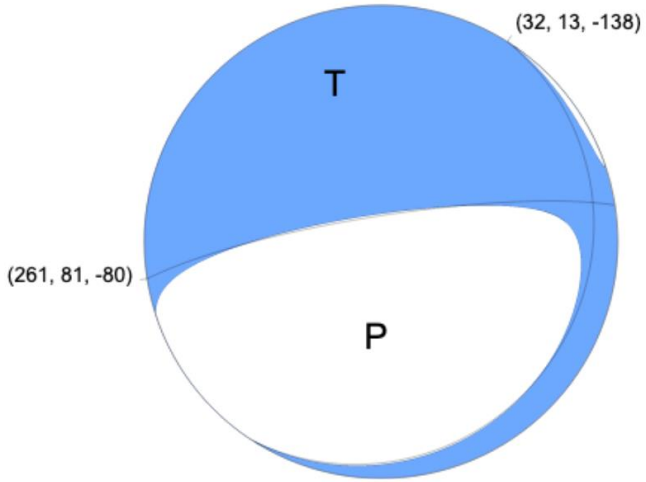
This earthquake occurred as the result of normal faulting on or near the boundary between the Pacific and Australian Plates.





USGS W-phase Moment Tensor Solution

The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

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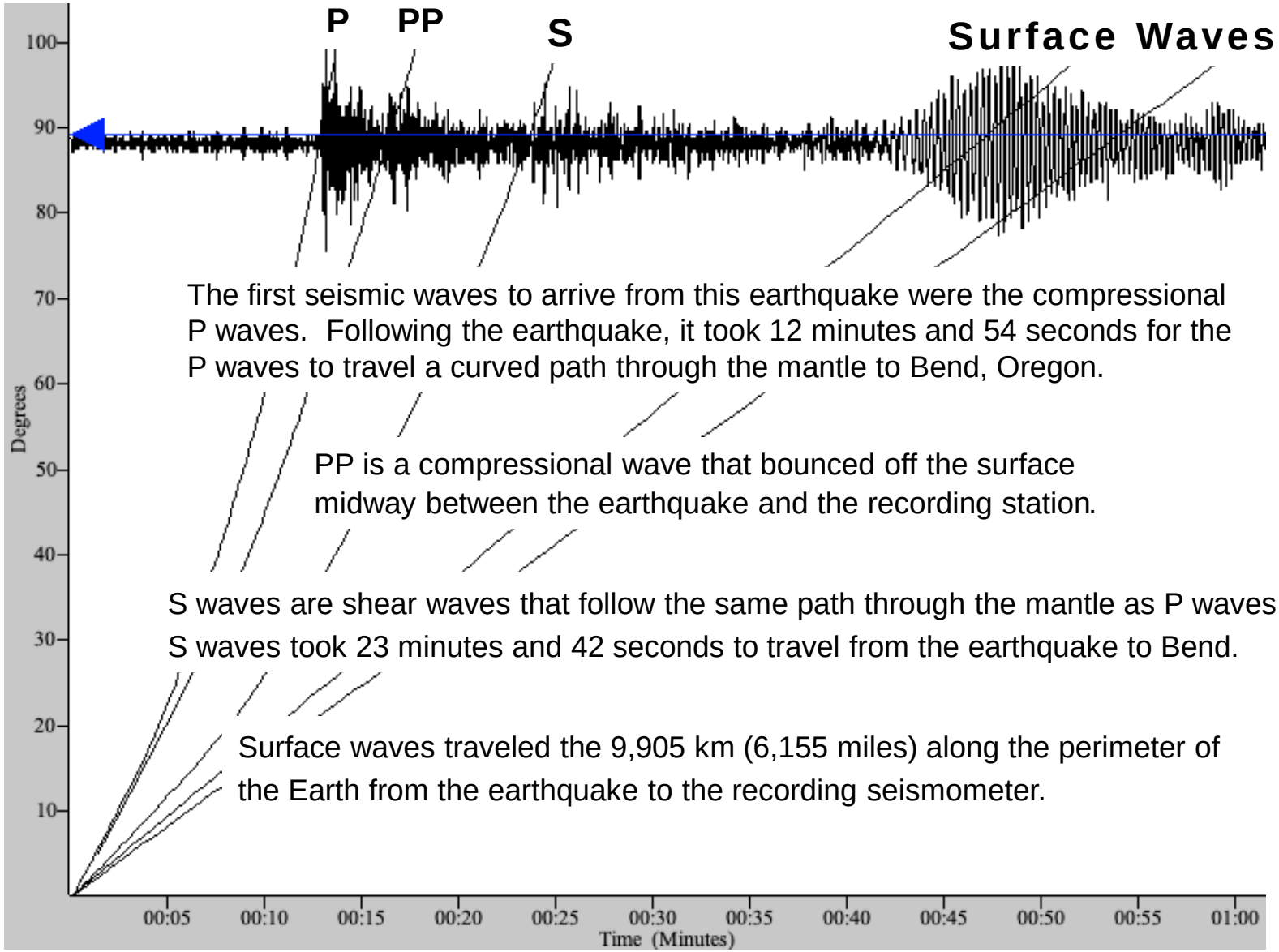
The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 9,905 km (6,155 miles, 89.2˚) from the location of this earthquake.



The first seismic waves to arrive from this earthquake were the compressional P waves. Following the earthquake, it took 12 minutes and 54 seconds for the P waves to travel a curved path through the mantle to Bend, Oregon.

PP is a compressional wave that bounced off the surface midway between the earthquake and the recording station.

S waves are shear waves that follow the same path through the mantle as P waves. S waves took 23 minutes and 42 seconds to travel from the earthquake to Bend.

Surface waves traveled the 9,905 km (6,155 miles) along the perimeter of the Earth from the earthquake to the recording seismometer.

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