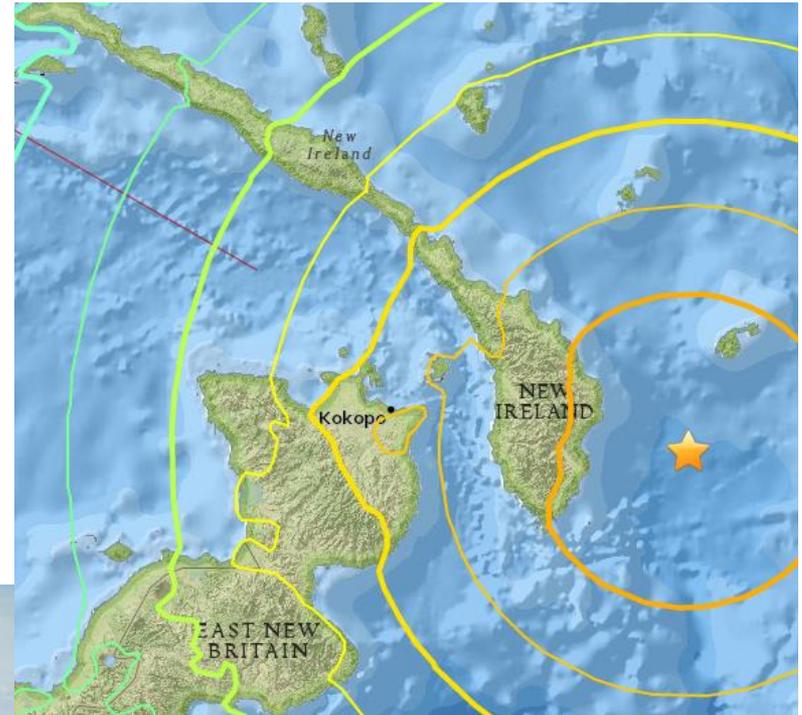A 7.9 magnitude earthquake has occurred east of New Ireland, Papua New Guinea.

The earthquake occurred 132.8 km (82.5 mi) east of Kokopo, Papua New Guinea, at a depth of 103.2 km (64 miles). There are no current tsunami warnings in effect.

Rabaul-Kokopo & Gazelle Peninsula, Papua New Guinea

Very strong to severe shaking was reported in southern New Ireland and eastern New Britain, which are closest to the epicenter of the quake.

Modified Mercalli Intensity
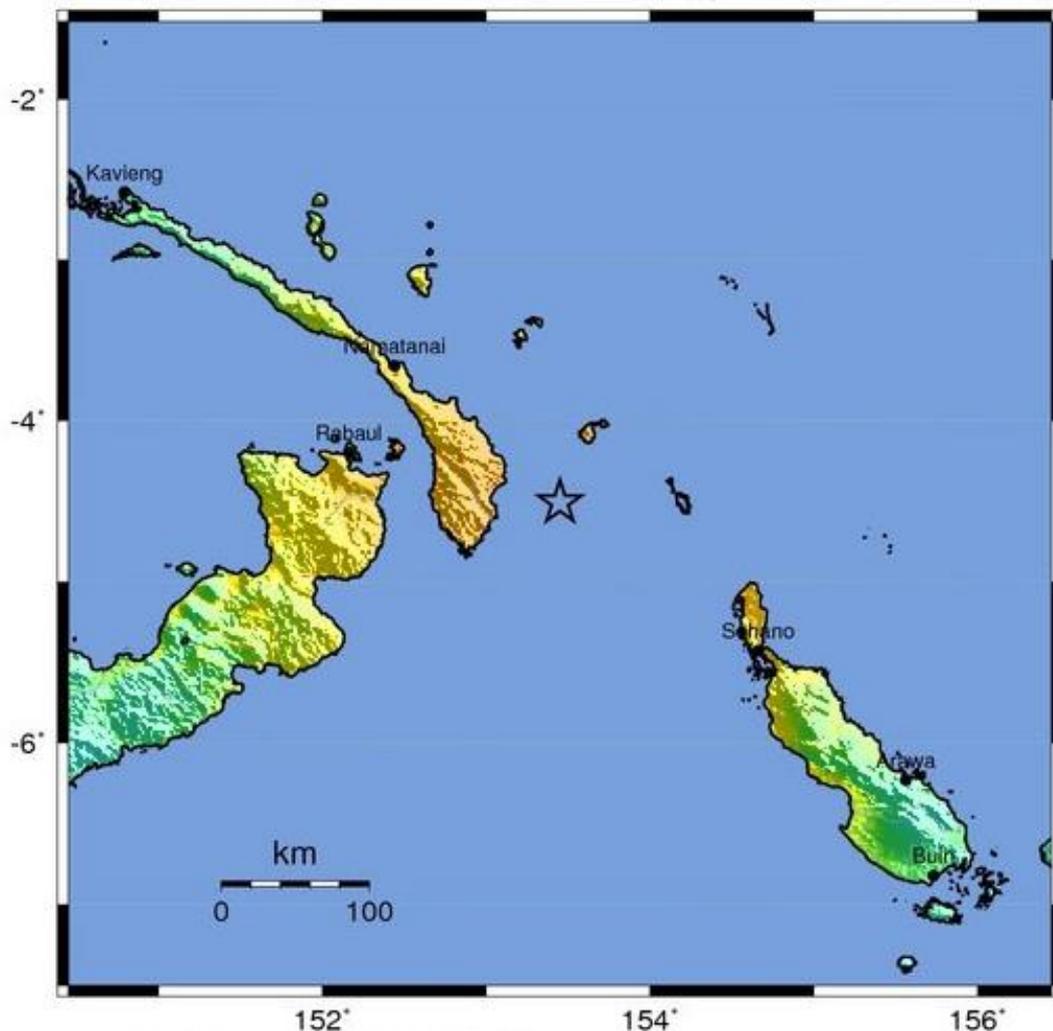
Perceived Shaking

MMI	Perceived Shaking
X	**Extreme**
IX	**Violent**
VIII	**Severe**
VII	**Very Strong**
VI	**Strong**
V	Moderate
IV	Light
II–III	Weak
I	Not Felt

USGS estimated shaking intensity from M 7.9 earthquake

Image courtesy of the US Geological Survey

Magnitude 7.9 PAPUA NEW GUINEA
Saturday, December 17, 2016 at 10:51:12 UTC

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

The USGS approximates 18,000 people were exposed to severe shaking from this earthquake.

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	--*
IV	Light	31 k*
V	Moderate	208 k
VI	Strong	126 k
VII	Very Strong	287 k
VIII	Severe	18 k
IX	Violent	0 k
X	Extreme	0 k

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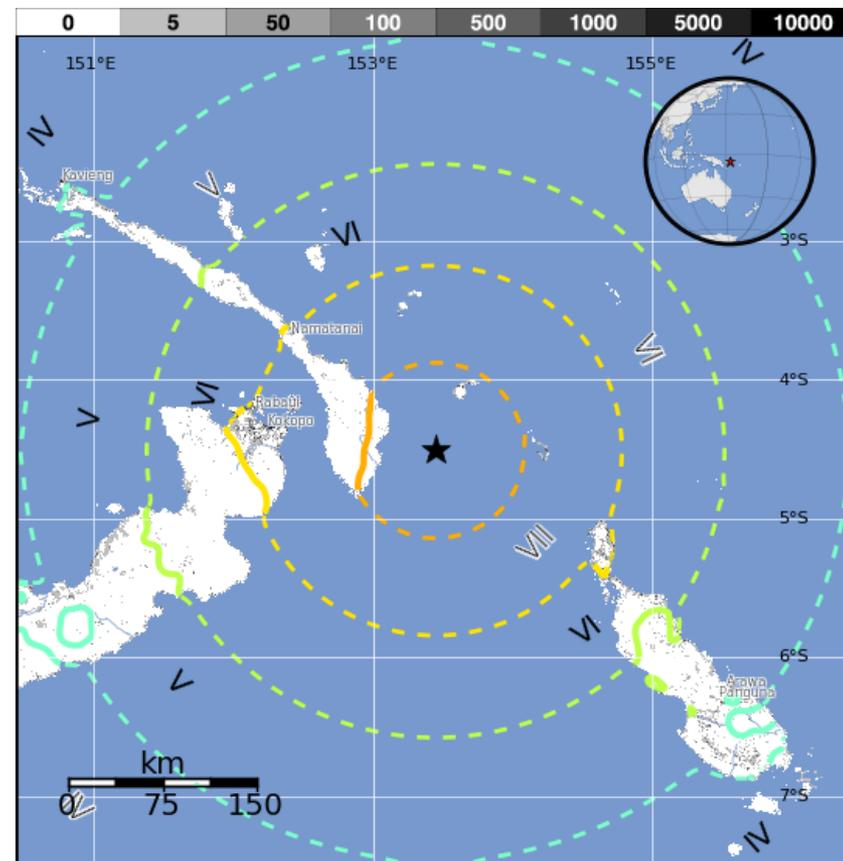
The color coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table.

Image courtesy of the US Geological Survey

Image courtesy of the US Geological Survey
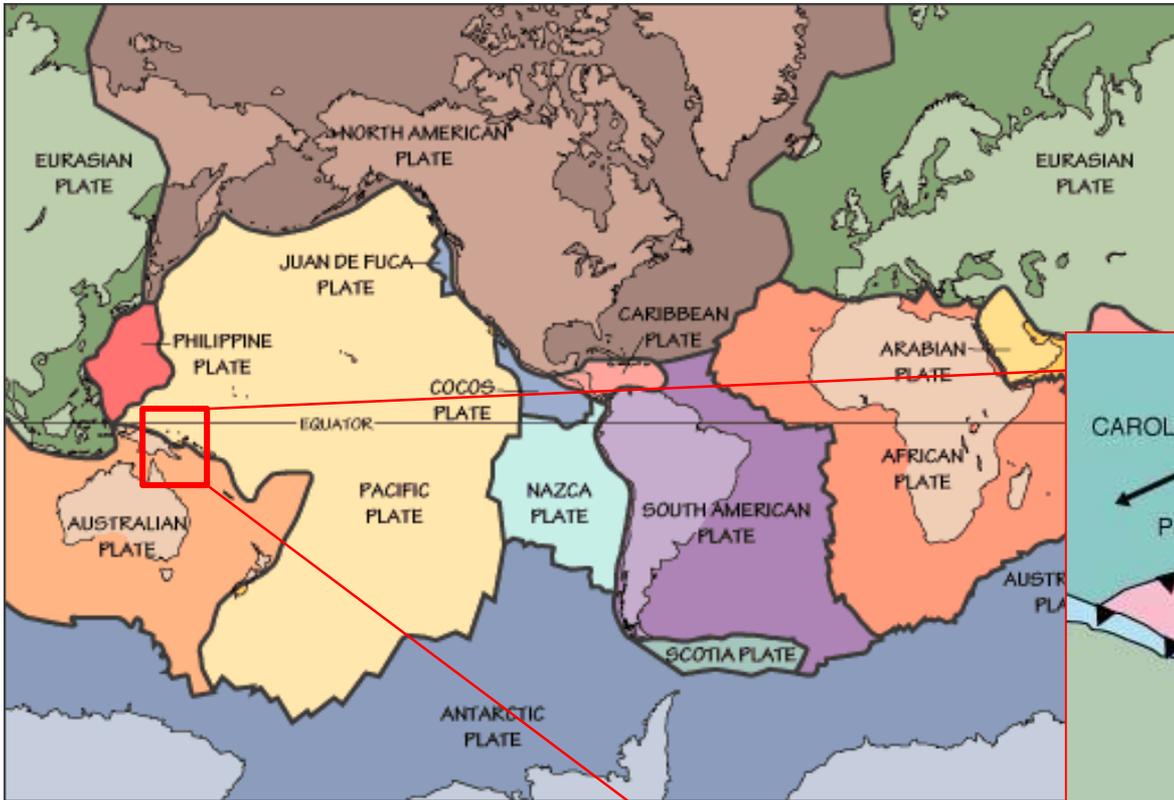
In this region of the Pacific Ocean, the Australian Plate is subducting under the overriding Pacific Plate.

In detail, there are numerous microplates (fragments of larger plates). Arrows show net plate motions relative to the Australian Plate. The location of this earthquake is shown by the red star.
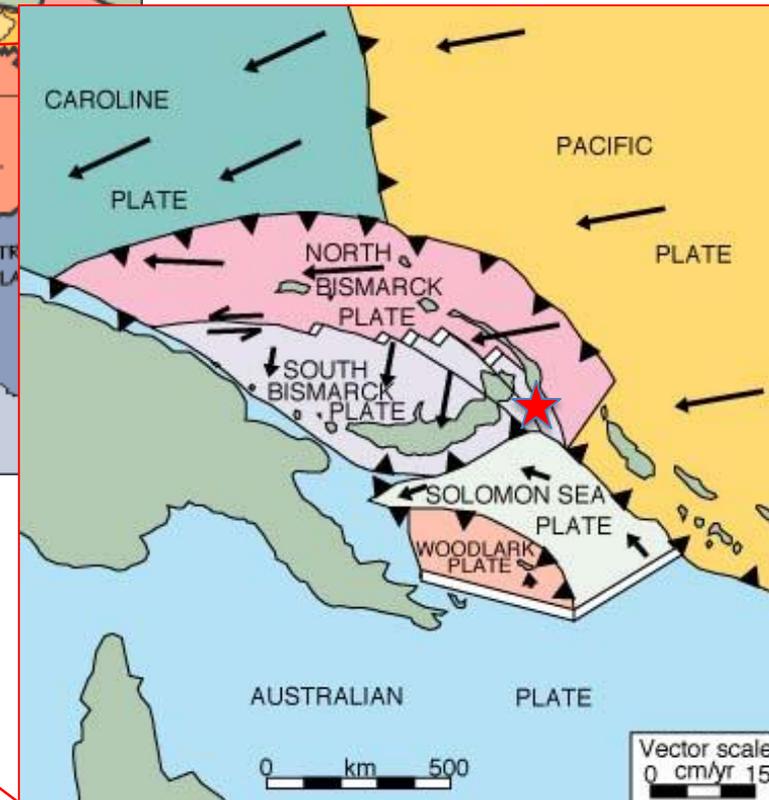
Image courtesy OSU; simplified from Hamilton (1979)

This map shows the complexity of small plates that accommodate convergence between the larger Australia and the Pacific Plates.

The Solomon Sea Plate moves slightly faster and more northeasterly with respect to the Pacific Plate than does the Australia Plate due to seafloor spreading in the Woodlark Basin.

This earthquake epicenter is shown by the red star and occurred at a depth of 103 km. It was likely related to subduction of the Solomon Sea Plate beneath the North Bismarck Plate portion of the Pacific Plate.
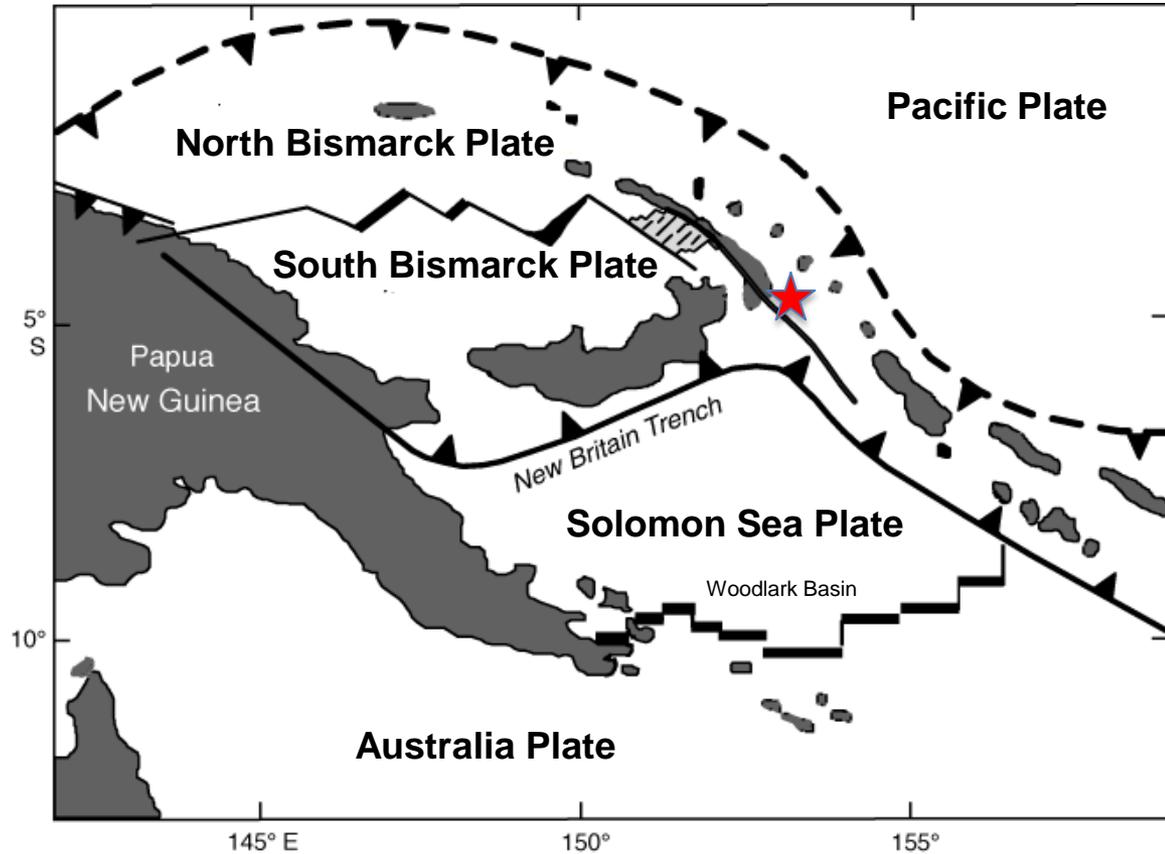

Map from Johnson (1976)

This map covers the same region as the tectonic map of the previous slide and shows locations of the 1000 most recent earthquakes of magnitude >5.

Earthquake depths increase from south to north across the New Britain Trench where the Solomon Sea Plate subducts beneath the North Bismarck Plate portion of the much larger Pacific Plate.
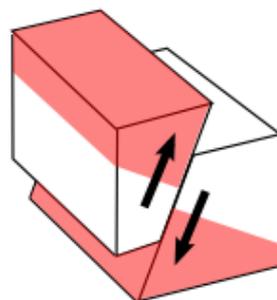
With a depth of 103 km and a thrust fault mechanism, this earthquake occurred within the subducting plate.
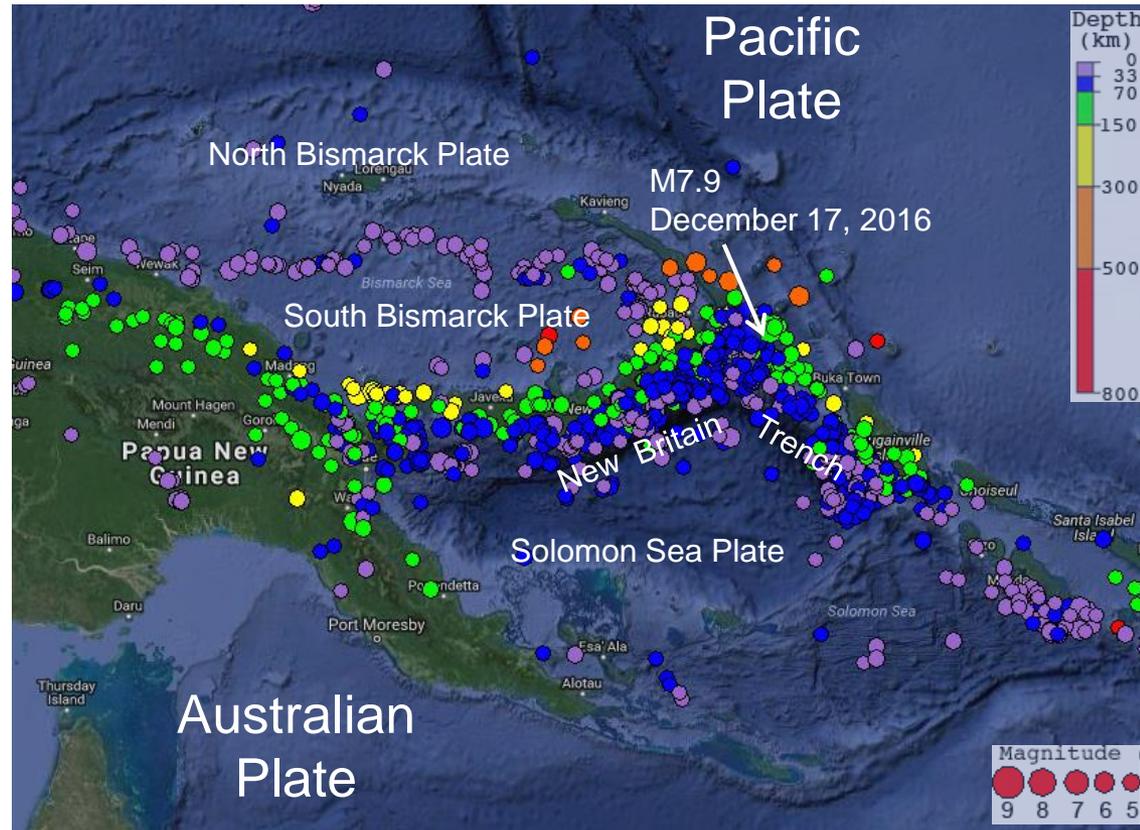
Map created with the IRIS Earthquake Browser

This earthquake occurred as the result of thrust faulting within the Solomon Sea Plate where it subducts beneath the Pacific Plate.

Reverse/Thrust/Compression

Block model **Focal Sphere** **2D Projection of Focal Sphere**
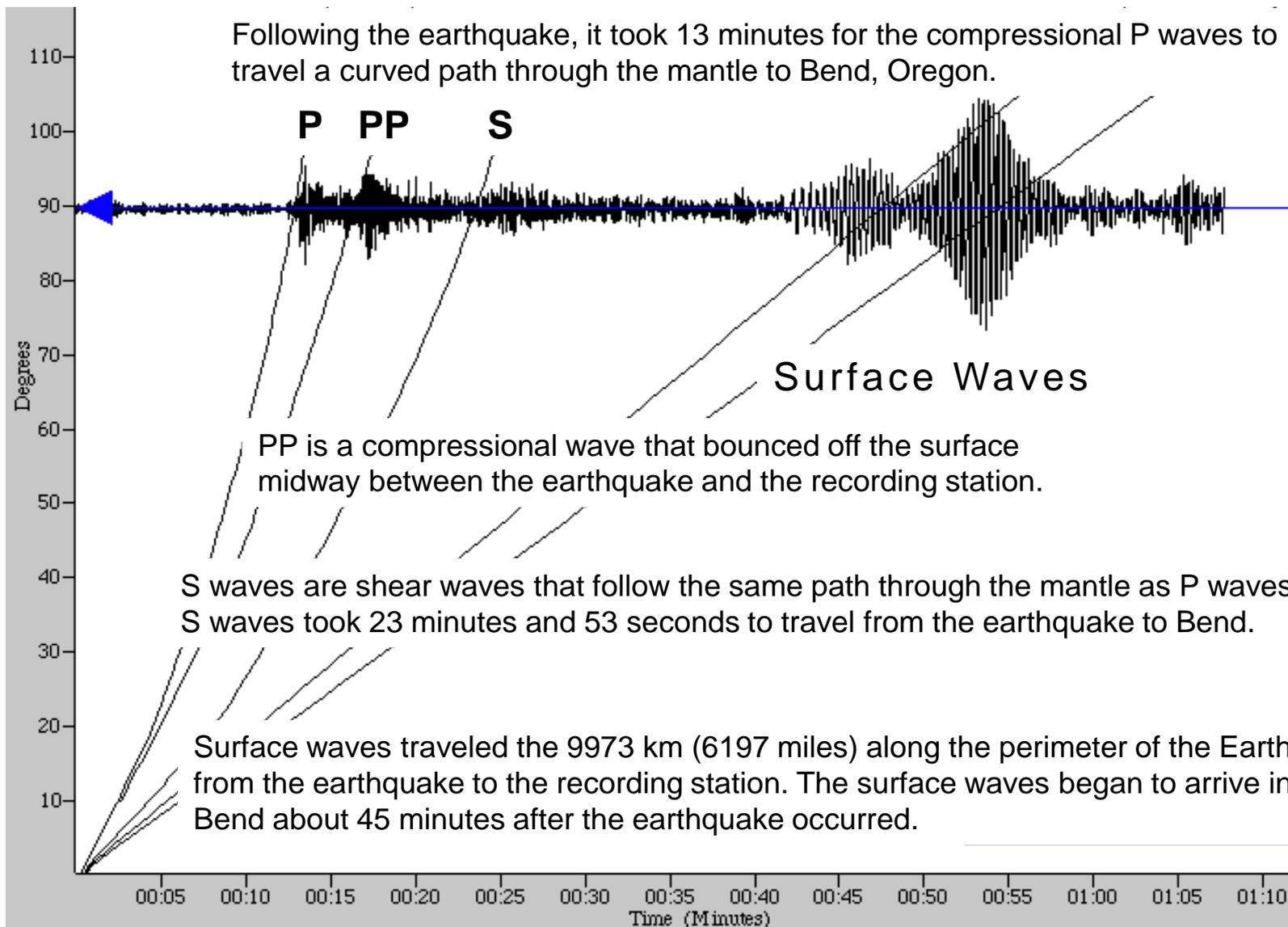
(331, 34, 111)

T

P

(126, 58, 76)
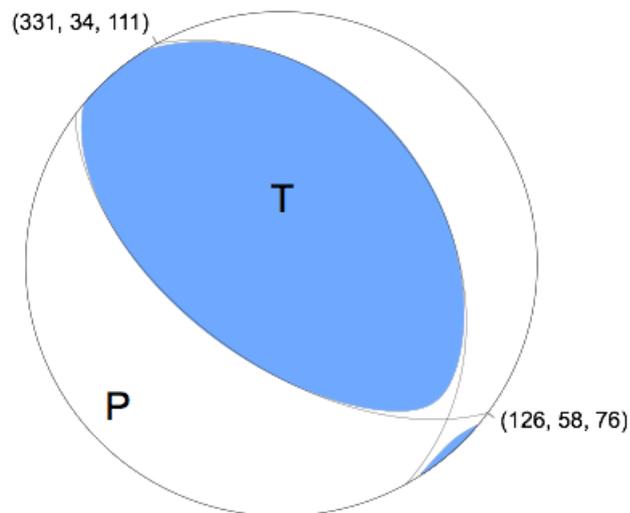
The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

USGS W-phase Moment Tensor Solution

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The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 9973 km (6197 miles, 89.85°) from the location of this earthquake.

Following the earthquake, it took 13 minutes for the compressional P waves to travel a curved path through the mantle to Bend, Oregon.

P   PP   S

Surface Waves

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 53 seconds to travel from the earthquake to Bend.

Surface waves traveled the 9973 km (6197 miles) along the perimeter of the Earth from the earthquake to the recording station. The surface waves began to arrive in Bend about 45 minutes after the earthquake occurred.

Degrees

Time (Minutes)

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