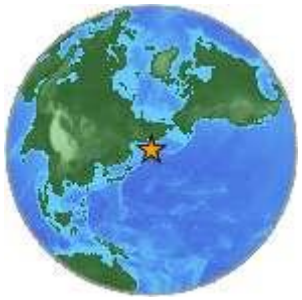
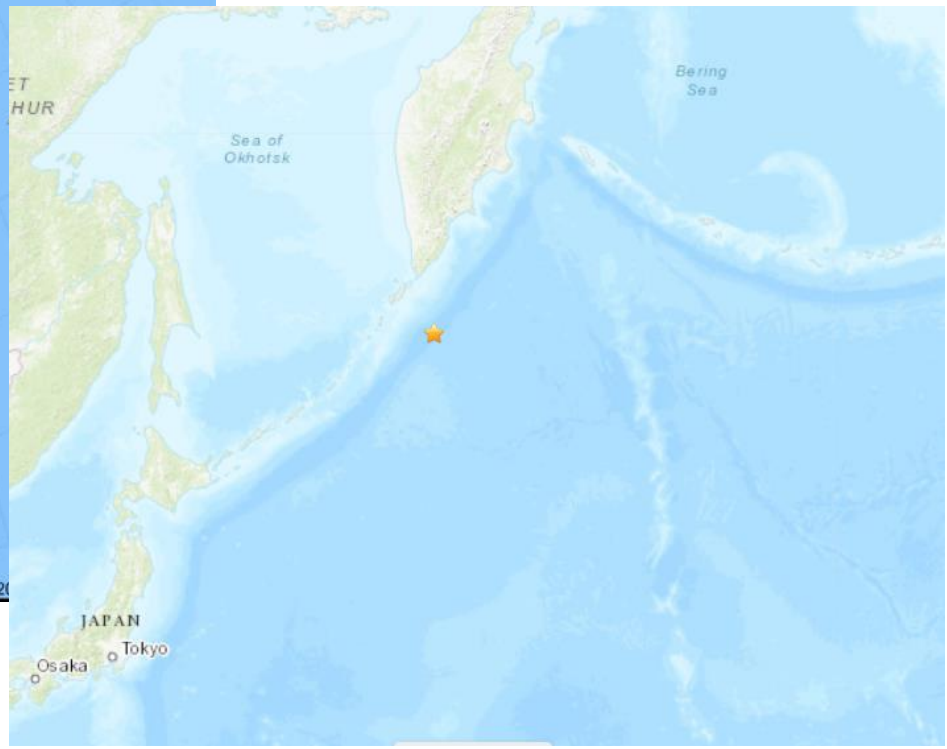
Magnitude 7.5 EAST of KURIL ISLANDS

Wednesday, March 25, 2020 at 02:49:21 UTC



A magnitude 7.5 earthquake occurred 218.6 km (135.9 mi) SSE of Severo-Kuril'sk, Sakhalin Oblast, Russia at a depth of 56.7 km (35.2 miles). There have been no reports of damage or injuries and the earthquake prompted a tsunami watch that was later cancelled.



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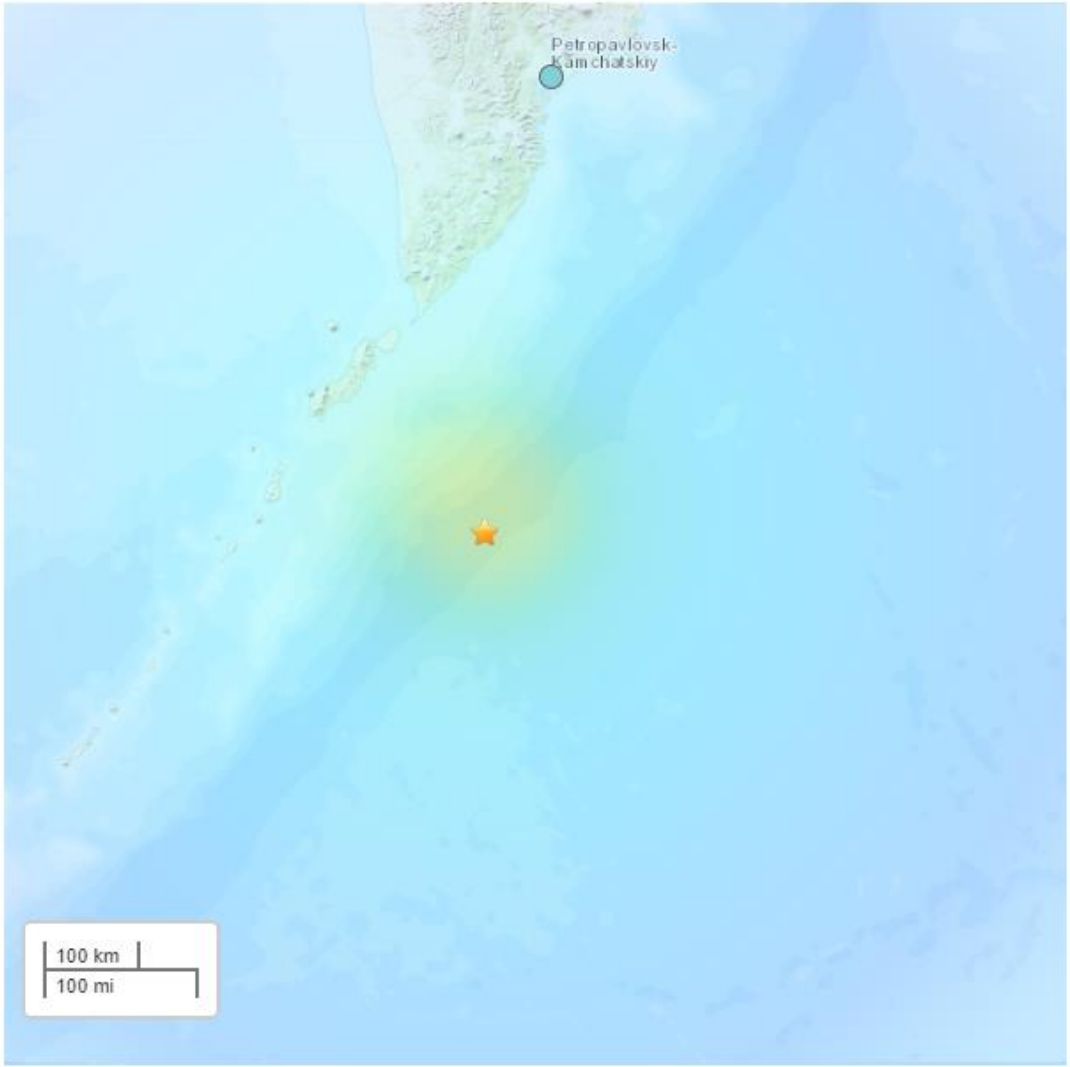
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking. Intensity is dependent on the magnitude, depth, local geology, and location.

The islands closest to the earthquake only felt light shaking.

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 7.5 Earthquake

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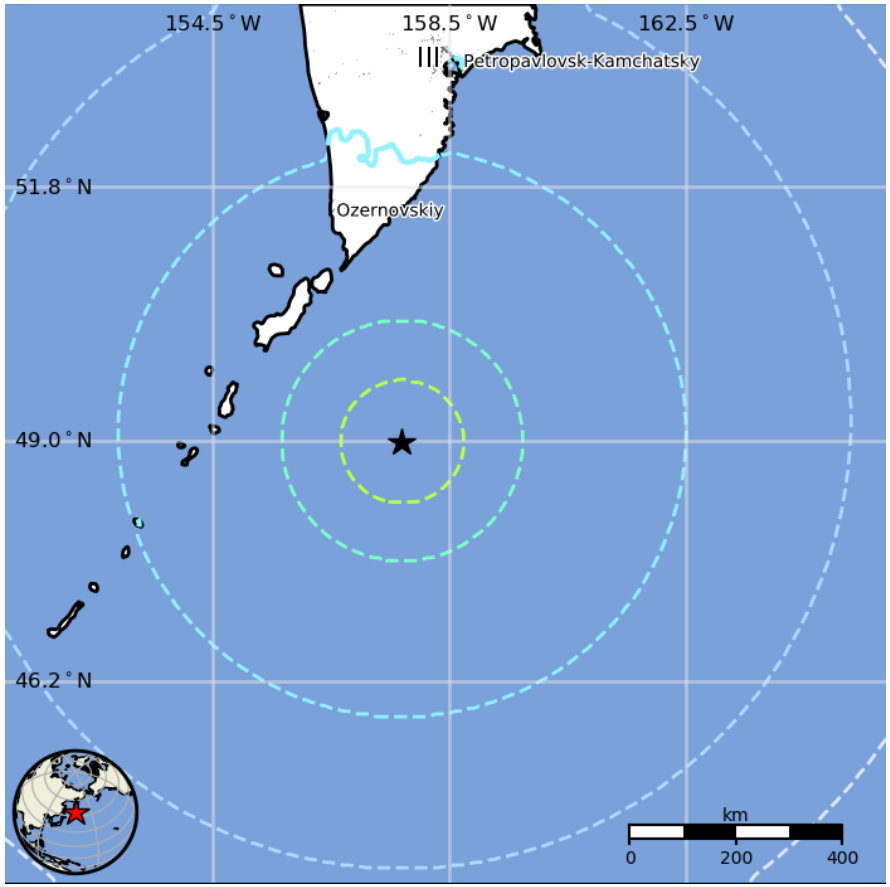
USGS PAGER

Population Exposed to Earthquake Shaking

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

The USGS estimates that 192,000 people felt light shaking from this earthquake.

I	Not Felt	0 k*
II-III	Weak	83 k*
IV	Light	192 k
V	Moderate	0 k
VI	Strong	0 k
VII	Very Strong	0 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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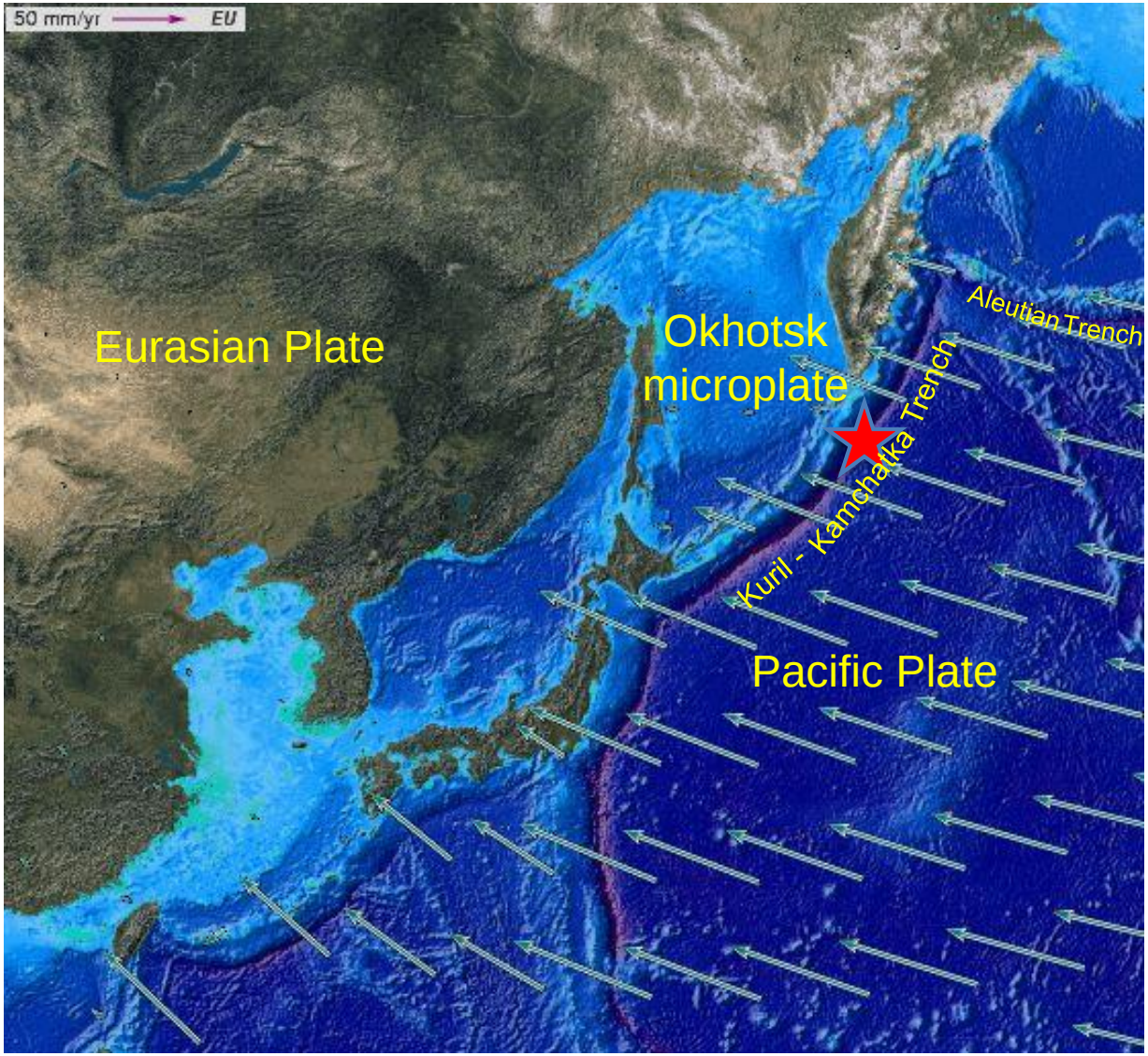
The blue arrows on this map show the motion of the Pacific Plate with respect to the Okhotsk microplate and the much larger Eurasian Plate. The red star is the epicenter of the March 25, 2020 M7.5 earthquake in the Kuril-Kamchatka Trench.

The Pacific Plate subducts into the Kuril-Kamchatka Trench beneath the Okhotsk microplate at a rate of about 80 mm/yr (8 cm/yr).



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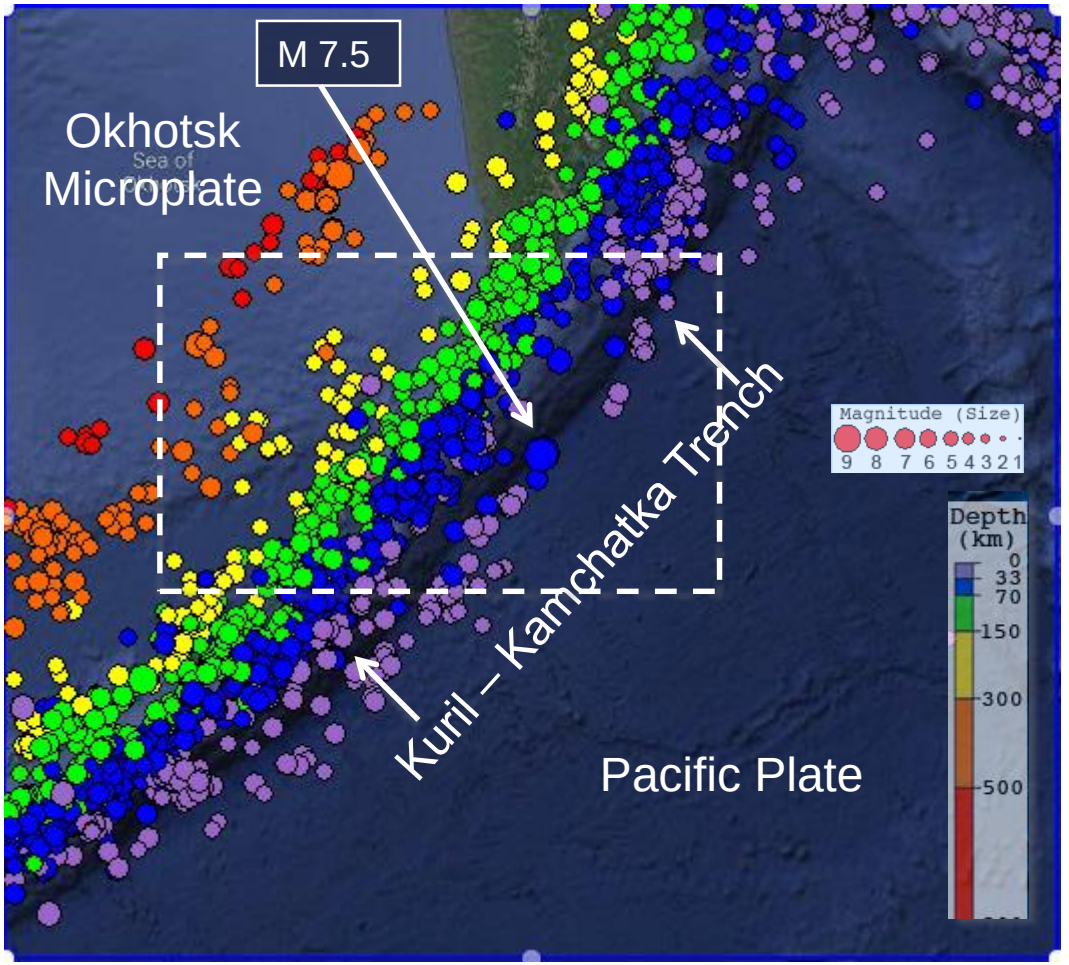
The map on the right shows regional seismicity along the Kuril-Kamchatka Trench. Earthquake depths in the Kuril-Kamchatka subduction zone increase from southeast to northwest as the Pacific Plate dives deeper beneath the Okhotsk microplate.

This earthquake is located just east of the axis of the Kuril-Kamchatka Trench. A cross section of earthquakes within the area outlined by the dashed rectangle is shown in the next slide.



Map created using the IRIS Earthquake Browser: *www.iris.edu/ieb*

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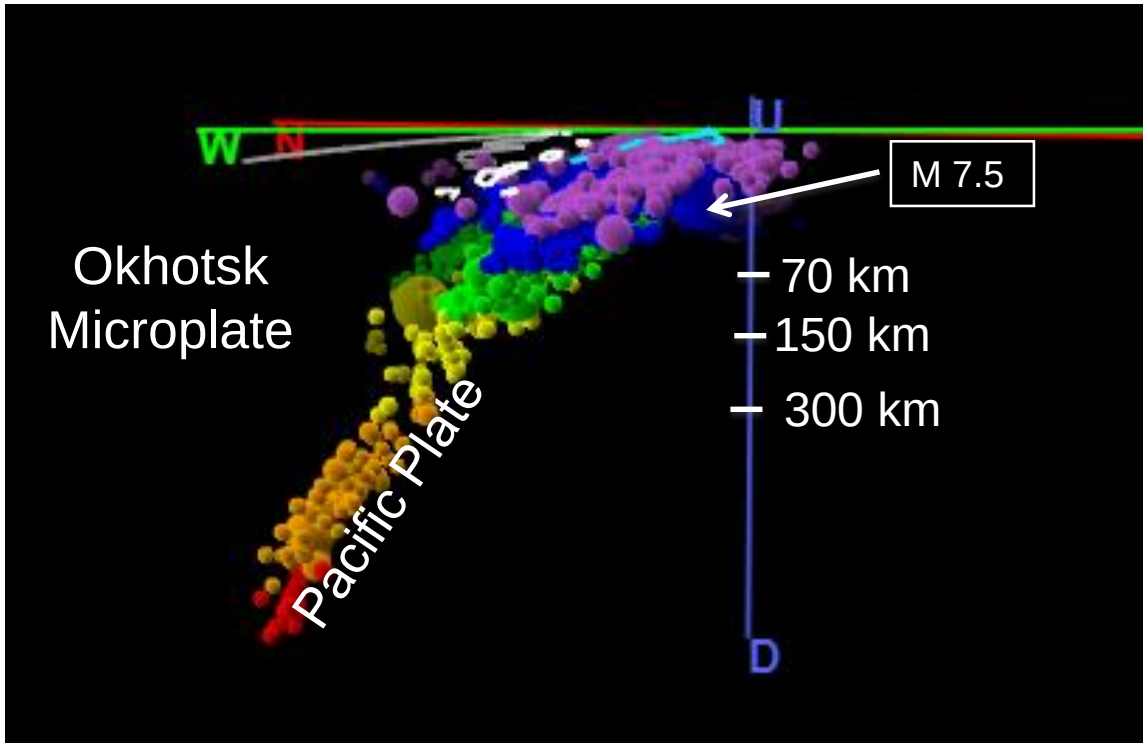
This cross section is oriented perpendicular to the Kuril-Kamchatka Trench. Earthquakes deeper than 100 km are within the subducting lithosphere of the Pacific Plate.

The March 25 earthquake occurred as a result of reverse (thrust) faulting within the Pacific Plate directly beneath the plate boundary where it subducts beneath the Okhotsk microplate.



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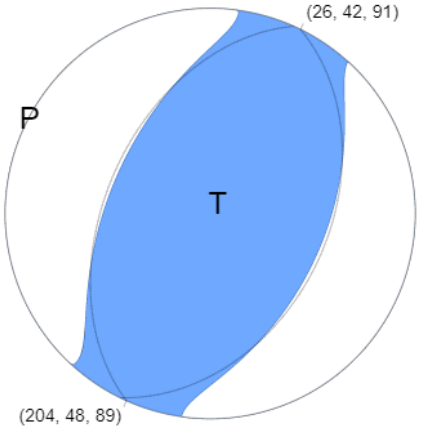
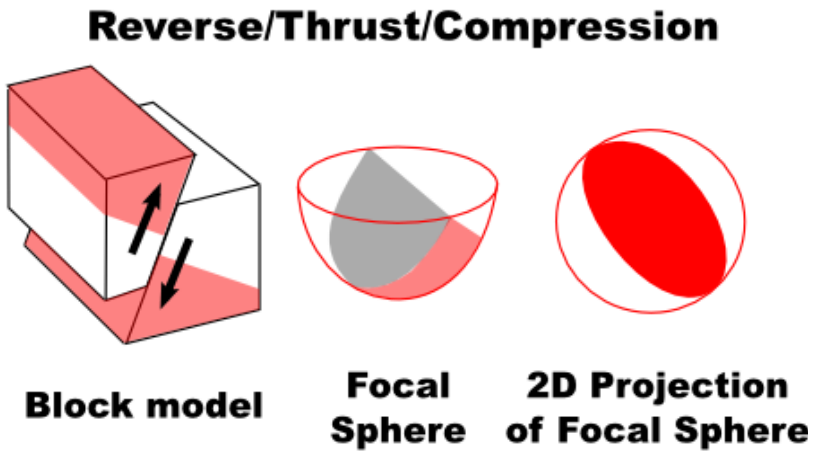
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Because an earthquake occurs as slip on a fault, it generates primary (P) waves in quadrants where the first pulse is compressional (shaded) and quadrants where the first pulse is extensional (white). The orientation of these quadrants determined from recorded seismic waves determines the type of fault that produced the earthquake.



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.



In this case, the focal mechanism indicates this earthquake occurred as the result of thrust faulting within the Pacific Plate.

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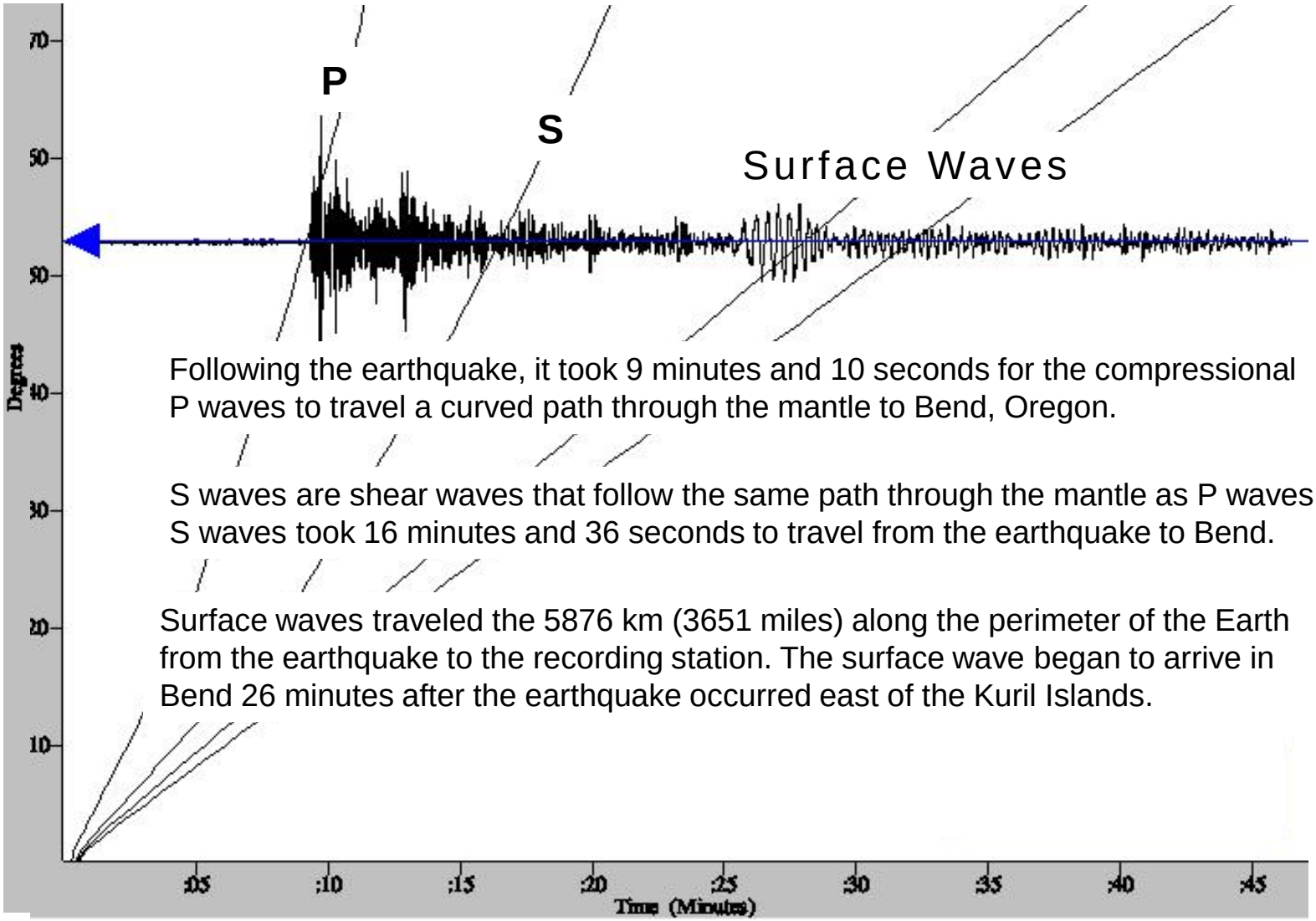
The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 5876 km (3651 miles, 52.94˚) from the location of this earthquake.



Following the earthquake, it took 9 minutes and 10 seconds for the compressional P waves to travel a curved path through the mantle to Bend, Oregon.

S waves are shear waves that follow the same path through the mantle as P waves. S waves took 16 minutes and 36 seconds to travel from the earthquake to Bend.

Surface waves traveled the 5876 km (3651 miles) along the perimeter of the Earth from the earthquake to the recording station. The surface wave began to arrive in Bend 26 minutes after the earthquake occurred east of the Kuril Islands.

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