

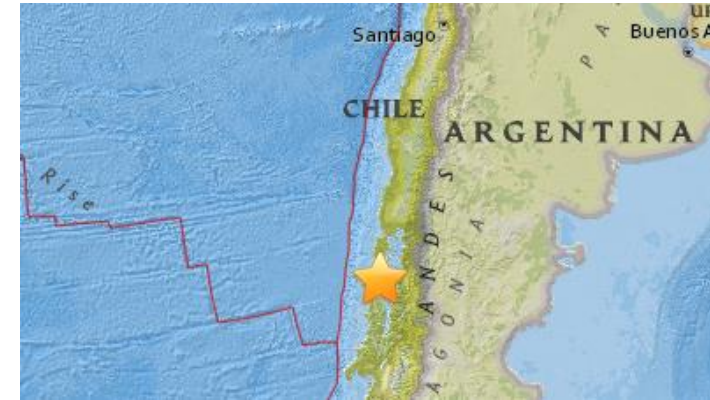
Magnitude 7.6 OFFSHORE LOS LAGOS, CHILE

Sunday, December 25, 2016 at 14:22:27 UTC

A magnitude 7.6 earthquake has occurred near the southern tip of Chiloe Island in southern Chile. There are no immediate reports of deaths. There are reports of landslides and some damage to highways.

The earthquake occurred at 11:22 a.m. local time about 39 kilometers (25 miles) south-southwest of Puerto Quello and at a depth of 35 kilometers (22 miles). The area, which is 1,300 kilometers (800 miles) south of the capital of Santiago, is sparsely populated.

Following the earthquake, approximately 4,000 people were evacuated in case of a tsunami, but the alert was cancelled after about 90 minutes.



Cracks appear in and along a road near Quellon, Chile, Sunday, Dec. 25, 2016, after an earthquake.

(Edinson Capdevilla/Aton via AP)

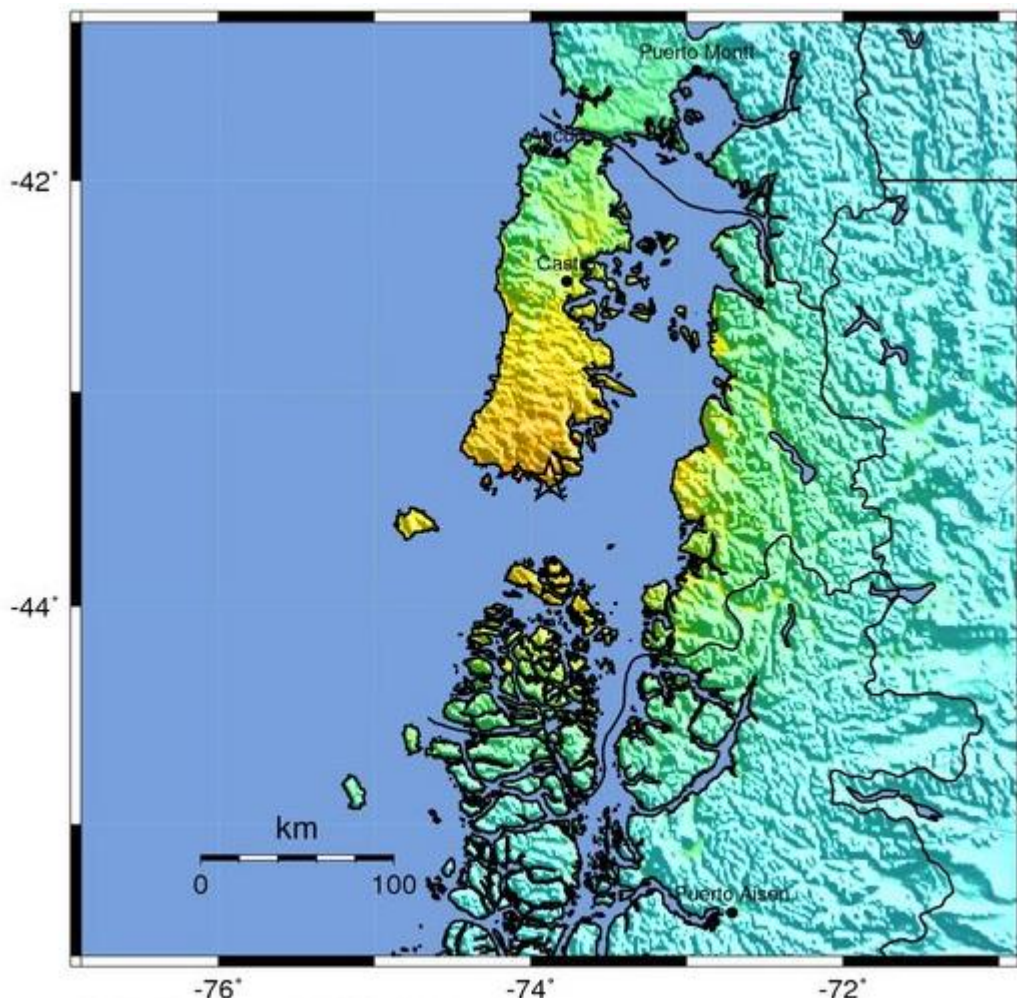
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The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The area nearest the earthquake experienced very strong 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



USGS Estimated shaking Intensity from M 7.6 Earthquake

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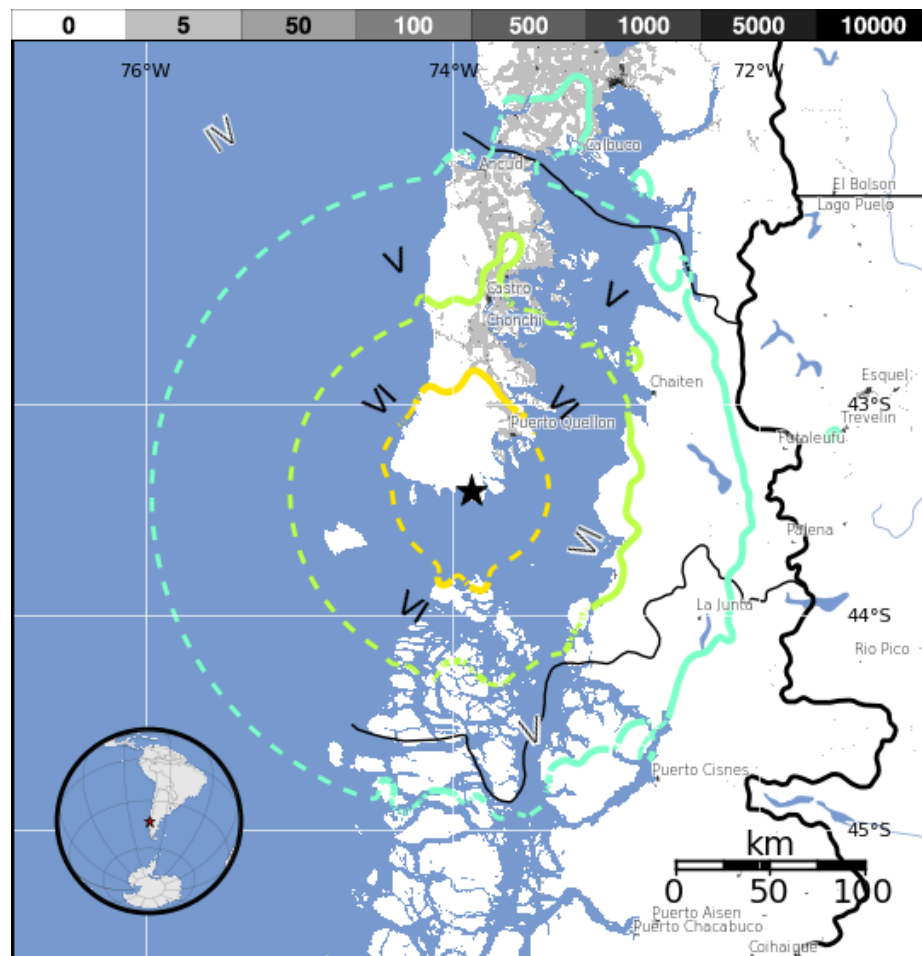
USGS PAGER

Population Exposed to Earthquake Shaking

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

35,000 people were exposed to very strong shaking from this earthquake.

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	--*
IV	Light	457 k*
V	Moderate	118 k
VI	Strong	79 k
VII	Very Strong	35 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 map shows seismicity along the west coast of South America in Southern Chile. Earthquakes are color-coded by depth as shown in the legend in the lower right corner. Depths of earthquakes increase from west to east across the subduction zone boundary.

The epicenter of the December 25, 2016 earthquake is labeled and occurred at a depth of 34.6 km.

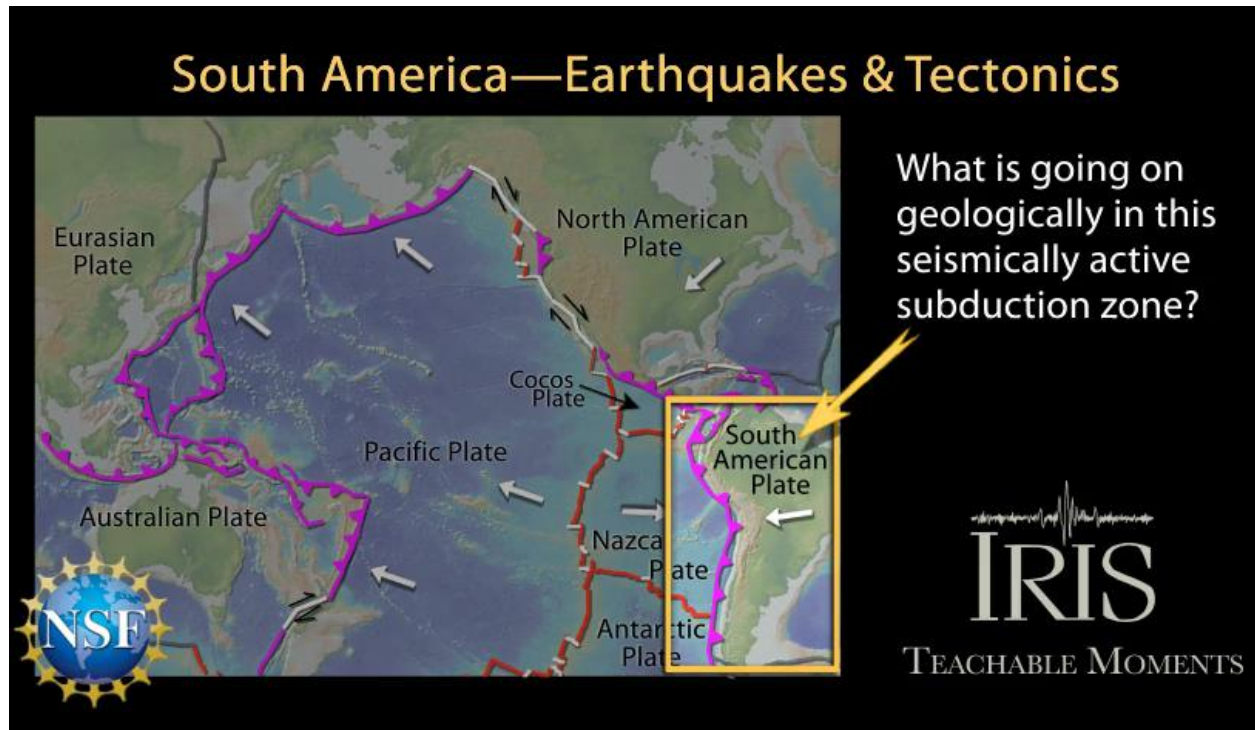


Created using the IRIS Earthquake Browser (IEB)

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This magnitude 7.6 earthquake is typical of subduction zone earthquakes on the shallow portion of the Nazca – South American Plate boundary. Earthquakes also occur within the shallow portions of both plates near the boundary; within the top portion of the Nazca Plate as it bends to descend into the deeper mantle; and at depths greater than 100 km within the subducting Nazca Plate.



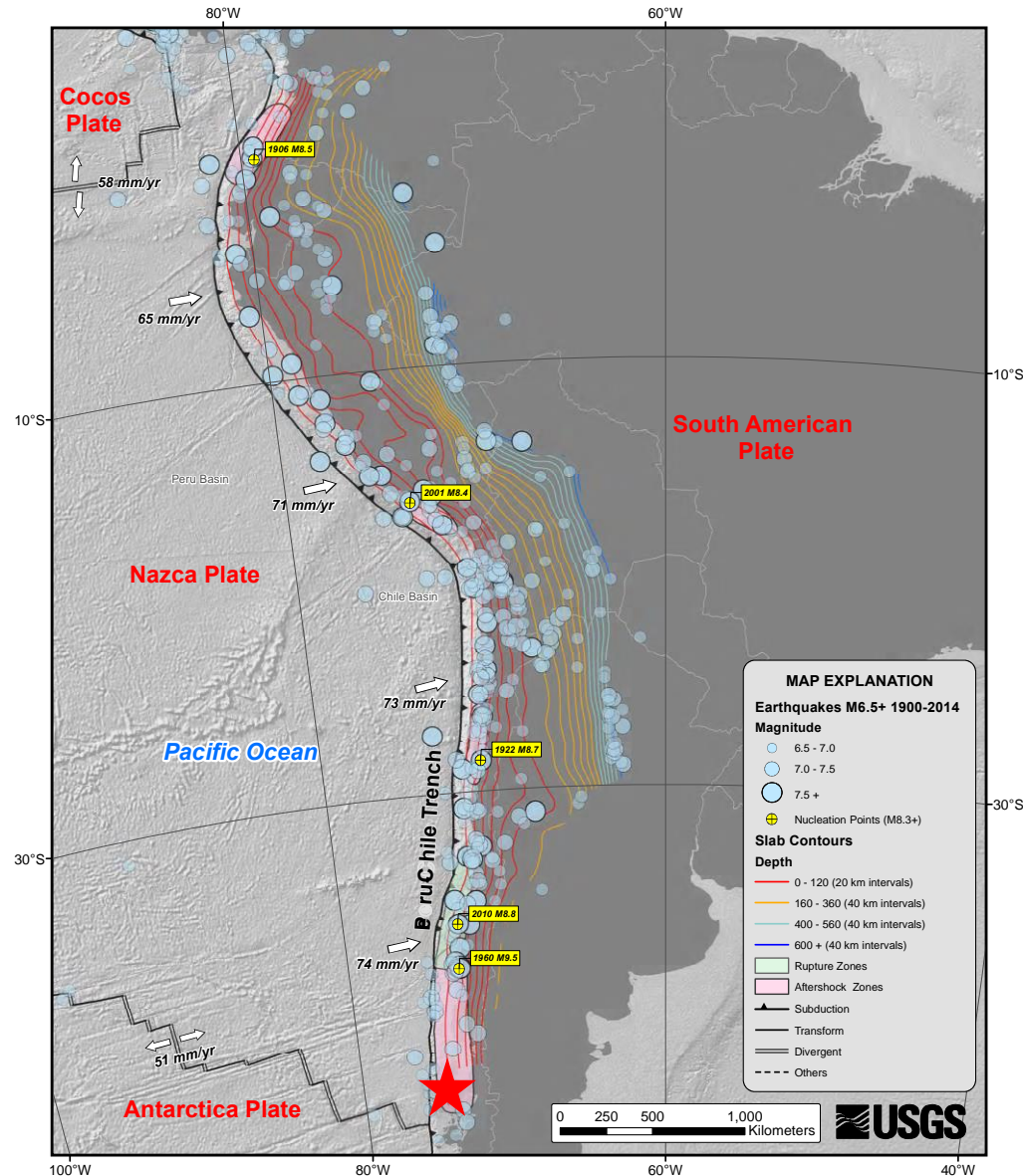
Animation exploring plate tectonics and earthquakes of the Nazca – South America plate boundary region.

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This earthquake occurred on the subduction zone plate boundary at the Peru – Chile Trench where the oceanic Nazca Plate subducts beneath the continental South American Plate. Near the location of this earthquake shown by the red star, the Nazca Plate moves toward the South American Plate in a east-northeast direction at a rate of over 7 cm/yr.

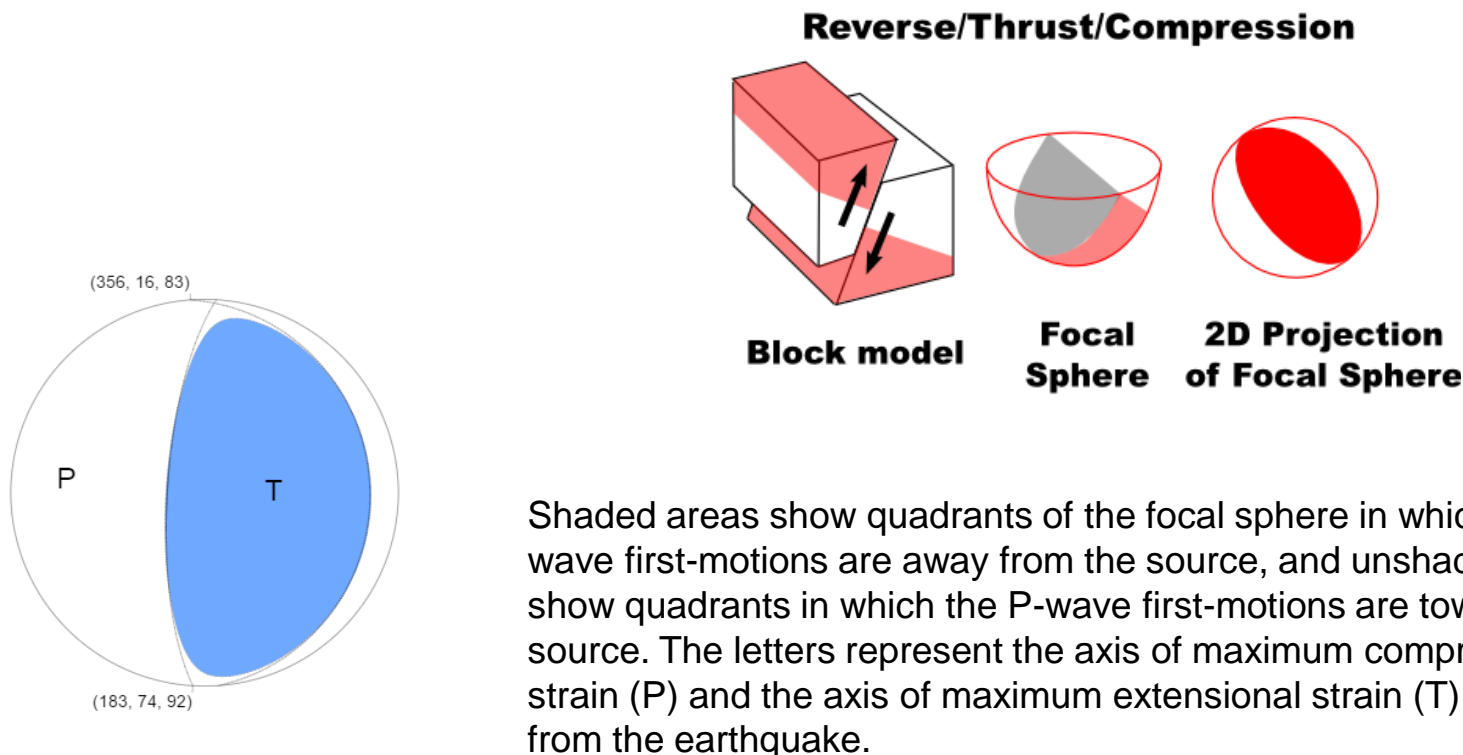
Since 1900, the Nazca – South America subduction zone has been the site of eighteen great earthquakes with magnitude ≥ 8.0 . The largest instrumentally recorded earthquake of all time was the 1960 Chile earthquake with magnitude 9.5. The aftershock zone of that earthquake is outlined in pink. The December 25, 2016 earthquake occurred within that aftershock zone which is the likely area of the subduction zone that ruptured in 1960.



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This magnitude 7.6 earthquake has a focal mechanism that indicates thrust faulting. This mechanism is consistent with displacement along the megathrust boundary between the Nazca and South America Plates.

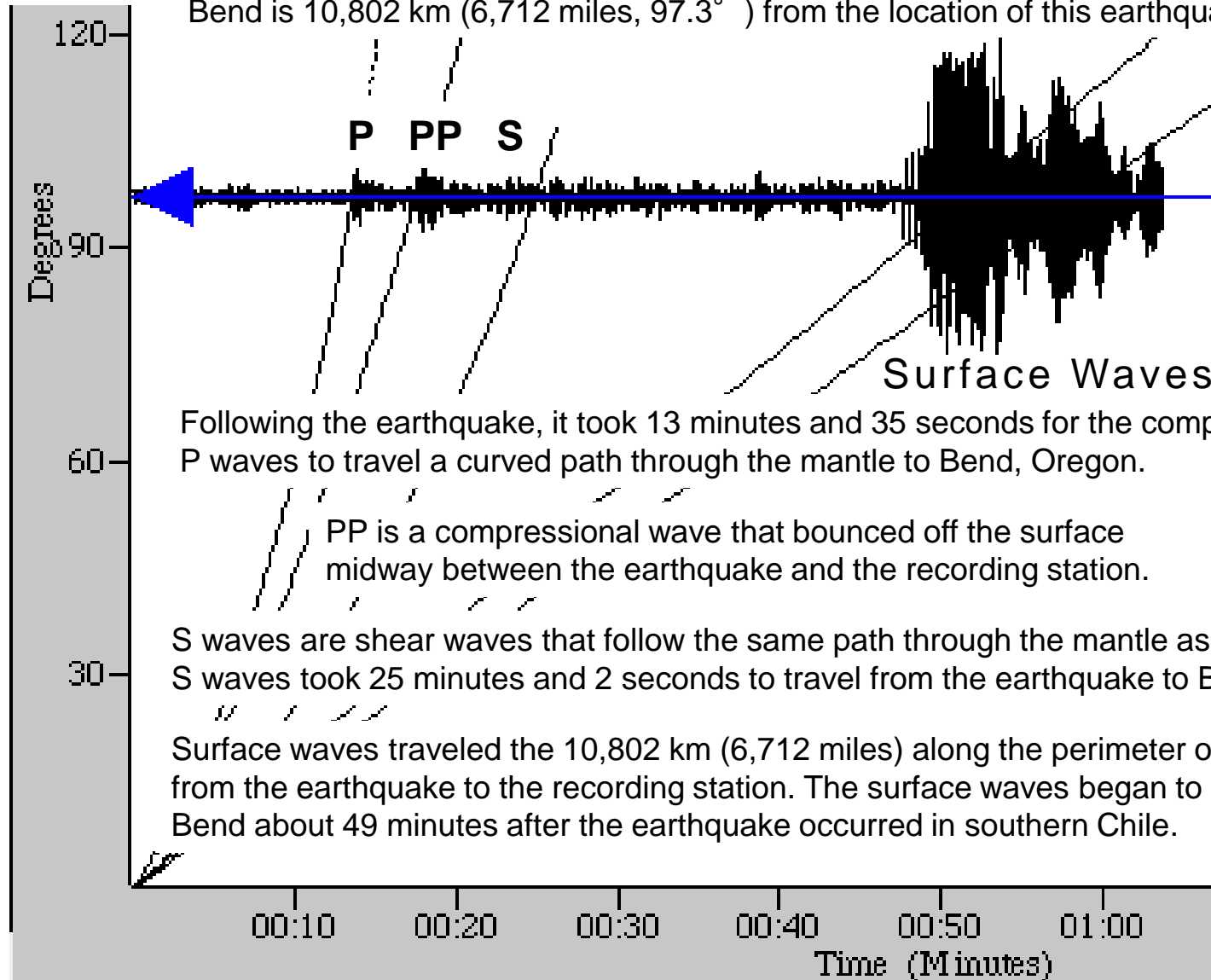


Shaded areas show quadrants of the focal sphere in which the P-wave first-motions are away from the source, and unshaded areas show quadrants in which the P-wave first-motions are toward the source. The letters represent the axis of maximum compressional strain (P) and the axis of maximum extensional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

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The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 10,802 km (6,712 miles, 97.3°) from the location of this earthquake.



Following the earthquake, it took 13 minutes and 35 seconds for the compressional 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 25 minutes and 2 seconds to travel from the earthquake to Bend.

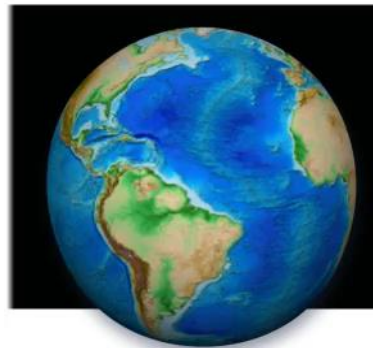
Surface waves traveled the 10,802 km (6,712 miles) along the perimeter of the Earth from the earthquake to the recording station. The surface waves began to arrive in Bend about 49 minutes after the earthquake occurred in southern Chile.

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