Magnitude 7.0 PERU
Friday, March 1, 2019 at 08:50:41 UTC

A magnitude 7.0 earthquake occurred in southeastern Peru on Friday about 27 kilometers northeast of the town of Azángaro, Peru, near the border with Bolivia. The earthquake occurred at a depth of 257.4 km.

This region of the Andes is a sparsely populated area, there were no immediate reports of injuries or damage.

Azángaro, Peru

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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 USGS estimates that approximately 320,000 people felt light shaking from this earthquake.

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 Did You Feel It? collects information from people who felt an earthquake and creates maps that show what people experienced and the extent of damage.

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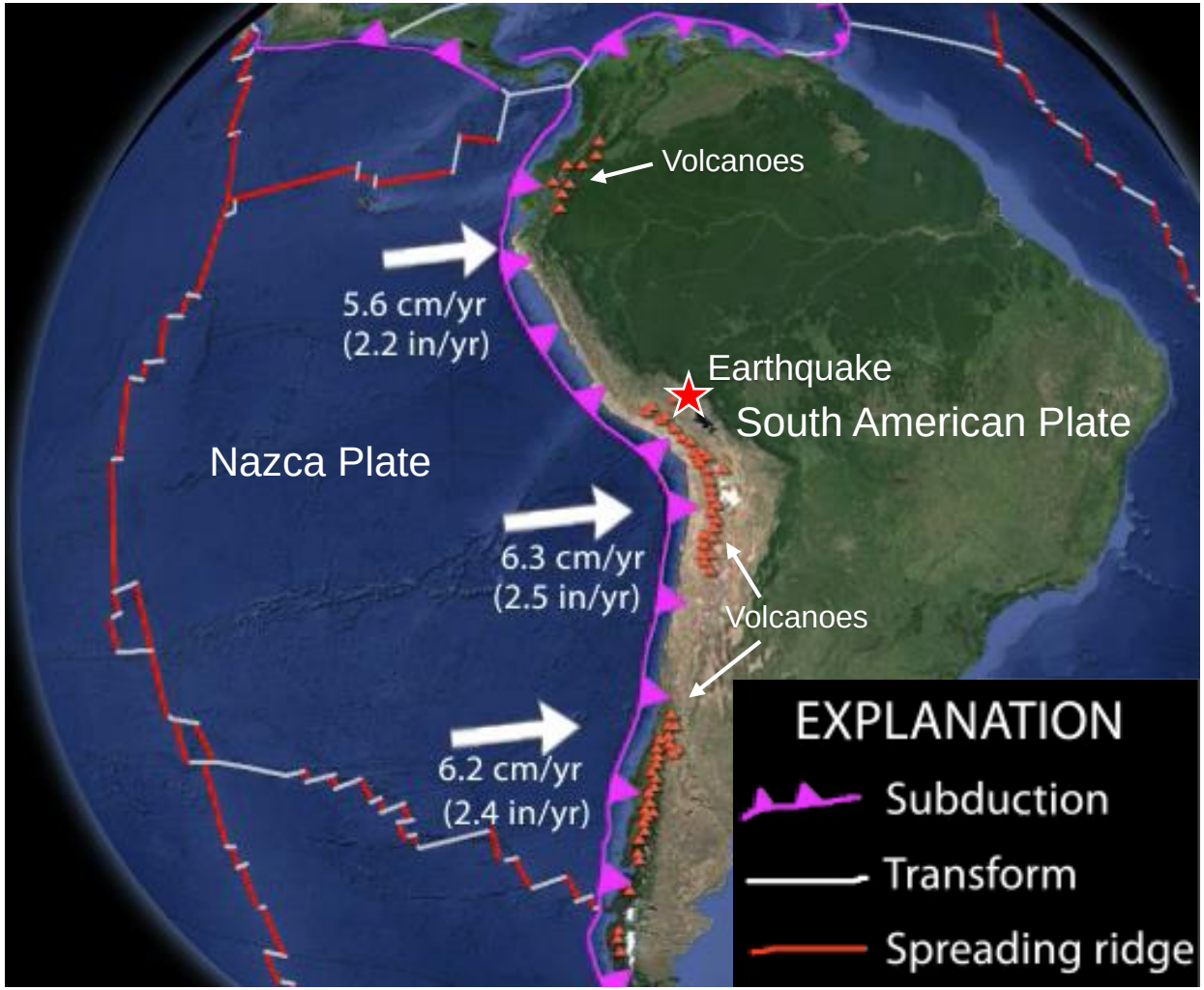
This illustration shows the rate and direction of motion of the Nazca Plate with respect to the South American Plate. Locations of active Andean volcanoes are shown by the orange triangles.

This earthquake is shown by the red star. At the location of this earthquake, the Nazca Plate subducts beneath the South America Plate at a velocity of about 58 mm/yr.



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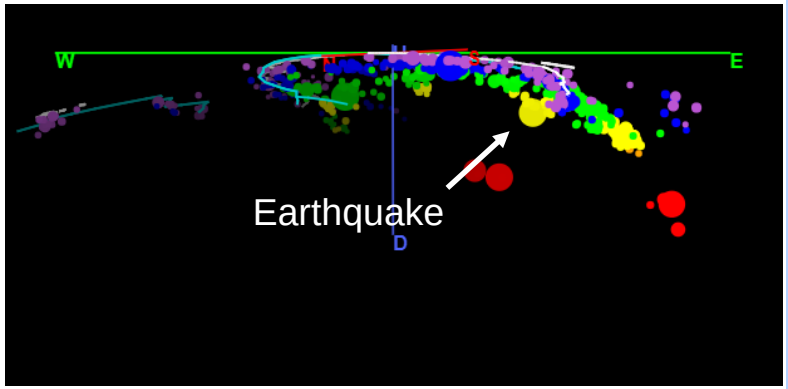
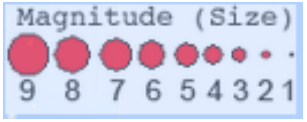
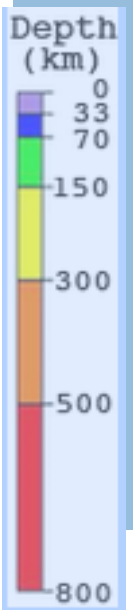
Epicenters are shown on a map of regional historic seismicity on the right. A 3D view is shown below. Earthquakes are shallow near west side of the map area. As the Nazca Plate subducts to the east beneath the South American Plate, earthquakes within the Nazca Plate increase in depth from west to east.







Map generated using IRIS Earthquake Browser

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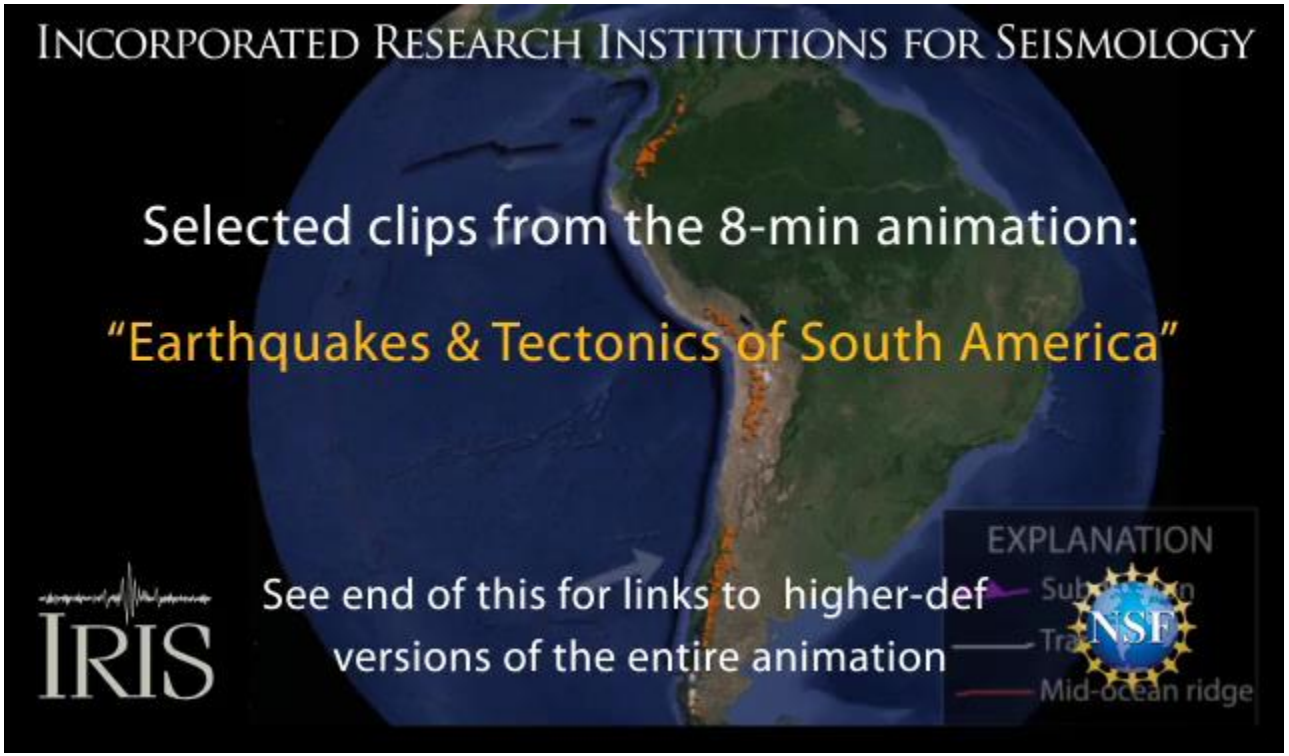
At the location of this earthquake, the oceanic Nazca Plate moves east relative to the South American Plate, subducting at the Peru-Chile Trench west of the Peruvian coast and sinking into the mantle beneath South America. This earthquake occurred at an intermediate-depth, where earthquakes occur within the subducting slab rather than at the shallow plate interface between subducting and overriding tectonic plates.



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

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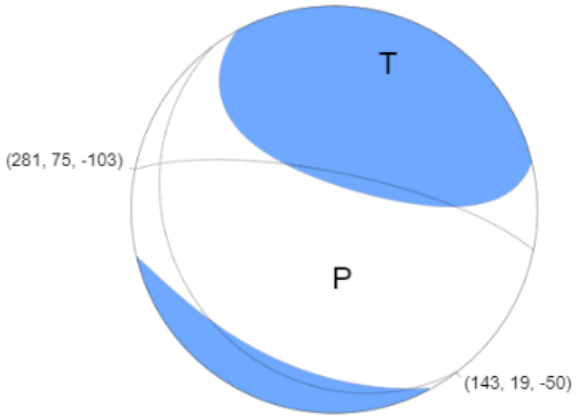
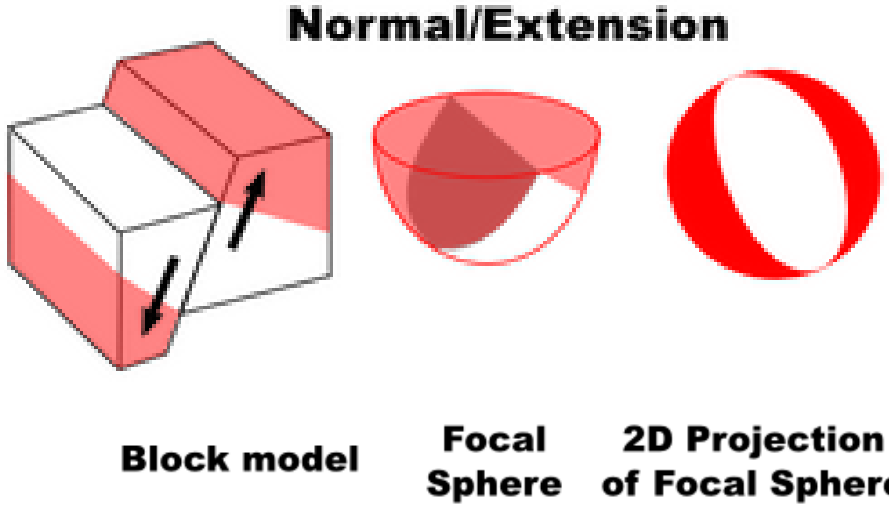
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Because an earthquake occurs as slip on a fault, it generates primary (P) waves in quadrants where the first pulse is compressional (shaded) and quadrants where the first pulse is extensional (white). The orientation 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 normal faulting beneath Peru within the lithosphere of the subducted Nazca Plate.

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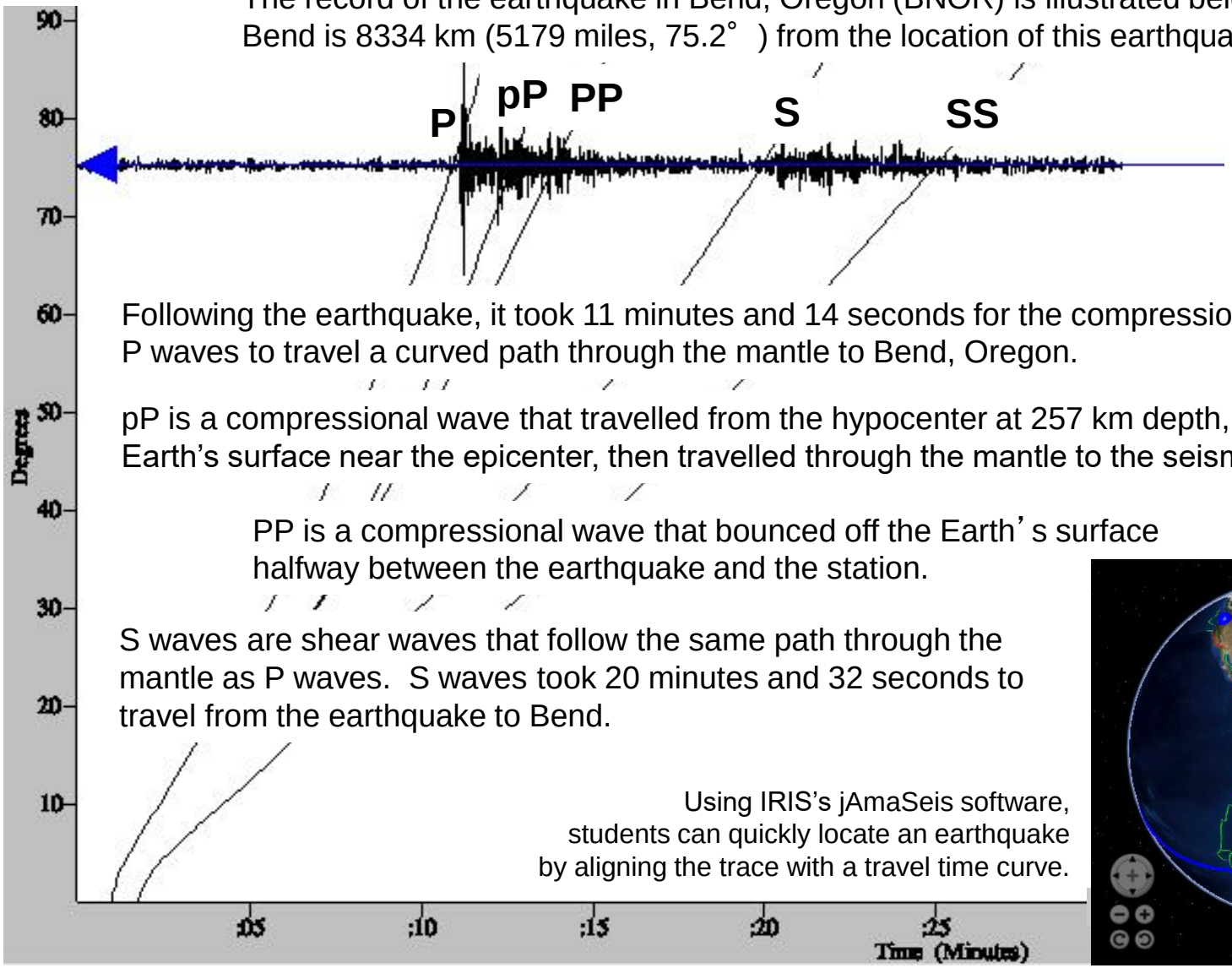
The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 8334 km (5179 miles, 75.2˚) from the location of this earthquake.



Following the earthquake, it took 11 minutes and 14 seconds for the compressional P waves to travel a curved path through the mantle to Bend, Oregon.

pP is a compressional wave that travelled from the hypocenter at 257 km depth, reflected off Earth's surface near the epicenter, then travelled through the mantle to the seismometer in Bend.

PP is a compressional wave that bounced off the Earth's surface halfway between the earthquake and the station.

S waves are shear waves that follow the same path through the mantle as P waves. S waves took 20 minutes and 32 seconds to travel from the earthquake to Bend.

Using IRIS's jAmaSeis software, students can quickly locate an earthquake by aligning the trace with a travel time curve.

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