

Magnitude 7.1 OFF THE EAST COAST OF HONSHU, JAPAN

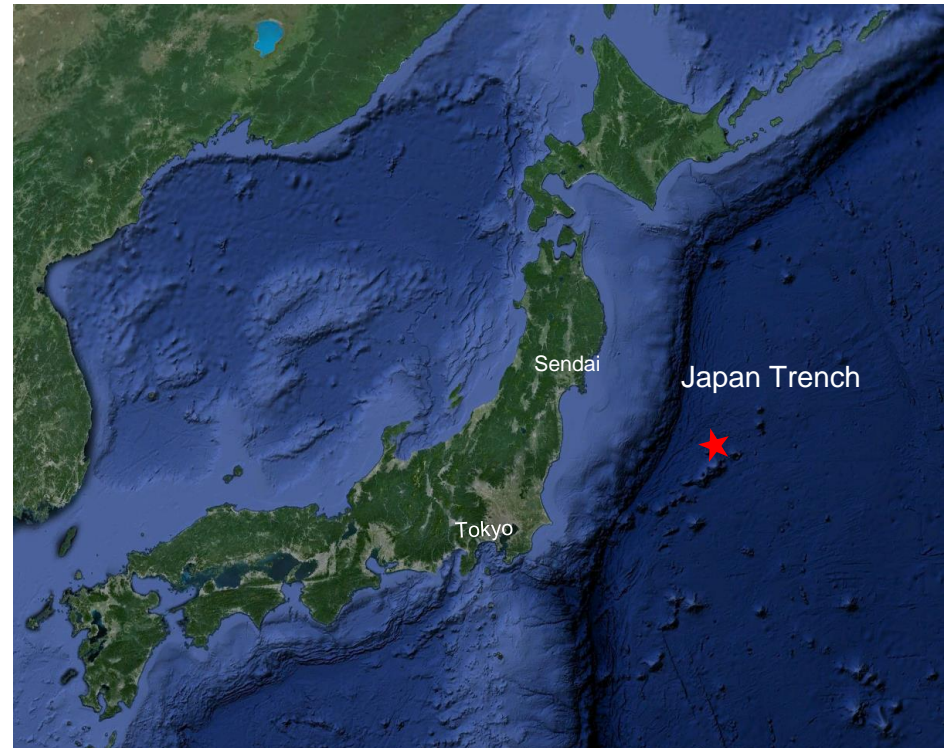
Friday, October 25, 2012 at 17:10:16 UTC

A magnitude 7.1 struck early Saturday off Japan's east coast. The quake hit at 2:10 a.m. Tokyo time about 170 miles from Fukushima, and it was felt in Tokyo, 300 miles away. There were no immediate reports of damage.



USGS

Japan's emergency agencies issued a tsunami advisory for the region that included the crippled Fukushima nuclear site. Tsunamis of up to 15 inches were reported at four areas along the coast, but the advisory was lifted less than two hours after the quake. Japanese television images of harbors showed calm waters.



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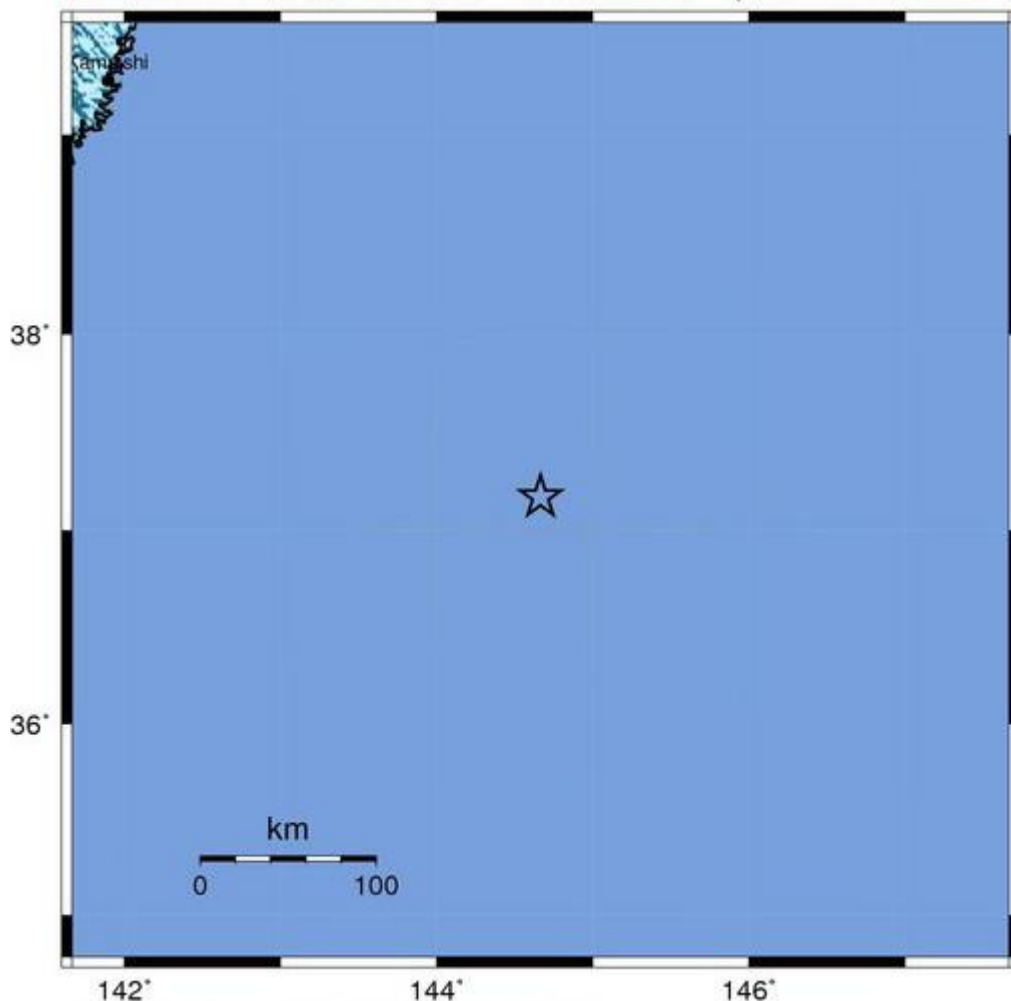
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The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

Areas nearest the epicenter experienced light to weak 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 7.1 Earthquake

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USGS PAGER

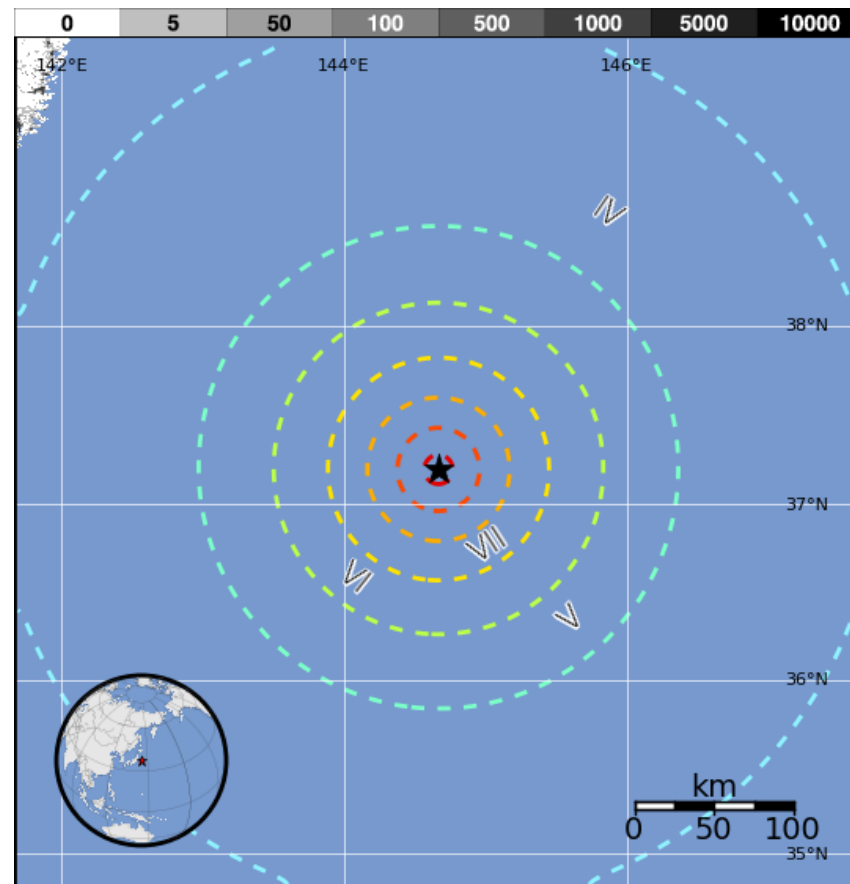
Population Exposed to Earthquake Shaking

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

The USGS estimates that coastal areas were subject to light shaking, though weak shaking was felt in tall buildings in Tokyo.

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 below.

Image courtesy of the US Geological Survey



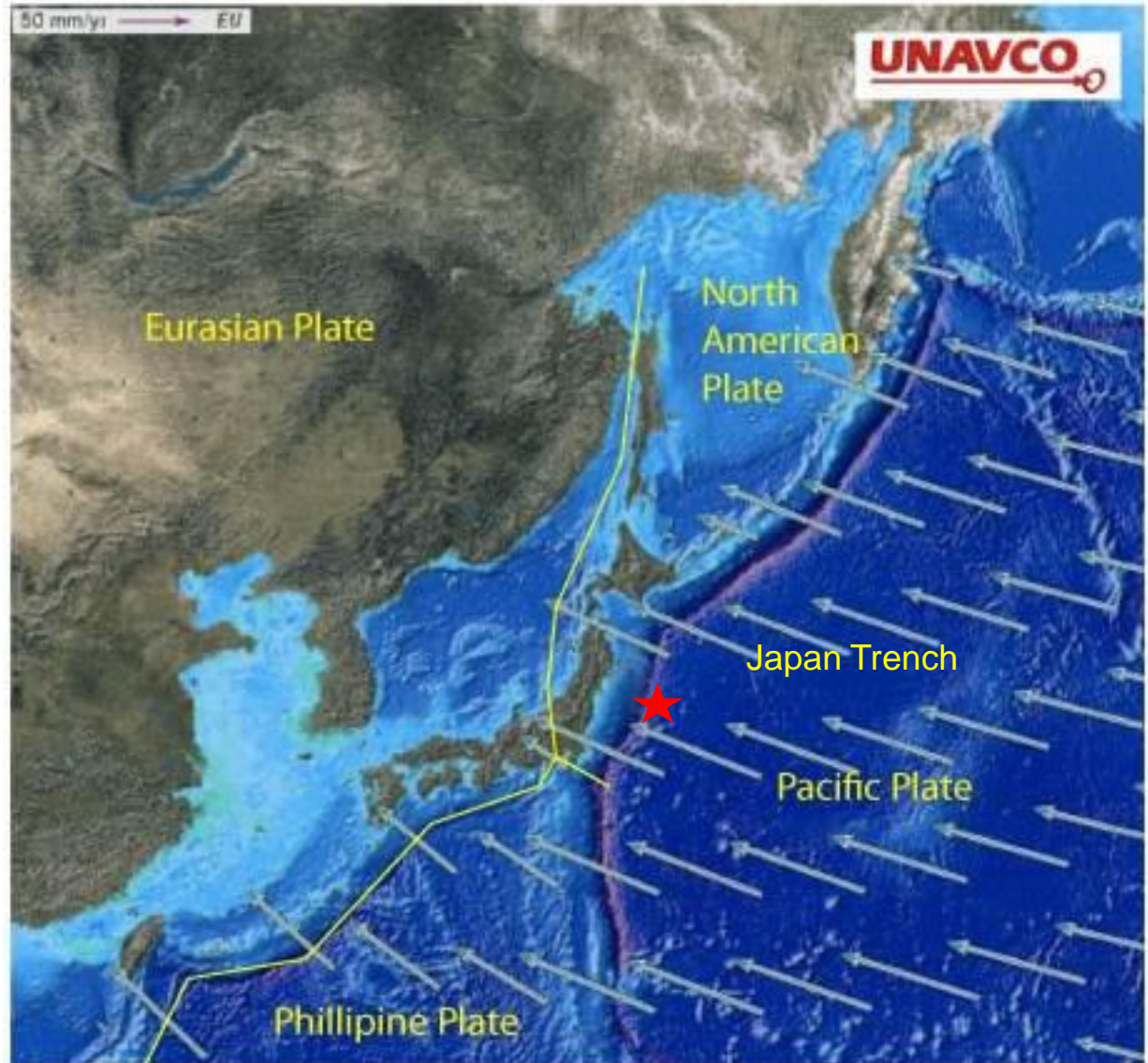
Estimated Modified Mercalli Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	--*	--*	21,869k*	14,164k	4,199k	1,286k	453k	43k	0k
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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This map shows the rate and direction of motion of the Pacific Plate with respect to the Eurasian Plate near the Japan Trench. The rate of convergence at this plate boundary is about 83 mm/yr (8 cm/year).

This is a fairly high convergence rate and the subduction zone is very seismically active.

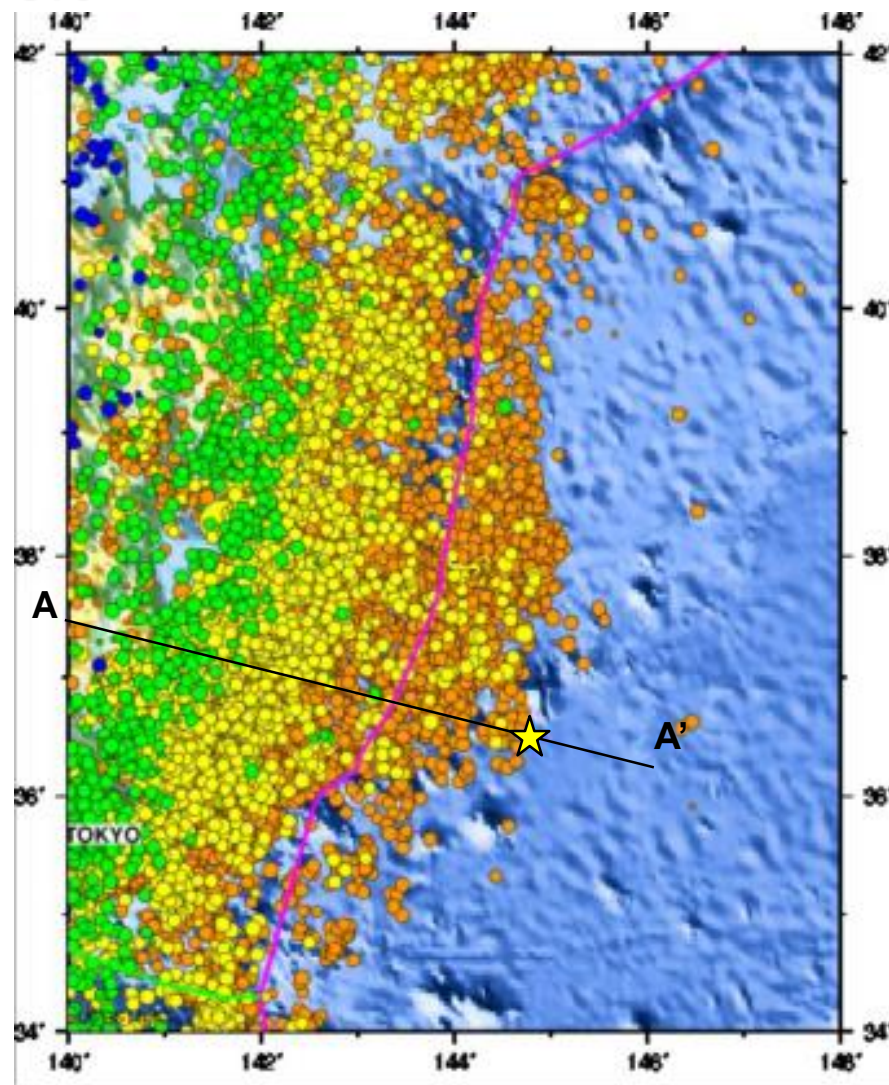
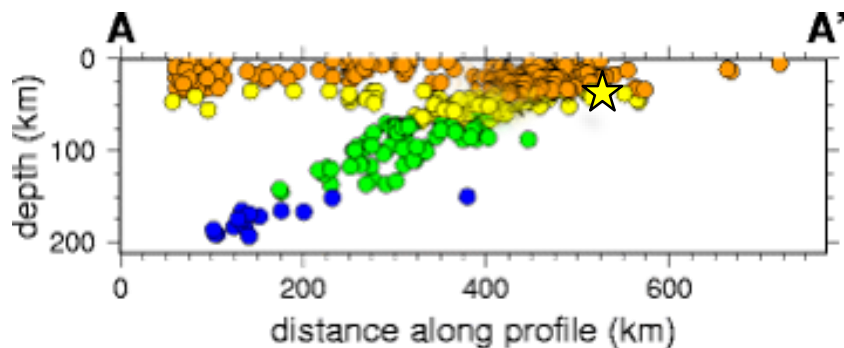


Earthquake and Historical Seismicity

This earthquake epicenter (yellow star), is plotted on the map with regional seismicity since 1990.

This convergent plate boundary hosts moderate to large earthquakes fairly regularly. Historic events include the M9.0 Tohoku earthquake of March 11, 2011 that ruptured a large area of the plate boundary northwest of this earthquake.

Images courtesy of the US Geological Survey

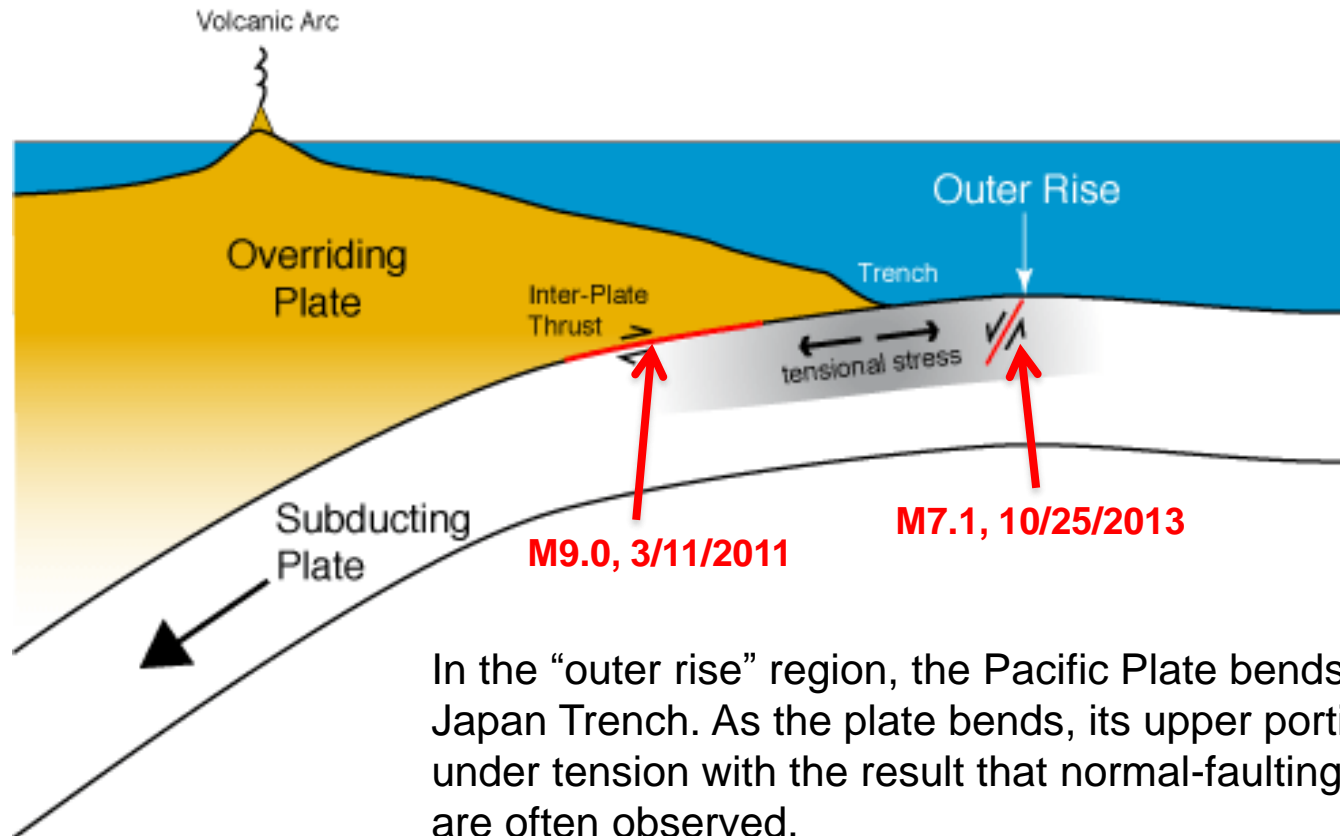


Seismicity Cross Section across the subduction zone showing the relationship between color and earthquake depth.

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According to the USGS, this earthquake occurred as the result of normal faulting in the shallow oceanic crust of the Pacific plate. The earthquake occurred east of the Japan Trench, which marks the seafloor expression of the subduction zone plate boundary between the Pacific and North America plates, and is immediately up-dip of the source region of the March 2011 M 9.0 Tohoku earthquake.

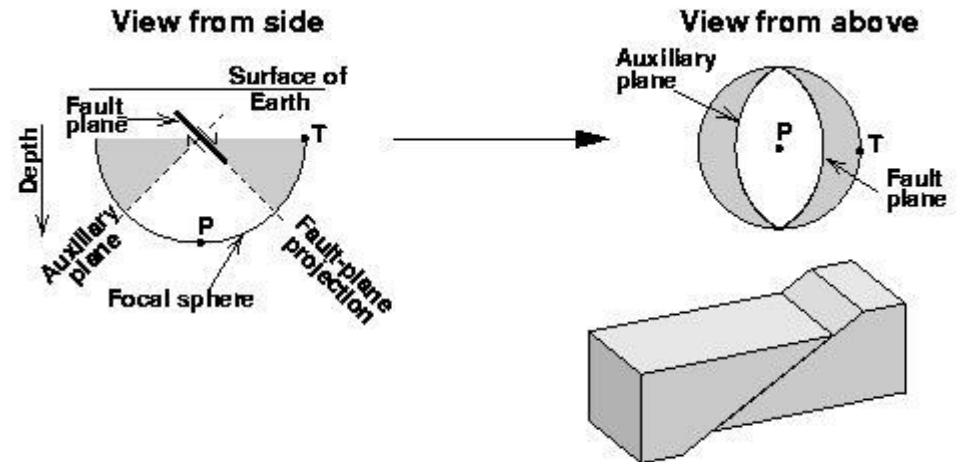
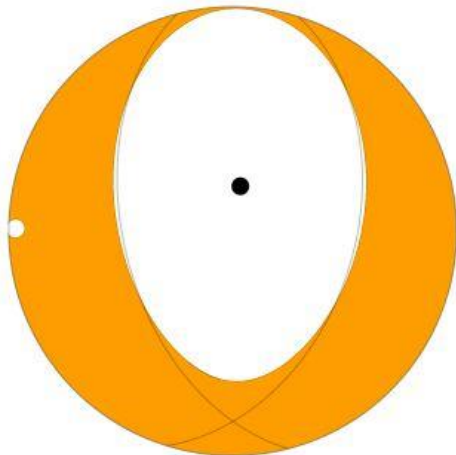


In the “outer rise” region, the Pacific Plate bends down into the Japan Trench. As the plate bends, its upper portion is put under tension with the result that normal-faulting earthquakes are often observed.

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The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Since an earthquake occurs as slip on a portion of the fault, it generates quadrants of compression (shaded) and extension (white) as the two sides of the fault move. Seismologists identify the orientation of these quadrants from recorded seismic waves, and use them to characterize the type of fault the earthquake occurred on. In this case the waves indicate a normal fault caused by extensional stresses within the upper portion of the Pacific Plate.

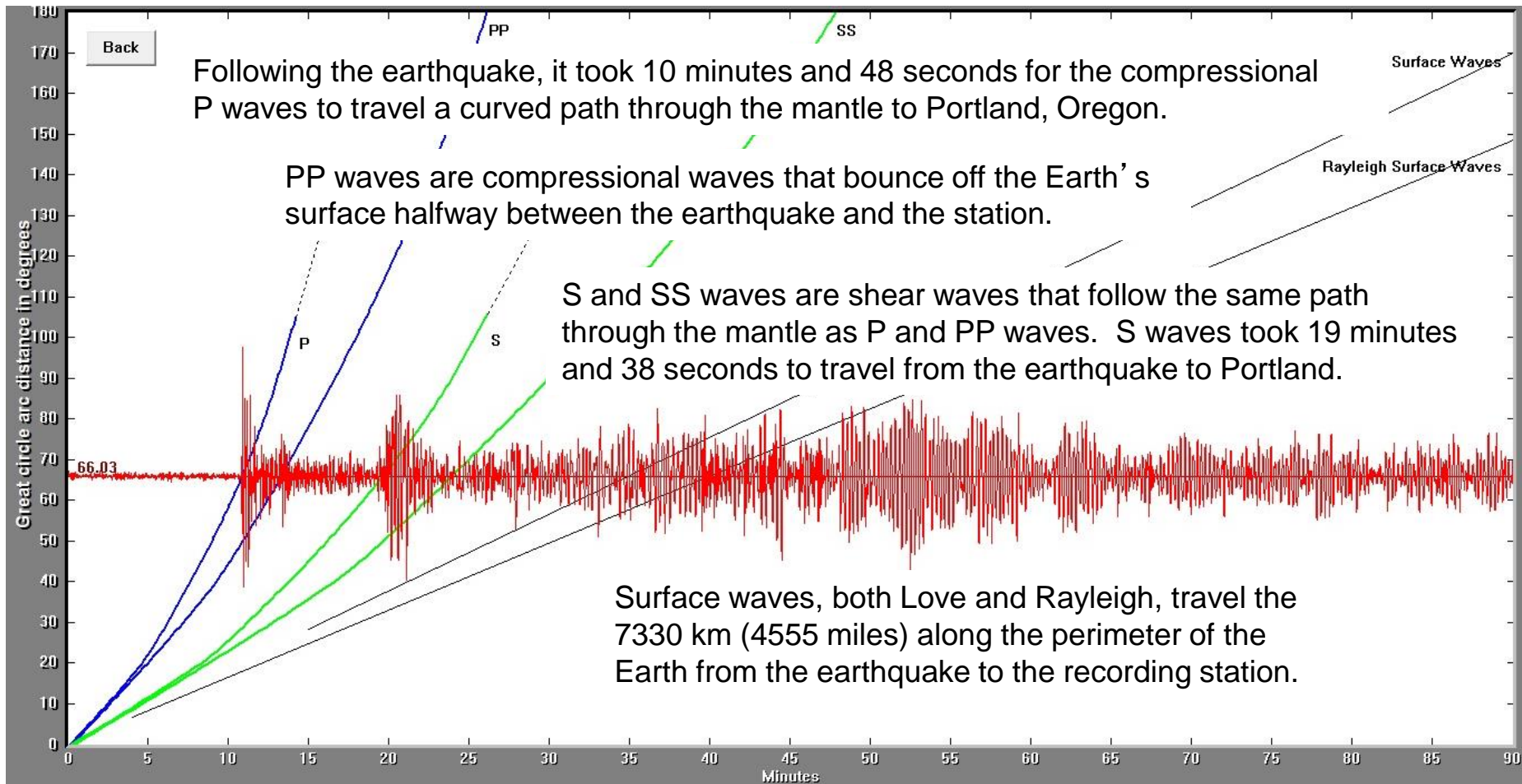


The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

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The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is 7330 km (4555 miles, 66.05°) from the location of this earthquake.



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