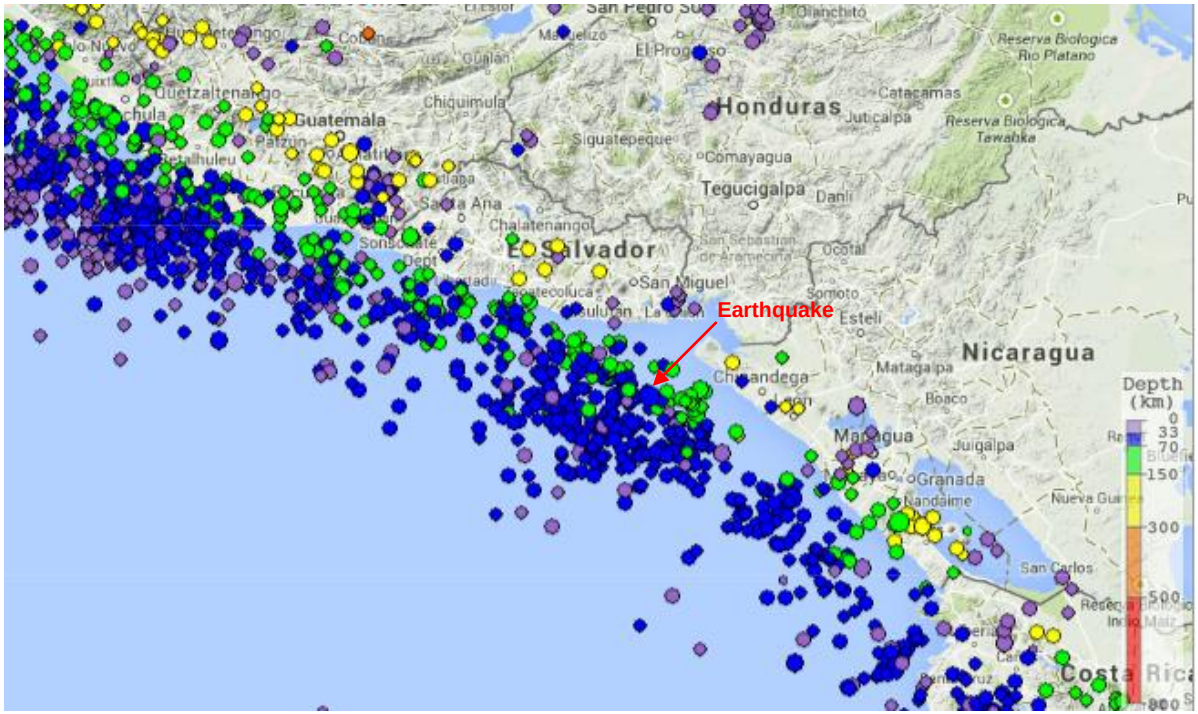
Magnitude 7.3 OFFSHORE EL SALVADOR

Tuesday, October 14, 2014 at 03:51:48 UTC

A magnitude 7.3 earthquake struck off the Pacific coast of Central America late Monday night, early reports indicate one death.

The earthquake occurred at a depth of 40 km (24.9 miles). Its epicenter was offshore, 86 km (53 miles) SSW of La Union, El Salvador.

The quake was felt widely across the region, with shaking reported in Guatemala, southern Belize, El Salvador, Honduras, Nicaragua, Costa Rica, western Panama, and far southeastern Mexico according to the USGS.



40 years of regional seismicity plotted by depth. This portion of the Middle America subduction zone bordering El Salvador and Nicaragua is very seismically active.

Source: www.iris.edu/ieb

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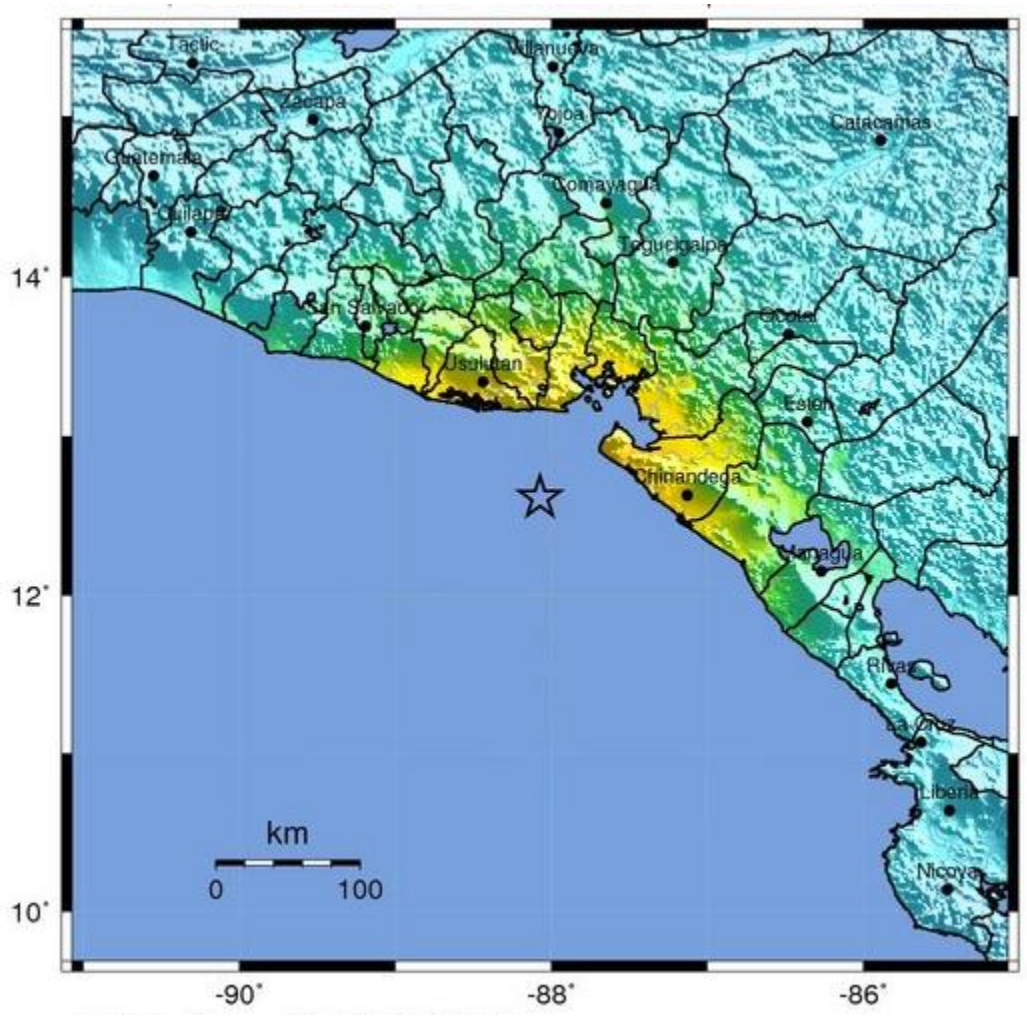
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The coastline near 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

Image courtesy of the US Geological Survey



USGS Estimated shaking intensity from M 7.4 Earthquake

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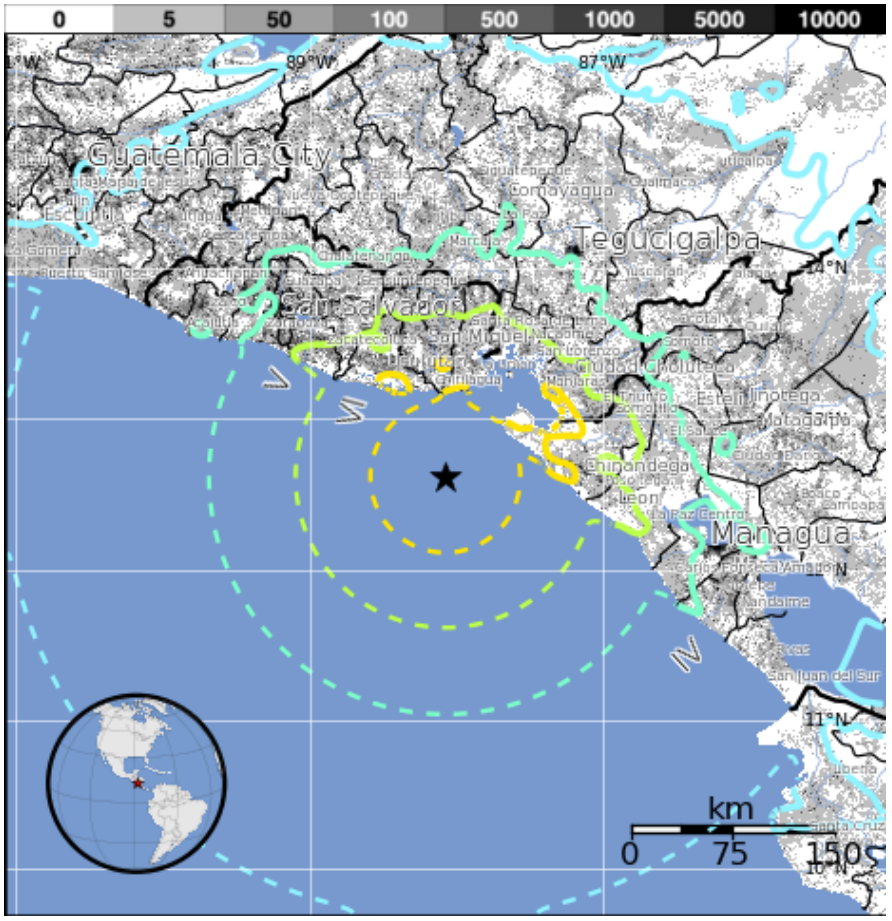
USGS PAGER

Population Exposed to Earthquake Shaking

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

Over 195,000 people experienced very strong shaking and over 2 million experienced strong shaking from this earthquake.



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	--*	3,502k*	15,193k	6,127k	2,096k	195k	0k	0k	0k
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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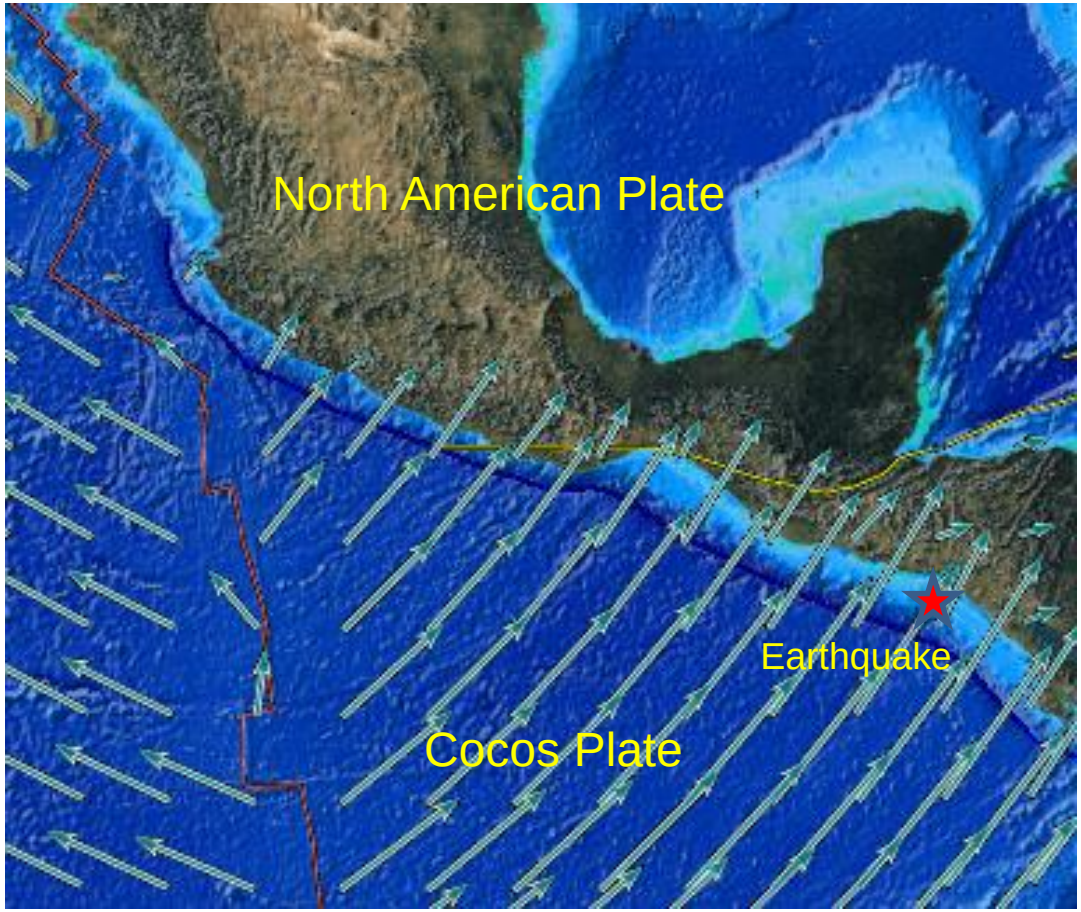

Arrows show plate motion relative to the North American Plate.

The Cocos Plate subducts along the Middle America Trench, under the North America Plate in the north, and under the Caribbean Plate in the south.

At the latitude of this event, the Cocos Plate is converging with the Caribbean Plate at a rate of roughly 73 mm/yr in an east-northeast direction.

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This earthquake is shown by the blue star on the map below. The Cocos Plate subducts beneath the Caribbean Plate at the Middle America Trench. The inset show the cross-section of the subduction.

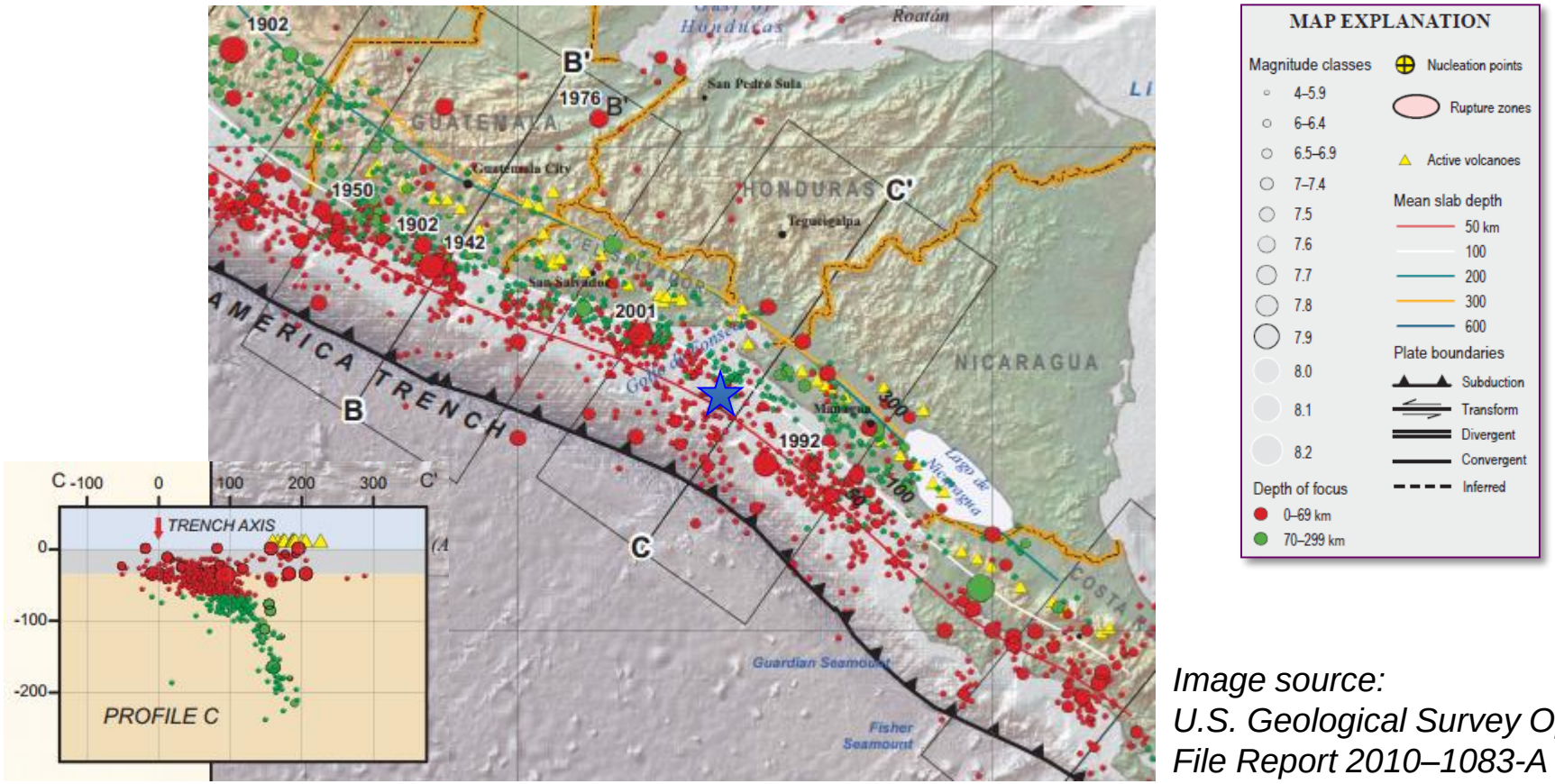

Image source:
U.S. Geological Survey Open-File Report 2010–1083-A

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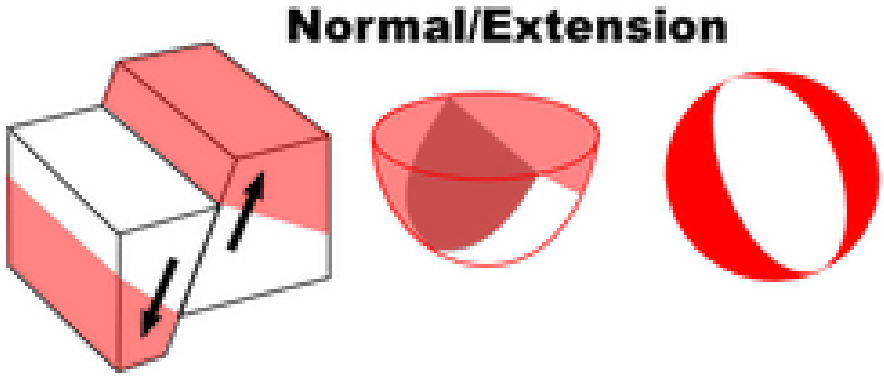
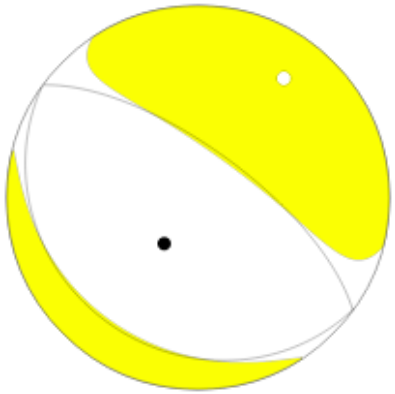
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Since an earthquake occurs as slip on a fault, it generates primary (P) waves in quadrants of compression (shaded) and extension (white). The orientation of these quadrants determined from recorded seismic waves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





USGS Moment Tensor Solution

In this case, the focal mechanism indicates this earthquake occurred as the result of normal faulting. The location and depth of the earthquake are consistent with its occurrence either within the subducting oceanic Cocos plate, or in the accretionary wedge of the overriding Caribbean plate, rather than on the main subduction zone thrust.

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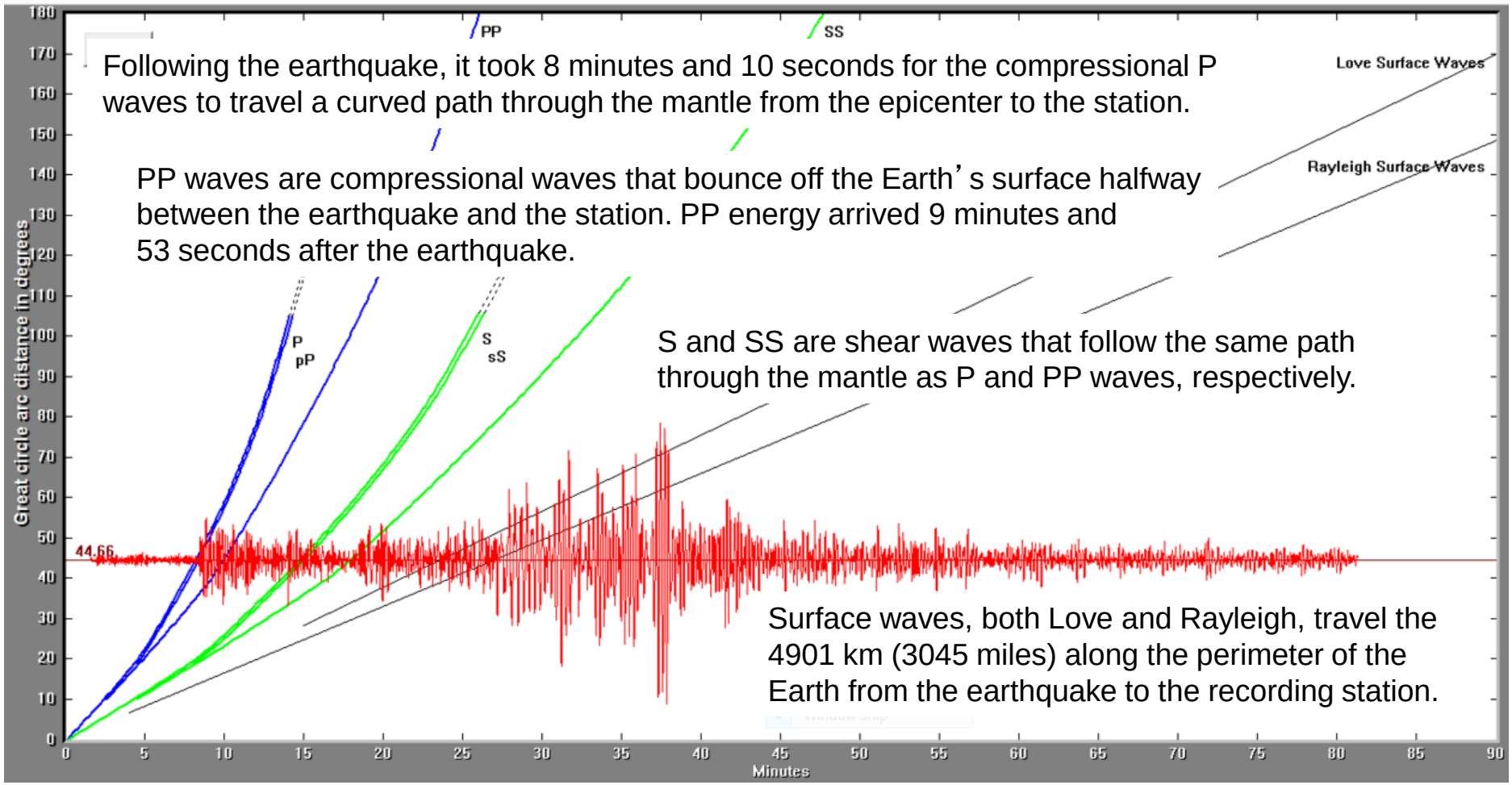
The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is about 4901 km (3045 miles, 44.16˚) from the location of this earthquake.



Following the earthquake, it took 8 minutes and 10 seconds for the compressional P waves to travel a curved path through the mantle from the epicenter to the station.

PP waves are compressional waves that bounce off the Earth's surface halfway between the earthquake and the station. PP energy arrived 9 minutes and 53 seconds after the earthquake.

S and SS are shear waves that follow the same path through the mantle as P and PP waves, respectively.

Surface waves, both Love and Rayleigh, travel the 4901 km (3045 miles) along the perimeter of the Earth from the earthquake to the recording station.

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