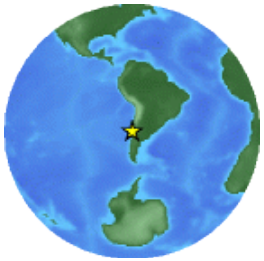
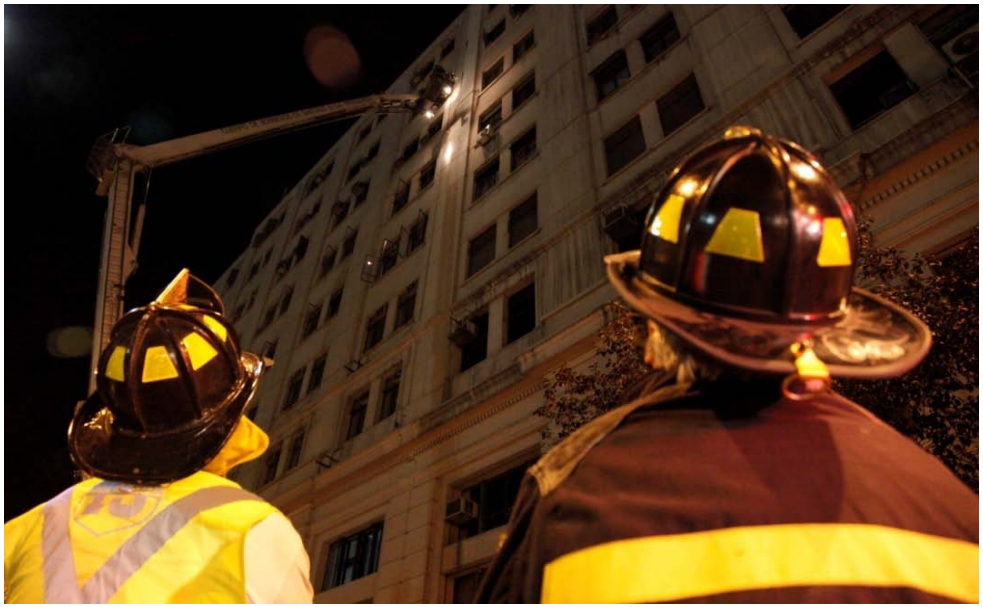
Magnitude 7.1 MAULE, CHILE
Sunday, March 25, 2012 at 22:37:06 UTC



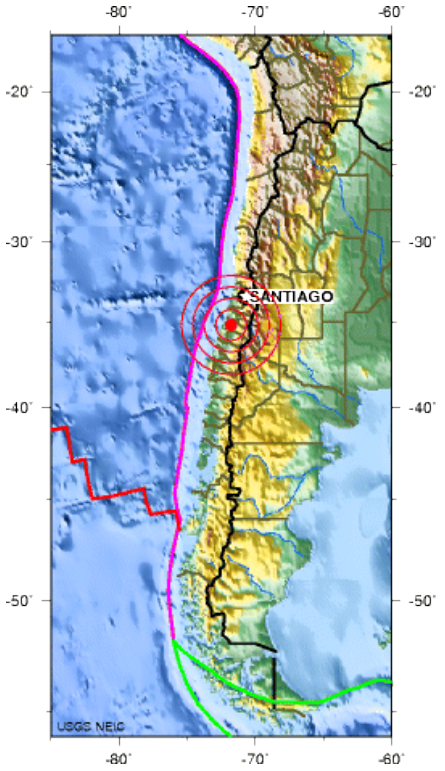
A major earthquake struck central Chile Sunday night. This was the strongest and longest earthquake that many people said they had felt since the magnitude 8.8 earthquake more than two years ago. Initial reports indicate only minor damage and injuries, with no reports of death.

The quake was located 136 miles (219 kilometers) south-southwest of the capital Santiago.

While people along a stretch of Chile's central coast were briefly warned to head for higher ground, that tsunami evacuation was quickly cancelled. There was no Pacific Ocean-wide tsunami expected, and no warnings were issued.



Firefighters inspect a building in downtown Santiago after an earthquake in central Chile (*AP Photo/Aliosha Marquez*)



USGS

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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. MMI describes the severity of an earthquake in terms of its effect on humans and structures and is a rough measure of the amount of shaking at a given location.

Overall, the population in this region resides in structures that are resistant to earthquake shaking, though some vulnerable structures exist.

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.

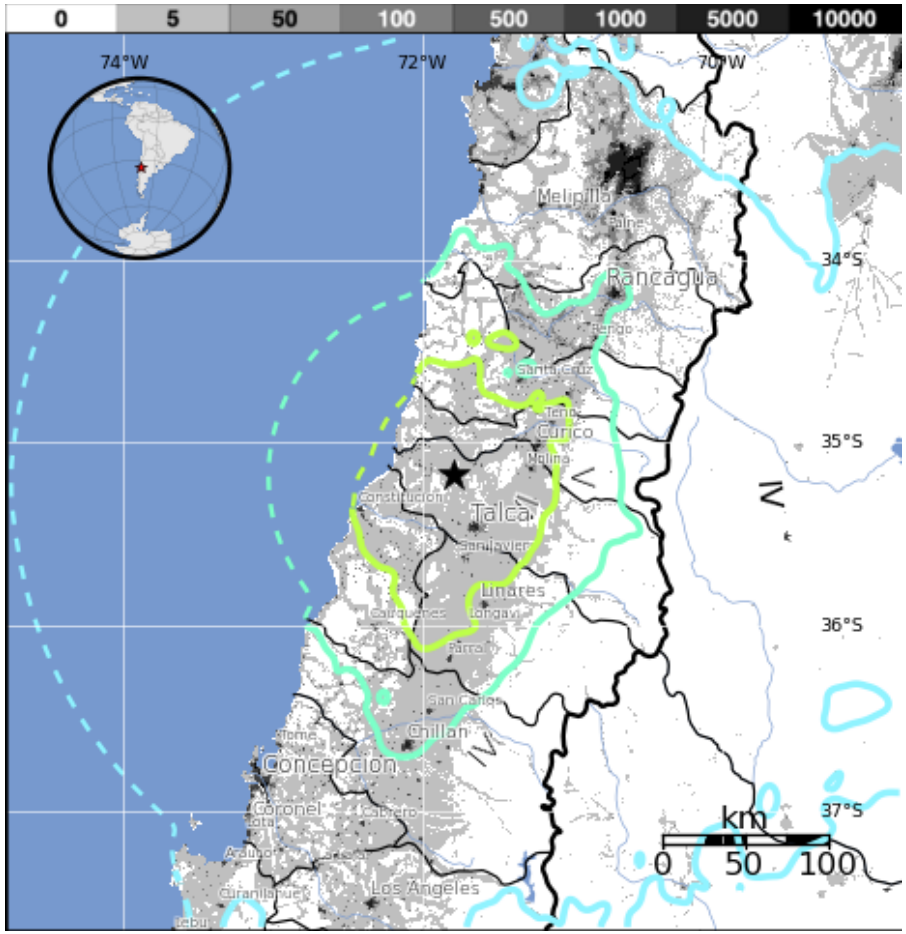

Image courtesy of the US Geological Survey

Estimated Modified Mercalli Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	---*	960k*	10,100k	1,287k	810k	9k	0	0	0
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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Shaking intensity scales were developed to standardize the measurements and ease comparison of different earthquakes. The Modified-Mercalli Intensity scale is a twelve-stage scale, numbered from I to XII. The lower numbers represent imperceptible shakin levels, XII represents total destruction. A value of IV indicates a level of shaking th is felt by most people. This earthquake produced strong ground shaking within about 100 km of the epicenter.

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

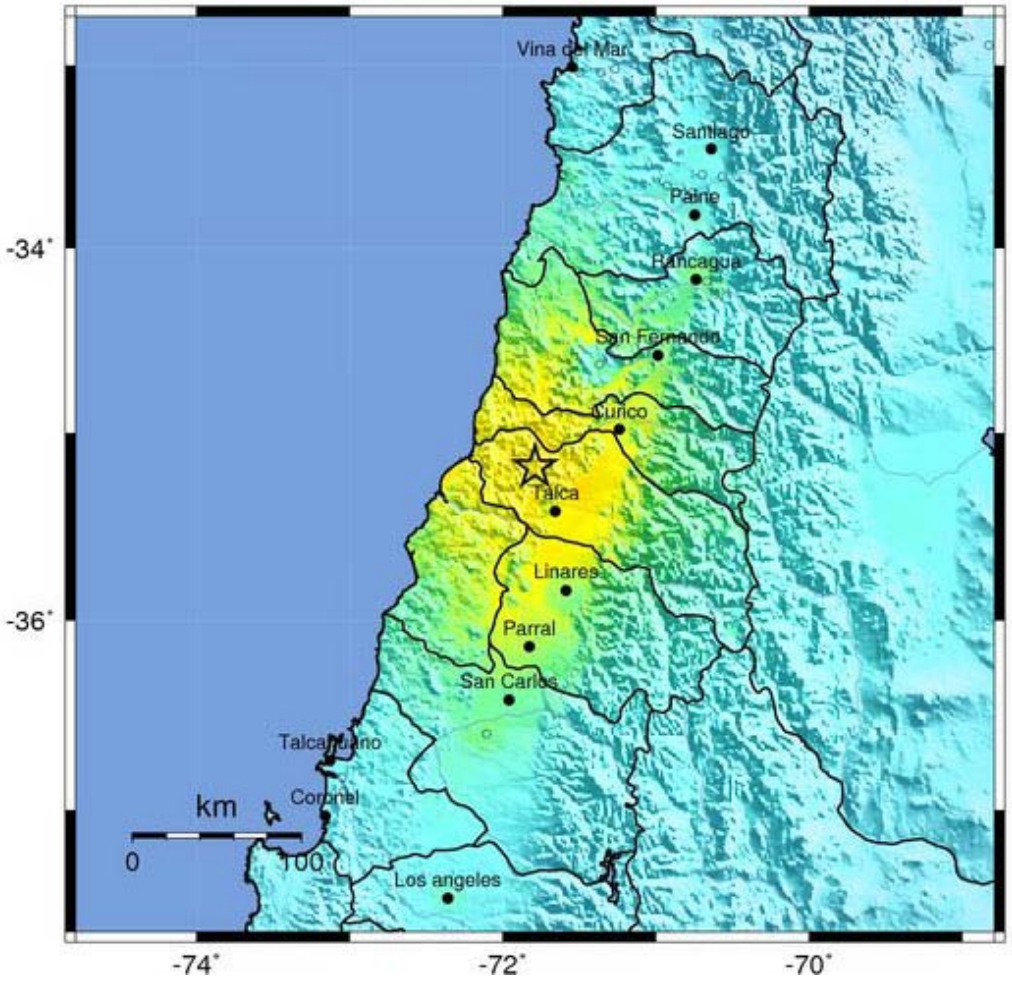

Image courtesy of the US Geological Survey

USGS Estimated shaking Intensity from M 7.1 Earthquake

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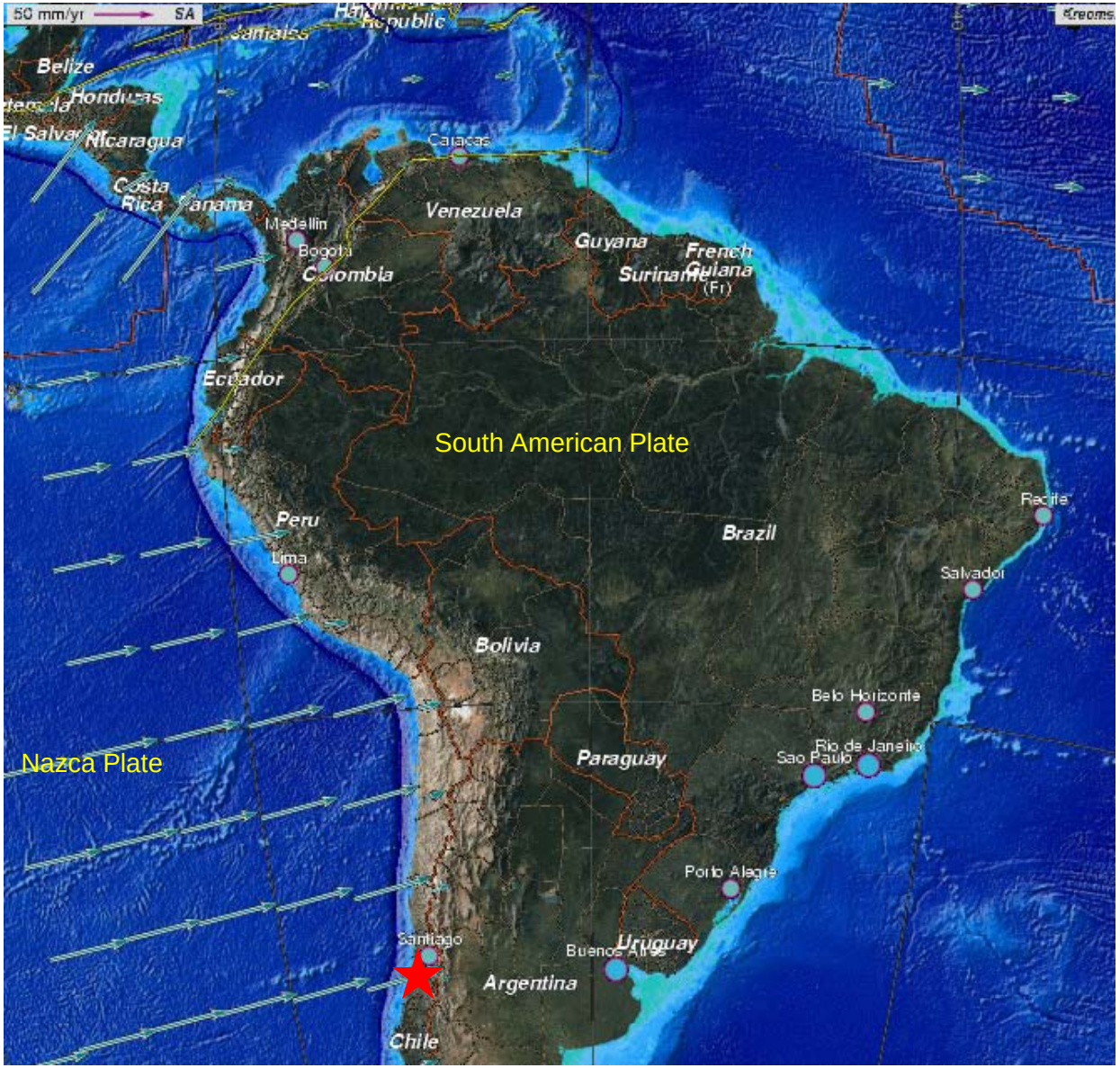
This earthquake occurred on the subduction zone plate boundary at the Peru – Chile Trench where the oceanic Nazca Plate subducts beneath the continental South American Plate.

The red star on the map below shows the epicenter of the earthquake while the arrows show the direction of motion of the Nazca Plate toward the South American Plate.

At the location of this earthquake, the two plates are converging at a rate of about 8 cm/yr.



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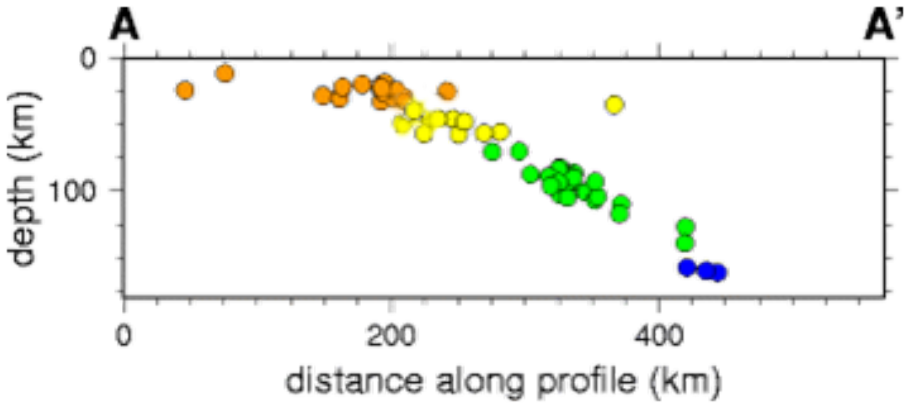
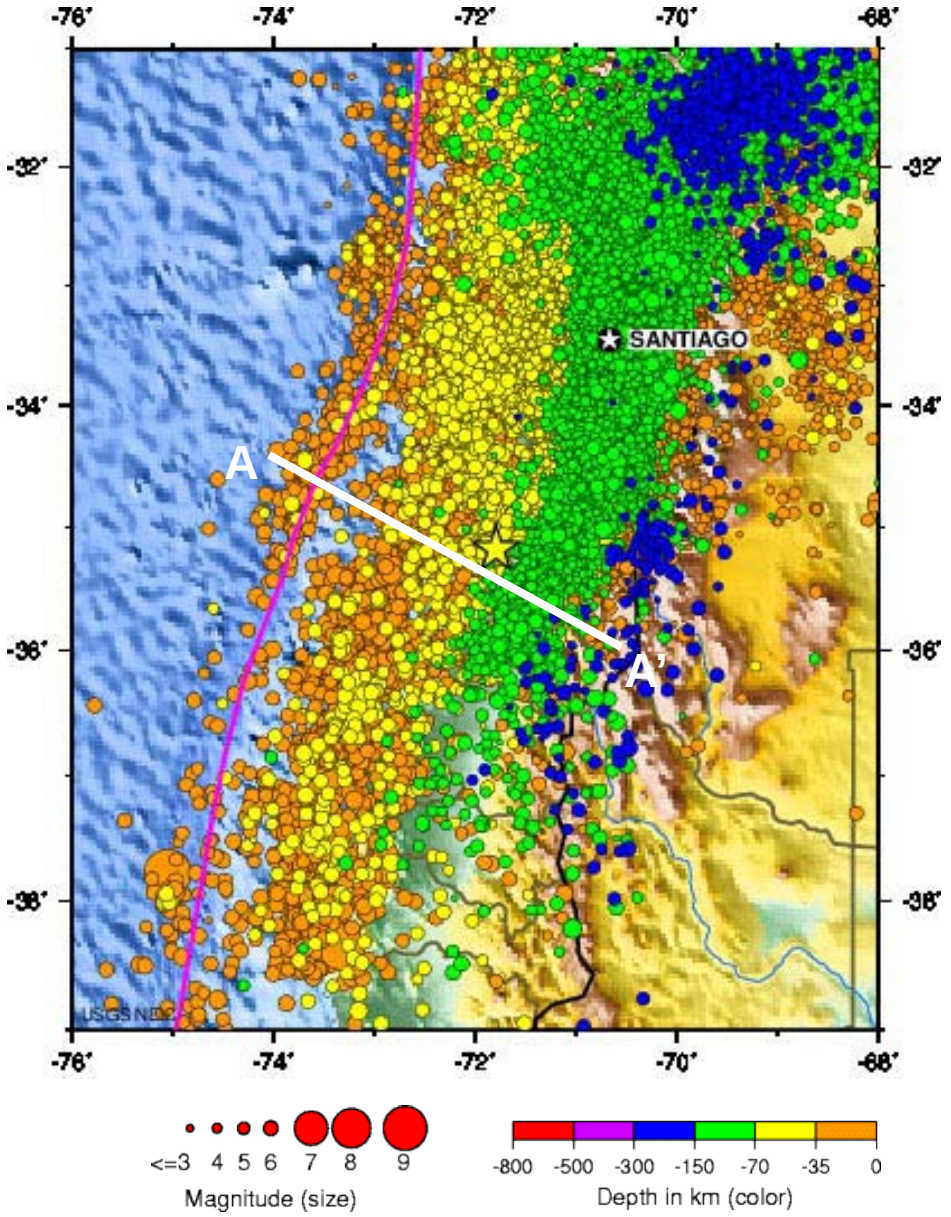
The map on the right shows historic earthquake activity near the epicenter (star) from 1990 to present.

As shown on the cross section, earthquakes are shallow (orange dots) at the Peru - Chile Trench and increase to 300 km depth (blue dots) towards the east as the Nazca Plate dives deeper beneath the South American Plate.



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



Images courtesy of the U.S. Geological Survey

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This earthquake occurred at the boundary between the Nazca and South American tectonic plates as a result of thrust faulting. The Nazca plate, oceanic in origin, subducts beneath the South America plate along the Peru-Chile trench.

At the location of this event, the Nazca plate moves east-northeastwards with respect to South America at a rate of approximately 80 mm/yr.

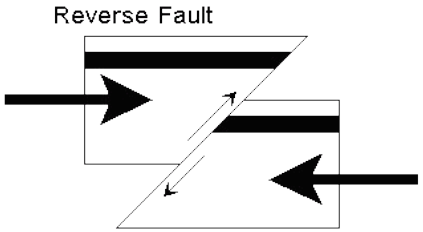
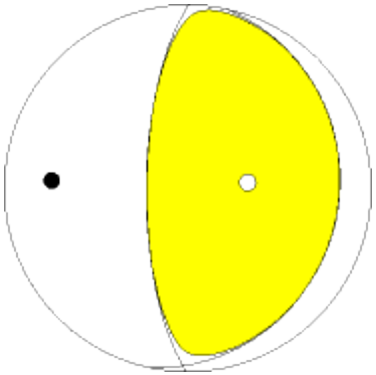
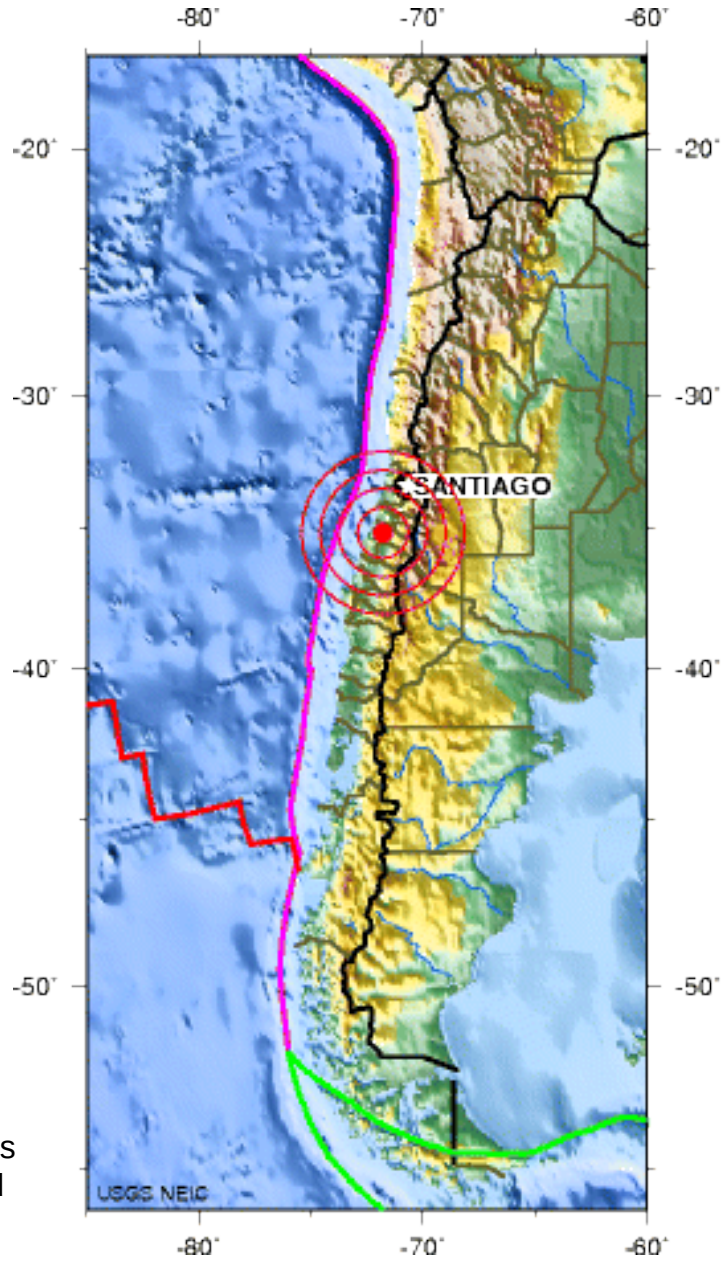


Image courtesy of Richard Harwood, Black Hawk College



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 dots represent the axis of maximum compressional strain (in black, called the "P-axis") and the axis of maximum extensional strain (in white, called the "T-axis") resulting from the earthquake.

USGS Centroid Moment Tensor Solution



Images courtesy of the U.S. Geological Survey

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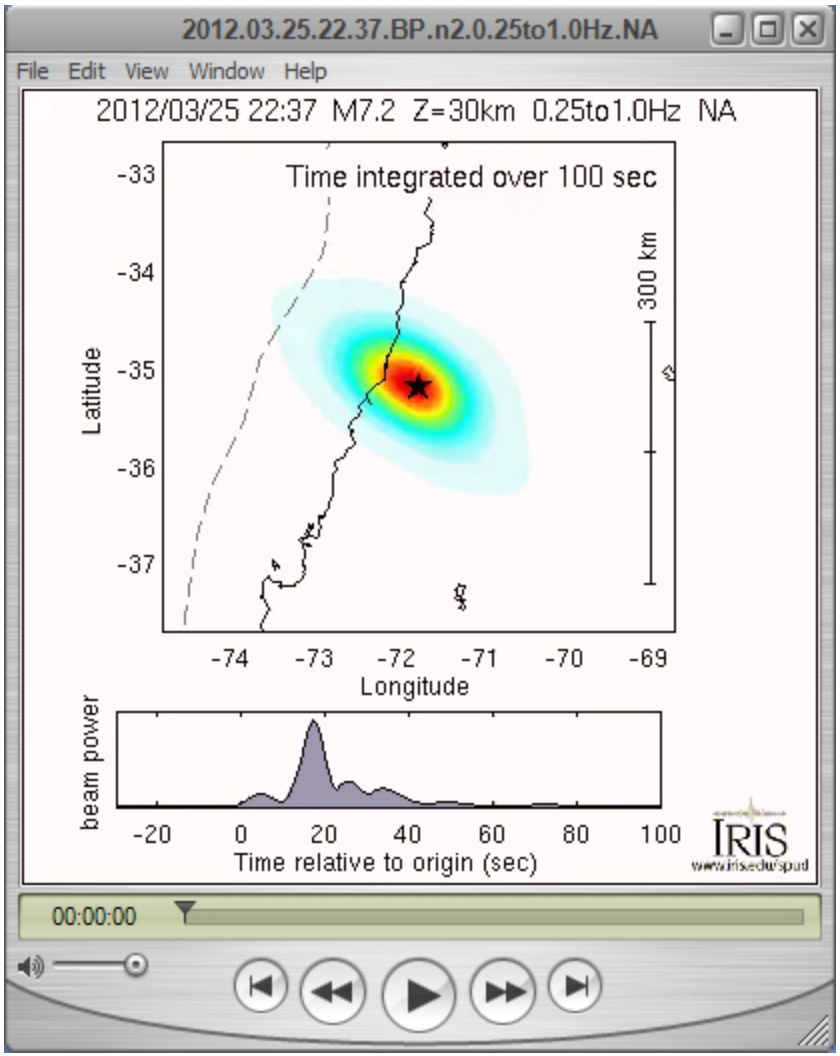
Back Projections are movies created from an automated data processing sequence that stacks up P wave energy recorded on many seismometers on a flat grid around the source region. This grid approximates the fault surface and creates a time and space history of the earthquake.

Warmer colors indicate greater beam power. In the movies, a red circle shows the location of the peak beam power when absolute beam powers are low.

Duration of rupture along the fault can be seen in the graph.



More info: http://www.iris.edu/spud/backprojection

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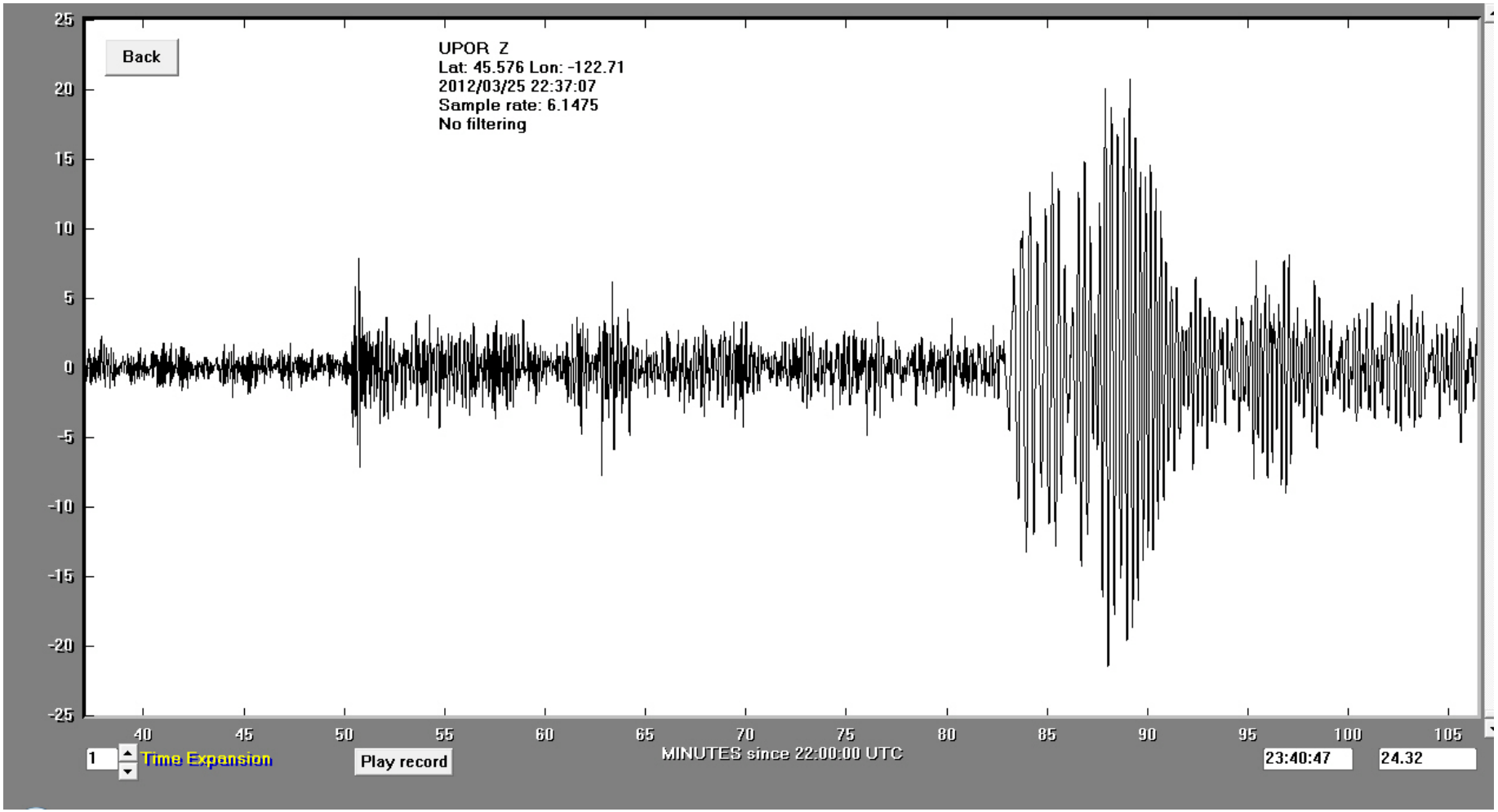
The record of the M7.1 Maule, Chile earthquake on the University of Portland seismometer (UPOR) is illustrated below.



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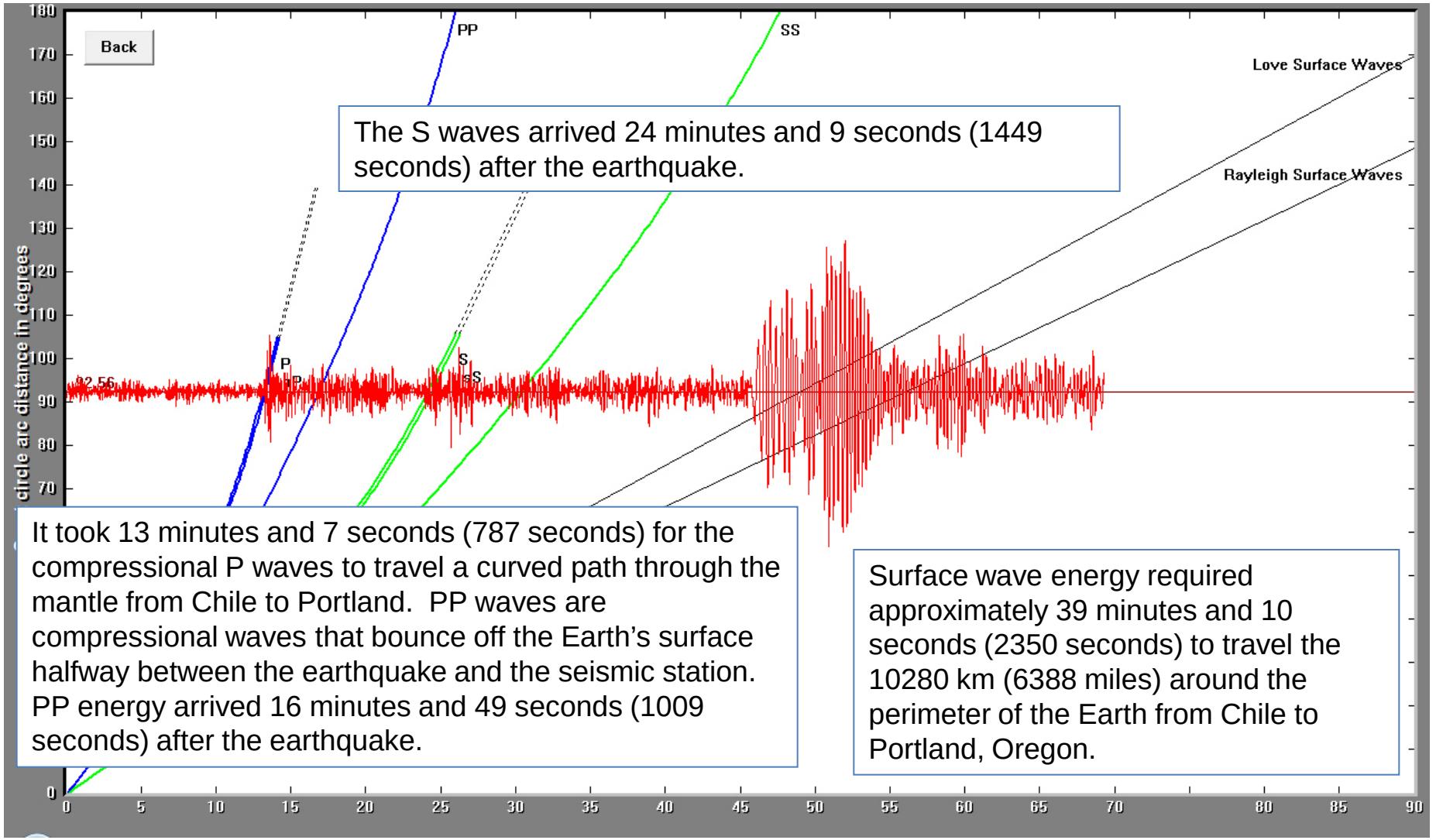
Portland is about 10280 km (6388 miles, 92.6°) from the location of this earthquake.



The S waves arrived 24 minutes and 9 seconds (1449 seconds) after the earthquake.

It took 13 minutes and 7 seconds (787 seconds) for the compressional P waves to travel a curved path through the mantle from Chile to Portland. PP waves are compressional waves that bounce off the Earth's surface halfway between the earthquake and the seismic station. PP energy arrived 16 minutes and 49 seconds (1009 seconds) after the earthquake.

Surface wave energy required approximately 39 minutes and 10 seconds (2350 seconds) to travel the 10280 km (6388 miles) around the perimeter of the Earth from Chile to Portland, Oregon.