

Magnitude 7.6 SOUTH OF IQUIQUE, CHILE

Thursday, April 3, 2014 at 02:43:14 UTC



USGS

A powerful aftershock struck off northern Chile prompting an evacuation of the coastal area and raising fears of a tsunami. This magnitude 7.6 earthquake is the largest of a series of aftershocks following a massive and deadly 8.2 magnitude earthquake that hit late Tuesday. This earthquake was located 19 km (12 miles) south of the port city of Iquique at a depth 40 km (24.9 miles).



Heavy machinery is used in the clearing of debris on the road leading to the town of Camarones. The road was cut off due to the magnitude-8.2 quake that struck Chile's Northern coast on Tuesday. Authorities discovered surprisingly light damage from the earthquake. As strong aftershocks continue, power remains out in many areas, and hospitals were handling only emergencies. Schools were closed, and large supermarkets and gas stations coordinated their reopenings Thursday with police and military to avoid problems with long lines of customers.

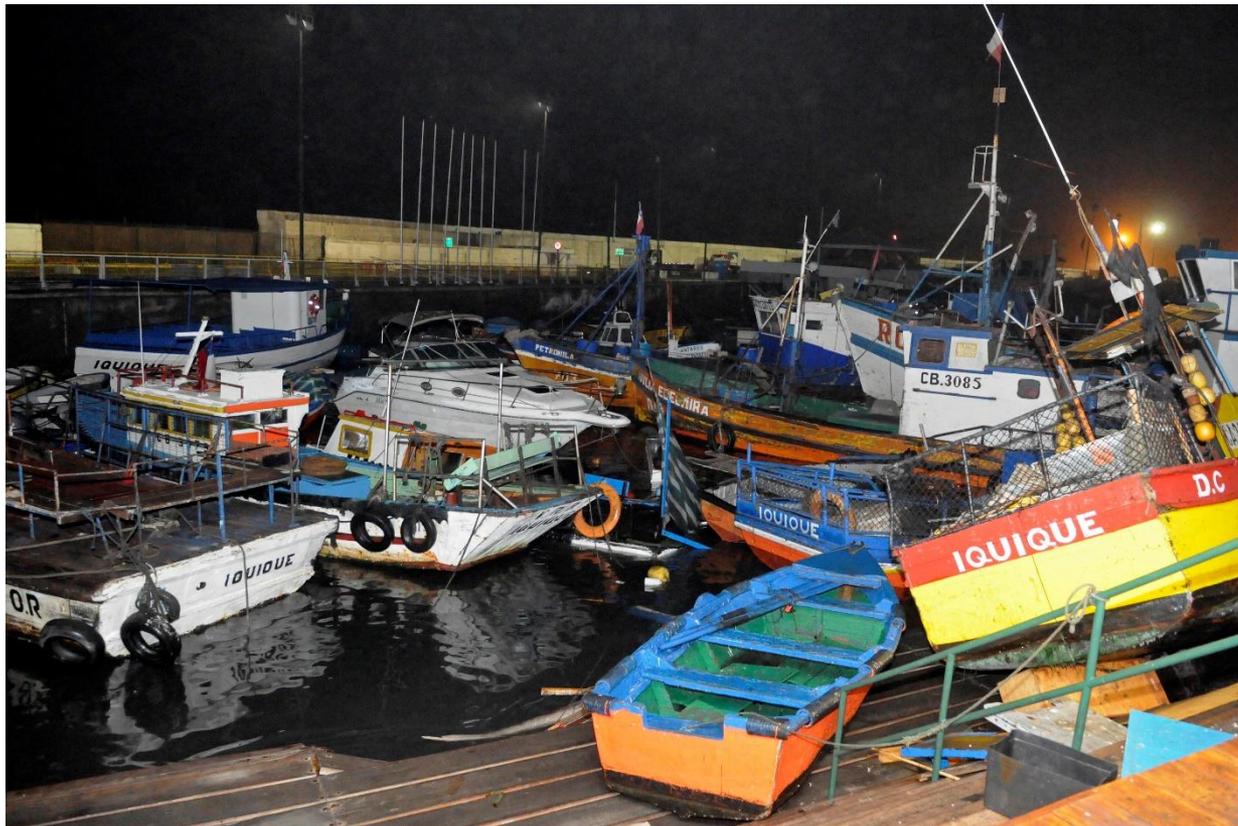
(AP Photo/ Luis Hidalgo)

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Because the April 3 M7.6 earthquake was both smaller and deeper than the April 1 M8.2 subduction zone earthquake, no Pacific-wide tsunami warning was issued. There was a precautionary evacuation of low-lying areas on the northern coast.

The tide gauge at Iquique measured a local tsunami of 0.74 meters height.



A local tsunami was recorded after the magnitude 8.2 earthquake. Fishing boats washed ashore by this small tsunami, sit in Caleta Riquelme, adjacent to the port, in the northern town of Iquique, Chile.

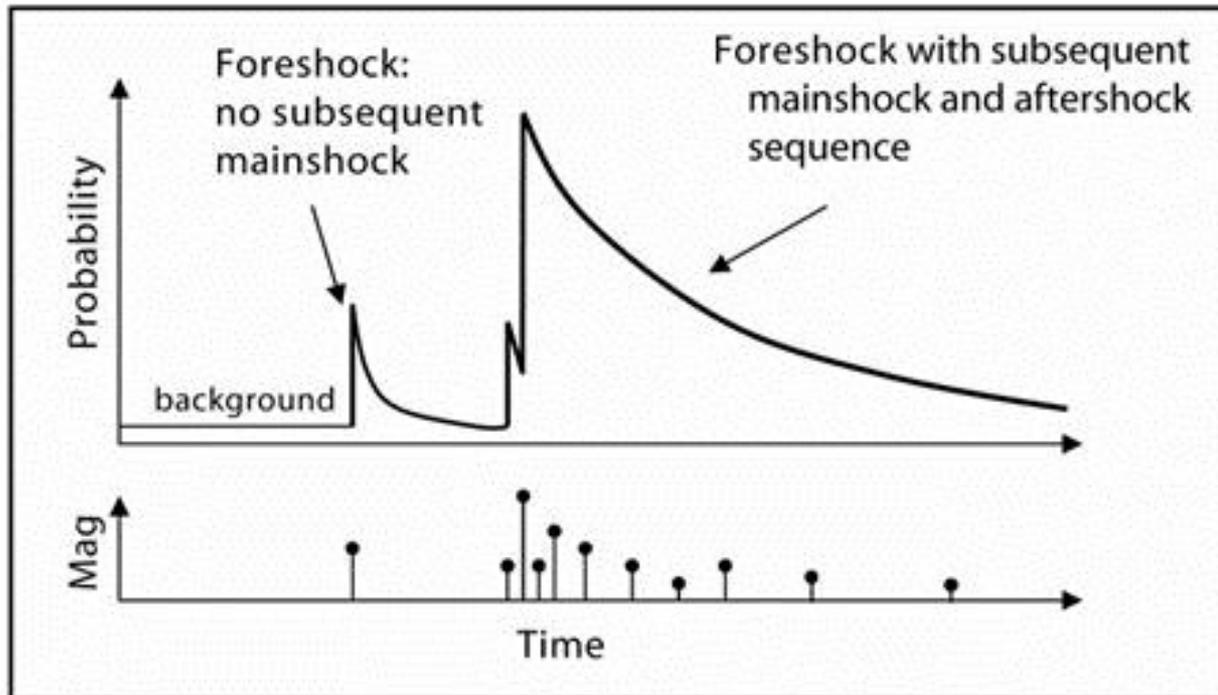
(AP Photo/Cristian Viveros)

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Aftershock sequences follow predictable patterns as a group, although the individual earthquakes are themselves not predictable. The graph below shows how the number of aftershocks and the magnitude of aftershocks decay with increasing time since the main shock. The number of aftershocks also decreases with distance from the main shock.

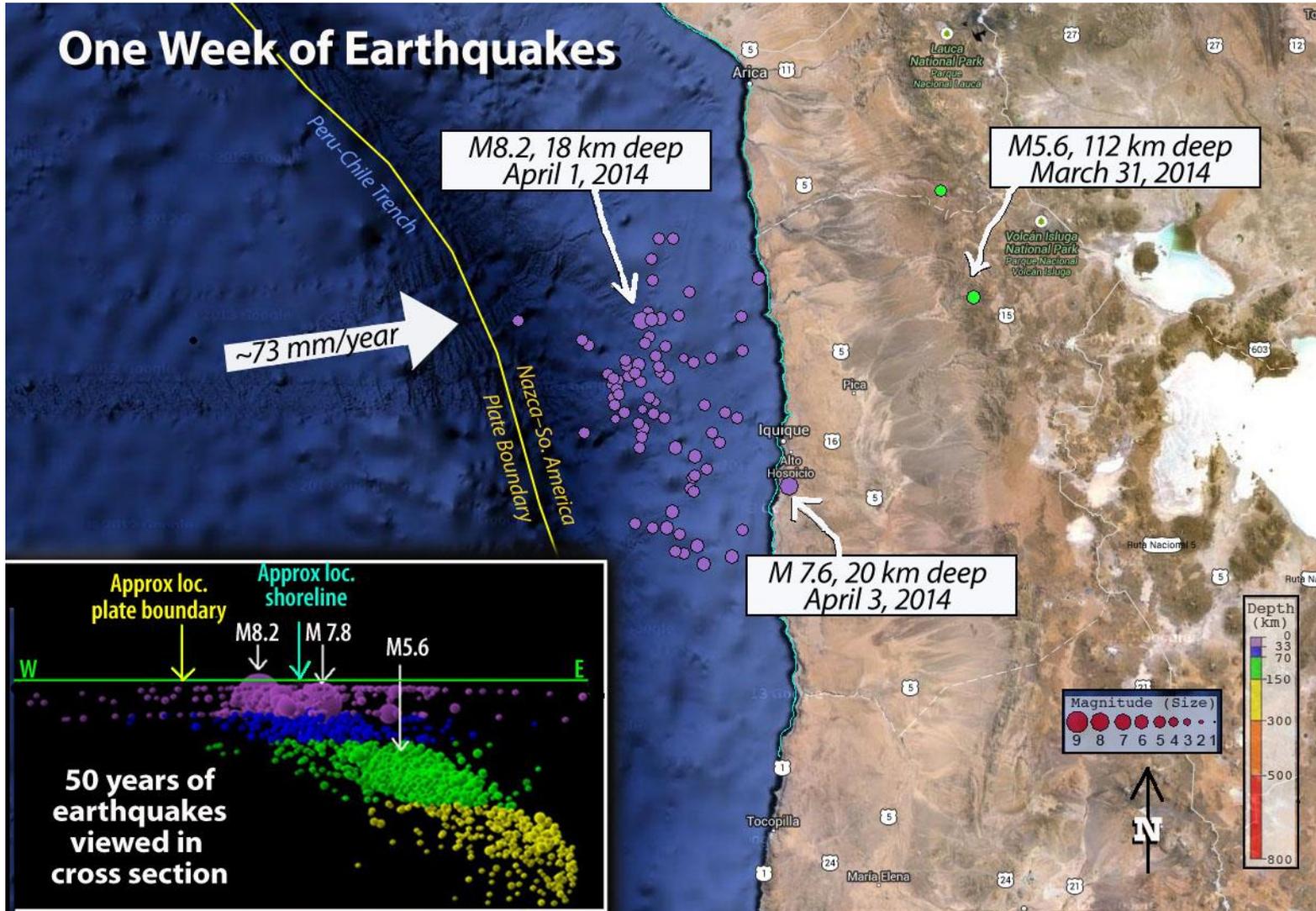
Over 47 aftershocks greater than M4.2 have occurred, with this M7.6 earthquake the largest aftershock.



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A week of earthquakes with an inset of 50 years of earthquakes plotted in 3D.

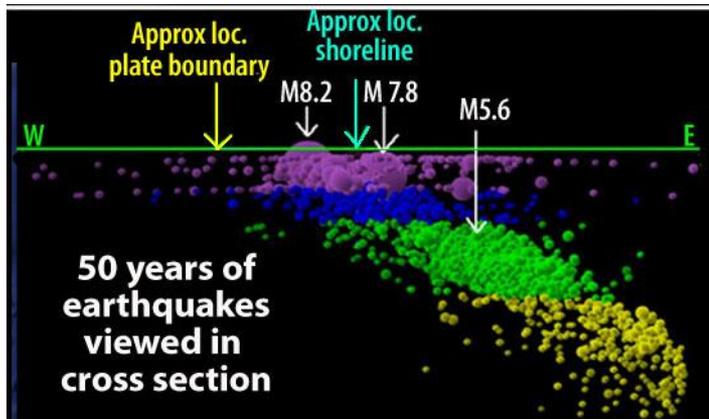


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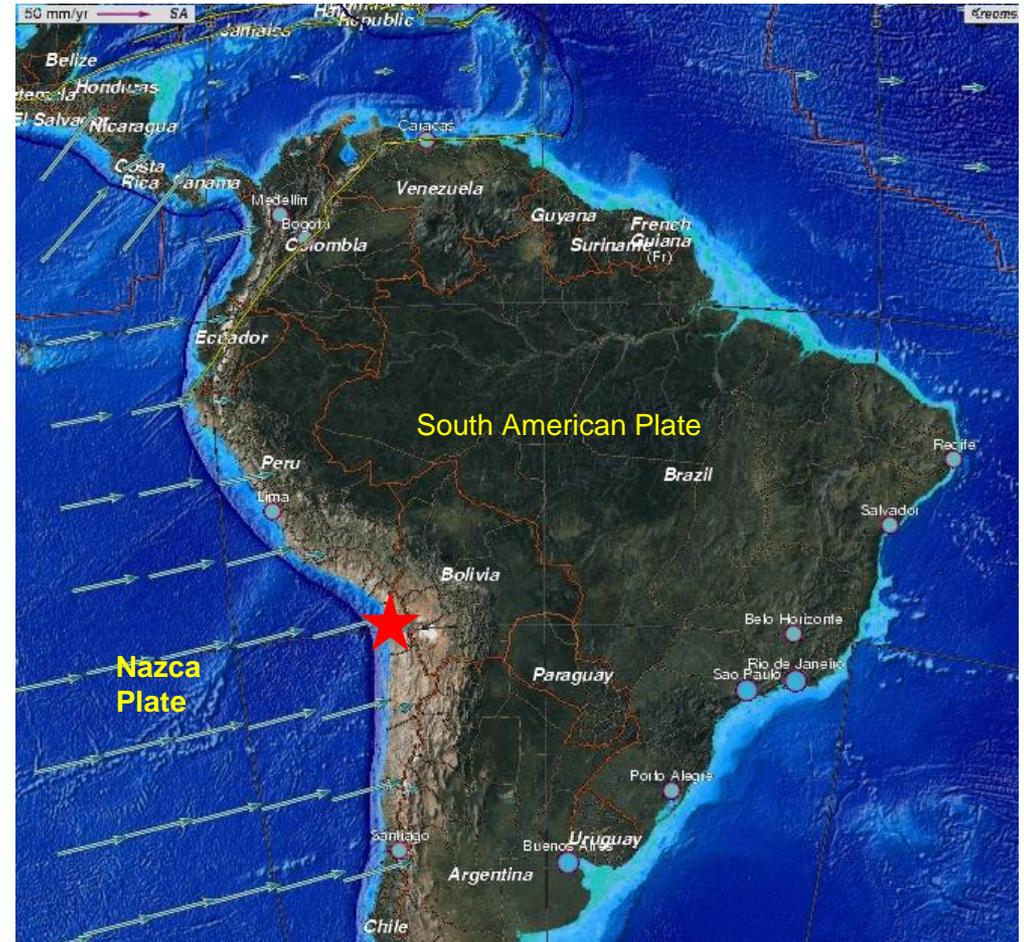
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This earthquake occurred on the subduction zone plate boundary at the Peru – Chile Trench where the oceanic Nazca Plate subducts beneath the continental South American Plate.

This subduction can be seen in a cross section of 50 years of earthquake plotted by depth.



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



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USGS PAGER

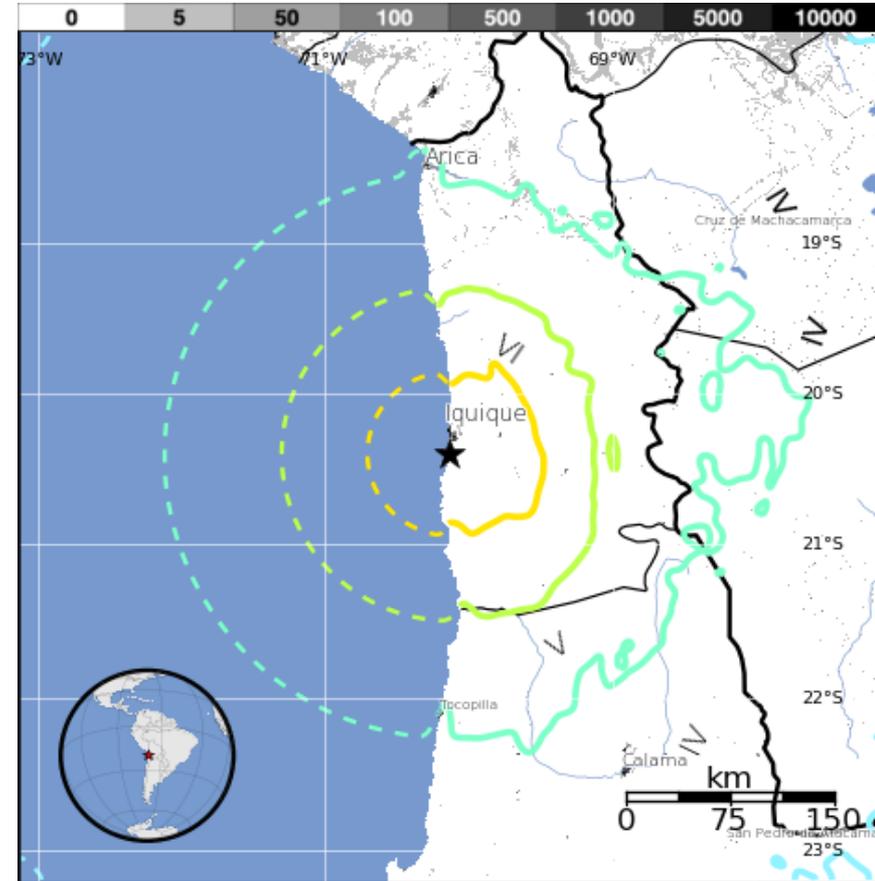
Population Exposed to Earthquake Shaking

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

Over 50,000 people experienced very strong shaking and 258,000 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	--*	0k*	580k*	218k	258k	50k	0k	0k	0k
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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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.

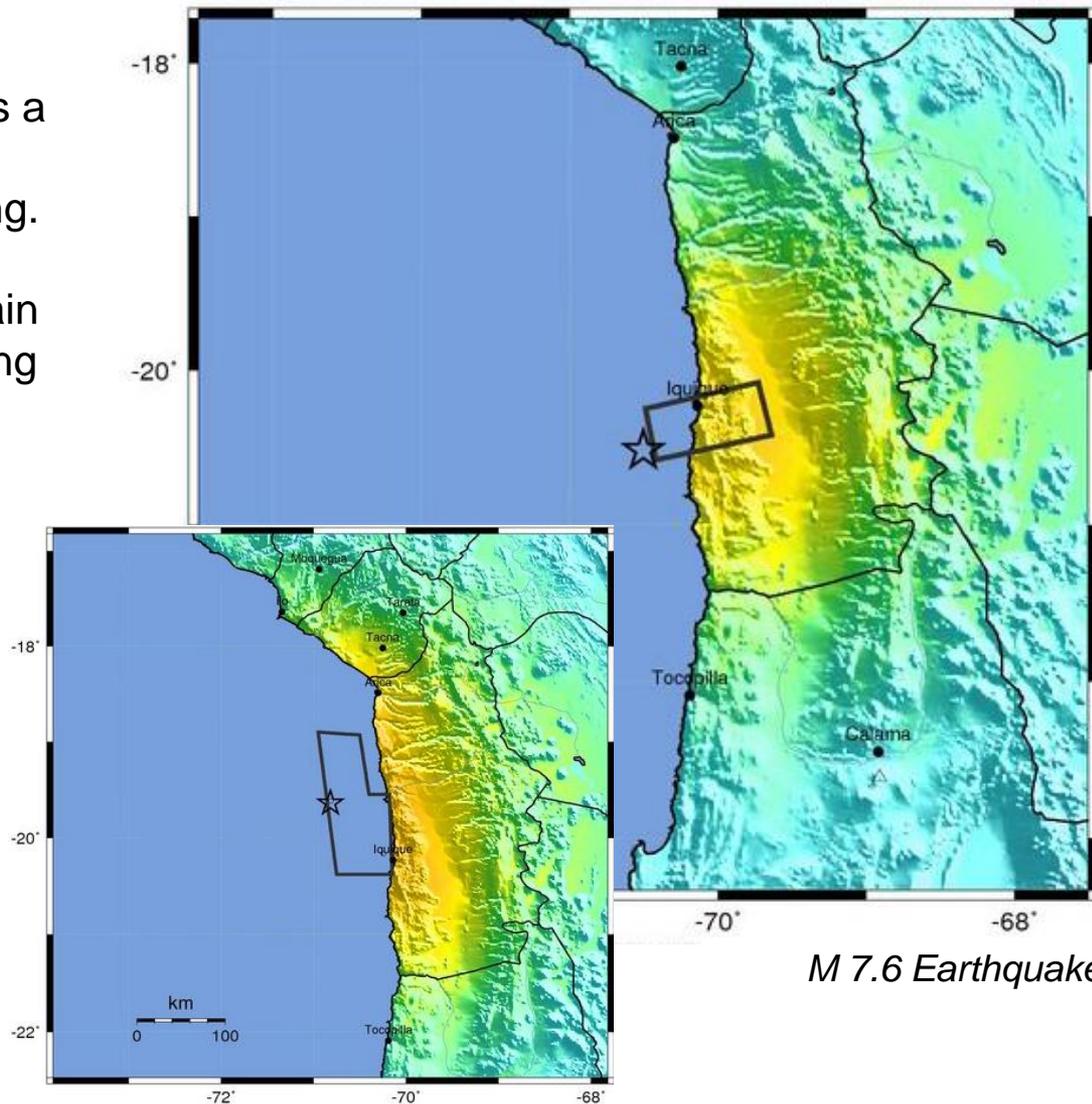
Residents in the vicinity of Iquique again experienced very strong ground shaking from this aftershock.

Modified Mercalli Intensity



Perceived Shaking

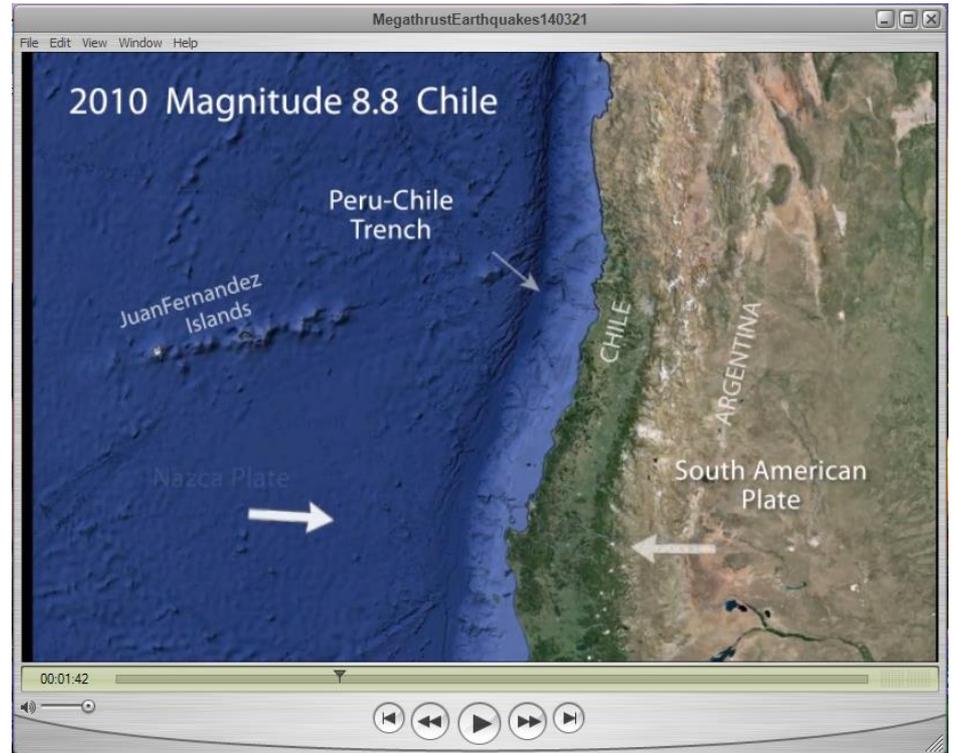
Extreme
Violent
Severe
Very Strong
Strong
Moderate
Light
Weak
Not Felt



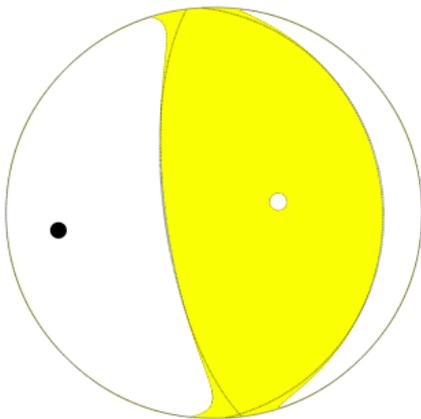
M 7.6 Earthquake

USGS Estimated shaking intensity from M 8.2 Earthquake

Like the M8.2 mainshock, this M7.6 aftershock has of thrust faulting mechanism consistent with displacement along the megathrust boundary between the Nazca and South America plates.



Animation exploring subduction-zone mega-thrust earthquakes, the most powerful earthquakes in the world.

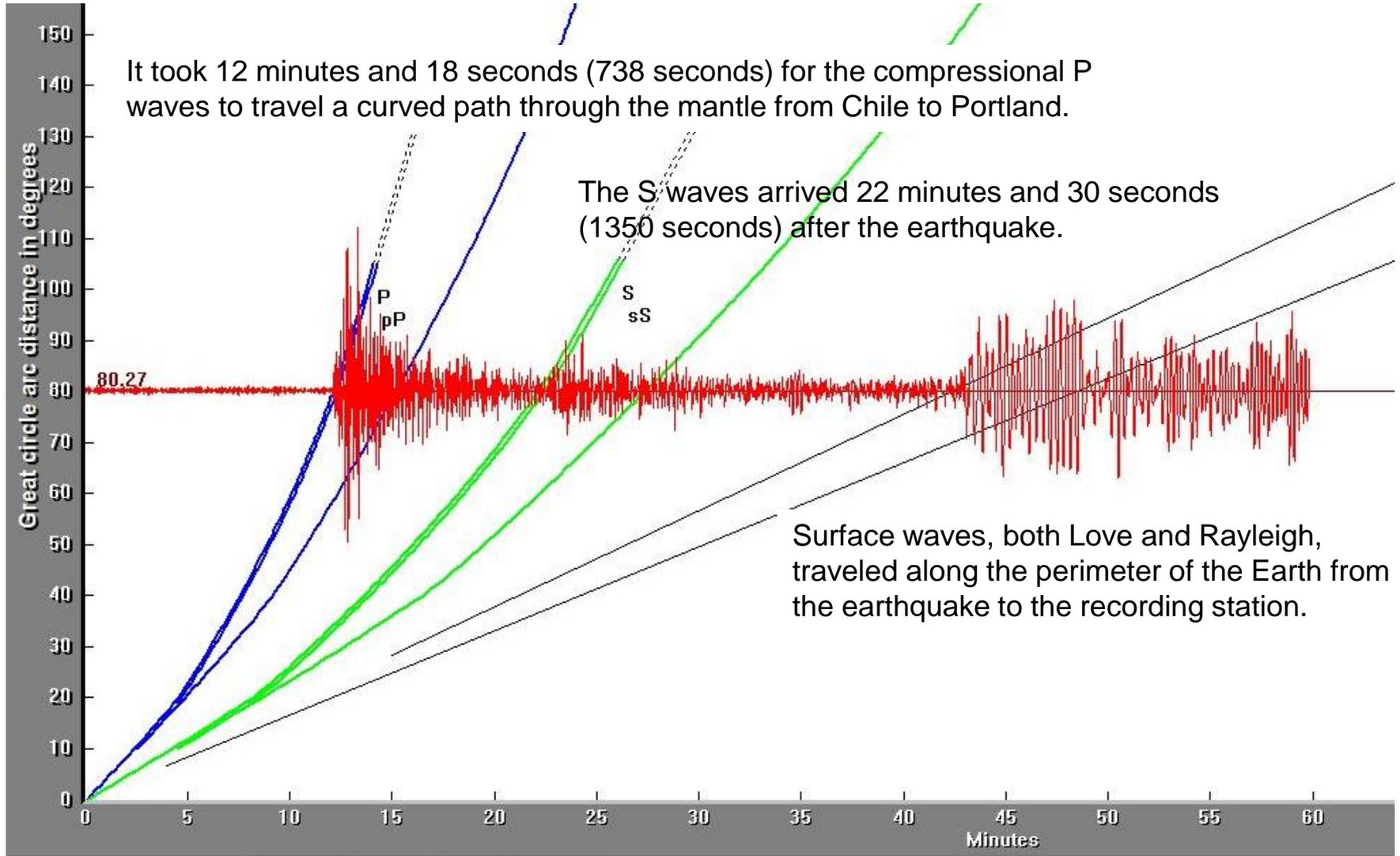


The tension axis (white dot) reflects the minimum compressive stress direction. The pressure axis (black dot) reflects the maximum compressive stress direction.

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The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is about 9024 km (5607 miles, 81.3°) from the location of this earthquake.



Teachable Moments are a service of

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