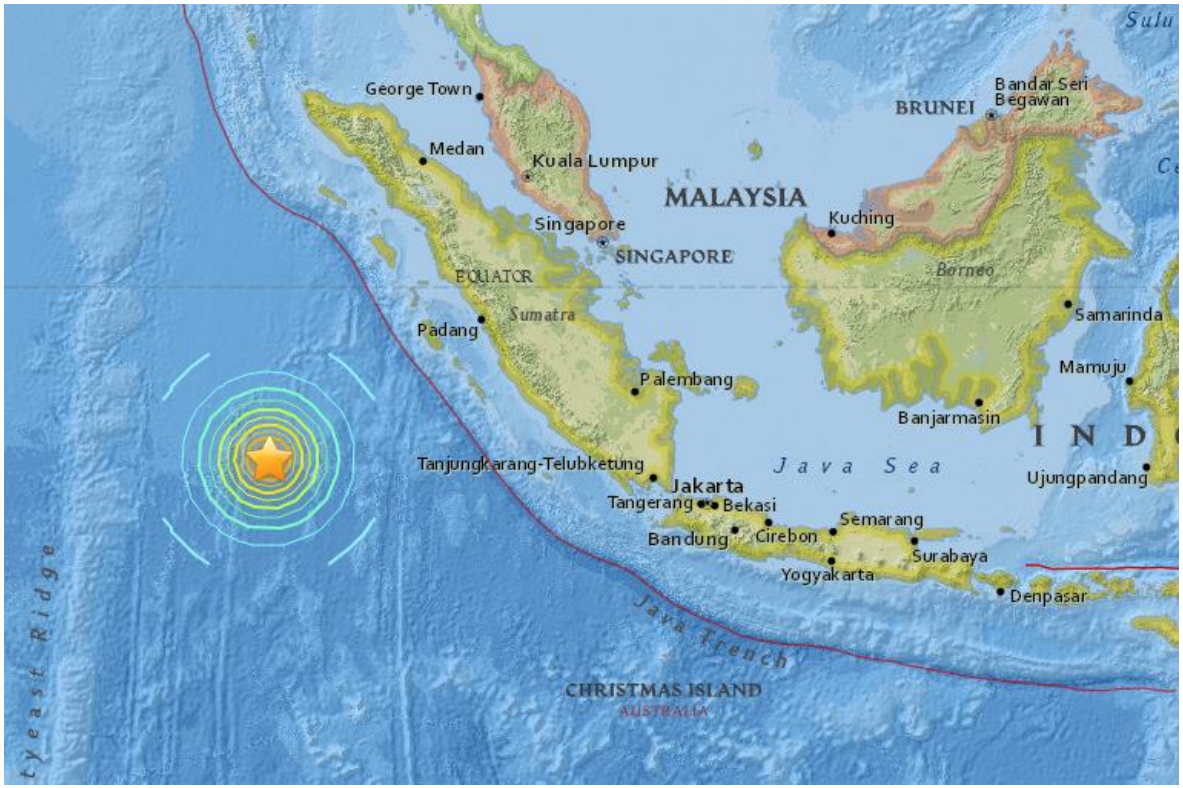
Magnitude 7.8 SW OF SUMATRA, INDONESIA

Wednesday, March 2, 2016 at 12:49:46 UTC

USGS

A 7.8 magnitude earthquake occurred 800 km off the west coast of southern Sumatra, Indonesia, as a result of strike-slip faulting within the mantle lithosphere of the Indo-Australia Plate.

There are currently no reports of damage or injury, and there is no risk of a large tsunami.



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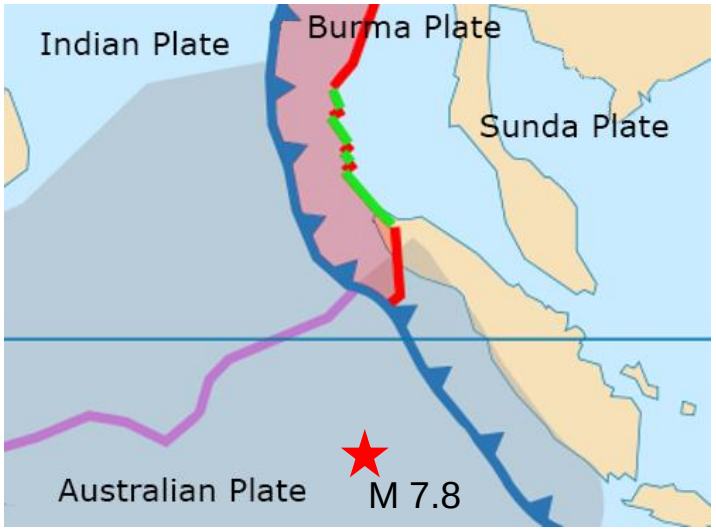
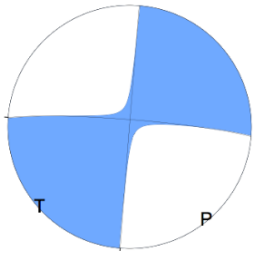
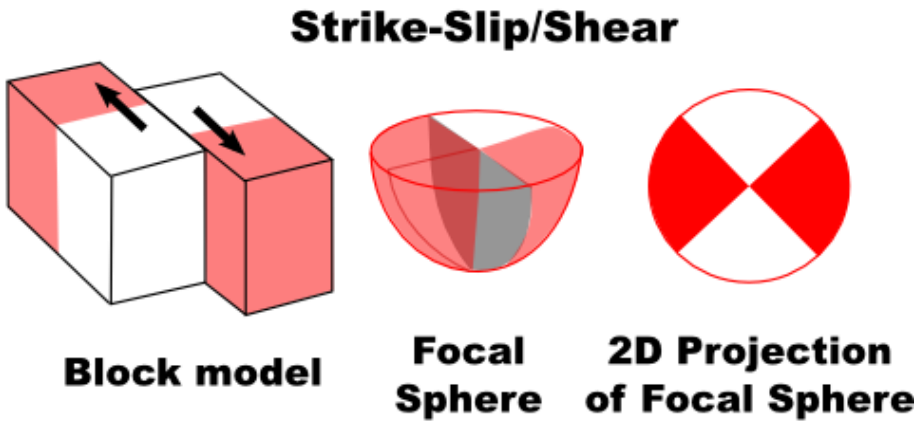
This earthquake occurred as a result of strike-slip faulting. Additional analysis indicates right-lateral motion on an E-W oriented fault. This is consistent with NW-SE oriented compression as the underlying cause of the earthquake.

This event is located 600 km southwest of the major subduction zone that defines the plate boundary between the Indo-Australia and Sunda Plates offshore Sumatra. It was on this subduction zone that a 1300-km-long segment ruptured in December of 2004 producing a massive M 9.1 earthquake.





USGS Centroid Moment Tensor Solution



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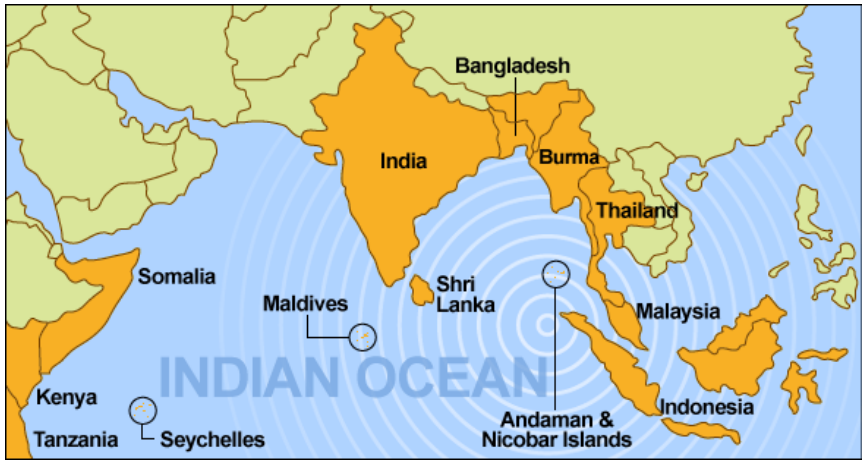
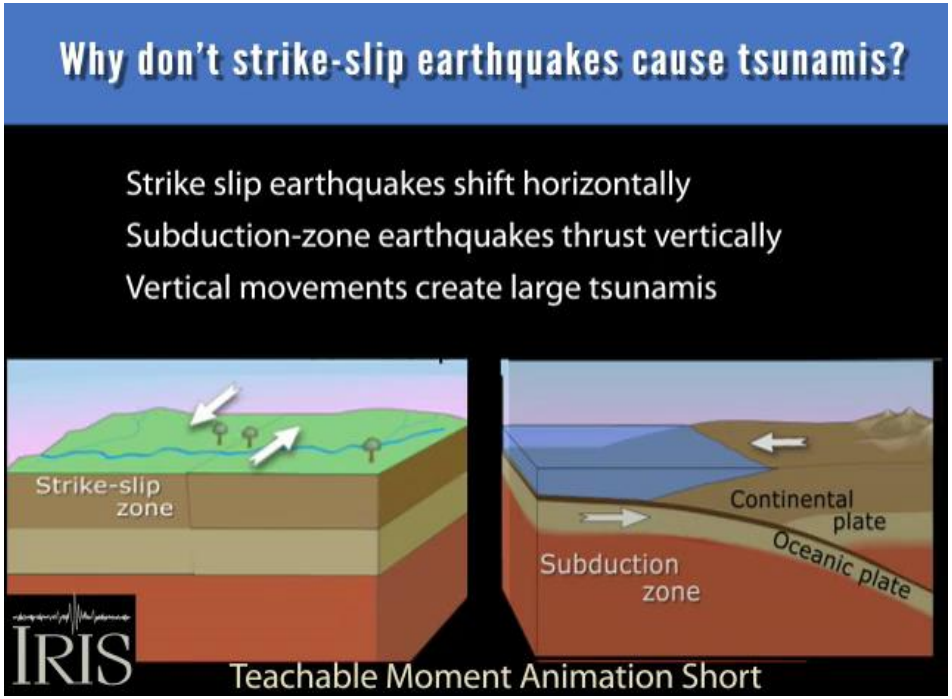
The 2004 M 9.1 megathrust earthquake off the coast of Sumatra triggered the world's deadliest ever tsunami, killing more than 200,000 people across the region.



Countries significantly impacted by the 2004 tsunami



After the March 2, 2016 earthquake was felt, many residents began evacuations to higher ground until the tsunami warning was lifted.

Understanding the type of earthquake is very important for evaluating the risk of a tsunami.

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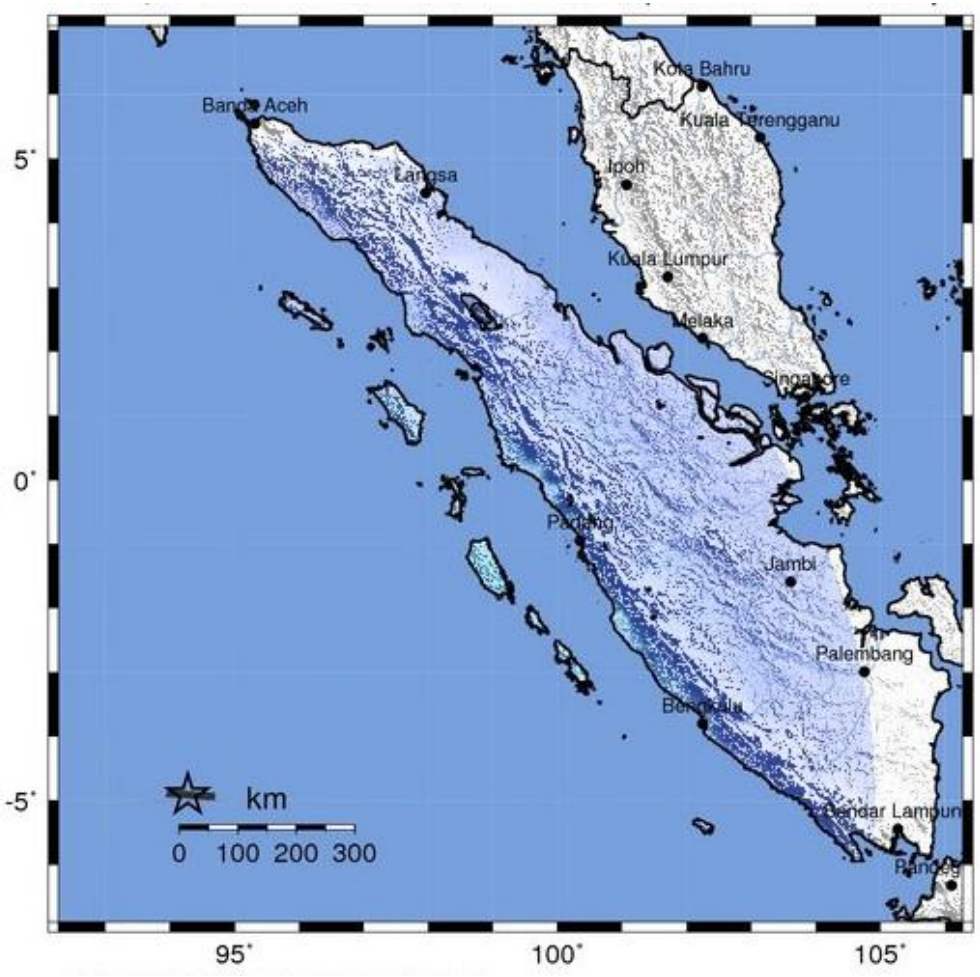
Shaking intensity scales were developed to standardize the measurements and ease comparison of different earthquakes. The Modified-Mercalli Intensity scale is a twelve-stage scale, numbered from I to XII. The lower numbers represent imperceptible shaking levels, XII represents total destruction

This M 7.8 event only cause weak shaking on the islands nearest the 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



USGS Estimated Shaking Intensity from M 7.8 Earthquake

Image courtesy of the US Geological Survey

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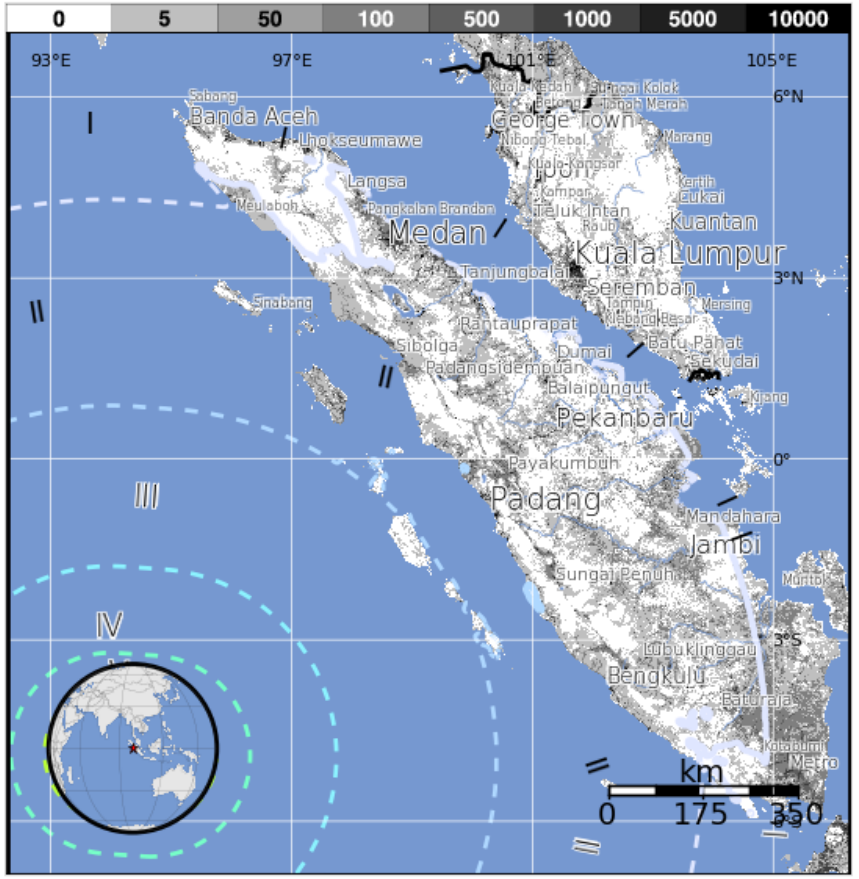
USGS PAGER
Population Exposed to Earthquake Shaking

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

The USGS estimates that shaking was felt only weakly along the west coast of Sumatra.

MMI	Shaking	Pop.
I	Not Felt	53,394k*
II-III	Weak	38,689k*
IV	Light	--*
V	Moderate	0k
VI	Strong	0k
VII	Very Strong	0k
VIII	Severe	0k



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

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The map on the right shows historic earthquake activity from 1990 to present near the epicenter. This M 7.8 intraplate event was produced by displacement on faults within the oceanic lithosphere of the Indo-Australian Plate.

Previous large events include

- **2004 M 9.1** megathrust earthquake that occurred on the subduction plate boundary where the Indo-Australian Plate subducts beneath the southeast Asia promontory of the Eurasian Plate.

- **2012 M 8.6** and **M 8.2** strike-slip events, located west of the Sunda Trench.

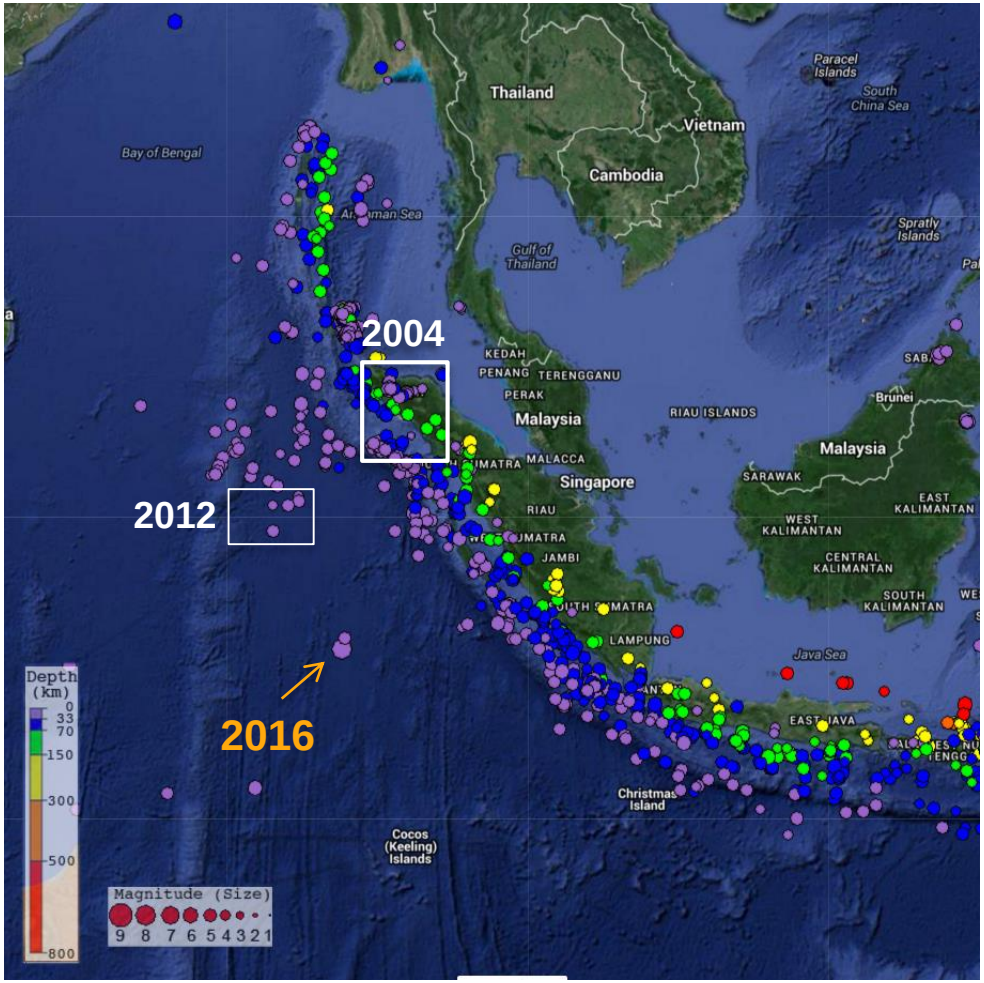

Image from the IRIS Earthquake Browser (www.iris.edu/ieb)

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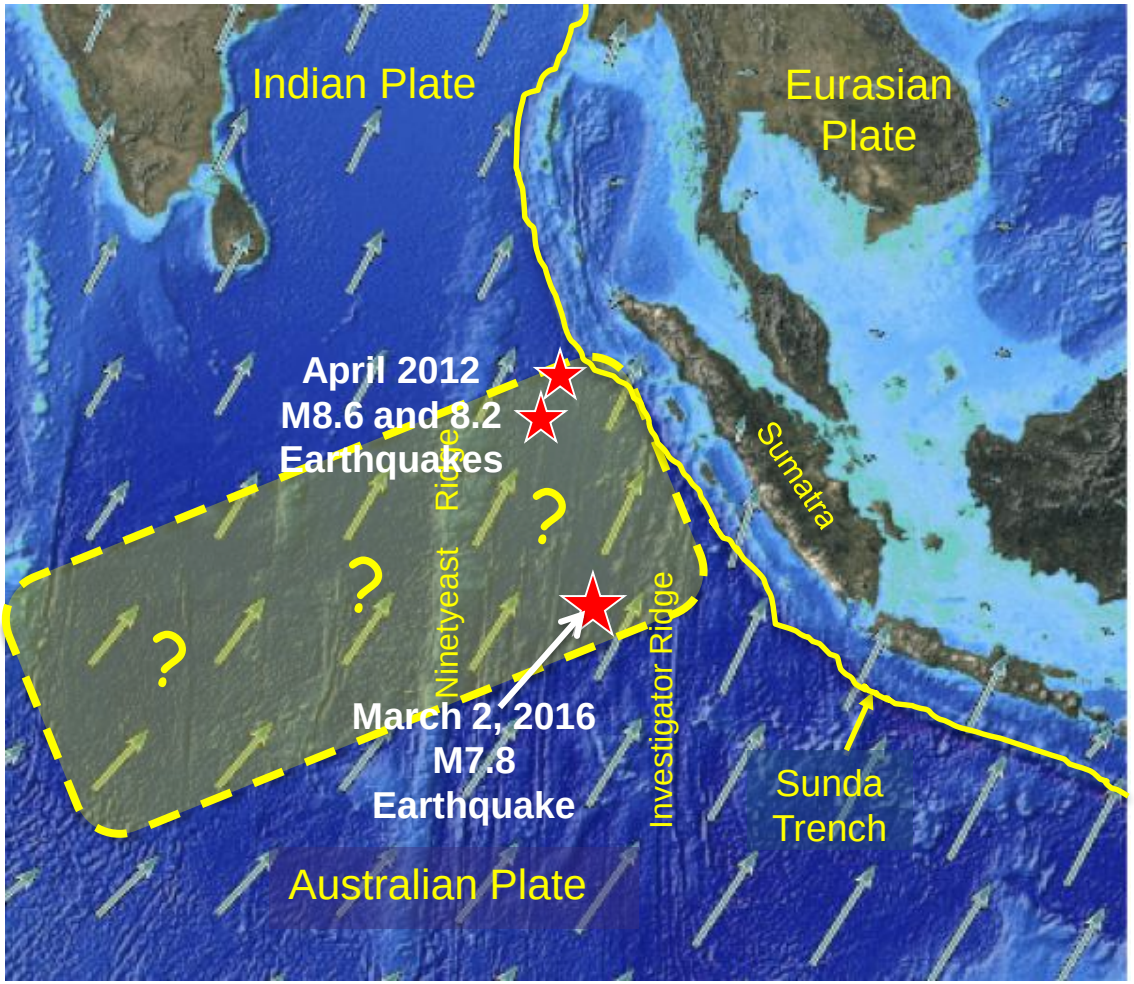
Near the location of this earthquake, the Indo-Australian Plate subducts at a rate of 5.5 cm/yr beneath the Southeast Asia promontory of the Eurasian Plate at the Sunda Trench. However, in this region, the Indian and Australian Plates slowly converge at a boundary that is diffuse and poorly understood.

Arrows show the motion of the Australian and Indian plates with respect to the Eurasian Plate.

Epicenters of the April 2012 great earthquakes and this major earthquake are shown by the red stars.

The dashed yellow line indicates the diffuse convergent boundary between the Australian and Indian plates.



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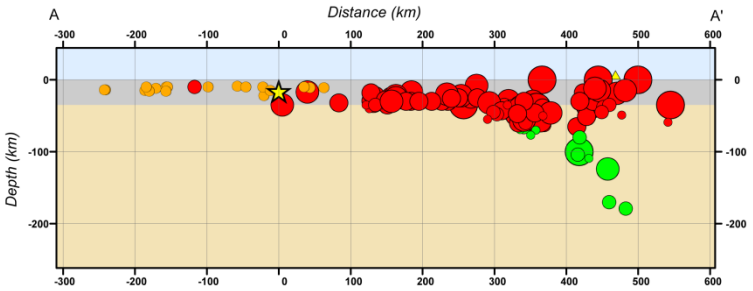
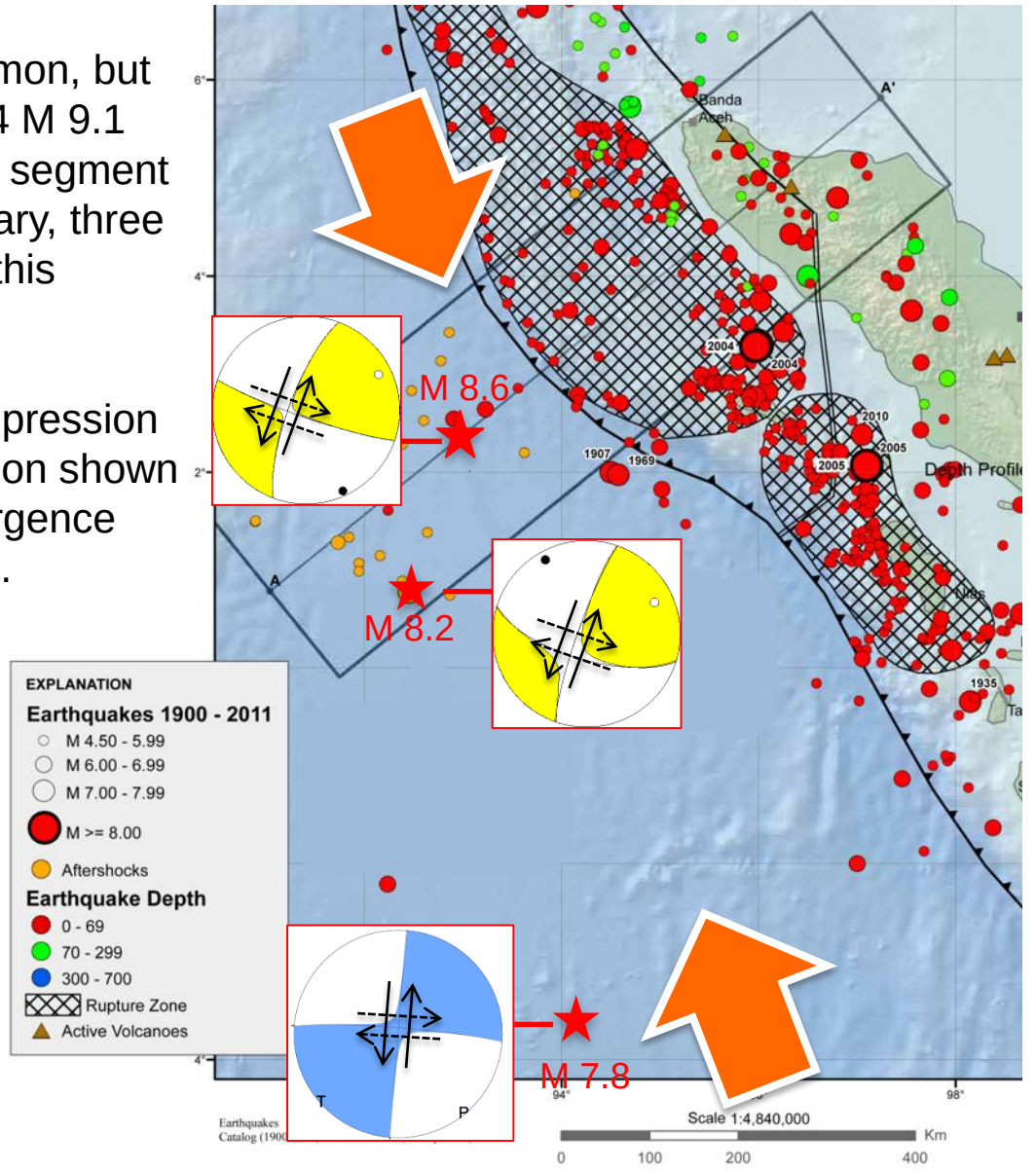
Large strike-slip earthquakes are uncommon, but they do occur. Since the December 2004 M 9.1 earthquake that ruptured a 1300 km long segment of the Sumatran megathrust plate boundary, three large strike-slip events have occurred in this region.

The NW-SE orientation of maximum compression is consistently observed. This compression shown by the orange arrows results from convergence between the Indian and Australian Plates.



Seismicity Cross Section across the subduction zone (April 2012 M 8.6)



Images courtesy of the U.S. Geological Survey

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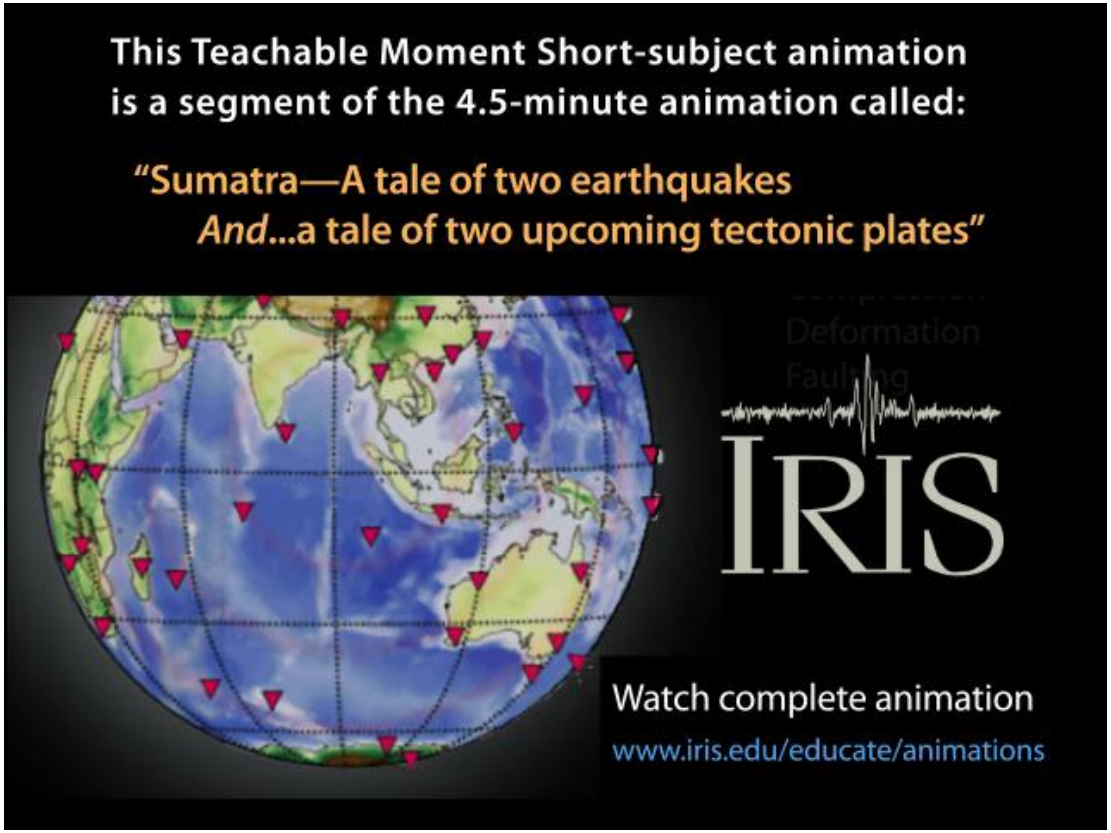
Explore an animation of the generalized regional tectonic setting.



This is an extract from "*Sumatra—A tale of two earthquakes*" which describes the mechanics of the 2004 and 2012 great earthquakes.

The full animation can be downloaded from IRIS www.iris.edu/educate/animations

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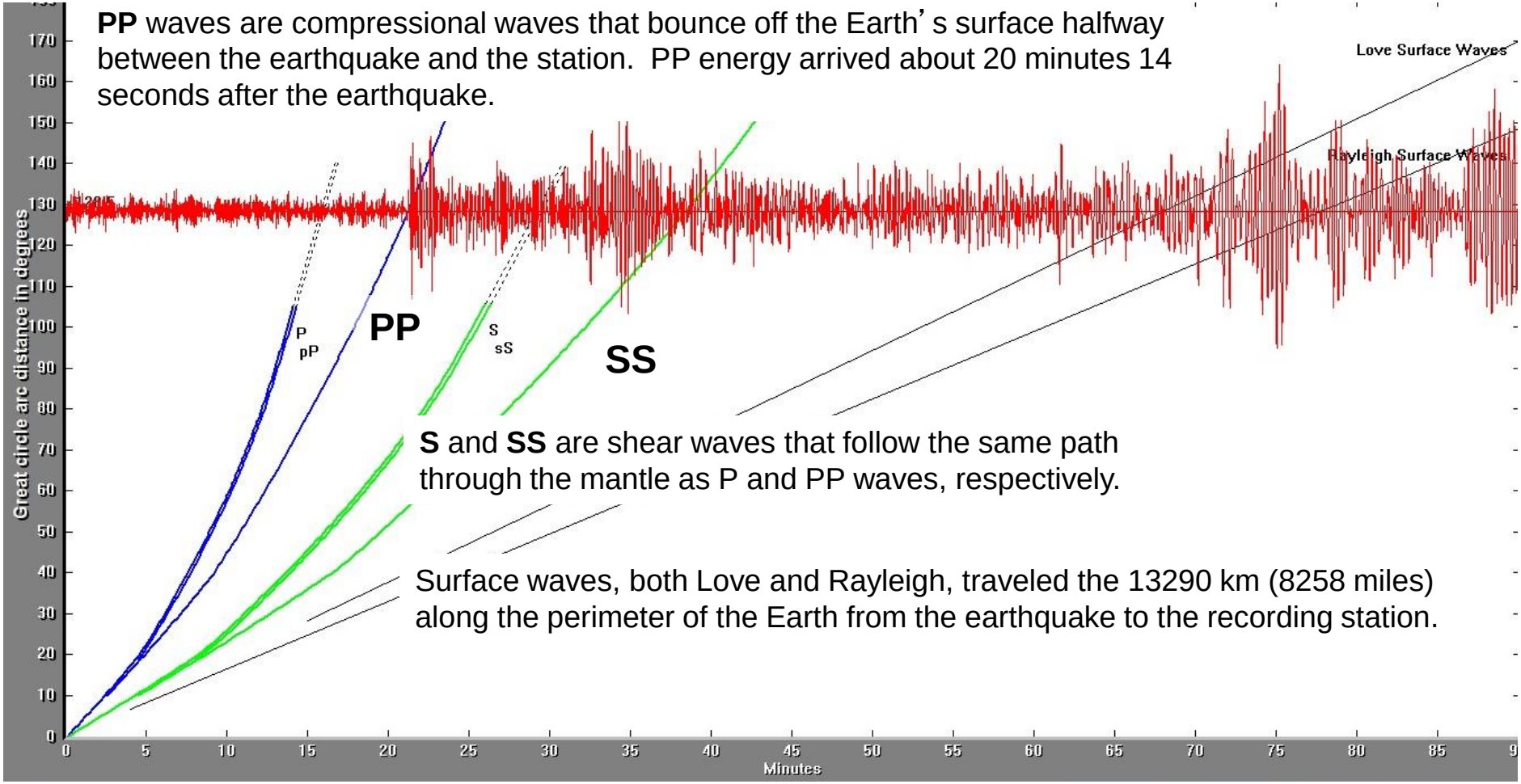
The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is 13,290 km (8258 miles, Δ = 119.73˚) from the location of this earthquake. Because of the decrease in seismic wave velocities between the lower mantle and the outer core, there is a “shadow zone” for direct P waves in the range 103˚ < Δ < 143˚ .



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