Magnitude 7.1 NORTHERN MID-ATLANTIC RIDGE

Friday, February 13, 2015 at 18:59:12 UTC

A major magnitude 7.1 earthquake occurred on the North America – Eurasia Plate boundary. The epicenter (★) was located ~1170km SE of Greenland in the middle of the North Atlantic Ocean.

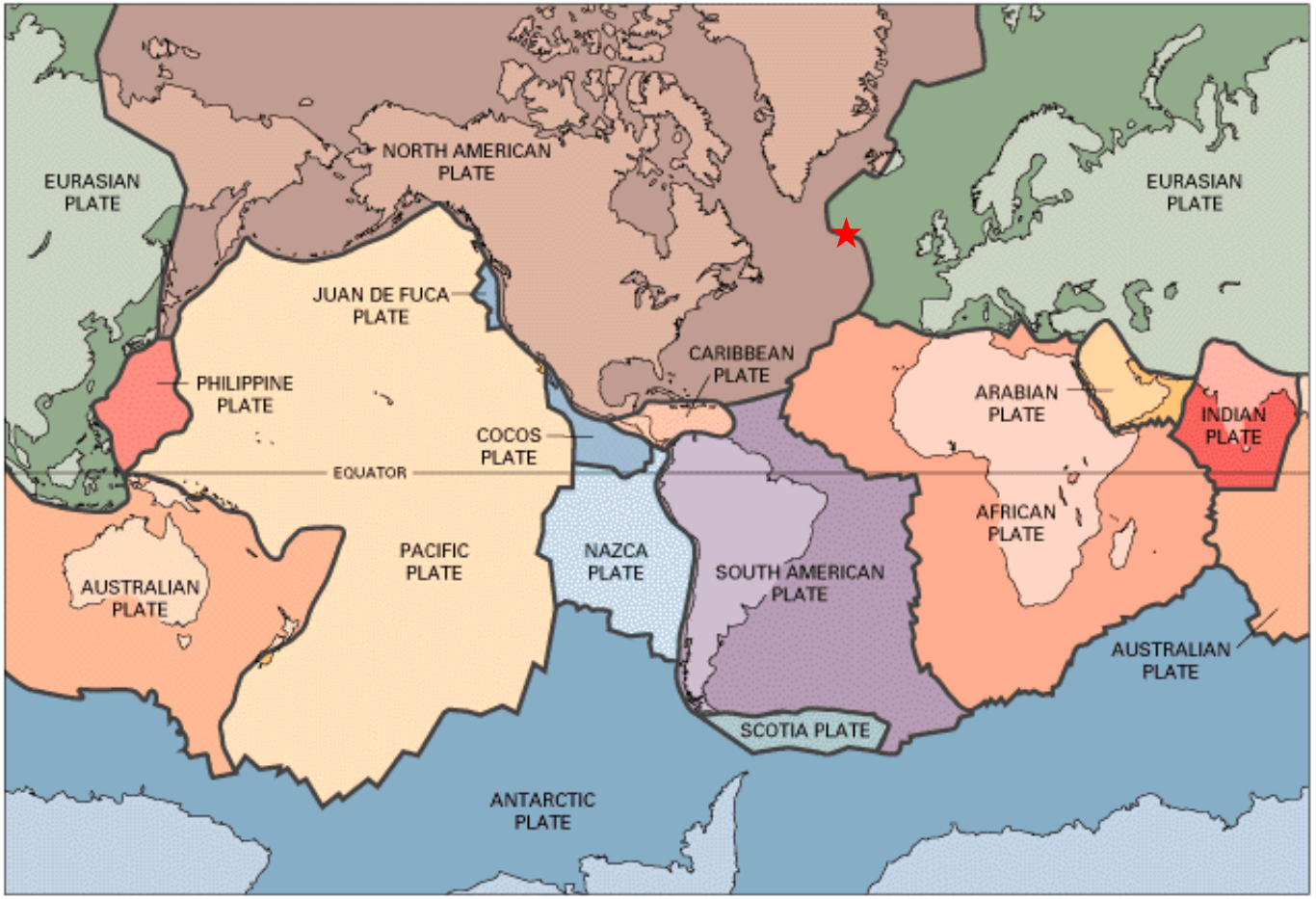

Image courtesy of the US Geological Survey

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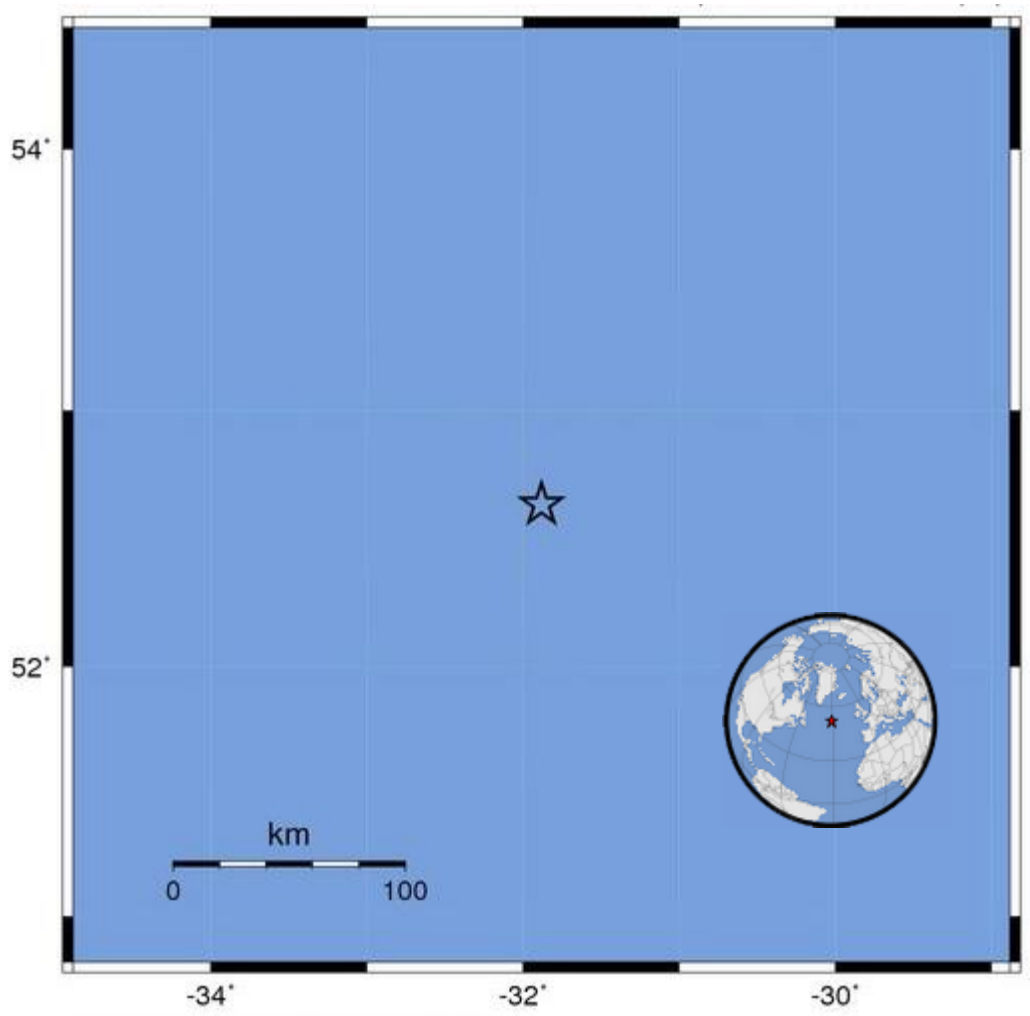
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

Because of the remote location, no one was shaken by this 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 7.1 Earthquake

Image courtesy of the US Geological Survey

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The Mid-Atlantic Ridge is a divergent tectonic plate boundary located along the floor of the Atlantic Ocean, and part of the longest mountain range in the world.

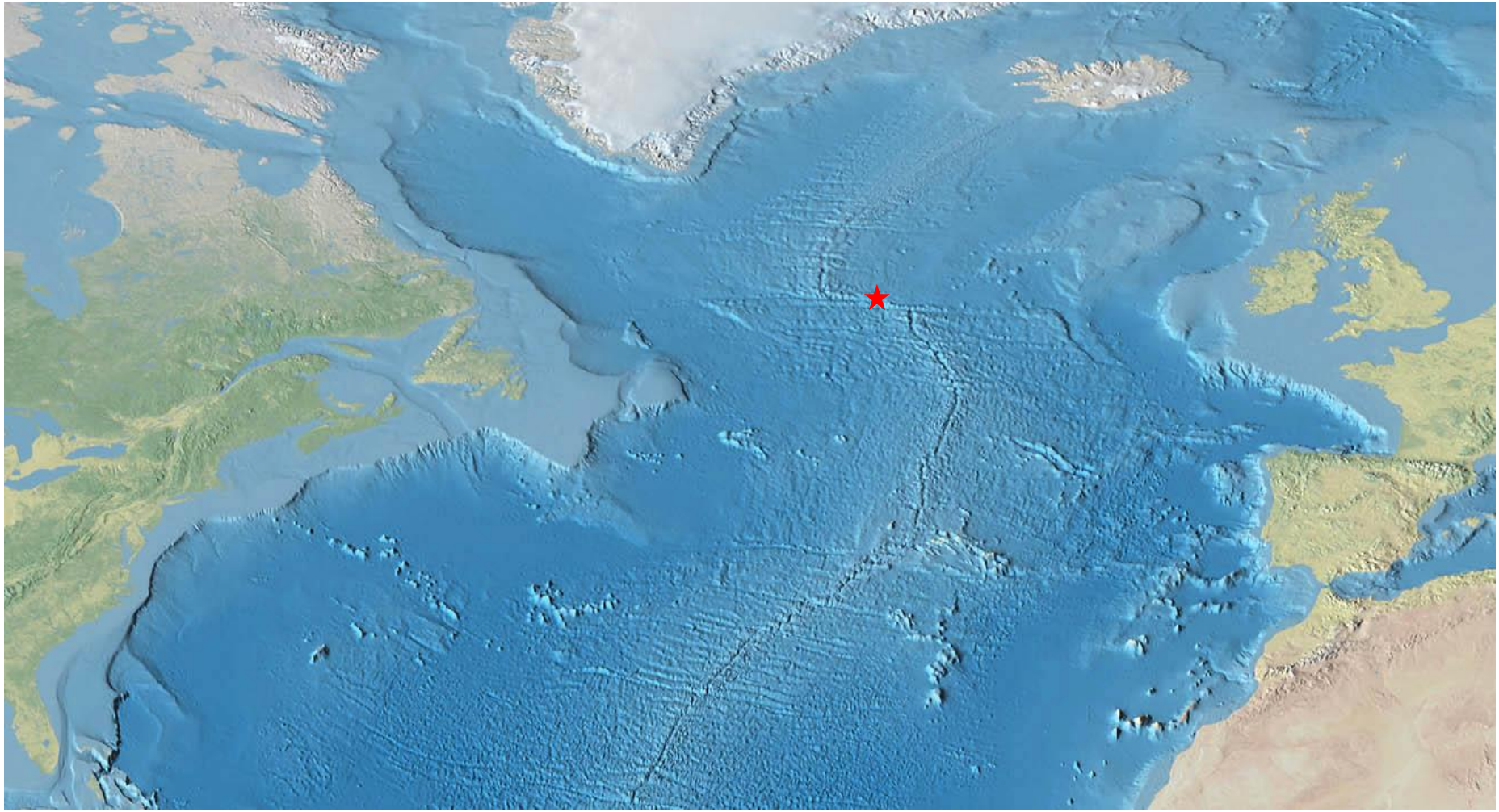

Image courtesy of www.shadedrelief.com

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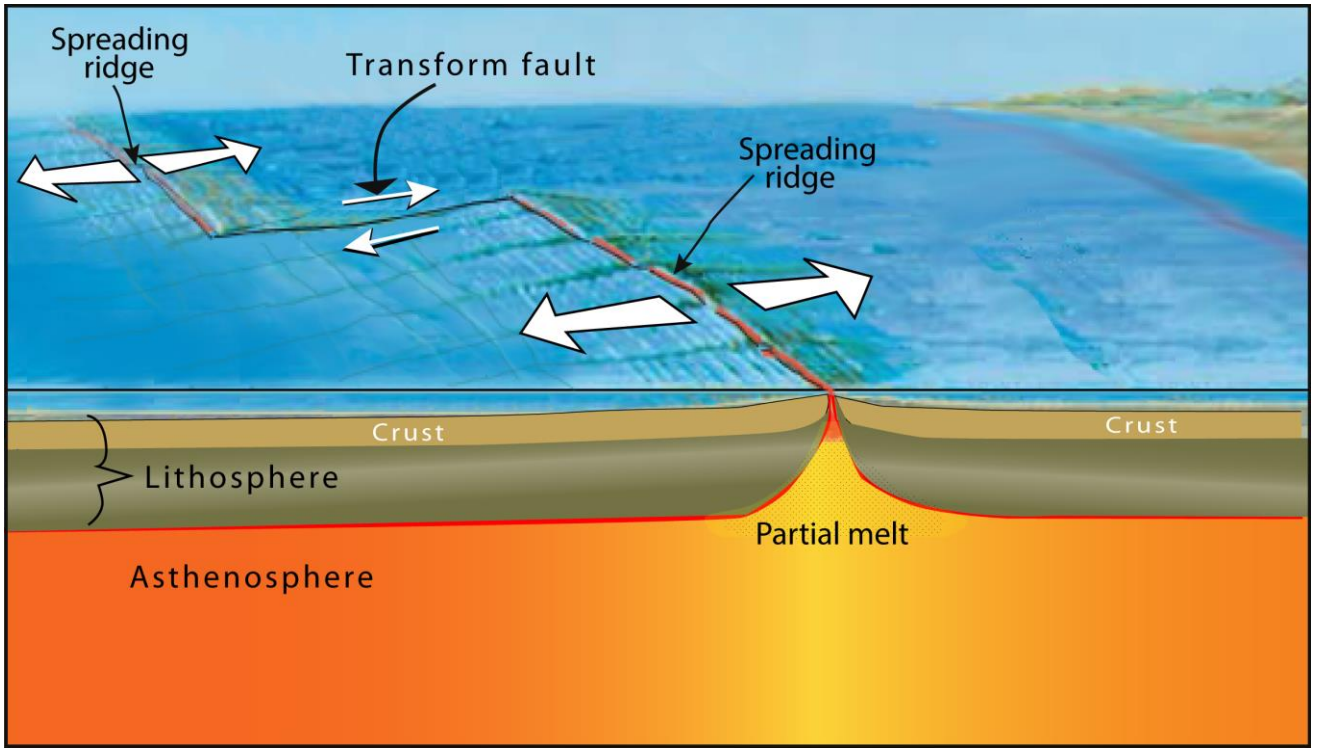
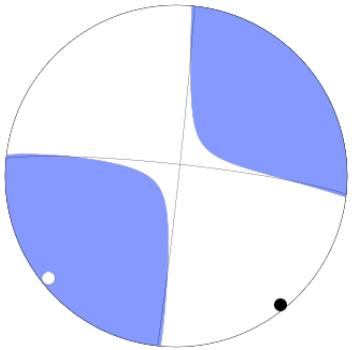
While the Mid-Atlantic Ridge is a divergent plate boundary, every 50-500 km, this mid-ocean ridge is offset sideways right or left by transform faults.





USGS Centroid Moment Tensor Solution

After an earthquake, focal mechanisms are used to describe the deformation in the source region that generates the seismic waves.

This focal mechanism is consistent with right-lateral strike-slip faulting on a near-vertical fault. Along with the location, it helps define this earthquake as having occurred as the result of right-lateral strike-slip faulting on a transform fault.

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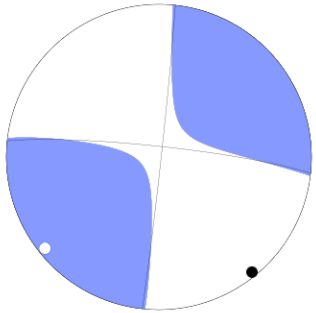
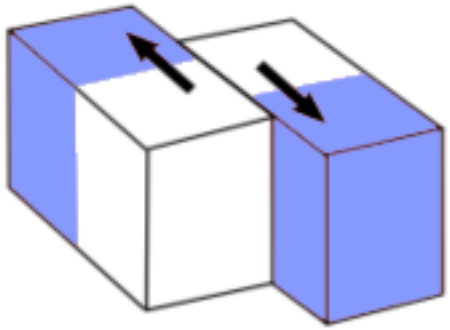
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Shaded areas show quadrants of the focal sphere in which the P-wave first- motions were away from the source, and unshaded areas show quadrants in which the P-wave first-motions were toward the source.

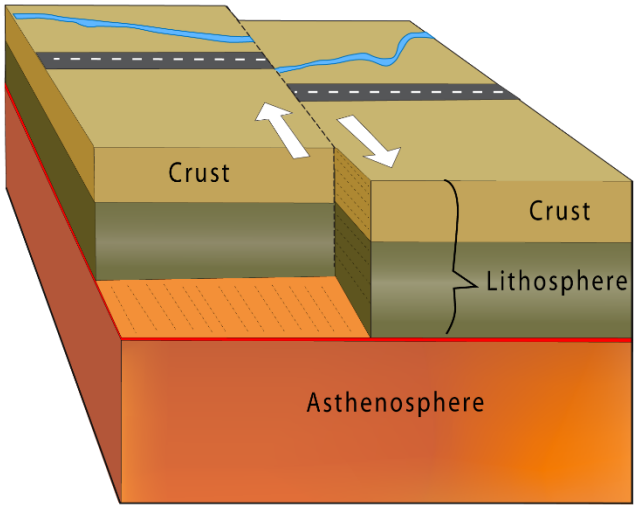


USGS Centroid Moment Tensor Solution

Translated to a block diagram, the focal mechanism is illustrating classic strike slip motion with quadrants of compression and extension. In the block diagram, the shaded regions experience compression during fault motion while the unshaded regions experience extension.



The offset direction of a strike-slip fault is the direction a feature is displaced when you cross the fault. The road is displaced to the right, so this is a “right-lateral” strike-slip fault.



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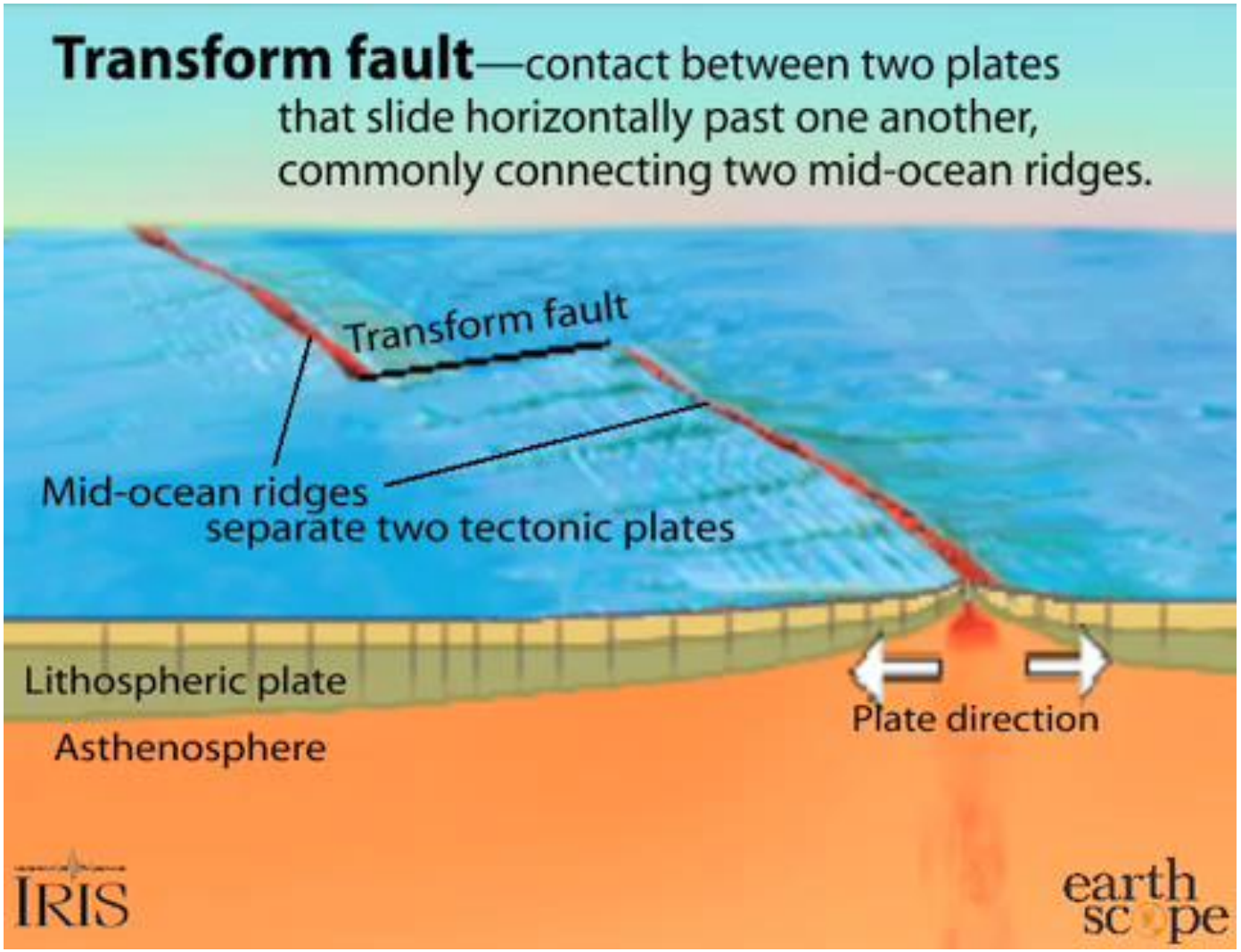

Animation: Exploring Transform Faults

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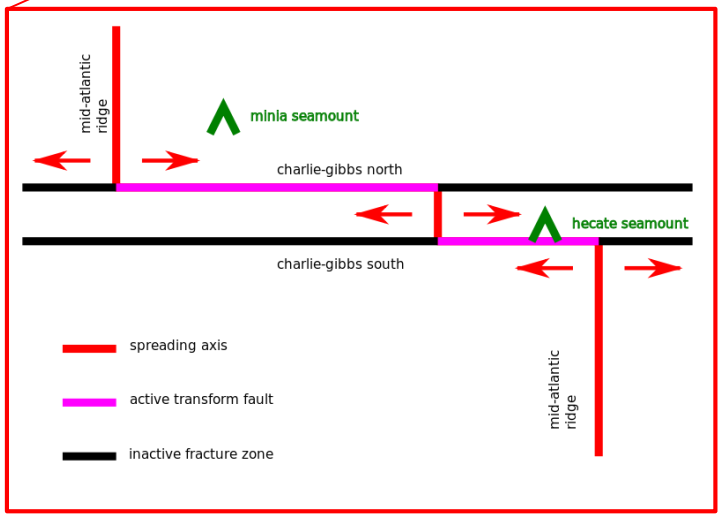
Based on the location and focal mechanism of this earthquake, it likely occurred as the result of right-lateral strike-slip faulting on or near the Charlie-Gibbs Fracture Zone, a system of two parallel fracture zones that act as a transform fault on the Mid-Atlantic Ridge System between the North American and Eurasian Plates.



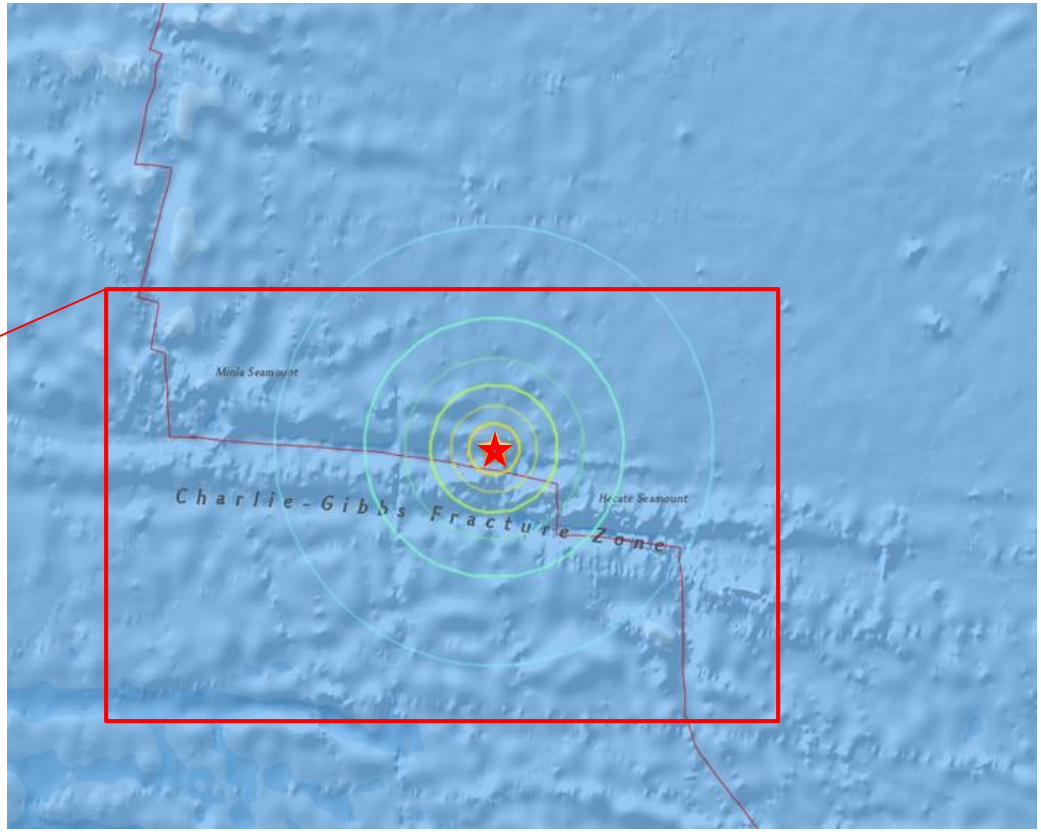


Image courtesy of the US Geological Survey

The rate of spreading of the Mid-Atlantic Ridge near the Charlie-Gibbs Fracture Zone is about 2 cm/year.

Image courtesy Wikimedia Commons User:Pimvantend

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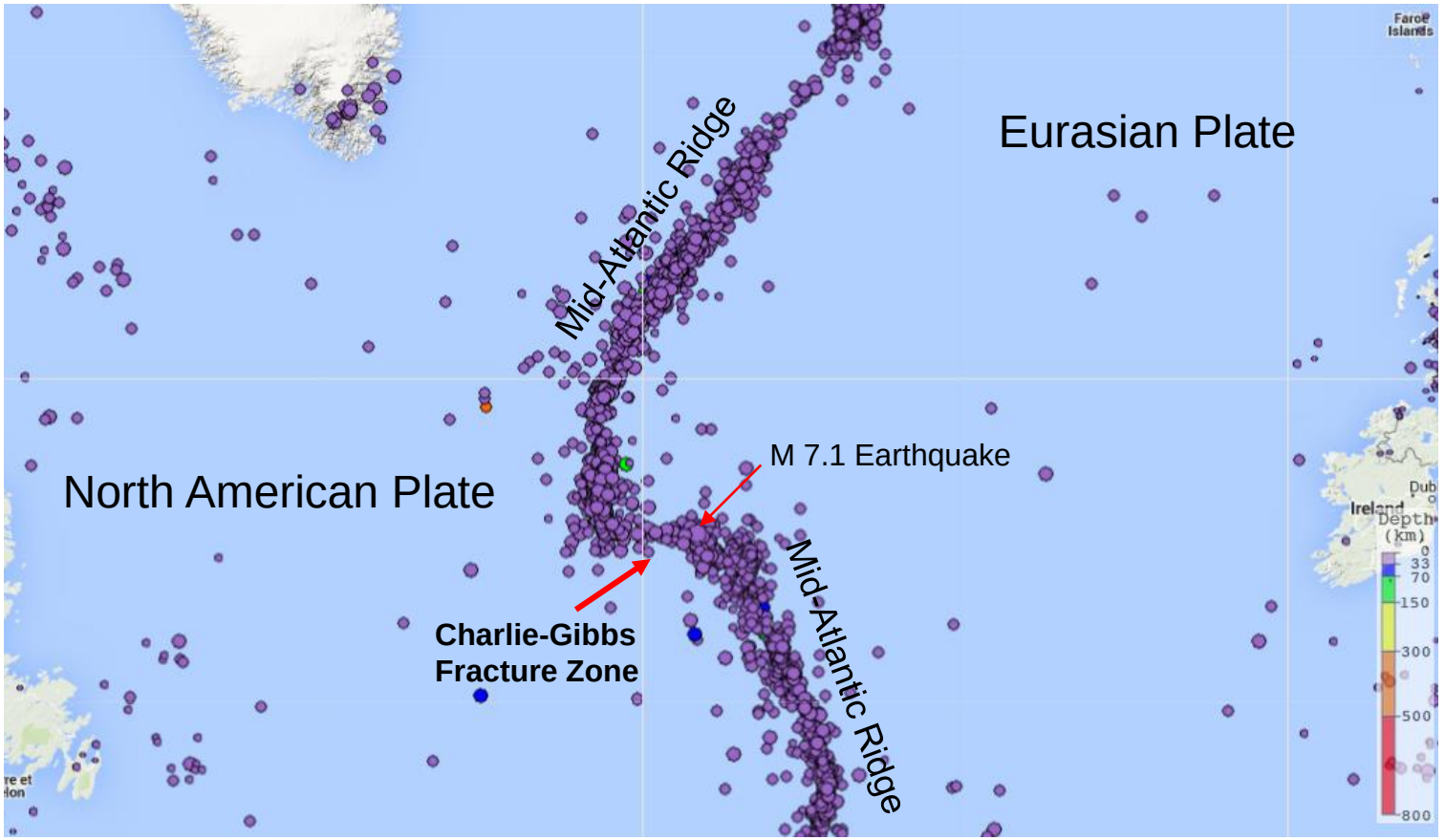
Regional historical seismicity outlines the Mid-Atlantic Ridge System in the North Atlantic that forms the plate boundary between the North American Plate and the Eurasian Plate. While this spreading ocean ridge is offset by many transform faults, the Charlie-Gibbs Fracture Zone is one of the largest.



40 years of regional seismicity – most earthquakes plotted here were smaller than M 6.0

Map created using the IRIS Earthquake Browser: www.iris.edu/ieb

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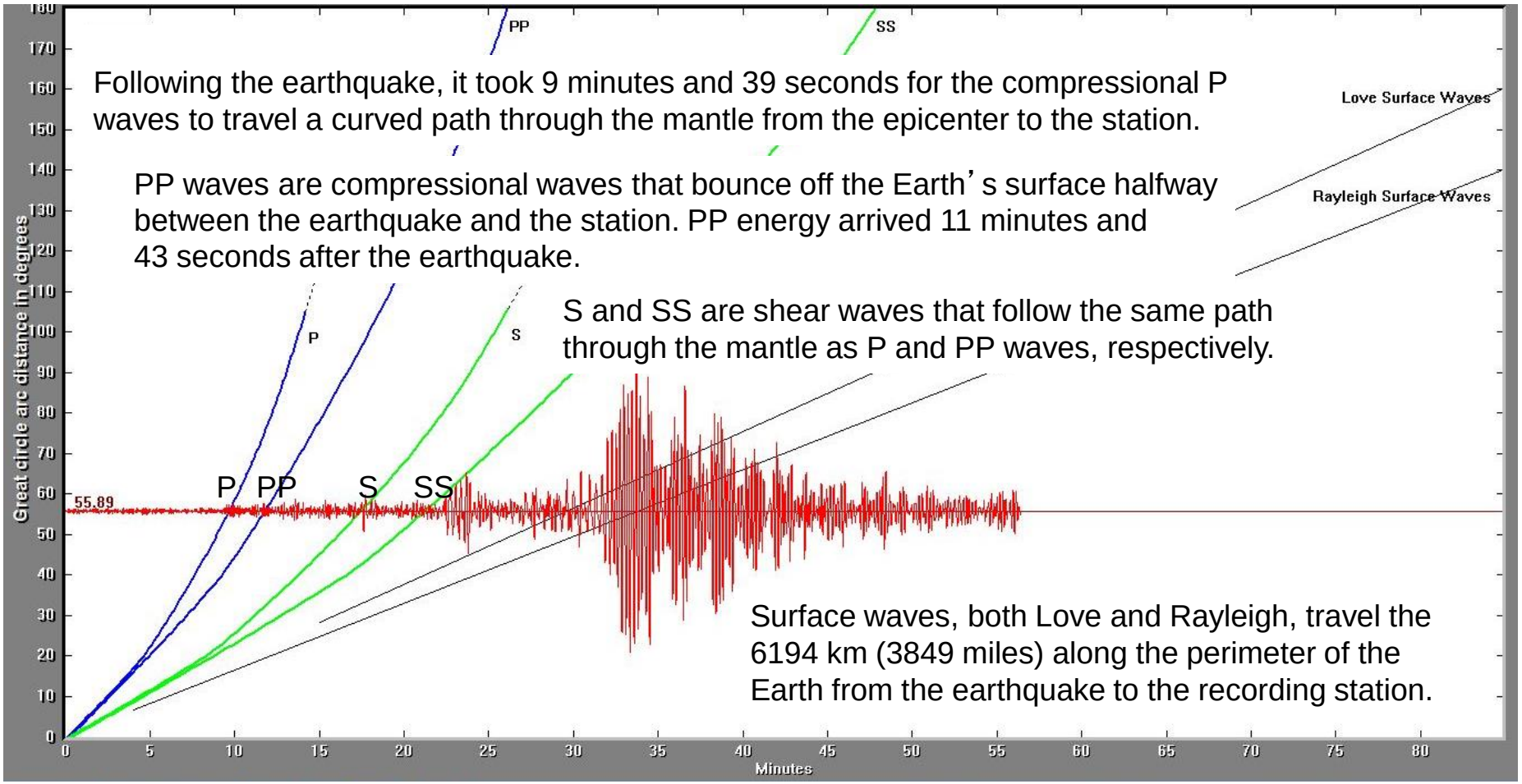
The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is about 6194 km (3849 miles, 55.8°) from the location of this earthquake.



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