Magnitude 7.4 SOUTH GEORGIA ISLAND REGION

Friday, August 19, 2016 at 07:32:22 UTC

A magnitude 7.4 earthquake occurred in the South Georgia Island Region. South Georgia Island is a British territory in the South Atlantic Ocean that lies about 800 miles east of the Falkland Islands. It is a remote and inhospitable island.

South Georgia Island northern shore

Image courtesy NASA

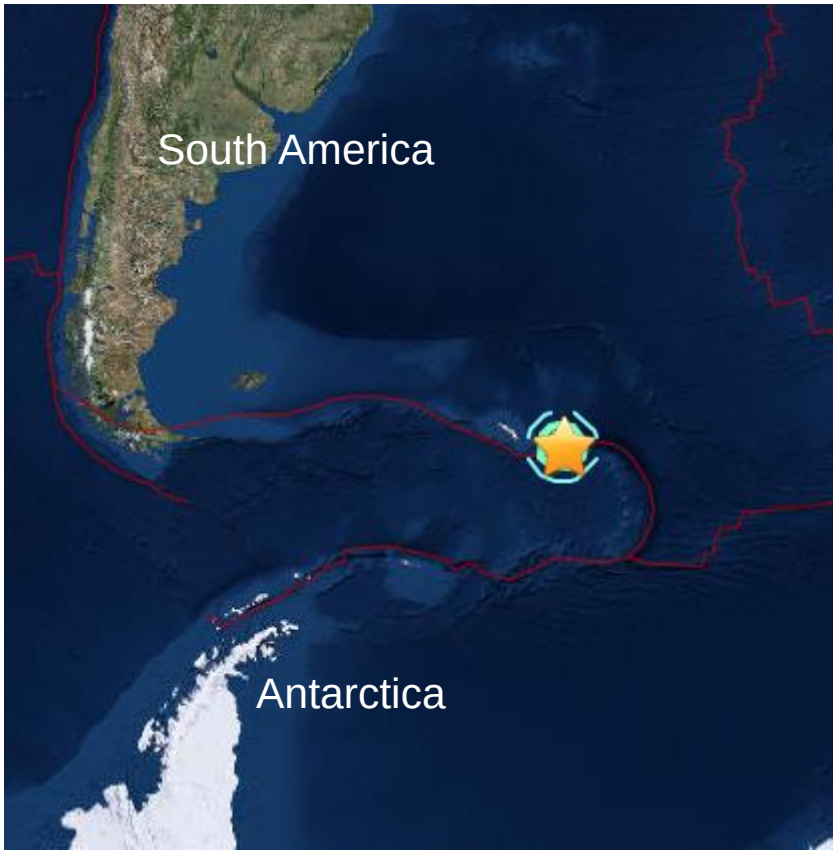

Image courtesy USGS

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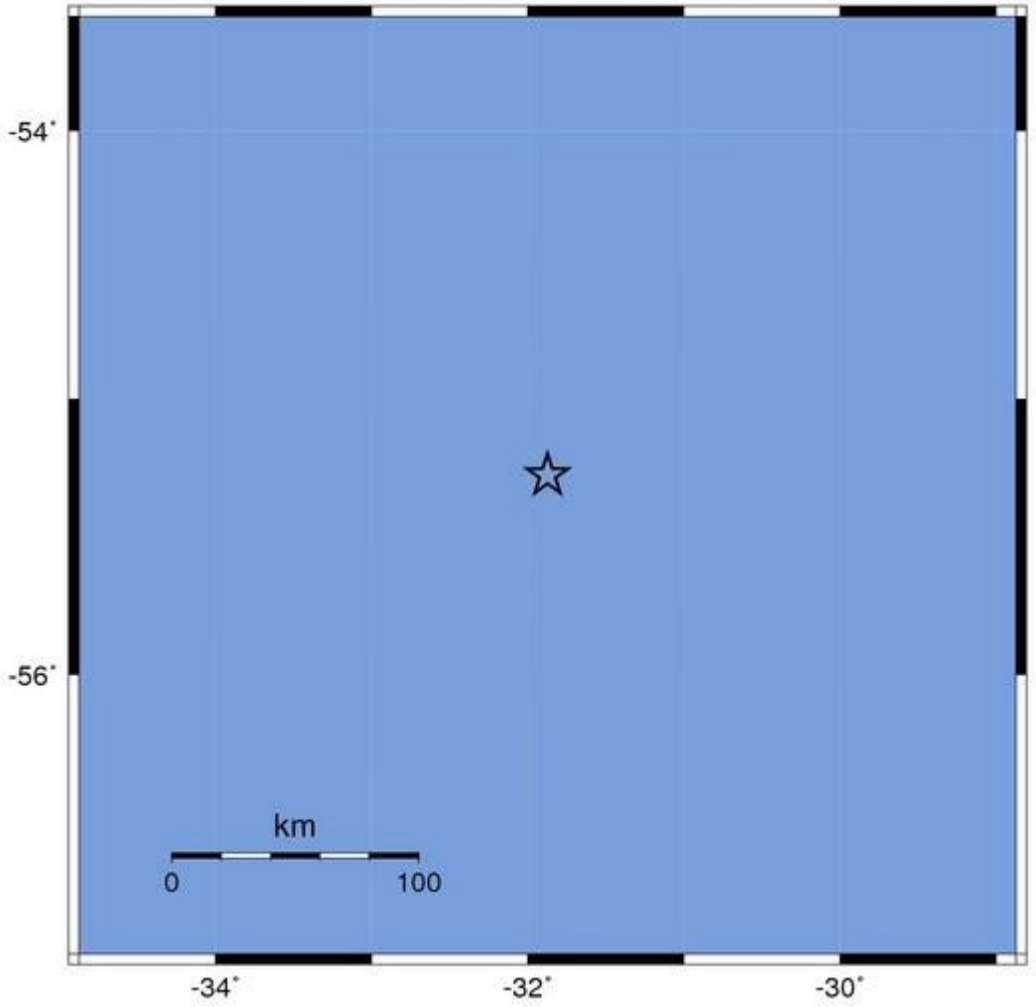
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

There were no land areas within the zone of 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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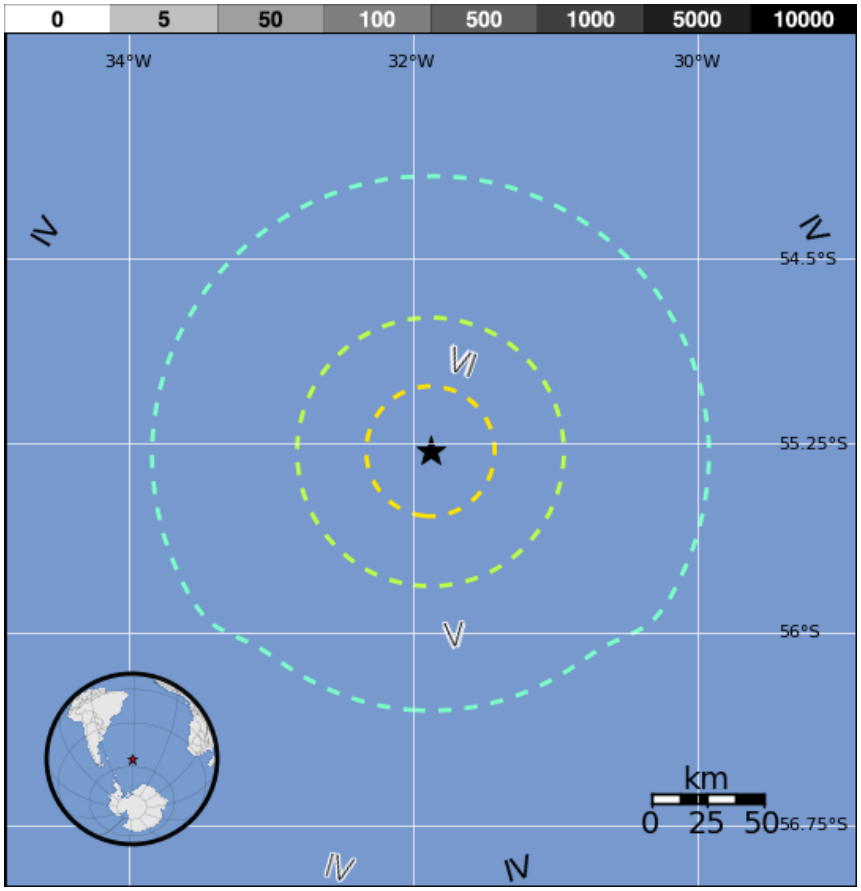
USGS PAGER
Population Exposed to Earthquake Shaking

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

There was one USGS felt report from South Georgia Island reporting weak shaking (MMI III).

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	--*
IV	Light	--*
V	Moderate	0 k
VI	Strong	0 k
VII	Very Strong	0 k
VIII	Severe	0 k
IX	Violent	0 k
X	Extreme	0 k



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.

Image courtesy of the US Geological Survey

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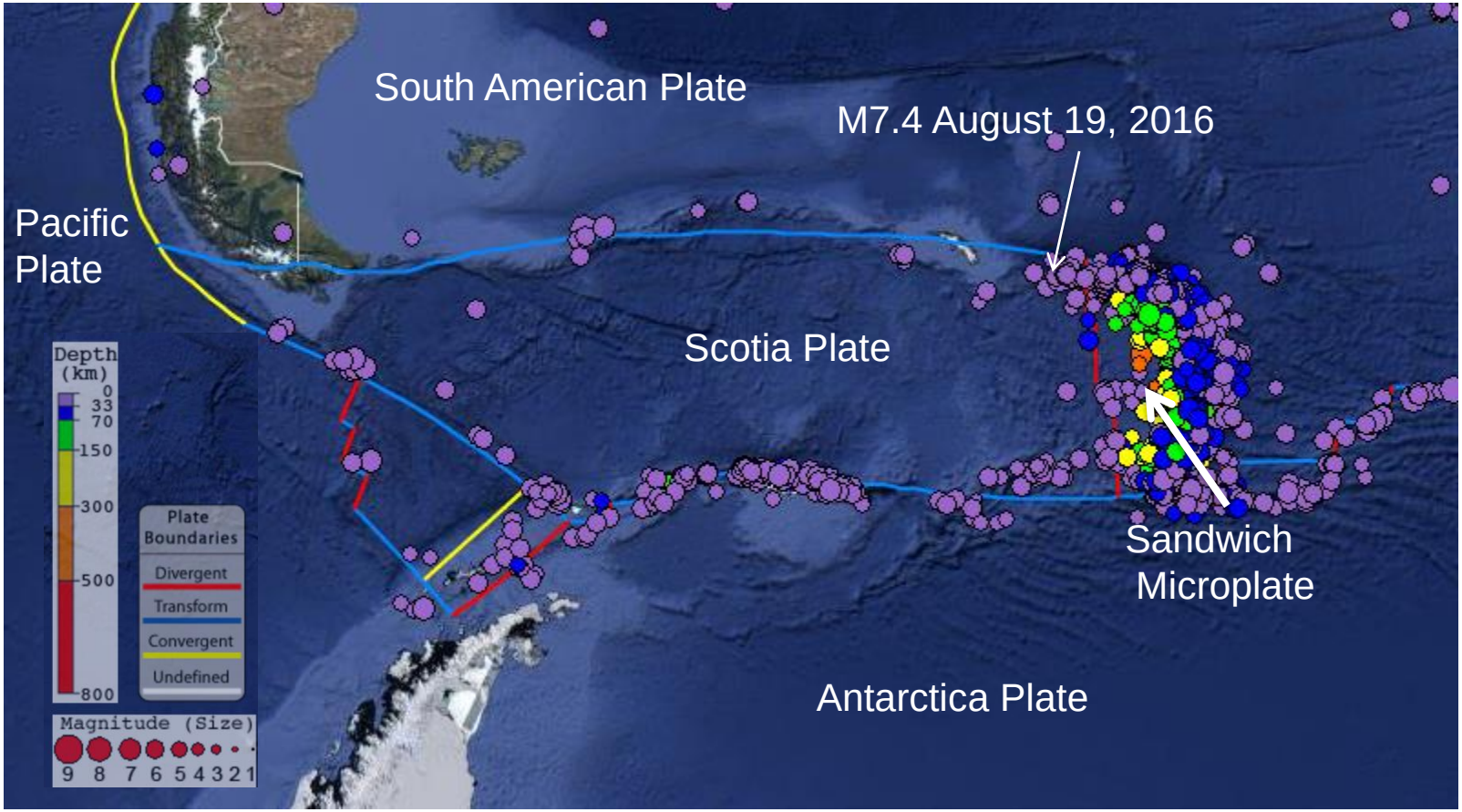
This earthquake epicenter is labeled on the map below along with the most recent 2000 earthquakes of magnitude $\geq$ 5. The subduction zone between the South American Plate and Sandwich Microplate has frequent earthquakes with depths increasing from east-to-west across the convergent plate boundary.



Map created with the IRIS Earthquake Browser

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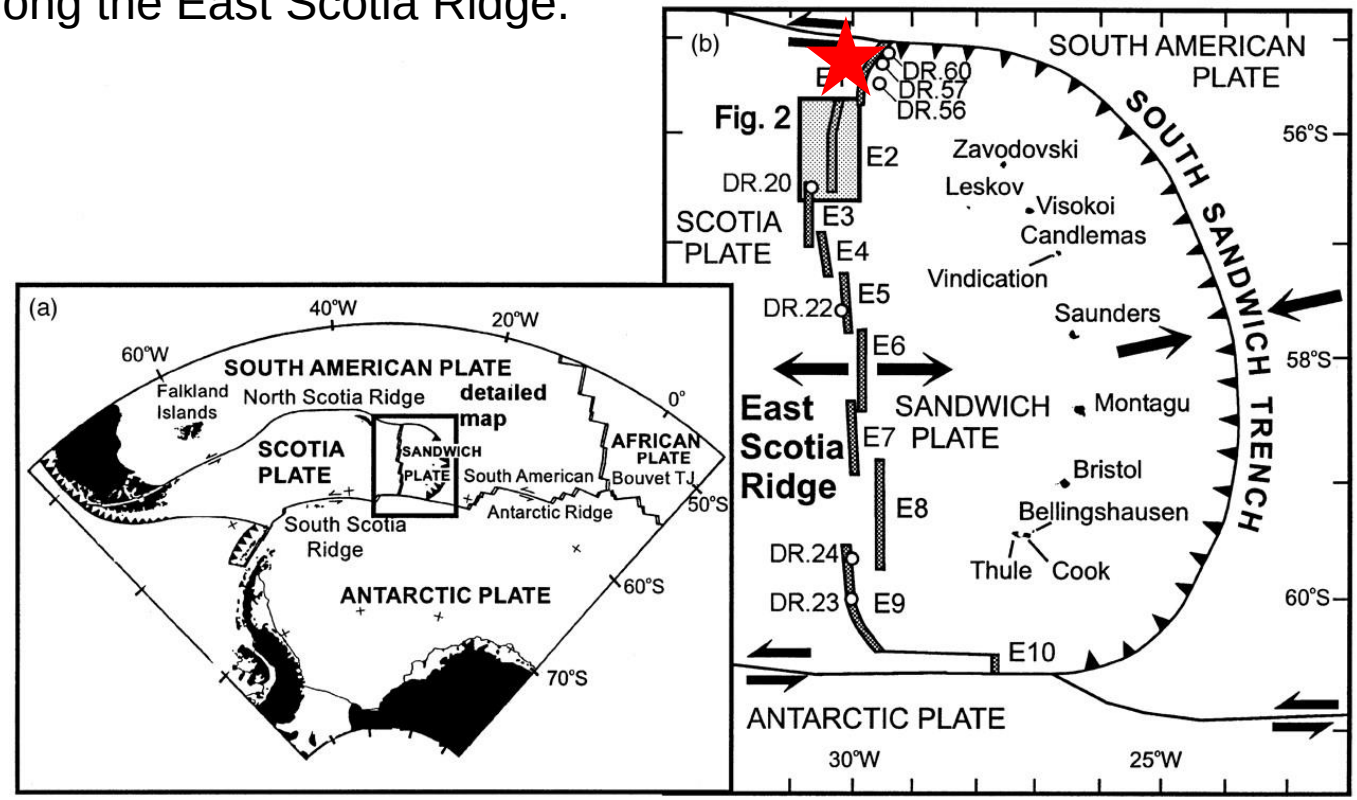
According to the USGS, to the west of this event, near South Georgia Island, the Scotia Plate - South American Plate boundary is represented by the North Scotia Ridge, a left-lateral transform fault. At the location of this earthquake, the South American Plate moves towards the west-southwest with respect to the Scotia Plate at a rate of just 9 mm/yr. Rates of subduction along the South Sandwich Trench are in excess of 65 mm/yr, but slow in the region of this earthquake due to back-arc spreading along the East Scotia Ridge.



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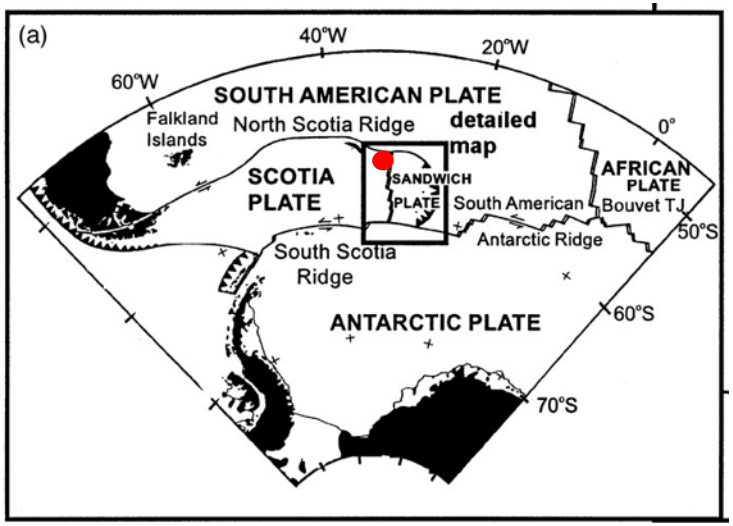
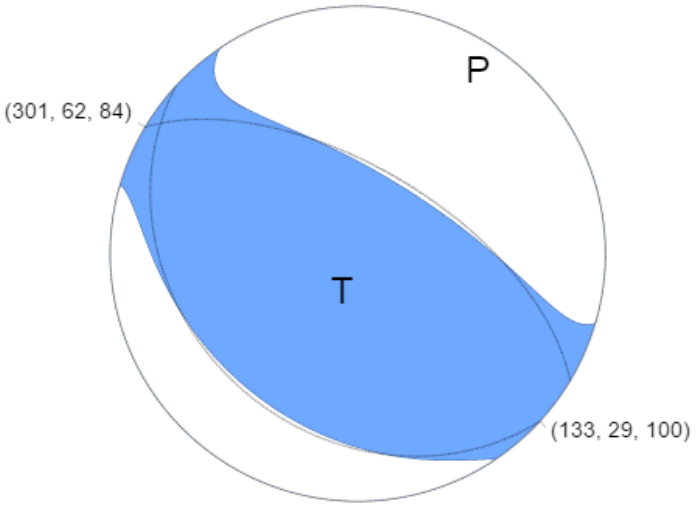
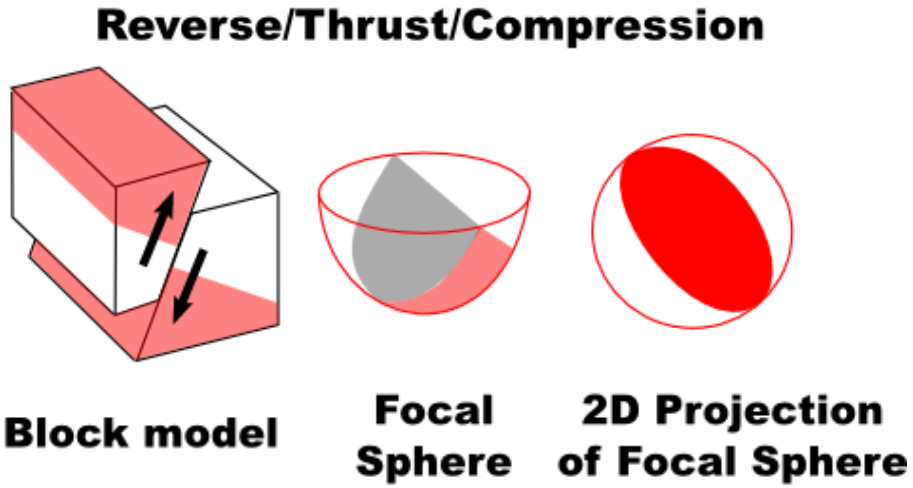
According to the USGS, the focal mechanism solution of this earthquake indicates southwest-oriented thrust faulting, consistent with occurring along the plate boundary interface between the South American Plate and Scotia Plate.





USGS W-phase Moment Tensor Solution



The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

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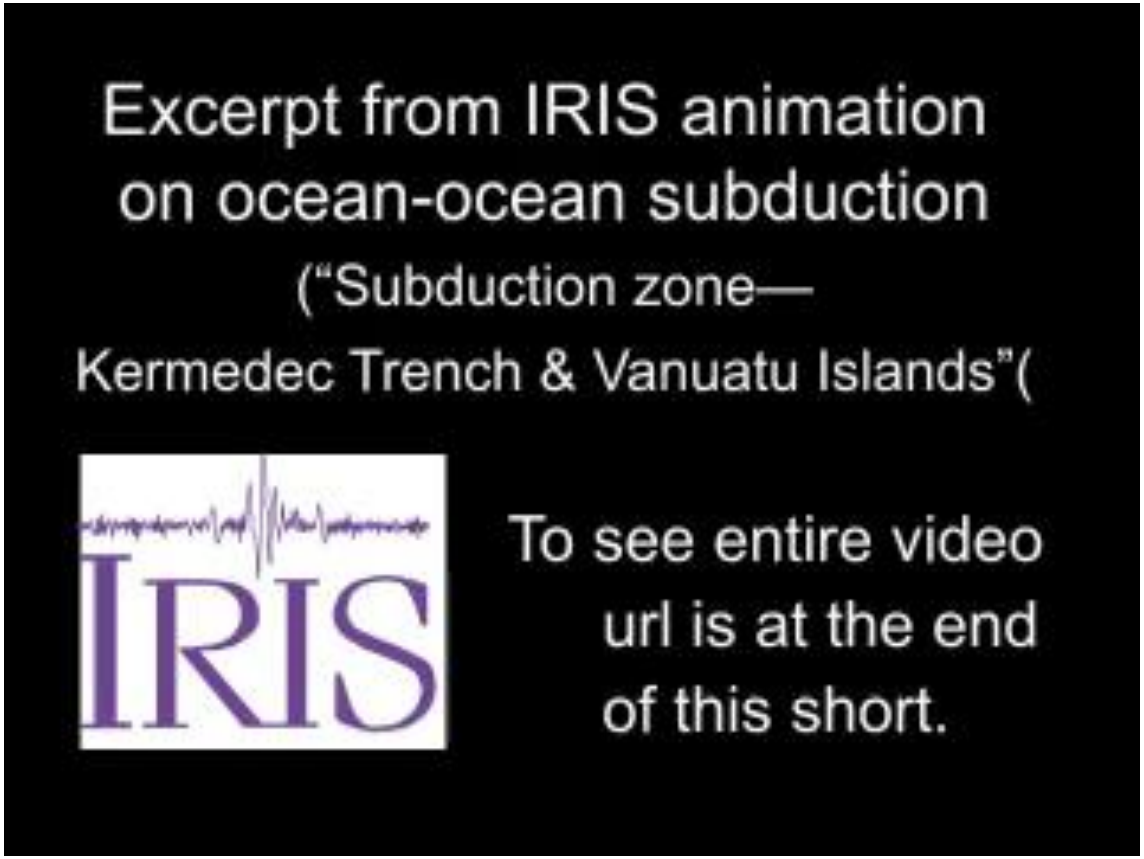

Exploring earthquakes in ocean-ocean subduction zones

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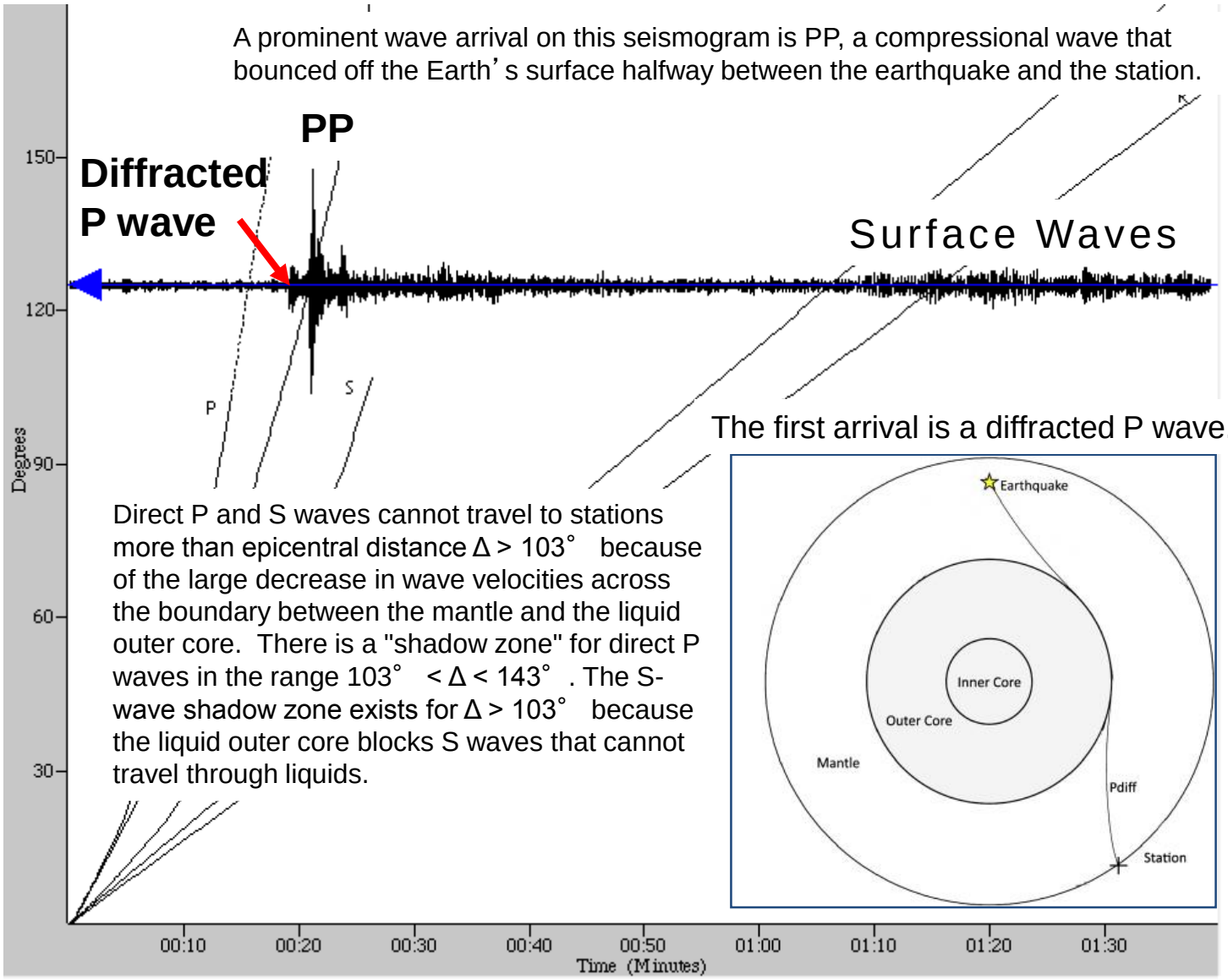
The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 13,851 km (8607 miles, 124.8˚) from the location of this earthquake.

A prominent wave arrival on this seismogram is PP, a compressional wave that bounced off the Earth's surface halfway between the earthquake and the station.



The first arrival is a diffracted P wave.

Direct P and S waves cannot travel to stations more than epicentral distance Δ > 103˚ because of the large decrease in wave velocities across the boundary between the mantle and the liquid outer core. There is a "shadow zone" for direct P waves in the range 103˚ < Δ < 143˚. The S-wave shadow zone exists for Δ > 103˚ because the liquid outer core blocks S waves that cannot travel through liquids.

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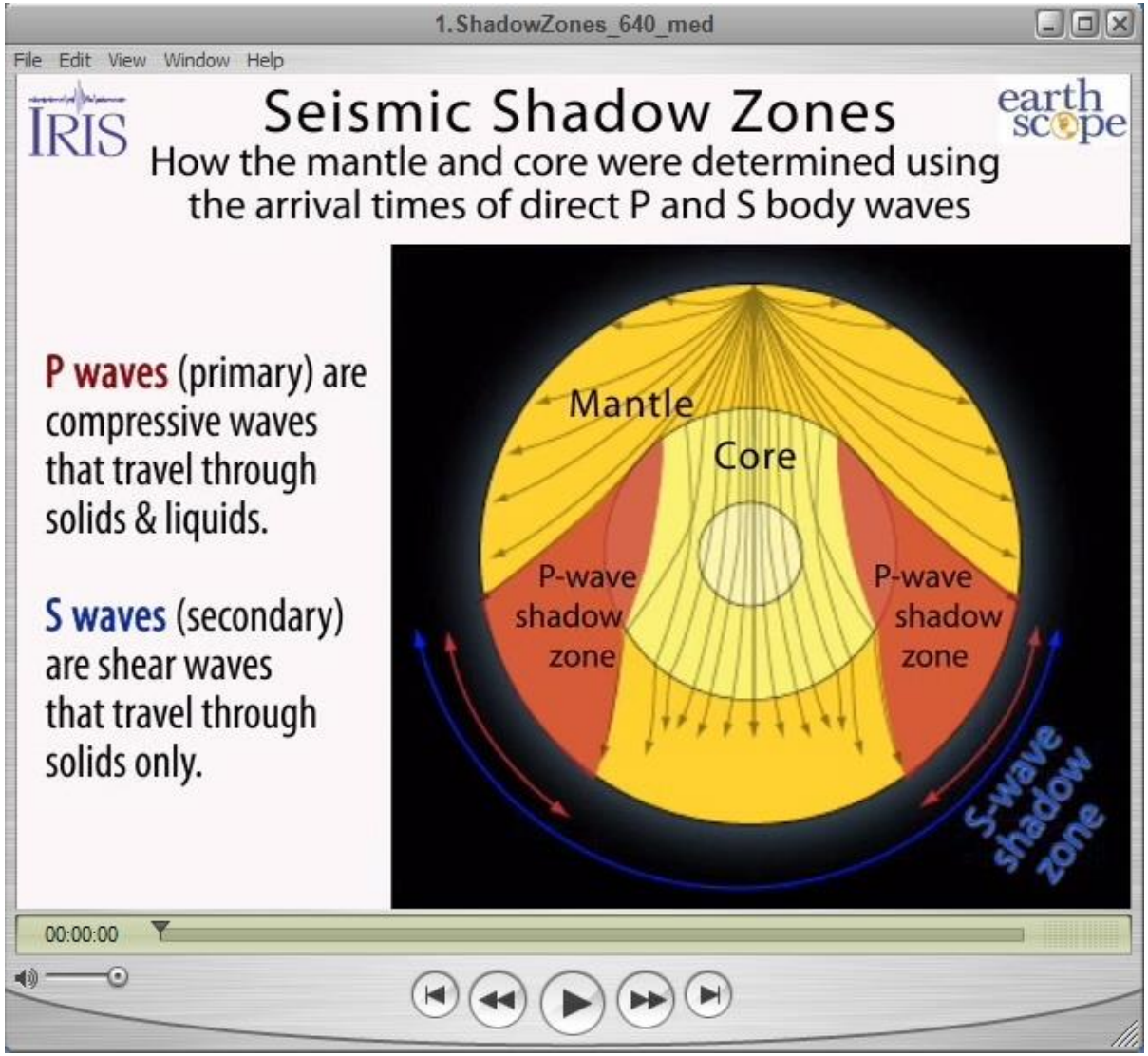
Animation explaining the seismic shadow zone.

Epicentral distance is the angle formed by the intersection of the line from the earthquake to Earth's center with the line from the observing point to the Earth's center.

S waves are seen up to a distance of 104° from an earthquake, but direct S waves are not recorded after this distance.

P waves also have a shadow zone between 104° and 143°



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