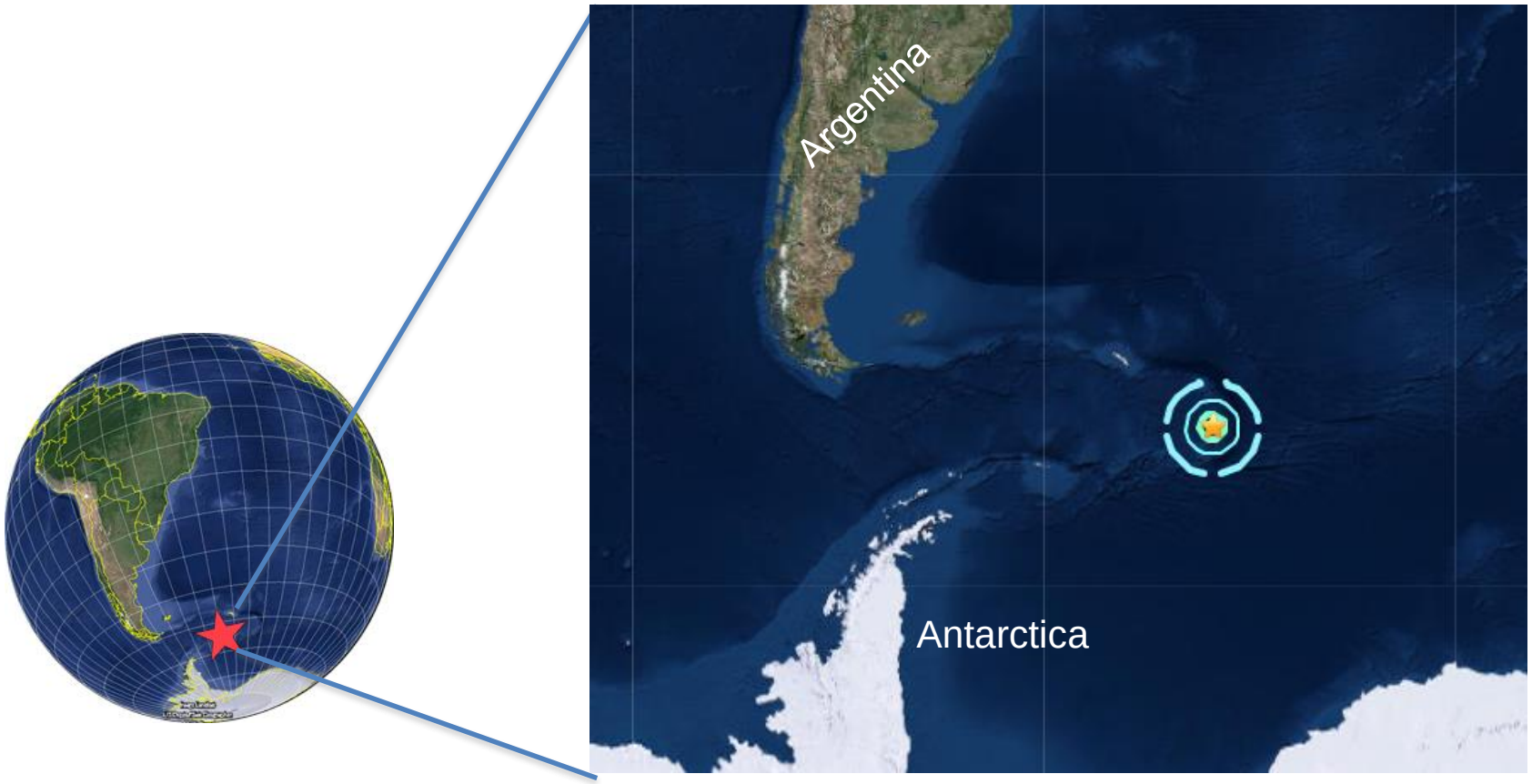
Magnitude 7.1 SOUTH SANDWICH ISLANDS

Tuesday, December 11, 2018 at 02:26:32 UTC

A magnitude 7.1 earthquake occurred at a depth of 164.7 km (102 miles) in the South Sandwich Islands, an uninhabited British territory off the coast of Argentina in the southern Atlantic Ocean.



Epicenter from U.S. Geological Survey

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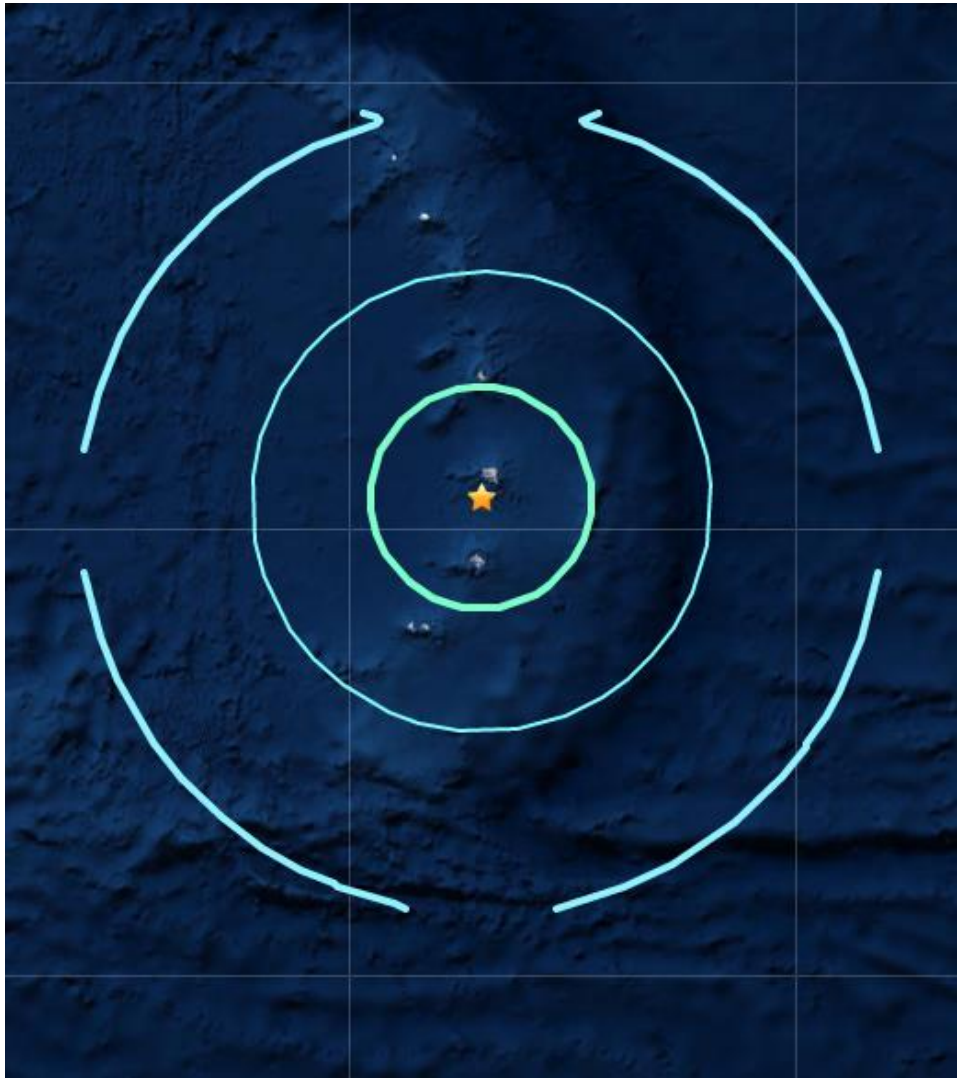
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The uninhabited islands nearest the earthquake experienced moderate 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 7.1 Earthquake

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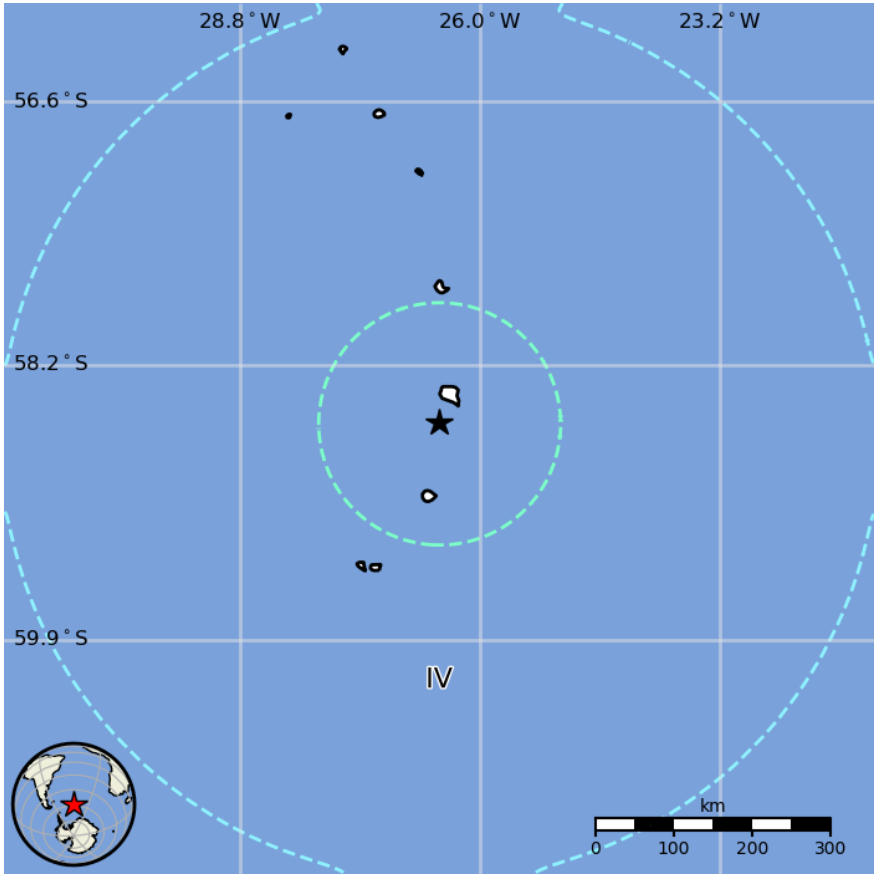
USGS PAGER
Population Exposed to Earthquake Shaking

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

The USGS estimates that no one felt this earthquake.

I	Not Felt	0 k*
II-III	Weak	0 k*
IV	Light	0 k
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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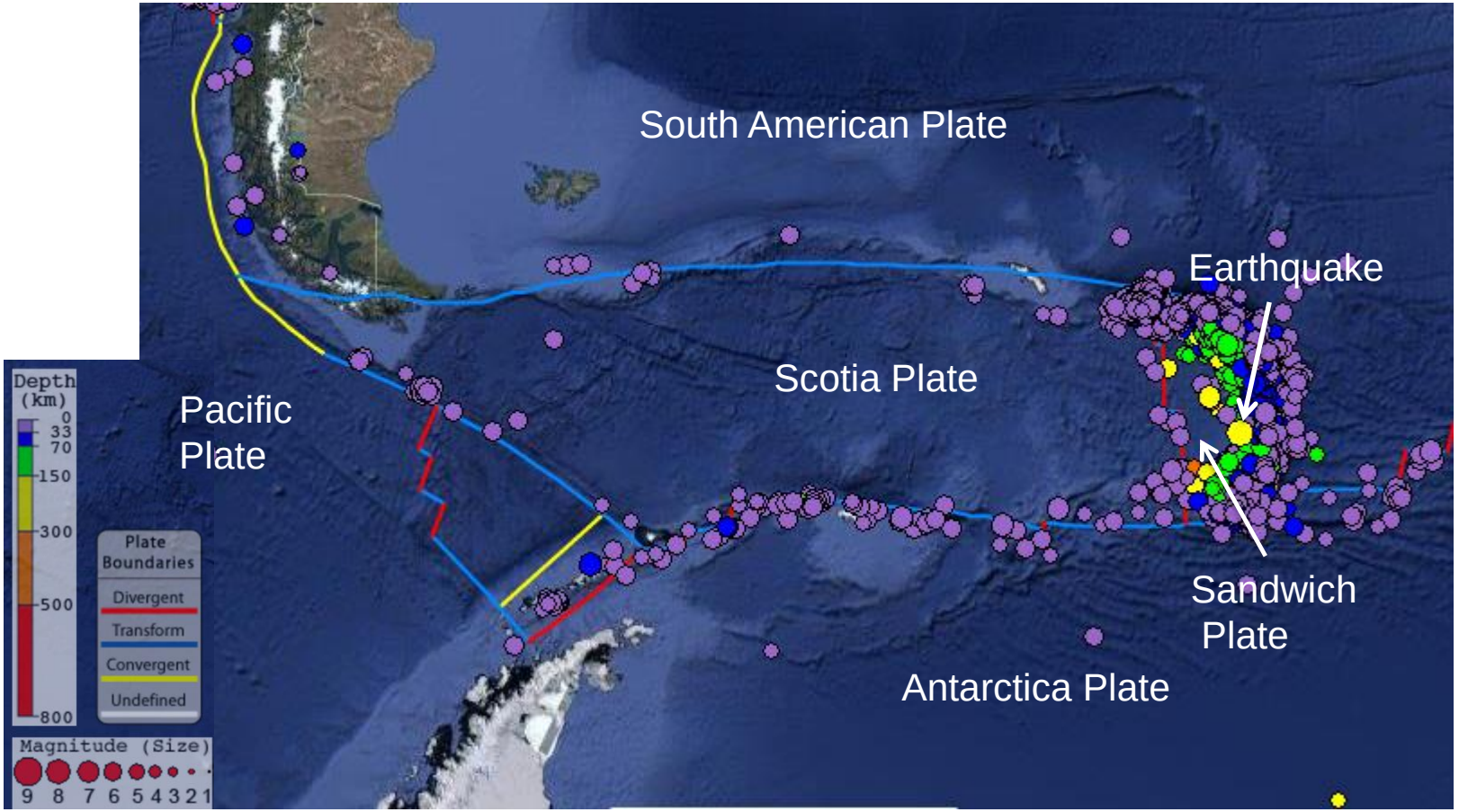
This earthquake epicenter is labeled on the map below along with the most recent 2000 earthquakes of magnitude ≥ 5. The subduction zone between the Sandwich and South American Plates has frequent earthquakes with depths increasing from east-to-west across the convergent plate boundary.



Map created with the IRIS Earthquake Browser

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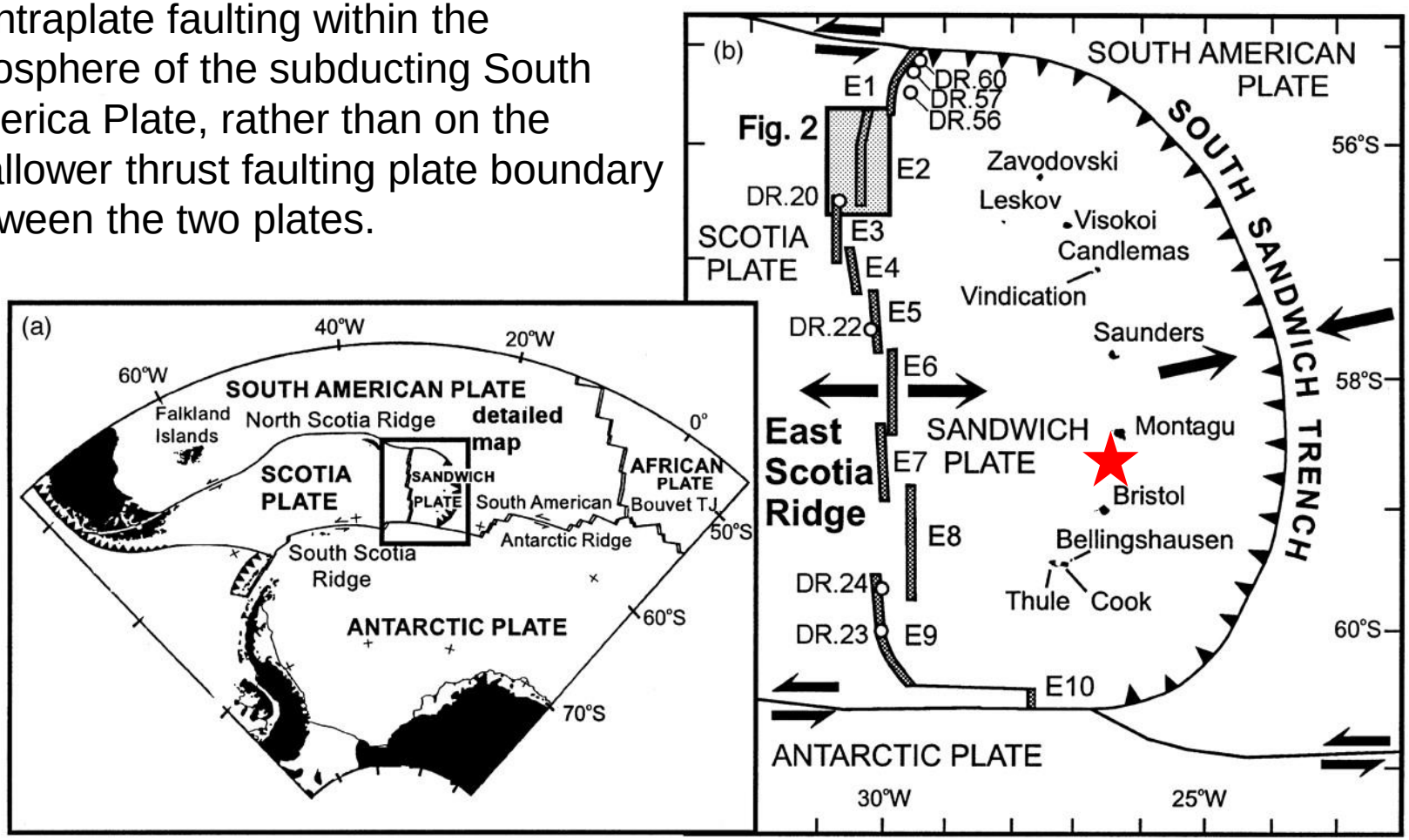
The earthquake epicenter (red star) is located 48 km (30 mi) north of Bristol Island. The South American Plate subducts towards the west beneath the Sandwich Plate. In the region of this earthquake, the South America Plate subducts at a rate of ~7 cm/yr. With a depth of 164.7 km (102 mi) this earthquake occurred as the result of intraplate faulting within the lithosphere of the subducting South America Plate, rather than on the shallower thrust faulting plate boundary between the two plates.



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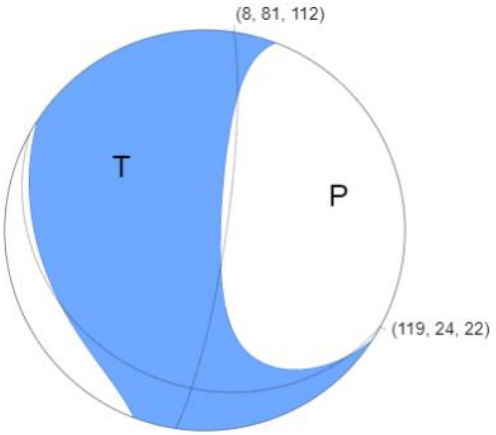
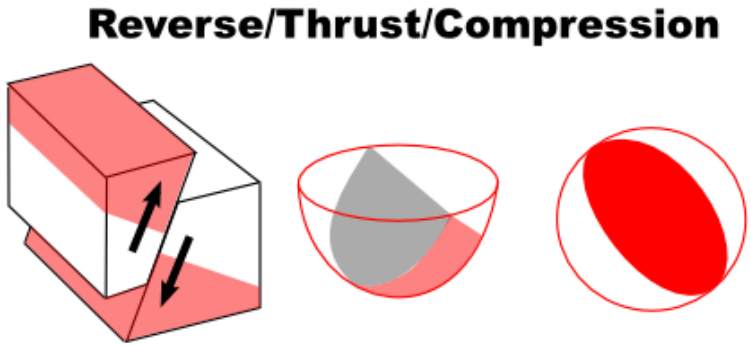
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Because an earthquake occurs as slip on a fault, it generates primary (P) waves in quadrants where the first pulse is compressional (shaded) and quadrants where the first pulse is extensional (white). The orientation of these quadrants determined from recorded seismic waves identifies the type of fault that produced the earthquake.

Earthquakes such as this event, with focal depths between 70 and 300 km, are commonly termed "intermediate-depth" earthquakes. Intermediate-depth earthquakes represent deformation within subducted slabs rather than at the shallow plate interface between subducting and overriding tectonic plates.





USGS WPhase Centroid Moment Tensor Solution

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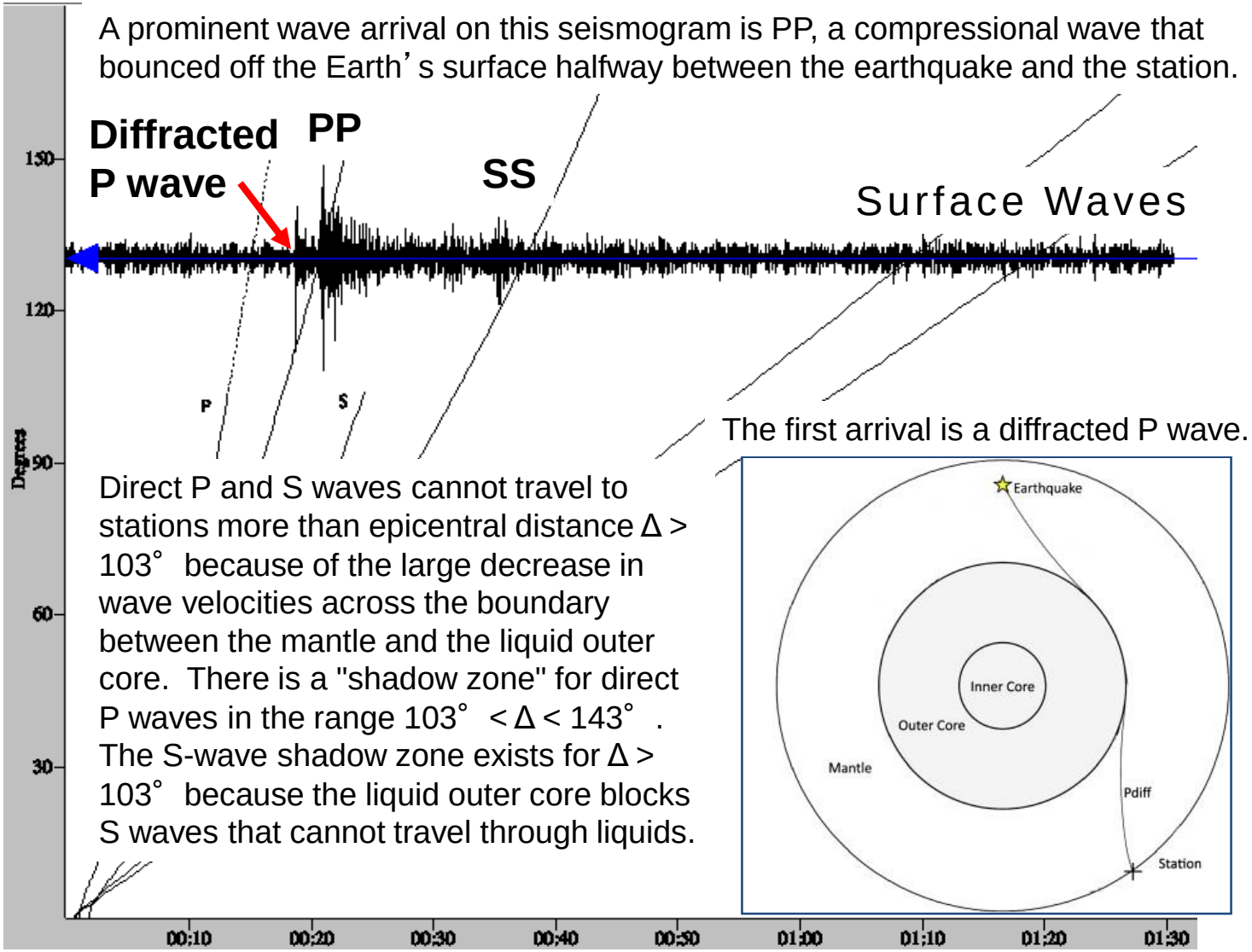
The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 14,415 km (8,957 miles, 129.9˚) from the location of this earthquake.

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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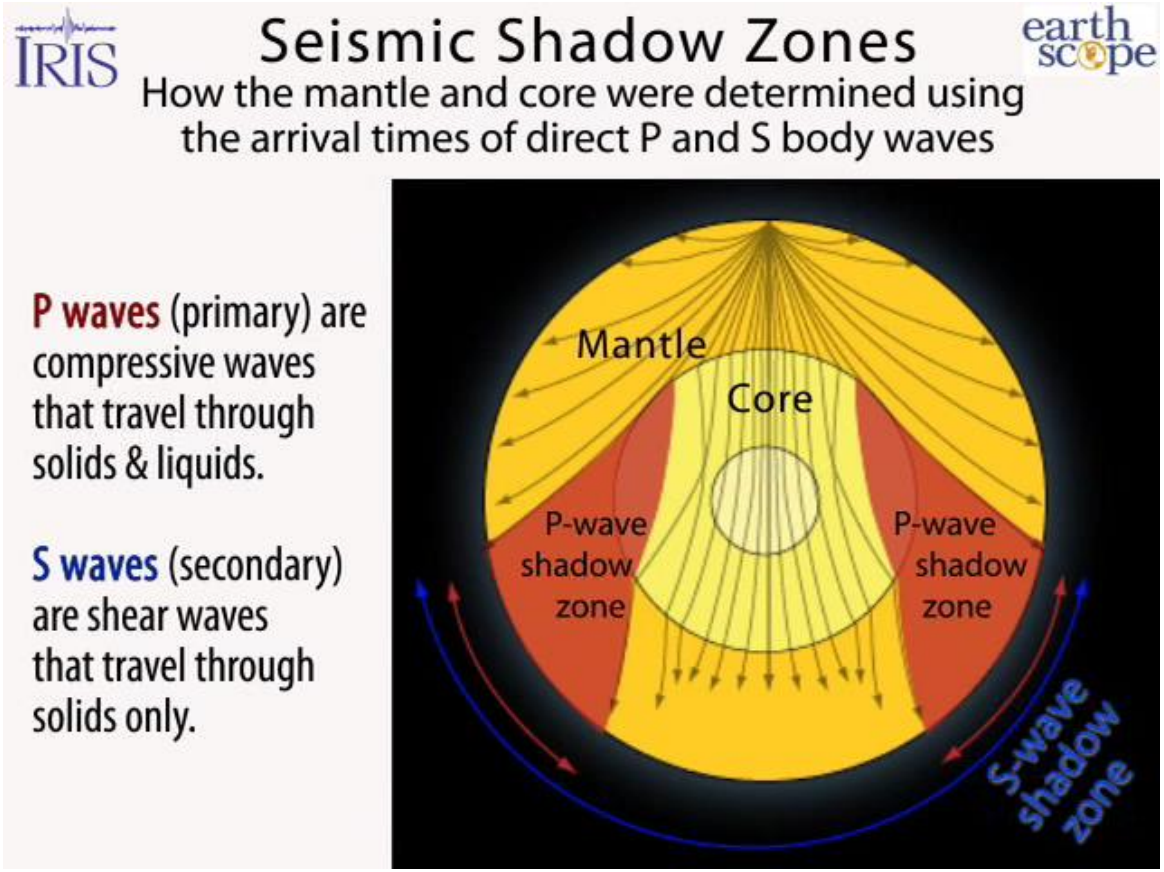
Animation explaining the seismic shadow zone.

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

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



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