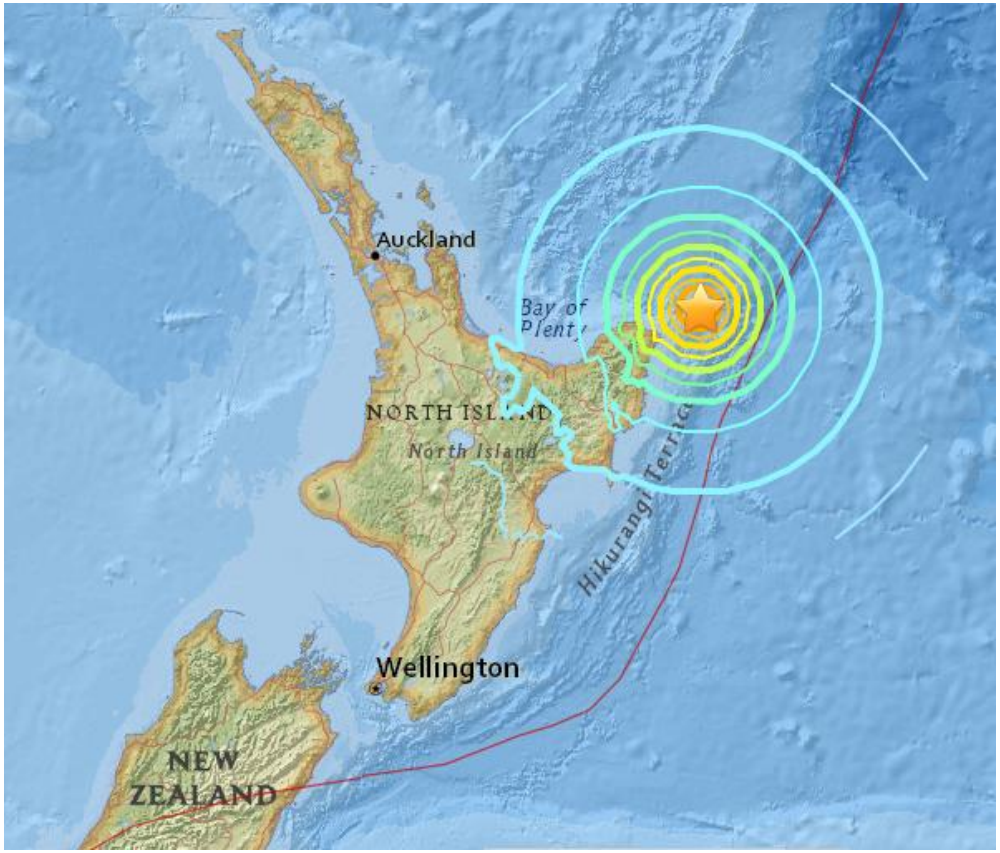
Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

A magnitude 7.1 earthquake has occurred 166.8 km (103 miles) north-northeast of Gisborne, New Zealand below the Pacific Ocean at a depth of 19 km (11 miles).



There are no immediate reports of serious damage or injuries.

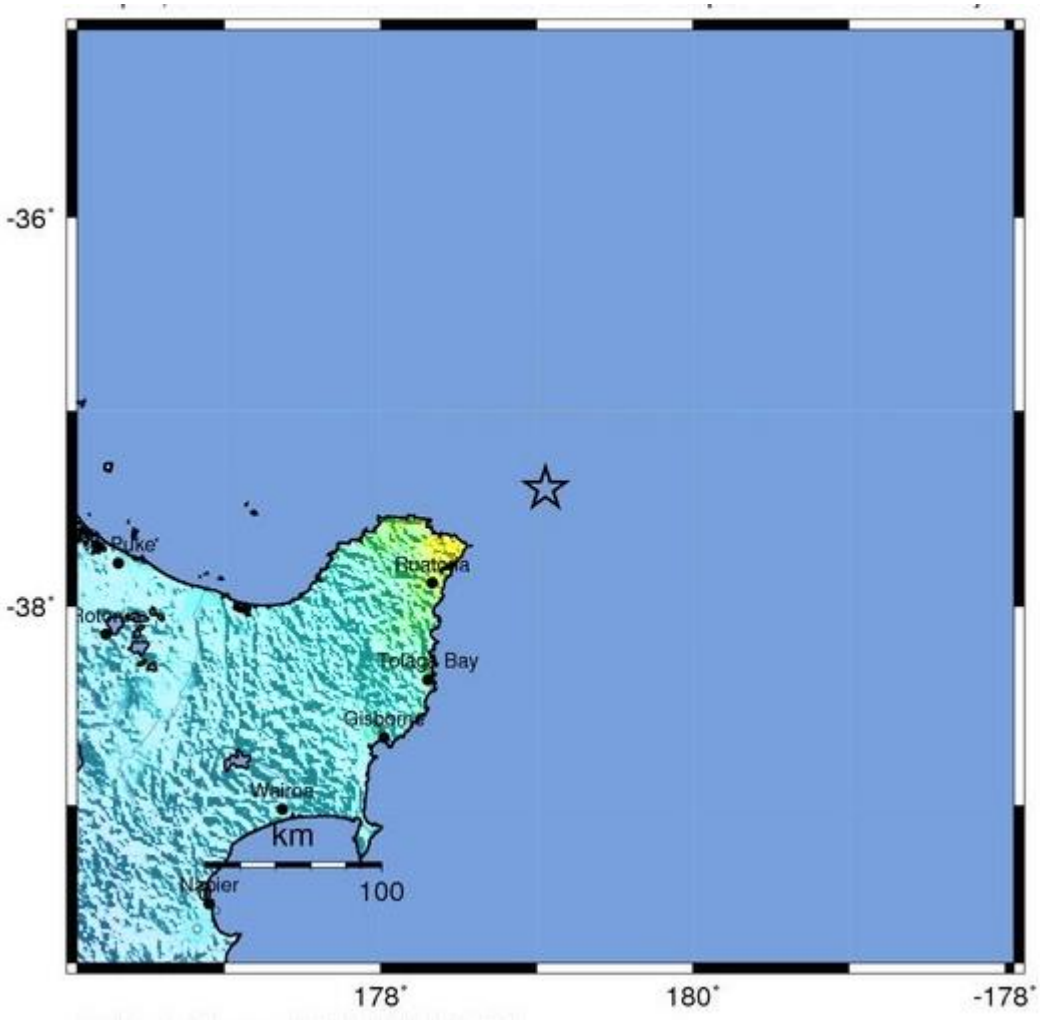
Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

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

A corner of the North Island of New Zealand experienced strong shaking from 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

Image courtesy of the US Geological Survey



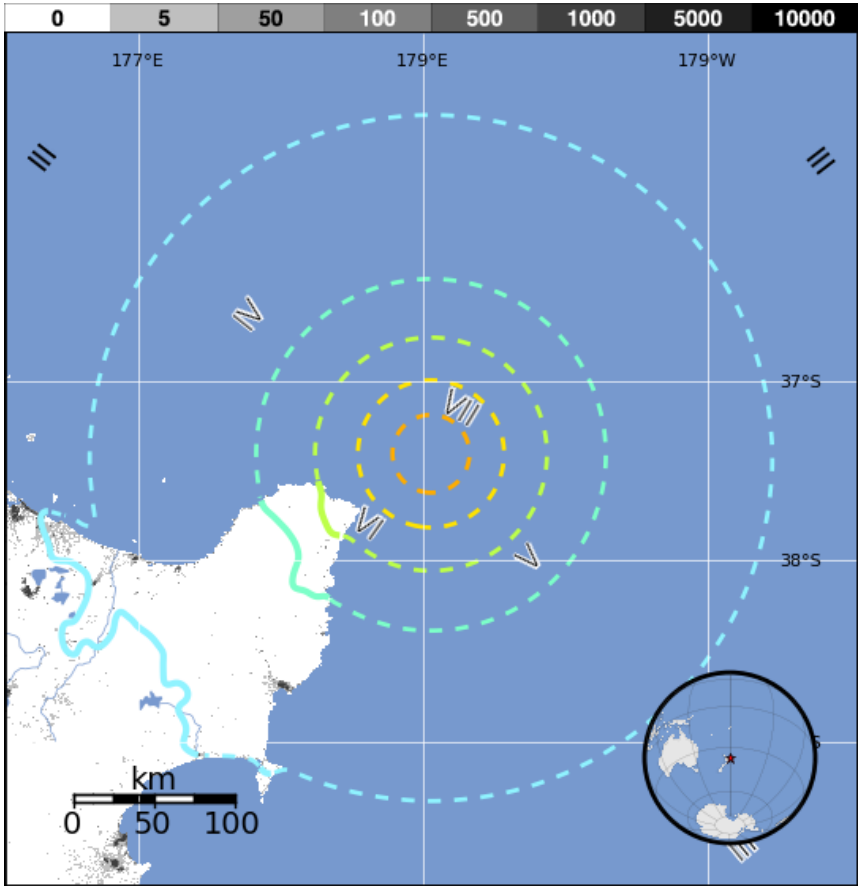
USGS Estimated shaking Intensity from M 7.1 Earthquake

Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

USGS PAGER
Population Exposed to Earthquake Shaking

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

The USGS approximates 1,000 people were exposed to strong shaking from this earthquake.



MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	335 k*
IV	Light	157 k
V	Moderate	4 k
VI	Strong	1 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.

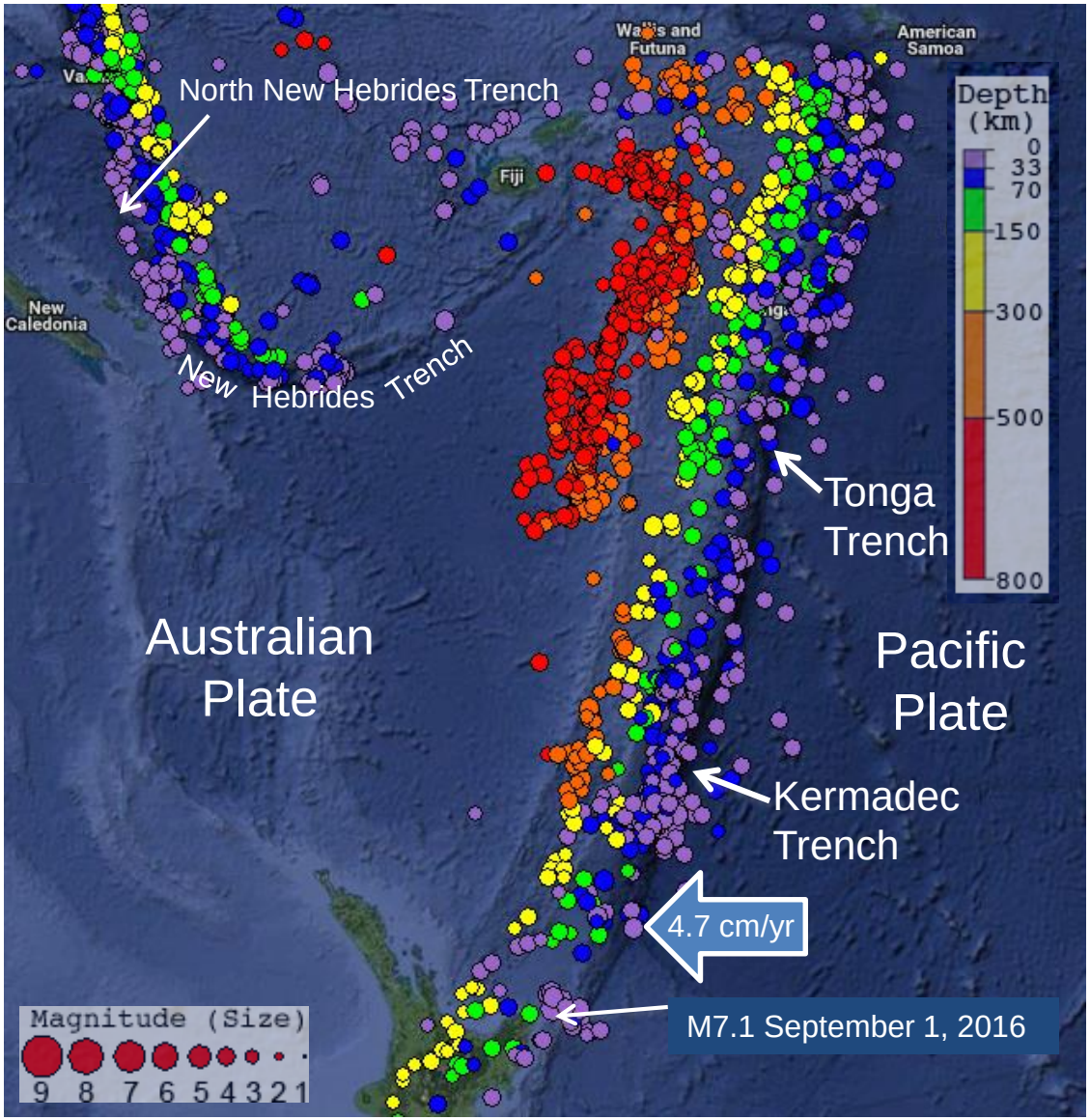
Image courtesy of the US Geological Survey

Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

This earthquake is labeled on this seismicity map showing the most recent 2000 earthquakes in this region of convergence between the Australian and Pacific Plates.

North of New Zealand, earthquake depths increase from east to west across the Kermadec Trench where the Pacific Plate subducts beneath the Australian Plate at a rate of 4.7 cm/yr.

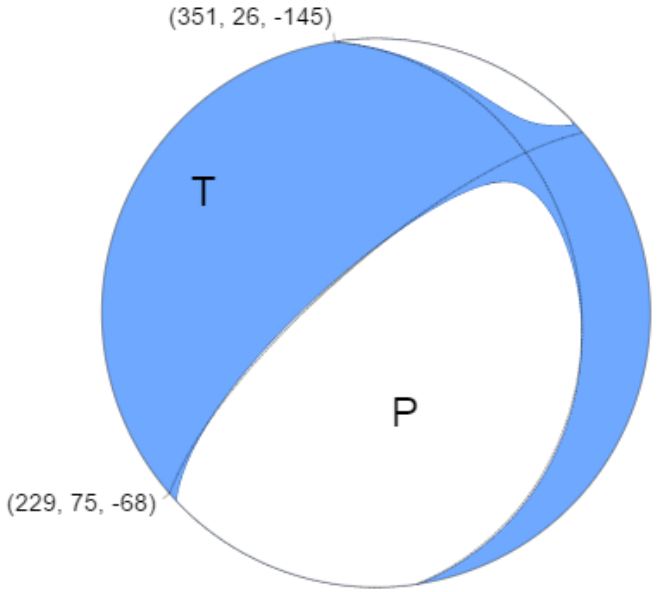
According to the USGS:
"The depth, location and (normal-faulting) focal mechanism of the earthquake all indicate this is most likely an intraplate event within the subducting Pacific slab, rather than being an interplate thrust earthquake on the overlying subduction zone interface."



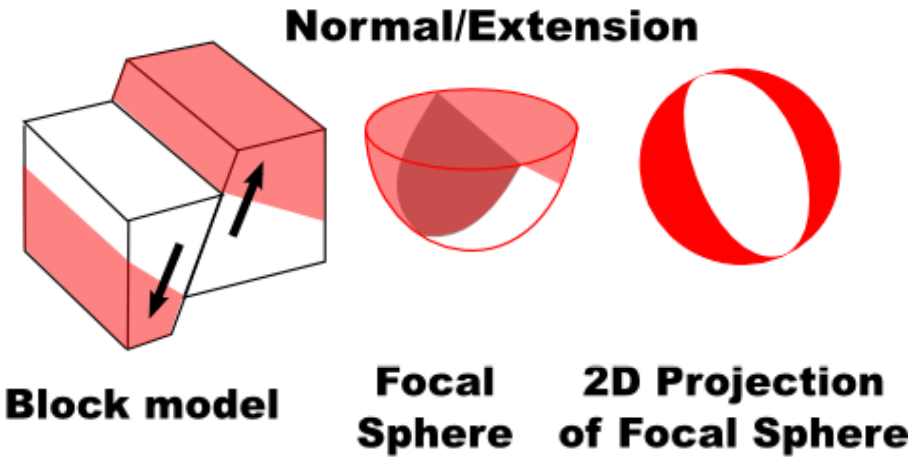
Map created with the IRIS Earthquake Browser

Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

This earthquake occurred as the result of shallow oblique-normal faulting near the plate boundary between the Pacific and Australian Plates, most likely an intraplate event within the subducting Pacific slab.



USGS W-phase Moment Tensor Solution

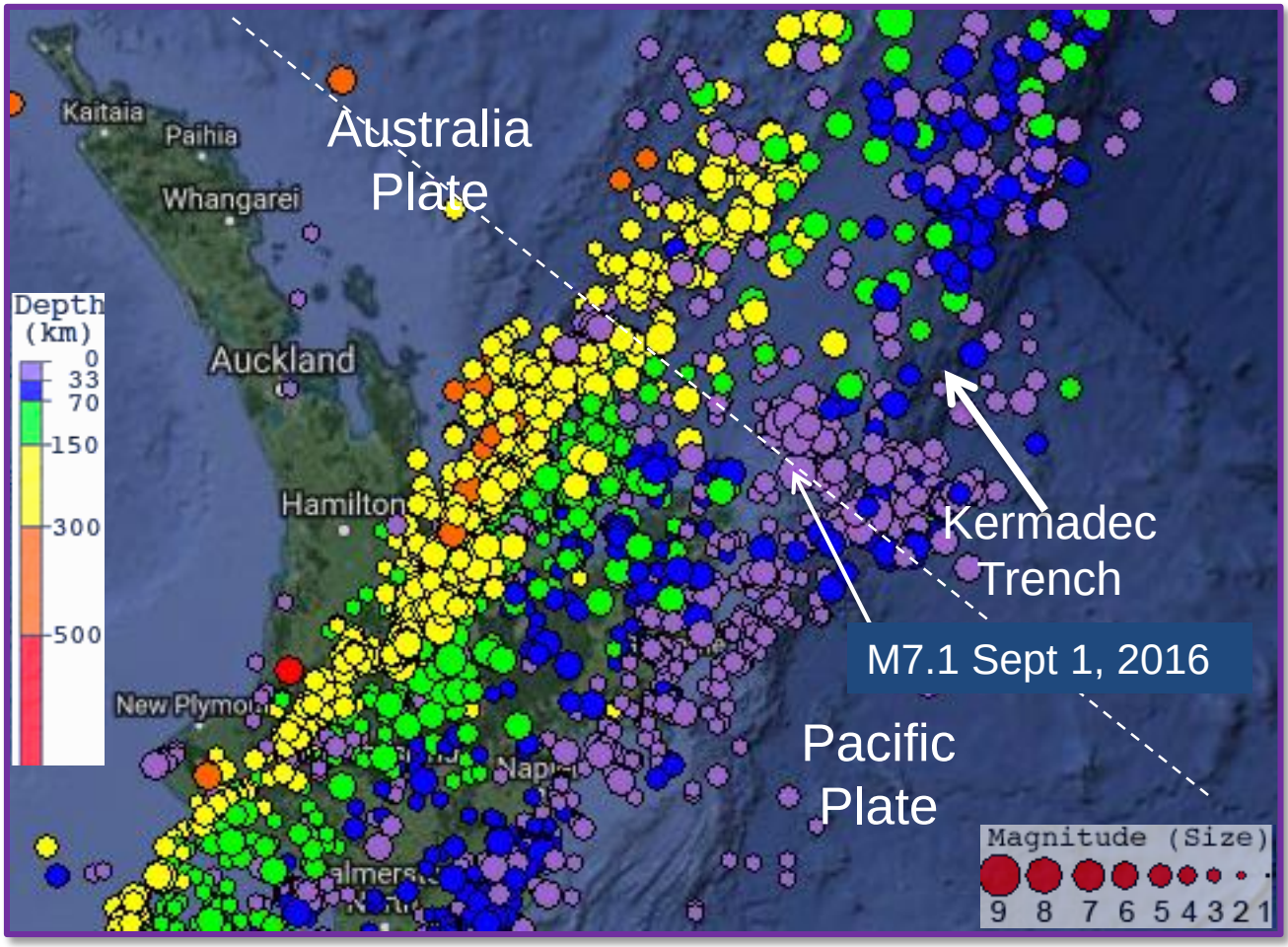


The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

This map presents a more detailed view of seismicity in the region of the North Island of New Zealand surrounding the epicenter of the September 1, 2016 earthquake.

The next slide shows a cross section centered on the dashed line of earthquake activity in the subduction zone between the Pacific and Australian Plates.

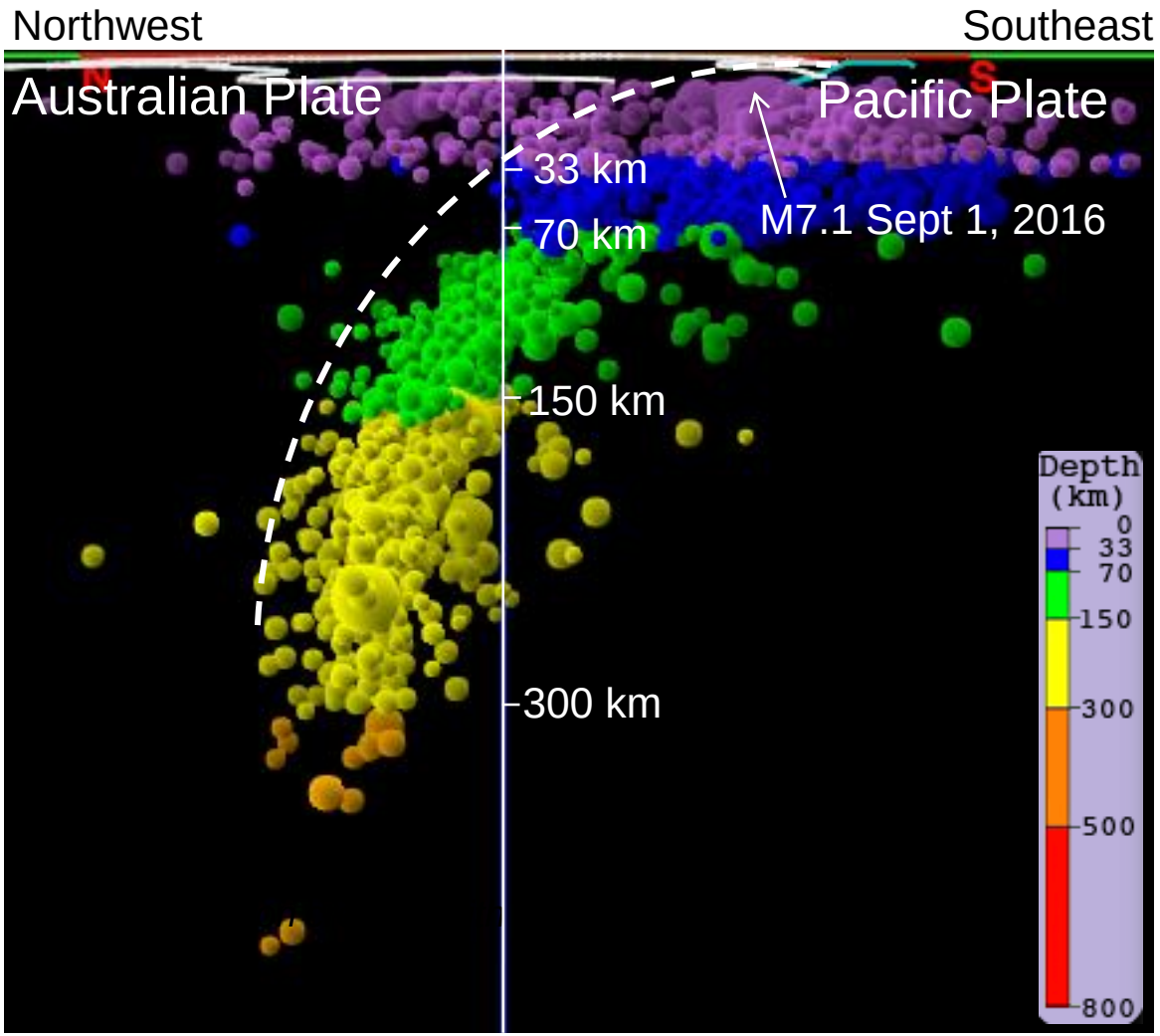


Map created with the IRIS Earthquake Browser

Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

The hypocenter of the M7.1 September 1 earthquake is shown on this Northwest–Southeast cross section of seismicity perpendicular to the Kermadec Trench. The dashed curve approximately outlines the top of the Pacific Plate in this subduction zone. Earthquakes below ~70 km depth are within the subducting Pacific Plate.

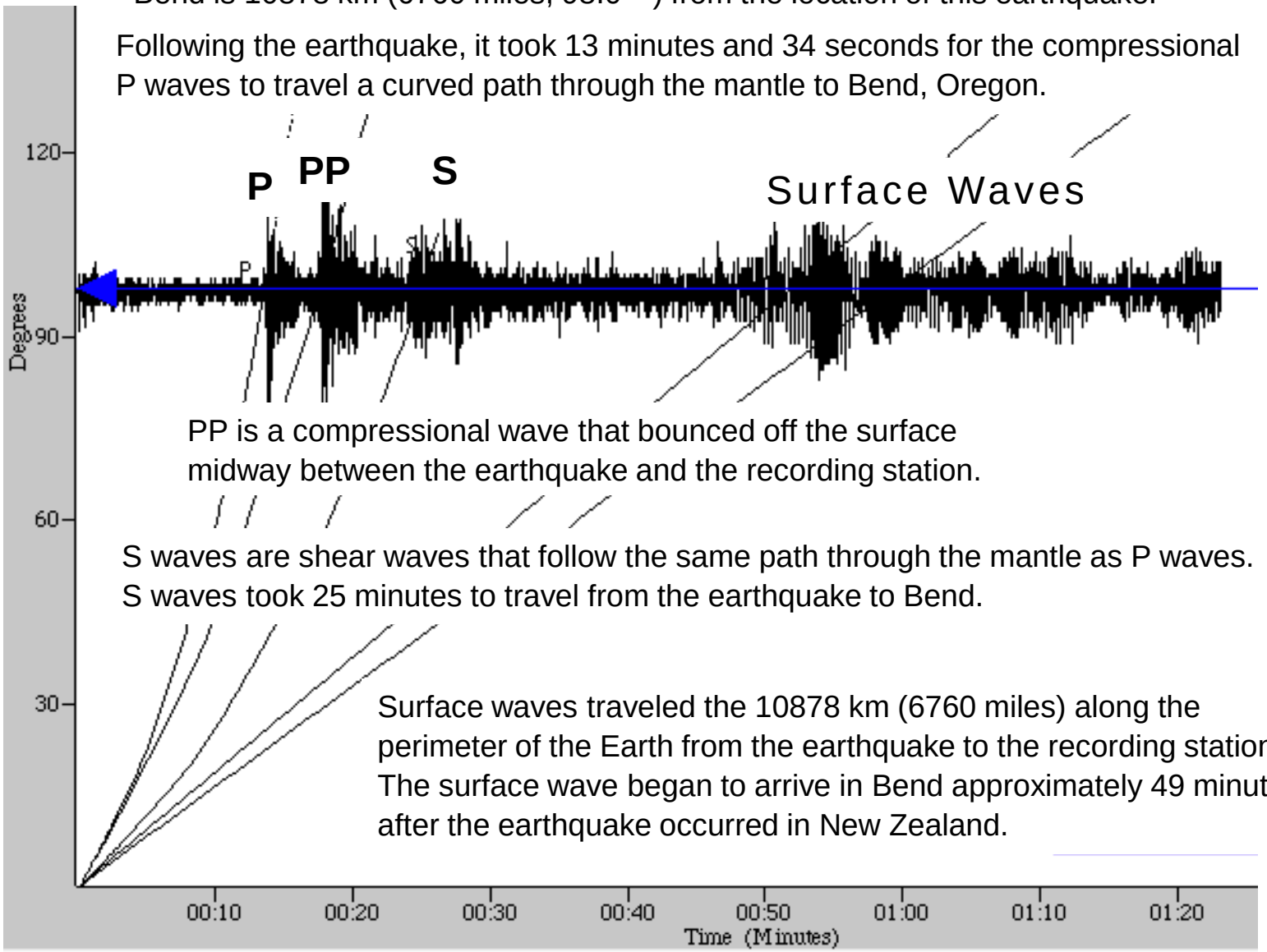
To produce earthquakes, rocks must be brittle with temperatures below ~600 ° C. With the exception of subducting oceanic plates, rock in Earth's mantle below about 70 km depth is viscoelastic and cannot rupture to produce earthquakes.



Magnitude 7.1 NEW ZEALAND
Thursday, September 1, 2016 at 16:37:57 UTC

The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 10878 km (6760 miles, 98.0˚) from the location of this earthquake.

Following the earthquake, it took 13 minutes and 34 seconds for the compressional P waves to travel a curved path through the mantle to Bend, Oregon.



PP is a compressional wave that bounced off the surface midway between the earthquake and the recording station.

S waves are shear waves that follow the same path through the mantle as P waves. S waves took 25 minutes to travel from the earthquake to Bend.

Surface waves traveled the 10878 km (6760 miles) along the perimeter of the Earth from the earthquake to the recording station. The surface wave began to arrive in Bend approximately 49 minutes after the earthquake occurred in New Zealand.

Teachable Moments are a service of

The Incorporated Research Institutions for Seismology
Education & Public Outreach
and
The University of Portland

Please send feedback to tkb@iris.edu

To receive automatic notifications of new Teachable Moments subscribe at www.iris.edu/hq/retm

www.iris.edu/earthquake