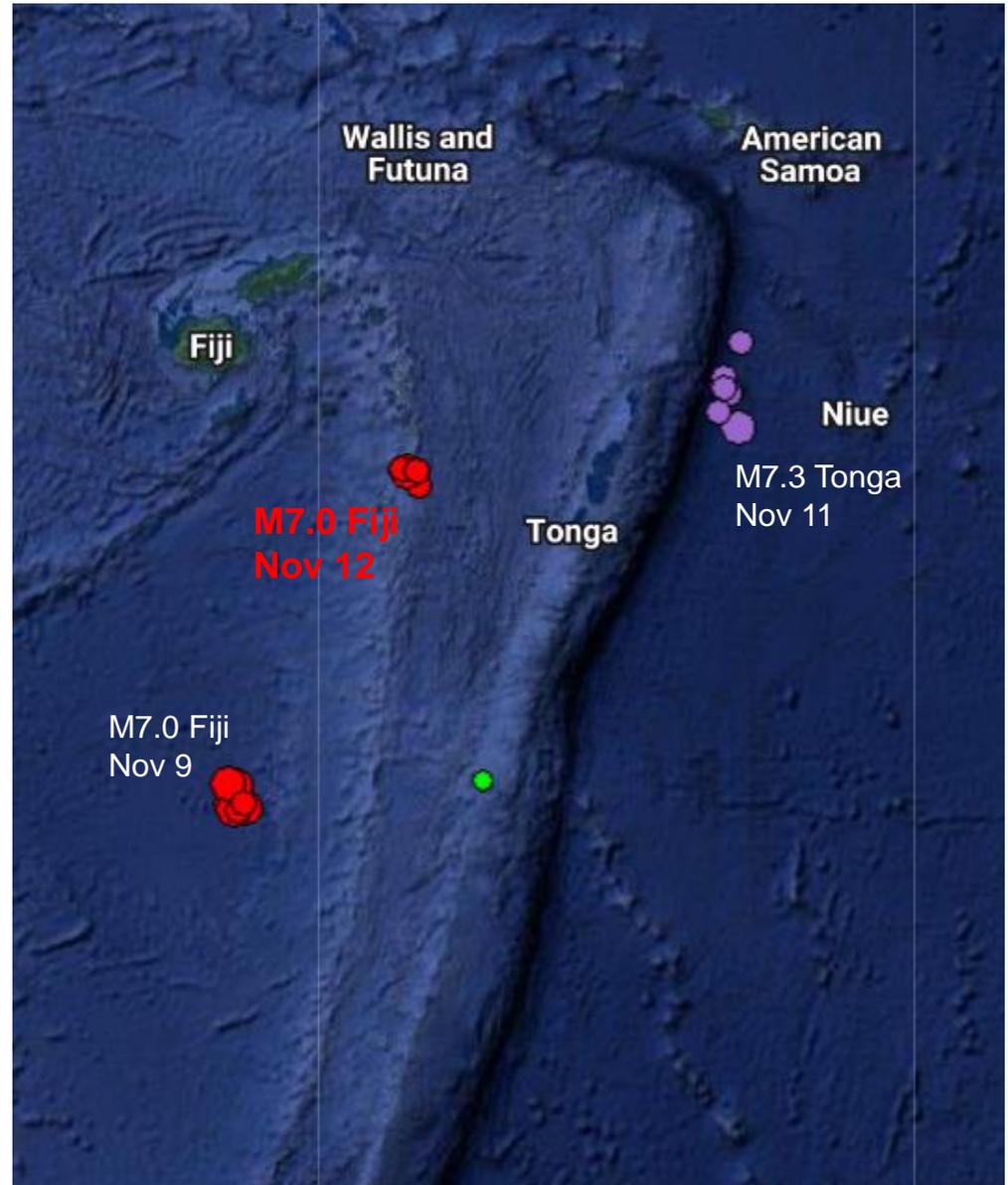


Another very deep M7.0 earthquake occurred south of the Fiji Islands at a depth of 578.2 km (359 miles). The earthquake was followed by a few aftershocks (M4.4 - M5.1).

This is the third cluster of earthquakes that have occurred in this region in the past week.

The epicenters were located about 334 km (207 miles) SE of Levuka, Fiji and 348 km (216 miles) WNW of Nuku'alofa, Tongatapu, Tonga.

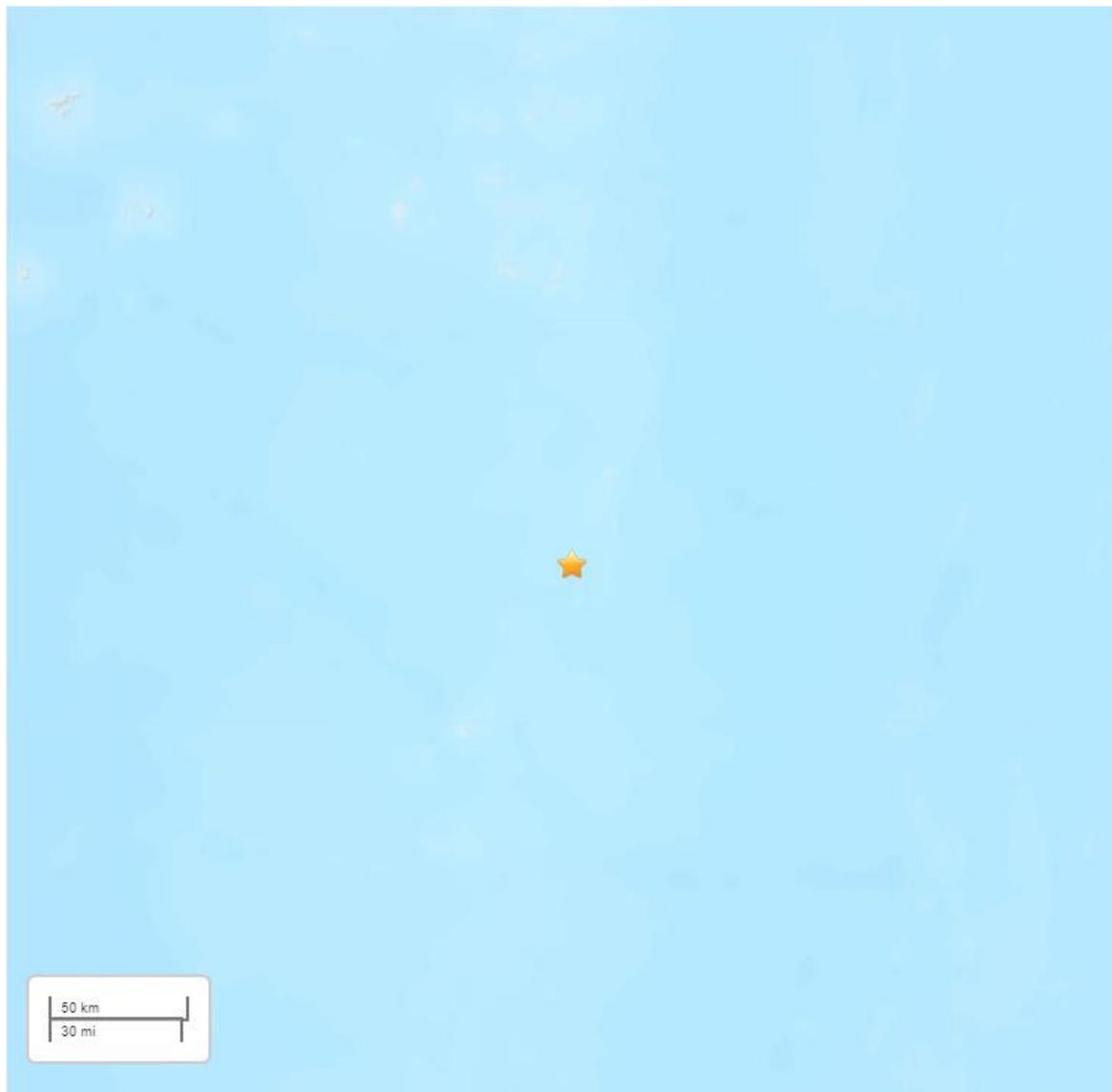
There is no risk of a tsunami from earthquakes at this depth.



The Modified-Mercalli Intensity (MMI) scale is a ten-stage scale, from I to X, that indicates the severity of ground shaking. Intensity is based on observed effects and is variable over the area affected by an earthquake. Intensity is dependent on earthquake size, depth, distance, and local conditions.

MMI 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 7.0 Earthquake

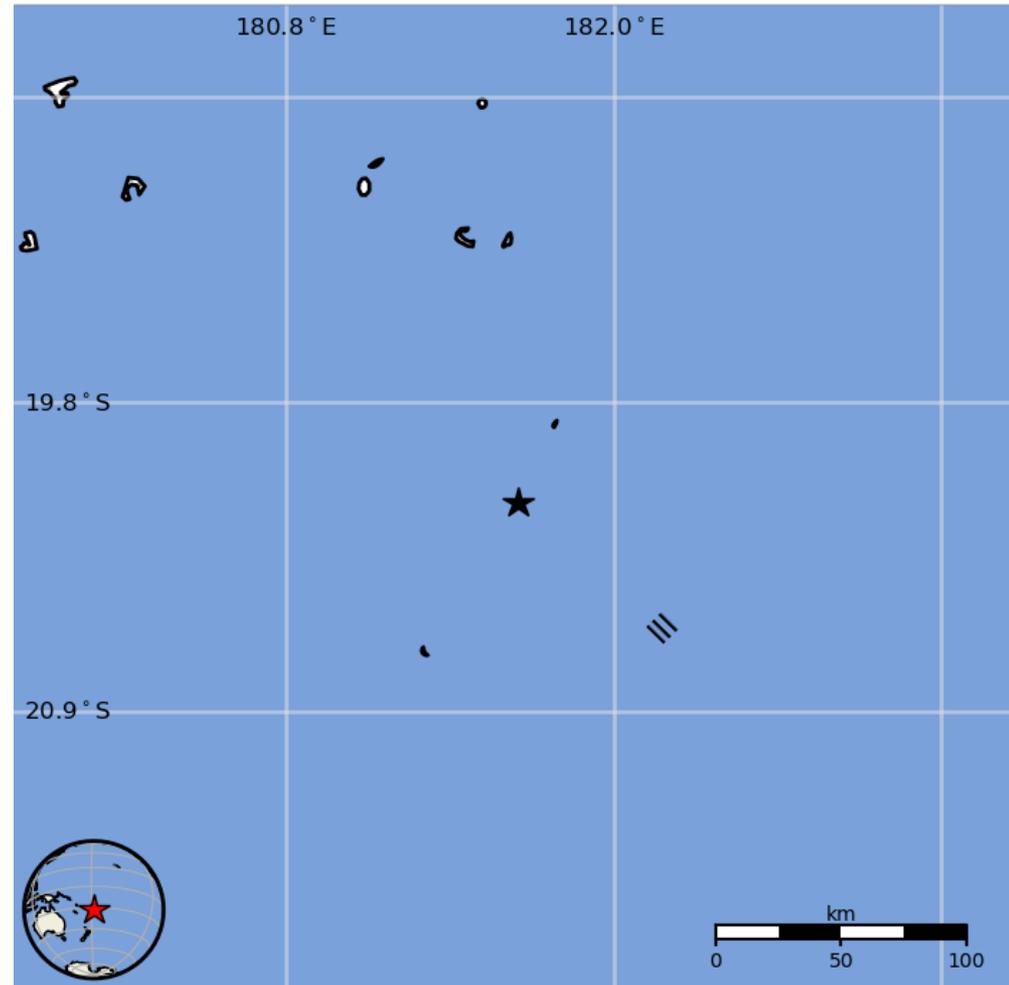
Magnitude 7.0 FIJI

Saturday, November 12, 2022 at 07:09:14 UTC

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

The USGS estimates that 5,000 people felt weak shaking from this earthquake.

I	Not Felt	0 k*
II-III	Weak	5 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



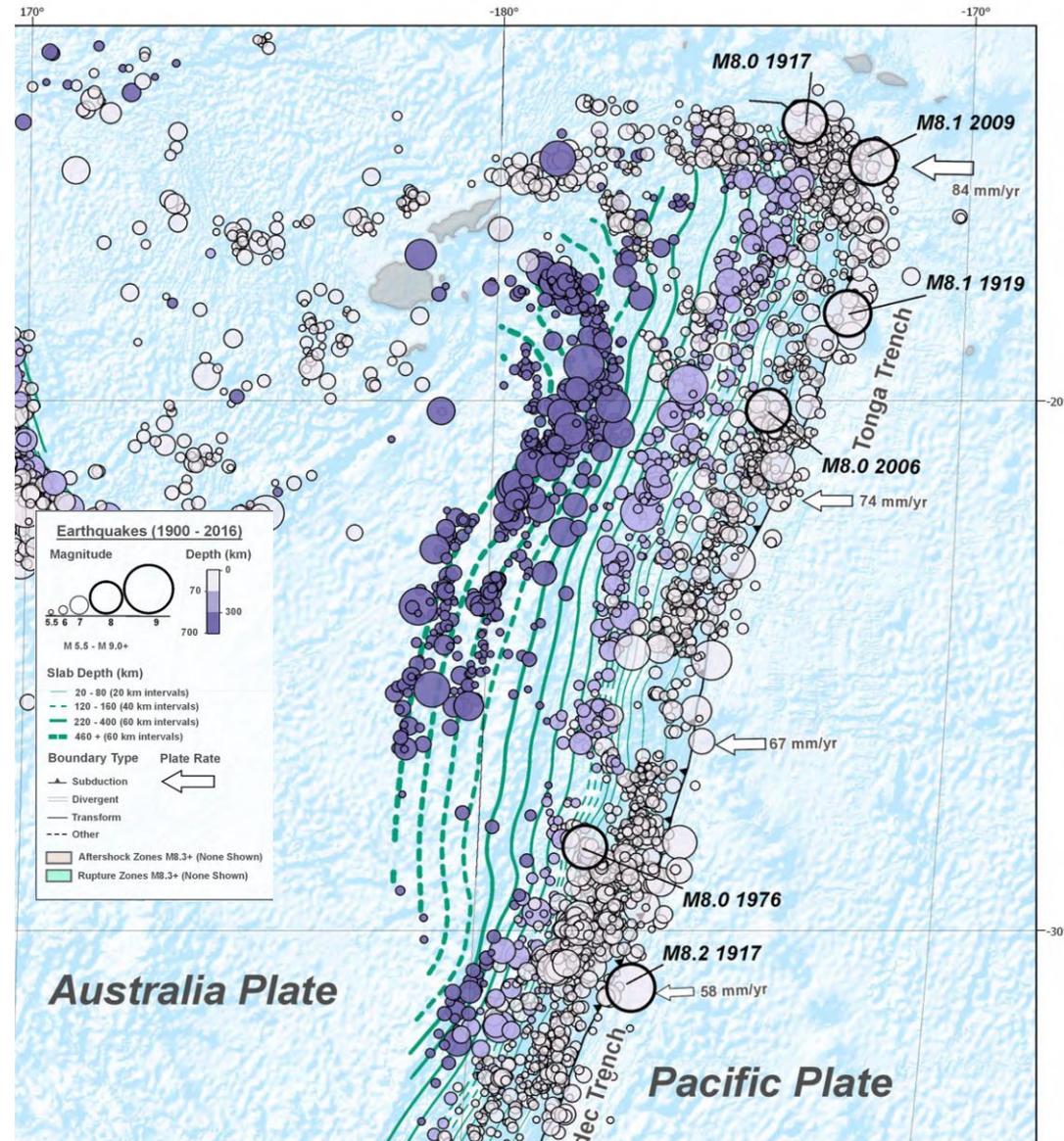
The color-coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table.

Image courtesy of the US Geological Survey

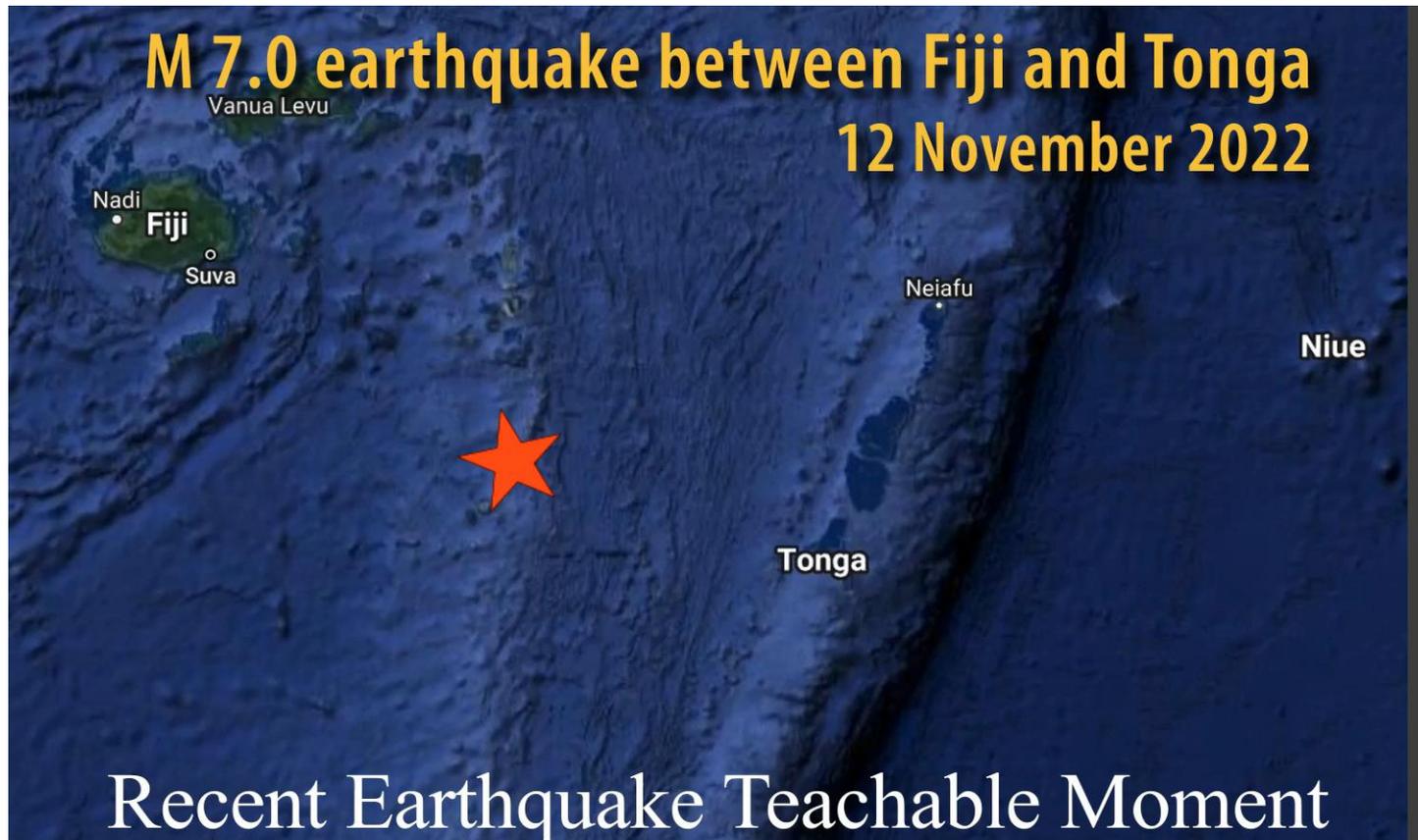
The eastern margin of the Australian Plate is one of the most seismically active areas of the world due to high rates of convergence between the Australian and Pacific Plates.

Earthquakes are shallow near the Tonga Trench on the east side of the map area. As the Pacific Plate subducts towards the west beneath the Australian Plate, earthquakes within the Pacific Plate increase in depth from east to west.

Since 1900, 40 M7.5+ earthquakes have been recorded in this region.



This deep earthquake occurred within the Pacific Plate where it subducts beneath the Australian Plate. This animation allows us to watch the regional seismicity over the last few days, both on a map, but also in 3D, where the seismicity even over this short time window, highlights the location of the subducting Pacific Plate.

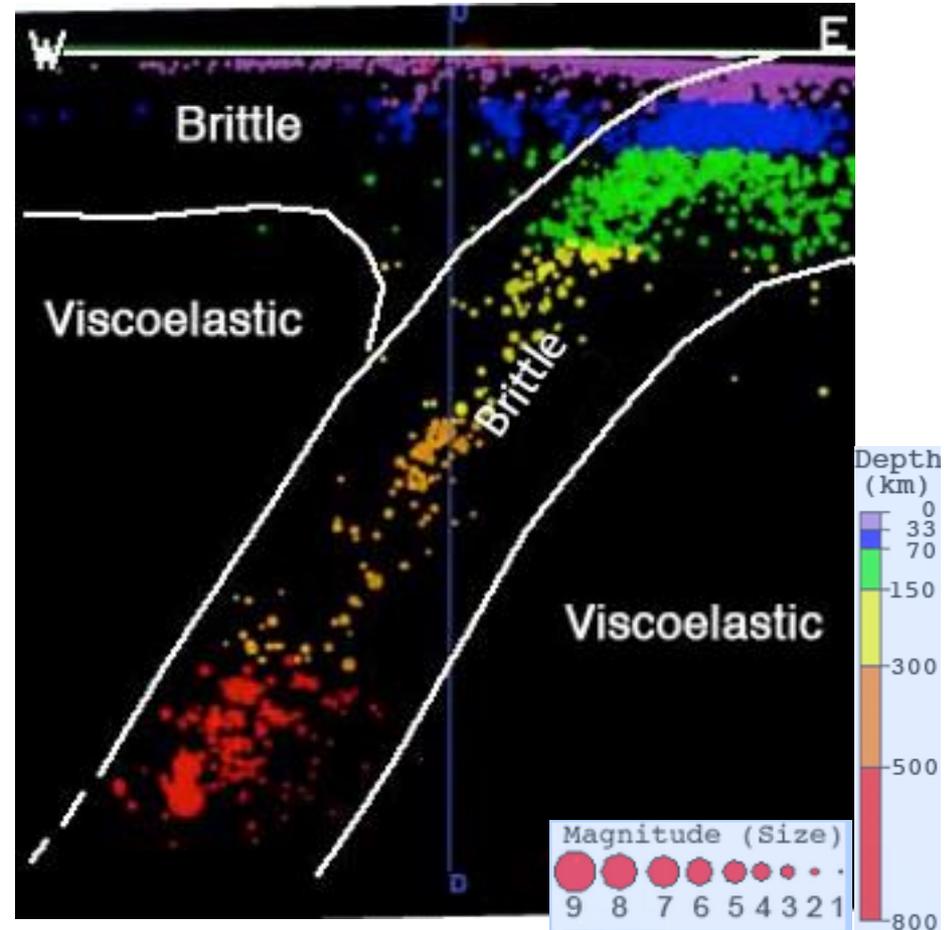


A deep-focus earthquake has a hypocenter depth exceeding 300 km. Deep earthquakes occur exclusively within subducting oceanic lithosphere, especially within old oceanic lithosphere that is subducting rapidly.

To produce earthquakes rocks must be brittle. Brittle rock accumulates elastic energy as they bend then rapidly releases that energy during earthquake rupture.

With the exception of subducting oceanic plates, rock in Earth's mantle below about 100 km depth is viscoelastic and cannot rupture to produce earthquakes. Rocks are brittle at low temperatures but become viscoelastic when they reach temperatures of about 600° C.

Rapidly subducting cool oceanic plates, however, can remain brittle up to about 700 km in the hot mantle.



Exploring a three-dimensional view from the IRIS Earthquake Browser.

A **foreshock** is a smaller magnitude earthquake that precedes the mainshock. There are no special characteristics of a foreshock that let us know it is a foreshock until the mainshock occurs.

A **mainshock** is largest magnitude earthquake during an earthquake sequence.

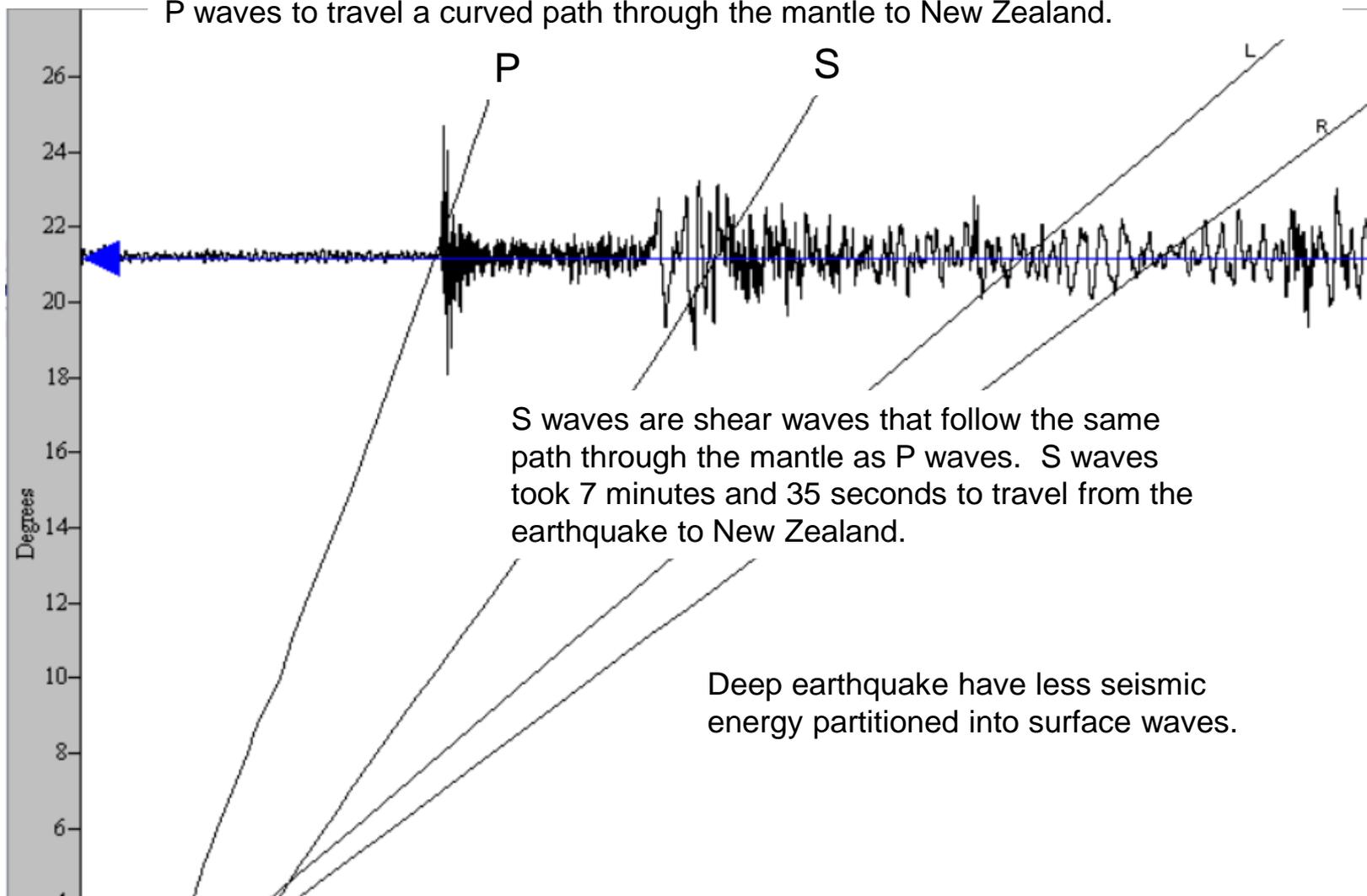
Aftershocks are smaller earthquakes occurring after a large earthquake as the fault adjusts to the new state of stress. Aftershock sequences follow predictable patterns as a group, although the individual earthquakes are themselves not predictable. Aftershocks often define the full area of fault rupture.



Magnitude 7.0 FIJI Saturday, November 12, 2022 at 07:09:14 UTC

The record of the earthquake in South Karoni, New Zealand (SNZO) is illustrated below. New Zealand is 2442 km (1517 miles, 22°) from the location of this earthquake.

Following the earthquake, it took 4 minutes and 12 seconds for the compressional P waves to travel a curved path through the mantle to New Zealand.



S waves are shear waves that follow the same path through the mantle as P waves. S waves took 7 minutes and 35 seconds to travel from the earthquake to New Zealand.

Deep earthquake have less seismic energy partitioned into surface waves.

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



These resources have been developed as part of the SAGE facility operated by IRIS via support from the National Science Foundation.