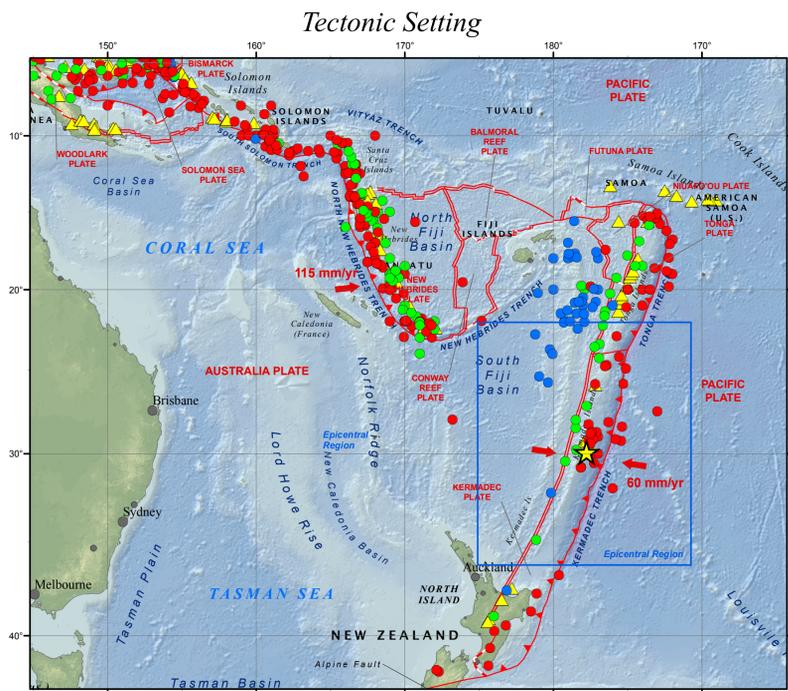


M7.0 Kermadec Islands, New Zealand, Earthquake of 29 September 2008



RELATIVE PLATE MOTIONS

The broad red vectors represent the motion of tectonic plates relative to the adjacent plate. In the vicinity of this earthquake, the Australia Plate and Pacific Plate are converging at about 60 mm/yr. Many microplates are caught in this convergence. The Kermadec Plate is one of these.

SCALE 1:25,000,000

0 200 400 800 1,200 1,600 Kilometers

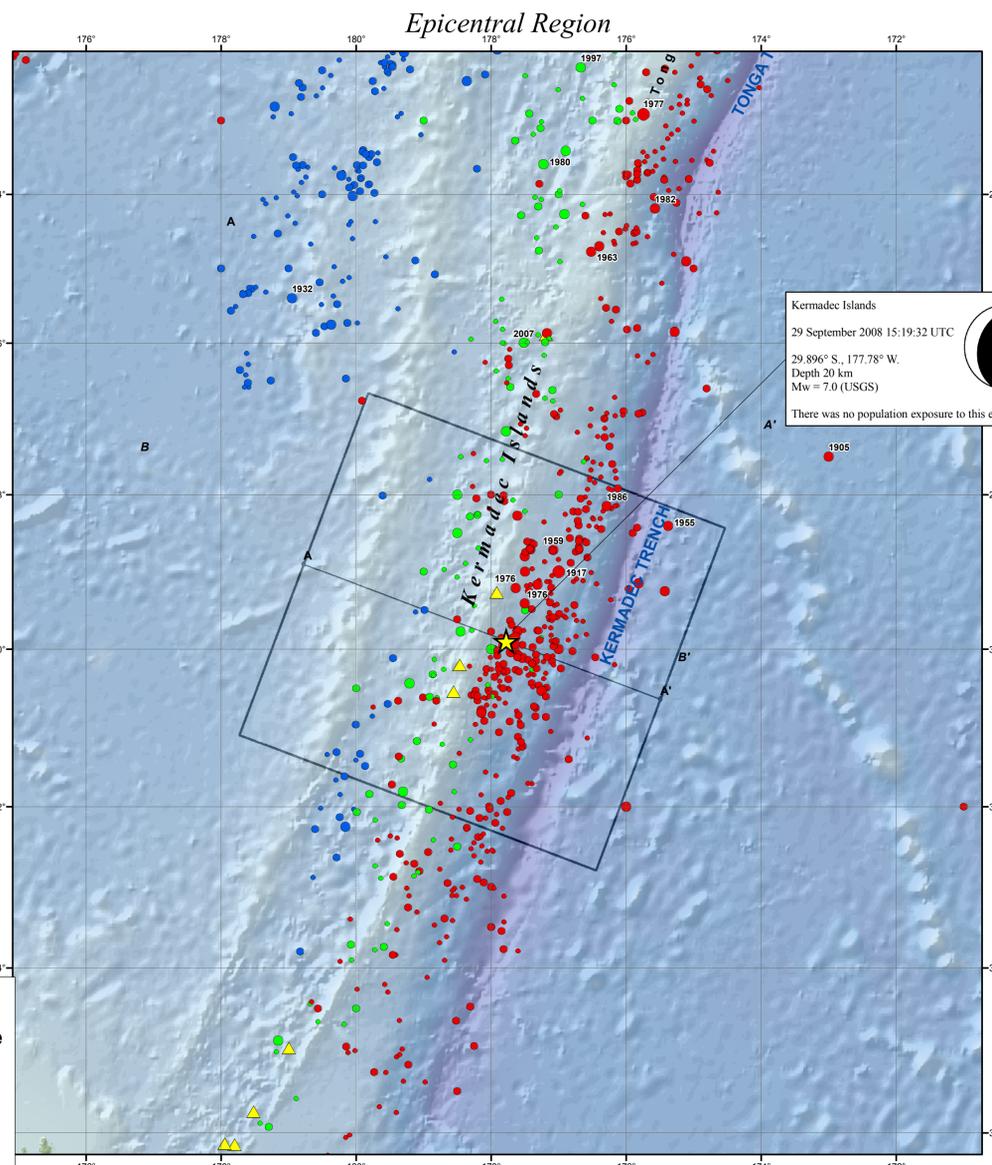
EXPLANATION

Mag ≥ 7.0

- 0 - 69 km
- 70 - 299
- 300 - 600

Plate Boundary

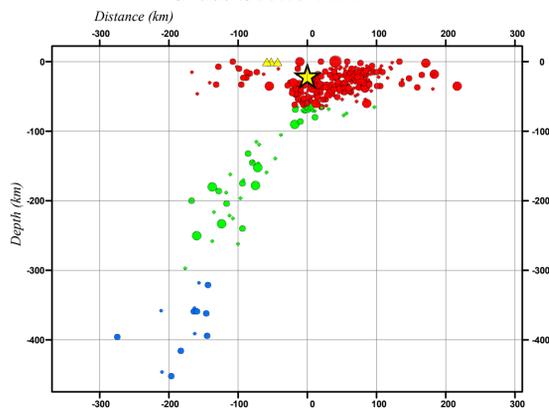
- Subduction
- Transform
- Divergent
- Convergent
- ▲ Volcanoes



Kermadec Islands
29 September 2008 15:19:32 UTC
29.896° S., 177.78° W.
Depth 20 km
Mw = 7.0 (USGS)
There was no population exposure to this earthquake.



Cross Section A-A'



EXPLANATION

Earthquake Magnitude

- 5.50 - 5.99
- 6.00 - 6.99
- 7.00 - 7.99
- ≥ 8.00

Earthquake Depth

- 0 - 69
- 70 - 299
- ≥ 300

Scale 1:5,500,000
Mercator Projection
0 100 200 400 Kilometers

Significant Earthquakes Mag ≥ 7.5

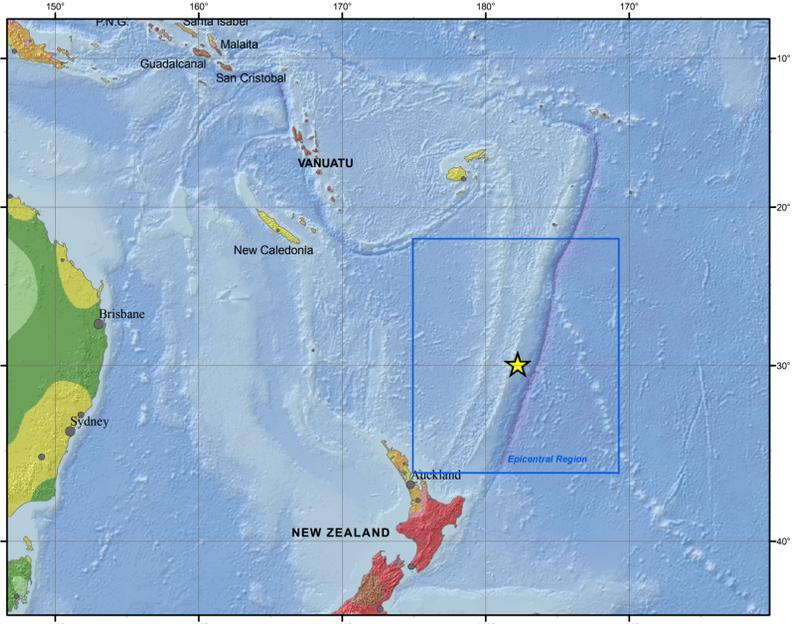
Year	Mon	Day	Time	Lat	Long	Dep	Mag
1905	03	18	0058	-27.500	-173.000	60	7.5
1917	05	01	1826	-29.000	-177.000	0	8.0
1932	05	26	1609	-25.399	179.049	568	7.5
1955	02	27	2043	-28.406	-175.379	17.9	7.8
1959	09	14	1409	-28.722	-177.079	35	7.8
1963	12	18	0030	-24.776	-176.520	35	7.7
1976	01	14	1556	-29.213	-177.638	43.7	7.8
1976	01	14	1647	-29.172	-177.316	31.7	7.9
1977	06	22	1208	-22.912	-175.744	65.5	8.1
1980	04	13	1804	-23.593	-177.225	148	7.6
1982	12	19	1743	-24.193	-175.575	31.6	7.5
1986	10	20	0646	-28.150	-176.291	26.7	7.7
1997	10	14	0953	-22.271	-176.672	169	7.7
2007	12	09	0728	-25.996	-177.514	152	7.8

DISCUSSION

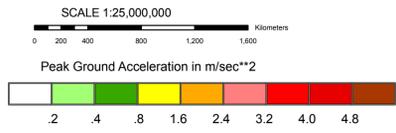
The September 29, 2008, M7.0 earthquake occurred in the Tonga – Kermadec subduction zone. The subduction zone extends north-northeast from the North Island of New Zealand for over 2500 km through Tonga to within 100 km of Western Samoa. At a broad scale, tectonics of the subduction zone reflect the motion of the Pacific plate westward with respect to the interior of the Australia plate at a velocity of about 60 mm/yr in the epicentral region of the earthquake. The Pacific plate subducts beneath the Australia plate at the Tonga and Kermadec trenches, and dips to the west. In detail, the eastern edge of the broad Australia plate may itself be viewed as a collection of small plates or microplates that move with respect to each other and with respect to the Pacific plate and the Australia plate interior. The location and focal-mechanism of the earthquake are consistent with it occurring as thrust faulting on the interface between the subducting Pacific plate and the overriding Australia plate (in detail, the overriding Kermadec microplate).

The interaction between the Pacific and Australia plate creates one of the most active tectonic environments in the world, with a high level of associated earthquake activity. Since 1976, a 200-km long section of the Tonga – Kermadec subduction zone that includes the epicenter of the September 29 earthquake has produced over 50 earthquakes of magnitude 6 or larger, with the largest having magnitude 7.9.

Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec², expected to be exceeded in a 50-yr period with a probability of 10 percent.



DATA SOURCES and REFERENCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999) and extensions Engdahl, E.R. and Villaseñor, A., 2002, *Global Seismicity: 1900 - 1999*, chap. 41 of Lee, W.H.K., and others, eds., *International Earthquake and Engineering Seismology*, Part A: New York, N.Y., Elsevier Academic Press, 932 p.
HDF (unpublished earthquake catalog) (Engdahl, 2003)
Global Seismic Hazard Assessment Program
<http://www.seismo.ethz.ch/GSHAP/>

PLATE TECTONICS

Bird, P., 2003, An updated digital model of plate boundaries: *Geochem. Geophys. Geosyst.*, v. 4, no. 3, pp. 1027-80.

BASE MAP

NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center
NOAA GEBCO and GLOBE Elevation Models

DISCLAIMER

Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.
Map prepared by U.S. Geological Survey National Earthquake Information Center 29 September 2008.
Map not approved for release by Director