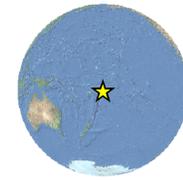
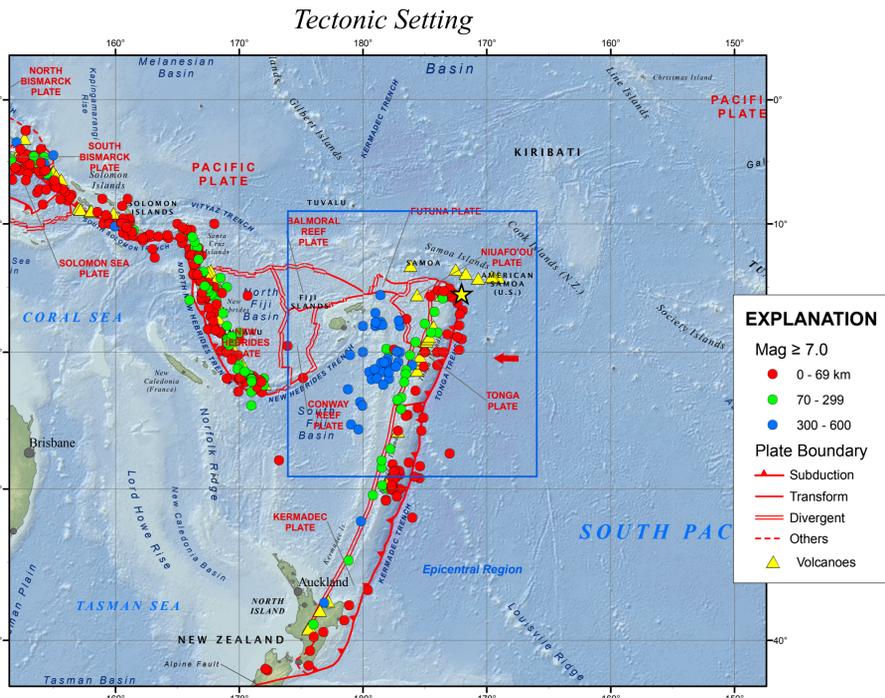


M8.0 Samoa Islands Region Earthquake of 29 September 2009



Epicentral Region



EXPLANATION

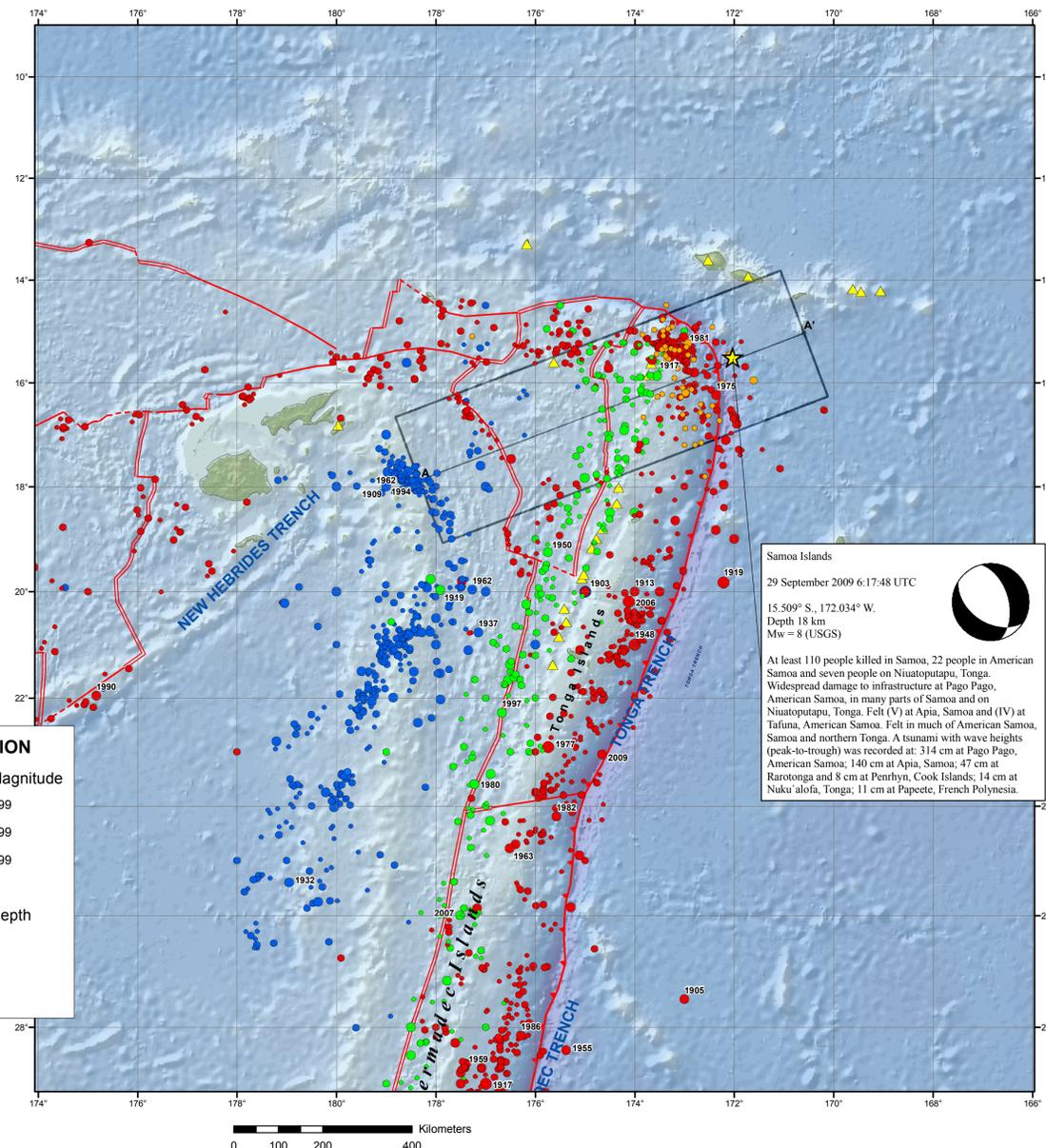
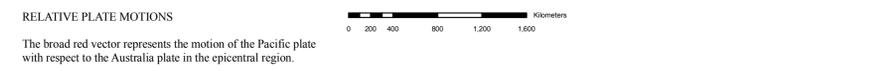
Mag ≥ 7.0

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

Plate Boundary

- Subduction
- Transform
- Divergent
- Others

Volcanoes



Samoa Islands

29 September 2009 6:17:48 UTC
15.509° S, 172.034° W
Depth 18 km
Mw = 8 (USGS)

At least 110 people killed in Samoa, 22 people in American Samoa and seven people on Niuauputapu, Tonga. Widespread damage to infrastructure at Pago Pago, American Samoa, in many parts of Samoa and on Niuauputapu, Tonga. Felt (V) at Apia, Samoa and (IV) at Tafuna, American Samoa. Felt in much of American Samoa, Samoa and northern Tonga. A tsunami with wave heights (peak-to-trough) was recorded at: 314 cm at Pago Pago, American Samoa; 140 cm at Apia, Samoa; 47 cm at Rarotonga and 8 cm at Penryn, Cook Islands; 14 cm at Nuku'alofa, Tonga; 11 cm at Papeete, French Polynesia.

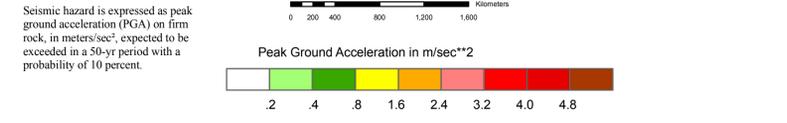
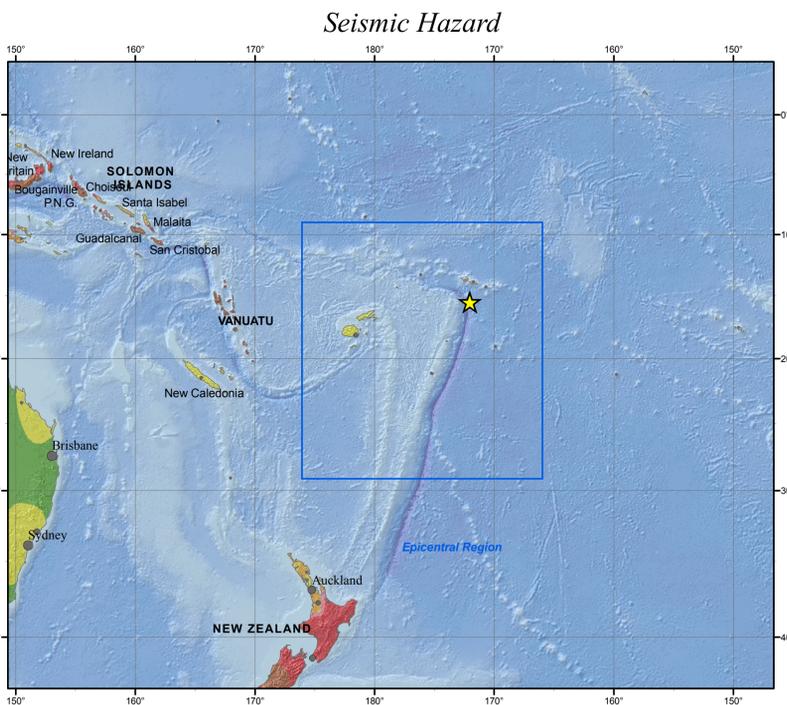
EXPLANATION

Earthquake Magnitude

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

Earthquake Depth

- 0 - 69
- 70 - 299
- ≥ 300



USGS USAID

M 8.0, SAMOA ISLANDS REGION

Origin Time: Tue 2009-09-29 17:48:11 UTC
Location: 15.50° S 172.07° W Depth: 18 km

PAGER Version 3

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (per 1 sq km)	I	II-III	IV	V	VI	VII	VIII	IX	X+
ESTIMATED MODIFIED MERCALLI INTENSITY	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
PERCEIVED SHAKING	None	None	None	Light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
POTENTIAL DAMAGE	None	None	None	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy	Very Heavy

Population Exposure (population per 1 sq km from Landsat 2000)

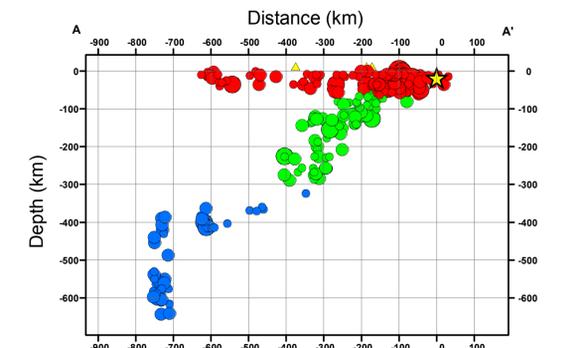
Selected City Exposure

City	Population
Liuliang	1K
Valkutat	1K
Faifa	1K
Socorro	1K
Lionie	4K
Lulluff	1K
Apia	40K
Valere	0K
Faiciu	3K
Tafuna	11K
Pago Pago	11K

Shaking Intensity (MMI)

Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist. On September 28, 2006 (UTC), a magnitude 6.9 earthquake occurred in the Tonga region 119 km south of the location of this earthquake, with estimated population exposures of 197,000 at intensity IV and 29,000 at intensity III, with no reported fatalities.

This information was automatically generated and has not been reviewed by a seismologist.
<http://earthquake.usgs.gov/pager> Event ID: us2009mbdi



DISCUSSION

The broad-scale tectonics of the Tonga region are dominated by the relative convergence of the Pacific and Australia plates, with the Pacific plate subducting westward beneath the Australia plate at the Tonga trench. At the latitude of the earthquake of September 29, 2009, the Pacific plate moves westward with respect to the interior of the Australia plate at a velocity of about 86 mm/year. The earthquake occurred near the northern end of a 3,000 km long segment of the Pacific/Australia plate boundary that trends north-northeast, farther north of the earthquake's source region, the plate boundary trends northwest and then west. The eastern edge of the broad Australia plate may 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.

On the basis of currently available location and fault mechanism information, we infer that the September 29 earthquake occurred as a normal fault rupture on or near the outer rise of the subducting Pacific plate.

The broad-scale Australia/Pacific plate boundary is one of the most active earthquake regions in the world. Earthquakes occur on the thrust-fault boundary between the Australia and Pacific plates, within the Pacific plate on both sides of the trench, and within and on the boundaries of the small plates that compose the eastern edge of the overall Australia plate.

Significant Earthquakes Mag ≥ 7.5

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1903	01	04	05:07	-20.000	-175.000	400	8.0
1913	06	26	04:57	-20.000	-174.000	0	7.7
1917	06	26	05:49	-15.500	-173.000	0	8.5
1919	01	01	03:00	-19.971	-177.914	202	7.7
1919	04	30	07:17	-19.823	-172.215	35	8.2
1937	04	16	03:01	-20.768	-177.144	348	7.5
1948	09	08	15:09	-21.000	-174.000	0	8.0
1950	12	14	01:52	-19.250	-175.750	200	7.5
1957	04	14	19:18	-15.403	-173.129	35	7.5
1962	05	21	21:15	-19.962	-177.272	416	7.5
1975	12	26	15:56	-16.241	-172.364	15	7.7
1981	09	01	09:29	-15.112	-173.019	14.2	7.5
2006	05	03	15:26	-20.187	-174.123	55	8.0
2009	09	29	06:48	-15.560	-172.070	18	8.0

DATA SOURCES and REFERENCES

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 - 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.
 - EHB catalog (Engdahl et al., 1998)
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- PLATE TECTONICS**
- Bial, P., 2003, An updated digital model of plate boundaries. Geochim. Geophys. Geovis., 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
2 October 2009
<http://earthquake.usgs.gov/>
Map not approved for release by Director USGS