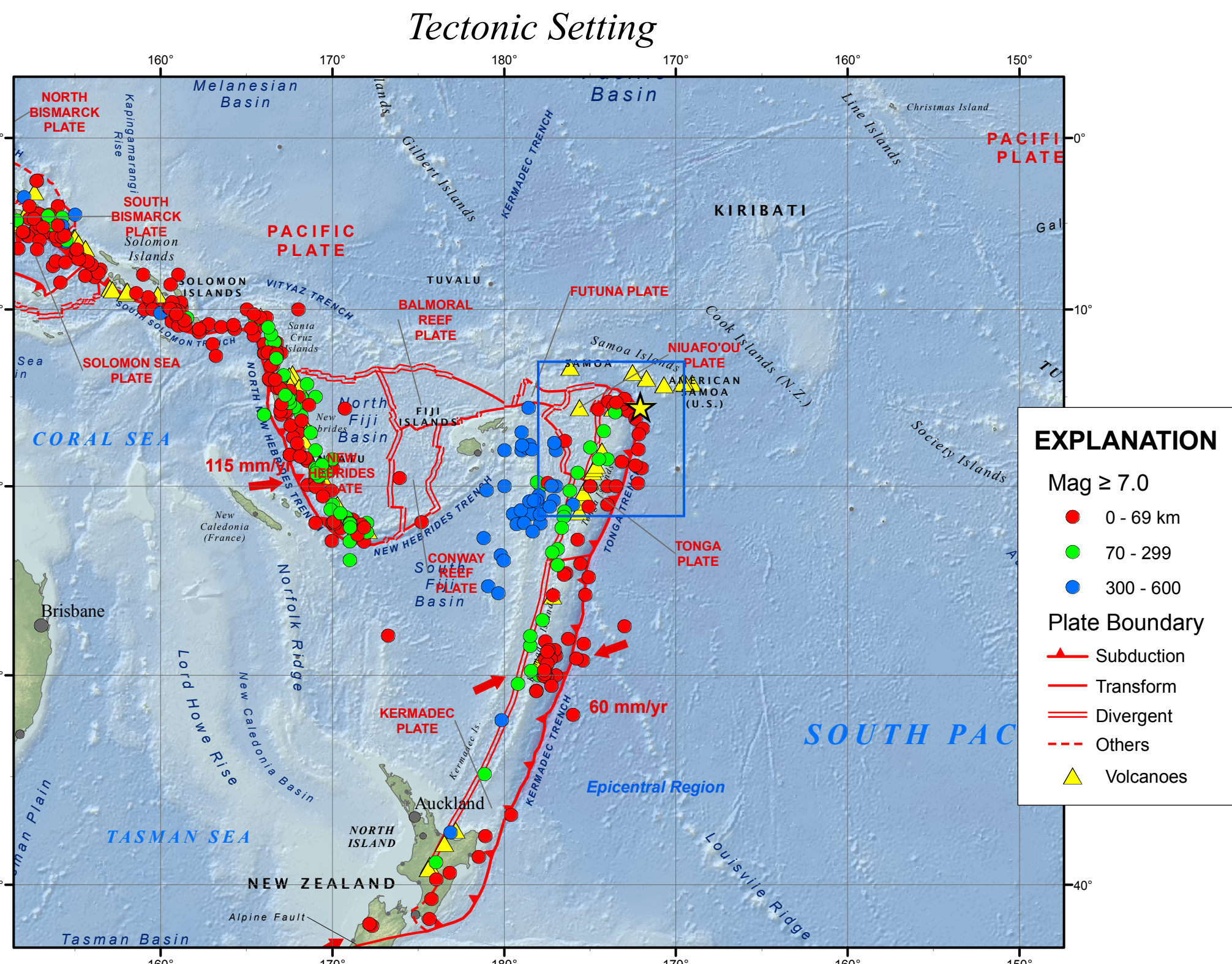
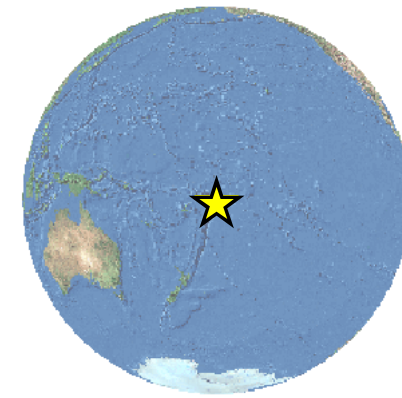
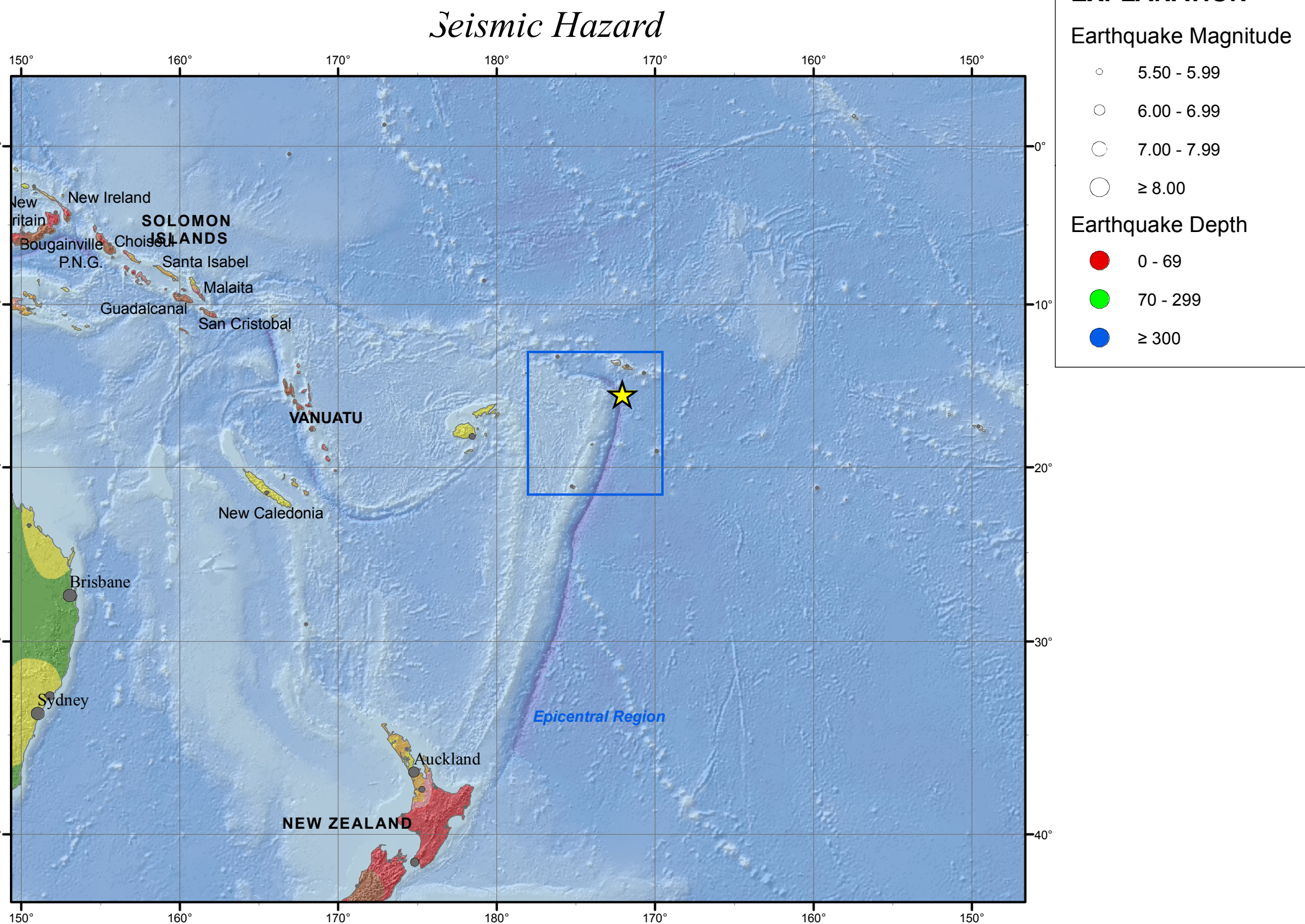


# M8.0 Samoa Islands Region Earthquake of 29 September 2009

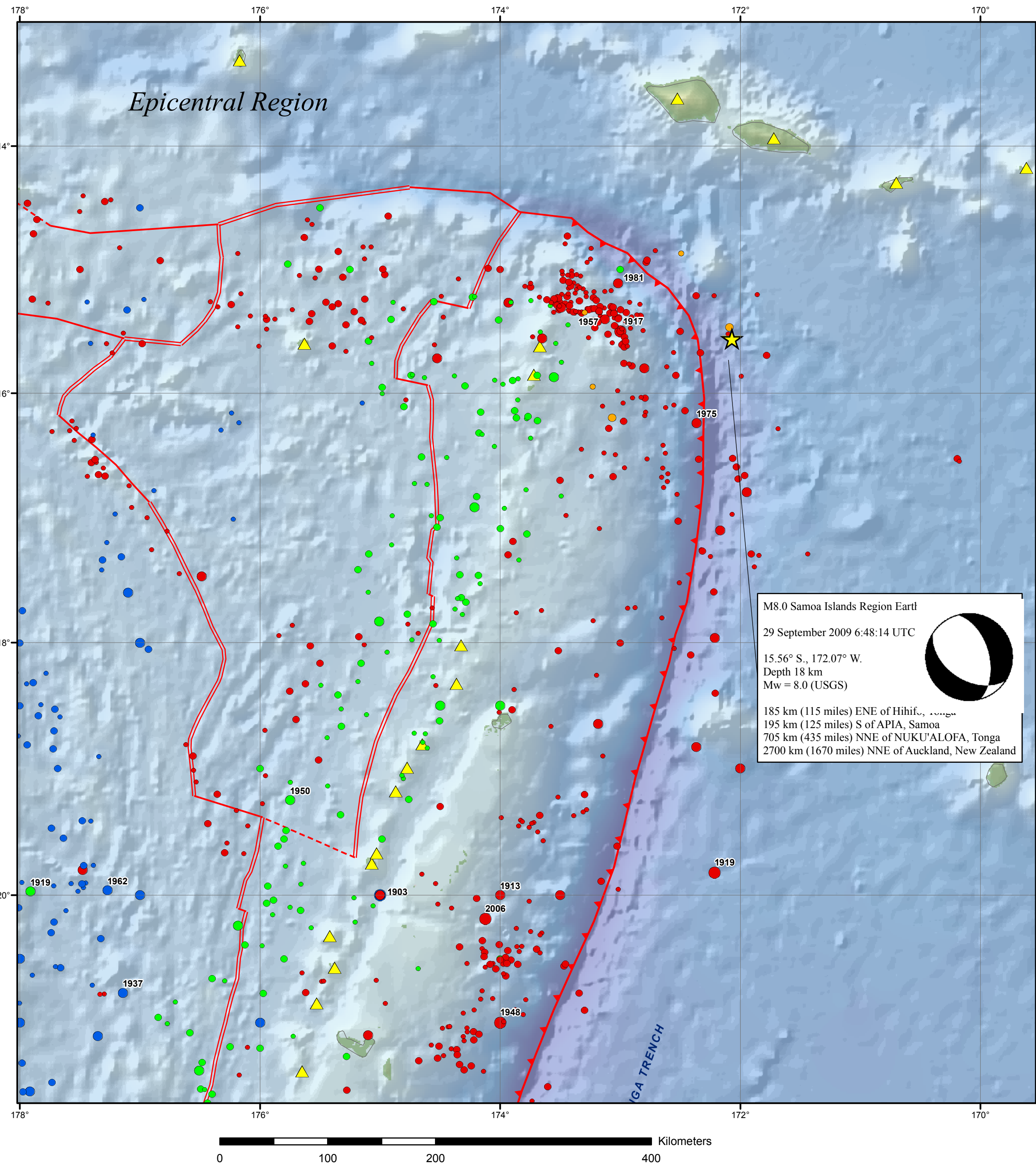
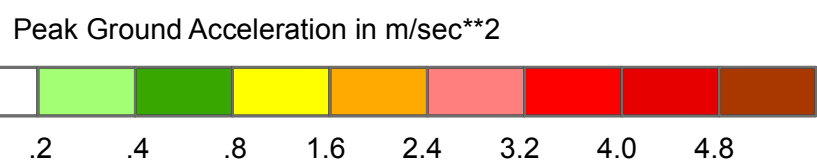


#### RELATIVE PLATE MOTIONS

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 35-45 mm/yr along the Puysegur Trench.



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec<sup>2</sup>, expected to be exceeded in a 50-yr period with a probability of 10 percent.

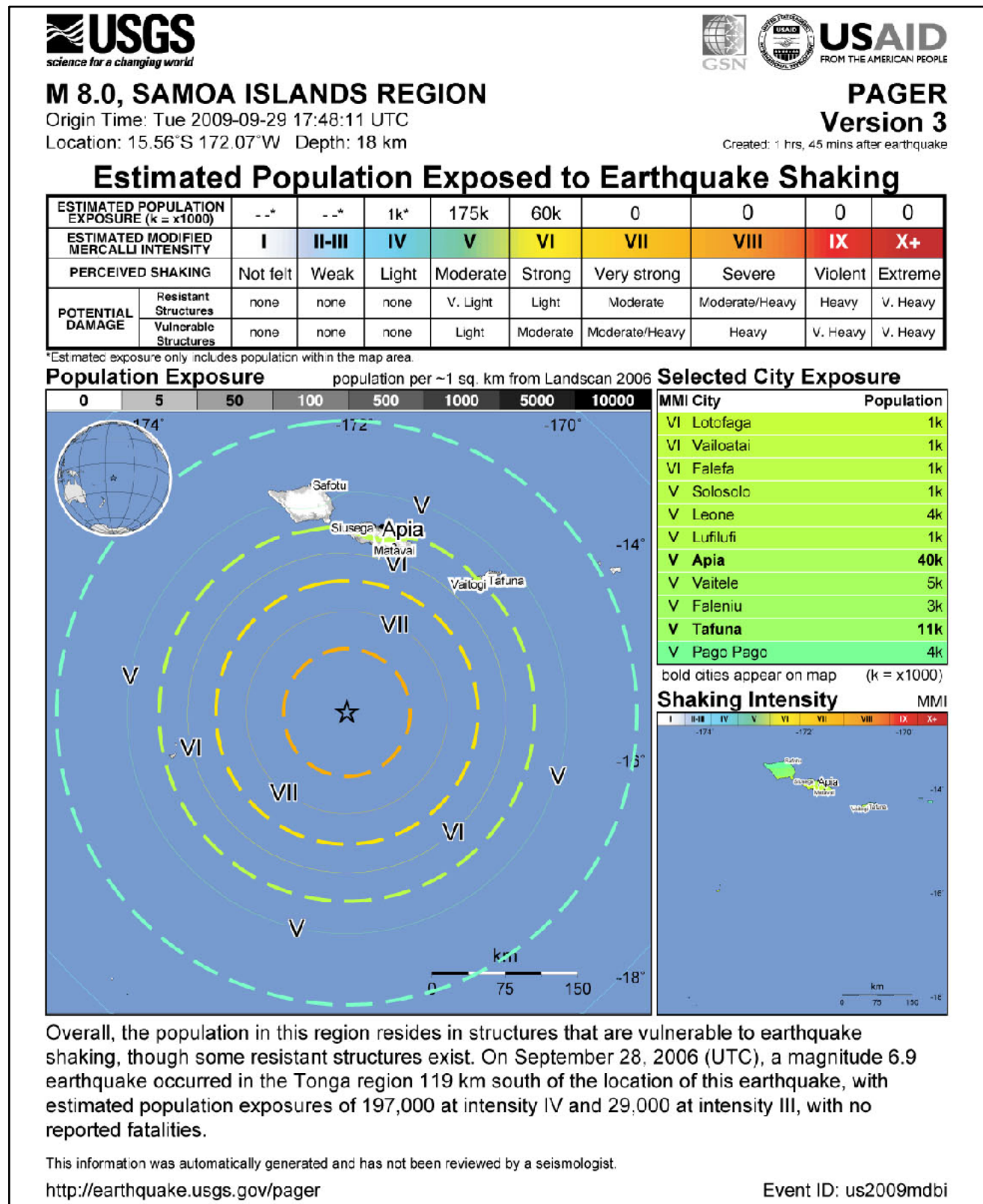


#### DISCUSSION

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 $\geq 7.5$

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1903	01	04	0507	-20.000	-175.000	400	8.0
1913	06	26	0457	-20.000	-174.000	0	7.7
1917	06	26	0549	-15.500	-173.000	0	8.5
1919	01	01	0300	-19.971	-177.914	202	7.7
1919	04	30	0717	-19.823	-172.215	35	8.2
1937	04	16	0301	-20.768	-177.144	348	7.5
1948	09	08	1509	-21.000	-174.000	0	8.0
1950	12	14	0152	-19.250	-175.750	200	7.5
1957	04	14	1918	-15.403	-173.129	35	7.5
1962	05	21	2318	-19.962	-177.272	416	7.5
1975	12	26	1556	-16.241	-172.364	15	7.7
1981	09	01	0929	-15.112	-173.019	14.2	7.5
2006	05	03	1526	-20.187	-174.123	55	8.0
2009	09	29	0648	-15.560	-172.070	18	8.0

#### DATA SOURCES AND REFERENCES

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**BASE MAP**  
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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 2009  
<http://earthquake.usgs.gov/>  
Map not approved for release by Director USGS