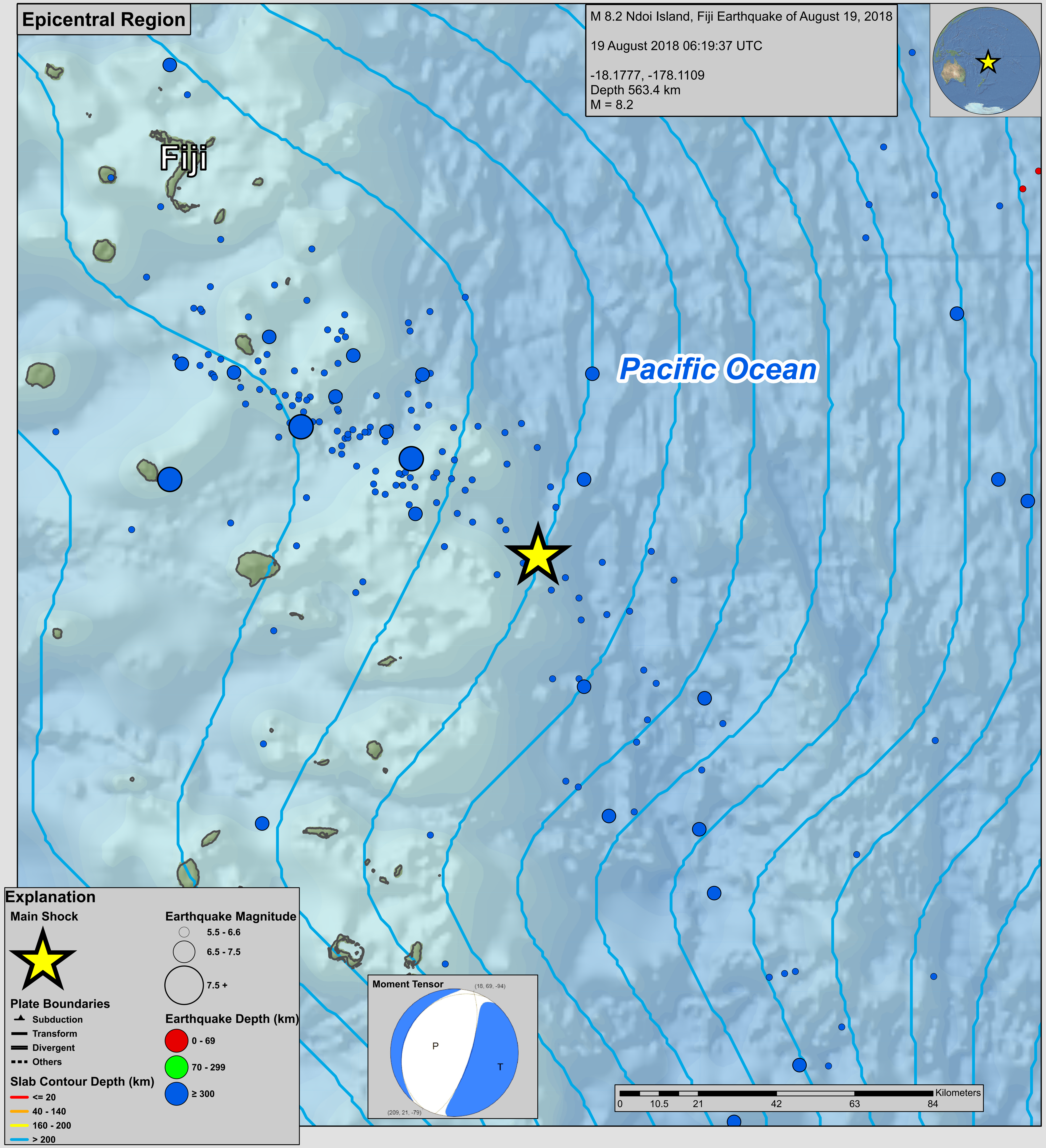
M 8.2 Ndoi Island, Fiji Earthquake of August 19, 2018

Earthquake Summary Map prepared in cooperation with the Global Seismographic Network

Epicentral Region



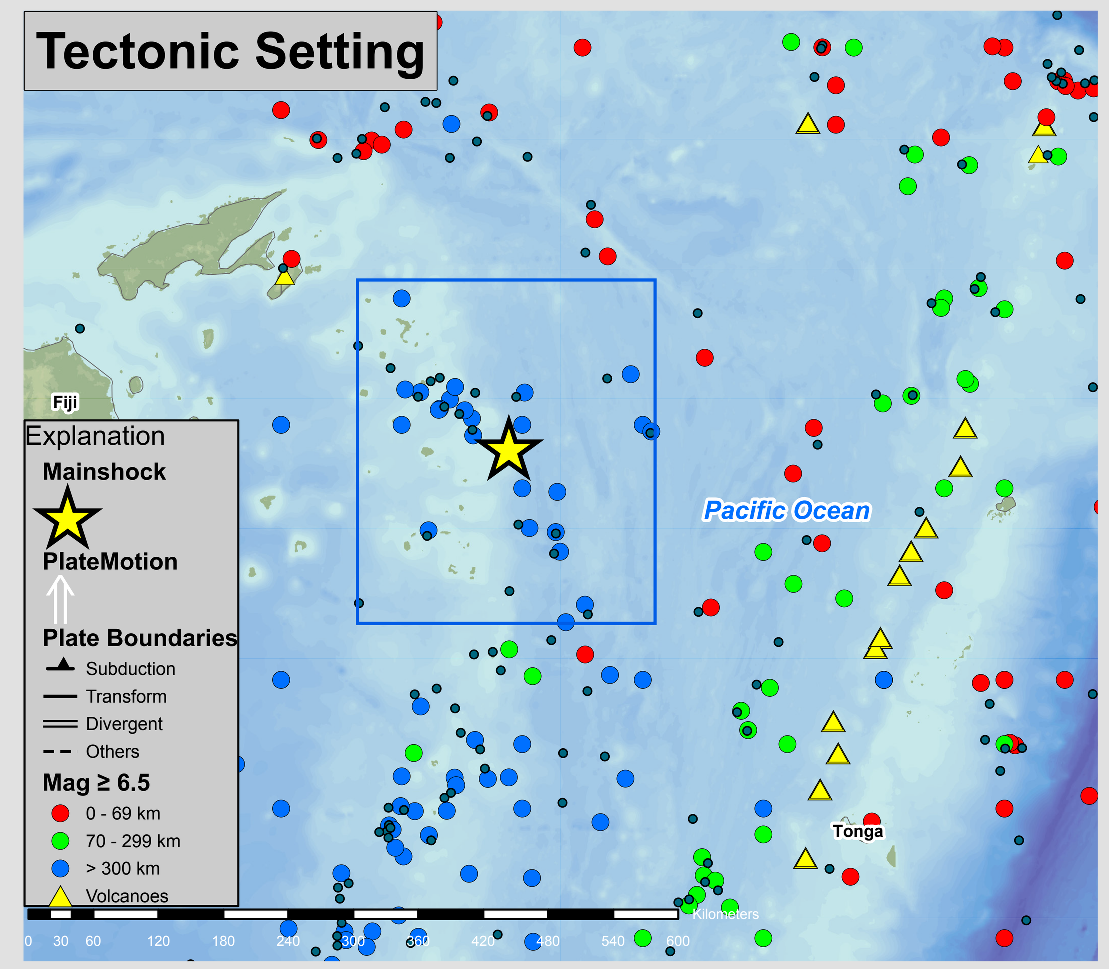
Tectonic Summary

The August 18, 2018, M 8.2 earthquake near Fiji occurred as the result of deep, normal faulting approximately 560 km beneath the South Pacific Ocean several hundred kilometers to the west of the Tonga Trench. Focal mechanism solutions indicate that rupture occurred on a moderately dipping normal fault striking to the west-northwest or the east-southeast. At the location of this earthquake, the Pacific plate moves approximately due west relative to the Australia plate at a velocity of about 81 mm/yr. The location, depth, and focal mechanism solutions of the August 18th event indicate that the earthquake is related to faulting within the subducted Pacific slab.

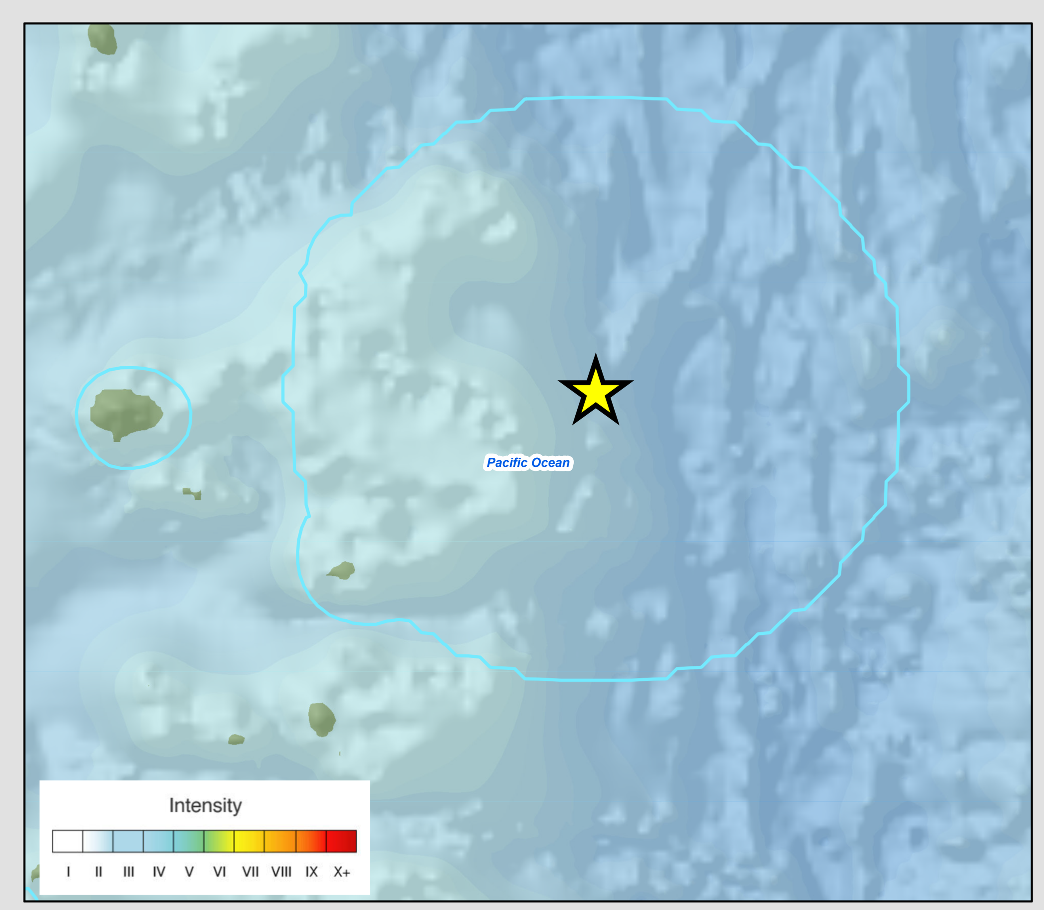
Earthquakes that have focal depths greater than 300 km are commonly termed “deep-focus” earthquakes. Deep-focus earthquakes cause less damage on the ground surface above their foci than similar-magnitude shallow-focus earthquakes, but large deep-focus earthquakes may be felt at great distance from their epicenters. This earthquake is similar in size to the largest observed deep-focus earthquakes. The largest recorded deep-focus earthquake to date was the M 8.3 event that occurred at a depth of 600 km within the subducted Pacific plate beneath the Sea of Okhotsk offshore of northeastern Russia in 2013. The M 8.3 Okhotsk earthquake was felt all over Asia, as far away as Moscow, and across the Pacific Ocean along the western seaboard of the United States (though at distant locations, individuals reporting having felt the event were likely very favorably situated for the perception of small ground motions). The M 8.2 Bolivian deep-focus earthquake in 1994 had similarly been reported by individuals in North America at great distance from the epicenter.

Deep focus earthquakes are common near this event. Over the past century, 9 earthquakes with a magnitude of M 7+ have occurred within 250 km of this event, all at depths greater than 300 km. The largest of these prior to this event was an M 7.8 earthquake in January 1919.

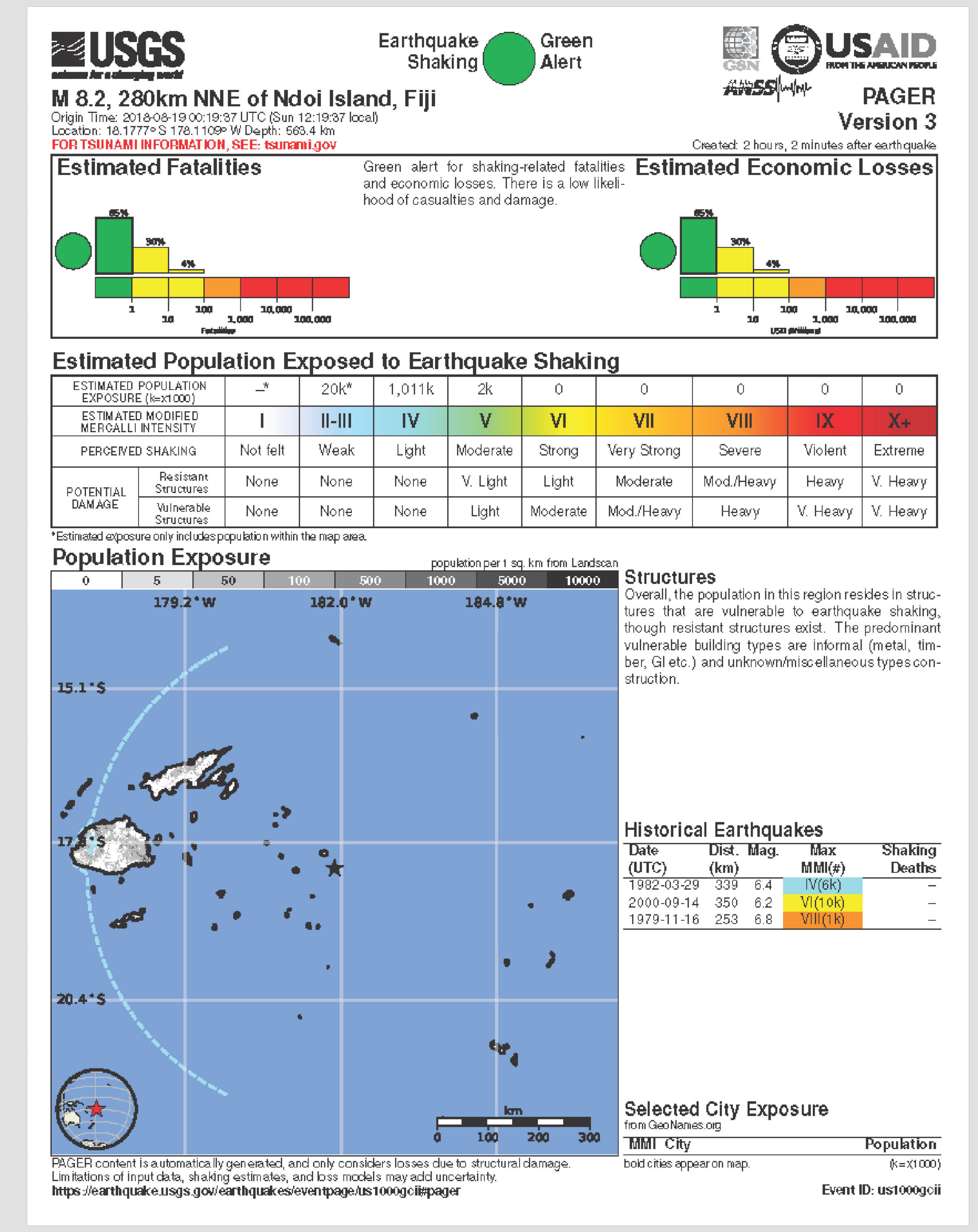
Tectonic Setting



Shakemap



PAGER



USGS science for a changing world | Earthquake Shaking Green Alert | USAID FROM THE AMERICAN PEOPLE | ANSS

M 8.2, 280km NNE of Ndoi Island, Fiji

Origin Time: 2018-08-19 00:19:37 UTC (Sun 12:19:37 local)
Location: 18.1777° S 178.1109° W Depth: 563.4 km
FOR TSUNAMI INFORMATION, SEE: tsunami.gov

PAGER Version 3
Created: 2 hours, 2 minutes after earthquake

Estimated Fatalities

65% 30% 4%
1 10 100 1,000 10,000 100,000
Fatalities

Green alert for shaking-related fatalities and economic losses. There is a low likelihood of casualties and damage.

Estimated Economic Losses

65% 30% 4%
1 10 100 1,000 10,000 100,000
USD (Millions)

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k=x1000)		–*	20k*	1,011k	2k	0	0	0	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY		I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	None	None	None	V. Light	Light	Moderate	Mod./Heavy	Heavy	V. Heavy
	Vulnerable Structures	None	None	None	Light	Moderate	Mod./Heavy	Heavy	V. Heavy	V. Heavy

*Estimated exposure only includes population within the map area.

Population Exposure

population per 1 sq. km from Landscan
0 5 50 100 500 1000 5000 10000
179.2°W 182.0°W 184.8°W
15.1°S 17.7°S 20.4°S
km 0 100 200 300

Structures

Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though resistant structures exist. The predominant vulnerable building types are informal (metal, timber, GI etc.) and unknown/miscellaneous types construction.

Historical Earthquakes

Date (UTC)	Dist. (km)	Mag.	Max MMI(#)	Shaking Deaths
1982-03-29	339	6.4	IV(6k)	–
2000-09-14	350	6.2	VI(10k)	–
1979-11-16	253	6.8	VIII(1k)	–

Selected City Exposure

from GeoNames.org

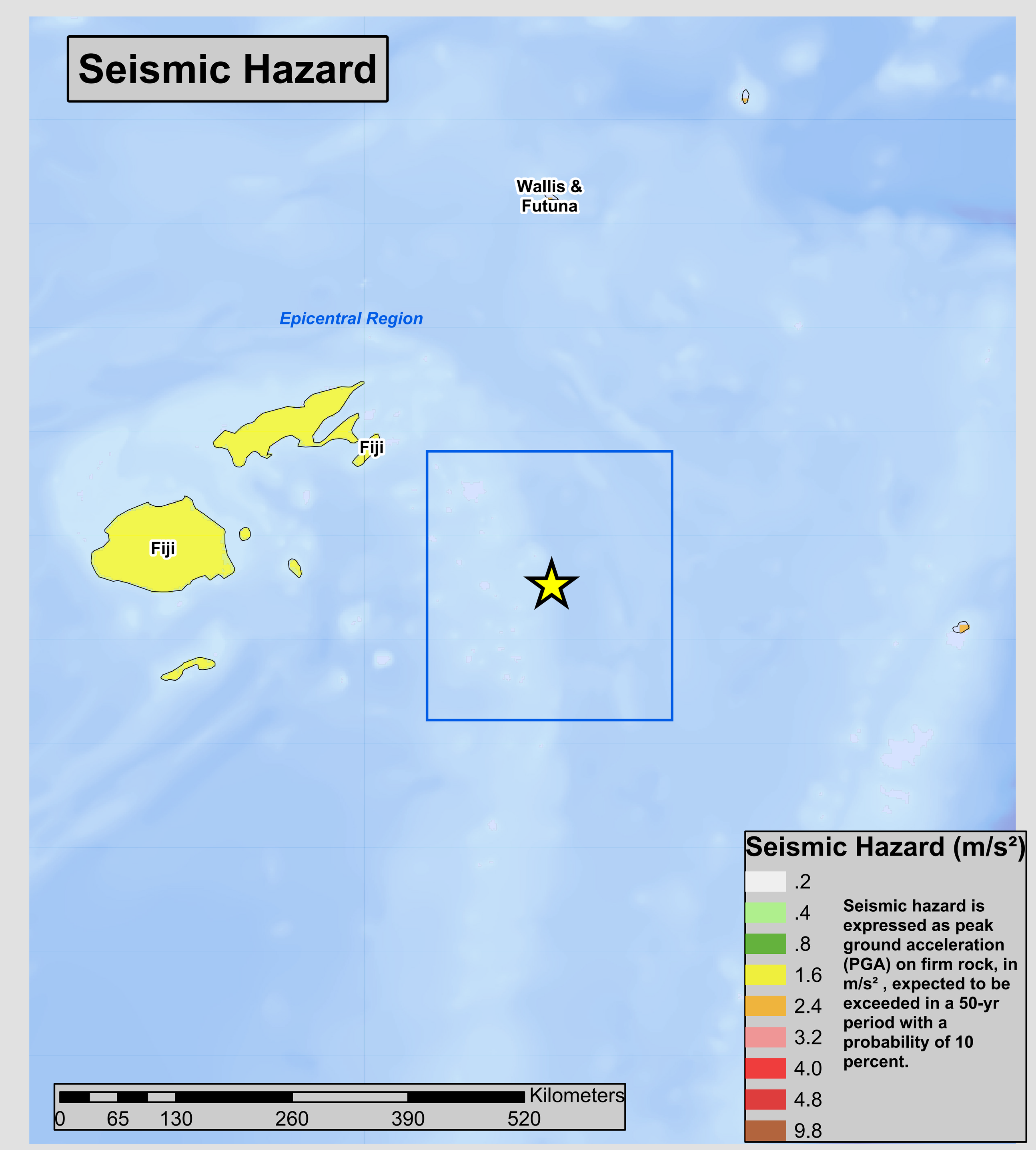
MMI	City	Population

bold cities appear on map. (k=x1000)

PAGER content is automatically generated, and only considers losses due to structural damage. Limitations of input data, shaking estimates, and loss models may add uncertainty.
https://earthquake.usgs.gov/earthquakes/eventpage/us1000gcii#pager

Event ID: us1000gcii

Seismic Hazard



DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999) and extensions (Engdahl and Villaseñor, 2002)
EHB catalog (Engdahl et al., 1998)
HDF (unpublished earthquake catalog, Engdahl, 2003)
Global Seismic Hazard Assessment Program
Volcanoes of the World (Siebert and Simkin, 2002)

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)
Ji, C., D.J. Wald, and D.V. Helmberger, Source description of the 1999 Hector Mine, California earthquake; Part I: Wavelet domain inversion theory and resolution analysis, Bull. Seism. Soc. Am., Vol 92, No. 4. pp. 1192-1207, 2002.
DeMets, C., Gordon, R.G., Argus, D.F., 2010. Geologically current plate motions, Geophys. J. Int. 181, 1-80.

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

REFERENCES

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

Engdahl, E.R., and Villasenor, 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.

Engdahl, E.R., Van der Hilst, R.D., and Buland, R.P., 1998, Global teleseismic earthquake relocation with improved travel times and procedures for depth determination;Bull. Seism. Soc. Amer., v. 88, p. 722-743.

DISCLAIMER

Map updated by U.S. Geological Survey National Earthquake Information Center
20 August 2018
http://earthquake.usgs.gov/
Map not approved for release by Director USGS