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EARTHQUAKE SUMMARY MAP

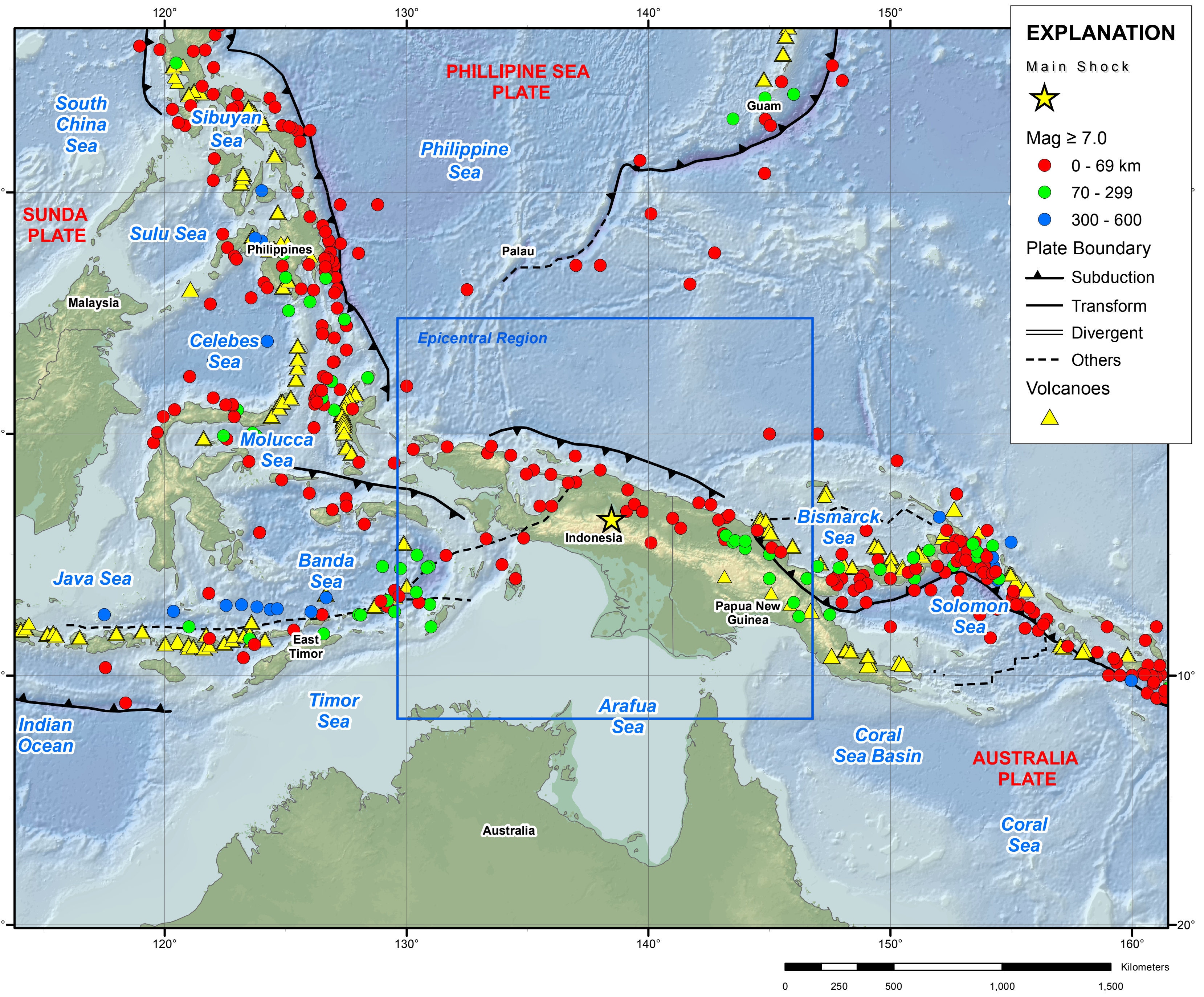
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
Global Seismographic Network

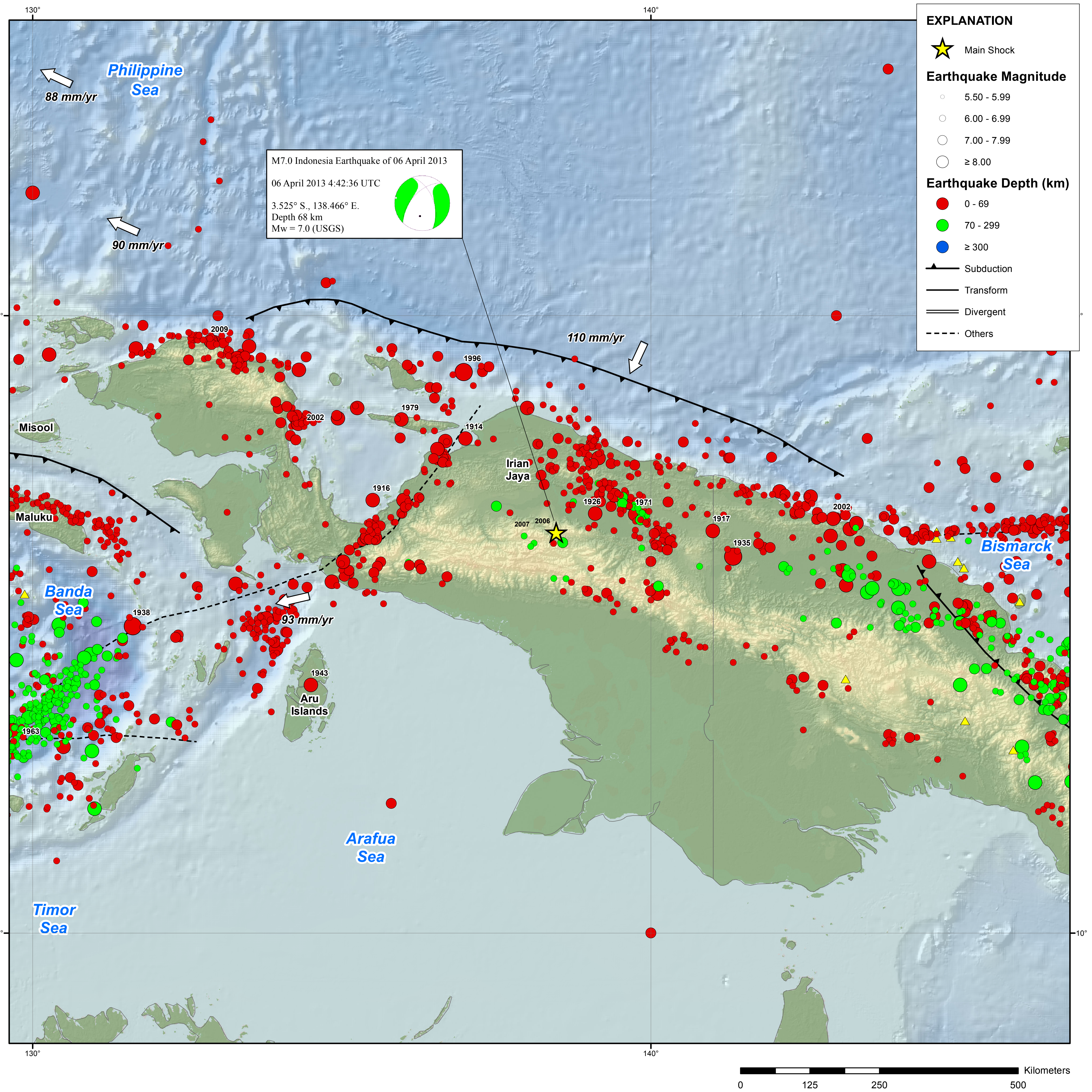
GSN

M7.0 Indonesia Earthquake of 06 April 2013

Tectonic Setting



Epicentral Region

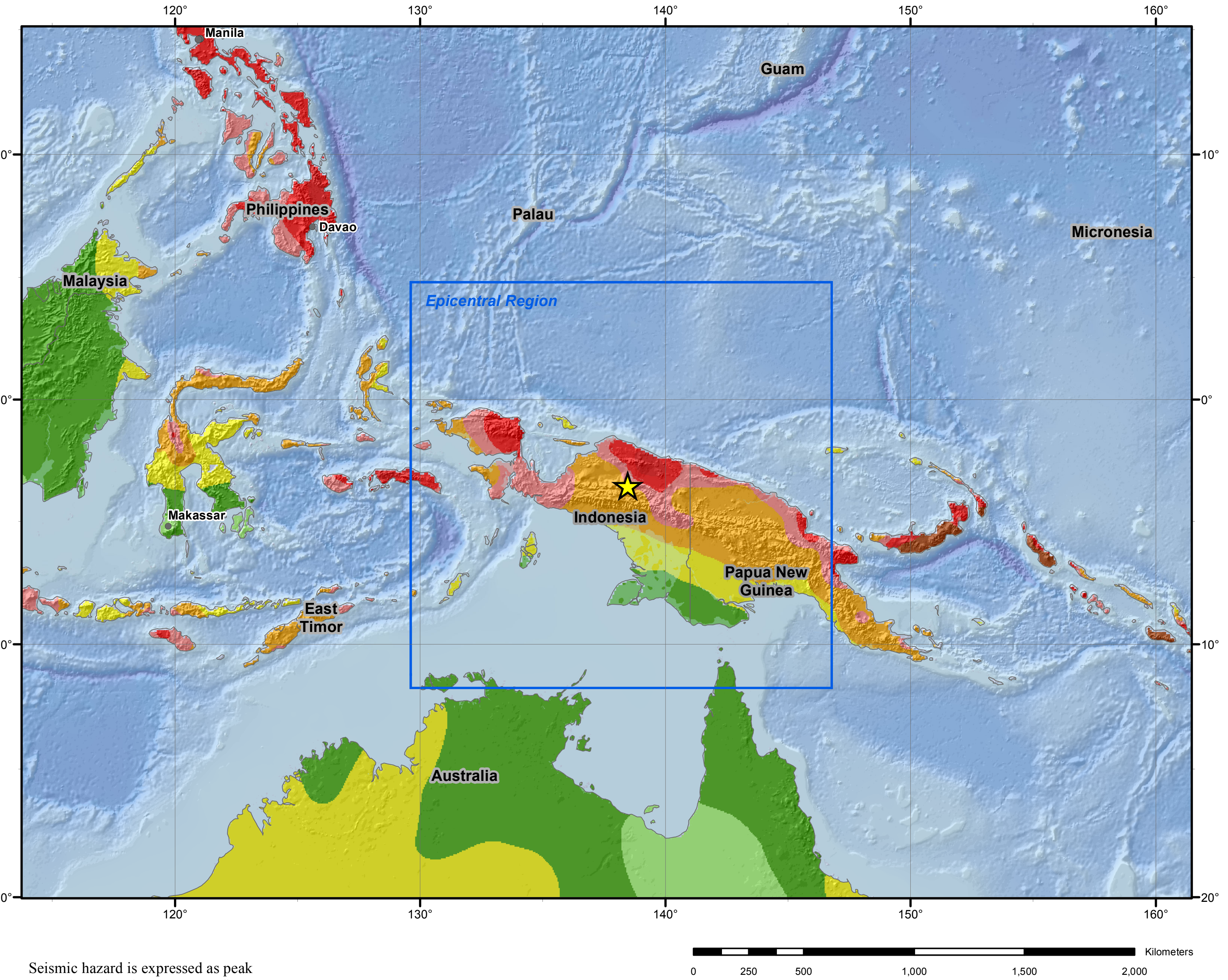


M7.0 Indonesia Earthquake of 06 April 2013

06 April 2013 4:42:36 UTC

3.525° S., 138.466° E.
Depth 68 km
Mw = 7.0 (USGS)

Seismic Hazard

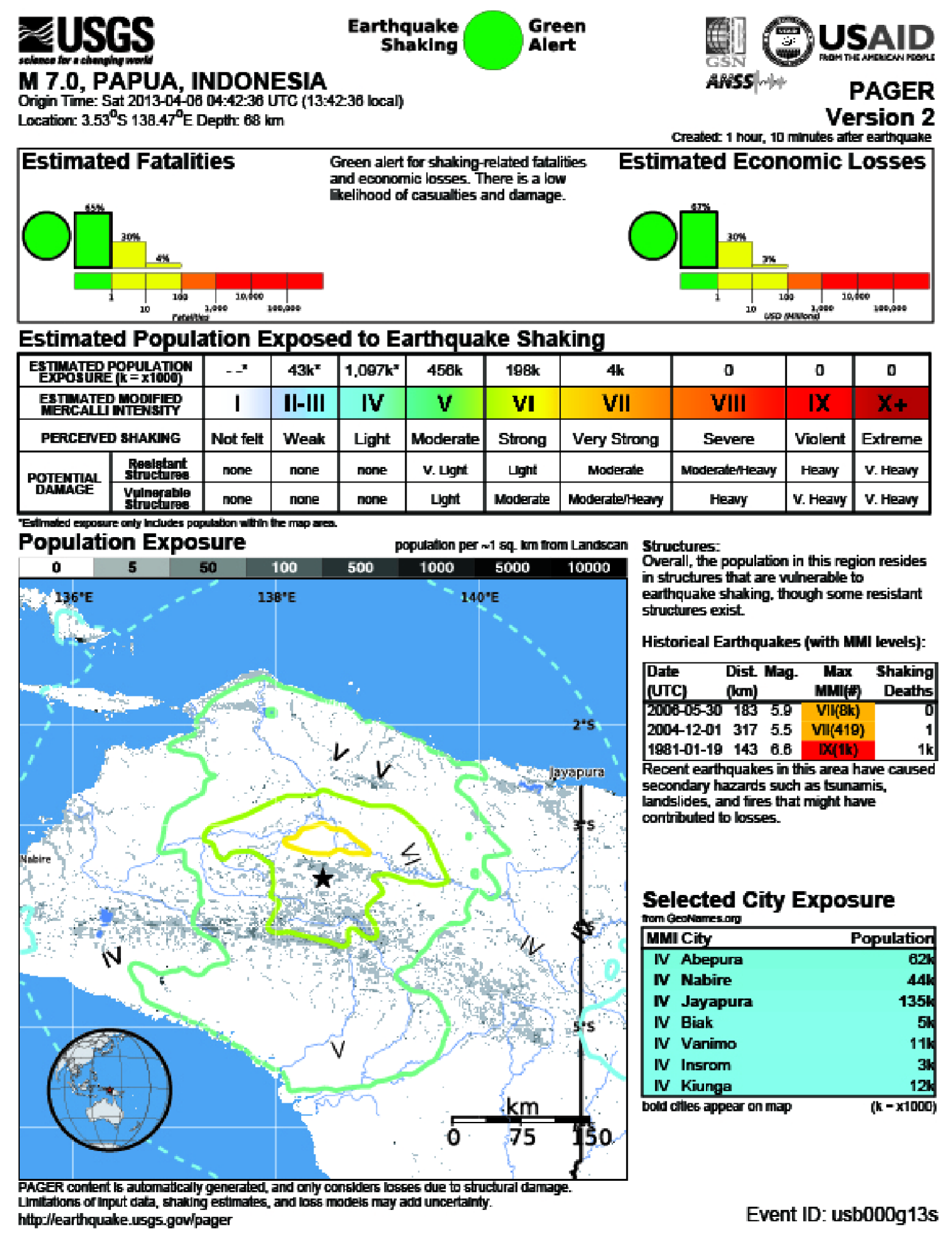


Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec², expected to be exceeded in a 50-yr period with a probability of 10 percent.

Peak Ground Acceleration in m/sec**2

.2 .4 .8 1.6 2.4 3.2 4.0 4.8

PAGER



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Earthquake Shaking Green Alert

GSN ANSS USAID FROM THE AMERICAN PEOPLE

M 7.0, PAPUA, INDONESIA
Origin Time: Sat 2013-04-06 04:42:36 UTC (13:42:36 local)
Location: 3.53°S 138.47°E Depth: 68 km

PAGER
Version 2
Created: 1 hour, 10 minutes after earthquake

Estimated Fatalities

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

Estimated Economic Losses

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)		--*	43k*	1,097k*	456k	198k	4k	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	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/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

Structures:
Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist.

Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max MMI(#)	Shaking Deaths
2008-05-30	183	5.9	VII(8k)	0
2004-12-01	317	5.5	VII(419)	1
1981-01-19	143	6.6	IX(1k)	1k

Recent earthquakes in this area have caused secondary hazards such as tsunamis, landslides, and fires that might have contributed to losses.

Selected City Exposure
from GeoNames.org

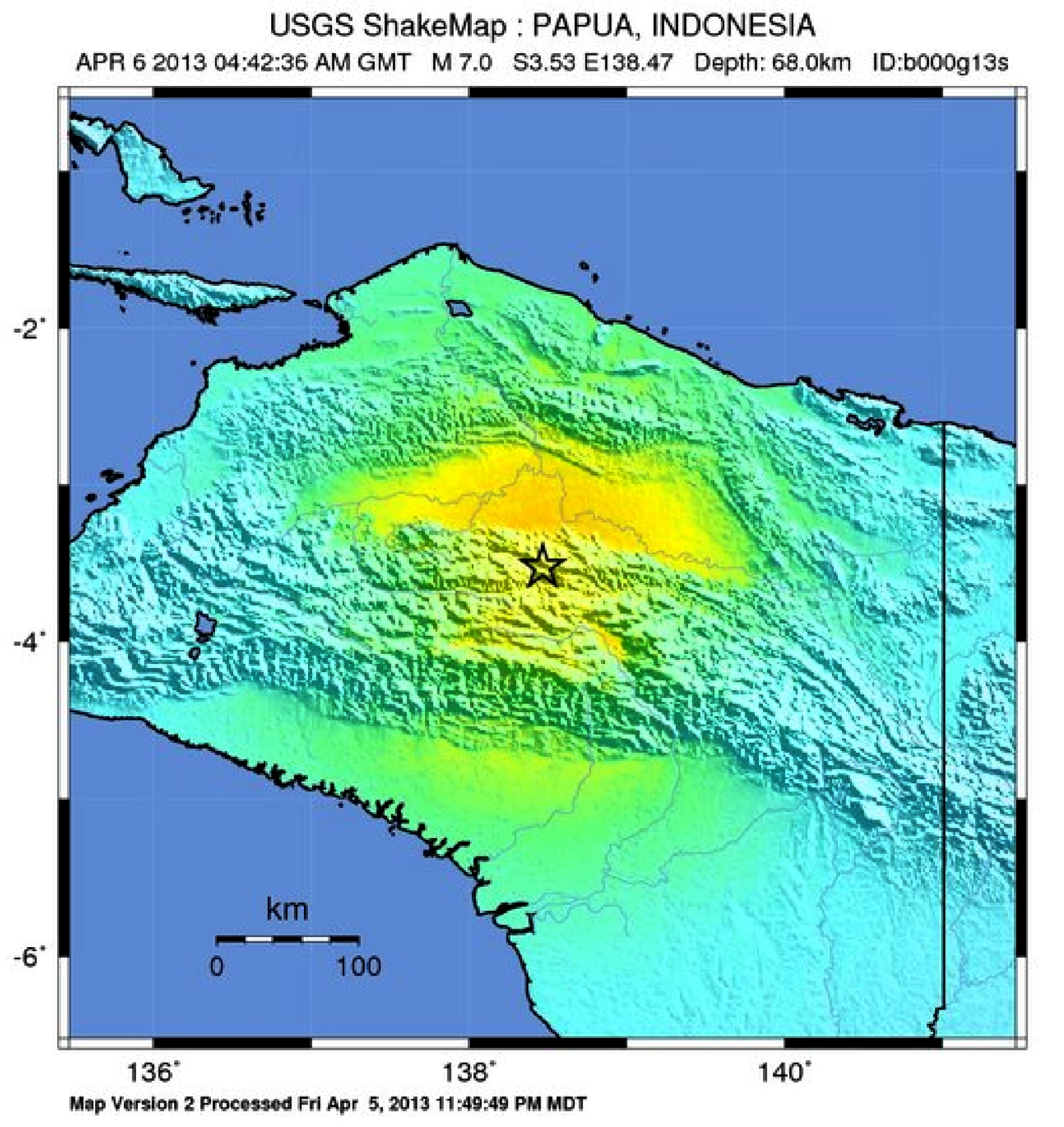
MMI	City	Population
IV	Abepura	62k
IV	Nabire	44k
IV	Jayapura	135k
IV	Biak	5k
IV	Vanimo	11k
IV	Insrom	3k
IV	Kiunga	12k

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.
http://earthquake.usgs.gov/pager

Event ID: usb000g13s

ShakeMap



USGS ShakeMap : PAPUA, INDONESIA
APR 6 2013 04:42:36 AM GMT M 7.0 S3.53 E138.47 Depth: 68.0km ID:b000g13s

Map Version 2 Processed Fri Apr 5, 2013 11:49:49 PM MDT

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2011)

TECTONIC SUMMARY

The April 6th, 2013 M 7.0 earthquake beneath Irian Jaya, Indonesia, occurred as a result of oblique-normal faulting, at a depth of approximately 70 km. At the location of this earthquake, the Pacific and Australia plates are converging at a rate of approximately 110 mm/yr in an east-northeast- west-southwest direction, resulting in the southward subduction of the Pacific plate beneath New Guinea at the New Guinea trench, north of the island. The depth and faulting mechanism of the April 6th earthquake indicate it likely ruptured a fault within the subducting Pacific lithosphere rather than on the shallower thrust interface between the two plates.

This region of New Guinea is familiar with moderate-to-large earthquakes; several dozen events with magnitudes greater than 6 have occurred within 250 km of the April 6th earthquake over the past 40 years. Many of those events were shallow expressions of microplate interactions at the complicated boundary between the Pacific and Australia plates in this region. The 19 January 1981 M 6.7 earthquake, 140 km to the southeast, struck at a depth of 20 km and caused approximately 1300 fatalities. In July of 1976, a M 7.1 earthquake 210 km to the east-southeast struck just a few kilometers beneath the surface and resulted in around 6000 fatalities. In contrast, intermediate depth earthquakes like the April 6th 2013 event are much less hazardous, and do not generally cause significant damage or fatalities, though large intermediate-depth (70 – 300km) and deep-focus (depth > 300 km) earthquakes may be felt at great distances from their epicenters.

Significant Earthquakes Mag >= 7.0

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1904	05	01	1524	2.000	130.000	0	7.0
1906	06	01	0430	0.000	145.000	0	7.1
1909	05	30	2101	-8.000	131.000	100	7.1
1914	05	26	1422	-2.000	137.000	0	7.9
1916	01	13	0618	-3.000	136.000	0	7.3
1916	01	13	0820	-3.000	135.500	0	7.6
1916	08	03	0130	-4.000	144.500	0	7.1
1917	07	29	2152	-3.500	141.000	0	7.6
1918	07	03	0652	-3.471	143.217	35	7.2
1925	06	09	1340	-4.142	143.098	35	7.0
1925	11	10	1350	-0.633	130.267	35	7.2
1926	10	26	0344	-3.219	139.097	35	7.5
1927	06	03	0712	-7.071	130.960	169	7.2
1927	08	10	1136	-0.534	131.673	35	7.1
1931	08	07	0211	-2.859	142.079	35	7.1
1934	07	19	0127	-0.793	133.354	35	7.0
1935	09	20	0146	-3.920	141.330	35	8.1
1935	09	20	0523	-3.583	142.905	35	7.0
1936	02	15	1247	-4.362	133.285	35	7.1
1938	02	01	1904	-5.050	131.620	35	8.5
1939	03	02	0700	-4.383	143.155	35	7.0
1940	05	28	0940	-2.318	139.150	35	7.0
1942	01	27	1329	-4.325	134.838	18.4	7.1
1943	11	06	0831	-6.000	134.500	0	7.6
1943	12	01	0604	-4.750	144.000	120	7.3
1944	01	07	0249	-4.500	143.500	120	7.0
1944	03	31	0251	-7.000	130.500	60	7.0
1944	04	27	1438	-0.500	133.500	50	7.2
1946	09	23	2330	-6.000	145.000	100	7.1
1947	04	02	0539	-1.500	138.000	0	7.2
1947	05	27	0558	-1.500	135.250	0	7.2
1948	11	26	0536	-5.000	145.000	70	7.0
1951	02	17	2107	-7.000	146.000	180	7.2
1952	11	06	1947	-4.728	145.091	35	7.1
1956	07	18	0619	-5.025	130.422	130	7.2
1957	03	23	0512	-5.501	130.933	133	7.1
1957	06	22	2350	-2.040	136.676	35	7.3
1959	03	01	1649	-0.883	134.307	35	7.0
1959	11	19	1108	-6.003	146.552	144	7.0
1961	01	05	1554	-4.219	143.199	140	7.1
1963	02	26	2014	-7.576	146.214	180	7.3
1963	11	04	0117	-6.733	129.684	35	7.8
1964	04	23	0332	-5.420	133.939	6.1	7.1
1964	07	08	1155	-5.597	129.741	206	7.0
1968	05	28	1327	-2.919	139.411	63.7	7
1968	10	23	2104	-3.375	143.322	9.4	7.
1970	10	31	1753	-4.907	145.471	8.1	7.3
1971	01	10	0717	-3.232	139.744	54.9	7.7
1976	06	25	1918	-4.523	140.105	3.2	7.2
1979	09	12	0517	-1.688	135.966	18.9	7.5
1980	07	16	1956	-4.432	143.579	87.3	7.3
1985	11	17	0940	-1.670	134.937	11.4	7.1
1986	06	24	0311	-4.443	144.003	123	7.2
1987	06	17	0132	-5.564	130.835	73.8	7.1
1992	12	20	2052	-6.575	130.391	83.4	7.3
1996	02	17	0559	-0.919	136.973	36.5	8.2
1998	07	17	0849	-2.943	142.582	25	7.0
2013	04	06	0442	-3.525	138.466	68	7.0

Earthquake locations are labeled by year on the Epicentral Region map.

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

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

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 regraded as having official signifiance.

Map prepared by U.S. Geological Survey National Earthquake Information Center
06 April 2013
http://earthquake.usgs.gov/
Map not approved for release by Director USGS