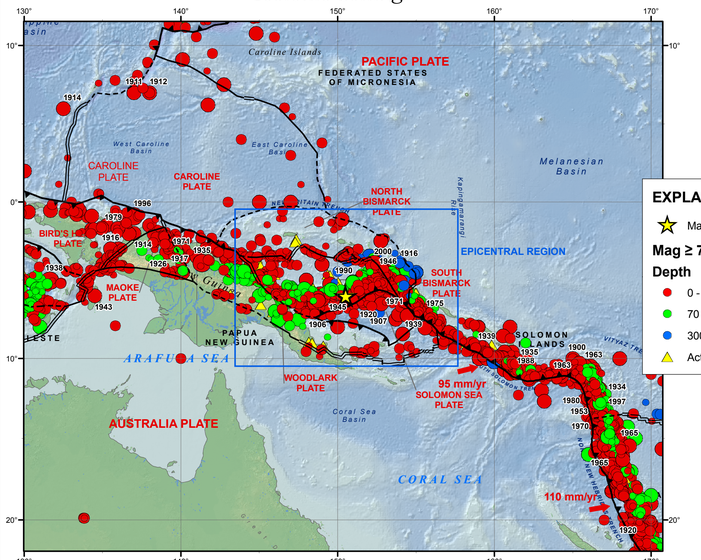
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

EARTHQUAKE SUMMARY MAP XXX

Prepared in cooperation with the Global Seismographic Network

M7.3 New Britain Region, Papua New Guinea, Earthquake of 18 July 2010

Tectonic Setting

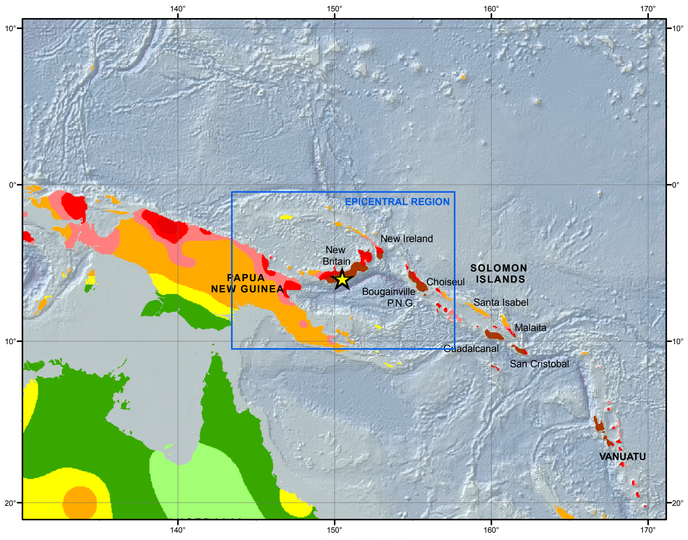


Scale 1:20,000,000

RELATIVE PLATE MOTIONS

Papua New Guinea is in a region of complex plate interactions. From a global perspective, Papua New Guinea consists of microplates whose relative motions absorb the convergence of the Pacific and Australia plates. At the location of this earthquake, the Solomon Sea plate moves approximately northwards with respect to the South Bismarck plate at a velocity of roughly 120 mm/year.

Seismic Hazard



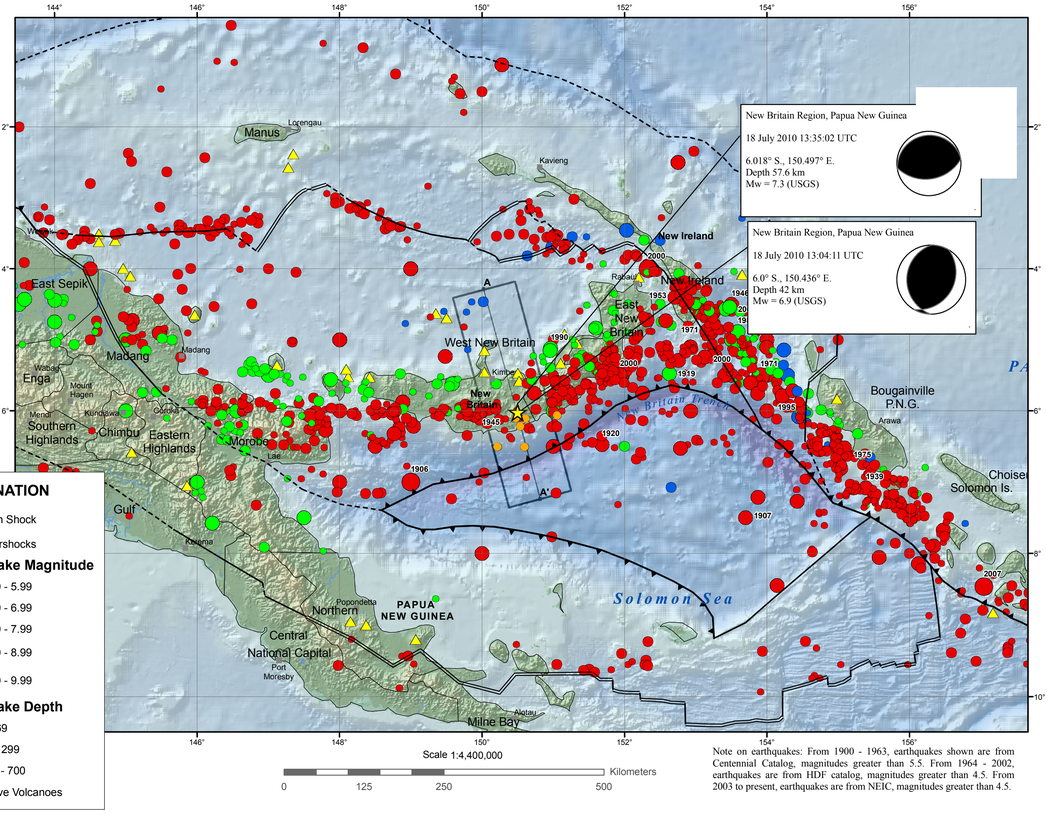
Scale 1:20,000,000

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

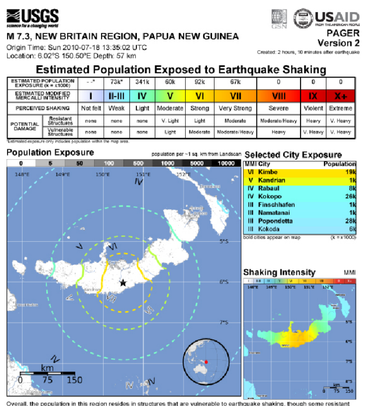
.2 .4 .8 1.6 2.4 3.2 4.0 4.8

Epicentral Region



Scale 1:4,400,000

Note on earthquakes: From 1900 - 1963, earthquakes shown are from Centennial Catalog, magnitudes greater than 5.5. From 1964 - 2002, earthquakes are from HDF catalog, magnitudes greater than 4.5. From 2003 to present, earthquakes are from NEIC, magnitudes greater than 4.5.



Significant Earthquakes Mag >= 7.5

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1906	09	14	1604	-7.000	149.000	0	8.0
1907	05	04	0651	-7.500	153.700	60	7.7
1913	05	30	1146	-5.000	154.000	0	7.7
1916	01	01	1320	-4.000	154.000	0	7.7
1919	05	06	1940	-5.477	152.629	232	7.6
1920	02	02	1122	-6.474	151.685	35	7.6
1939	01	30	0218	-7.080	155.386	35	7.7
1945	12	28	1748	-6.000	150.000	0	7.6
1946	09	29	0301	-4.500	153.500	0	7.6
1949	10	19	2100	-5.500	154.000	60	7.5
1953	04	23	1624	-4.402	152.708	35	7.6
1971	07	14	0611	-5.519	153.906	44.5	8.0
1971	07	26	0123	-4.889	153.183	37.1	8.1
1975	07	20	1437	-6.612	155.097	59.7	7.7
1983	03	18	0905	-4.887	153.589	88.7	7.7
1990	12	30	1914	-5.118	150.962	177	7.5
1995	08	16	1027	-5.788	154.213	30	7.7
2000	11	16	0454	-4.001	152.327	16.8	8.0
2000	11	16	0742	-5.243	153.127	32.6	7.8
2000	11	17	2101	-5.491	151.936	25.7	7.8
2005	09	09	0726	-4.539	153.474	90	7.6
2007	04	01	2039	-8.466	157.043	24	8.1

TECTONIC SUMMARY

The M7.3 New Britain, Papua New Guinea earthquake of July 18, 2010 (13:35 GMT) occurred as a result of thrust faulting on or near the plate boundary between the Solomon Sea and South Bismarck plates, microplates involved in the accommodation of large-scale convergence between the Australia and Pacific plates in the Woodlark Basin region of the southwest Pacific. At the location of this earthquake, the Solomon Sea plate moves approximately northwards with respect to the South Bismarck plate at a velocity of roughly 120 mm/year, thrusting under the South Bismark plate at the New Britain trench and dipping to the north-northwest. The July 18 (13:35) earthquake's location, depth, and focal mechanism are consistent with the earthquake having occurred as thrust faulting associated with subduction along this plate boundary.

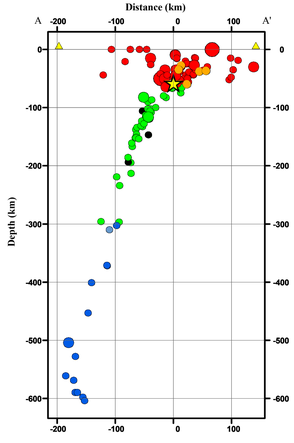
This earthquake occurred approximately 10 km to the north and 30 minutes after a M6.9 earthquake. That smaller foreshock was deeper, and occurred as a result of reverse faulting in a direction highly oblique to the plate convergence direction. It is thus likely that the earlier M6.9 event occurred within the subducting Solomon Sea plate, rather than on its thrust interface. The subducting Solomon Sea plate is seismically active to depths of about 600 km beneath the island.

The New Britain region experiences a high level of earthquake activity, with 15 events of magnitude 7 and larger having been recorded within 3 degrees (336 km) of today's event since 1973. The region also has a history of large earthquakes occurring close together in time; of those 15 events, 11 occurred within several days-to-months of another nearby large earthquake. In November 2000, three earthquakes of M7.8 or larger occurred over a two day period approximately 300 km to the northeast of today's earthquake.

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.

Depth Profile



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)
HDF (unpublished earthquake catalog) (Engdahl, 2003)
Global Seismic Hazard Assessment Program

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)
Finite Fault Model, Chen Ji, UC Santa Barbara (2007)

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 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 Academeic 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.

Map prepared by U.S. Geological Survey
National Earthquake Information Center
19 July 2010
Map not approved for release by Director USGS