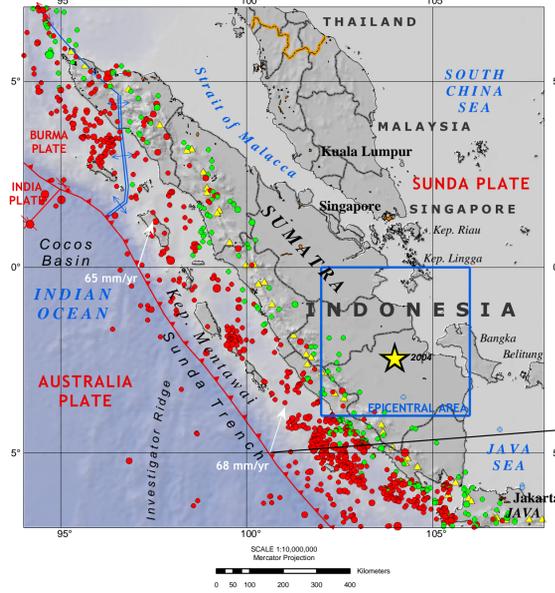


M7.3 Southern Sumatra, Indonesia Earthquake of 25 July 2004

Plate Tectonic Setting

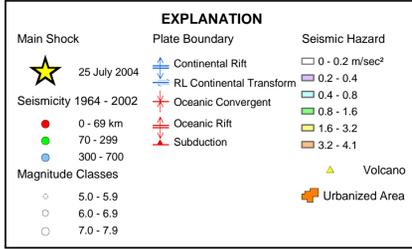


RELATIVE PLATE MOTIONS

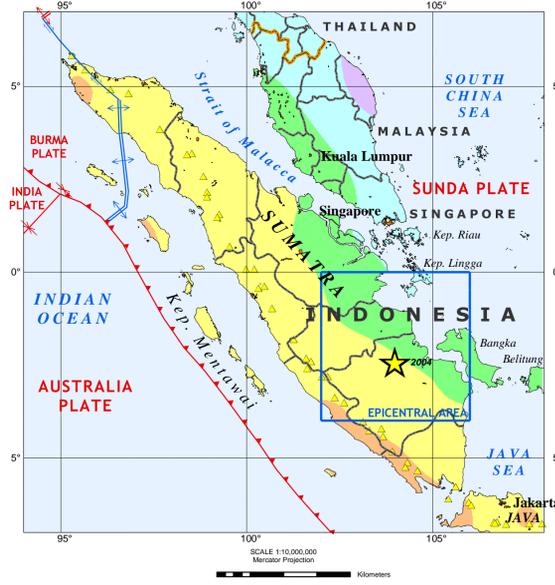
The relative motion of adjacent tectonic plates is depicted on the map by short vectors located at selected points on the plate boundary. In this presentation, one plate (the fixed reference plate) is assumed to be rigid. The vector therefore represents the direction of the moving plate relative to the reference plate. The rate of relative motion is labeled next to the vector.

The components of the vector perpendicular and parallel to the plate margin approximate convergent/divergent and transverse direction of motion between the plates, respectively. As viewed from the fixed plate, an inward directed component suggests convergence at and near the plate boundary that may be expressed as crustal folding, uplift, thrust faulting, or plate subduction. Similarly, an outward directed component suggests plate divergence such as would be expected at a zone of crustal spreading. Transcurrent or transform faulting would be expected when the predominant vector component is parallel to the plate margin.

In this case, the Australia plate in the vicinity of Sumatra is moving NNE relative to the reference Sunda plate at a speed ranging between 65 and 70 mm/yr.

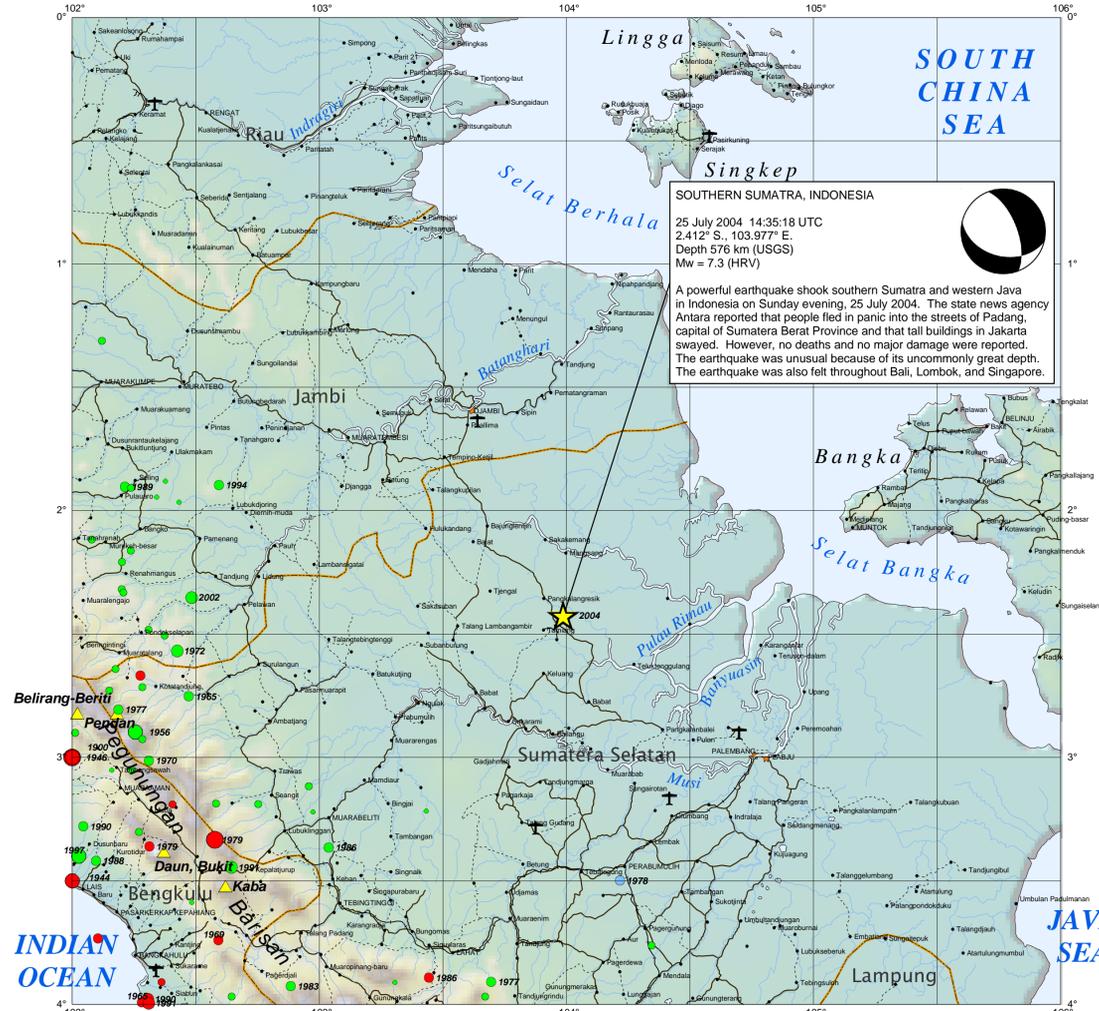


Generalized Seismic Hazard



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.

Epicentral Area



SOUTHERN SUMATRA, INDONESIA
25 July 2004 14:35:18 UTC
2.412° S., 103.977° E.
Depth 576 km (USGS)
Mw = 7.3 (HRV)

A powerful earthquake shook southern Sumatra and western Java in Indonesia on Sunday evening, 25 July 2004. The state news agency Antara reported that people fled in panic into the streets of Padang, capital of Sumatera Barat Province and that tall buildings in Jakarta swayed. However, no deaths and no major damage were reported. The earthquake was unusual because of its uncommonly great depth. The earthquake was also felt throughout Bali, Lombok, and Singapore.

SCALE 1:1,500,000
Mercator Projection
0 10 20 40 60 80 Kilometers



DISCLAIMER

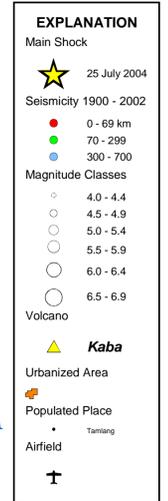
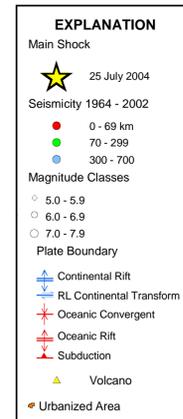
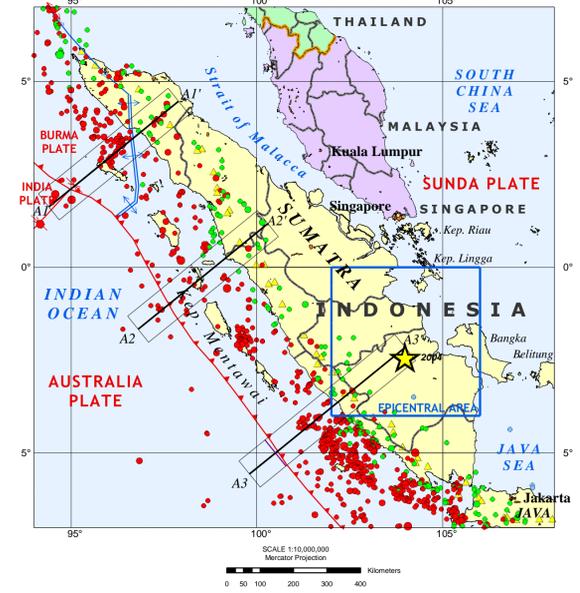
Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.

DISCUSSION

The earthquake occurred deep beneath the island of Sumatra, which is one of many islands in the large Indonesian island-arc system. Off the southwest coast of Sumatra, the Australia plate^{*} is being subducted, toward the north-northeast, beneath the Sunda plate at a rate of about 7 cm/yr (see the Plate Tectonic Setting map). At the earth's surface, the boundary between the plates is marked by the 3400 km long Sunda (Java) Trench. The island arc is delineated by the Sunda Trench axis, a parallel line of volcanoes, and zones of intense seismicity. The subducted Australia plate has previously been known to be seismically active to a depth of about 650 km beneath Java, but the 25 July 2004 magnitude 7.3 earthquake is one of the few to occur below 300 km beneath the island of Sumatra. Due to the earthquake's great depth it was felt over a large area, but caused little damage.

* Plate names and boundaries are due to Bird (2003)

Seismicity 1964 - 2002



LARGEST EARTHQUAKES IN THE EPICENTRAL AREA 1900 - 2002

YR	MO	DY	LAT	LONG	DEPTH	MAG
1900	1	5	-3.000	102.000	0	7.0
1944	1	5	-3.500	102.000	60	6.8
1946	3	26	-3.000	102.000	0	6.6
1956	4	10	-2.897	102.255	131	6.6
1965	1	28	-2.753	102.472	174.6	5.2
1965	4	3	-3.991	102.282	69.8	5.0
1969	9	15	-3.740	102.592	45.0	5.1
1970	8	1	-3.013	102.311	119.7	5.3
1972	1	26	-2.568	102.425	171.0	5.4
1977	4	4	-2.806	102.187	118.7	5.3
1977	9	5	-3.909	103.696	162.2	5.1
1978	2	5	-3.499	104.217	302.9	5.0
1979	12	15	-3.333	102.577	13.4	6.6
1979	12	18	-3.361	102.313	28.3	5.1
1983	1	3	-3.926	102.885	103.8	5.0
1986	1	29	-3.892	103.444	47.5	5.0
1986	10	9	-3.365	103.038	189.2	5.0
1988	6	15	-3.419	102.097	97.2	5.2
1989	9	30	-1.903	102.214	204.8	5.0
1990	7	1	-3.279	102.045	112.8	5.0
1990	9	26	-3.979	102.306	68.4	5.4
1991	1	26	-3.445	102.645	130.6	5.5
1991	3	5	-3.995	102.310	56.6	5.8
1994	11	22	-1.896	102.594	232.3	5.1
1997	4	22	-2.400	102.026	101.7	5.9
2002	6	16	-2.352	102.484	226.8	5.8
2004	7	25	-2.412	103.977	576	7.3

Depth Profiles

