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

EARTHQUAKE SUMMARY MAP XXX

M6.4 and 6.3 Indonesian Earthquakes of 6 March 2007

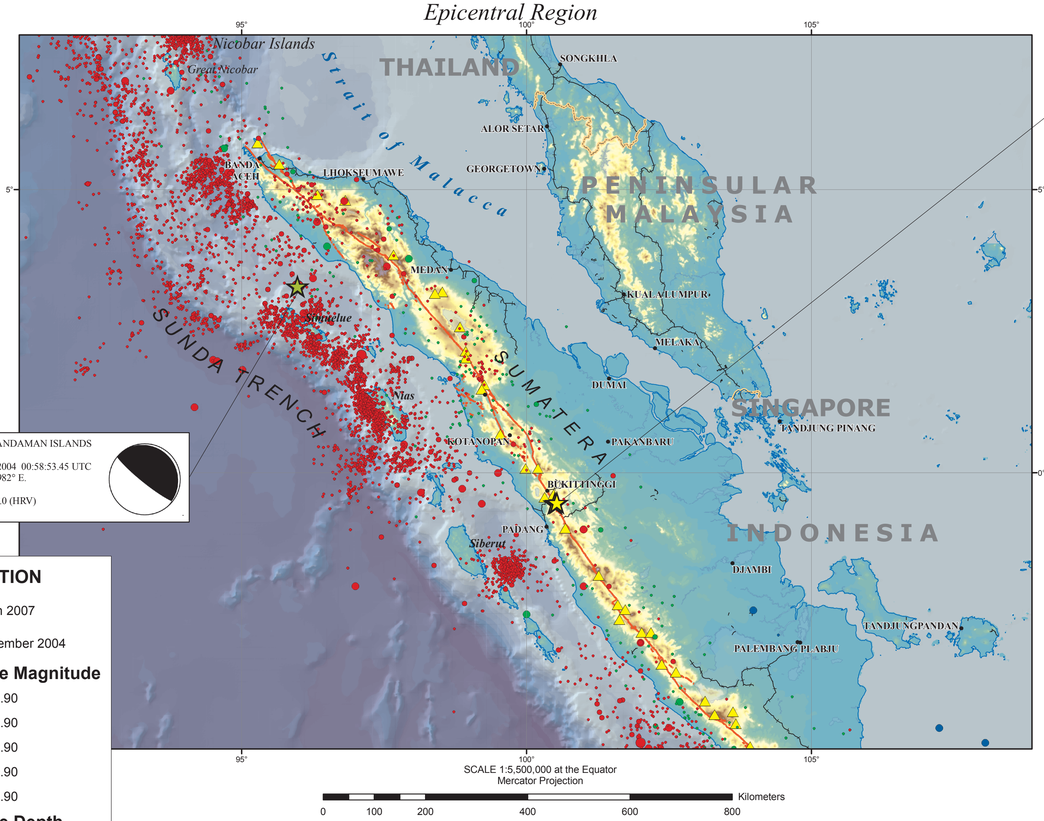
Prepared in cooperation with the Global Seismographic Network

Tectonic Setting

RELATIVE PLATE MOTIONS

The broad red vectors represent the motion of the India and Australia plates with respect to the interior of the Eurasia plate. The motion of India and Australia generally northward with respect toEurasia produces motion of many smaller plates that lie between the India/Australia plates and the Eurasia plate. The 26 December 2004 earthquake occurred on the boundary between one of the smaller plates, the Burma microplate, and the India plate. The earthquakes of 6 March 2007 occurred on the Sunda plate.

Epicentral Region



SOUTHERN SUMATRA, INDONESIA

6 March 2007, 03:49:40 UTC
0.472° S., 100.574° E.
Depth 30 km fixed
Magnitude = 6.4 (USGS)

6 March 2007, 05:49:29 UTC
0.458° S, 100.524° E
Depth 30 km fixed
Magnitude 6.3 (USGS)

SUMATRA - ANDAMAN ISLANDS

26 December 2004 00:58:53.45 UTC
3.295° N , 95.982° E.
Depth 30 km
Magnitude = 9.0 (HRV)

EXPLANATION

- 6 March 2007
- 26 December 2004

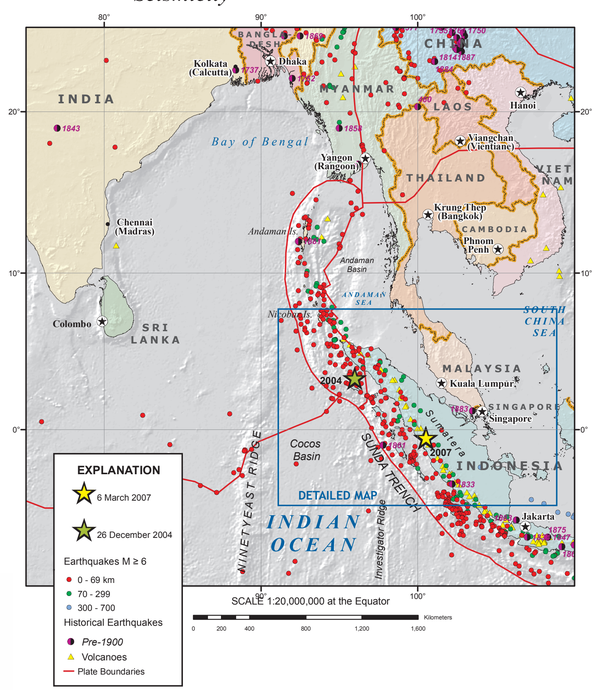
Earthquake Magnitude

- 4.00 - 5.90
- 5.91 - 6.90
- 6.91 - 7.90
- 7.91 - 8.90
- 8.91 - 9.90

Earthquake Depth

- 0 - 69
- 70 - 299
- 300 - 700
- Volcano

Seismicity



EXPLANATION

- 6 March 2007
- 26 December 2004

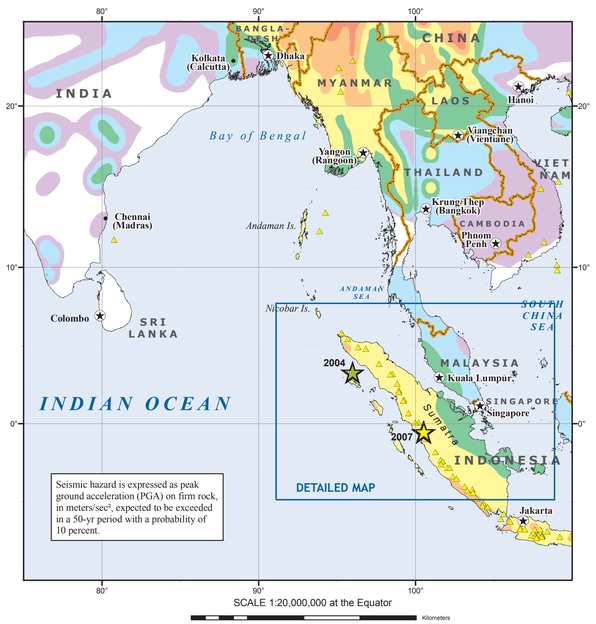
Earthquakes M ≥ 6

- 0 - 69 km
- 70 - 299
- 300 - 700

Historical Earthquakes

- Pre-1900
- Volcanoes
- Plate Boundaries

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.

EXPLANATION

- 6 March 2007
- 26 December 2004
- Volcanoes

Seismic Hazard

- 0 - 0.2 m/sec²
- 0.2 - 0.4
- 0.4 - 0.8
- 0.8 - 1.6
- 1.6 - 3.2
- 3.2 - 6.4
- 6.4 - 9.7

DISCUSSION

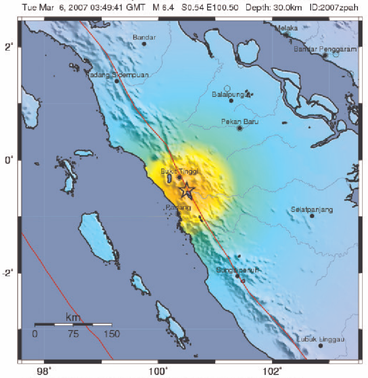
The locations and focal-mechanisms of the Sumatra earthquakes of March 6, 2007, are consistent with these shocks occurring on the Sumatran fault, a 1900 km-long strike-slip fault that extends the length of the island. At the latitude of the earthquake, the average long-term rate of displacement on the fault is about 20 mm/yr. The exact position of the 2007 earthquakes with respect to earlier historic earthquakes on the Sumatran fault will not be known until detailed studies have been conducted of the recent earthquakes. Two earthquakes having magnitudes of 7.2 and 7.5, respectively, occurred within seven hours of each other on June 8-9, 1943, with epicenters assigned to the section of the fault immediately to the southeast of the epicenters of the 2007 earthquakes. The magnitude 7.5 shock was among the largest earthquakes to have occurred on the Sumatran fault since the late nineteenth century. Two earthquakes that occurred within three hours of each other on June 28, 1926, which have been assigned magnitudes of 6 ½ and 6 ¾ respectively, have been assigned epicenters virtually identical to the epicenters of the 2007 earthquakes.

The tectonics of west-central Sumatra are dominated by the motion of the Australia plate northward with respect to the Sunda plate at a velocity of about 50 mm/yr. The principal plate boundary is taken to be the axis of the Sunda trench, but significant plate-boundary deformation occurs in a zone that extends hundreds of kilometers inland from the Sunda trench. The component of motion of relative plate motion that is perpendicular to the trend of the plate-boundary is mostly accommodated by underthrusting along the Sumatra subduction zone, which dips eastward from the Sunda trench and is seismically active to depths of over 200 km in west-central Java. The Sumatra subduction zone has historically produced great thrust-fault earthquakes. The component of relative plate motion that is parallel to the plate-boundary is substantially accommodated by strike-slip faulting on the Sumatra fault, which is about 300 km inland of the Sunda trench. The part of the Sunda plate that lies to the west of the Sumatra fault and east of the principal plate boundary at the Sunda trench is sometimes called the "forearc sliver" of the Sunda plate, being distinguished from the rest of the Sunda plate because of its relative motion with respect to the plate's interior.

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.

USGS ShakeMap : SOUTHERN SUMATRA, INDONESIA
Tue Mar 6, 2007 03:49:41 GMT M 6.4 S0.54 E100.50 Depth: 30.0km ID:2007zpah



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
POTENTIAL DAMAGE Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
ESTIMATED INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

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.

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Pubellier, M., Ego, F., Chamot-Rooke, N., and Rangin, C., 2003, The building of pericratonic mountain ranges: structural and kinematic constraints applied to GIS-based reconstructions of SE Asia: Bull. Soc. Geol. France, v. 174, p. 561-584.

Zachariasen, J. and others, 1999, Submergence and uplift associated with the giant 1833 Sumatran subduction zone earthquake: Evidence from coral microatolls: J. Geophys. Res., v. 104, p. 895-919.

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 FAULTS
PB2002 (Bird, 2003)
Pubellier and others, 2003
Historical rupture zones (Zachariasen and others, 1999; Ortiz and Bilham, 2003)

VOLCANOES
Smithsonian Institution, Global Volcano Program

BASE MAP
NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center

OTHER SOURCES
Associated Press
UN Office for Coordination of Humanitarian Affairs (OCHA)

Map prepared by U.S. Geological Survey
National Earthquake Information Center
2007
Map not approved for release by Director USGS