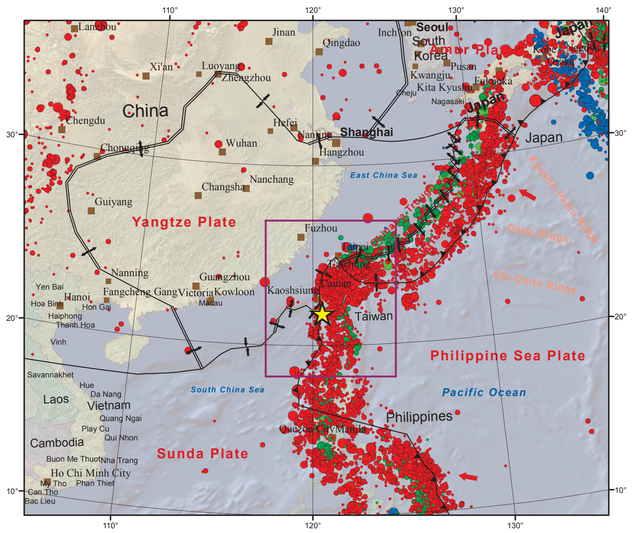
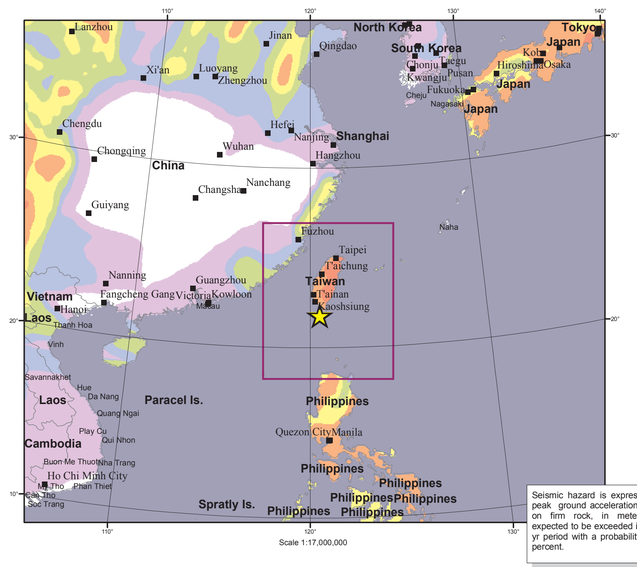
M7.1 Taiwan Region Earthquake of 26 December 2006

Seismotectonic Setting

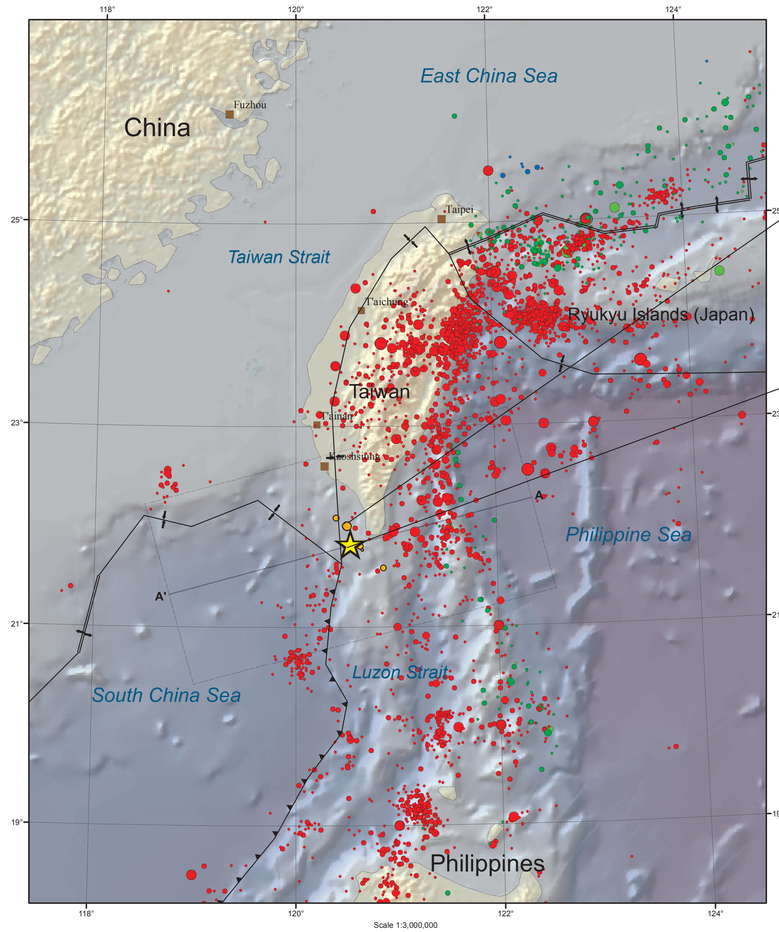


Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec^2, expected to be exceeded in a 50-yr period with a probability of 10 percent.

Epicentral Region



Taiwan Region

26 December 2006 12:34:14 UTC
22.023° N, 120.539° E
Depth 5 km

Mw = 6.9 (USGS)

A major earthquake occurred 70 km (45 miles) SSE of Kao-hsiung or 355 km (220 miles) SSW of T'AI-PEI, Taiwan at 6:34 AM MDT, Dec 26, 2006 (8:34 PM local time in Taiwan). The magnitude and location may be revised when additional data and further analysis results are available.

This earthquake ocurred shortly after the magnitude 7.1 earthquake.

Taiwan Region

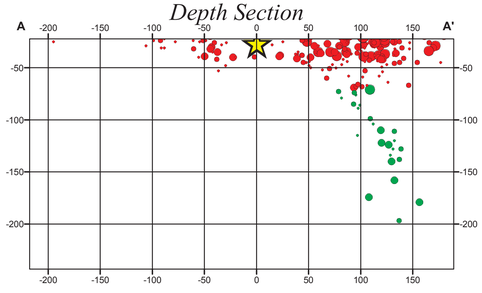
26 December 2006 12:26:21 UTC
21.825° N, 120.538° E
Depth 5 km

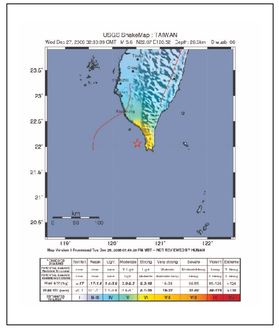
Mw = 7.1 (USGS)

A major earthquake occurred 90 km (55 miles) SSE of Kao-hsiung, Taiwan and 795 km (495 miles) N of Manila, Philippines at 6:26 AM MDT, Dec 26, 2006 (8:26 PM local time in Taiwan). The magnitude and location may be revised when additional data and further analysis results are available.

The earthquake was felt throughout Taiwan. Several buildings were damaged or destroyed. At least one person was killed and three injured at P'ing-tung. The earthquake was also felt along the coast of southeastern China from Shantou in the south to Fuzho in the north.

Depth Section





Significant Earthquakes Mag ≥ 7.5

Year	Mn	Dy	Lat	Long	Dep	Mag
1604	12	29	25.000	119.500		8.0
1897	08	15	18.000	120.000	60	7.9
1910	04	12	25.500	122.500	200	8.3
1915	02	28	23.600	123.500	60	7.7
1917	07	04	25.000	123.000	60	7.7
1920	06	05	23.500	122.000	10	8.3
1922	09	01	24.500	122.000	60	7.6
1938	06	10	25.500	125.000	60	7.7
1958	03	11	24.600	124.200	77	7.5
1966	03	12	24.200	122.600	48	8.0
1972	01	04	22.500	122.100	6	7.6
1972	01	25	23.100	122.100	34	7.7
1978	07	24	22.100	121.400	18	8.0
1986	11	14	23.900	121.800	38	7.8
1998	05	03	22.306	125.308	33	7.9
1999	09	20	23.772	120.982	33	7.7

DISCUSSION

The southwestern Taiwan earthquakes of 2006 December 26, 12:26 UTC (M = 7.1) and 12:34 UTC (M = 6.9) occurred in a zone of transition along the north-south boundary between the Eurasian plate and the Philippine Sea plate. The Eurasian plate is moving east-southeast with respect to the Philippine Sea plate at a velocity of about 80 mm/y. Along the plate-boundary south of Taiwan, the Eurasian plate is oceanic lithosphere, and convergence is mostly accommodated by the subduction of the Eurasian plate beneath the Philippine Sea Plate. The subducted Eurasian plate is seismically active to depths of about 200 km offshore of southeastern Taiwan, to the east-southeast of the December 26 shocks. North along the plate boundary from southwestern Taiwan to northern Taiwan, by contrast, the Eurasian plate is buoyant continental lithosphere that resists subduction, and a significant fraction of plate convergence is accommodated by intense compressional deformation of the earth's crust rather than by subduction of one plate beneath the other.

Preliminary focal-mechanism solutions indicate that the earthquake of 12:26 UTC occurred as the result of normal faulting and that the earthquake of 12:34 UTC occurred as the result of predominantly strike-slip faulting.

The normal-faulting focal-mechanism of the shock of 12:26 UTC suggests that this shock occurred as the result of intraplate stresses within the subducting Eurasian plate. Normal-faulting focal-mechanisms are commonly observed in the shallow parts of subducting plates; the causative stresses are generated by the bending of the subducting plates. A normal-fault focal-mechanism is not consistent with the earthquake having occurred as the result of shallow compressional deformation between two converging plates which each consist of buoyant lithosphere.

Presently available evidence does not permit a confident statement on whether the earthquake of 12:34 UTC occurred as the result of shallow deformation caused by convergence between two plates consisting of buoyant lithosphere or instead occurred as the result of deeper deformation within a subducted and deformed Eurasian plate. The style of faulting preliminarily inferred for the shock of 12:34 UTC, right-lateral strike-slip faulting on a northeast striking fault or left-lateral faulting on a north-northwest striking fault, would be consistent with the style of faulting that has been observed at the surface in southwestern Taiwan and that helps accommodate the mutual convergence of buoyant Eurasian lithosphere and Philippine Sea lithosphere. It is possible, however, that this style of faulting could also occur as the result of intraplate stresses within the subducting Eurasian plate, beneath its boundary with the Philippine Sea plate.

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Bassin, C., Laske, G. and Masters, G., The Current Limits of Resolution for Surface Wave Tomography in North America, EOS Trans AGU, 81, F897, 2000.

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 (GSHAP, 1999)

PLATE TECTONICS
PB2002 (Bird, 2003)

BASE MAP
ESRI (1992), Digital Chart of the World
GLOBE (1999)
IOC, IHO, and BODC (2003)

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.

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National Earthquake Information Center
2006
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