

The Great Sumatra-Andaman Earthquake of 26 December 2004

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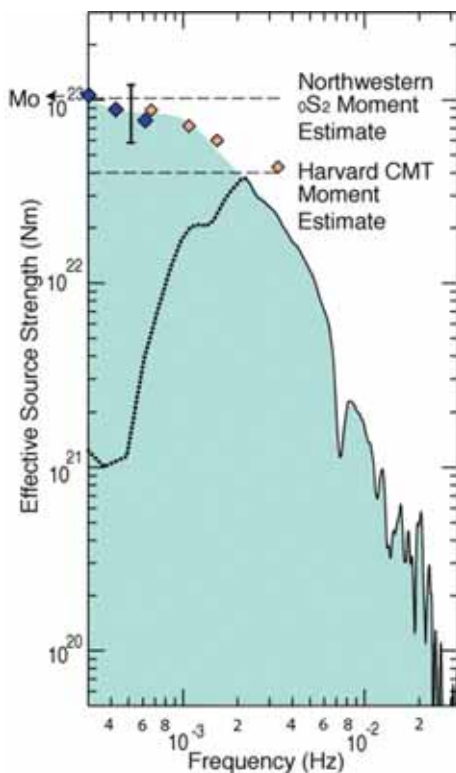
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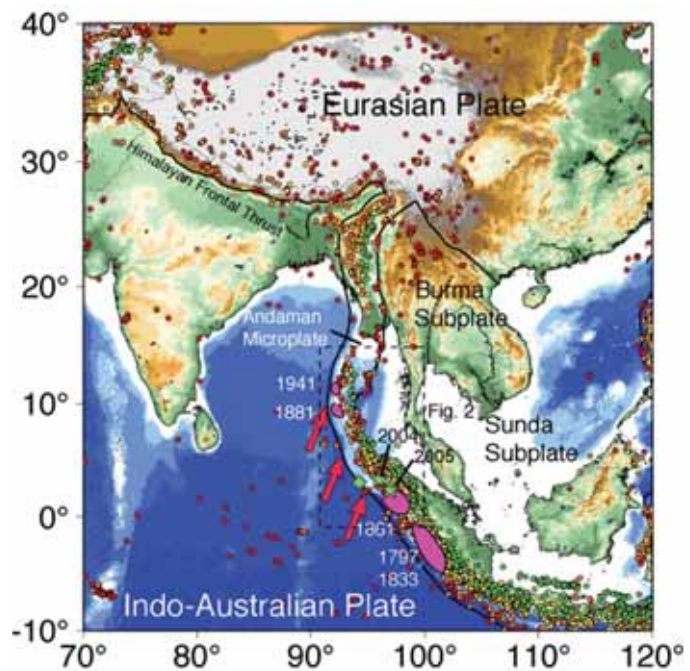
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An overview of the tectonics and faulting process of the 26 December 2004 rupture and its tsunamigenesis is presented. This earthquake is the largest event in the world in 40 years, and produced the most devastating tsunami in recorded history. Slip during the 10 minute-long rupture along the plate boundary varied systematically toward the north, decreasing from about 15 m near Banda Aceh to only a meter or two near the Andaman Islands. It appears that additional, slower slip occurred in the northern portion of the



Effective source strength for normal modes and Rayleigh waves for the 2004 event, obtained from GSN observations.



Regional tectonic map of the 2004 earthquake, showing earthquakes with magnitudes > 5.0 from 1965 to 25 December 2004. The arrows indicate the relative plate motions between the Indian and Eurasian plates for model NUVEL-1. The location of prior large events in the area are shown.

rupture zone, possibly on a time-scale of one hour or more. This is indicated by modeling of the ocean surface displacements observed by the JASON altimeter. The overall energy release of the earthquake is measured at 1.1×10^{18} J. The seismic moment is $0.65\text{--}1.0 \times 10^{23}$ N-m, with some uncertainty being due to weak constraint on the dip of the fault segments along the rupture. An increasing component of obliquity in the slip is found along-strike. The rupture extended about 1300 km from the epicenter, and an additional 300 km of the fault boundary failed in the March 28, 2005 earthquake.

Lay, T., et. al., The Great Sumatra-Andaman earthquake of 26 December 2004, *Science*, 308, 1127-1133, 2005.

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