



The geodynamic meaning of the great Sumatran earthquake: what are the ‘subduction’ earthquakes?

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The difference between the value of seismic moment computed using the surface wave data and the value derived from the normal modes of the Earth requires reinterpretation of the focal mechanism of the Great Sumatran earthquake (TU=26 December 2004 - 00h 58m, Lat=3.3°N, Lon=95.8°E, H=10 km, M=9.3) based on the second conjugate – near vertical CMT fault plane solution. The displacement of the Earth’s instantaneous rotation pole – observed at ASI of Matera, Italy –, the seismic data (USGS) in the two days following the main shock, the high frequency P-wave radiation, the geomorphologic data, and the satellite data of uplift/subsidence of the coasts (IGG) converge toward this interpretation. In addition, the alleged coseismic sudden displacement towards SE of the arc and of Sumatra – forecasted by the elastic rebound model – is at odd with the slow retreat of the seawater before the tsunami.

Case-history great earthquakes are then reviewed to highlight the overall analogies. The similarity of the vertical displacements shown by these earthquakes (Chile 1960, Alaska 1964, ...) leads to a common interpretation making resort to a prevailing uprising of lithospheric material. This interpretation is supported by the inspection of the irregularities of the hypocentres distribution along the Wadati-Benioff zones. A thorough revision or a complete overcoming of the subduction concept is then needed.