Spatiotemporal variation of source mechanisms of medium earthquakes in the rupture zone of the 2004 Sumatra-Andaman earthquake

Shinya Hiratsuka[1]; Makiko Oishi[2]; Tamao Sato[3]

[1] Earth and Environmental Sci.,Hirosaki Univ; [2] Earth and Environmental Sci,nagoya Univ; [3] Earth and Environmental Sci., Hirosaki Univ

The 2004 Sumatra-Andaman earthquake (Mw=9.3)has provided an unprecedented data for studying a spatiotemporal variation of source mechanisms of medium-sized earthquakes in and around the rupture zone of such a gigantic earthquake. We investigated this using the fault plane solutions of 442 events taken from the Harvard CMT catalogue for the last 30 years including the 2004 earthquake (January 1976 through October 2005). With reference to an estimated plate boundary of the subducted Indo-Australian plate, we sorted the events into the group along the dipping megathrust plate boundary and the group on the back-arc side, i.e., the group along the Sumatra fault and submarine ridge-transform faults on the east of the Nicobar and Andaman islands. Although the thrust type events consistent with the interplate slip are dominant for the group along the megathrust plate boundary, there are a certain amount of normal-fault type and strike-slip type events from place to place. The group on the back-arc side almost consists of normal faults and strike-slip faults. The two different fault types are not clearly separated spatially in the Nicobar and Andaman segments. We applied Angelier's (2002) and Yamaji's (2000) methods of stress inversion to the present data set and compared the results. While the Angelier's method fits a single stress field to heterogeneous data in a least squares sense, the Yamaji's method provides multiple solutions to the heterogeneous data, allowing us to discuss the stress heterogeneity comprehensively. Based on the inversion results, we will discuss the spatiotemporal variation of source mechanisms of medium earthquakes in the rupture zone of the 2004 Sumatra-Andaman earthquake and its seismological implications.