Stress due to the back slip and its relation with the focal mechanisms of events in the rupture zone of 2004 Sumatra earthquake

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The rupture zone of the 2004 Sumatra earthquake (Mw=9.3) is characterized by a strong variation in the degree of oblique plate convergence. In order to resolve the detailed stress field, we applied the multiple inverse method [Yamaji (2000)] to the focal mechanisms of earthquakes in and around the rupture zone of the 2004 earthquake. Following the previous study [Oishi and Sato (2007)], we sorted the events into the group of interplate earthquakes on the dipping plate boundary and the group of shallow earthquakes on the back-arc side. The results obtained from the method revealed the detailed spatial variation of the stress field in and around the rupture zone of the 2004 earthquake and the method was proved to be useful for resolving stress heterogeneity comprehensively. For the groups of events on the megathrust plate boundary, normal fault and strike-slip fault stress regimes were obtained in addition to reverse fault stress regime consistent with the interplate slip. For the groups of events in the back-arc, the stress regime consists of strike-slip fault stress regime and normal fault stress regime.

We calculated the stress fields due to the back slip model [Savage (1983)] and the transcurrent movement of fore-arc sliver (Burma micro plate). Comparing the calculated stress fields with the spatial variation of the focal mechanisms, we investigated the effect of variation in the obliquity on the stress field in and around the rupture zone of the 2004 earthquake.