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Crustal Deformations Associated with the Sumatra Earthquake on December 26, 2004 derived from continuous GPS measurements

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We analyze continuous GPS data in and around Indonesia that are available through SOPAC's website (http://gsac.ucsd.edu/) in order to detect coseismic and postseismic deformations associated with the great Sumatra earthquake on December 26, 2004. We use the following GPS Stations: COCO (IGS), NTUS (IGS), BAKO (IGS), and SAMP (BAKO) in Medan, Sumatra. Observation period is from December 15, 2004 (DOY350) ~ January 23, 2005 (DOY023). The Bernese ver.4.2 is adopted in the coordinate calculation and daily static solutions are obtained. We use IGS Rapid ephemeris and IGS Rapid earth rotation parameters since the final orbit and erp's are not available for the entire period. We set elevation mask to 10 deg and estimate zenith delay every 2 hrs. Integer ambiguities are also fixed. In this preliminary analysis ocean tide load is not taken into account.

Coseismic step of about 13cm can be seen in the EW component of SAMP (Figure 1). Coseismic step of ~1cm is also seen in the NS component. Postseismic movement began afterward and it amounts to ~3cm westward and ~1cm southward till Januray 23, 2005. This pattern of horizontal displacements is consistent with the low-angled thrust faulting on the interface between the subducting Australian-Indian plate and overlying Sunda block.

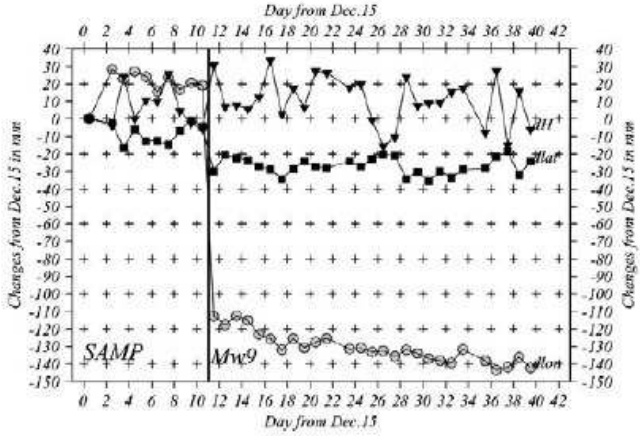

Figure 1. Temporal variation in coordinate of SAMP w.r.t COCO