



Co- and postseismic deformations associated with large earthquakes in Sumatra detected by ALOS/PALSAR

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Since the occurrence of the 2004 Sumatra-Andaman earthquake (Mw9.2), the Sumatra-Andaman Subduction zone has attracted geophysicists' attention. On March 6, 2007, a doublet of M6 events hit central Sumatra. On September 12, 2007, another Mw8.4 event occurred SW off Sumatra. We report deformations observed by ALOS/PALSAR including co- and postseismic deformation following these events.

The March 6 doublet occurred in a pull-apart basin along the Sumatra fault north of Padang. We analyzed PALSAR images acquired on October 15, 2006 and June 6, 2007. Interferogram shows coseismic line-of-sight displacement up to 8cm and clear discontinuity of fringes along the surface rupture detected by field survey, although correlation is not good in the mountain region due to long perpendicular baseline. Observed LOS displacement suggests that the two events occurred on the same fault plane. Estimated fault plane is about 50km x 20km, but slip is estimated as large as 30cm.

We analyzed ALOS/PALSAR images from two paths, 445 and 446, to detect coseismic displacement from the 2007 Sumatra event which occurred north of Bengkulu on the coast of southern Sumatra. The largest LOS displacement of about 35cm in the interferogram of path 445 is observed 100km NW of Bengkulu. Coseismic westward displacements of 3.5cm from the 2007 Sumatra event are also observed at Singapore, whose epicentral distance is about 700km, with CGPS. The above observed LOS displacement can be simulated by a plane fault model gently dipping northeastward with a 10m slip. Interestingly, we found discontinuity between interferogram of 445 and 446. This discontinuity may be attributed to a postseismic transient, since slave images for 446 were acquired three weeks after the acquisition on path 445. CGPS observation at Singapore suggests that postseismic transient during this interval may be about one third of coseismic displacement.