Crustal deformation of doublet Sumatra earthquake on September 12, 2007 inferred by GPS and InSAR observation

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A great earthquake with magnitude Mw=8.7 struck the southern Mentawai Strait and adjoining parts of Bengkulu province, Sumatra on 12 September 2007 at 18:10 PM local time in Sumatra. This earthquake was followed by a large earthquake of Mw=7.9 at 06:49 AM local time after 12 hour, and the epicenter of the earthquake located at northern of main schock. In order to estimate crustal deformation due to these earthquakes, we used Global Positioning satellite and Synthetic Aperture Radar data, and we employed differential GPS and InSAR method to process both raw GPS and SAR data. The results show that maximum coseismic horizontal displacement observed by GPS data was 1.83 m located in Pagai Island. The analysis GPS data enabled us to draw the uplift and subsidence along subduction zone in Sumatra, which most of GPS stations around shoreline in Sumatra island moved down whereas the sites around Mentawai islands particularly in Pagai island were uplifted by the earthquakes. The coseismic deformation derived by differential InSAR, after removing topography effect, was estimated by about 2 m in line of sight (LOS) direction at southern part of Pagai island. Our results both from GPS and InSAR observation are matching well with insitu observation. Now, we are performing the inversion model to estimate source of parameters of the earthquakes, and in the next future we will investigate long term deformation in Sumatra subduction zone.