Rapid postseismic deformation following the M9.0 Sumatra-Andaman Earthquake

Irwan Meilano[1]; Yusaku Ohta[2]; Takeo Ito[3]; Fumiaki Kimata[4]; Takeshi Sagiya[5]; Kazuro Hirahara[5]

[1] Earth and Planetary Sci.,Nagoya Univ.; [2] Env,Studies Nagoya Univ.; [3] RSVD, Nagoya Univ.; [4] Res. Center Seis. & Volcanology, Graduate school of Environ., Nagoya Univ.; [5] Environmental Studies, Nagoya Univ.

A megathrust earthquake of a magnitude 9.0 struck Aceh in North of Sumatra, Indonesia at 00:58:53 UTC. This devastating megathrust earthquake occurred on the interface of the India and Sunda (Burma) plates. The earthquake ruptured a surface at least 400 km long and 100km, some models use a longer rupture up to 1000 km further north. Most of the aftershock occur in the Andaman area. Whether this part of the fault slipped during mainshock's rupture is difficult to infer from seismic records, because the long period nature of the event.

We processed three GPS sites close to the epicenter; SAMP Medan, Indonesia epicentral distance 300 km, PDNG Padang, Indonesia epicentral distance 450 km and NTUS Singapore (IGS) epicentra distance 900 km, with respect to COCO Cocos Island (IGS). Daily solution in SAMP estimated 13 cm displacement to the east. However the highrate solution (30 seconds) estimated only 10 cm of the main shock. Continuous GPS time series from those three GPS station documented rapid postseismic fault creep, representing an additional moment release upward of 25% over the weeks following the main shock.