

## Crustal deformation associated with the 2006 Hakone earthquake swarm

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We have conducted observations of crustal deformations in western Kanagawa Prefecture as a part of earthquake research in western Kanagawa Prefecture and for the purpose of monitoring volcanic activity in Hakone. We started continuous GPS observations at Hakone, Manaduru, Nakai, and Yamakita sites since 1992.

A series of earthquakes started on 12th June 2001 near Hakone volcano and continued 4 months. This swarm was the largest activity in the last 30 years. Nishimura et al. [2001] analyzed GEONET data, and reported significant baseline length changes due to this activity. They estimated that expansion of Hakone started since late June 2001. Tanbo and Tanada [2002] suggested that the observed crustal deformation is caused by upward movement of volcanic material beneath the central cone of Hakone volcano.

Another earthquake swarm started in August 2006 and returned to normal in April 2007. Level of activity in 2006 was lower than that in 2001. Harada et al. [2007] reported a slight extension of baseline length in Nakai - Hakone and Yamakita - Hakone since August 2006 using our own data. GSI also reported extension of the lengths of baselines that cross the Hakone volcano, using only GEONET data (GSI web: <http://www.gsi.go.jp/WNEW/PRESS-RELEASE/2006/goudou1107.htm>). However detailed crustal deformations associated with earthquake swarm in 2006 have not been reported.

To estimate more precise crustal deformation for the 2001 activity, we reanalyzed data of both our Institute and GEONET using GIPSY - OASIS II software. Period of analyzed data is from 1st January 2005 to 31st December 2006. Extensions of lengths of baselines that cross Hakone volcano are observed. The results suggest that the extension seems to have started in July 2006. For example, north-south baseline extension is observed between Hakone (our Institute) and Yamakita (93031) sites. East-west baseline extension is observed between Yamakita (our Institute) and Susono2 (960621) sites. We will report crustal deformations in 2006 derived from GPS observations and the dislocation source model estimated from thus observed crustal deformations.