

## A crustal movement accompanying swarm earthquakes of Hakone in 2001 detected with GPS and EDM array

# Toshiya Tanbo[1], Toshikazu Tanada[2]

[1] HSRI, [2] Hot Springs Res. Inst. of Kanagawa Prefecture

We report on the crustal movement detected with GPS and EDM arrays in the swarm earthquakes of Hakone in 2001. We carried out continuous observation of GPS and EDM arrays in the western area of Kanagawa prefecture, which promote the prediction research of Western Kanagawa Prefecture Earthquake and the activities monitoring of Hakone volcano.

The Hakone swarm earthquakes activity occurred near the central cone of Hakone volcano from June 12, 2001. The crustal movement accompanying this seismic activity was detected by the GPS and EDM in the western area of Kanagawa prefecture including the inside of Hakone caldera.

We found a remarkable characteristic at observation of GPS array to be follows:

(1) Changes of three baseline length at Hakone GPS station during swarm earthquakes activities were +2.2 cm at Hakone-Manaduru, +1.6 cm at Hakone-Nakai and -0.6 cm at Hakone-Yamakita.

(2) Changes of two baseline length at Manaduru GPS station were +1.6 cm at Manaduru-Yamakita and +1.1 cm at Manaduru-Nakai.

These facts suggest that Hakone and Manaduru GPS stations were displaced in each of northwestern directions and southeastern directions. Therefore, these results can be thought to suggest swelling of the central cone of Hakone volcano, in consideration of the swarm earthquakes activity area.

And we also found a remarkable characteristic at observation of EDM array inside of Hakone caldera to be follows:

(3) All six baseline length showed tendency of stretch. Three baseline by the side of central cone were extended longer than two baseline by the side of somma.

(4) One baseline by the side of somma was extended longest than other baselines. The baseline was extended +10.3mm.

The longer expansions of three baseline length by the side of central cone can be explained due to upheaval of the central cone. The longest expansion of one baseline length by the side of soma has suggested that source of crustal movement exists besides central cone of Hakone volcano.

The observation results harmonize qualitatively with the results of a GPS array by Geographical Survey Institute, and the crustal movement has suggested expansion and upheaval of the central cone of Hakone volcano.