

Vertical deformation around Asama Volcano detected by precise leveling in June, and November, 2005

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Abstract

We extend the level route toward west from the Asama Volcano to discuss pressure source in Asama Volcano with more detail, and executed the precise leveling in May and November, 2005. As a result uplift of 6 mm was detected in the western part of the Asama Volcano by our leveling for six months. This uplift suggest the spherical source at the depth of 3-4 km with a volume changes of $1 \times 10^6 \text{ m}^3$. The pressure source estimates at the depth of 3km with the inflation volume of $7 \times 10^6 \text{ m}^3$ from the GPS measurements for seven months in 2004 when a small-scale eruption was repeated (Aoki et al., 2005). The depth of the pressure source is almost same as that estimated in the period of 2004, and inflate rate of pressure source is about 10% in 2004. However horizontal deformation around the Asama volcano indicates no identical inflation with the continuous GPS measurements in this period. The horizontal deformation calculated from our spherical source model indicates horizontal deformation of 2 mm in maximum. We have one conclusion the horizontal deformation showing inflate should be not observe with the GPS measurements around the Asama Volcano.

New leveling route to Kurumasaka-Pass, Kurofu Volcano

Since the start of the leveling around the Asama volcano, volcanic pressure source is estimated western part of the volcano (Murakami, 1960; Miyazaki, 1990; Aoki et al., 2006). However, there is no leveling near the estimated pressure source. We extend the new precise leveling route of 29.5 km to Kurumasaka-Pass, west of Kurofu Volcano from BM 549 in Karuizawa, southern mountain foot of the Asama Volcano. The leveling route is consisting with 59 benchmarks and the height of lower benchmark and higher benchmarks is amounting to 1005 m. The highest benchmark locates over 2000m from sea level.

Detected uplift of 6 mm for the last six months and discussion of leveling error

We repeated the precise levelings in May and November in 2005 with the joint work of Nagoya Univ., Hokkaido Univ., Japan Meteorology Agency, Kyoto University and Univ. of Tokyo. From the levelings, uplift of 6 mm is detected around the Kurumasaka-Pass. Large uplift is observed at the bench marks at a high attitude. A positive correlation can be pointed out between the vertical deformations and attitudes of the benchmarks. It is necessary to examine the scale error margin of the leveling roads. It is able to explain the uplift of 6 mm detected this leveling when there is a scale error margin of $(5-6) \times 10^{-6}$. Loads are calibrated vertically before the levelings, and we employed four groups of leveling roads in May and three groups in November.