

## Vertical ground deformation of Ioyama, Kirishima volcanoes measured by precise leveling survey (during Mar. 2012 - Nov. 2016)

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Ioyama is an active volcano located in Ebino kogen volcanic area, Kirishima Volcanoes, southern Kyushu, is activated from December 2015. We conducted the precise leveling survey in the Ebinokogen volcanic area from March 2012 to November 2016. The purpose of the survey is to reveal the vertical deformation and pressure source. We measured in December 2015, February, March, June, November 2016. Inflation of the Ioyama was detected from we initiated this observation to March 2016. Subsequently, the ground subsidence from around June 2016. However, uplift is detected around the Ioyama again in November 2016.

From the surveyed leveling data in November 2016, the vertical displacements indicate the ground uplift at all bench marks. In this study, the reference bench mark is BM1120 at the western flank of Ioyama. The amount of maximum uplift is about 17.2 mm near the summit referred to BM1120 in November 2016. We estimated pressure source models based on the vertical deformation. We supposed the presence of an inflation spherical source as Mogi's model, the depth has been inferred about 700 m. The lower limit of low resistivity layer assumed to be the clay layer is estimated in this depth (Aizawa et al., 2013). Accordingly, the inflation source by using precise leveling survey is located under the impermeable clay layer. In addition, the increase of pressure source volume since June 2015 is detected  $4.8 \times 10^4 \text{ m}^3$  in November 2016.

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