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Precise Leveling survey around mount Io, Kirishima Volcanoes, Japan

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Since the magmatic eruption of Kirishima Shinmoedake in southern Kyushu in 2011, volcanic activity of the Kirishima mountain range has been followed by a calm situation. However, the number of volcanic earthquakes has been increased around Ebino plateau (Mount Io), at a distance of about 5 km northwest from Shinmoedake, since December 2013. In August 2014 a volcanic tremor was recorded nearby mount Io, and tilt change was observed at the same time. Furthermore, a geothermal field sprang up in Mount Io's summit area in December 2015, and thus ejection of volcanic gas began. Mount Io is also the source of some dacitic lava flows of 16th and 17th centuries in the eastern part of Ebino plateau. Although the summit area was also sulfur mined up to 1962, in recent years its volcanic activity has rapidly declined. We thought that volcanic activity in the vicinity of Ebino plateau since the end of 2013 reflects new magmatic activity, so in order to understand the crustal deformation associated with this magma intrusion we carried out a precise leveling survey crossing the Ebino plateau from east to west. Uplift amount is larger as it approaches the Mount Io from Ebino plateau; uplift of up to 17 mm was recorded in a west trailhead at Mount Io. Uplift becomes gradually smaller when cross the mountain pass, and is almost negligible towards the eastern end of the route. Using the Mogi model analysis, an increasing pressure source of 3.1•104 m3 at 150 m eastwards of Mount Io fumarole area was estimated at a depth of 700 m. The depth of that pressure source is quite near to the lower limit of the low-resistivity layer (impermeable layer) that has been estimated by Aizawa et al. (2013).