蔵王山の火山性微動発生時にみられる地殻変動
Ground deformation accompanying volcanic tremors at Zao volcano

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Volcanic tremors have been observed on occasion at Zao volcano, NE Japan since January 2013. Some of them were accompanied by ground deformation. Japan Meteorological Agency (JMA) has been operating two tiltmeters on the volcano. One is the deep borehole type tilt station installed at Bodaira on the west flank, about 5 km west to the summit crater Okama, and another is the shallow drilled tilt station near the summit of Kumanodake. The latter has been operated since December 2016. Prior to the volcanic tremor observed on 28 January, both Bodaira and Kumanodake tilt stations started recording NW and N downward ground deformation, respectively indicating ground uplift of the south part of the summit area. These tilt changes were followed by several volcanic tremors. Major tremors in terms of amplitude and/or duration had occurred during 28-30 January which corresponded to the rapid tilting phase. The tilting rate of Bodaira is estimated at c.a. 0.2 micro-radian/day for the initial two days. This is the fastest since the beginning of observation at this station comparing to the similar tilting episodes in the past years (except for short-lived tilting that precedes each single tremor). The occurrence of a couple of volcanic tremors with the rapid ground deformation let Regional Volcanic Observation and Warning Center in Sendai to issue Near-crater Warning and raise Volcanic Alert Level from 1 to 2 at 14:38 on 30 January. The ground deformation gradually decreased in the next few days and ceased at around 4 February. Contrary to the 2015 volcanic activity in which ground deformation gradually progressed with a number of volcanic earthquakes, the January-February 2018 activity is characterized by the rapid ground deformation associated with a couple of volcanic tremors with relatively bigger amplitude. This may reflect the difference of the volcanic source processes. In order to better understand the geometry, location and magnitude of deformation sources, we analyze continuous GNSS data obtained by JMA and Geographical Information Institute, Japan. We study if the deformation source models estimated from tilt data can also explain our GNSS results without discrepancy.

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