

Inflation Event of Zao Volcano in 2015

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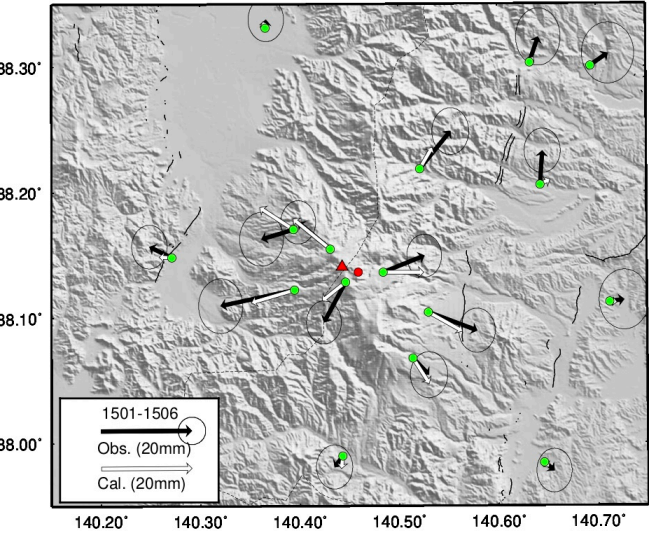
Volcanic earthquakes and tremors have been occurring beneath Zao volcano located in the northern Honshu, Japan since 2013, following the increase in the number of deep low frequency earthquakes from around 2012. Tohoku University has deployed some new seismological, geodetic, and geomagnetic stations to enhance rather poor observation network prior to the activity. On account of a burst of volcanic earthquakes initiated in April 2015, the Japan Meteorological Agency announced a warning of eruption, however, the number of events gradually decreased for the next two months and the warning was canceled in June 2015. In the same time period, minor expansive deformation was observed by GNSS. Small-scale volcanic earthquakes and tremors are occasionally occurring, and long-period earthquakes have taken place sometimes accompanied by static tilt changes. In this talk, We report the outcome obtained from the five-year observational research to monitor the preparatory process going under the volcano for evaluation of the eruption potential.

Figure 1 demonstrate the horizontal and vertical movement around Zao, respectively, from Jan. to Jun. of 2015. The black arrows show the observed ground movement. The radial pattern of movement around the summit of the volcano is clearly seen and the upheaval indicated by the black bars also centered around the summit. These characteristics of deformation can be modeled by a infinitesimal pressure source underground (so called Mogi model). We tried inversion analyses to find its location and magnitude. It is located about 0.8 km east of the crater lake with depth of about 5.6 km, and the volumetric change equivalent to the pressure change is $3.8 \times 10^6 \text{ m}^3$. The calculated displacements are shown in the figure by white arrows and bars.

Comparing the hypocenter map, the pressure source is located just above the deep low frequency earthquakes cluster. This suggests that the pressure source might be activated by geothermal heat supplied by magma or fluid. Ogawa et al. (2014) found a conductive zone beneath Zao volcano deeper than about 5km and this may support our result.

Keywords: Volcano, deformation, Pressure source

(a) 水平変動 (2015年1月～6月)



(b) 上下変動

