

Ground deformation associated with B-type earthquakes swarm and volcanic tremors

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The ground deformation (inflation-deflation process) associated with vulcanian summit eruptions has been observed in detail by watertube tiltmeters and extensometers at Sakurajima Volcano. And at Sakurajima Volcano, except vulcanian eruption, relatively low explosive intermittent eruption that is similar to strombolian style and continuous ash emission has been observed. In response to each eruptions, explosion earthquake, BL-type earthquake swarm and continuous tremors occurred in the case of vulcanian eruption, strombolian eruption and continuous ash emission respectively. In this study, characteristics of ground deformation associated with BL-type earthquake swarm and volcanic continuous tremors were cleared up. And the dates of them were analyzed according to Mogi's model to evaluate the depth and nature of the pressure sources that induce the ground deformation, and compared with ground deformation associated with vulcanian eruptions.

Consequently, the following ground deformation characteristics were observed. (1) In the case of both BL-type earthquake swarm and continuous tremors activities as well as vulcanian eruption, pre-eruption inflation of the summit (upward tilt and extension) were observed. But the duration of inflation processes are longer (several hours to several ten hours) and the inflation rate are more gradual than those of vulcanian activities. (2) After the inflation reached a peak, inflationary senses reverse to gradual deflation process. (3) Then the rapid main deflation occur with seismic activities and surface activities. The duration of deflation processes are longer (several ten minutes to several hours) than those of vulcanian activities (within several ten minutes).

And in the case of both BL-type earthquake swarm and continuous tremors activities, the inflation-deflation processes are inferred to be caused by pressure changes at a depth of 3-6 km beneath the summit crater on the inflation process and deflation process respectively. These depth range are nearly consistent with those of pressure source which induce ground deformation on vulcanian activities and corresponds to the depth interval from the lower part of conduit to the upper part of magma chamber.