

Incorporating gravimetric information to muon radiography to obtain an internal density structure of the Mt.Showa-Shinzan lava dome.

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In this report, we will present three-dimensional structure of the Mt.Showa-Shinzan lava dome obtained from joint analysis of muon radiography and gravimetric observation.

Muon radiography (MR) is a non-destructive inspection based on high penetration power of cosmic-ray muons. It has been applied to several volcanoes, and their internal density structures were measured. The advantage of this method is its high spatial resolution (a few tens of milliradian from a detector) compared with other geological techniques. However, MR is not sensitive to the mass below the detector, because muons always come from the upper hemisphere. In addition, density estimated by MR has a slight systematic error because of uncertainty in cosmic-ray muon intensity.

In order to compensate for these problems of MR, gravimetric observation, which measures gravitational attraction from every subsurface volume, can be a feasible technique. At first, we conducted gravimetric observation at 35 points near the Mt.Showa-Shinzan lava dome, where muon radiography has been performed with emulsion cloud chambers in 2006-2007(Tanaka et al,2007).

In this report, we will show the details of MR and gravimetric observations. The methods of joint inversion to retrieve the three-dimensional structure will be explained.