

The radiography of the latest lava dome in Unzen by cosmic muons

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It is significant for the growth model of volcano which has viscous magma to investigate the density structure in a lava dome. The project imaging the new lava dome density structure in Unzen, Japan, is going on. The first observation of the imaging a inner density structure in lava dome with cosmic-ray muon was performed by Tanaka et al. (2007) in Showa-shinzan, Japan. The results indicates the growth model advanced by I. Yokoyama in 2002 is most compatible.

The latest lava dome in Mt. Unzen was formed in the eruption from January 1991 to early 1995 and the activity was calmed down in 1995. The formation of the lava dome in Unzen can be divided into two characteristic growth period, exogenous and endogenous. The exogenous dominant period is from January in 1991 to late 1993, the endogenous dominant period is from the end of 1993 to early 1995. Nakada et al (1995) observed that the surface of the lava dome was moving from the in endogenous period in Unzen. They also observed there are several faults, cracks, and thrusts around the base of lava dome. They proposed a growth model in the endogenous period in Unzen, which is based on their observation and the model includes "peel" structure .

According to the dome growth model by Nakada et al, the current density structure in the lava dome should be the following : 1. The ellipsoidal massive part is in the center of lava dome. 2. The talus spread around the massive ellipsoidal. In the talus region, there are a lot of air gaps, which makes the clear contrast in the image of density with muon-radiography.

The systematic analysis of efficiency and random noise ratio are performed by taking a pattern match and making a connection of muon tracks between three films. After estimation and removing unwanted low energy electron tracks, the density map of Unzen lava dome was calculated. The performance of the detector and the first result of radiography will be shown in this topic.

Keywords: volcano, Unzen, muon, nondestructive, lava dome, eruption