The imaging a lava dome density structure in Unzen with cosmic-ray muons

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It is significant for the growth model of lava dome which has viscous magma to investigate the density structure in it. The first observation of the imaging a inner density structure in lava dome with cosmic-ray muons was performed by Tanaka et al. (2007) in Showa-shinzan, Japan. The result indicates that the growth model advanced by I. Yokoyama in 2002 is most compatible. The imaging analysis of Unzen lava dome with cosmic-ray muons is going on. The lastest 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 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 muon detector, nuclear emulsion films which has high position resolution and 0.85m^2 effective area, was installed in Unzen from early December 2010 to the end of March. Now the analysis of nuclear emulsion is going on. We will report the preliminary result of the imaging Unzen lava dome.