

Eruption processes of the 3rd and 4th stage of Niigata-Yakeyama Volcano, Japan, inferred from microlite texture and chemical composition

*Takumi Yoshida¹, Takeshi Saito¹

1. Shinshu University

Niigata-Yakeyama volcano, which belongs to the Myoko volcano group, is one of the most active and youngest volcanoes in Japan. In the 3rd stage of Yakeyama activity, Maeyama lava flows and Hayakawa pyroclastic flows were generated to the northern slope of the volcano. In the 4th stage activity, Yakeyama lava flows, which forms present lava dome at the summit, and Otani pyroclastic flows were effused. Otani pyroclastic flow deposit contains well-vesiculated lavas, while lavas from Hayakawa pyroclastic flow are poorly-vesiculated. In this study, groundmass textural analysis of the eruptive products at the 4th stage was carried out. Chemical composition of plagioclase phenocrysts and microlites of the eruptive products at the 3rd and 4th stage were analyzed in order to examine the eruption process of the 3rd and 4th stage of Yakeyama volcano.

Microlite number density (MND) and crystallinity of plagioclase in Otani pyroclastic flow deposits were obtained from groundmass textural analysis. Our results indicated that Otani pyroclastic flows showed lower MND and intermediate crystallinity compared with Hayakawa pyroclastic flow deposits. As a result of chemical composition analysis, phenocryst in the samples of the 3rd stage activity shows $An\#(Ca/Ca+Na) = 0.65 \sim 0.84$. Microlite of andesite of Maeyama lava flow has an average $An\#$ of 0.61, which is lower than that of dacite lava of Maeyama Lava flow (average $An\# = 0.54$). Phenocryst of the 4th stage activity has $An\# = 0.45 \sim 0.89$. Microlite of Yakeyama lava flow and Otani pyroclastic flow have average $An\#$ of 0.63 and 0.62, respectively. The $An\#$ of plagioclase microlite becomes lower with decreasing crystal size.

Plagioclase microlite becomes lower $An\#$ with higher degree of H₂O exsolution due to decompression (e.g. Nakamura, 2011). Our results suggest that microlite in dacite lava of Maeyama lava flow has undergone high decompression compared with andesite lava of Maeyama lava flow. However, there were little difference between plagioclase microlite of lava flow and that of pyroclastic flow samples. Eruptive products of the 4th eruption have relatively homogeneous SiO₂ composition. Plagioclase microlite of Otani pyroclastic flow deposit, showing lower MND and higher $An\#$ than Hayakawa pyroclastic flow, may be crystallized under a condition of lower undercooling. Another possibility is that rapid vesiculation and H₂O exsolution may proceed before microlite crystallization and prevent from decreasing $An\#$.

Keywords: Niigata-Yakeyama, Yakeyama lava flow, Otani pyroclastic flow, Maeyama lava flow, Hayakawa pyroclastic flow, Plagioclase microlite