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Magma mingling of the Kagusa lava in the Kusatsu-Shirane volcano: preliminary results from analyses of a boring core

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Three borehole-type seismometer and tiltmeter were installed around the Yugama crater in the Kusatsu-Shirane volcano by the Kusatsu-Shirane volcano observatory, Tokyo Tech. NE observation well was penetrated into the Kagusa lava which thickness was about 50 m (Uto et al., 2004). Hayakawa (1983) reported that Kagusa lava flowed from neighborhood of the Mizugama crater to east valley along the Oosawa river about 7,000 years ago. Whole-rock chemical compositions of Kagusa lava which samples were collected subaerially were analyzed by many studies (e.g. Hayakawa 1983, Uto et al. 1983, and Takahashi et al. 2010) and range from andesite to dacite (from 58 to 65 wt.% SiO_2). Kagusa lava often displays banded texture of andesite (gray color) and dacite (white color) in a flow unit at intervals of dozens of centimeter and flowed with mingling andesite and dacite together (Uto et al., 1983). In order to understand the time and space scale of magma mingling of eruption of Kagusa lava, in this study, depth profile of whole-rock compositions for this boring core was researched for every several meters based on description of this core (Uto et al., 2004).

Core samples were cut into homogeneous fractions which had no banded texture and each fractions were powdered. Some core samples which had complex mingling texture were powdered as a whole. Eleven times diluted glass beads were prepared for each sample using $Li_2B_4O_7$. Major elements of whole-rock compositions were analyzed using XRF (RIGAKU RIX2100) which was installed at Tokyo Tech. In the results, two groups were recognized in the compositions of most samples; group (1) corresponded to $\sim$60 wt.% SiO_2 (andesite) and group (2) corresponded to $\sim$65 wt.% SiO_2 (dacite). In view of the whole trend, intermediate samples which compositions corresponded to 62-63 wt.% SiO_2 lay along mixing trend between group (1) and (2). Core samples above $\sim$35 m in depth were dominated by dacite and those below $\sim$35 m in depth were dominated by andesite. This profile was consistent with core description of NE observation well (Uto et al. 2004). Some lower core samples which was collected below $\sim$50 m in depth sometimes displayed banded texture of andesite and dacite. Judging from this results, regarding compositions, magmas of group (1) and (2) were mingled together immediately before eruption and mingled magma had no time to homogenize. In order to discuss mingling time scale in detail, I will carried out petrological study; phenocryst assemblage, composition, and zoning profile of phenocryst in the regions of contact will be researched.

Keywords: magma mingling, magma mixing, Kusatsu-Shirane volcano