

Characteristics of grain composition of volcanic ash from each eruptive style

Masayuki Oishi^{1*}, Nobuo Geshi¹, Hiroshi Shinohara¹, Takahiro Miwa²

¹Geological Survey of Japan, AIST, ²Department of Geophysics, Graduate School of Science, Tohoku University

Surface phenomena of eruptive activity, such as eruptive style, eruptive rate, column height, is usually variable in an activity. For understanding the mechanism of change of surface phenomena, correlation between the time series of eruptive style and characteristics of volcanic ash as direct evidence of magma is important.

We analyzed the grain compositions, morphologies and textures, groundmass chemical compositions of ash produced by the 2011 eruptive event of Shinmoedake, Kirishima Volcano, Japan. As the result, it was estimated that the highly-vesiculated magma was ascended and erupted at both sub-plinian and vulcanian eruptions, without resident in shallow conduit. This infers that the analysis of grain composition may be useful indicator for estimating the mechanism controlling eruptive styles. For these purpose, it is important to accumulate more data. Therefore, we analyzed the grain compositions of ash deposits derived from the eruptions of Showa crater of Sakurajima Volcano (recent eruptions), Suwanosejima Volcano (sampled in 2012), and Asama Volcano (2004 eruptions).

Fresh blocky, black-colored glassy particles are contained abundantly in the products from recent eruption of Sakurajima Volcano. Highly-vesiculated fresh glassy particles are contained less than 10 %. There are no significant changes for a few years, and eruptive style does not change, too.

In addition, we correlated the grain composition of ash products from Sakurajima Volcano, sampled at five localities from proximal to distal area, for the purpose of clarifying the differences of grain composition of ashes from one eruption. There are no differences about the grain compositions of these five samples.

The ash derived from the eruption of Suwanosejima Volcano consists mainly of lithic fragments characteristically. On the other hand, about 15 % of dark brown-colored fresh glassy particles are also contained.

In the 2004 eruptive event of Asama Volcano, fresh glassy particles in the ashes decrease from the eruptions of September 1 to that of 14, while, highly-vesiculated fresh glassy particles are contained abundantly in the ash of September 16. It may correspond to the continuous activity for three days. It may infer that proportions of highly-vesiculated glassy particles concerned with eruption styles, such as duration time.

We can not recognize the positive correlation between proportion of highly-vesiculated glassy particles and height of eruption column. We will discuss about the correlation between highly-vesiculated glassy particles and duration time and eruption mass, for example.

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