Vesiculation texture and change in the amount of phenocrysts of the summit eruption of the Izu-Oshima volcano - Comparison between the An'ei and the 1986 eruption -

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Izu-Oshima is one of the most active basaltic volcanoes in Japan that caused eruptions for many times. In 1986, there were Strombolian eruption and lava effusion from the summit crater, and lateral craters caused subplinian eruption and lava effusion for several days (e.g. Endo et al. 1988). The last large-scale eruption, the An’ ei (Y1) eruption, started in 1777 with approximately one-year scoria ejection from the summit crater and lava effusion from the mountainside (basal scoria period) (Nakamura 1964, Tsukui et al. 2009).

There are differences between Y1 and 1986 eruptions in the characteristics of eruption from the summit crater. In the basal scoria period of Y1 eruption, thick scoria layer was formed outside the caldera rim. The amount of plagioclase phenocrysts (Pl) in scoria and the intensity of scoria ejection both increased as the eruption proceeded (Misonou et al 2005, Ikenaga et al. 2018). On the other hand, about the summit eruption in 1986, the amount of Pl was nearly constant (Fujii et al. 1988) and the intensity was weak that almost all scoriae deposited inside the caldera.

In this study, we conducted density measurements and textural observations of scoriae, and compared them between Y1 and 1986 eruptions. In Y1 eruption, the change in the amount of Pl was investigated in detail at the outcrop in the B2 crater of 1986 eruption nearby the summit crater.

The ejecta in the later stage of Y1 eruption (Unit C) contain more dense scoriae than those in the early stage (Unit A). The density of 1986 scoria was lower than those of 2 units of Y1. The scoriae of Unit A contain many small bubbles and some particles are bubbly like reticulite. The scoriae of Unit C also contain small bubbles, but bubbles are surrounded by thick glass walls. The scoriae of 1986 eruption hold larger bubbles than those of Y1. Based on the geological study that Unit C was more intense than Unit A (Ikenaga et al. 2018), it is assumed that there was not enough time to vesiculate because of fast ascent of magma in Unit C, whereas magma vesiculated during slow ascent of magma in Unit A. It is possible that in 1986 eruption large bubbles were formed as a result of expansion and interconnection during slower magma ascent than Y1 eruption.

The amount of Pl in Y1 eruption increased in a step-like form in terms of stratigraphic level. The deposits of Y1 eruption can be divided into several layers in which the clast size is constant, and the steps of Pl amount coincide with boundaries between layers. It is indicated that there is some system in the magma chamber that the amount of Pl increases according to the time that passed since the onset of the eruption, if the boundaries indicate pauses of the eruption. Because of this, it is assumed that the amount of Pl increased in Y1 eruption that the basal scoria period continued for approximately 1 year, and that the amount of Pl was constant in 1986 summit eruption of which the main phase continued for only several days.

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