

## Explosive eruption history of Kozushima Volcano, the Izu Islands: pyroclastic deposits newly recognized in the northern part of the island

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The eruption history of Kozushima Volcano has not been well established, compared with other volcanic volcanoes of the Izu Islands. This is due to the isolated distribution of monogenic volcanoes lying without topographical overlapping. In addition, there is no unified tephrostratigraphy of whole of the island. In previous study, four pyroclastic deposits formed during the last 10 ka have been reported in the southern part of the Kozushima islands. These are the Chichibuyama pyroclastic surge deposit-B (Cb-B), AT (30 ka; Smith et al., 2013), Chichibuyama pyroclastic surge deposit-A (Cb-A), and the latest Tenjosan tephra (AD838), in ascending order (Suga et al., 1992; 2003).

On the other hand, pyroclastic deposits distributed in northern part of the island were defined by Taniguchi (1977), those are the Chichibuyama Pyroclastic Rock Upper and Lower. Isshiki (1982) collectively defined these pyroclastic deposits, which cannot be identified by field observation, namely the Chichiyama Pyroclastic Deposits. Among these deposits, while those distributed in the southern region were partially correlated with Cb-A and Cb-B by Suga (1992, 2003). However, in the northern part, their succession, stratigraphy and petrographic features have not been well clarified. In addition, between the Cb-A and Tenjosan eruption, during approximately last 30,000 years, tephras originated from Kozushima Volcano have not been well identified. To reveal the detailed volcanic history of this island, it is necessary to construct the schematic tephrostratigraphy.

The purpose of this study is to establish the tephrostratigraphy of Kozushima Volcano. Using classified individual volcanic landforms (Kobayashi et al., 2018), the authors identified pyroclastic deposits composing the northern terrain based on the major element chemical composition of the volcanic glass shards. The explosive eruptive history of Kozushima Volcano is discussed on the basis of stratigraphic relationships together with the detailed topographic interpretation.

The results are as follows:

1. Two pyroclastic surge deposits (ps-1, ps-2), and one pyroclastic flow deposit (pfl-1) are newly recognized in the northern part of the island. They are distinguishable from Cb-B and Cb-A by comparison of the major chemical composition of volcanic glass shards. These pyroclastic surge deposits are distributed with corresponding to a double structure, which consists of semi-circular-shaped or arcuate ridges, in the northern part of the island.
2. Geochemical plots of the glass shards sampled from ps-2, which composes of the Nachiyama semi-circular-shaped ridge, in the northwestern part in the island, show a different population from those of Cb-B and Cb-A, that is, ps-1 has glass shards characterized by a broad K<sub>2</sub>O content.
3. Compared with each K<sub>2</sub>O wt.% in their volcanic glass shards, ps-1 which composes of the Takigawa arcuate ridge, western part of the island, is clearly distinguished from Cb-B and Cb-A. Volcanic glass shards of this deposit indicate higher K<sub>2</sub>O ratio than those of Cb-B, and lower than those of Cb-A.
4. The stratigraphic relationship between the two pyroclastic surge deposits is clarified at the western margin of the Nachiyama, ps-1 (upper surge deposit) is exposed with a thickness of 4 m, and the contact

with ps-2 appears quite sharp.

5. Volcanic glass shards of a pyroclastic flow deposit distributed in Kan-nonura (eastern side of the Jogoyama) indicate lowest K<sub>2</sub>O ratio than those of the other pyroclastic deposits reported in previous and this study.

6. On the basis of the stratigraphic relationship by field observations and topographical interpretation, it is presumed that the explosive eruption occurred in the northern part of the island at least three times except Cb-B and Cb-A eruptions. In addition, the double structure of semi-circular-shaped landform is most likely to be formed in the order of inner ridge (Nachiyama semi-circular-shaped ridge) and outer ridge (Takigawa arcuate ridge).

Keywords: Kozushima Volcano, eruption history, tephra fingerprinting, geomorphic classification, Izu Islands