

Tephrostratigraphy at Daisen-yama and Jinai-jima, and correlation with eruption deposits from Mamashitaura Volcanoes in Niijima Volcano, Izu-islands

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In this study, we established tephrostratigraphy at both sites of Daisen-yama and Jinai-jima, and correlated with eruption deposits from Mamashitaura volcanoes based on the characteristics of the mineral compositions, the refractive indexes and major chemical element compositions of the volcanic glass shards. We are aiming to clear long-term eruption history of Niijima volcano.

We recognized deposits associated with at least 20 eruption deposit events at Daisen-yama and Jinai-jima. Based on the stratification of widespread tephra AT, it is considered that the history of the explosive eruption of Niijima volcano and the surrounding volcanoes during late Quaternary (past about 50,000 years) are preserved at these sites. At the both sites, as the ca. 20ka tephra layers, there are coarse fall-out ash deposits containing accretionary lapilli (N), fine fall-out ash deposits (P; Kozushima-Chichibuyama A (Suga et al., 1992)), AT, fine fall-out ash deposits containing pumices (S; Kozushima-Chichibuyama B (Suga et al., 1992)), pyroclastic surge deposits that squeezes phalanx of pumices with diameter several cm (T), fall-out ash deposits containing volcanic lapilli and pumices (V) and pyroclastic surge deposits (X) in descending orders. At Jinai-jima, as lower tephra layers, there are pyroclastic deposit containing many altered volcanic lapilli and blocks (Y) and pyroclastic surge deposit (Z) covering Jinai-jima lava.

Ito and Isobe (2007) suggested that eruption deposits from Mamashitaura Volcanoes were divided into upper Mamashitaura Volcano (cumingtonite rhyolite; ca. 20 ka) and lower Mamashitaura Volcano (biotite rhyolite; >ca. 35 ka) based on the difference of mineral compositions, paleo-soil layers and ¹⁴C ages of charcoals contained therein. We recognized that upper Mamashitaura Volcano deposits composed of pyroclastic surge and pyroclastic cone deposits including rhyolite blocks and lapilli, that the lower layer contained more altered brown volcanic breccia (basalt?). On the other hand, lower Mamashitaura Volcanoes deposits composed of pyroclastic flow and pyroclastic surge deposits with a thickness of 20 m or more, and the debris flow containing many volcanic blocks covering them.

We collected data mineral compositions, refractive indexes and major chemical element compositions of glass shards for Daisen-yama and Jinai-jima tephtras (T, V, X etc.) and Mamashitaura Volcano deposits. Tephra-T contains many minerals of hornblende and cumingtonite, and is characterized by refractive indexes (1.497-1.500), K₂O contents (3.0-3.3 wt.%) and CaO contents (0.7-1.0 wt %). These characteristics closely resemble features of some of upper Mamashitaura Volcano deposits. On the other hand, the lower tephtras V and X are similar to lower Mamashitaura Volcano deposits in point of contain biotite in addition to hornblende and cumingtonite, but the refractive indexes and CaO contents of the volcanic glass shards are significantly different. This suggests that it is difficult to correlation them. As a result of currently in progress, it is highly likely that T-tephra is eruption deposits from upper Mamashitaura Volcano, and it is appropriate to think that the age is 30,000 to several thousand years ago. On the other hand, we can't recognize eruption deposits from the lower Mamashitaura Volcano at Daisen-yama and Jinai-jima.

Keywords: Daisan-yama, Jinai-jima, Mamashitaura Volcano, Nijima Volcano