

Descriptions and age of volcanic products before the caldera formation in the northern part of Izu-Oshima, off Tokyo, Pacific Ocean

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Introduction

Izu-Oshima Volcano erupted in 1986 is an active volcano that will erupt in near future. The volcano has been studied for a long time, and many studies has been conducted (Nakamura, 1964; Koyama and Hayakawa, 1996; Kawanabe, 2012 and so on). However, most previous studies focused on "Syn-and post-caldera volcano" (Kawanabe, 1998) after the caldera formation of Izu-Oshima Volcano. There are few studies discussed "Younger Edifice of Pre-caldera volcano". In this study, the purpose is to investigate the volcanic products of Younger Edifice of Pre-caldera volcano and older period with little investigation and to clarify the eruption history. The description of the volcanic products should be important in considering prediction of volcanic eruption and volcanic disaster prevention.

The study site is a coast called Goishihama located between the Chigasaki and Kazehayasaki capes in the northernmost part of Izu-Oshima. At the site volcanic products are exposed on the coasted cliff with a width of about 1 km and a height of about 30-40 m. Volcanic products that can be observed along Goishihama are described by Isshiki (1984), who reported mainly volcanic product of "Okata volcano" and "Older Edifice of Pre-caldera volcano". However, its description is limited, and description and discussion of fall-out tephra have not been done. In this study, we investigated volcanic products that are exposed on the sea cliff of Goishihama. As a result, some new views on the observable layer were obtained.

Results

The fall-out tephra group composed of 31 eruptive products is named "Goishihama fall-out tephra group". We sampled black humus buried soil from three horizon in "Goishihama fall-out tephra group" and determined the radiocarbon age. Ages are 11076-10713, 12027-11747, 18117-17803 cal BP in descending order. Therefore, it was revealed that "Goishihama fall-out tephra group" is the volcanic products of "Younger Edifice of Pre-caldera volcano" after 20 ka. Isshiki(1984) showed no description of the volcanic products of "Younger Edifice of Pre-caldera volcano" at Goishihama. As a future issue, it is necessary to correlate Goishihama with 95 fall-out of O1 to O95 distributed mainly in southwest part of the island by Tazawa (1980).

In addition, a fine white pumice with a diameter of about 1 mm was found slightly in the "Goishihama fall-out tephra group". After sampling the layer, we washed and observed it with a microscope, colorless and transparent pumice type volcanic glass shards were discovered. The chemical composition of the volcanic glass was measured, that is, $\text{SiO}_2=78.07$ wt.%, $\text{CaO}=0.61$ wt.%, $\text{FeO}=0.75$ wt.%, $\text{Al}_2\text{O}_3=12.74$ wt.%, $\text{K}_2\text{O}=3.29$ wt.%, showing a rhyolitic tephra. Therefore, it is not a tephra from the Izu-Oshima volcano formed by basaltic magma. The source of this rhyolitic tephra seems to be Kozushima Volcano or Niijima Volcano. These results suggest that "Goishihama fall-out tephra group" is the products of "Younger Edifice of Pre-caldera volcano" and that this rhyolitic tephra can be compared with O55 (Niijima Miyatsukayama tephra) (Saito et al., 2007). Thus, in this study, a new radio carbon age was obtained from Goishihama, and a rhyolitic tephra was newly discovered. The future issue is to correlate tephra in the outcrop of this study site with those in other outcrops, and it is needed to confirm the correlating of rhyolitic tephra.

Keywords: Izu-Oshima Volcano, volcanic products, Niijima Miyatukayama tephra, radiocarbon dating