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Volcanic history of Atami district in and around the southern part of Hakone Volcano

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The Atami district is located on the northwestern part of the Izu Peninsula, central Japan. Kuno (1952) pointed out that the age of the volcanic rock in this district was the Neogene to Quaternary. However, based on the volcanic stratigraphy and the radiometric dating, it is clear that the volcanic rocks exposed on the surface in this district are the Quaternary only. These Quaternary volcanic rocks are divided roughly into the Hakone Volcanic Group and Usami - Taga Volcanic Group. In this district, the Hakone Volcanic Group comprises two stratovolcanoes: the Hakone Volcano (0.4Ma to present) and Yugawara Volcano (0.4 - 0.2Ma). The product of the Hakone Volcanic Group is distributed in the northern part of the district. These volcanic products of volcanoes consist of basalt to dacite lavas, and pyroclastics. The rock types of these volcanic products are mainly olivine-clinopyroxene or olivine-clinopyroxene-orthopyroxene basalt to andesite, and clinopyroxene-orthopyroxene andesite to dacite. The Usami - Taga Volcanic group, distributed in the southern part of the district, comprise seven stratovolcanoes that are divided by structure and topography of the volcanic body and radiometric (K-Ar and 40Ar/39Ar) ages: the Shimotaga (1.2 - 0.8 Ma), Usami (0.8 - 0.75Ma), Osaki (0.75 - 0.65 Ma), Atami (0.7 - 0.45 Ma), Uomisaki (0.6 - 0.5 Ma), Hatsushima (0.7 - 0.6 Ma and younger 0.3 Ma) Volcanoes. These volcanic products consist of basalt to andesite with dacite lavas, and pyroclastics. The rock types of these volcanic products are mainly olivine-clinopyroxene or olivine-clinopyroxene-orthopyroxene basalt to andesite, and clinopyroxene-orthopyroxene andesite. The volcanic products are low-K tholeiitic basalt to andesite.

These Quaternary volcanic rocks are not recognized as water chilled structures. Thus, it is determined that this district became land after the late Quaternary (about after 1 Ma). However, water-chilled structures are sometimes recognized in a seashore area (seashore to 100 m a.s.l.) of volcanic rocks (i.e. products of Uomisaki Volcano). This suggests that the northern part of the Izu Peninsula is an uplift tendency.

The Usami-Taga and Hakone Volcanic Group are covered on the small volcanoes, which are the rhyolite monogenetic volcanoes and Sukumoyama Volcano and Chojagahara Marl of the Higashiizu monogenetic volcanoes. The activity periods of the rhyolite monogenetic volcanoes, Sukumoyama Volcano and Chojagahara Marl are 0.45 - 0.15 Ma, 0.15-0.3 Ma, and 0.15-0.3Ma respectively.

Keywords: Atami, Usami-Taga Volcanic Group, Hakone Volcanic Group, Volcanic stratigraphy, Radiometric dating