

## Eruptive history of long-lived active Tokachidake volcano group, southwestern Kurile arc

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Detailed geologic mapping supported by radiometric age determinations is important tool to clarify the eruptive history of long-lived arc active volcanoes. Tokachidake is one of the most active volcanoes in Japan, and is a cluster of Quaternary volcanoes. It overlies Late Pliocene to Early Pleistocene rhyolite ignimbrites. The volcano group extends 25 km mainly in the NE-SW direction, consisting of at least twelve volcanic edifices which are 5 to 10 km in diameter. Using detailed mapping and stratigraphy, airborne laser scanner data, and new 33 K-Ar and 16 radiocarbon ages determinations, and geochemical data, we have mapped the 55 geologic units in the area of 270 km<sup>2</sup> centered on the volcano group.

The Tokachidake volcano group can be divided the volcanic evolution spanning approximately 1.0 Ma into three stages -Older, Middle and Younger- on the basis of their radiometric ages, eruption centers and petrologic features. (1) In the Older stage, the products have limited distribution and consist mainly of andesite lava flows that erupted during 1.0 Ma to 500 ka. (2) The Middle stage activity occurred during 300 to 70 ka, and had increased extensively. Five basaltic stratovolcanoes were built in the margins of the volcano group, whereas six andesite stratovolcanoes and a dacite lavas erupted around its center. (3) The Younger stage began around 60 ka, and the active region is concentrated in the central part of the volcano group. The topographical features of each volcanic unit are preserved. The products are composed of basalt to andesite lava flows and pyroclastic fall, pyroclastic flow and debris avalanche deposits with a dacite lava dome. These products are enriched in K<sub>2</sub>O relative than those of the Middle stage.

The most characteristic of the eruptive history of the Tokachidake volcano group is that the activity expanded approximately 300 ka and gradually contracted to the center. Then mafic magmas were erupted in the whole area of the volcano group, whereas the intermediate to felsic magmas were only around the center. We could evaluate the long-term volcanic activity in the point of view of this geologic mapping.