

Evolution of conduit system in a polygenetic volcano: Geochemistry of the Oki Dozen dikes and their regional characteristics.

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1. Overview

Migration of eruptive conduits is key subject to study in the growth of polygenetic volcano. Characteristics of such a migration can be used to predict a future eruptive location. It is essential for reducing volcanic hazard risks.

Late Miocene Oki Dozen volcano, southern Japan Sea, is one of the ideal fields for studying the passway of magma migration inside a polygenetic volcano.

2. Geology of Oki Dozen volcano

Oki Dozen volcano is a group of three islands composed of lavas of alkali basalt, trachyandesite and trachyte. A large depression (inner bay) at the volcano center is considered as a caldera. The central peak of volcano consists of welded tuff and syenite. These findings suggest the activity of voluminous magma at a certain stage of the volcano history.

Passways of flank migration of magma are recorded as a number of dikes and well-preserved scoria cones inside volcanic edifice. Mafic dikes and parasitic craters tend to be concentrated into the west-northwest and the southern parts of the volcano.

3. Spatial variation on whole rock geochemistry of the dikes

There are two geochemical groups of trachyandesite-trachyte dikes based on difference in MgO content. Each group corresponds to rocks from separate regions of the volcano. The higher MgO group belongs to the dikes of west-northwest part, and the lower MgO group is to the southern part. The welded tuff and the syenite of the central peak also belong to the higher MgO group.

These spatial variations in MgO suggests that the lower MgO group magma in the southern part is isolated either by space or by time from the higher MgO group magma at the central and western part of the volcano.

4. K-Ar dating

K-Ar ages of dikes are necessary to determine the migration of magma through the volcano growth. However, the number of K-Ar ages is not sufficient for dikes, especially those in the southern part. K-Ar dating of dikes is being carried out, to be compared to the geochemical groups.