

Geochemistry of volcanic rocks in Hokusatu district, Kagoshima, Japan

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The volcanic rocks of bimodal chemical composition are widely distributed in the Satsuma peninsula, Kagoshima. The age of these volcanic eruptions is from late Miocene epoch to present. The Satsuma peninsula has been divided into Hisatsu Volcanic Province, Hokusatsu Volcanic Province, Nansatsu Volcanic Province from north to south, from the geochemical and geological aspects, and has been discussed the history of volcanic evolution. In this study, we measured the chemical composition of the volcanic rocks in Hokusatsu volcanic rocks using XRF and ICP-MS, to consider the heterogeneity of volcanism from temporal and special aspects.

In Zr-Nb-Y discrimination of basalt and andesite from Hokusatsu area, this shows that these volcanic rocks are MORB type and island arc type, within-plate type. In spidergram for those rocks, it show an island arc and within-plate type. Considering synthetically, the volcanism in the Hokusatsu district is divided into three types of island arc type, within-plate-island arc type which has the intermediate composition of these two types.

The island type magmas are characterized by high chlorine content and are distributed along NNE-SSW direction about chlorine content. Furthermore, the chlorine content is correlated with Rb/K₂O ratio. The zonation might be corresponding to this transitional change from the front to back arc system in Northeast Japan (Tatsumi, 1995), although the tendency are obscure. The relationship with age of volcanic eruption and this tendency is not clear, but these evidences suggest that the volcanic front has skipped intermittently toward east, which might have occurred during discontinuous movement of subducted slab toward the ocean side.

On the other hand, the distribution of the within-plate type magma with WNW-ESE direction was proposed by Nagao and Hase (2002). The chlorine contents of the within-plate type magma are rather low. The distribution of within-plate-island arc type from late Pliocene to middle Pleistocene is also almost same with those of the within-plate type magma. The within-plate type magma (and within-plate-island arc type) could be related to the activity of transverse fault, because the transverse fault is proposed that the Benioff zone of Japanese island is cut by the numerous transverse faults vertically (Carr et al., 1973) and because it is pointed that the present WNW-ESE transverse fault is in the Hokusatsu district.