

The temporal variations of geochemistry of magmas from north of Kofu Basin, central Japan

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It is considered that fluid or melt, caused by dehydration of subducting slab or partial melting of the slab, is added to mantle wedge and induce a magma genesis at subduction zone. However, the detail of addition of slab-derived materials is still controversial (e.g. Nakamura et al., 2006, Nature Geoscience, Seghedi et al., 2006, Lithos). To make it clear, it is generally recognized that spatial and/or temporal variations of geochemistry of the subduction zone magmas are useful.

The Pacific plate (PAP) and Philippine Sea plate (PSP) is subducting beneath Central Japan. The subduction of PSP started from 15 Ma. After an inactive duration, subduction of PSP restarted from 6 Ma, and the direction of the subduction has been changed for NNW to WNW at 1.5 Ma (Kamata, 1999). In north of Kofu Basin, central Japan, volcanic activity has been occurred from Neogene to Quaternary. We expect that temporal geochemical variations of magmas related to the changes of PSP subduction are observed from lavas of this area. We collected the samples from the lavas and dykes of the Traga-thoge, Mizugamori, Kengamine, Kurofuji volcanoes, and analyzed major element, trace element and Sr-Nd-Pb isotopic compositions.

In the silica-alkali diagram, data are plotted on the boundary of tholeiite and high alumina basalt rock series. The patterns of trace elements show typical characteristics of island arc magma such as enrichment of LILE and depletion of HFSE. They show TiO_2 less than 0.9 wt% and nearly constant Zr/Nb ratio (25 - 35) which is similar to the ratio of MORB. These signatures suggests that the mantle wedge beneath this area is MORB type mantle. The Sr/Y ratios of Neogene volcanics are lower compared with those of Quaternary volcanics. It suggests that the mechanism of slab material addition to the mantle wedge has changed from slab dehydration (Neogene) to slab melting (Quaternary). From the model calculation using Sr-Nd-Pb isotopic compositions, it can be suggested that; 1) the mantle wedge was already metasomatized by PSP derived materials at Neogene, 2) the fluid derived from PAP has induced the Neogene magma generation, and 3) Quaternary magmas can be produced by partial melt of PSP. We think that the leading edge of PSP away from, but close to below the volcanic center at Neogene, and PSP has reached below the volcanic center at Quaternary.