Geochemistry of Yokota Monogenetic Volcanoes, Southwest Japan

Jun-Ichi Kimura[1], Tomoyuki Kunikiyo[1]

[1] Dept. Geosci., Shimane Univ.

The Yokota Monogenetic Volcanoes were active between 2.3 and 1.0Ma, in Southwest Japan. Majore and trace element chemistry of the alkali basalts suggests that the basalts were originated from a heterogeneous mantle source, which additionally experienced common metasomatic fluid addition. The mantle heterogeneity is supported by variable HFSE ratios of the basalts, whereas LILE ratios are always similar suggesting a common metasomatic fluid addition.

The Yokota Monogenetic Volcanoes, Southwest Japan, consist of 13 eruption centers and are scattered over an area of 35 by 35 km near Daisen volcano. The volcanism occurred at about 2.3Ma and continued until 1.0Ma. During the 1.3 million years activity, the eruption centers expanded spatially outwards from the center of the volcanic field. Such the spatial variation is considered to be generated by an incubation of a small mantle diapir head through the time, as pointed out elsewhere. All, but one lava of 130 samples collected from the area are alkali basalts. Incompatible trace element concentrations of the basalts show a distinctive feature by its very high Sr content (about 3000 ppm maximum). Large ion lithophile elements (LILE), such as Rb, Ba, K, and Sr, always show positive correlations, suggesting that these fluid mobile elements would have been added to the source mantle by a single mantle metasomatism event. In contrast, high field strength element (HFSE) ratios, such as Nb/Zr, vary considerably between samples. This may indicate source mantle heterogeneity of the basalt existed before addition of the LILE rich fluid.