

Fractionation of garnet and amphibole of Pre-Komitake prior to Fuji and Komitake volcanoes, Japan

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The Pre-Komitake volcano, discovered by drilling into Mt. Fuji, is an older volcanic body than Fuji and Komitake volcanoes [1] [2]. No detailed research has yet been carried out into Pre-Komitake magma genesis. Therefore, we analyzed the trace element and Sr-Nd isotopic compositions of the Pre-Komitake magmas in order to better understand their genesis.

The Sr-Nd isotope ratios ranged from 0.703320–0.703476, and 0.512885–0.513087, respectively, which are very similar to those of the lavas from Fuji and Komitake volcanoes [3]. The primitive mantle-normalized multi-element diagram of the Pre-Komitake, Komitake, and Fuji lavas show island arc lava signatures, however, the middle to heavy rare earth elements are more depleted in the Pre-Komitake lavas, compared to those from Fuji. Positive Eu anomalies are observed, although the extents of these anomalies decrease with increasing SiO₂ only in the Pre-Komitake lavas. The Sr/Y ratios of Pre-Komitake lavas increase from basalt to basaltic andesite, but decreases through andesite to dacite. This occurs in combination with a rapid increase in La/Yb ratios, followed by a more gradual increase. A gradual decrease in Dy/Yb ratios is also seen over the entire compositional range. These data suggest deep (>12 kbar) fractionation of garnet and amphibole followed by shallow (i.e., ~ 5 kbar) fractionation of amphibole and plagioclase. Such variations are not observed in the Komitake and Fuji lavas, for which deep fractionation of clinopyroxene and shallow fractionation of plagioclase have been suggested. All three lavas, including those from the Pre-Komitake volcano, show similar isotopic, major, and trace element compositions in the unfractionated basalts. The differing geochemical trends found in the Pre-Komitake lavas are likely to be due to different mineral fractionations occurring in the hydrous Pre-Komitake basalts compared to the dry Fuji and Komitake basalts.

[1] Nakada et al., 2004, *Chikyu Monthly Special Volume*, **48**

[2] Yoshimoto et al., 2010, *The Island Arc*, **19**, [3] Nagai et al., 2004, *Proc. Inst. Nat. Sci. Nihon Univ.* **39**