

Geochemical characteristics of Izu rear arc magmatism after the cessation of the Shikoku Basin opening: Results from IODP Exp. 350

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International Ocean Discovery Program Expedition 350 Site U1437 drilled, for the first time, into the rear arc volcanoclastic sediment in the Izu arc. The drilling reached 1806.5 m below seafloor (mbsf) and in-situ lava clasts were recovered in the deepest part of the hole (stratigraphic Unit VII, below ~1460 m) (Tamura et al., 2015).

The U-Pb zircon ages obtained from an intrusive rhyolite sheet of the Unit VI at the depth of ~1390 mbsf showed 13.6 ± 1.6 – 1.7 Ma (Tamura et al., 2015) and 13.71 ± 0.25 Ma, thus Unit VII lava clasts suggest magmas erupted after the cessation of the Shikoku Basin opening (~15 Ma) and before onset of the rear arc seamount chain magmatisms (hot fingers).

We have analyzed the major and trace element compositions, and Sr, Nd, Pb and Hf isotope ratios of selected >2 cm lava clasts collected from Unit VII. These show neither rear arc nor Quaternary volcanic front signatures in terms of trace elements and isotopes. The Nd and Hf isotope compositions are similar to those in the Quaternary volcanic front magmas. However, most samples have Sr and Pb isotope compositions similar with those in the rear arc magmas. The isotopes of Unit VII are also similar to samples collected from the active rifts. Most of samples show low Ba/La and La/Sm, and chondritic Sm/Hf ratios, suggesting that the addition of slab derived fluids/melts is small despite the horizontal trend of Nd-Hf isotopes.

Above results show that Izu rear arc magmatism at Site U1437 differed from that in the rear arc seamount chains after cessation of the Shikoku Basin opening. Contribution of the slab flux was small and the source mantle was highly depleted in terms of isotopes.