

## Geochemical diversity of basalts and mantle heterogeneity beneath the active rifts, Izu- Bonin arc, Japan

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New Sr, Nd, and Hf isotope and trace element data are presented for Quaternary basalts erupted in the Sumisu Rift of the Izu back arc. Two geochemical groups can be identified within the basalts: High-Zr (HZ) basalts and Low-Zr (LZ) basalts. The HZ basalts exhibit higher in K<sub>2</sub>O, Na<sub>2</sub>O, Y, Zr and Ni than the LZ basalts. HZ basalts also have higher Nb/Yb, Ce/Yb and Zr/Yb, and lower Ba/Th than LZ basalts. Estimated primary basalt compositions for the Sumisu Rift basalts suggest that primary magma segregation for the HZ basalts occurred at depths less than 70 km (~ 2 GPa), whereas the LZ basalts more than 70 km (2~3 GPa). The <sup>176</sup>Hf/<sup>177</sup>Hf ratios are slightly lower in the HZ basalts than in the LZ basalts. Correlations between HFSE/HREE (Nb/Yb, Zr/Yb) and isotopic ratios require changes in source composition - not simple variations in percentage of melting of a homogeneous mantle source. The LZ basalts have trace element and isotope ratios similar to the Sumisu Caldera basalts in the volcanic front and the West Philippine Basin basalts (51~34 Ma) [1], whereas the HZ basalts similar to the Shikoku Basin basalts (27~15 Ma) [2]. We propose that a Shikoku Basin basalts-type mantle may be present beneath the Sumisu Rift just above a West Philippine Basin basalts-type mantle in the lower part of the asthenosphere.

[1] Ishizuka *et al.* (2013) *Geology*, **41**, 1011-1014.

[2] Okino *et al.* (1999) *Geophys. Res. Lett.*, **26**, 2287-2290.