Deep crustal magma differentiation of Late Cenozoic volcanic rocks beneath Northern Fossa Magna, central Japan

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Pliocene-Pleistocene volcanic rocks from Northern Fossa Magna, central Japan, consist of basaltic to andesitic rocks and frequently hornblende (Hbl) gabbroic cumulates and Hbl megacrysts. The cumulates and megacrysts have $^{87}Sr/^{86}Sr$, $^{143}Nd/^{144}Nd$, and $^{176}Hf/^{177}Hf$ ratios similar to those of the hosting volcanic rocks ($^{87}Sr/^{86}Sr$ = 0.70336-0.70568, $^{143}Nd/^{144}Nd$ = 0.51275-0.51289, $^{176}Hf/^{177}Hf$ = 0.28303-0.28317). Estimation using Ca-amphibole geobarometer suggests that Hbls have crystallized at depths of lower crust (2-13 kbar). Dy/Yb (MREE/HREE) ratios of the Pliocene-Pleistocene volcanic rocks decrease with increasing La/Yb (LREE/HREE) ratios. We suggest on this basis that the volcanic rocks were produced by fractional crystallization of large amount of Hbls in lower crustal magma chamber. Based on mineral texture, *P-T* estimation and major-trace elements modelling, we infer that cryptic fractionation of Hbl can produced the Pliocene-Pleistocene magma trend. Early Miocene volcanic rocks from the Northern Fossa Magna indicate slightly increasing Dy/Yb (1.6-2.2) with increasing La/Yb (3.0-12.8), and Middle-Late Miocene volcanic rocks indicating constant Dy/Yb (1.5-1.8) with inicreasing La/Yb (2.1-6.1) [1]. Geochemical studies for back-arc side volcanic rocks from Northeast Japan suggest that wedge mantle component beneath eastern margin of Eurasian plate was drastically changed from enriched to depleted composition during Early-Middle Miocene period [2]. The geochemical differences between the Early-Late Miocene and the Pliocene-Pleistocene volcanic rocks may imply changing thickness of the lithosphere and *P-T-*f_{H2O} conditions of magmas.

[1] S. Okamura *et al.*, 2016; *Jour. Geodyn.*, **97**, 42-61.
[2] K. Shuto *et al.*, 2006; *Lithos*, **86**, 1-33.