



## **Pb, Sr, Nd, Hf isotope geochemistry of the North Arch and South Arch lavas: Evidence for multiple sources in the Hawaiian Arch volcanisms**

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We present Pb, Sr, Nd and Hf isotope compositions of alkalic lavas collected from North Arch volcanic field and South Arch volcanic field located on the seafloor at water depths in excess of 4 km on the Hawaiian Arch. North Arch is located downstream-side of the mantle plume and 500 - 600 km north of Kilauea which is the center of plume. South Arch is located upstream-side of the mantle plume and 200 km south of Kilauea. It is important to identify the mantle components involved in Arch type volcanisms because it could constraint on dispersal influence of the Hawaiian mantle plume component that is accompanied with moving lithosphere and contaminate asthenospheric uppermost mantle.

It is proposed that the source of upstream volcanism was DMM mantle metasomatized by incipient volatile-rich melt from the upwelling mantle plume and the source of downstream volcanism was DMM mantle metasomatized by volatile-poor major melt from the mantle plume (Hanyu et al., 2004, Clague and Dixon, 2001). The results of Pb, Hf, Sr and Nd isotope data of South Arch and North Arch lavas reflect that Hawaiian plume source and an asthenospheric depleted mantle source are involved with Arch-type magmatism. Significantly, South Arch and North Arch lavas define individual steep negative trends in epsilon Hf versus  $^{206}\text{Pb}/^{204}\text{Pb}$ .  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios of South Arch lavas range from 18.36 to 18.43, epsilon Hf range from 15.8 to 18.4.  $^{206}\text{Pb}/^{204}\text{Pb}$  ratios of North Arch lavas range from 18.03 to 18.27, epsilon Hf range from 15.3 to 17.0. To evaluate “the three-component mixing model”, Pb and Hf iso-

topic data of the South Arch and North Arch basalts were plotted on the hyperboraes for the mixing of three components, KEA, KOO, and DMM. South Arch and North Arch data were fitted by identical mixing curves defined by mixing of DMM and plume melt. We suggest that the identical trends of Pb isotope and Hf isotope compositions in South Arch and North Arch lavas indicate involvement of DMM that is metasomatised by melt produced in different partial melting process from mantle plume. These isotopic data are consistent with the model proposed by Hanyu (2004) based on Noble gas isotopic ratios, that is, the major melt from plume is involved in North Arch volcanism and the incipient melt from plume is involved in South Arch volcanism.