

## Volatile concentrations and hydrogen isotope ratios of submarine glasses from Loihi and Kilauea, off the coast of the Hawaii Island

\*Kenji Shimizu<sup>1</sup>, Takayuki Ushikubo<sup>1</sup>, Ichiro Kaneoka<sup>2</sup>

1. Kochi Core Center, Japan Agency for Marine-Earth Science and Technology, 2. Earthquake Research Institute, University of Tokyo

Volatile ( $\text{H}_2\text{O}$ ,  $\text{CO}_2$ , F, Cl and S) concentrations and hydrogen isotope ratios were analyzed for fresh quenched glasses of Hawaiian submarine volcanoes from Loihi (eight samples) and the East Kilauea Rift (three samples) using Cameca IMS-1280HR at the Kochi Institute for Core Sample Research, JAMSTEC.  $\text{H}_2\text{O}$ ,  $\text{CO}_2$ , F, Cl and S concentrations of these glasses are 0.4-2.5 wt%, 47-342 ppm, 392-874 ppm, 140-1447 ppm, and 899-2490 ppm, respectively. Three glass samples from Loihi with high  $\text{H}_2\text{O}$  content of >2 wt% are high in Cl/F (>2.5), indicating that they are affected by seawater or brine assimilation. Hydrogen isotope ratios ( $\delta \text{D}_{\text{SMOW}}$ ) of the glasses range from -84 to -118 ‰, except for brine assimilated glasses ( $\delta \text{D}$  of -64 to -62). Low  $\delta \text{D}$  values of all the Hawaiian volcanic glasses are distinct from those of mid ocean ridge basalts, MORBs ( $-60 \pm 5$  ‰; Clog et al., 2013). The glasses with the lowest  $\delta \text{D}$  (-118 and -111 ‰) are from Loihi whose S contents are high (2367 and 2490 ppm, respectively). Whereas, glasses from Kilauea are higher in  $\delta \text{D}$  (-84 and -98 ‰) and lower in S content (900 and 1600 ppm). Since  $3\text{He}/4\text{He}$  ratios of MORBs, basalts from Kilauea and Loihi are  $\sim 8 \text{ Ra}$ ,  $13\text{-}15 \text{ Ra}$  and  $20\text{-}35 \text{ Ra}$ , respectively (Kaneoka et al., 2002), hydrogen isotope ratios may negatively correlate with  $3\text{He}/4\text{He}$ . The present result implies that the hydrogen isotope of the high  $3\text{He}$  Hawaiian mantle is low ( $\delta \text{D} < -120$  ‰), but it may not be as low as  $< -220$  ‰, which is recently suggested by olivine melt inclusions from the Baffin Island picrites (Hallis et al., 2015).

Keywords: Hawaiian volcano, hydrogen isotope ratio, Volatile concentration