

## Geochemical constraints on enriched mantle source of the North Fiji Basin

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North Fiji Basin (NFB) is a well-known mature back-arc basin as having chemical characteristics of Mid-Ocean Ridge Basalt (MORB) with source heterogeneity in composition varying from depleted MORB to enriched MORB or Oceanic Island Basalt (OIB). Samoan plume has been provided as a source for the enriched mantle beneath the northern NFB as well as Lau Basin. Plausible explanations, however, are still required to define precise origin of the OIB-like lavas found in the northern NFB including Fiji Triple Junction (FTJ). Here we present the suite of geochemical data including H<sub>2</sub>O and Sr-Nd-Pb-He isotopes of the basaltic glasses sampled systematically along the Central Spreading Ridge of the NFB (16°S -21°S) and constrain the cause of the geochemical heterogeneity observed in the NFB. Regional variation in the mantle source component is described by two groups of samples, which are verified in the Sr-Nd-Pb-He isotope spaces. Basalts showing plume-influenced features (H<sub>2</sub>O > 0.4 wt.%, (La/Sm)<sub>N</sub> > 1.8) cluster at the field of high <sup>87</sup>Sr/<sup>86</sup>Sr, low <sup>143</sup>Nd/<sup>144</sup>Nd, high Pb isotope ratios, and slightly elevated <sup>3</sup>He/<sup>4</sup>He and their occurrence is restricted to the northern segments, i.e. N160 and FTJ. While relatively dry and depleted MORB lavas found in the whole spreading segments. These geochemical behaviors can be explained by two components mixing between the depleted ambient upper mantle and the injected plume-influenced component from the north. Considering the isotopic mixing models and low CaO/Al<sub>2</sub>O<sub>3</sub> ratio and negative anomalies in Pb, Sr, U and K of the plume-influenced group, the most plausible enriched endmember is ~99% helium degassed plume material metasomatized by EM1 (enriched mantle 1) component rather than other mantle endmembers comprising the Samoan shield lavas, similar to the case of rejuvenated lava in Samoa.