

## **Helium, carbon, trace metals and radiogenic isotopes in the northern Lau and north Fiji basins**

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The northern Lau Basin is host to a complicated pattern of volcanic activity, including the volcanoes of the Tofua Arc and several back-arc spreading centers such as the NE Lau Spreading Center (NELSC), the NW Lau Spreading Center (NWLSC), as well as various “rear-arc” volcanoes. We have employed helium isotopes, C/<sup>3</sup>He ratios, and trace element signatures to distinguish between various arc, back-arc, and hotspot affinities in the region. Along the NWLSC elevated <sup>3</sup>He/<sup>4</sup>He ratios in the seafloor lavas (12 - 28 Ra) suggest that an OIB or mantle plume signature, possibly from Samoa, has influenced this extensional zone. However this hotspot helium is absent in the NE Lau Basin, which has mid-ocean ridge (MOR) type helium (~8 Ra). In the NE Lau Basin, <sup>3</sup>He/<sup>4</sup>He – C/<sup>3</sup>He systematics and Ba-Nb-Ti signatures indicate varying degrees of subduction influence among the volcanic centers. For example, the recently erupting West Mata submarine volcano in the NE Lau has a C-He signature indicating strong arc affinities. Farther west in the North Fiji Basin (NFB), some of the seafloor volcanic rocks have elevated <sup>3</sup>He/<sup>4</sup>He of 12 – 20 Ra suggesting the presence of an OIB component. Additional measurements of helium and radiogenic isotopes should help to determine whether the NFB has been influenced by intrusion of the Samoan hotspot or by a different OIB component.