Implications from U and Th concentrations for drivers of oceanic crustal construction along the Kane-Atlantis supersegment, 24-30°N MAR

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Faulting style along slow-spreading ridge segments exerts a major control over oceanic crustal construction and ridge morphology. Seafloor spreading along slow-spreading ridges is classified into asymmetrical detachment faulting and symmetrical spreading styles. Magma supply variations may influence the formation of symmetric versus asymmetric segments, but the factors that drive such variations remain unclear. We present U and Th concentration data by isotope dilution for basalts from 24 to 30°N MAR, of which 15 samples were retrieved from detachment faulted and 5 from symmetrical segments.

Basalts from symmetrical ridge segments exhibit more limited concentrations ranges ([U] = 0.04-0.12 ppm, [Th] = 0.08-0.3 ppm) than those from asymmetrical segments ([U] = 0.01-0.14 ppm, [Th] = 0.08-0.41 ppm). Samples from symmetrical segments also have higher mean U and Th concentrations ([U] = 0.084 ppm, [Th] = 0.189 ppm) than those from asymmetrical segments ([U] = 0.072 ppm, [Th] = 0.183 ppm). Mean Th/U ratios from asymmetrical segments are also higher (2.715) than symmetrical segments (2.222). Similar, statistically significant variations are exhibited by prior published trace element data for the same ridge [1]. Together, these variations suggest that asymmetrical segments are underlain by a more trace element enriched source, contrary to expectations from the southern MAR, where basalts from symmetrical segments exhibit more enriched trace element and isotopic signatures than detachment-faulted segments [2]. This result suggests that source enrichment signatures can be decoupled from mantle drivers of magma supply, e.g. melting mafic lithologies, and may instead be controlled by near-surface magma transport delivery mechanisms.

[1] Gale et al., 2013, *Geochem. Geophys. Geosyst.* **14**, 489-518. [2] Wilson et al., 2013, *Geochem. Geophys. Geosyst.,* **14**, 979-995

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