Heterogeneity in magmatic processes and mantle composition: Seamounts at the edge of the Galápagos hotspot

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Compositions of Galápagos island lavas have classically been used to infer variations in magmatic processes and mantle composition at depth [1]. However, sampling restricted to volcanic islands results in limited spatial resolution and their multigenetic construction overprints temporal variations. Seamounts surrounding the islands, on the other hand, preserve a more spatially distributed record of punctuated, point-source magmatism that provide a different perspective on deeper magmatic processes. Here, we present whole rock major (XRF) and trace element concentrations (ICPMS), and radiogenic isotope ratios (TIMS) for samples collected by submersibles from seamounts on the edge of the Galápagos Archipelago, south of Fernandina and west of Floreana. Variations in lava chemistry occur between closely spaced seamounts (e.g., $[La/Sm]_N$ = 1.4-4.9 in Floreana and 1.6-2.2 in Fernandina), departing from the limited range observed subaerially. These higher degrees of variation contrast what is observed at seamounts in the central archipelago. Moreover, low $[La/Ba]_N$ that characterize subaerial Floreana (≥0.5) are present in some seamount lavas, however, values reach up to 2.4, similar to the most primitive mantle observed in the region. Additionally, Fernandina seamounts have variable $[Sm/Yb]_N$ (2.5-3.5), compared to more homogeneous subaerial lavas, indicating variable extents of melting. Our data suggest heterogeneities vary on short [length/time] scales at the edges of the Galápagos hotspot and are observable in seamounts surrounding the islands on the edges of the archipelago, but not the islands themselves.

[1] White et al. (1993), *J. Geophys. Res. Solid Earth* **98**, 1953-1963.