Trace-element signatures of Réunion hotspot-ridge interactions

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Rodrigues Island, the eastern-most island in the Réunion hotspot chain, lies at the western end of an active volcanic lineament extending more than 200 km from the Central Indian Ridge (CIR) axis. Where these ridges intersect, MORB glasses host enriched trace-element signatures and elevated $^{3}He/^{4}He$ ratios [1]. These characteristics provide evidence for interaction between Réunion hotspot and N-MORB signatures found elsewhere on the CIR. To further constraint hotspot-ridge interactions, we present new major- and trace-element abundance data for basaltic lavas from Rodrigues (4.5-9.4 wt.% MgO), as well as for basalt and ultramafic lavas from the westerly islands of Mauritius and Réunion (7.5-35 wt.% MgO). In addition, we present new geochemical data for cumulate dunite and harzburgite (33-46 wt.% MgO) xenoliths with high-$^{3}He/^{4}He$ from Réunion. Rodrigues lavas have more variable primitive-mantle normalized La/Yb and Nb/Zr ratios (2.6-10.1 and 1.5-5.4, respectively; $n = 12$) than Réunion lavas (5.0-9.2 and 1.7-2.4, respectively, $n = 12$). These differences reflect interaction between a more enriched 'Réunion' hotspot component and a depleted N-MORB component for Rodrigues. Réunion cumulate xenoliths have lower absolute trace element concentrations than associated lavas and lower La/Yb (1.2-4.0) and positive Ti anomalies due to spinel and olivine accumulation. These data allow quantitative removal of the effect of mineral accumulation from olivine-phyric Réunion OIB and thus constrain the trace element composition of Réunion parental magmas. Comparison with Rodrigues lava compositions provides compelling evidence for interaction of the hotspot with the CIR as far west as Rodrigues.

[1] Füri *et al* (2011) *JGR* doi:10.1029/2010JB007609.