

Petrogenesis of enriched MORB from the Macquarie Ridge Complex

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The Macquarie Ridge Complex is an ideal site for examining magmatism at slow-spreading mid-ocean ridges due to the Miocene evolution from seafloor spreading to oblique convergence along the coincident Australia–Pacific plate boundary. We present whole-rock major and trace and glass volatile element data for volcanic samples collected from a 1200 km section of the extinct spreading ridge in order to investigate the dynamics of magma generation, ascent, and eruption in such settings. The sample suite can be divided into E-MORB lavas with moderate ($La/Sm_N = 1.0\text{--}1.8$) or high ($La/Sm_N > 2.0$) incompatible element enrichment. The latter type is consistent with being sourced from low-degree partial melts of enriched mantle domains. Furthermore, as indicated by their evolved geochemical compositions and CO_2 - H_2O systematics, the source magmas underwent fractionation and degassing during stalled ascents, possibly due to ultraslow seafloor spreading rates.

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