

Petrogenesis of enriched MORB from the Macquarie Ridge Complex

*Chris Conway¹, Richard Wysoczanski², Alexander Nichols⁴, Joel Baker³, Helen Bostock²

1. National Museum of Nature and Science, 2. National Institute of Water and Atmospheric Research, 3. University of Auckland, 4. University of Canterbury

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 ($\text{La}/\text{Sm}_\text{N} = 1.0\text{--}1.8$) or high ($\text{La}/\text{Sm}_\text{N} > 2.0$) 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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