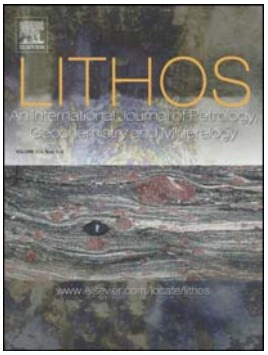

Reconciling the Shadow of a Subduction Signature with Rift Geochemistry and Tectonic Environment in Eastern Marie Byrd Land, Antarctica

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Reconciling the Shadow of a Subduction Signature with Rift Geochemistry and Tectonic Environment in Eastern Marie Byrd Land, Antarctica.

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Abstract

Basalt-trachyte volcanoes in the Marie Byrd Land (MBL) Cenozoic province lie along the Amundsen Sea coast on the north flank of the West Antarctic rift. Basalts here are characterized by OIB-like geochemistry, restricted ranges of $^{87}Sr/^{86}Sr$ (0.702535 – 0.703284) and $^{143}Nd/^{144}Nd$ (0.512839–0.513008) and a wide range of $^{206}Pb/^{204}Pb$ (19.357–20.934).

Basalts at three MBL volcanoes display two anomalies compared with the above and with all other basalts in West Antarctica. They include $^{143}Nd/^{144}Nd$ (0.512778 – 0.512789) values at Mt. Takahe and Mt. Siple that are 2σ lower than other West Antarctic basalts, and Ba/Nb, Ba/La, and Ba/Th values at Mt. Murphy and Mt. Takahe that are 3-8 times higher than normal OIB. Isotope and trace element data do not support crustal and lithospheric mantle contamination, or the presence of residual mantle amphibole or phlogopite as explanations of these anomalies.

The apparent coincidence of these anomalies with the site of a pre-Cenozoic convergence zone along the Gondwanaland margin suggests a subduction influence. Major episodes of subduction and granitic plutonism took place in MBL during the Devonian, Permian, and Late Cretaceous.