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***Age, Geochemistry, and Sr-Nd-Pb Isotopic Compositions of Volcanic Rocks from Mt. Melbourne and the Western Ross Sea, Antarctica***

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New K/Ar ages and geochemical and isotope data (Sr, Nd, Pb) of submarine samples from the Terror Rift Region and subaerial lavas from Mt. Melbourne Volcanic Field (MMVF) in the western Ross Sea, are presented. The MMVF samples are classified into Groups A and B based on their temporal and spatial distribution. All samples are alkaline, ranging from basanite to trachybasalt, and exhibit the Ocean Island Basalt (OIB)-like patterns of trace element distribution, with a prominent depletion in K and Pb. They exhibit anHIMU-like isotopic signature ($^{206}Pb/^{204}Pb$ = 18.510-19.683, $^{87}Sr/^{86}Sr$ =0.70300-0.70398, $^{143}Nd/^{144}Nd$ = 0.51284-51297) and trace element affinities (Ce/Pb = 25-35, Nb/U = 45-60, Ba/Nb = 5-13, La/Nb = 0.5-0.9). New K/Ar ages and geochemical data, combined with published data,show no correlations between age and composition of Cenozoic basalts in NVL. The Terror Rift submarine lavas (0.46-0.57 Ma) display a distinct trend, with more primitive geochemical characteristics (higher MgO (7.2-9.8 wt.%) and CaO (9.9-11.9 wt%) and stronger HIMU signature (higher $^{206}Pb/^{204}Pb$ and less radiogenic $^{87}Sr/^{86}Sr$ and $^{143}Nd/^{144}Nd$ ratios) than those of MMVF basalts. Results from a rare earth element (REE) model suggest that the Terror Rift submarine lavas are derived from small degrees (1-2%) of partial melting of an amphibole-bearing garnet peridotite mantle source. Despite the distinctly different ages and locations of the MMVF Group A (0.16-0.33 Ma) and B (1.25-1.34 Ma) basalts, they show similar geochemical and isotopic features, indicating the sharing ofcommon mantle sources and magma processes during magma generation. Incompatible trace element ratios (e.g., Ba/Nb = 6.4-13.2, La/YbN = 14.4-23.2, Dy/Yb = 2.2-3.0) and isotopic compositions of the MMVF Group A and B volcanics suggest derivation from higher degrees (2-5%) of partial melting of a garnet peridotite source and strong influence of an EMI-type mantle source. The stronger HIMU signature of the Terror Rift submarine lavas appears to be related to smaller degrees of partial melting, suggesting preferential sampling of the HIMU component in the less partially melted rocks from the Cenozoic NVL magmatism. In contrast, the higher degree of MMVF A and B magmas can be explained by greater interaction with heterogeneous lithospheric mantle, resulting in a diluted HIMU signature compared with that of the Terror Rift submarine lavas.