Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17339

Geochemistry of Rittmann volcano, Northern Victoria Land, Antarctica: Implications on mantle sources and magma evolution

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We present new major and trace element and Sr, Nd and Pb isotope data for quaternary alkaline volcanic rocks from the Ritmann volcano, Northern Victoria Land (NVL), Antarctica. The volcanic rocks found in outcrops are mainly trachytic lava flows and hawaiitic scorias. Less commonly, mugearite, benmorite and phonolite are found. The mineralogical and petrochemical features of these alkaline magmatic products have investigated in order to assess mantle sources and the genetic relationships between the mafic and trachytic rocks and further to get insights for the architecture of the magmatic plumbing systems feeding the Rittmann volcano. The mafic products show mostly mild alkaline hawaiitic composition with ~47 wt % SiO_2, ~5 wt % MgO and Na_2O+K_2O ~ 6 wt %. Major elements of trachytes in Rittmann volcano cluster at ~61 wt % SiO_2 and Na_2O+K_2O ~ 12 wt %, and form a prominent Daly Gap when plotted with the mafic products. Two trachyte types are distinguished by based on their textures: porphyritic or apyric trachytic types. Porphyritic trachytes often include antecrysts of forsteritic olivine (Fo#~80) and clinopyroxene showing disequilibrium textures (reaction rims and resorbed margins). Incompatible trace elements are enriched in all trachytes, except for Ba, Sr, Eu and Ti which show prominent negative anomalies. Apyric trachytes show more enriched characteristics compared to porphyritic tracytes, but isotopically very similar compositional ranges. Radiogenic isotope compositional ranges of hawaiites ($^{206}Pb/^{204}Pb$ = 19.94–19.98, $^{87}Sr/^{86}Sr$ = 0.703369–0.703757, $^{143}Nd/^{144}Nd$ = 0.512861–0.512885) and trachytes ($^{206}Pb/^{204}Pb$ = 19.39–19.99, $^{87}Sr/^{86}Sr$ = 0.703358–0.707625, $^{143}Nd/^{144}Nd$ = 0.512806–0.512858) are very similar, suggesting a common mantle source with HIMU-like characteristics and little contribution of assimilation of shallow crust to the generation of the trachytic magma.