Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.13210

Geochemical and Sr-Nd-Pb isotopic study of volcanic rocks from Rittmann volcano, Antarctica: insights into the petrogenesis of mantle-derived trachytes

JONG IK LEE[1], MI JUNG LEE[1] AND PHILIP KYLE[2]

[1]Korea Polar Research Institute

[2]New Mexico Institute of Mining and Technology

Presenting Author: jilee@kopri.re.kr

Trachytes occur mainly as important components of the volcanic complexes in three active volcanoes in Melbourne Volcanic Province of Northern Victoria Land, Antarctica. These rocks are typically interpreted in terms of combined processes of extreme fractional crystallization from basaltic magmas and assimilation of the crust during their ascent. These are supported in many cases by a continuous spectrum of compositions between the two end-members. However, some others display a distinct compositional gap, and are explained by other magmatic processes including fractional crystallization, liquid immiscibility and two different independent direct partial melts. Here, we present geochemical and Sr-Nd-Pb isotopic data for volcanic rocks of the Rittmann volcano to investigate the genetic relationships between basaltic and trachytic rocks within the volcanic succession. 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 basalts. Incompatible trace elements are enriched in all trachytes, except for Ba, Sr and Eu, which show prominent negative anomalies. Radiogenic isotope compositional ranges of alkali basalts ($^{206}Pb/^{204}Pb$ = 19.94–19.98, $^{87}Sr/^{86}Sr$ = 0.703369–0.703757, $^{143}Nd/^{144}Nd$ = 0.512878–0.512885) and trachytes ($^{206}Pb/^{204}Pb$ = 19.39–19.99, $^{87}Sr/^{86}Sr$ = 0.702949–0.7030763, $^{143}Nd/^{144}Nd$ = 0.512806–0.512952) 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.