GEOCHEMICAL SIGNATURES OF ALKALINE MAGMATISM OF E. ANTARCTICA RELATED TO KERGUELEN-PLUME ACTIVITY

N.M.SUSHCHEVSKAYA[1]*, B.V.BELYATSKY[2], M.A.MIGDISOVA[1], A.V.SOBOLEV[1], V.G.BATANOVA[1]

[1]Vernadsky Institute of Geochemistry, RAS, Moscow, Russia (*correspondence: nadyas@geokhi.ru)

[2]Karpinsky Geological Institute (VSEGEI), CIR, St.Petersburg, Russia (bbelyatsky@mail.ru)

The Eastern Gondwana has undergone for at least 50 million years by plume magmatism impact during Mesozoic time. The last stage of this process is connected with the Kerguelen-plume formation, plume head intrusion underneath the lithosphere about 130 m.y. ago and basaltic eruptions in eastern India and south-western Australia, on the Naturaliste Plateau and within the Bruce Bank of the Indian Ocean.

The Kerguelen-related alkaline-ultramafic rocks confined to the apical parts of the plume within Antarctica (Lambert glacier) and enriched with the most radiogenic component ($^{206}Pb/^{204}Pb \sim 18.7$, $^{207}Pb/^{204}Pb \sim 15.65$, $^{208}Pb/^{204}Pb \sim 39.2$, $^{143}Nd/^{144}Nd \sim 0.5125$, $^{87}Sr/^{86}Sr \sim 0.706$, $^{187}Os/^{188}Os \sim 0.24$) were intruded 120-130 Ma. Isotopic compositions of trapped Ga- and Sp-peridotite xenoliths reflect several evolution stages of the mantle beneath Phanerozoic Lambert-Amery Rift associated with rift-propagation. According to the mantle nodule Re-Os isotope systematics the beginning of lithospheric mantle formation in this region of the East Antarctic craton was no later than 2400 Ma. The melting temperature for the Lambert glacier lavas is estimated at about 1270°C according to Al-distribution between host olivine and spinel inclusions, while for the ultrapotassic Gaussberg-volcano magmas at about 1100°C. The source of alkaline-ultramafic magmas is supposed to be the subcontinental Gondwanian ancient mantle similar in composition to these xenoliths, which is stretched down to 150 km and has undergone partial melting under the plume influence at about 120-130 m.y. ago. Such mantle is detected for India Rajmahal province alkaline basalts and young lavas from the Heard island (Kerguelen Plateau) reflecting the spatial distribution of the mantle in the Eastern Gondwana. The melting of this mantle under the influence of the Kerguelen-plume and interaction between them led to the formation of specifically enriched alkaline magmas.

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