GEOCHEMICAL EVOLUTION OF THE JURASSIC PLUME MAGMATISM IN EAST ANTARCTICA

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Jurassic magmatism formed under the influence of a huge Karoo plume at ~ 184-178 Ma covered large areas of the Queen Maud Land (QML) in East Antarctica. It is distributed over an area of about 145 000 km^2 and includes mafic dikes, plutons and lava flows, as well as rare alkaline and acid dikes. A peculiarity of this plume-related magmatic province is the presence of high-Fe, high-Mg and higher-temperature pyroxenite magmas associated with the earliest stage of magmatism. They were formed in the deep setting of the rising plume due to the transformation of ancient eclogites, and were brought to the surface via translithospheric fractures without interaction with the lithospheric substance.

A rather flat spectrum of normalized lithophile elements is characteristic for the pyroxenite magmas. The primary isotope characteristics of magnesian dolerites are distinguished by lower Pb ratios: $^{206}Pb/^{204}Pb$: 17.33-17.37, $^{207}Pb/^{204}Pb$: 15.37-15.52, $^{208}Pb/^{204}Pb$: 37.40-37.79 and moderately elevated values Nd ($^{143}Nd/^{144}Nd$: 0.51249-0.51259) and Sr isotope ratios ($^{87}Sr/^{86}Sr$: 0.7049-0.7063), which can be taken as a first approximation for the isotope composition of the enriched mantle source of these magmas. These isotopic signatures are similar to those of the LoMu component and may reflect the composition of the pyroxenite source represented by the ancient oceanic lithosphere subducted along the ancient subduction zone. Such magmas are developed within the QML and on the adjacent margin of Africa. In the course of plume evolution, the share of pyroxenites in the source decreased and the melts acquired isotopic characteristics of the lithospheric mantle with the EMII enriched component − like the rocks from the trap provinces framing the North, Central and South Atlantic. These relatively low-Ti basalts, developed mainly along the periphery of the Karoo Province, are associated with the melting of the metasomatized lithospheric mantle and constitute the bulk of the plume-related magmatic complex.