Sr-Nd-Pb-Hf isotope signatures of alkaline-carbonatite magmatism of Urals fold belt, Russia

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The Ilmeno-Vishnevogorsky carbonatite-miaskite complex (IVC) of the Urals fold belt is characterized by the next initial isotopic signatures: $^{87}Sr/^{86}Sri$: 0.70336-0.70380, ε_{Nd} from + 2.9 to + 5.8, ε_{Hf} from + 4.7 to + 11.4, $^{206}Pb/^{204}Pb$*: 18.54-20.6, $^{207}Pb/^{204}Pb$*: 15.53-15.66. However, the Buldym carbonate -ultramafic complex, the nearest to the mentioned above, has very distinct isotopic characteristics - $^{87}Sr/^{86}Sri$: 0.70421-0.70470, ε_{Nd} ~ + 0.7 to -2.8, $^{206}Pb/^{204}Pb$*: 18.04-19.91, $^{207}Pb/^{204}Pb$*: 15.65-15.93 and ε_{Hf} 0 to -2 for. Nevertheless all of these data are well compared to those typical for the alkaline-carbonatite magmatism existing in various tectonic structures of the Earth.

The initial Sr-Nd isotopic signatures of the IVC rocks can be approximated by a straight line connecting depleted (DM) and enriched (EMI-like) mantle components, which is quite similar with the well-known Kola carbonatite line marked distribution of the Baltic shield carbonatite complexes within Sr-Nd diagram and reflected mixing of two mantle reservoirs FOZO and EM1 in the processes of magma generation. Carbonatite complexes from the Maimecha-Kotuiskaya and E. Aldan provinces of the Siberian Platform edge also have a similar isotopic compositions. While the Sr-Nd isotopic signatures of the Buldym complex correspond to the enriched mantle EM1-like composition. The Urals carbonatite complexes differ by Sr-Nd isotopic composition from the collision carbonatite complexes (Himalayas, Tien Shan, Altai, Mongolia) the melt sources of which were formed by mixed mantle-crustal substances with EM2-like characteristics.

On the $^{206}Pb/^{204}Pb$ *vs* ε_{Nd} diagram IVC compositions are plotted on a three-component mixing line with DM, EM1 and HIMU-components, but the Buldym complex – on the mixing HIMU-EM1 line which are similar to distribution of Scandinavian platform carbonatites and East African Rift carbonatite line, correspondingly, and very differ from isotopic compositions of collision carbonatite complexes.

Thus, the isotopic signatures of Urals alkaline-carbonatite complexes reflect isotopic evolution of mantle sources formed during two- or three-component mixing and close to those of carbonatite complexes, localized on the shields and the platform edge, and differ from the carbonatite complexes of consolidated fold regions.