

Long lifetime of the plume and polyphase evolution is a new paradigm for paleoproterozoic PGE intrusions of the Fennoscandian Shield

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In frame in N-E part of Fennoscandian Shield there are two belt: North (Kola) and South (Finland and Karelia) with basite-ultrabasite layered Cu-Ni-Cr and Pt-Pd bearing intrusions. Precise isotope-geochronological data using U-Pb (on single zircon and baddeleyite) and Sm-Nd (rock-forming and sulfides minerals) gave polyphases magmatic activity (with 2.53, 2.50, 2.45, 2.40 Ga) and long lifetime of mantle plume activity from 2.53 to 2.40 Ga. The barren phases were dated in Fedorovo-Pansky massif with 2.53 Ga for orthopyroxenites and olivine gabbro based on U-Pb (on zircon) and Sm-Nd (rock-forming minerals) data in Kola belt. Main PGE-bearing phase of gabbro-norites (Mt. General'skaya) norites (Monchepluton) and gabbro-norites (Fedorovo-Pansky and Monchetundra) layered intrusions have yielded 2.50 Ga on U-Pb and Sm-Nd dating. The second PGE-bearing phase with 2.45 Ga belongs to anorthosites of Mt. General'skaya, Fedorovo-Pansky and Monchetundra massifs. The same ages reflect layered PGE-bearing intrusions of Finland – Penikat, Koitelainen, Koilismaa et. set., and basite intrusions in Karelia (Bayanova *et al.*, 2009). Dykes of the final basite magmatic pulse with 2.40 Ga have been dated in Imandra lipolith. Isotope geochemical ϵ_{Nd} - I_{Sr} values for layered intrusions in the Baltic Shield reflect enriched mantle reservoir EM-1 according to (Hoffman, 1997) type reservoir with I_{Sr} values from 0.703-0.704. Isotope $^3He/^4He$ data for accessory minerals (ilmenite, magnetite et. set.) have significant lower and upper mantle indicators of plume component. The model Sm-Nd ages of protolith of the intrusions lies in 3.2-2.9 Ga and primary magma source as fertile according to (Arndt, 2010). Based on the isotope-geochemistry and geochronology data for layered paleoproterozoic PGE-intrusions considered Fennoscandian Shield with Superior and Wyoming as a big magmatic LIP, which related with breakup of oldest Kenorland Supercontinent. We thank to G. Wasserburg for 205 Pb artificial spike.

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