Long duration (130 Ma), mantle reservoirs (EM-1, OIB, E-MORB and N-MORB) and multistages history for PGE-bearing Paleoproterozoic layered intrusions in the N-E part of Fennoscandian Shield.

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Layered Paleoproterozoic PGE intrusions located in the N-E part of the Fennoscandian Shield and have a total are about 2000 km2. Long multidisciplinary studies using isotope Nd-Sr, U-Pb and 3He/4He systematic permit create a big bank of geochemistry data for different part of the intrusions: barren and main Cu-Ni-Cr-Ti-V and PGE phases, dykes complexes and host rocks. The primary reservoir for all precious and multimetal massifs are considered as enriched mantle EM-1 using εNd- ISr system with negative εNd values and low ISr data for whole rocks of the intrusions. Dyke complexes are presented as three groups: high Ti-ferrodolerites, low Ti and low Fe-gabbronorites.Complex isotope (U-Pb, Sm-Nd) and geochemistry (REE, εNd, ISr) data investigations reflect OIB, E-MORB and N-MORB reservoirs for its origin (Nerovich et al., 2014).

Isotope 3He/4He and 3He concentrations for accessory minerals (ilmenite, magnetite et. set) from the layered paleoproterozoic intrusions reflect significant lower mantle component and upper mantle contribution. According to the model of binary mixing there were calculated mantle and core component into plume magmatic reservoir connected with the origin of the PGE paleoproterozoic intrusions and mantle contributions lie in the interval from 85 to 93% (Jahn et all, 2000).

Based on U-Pb isotope data (on single baddeleyite and zircon) and Sm-Nd mineral isochrones (on rock-forming and sulphides minerals) there are distinguished long magmatic duration from 2.53 to 2.40 Ga. Using precise U-Pb and Sm-Nd data for different part of the intrusions there are established four main impulses: 2.53, 2.50, 2.45, and 2.40 Ga of magmatic (LIP) activities for gabbronorite, anothosite et.set. rocks. The very similar Sm-Nd data have been measured on the rocks of layered intrusions in Finland part of the Fennoscandian shield (Huhma et al., 2012).

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