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Comparison between Sm-Nd rock-forming mineral and U-Pb zircon and baddeleyite data of the Fedorovo-Pansky Pt-bearing layered intrusion

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Two belts of PGM-bearing layered mafic-ultramafic intrusions are known within the Fennoscandia. The Northern group includes Mt. Generalskaya, Fedorovo-Pansky Massif, Monchepluton, Monchetundra and Imandra lopolith. The Southern group composes the Tsipringa, Lukkulaisvaara, Kivakka, and Burakovka intrusions, as well as several layered inrusions of Finland (Koilismaa, Kemi, Nyaryankavaara, Koitilainen, Penikat, Akanvaara and others).

The rocks of pyroxenite-gabbronorite-anorthosite formation of these intrusions have similar isotope-geochemical characteristics: U-Pb age (zircon and baddeleyite) within 2526-2396 Ma, LIL-rich mantle source according to REE data, I_{Sr} 0.703-0.704; and ε_{Nd}(T) from -0.2 to -2.6, model Sm-Nd ages T_{DM} from 2.8 to 2.9 Ga. These features indicate that the Proterozoic layered intrusions of the north-eastern part of the Baltic Shield have a common source and were formed by a mantle plume [Mitrofanov et al., 2004].

The Fedorovo-Pansky layered massif is one of the most promising objects for low-sulfide PGM ores in Russia. The intrusion (3-4 km thickness) is located in the central Kola Peninsula and extends northwestward over 70 km. The rocks dip southwestward at 30-35^o. The massif consists of four main blocks: Fedorova Tundra (FTB), Lastyavr, Western Pana (WPB) and Eastern Pana.

The aims of the studies are to present new Sm-Nd data for the rock-forming minerals and WR from the Western Pana and Fedorova Tundra blocks of the intrusion.

The new Sm-Nd isochron age for rock-forming minerals and WR from the norite of FTB equals 2482$\pm$36 Ma (U-Pb zircon age is 2485$\pm$9 Ma); for gabbro of FTB –

2516±35 Ma (U-Pb zircon age is similar – 2516±7 Ma); for orthopyroxenites of FTB Sm-Nd mineral age yielded 2521±42 Ma (U-Pb zircon age is 2526±6 Ma according to [Nitkina et al., 2006]). Additional rock-forming minerals from gabbronorites and norites WPB were measured by Sm-Nd method. The new Sm-Nd mineral and WR isotopic data for gabbronorites of WPB gave 2494±36 Ma age and for norites of WPB is 2485±54 Ma.

New isotope Sm-Nd and U-Pb data for the rocks of the massif showing that obtained ages for the Fedorovo-Pansky massif is older than previously reported 2.40-2.50 Ga [Mitrofanov et al., 2004]. The duration of pyroxenite-gabbronorite-anorthosite formation can be extended up to 130 Ma (2.40-2.53 Ga).

The new Sm-Nd model T_{DM} ages for WR of the Fedorova Tundra are 2.91 - 3.25 Ga and slightly older then WPB rocks from 2.97 to 2.99 Ga. In the ε_{Nd}(T)-I_{Sr} diagramm, the data points of all N-E Baltic Shield Pt-bearing layered intrusions lie within the EM-1 field [Serov, Mitrofanov, 2005].

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