



New Sm-Nd data for the Fedorovo-Pansky PGE-bearing layered intrusion (N-E Baltic Shield)

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Two belts of PGE-bearing layered ultramafic-mafic intrusions are known within N-E Baltic Shield (Fennoscandia). The Northern group composes Mt. General'skaya, Fedorovo-Pansky Massif, Monchepluton, Main Ridge and Imandra lopolith. The Southern group includes the Tsipringa, Lukkulaisvaara, Kivakka, and Burakovskaya intrusions, as well as several layered intrusions in Finland (Koilismaa, Kemi, Koitilainen, Penikat, Akanvaara etc.). The rocks of these massifs belong to pyroxenite-gabbronorite-anorthosite formation and have similar isotopic-geochemical characteristics: (1) U-Pb age within 2526-2396 Ma; (2) LILE-rich mantle source (according to REE data; ISr 0.702-0.704; and $\varepsilon\text{Nd(T)}$ from -0.2 to -2.6); (3) model Sm-Nd ages $T(\text{DM})$ from 3.2 Ga to 2.8 Ga. These characteristics indicate that the Palaeoproterozoic layered PGE-bearing intrusions of Fennoscandia have a common source and were likely formed by a mantle plume [Mitrofanov et al., 1997-2005].

The Fedorovo-Pansky layered intrusion is one of the most promising objects for low-sulfide PGM ores in Russia [Mitrofanov et al., 1999, Schissel et al., 2002]. The intrusion (3-4 km thick) is located in the central part of the Kola Peninsula and extends northwestward over 70 km. The massif consists of four blocks: Fedorova Tundra (FTB), Last'yavr, Western Pana (WPB), and Eastern Pana.

Recent Sm-Nd data on the cumulus rock-forming minerals and WR from the Western Pana and Fedorova Tundra blocks of the intrusion have been obtained. New Sm-Nd isochron age for rock-forming minerals and WR from the norite of FTB equals 2482 ± 36 Ma (U-Pb zircon age is 2485 ± 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 [Nikitina, 2006]). Additional rock-forming minerals from gabbronorites and norites WPB were measured by Sm-Nd method. 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.

Based on 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 2.50-2.40 Ga [Bayanova, 2004] and duration of this formation can be extended up to 130 Ma (2.53-2.40 Ga). All Palaeoproterozoic layered PGE-bearing intrusions in the N-E Baltic Shield (Fennoscandia) were derived from intraplate magmatism (mantle plume). The same Palaeoproterozoic layered intrusions are known on the Baltic Shield, Superior and Wyoming provinces of the world, and according to [Heaman, 1997] they were derived from the mantle plume which caused the break up of the oldest supercontinent.

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