



Layered Proterozoic PGE-bearing intrusions on the N-E Baltic Shield: new U-Pb on zircon and He^4/He^3 for accessory minerals data

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There are distinguished in Proterozoic on the N-E Baltic Shield two 350 km long belts of the PGE-bearing intrusions: Mt. Generalskaya, the Monchepluton, the Monchetundra Massif, the Pana Massif and Imandra Lopolith Northern belt and Finnish-Russian Southern belt with Penikat, Koilismaa, Kontilainen and Olanga - group intrusions and Burakovskiy massif in Karelia. U-Pb precise zircon-baddeleyite ages for the different parts of the intrusions (gabbro-norite, gabbro-pegmatite and anorthosite) show 130 Ma (2,53-2,40 Ga) duration of the mantle plume (Mitrofanov et al, 1999-2005, Bayanova, 2004). Rocks of the intrusions have low initial (I_{Sr}) ratio = 0,703-0,704, ε_{Nd} varying from -2,4 to -1,1, mantle reservoir EM-1 according to $\varepsilon_{Nd}-I_{Sr}$ data and He^4/He^3 ratio of $0,69 \cdot 10^6$. Regarding all world isotope data of the Proterozoic mafic magmatism (Heaman, 1997), global mantle plume connecting with PGE-bearing layered intrusions resulted in break up of the oldest supercontinent.

The main object of our investigation was the Monchetundra Massif with Pd-Pt mineralization.

The result obtained was new U-Pb data for zircon from different rocks. Four populations of magmatic-type zircon were picked out from coarse-grained amphibolised gabbros. These show a U-Pb isochron with upper intercept at 2521 ± 8 Ma, MSWD=0.24. The age of the gabbros from Monchetundra is close to that of barren melanocratic basic rocks of The Fedorovo-Pansky Massif (Nitkina, 2006). The coarse-grained gabbro-norite-anorthosite and medium-coarse-grained amphibolised gabbros contain magmatic baddeleyite and a few populations of zircon that yield isochronal U-Pb ages of 2456 ± 5 Ma, MSWD=0.0041 and 2420 ± 5 Ma, MSWD=0.077, respectively, and are

typical of PGE-bearing mafic intrusions of the region. The rocks also include zircon of metamorphic genesis with Pb-Pb age of 2376 Ma and Achaean xenogenic zircon with Pb-Pb age of over 2.7 Ga. Such zircons of different age and genesis can usually be found in layered mafic intrusions of the region (Bayanova, 2004). An interesting fact here is that a blastomylonite after anorthosite (leucogabbro) contain three types of zircon showing discordant U-Pb ages of ca. 2.9 Ma. In this case we can speak of an older anorthosite of Achaean Chunutundra type that was proved by geological observations in this region (Mitrofanov et al., 1997).

New $^4\text{He}/^3\text{He}$ mass-spectrometry isotope ratios for rock forming (Cpx, Opx, Amph) and accessory minerals (Mgt and Ilm) from Monchetundra Massif reflect contribution about (0, 2%) lower mantle component (or plume). The main concentrations of He^3 isotopes belong to cumulus rock forming minerals (Opx, Cpx). It is very important note that all rocks of the Monchetundra Massif are a result of polymetamorphic processes (granulate and amphibolite faces of metamorphism), so helium ratios quite low.

This study was supported by the RFBR 04-05-64179, Scientific School 1413.2006.5 and State Program No. 02.445.11.7403.00