



## Variations of Nd-Sr over the “critical horizon” sections of Mt. Nyud (Monchegorsk mafic-ultramafic pluton, Kola Peninsula)

Pavel Serov, Tamara Bayanova, Eugenii Kunakkuzin, Ekaterina Steshenko, Elena Borisenko, and Nadezhda Ekimova

Russian Federation (serov@geoksc.apatity.ru)

In the north-eastern part of the Fennoscandinavian shield there are two large Palaeoproterozoic layered intrusions: Monchegorsk mafic-ultramafic pluton and Monchetundra mafite massif. They are a part of the Monchegorsk PGE-Cr-Cu-Ni ore region [Layered intrusions ...; 2004; Sharkov, 2006].

Our geochronological studies confirm the time interval for the formation of the main varieties of intrusive rocks - 2480-2506 Ma [Bayanova et al., 2009, 2014; Rundkvist et al., 2014; Serov et al., 2015]. A change in the rock composition in the vertical section is disturbed by the presence of the ore dunite-harzburgite bed among the orthopyroxenites of Mt Sopcha and the “critical” horizon with olivine-containing rocks on Mt Nyud [Sharkov, 2006]. The age of the harzburgite ore bed “330” of Mt Sopcha is  $2442 \pm 59$  Ma (the Sm-Nd method), which agrees with the idea of its formation due to the introduction of an additional portion of high-temperature ultrabasic magma that experienced significant crustal contamination [Layered intrusions ...; 2004].

The “critical horizon” of Mt Nyud in the deposit Terrasa area was studied over several sections during field work. The initial isotopic composition of strontium for most of the studied samples varies in a narrow range — 0.702–0.704; however, for metamorphized differences and rocks with sulphide mineralization lower values of the initial isotopic composition are observed - about 0.702. At the same time, the Sm-Nd data for the same samples show an extreme scatter of  $\epsilon\text{Nd}(T)$  values, which range from small negative (-1.25) to strongly positive values (+8 - +14). Such variations are probably caused by several factors, including: increased analytical errors in measuring samples with low element concentrations, possible mixing of several sources with different isotopic characteristics, varying degrees of change due to metamorphic or metasomatic processes and fluids, a possible rearrangement of the isotopic systems during the introduction of additional portions of magma and heating of the contacting rocks as well as the diffusion processes of REE.

To check up our hypothesis about a possible mixing of sources with different isotopic characteristics, test diagrams were constructed in the coordinates “ $1/[\text{Nd}]$  vs isotopic composition”. In the diagram with Rb-Sr data, the points of the analyzed samples form a cloud without correlation, which indicates the absence of dependencies between the isotopic composition and concentration. In this case, one can say that the Rb-Sr systems of the studied samples are not the result of mixing sources with different isotopic parameters. In the case of the Sm-Nd system, most of the points form a linear trend, which may indicate a mixed source or contamination processes.

Thus:

- the sites with industrial concentrations of Pt+Pd are often characterized by sharp variations in the isotopic composition of neodymium, which is probably due to increased fluid saturation and diffusion of REE;
- the results of the Rb-Sr and Sm-Nd analyzes suggest that the Rb-Sr system is better preserved than the Sm-Nd system (isotopic rearrangement when mixed or contaminated are observed).

These studies were supported by the RFBR (16-05-00305, 18-35-00246, 18-05-70082) and Program of the RAS Presidium No. 48. Topic of the state assignment No. 0231-2015-0005.