The Paleoproterozoic Kandalaksha-Kolvitsa gabbro-anorthosite complex (Fennoscandian Shield): new U-Pb, Sm-Nd and Nd-Sr (ID-TIMS) isotope data on the age of formation, metamorphism and geochemical features of zircon (LA-ICP-MS)

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The paper provides new U-Pb, Sm-Nd and Nd-Sr isotope-geochronological data on rocks of the Paleoproterozoic Kandalaksha-Kolvitsa gabbro-anorthosite complex. REE contents in zircons from basic rock varieties of the Kandalaksha-Kolvitsa area have been defined in situ using LA-ICP-MS. Plots of REE distribution have been constructed, confirming the magmatic origin of zircon. Temperatures of zircon crystallization have been estimated, using a Ti-in-zircon geochronometer. For the first time, the U-Pb method with $^{205}\text{Pb}$ artificial tracer has been applied to date single zircon grains (2448±5 Ma) from metagabbro of the Kolvitsa massif. The U-Pb analysis of zircon from anorthosites of the Kandalaksha massif has dated the early stage of the granulite metamorphism at 2230±10 Ma. The Sm-Nd isotope age has been estimated on metamorphic minerals (apatite, garnet, sulfides) and the rock at 1985±17 Ma (granulite metamorphism) for the Kolvitsa massif, 1887±37 Ma (high-temperature metasomatic transformations) and 1692±71 Ma (regional fluid reworking) for the Kandalaksha massif. The Sm-Nd model age of metagabbro is 3.3 Ga with negative value εNd=4.6, which corresponds either with processes of crustal contamination, or with primary enriched mantle reservoir of primary magmas.

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