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Isotope systematics (Pb-Nd-Sr) and LA-ICP-MS (REE, Os, PGE) data on time, duration and origin of Paleoproterozoic complex deposits in the N-E part of the Arctic region, Fennoscandian Shield

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The isotope U-Pb system on zircon and baddeleyite reflects the precise age of the origin (2.5, 2.45 and 2.4 Ga) and duration (more than 100 Ma) for Cu-Ni and PGE complex deposits widespread in the N-E part of the Fennoscandian Shield. The Monchegorsk, Fedorovo-Pansky and Mt. Generalskaya layered intrusions and ore regions of the orthomagmatic Cu-Ni and PGE deposits with Pt-Pd reefs originated on the continental crust (3.7 Ga). Main phases of gabbro-norites were formed mainly at 2.5 Ga and secondary anorthosites at 2.45 Ga, according to U-Pb data on zircon-baddeleyite geochronometries. The Imandra lopolith with Cr deposits was active from 2.45 Ga to 2.4 Ga due to dyke deformation complexes. Isotope Sm-Nd studies and investigations of rock-forming and sulphide minerals from the deposits indicated coeval ages and 3 magmatic time activity with positive epsilon Nd. Deformation or metamorphic events were dated using the Rb-Sr system on minerals and whole rocks from the deposits at 1.9-1.8 Ga.

The Pados Cr (2.08 Ga), Pechenga Cu-Ni (1.98 Ga) and Kolvitsa Ti-Mg (1.89 Ga) orthomagmatic deposits were dated, using the Pb-Nd-Sr isotope systematics. The mentioned deposits originated probably on the oceanic crust (2.7 Ga). According to new in situ LA-ICP-MS data on Os, PGE and REE concentration in zircon, baddeleyite and sulphide minerals from the complex deposits are characterized by subchondritic sources (Malitch et al., 2019). Paleoproterozoic layered intrusions (2.5-1.8 Ga) and deposits were formed from the plume enrichment mantle reservoir (EM-1), according to Nd-Sr data on whole rocks. Baddeleyite as a mantle mostly mineral (Zircon, 2003) reflects the continental break-up and is connected with the oldest supercontinental reconstruction (Ernst, 2016).

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