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Two long duration epochs of the intraplate plume magmatism in the Baltic Shield: 2.75-2.61 Ga and 2.53-2.40 Ga

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The late Achaean gabbro-anorthosites, lamprophyre dikes, alkaline granites, syenites, sanukitoids, nepheline-syenites and carbonatites are well known in the Baltic Shield (Finland, Kola and Karelia regions). In the Kola region all these rocks apply to Keivy protoplatform type and are characterized by Ti-V, Zr and TR mineralization. The similar rocks are known in Canada, Australia and Greenland (Blichert-Toft et al., 1996). The Sm-Nd mineral and U-Pb zircon and baddeleyite ages (carbonatite of Finland) and U-Pb zircon data for the different Kola rocks show interval of the time origination from 2.75 Ga to 2.61 Ga. Rather similar U-Pb ages have been received for zircon from sanukitoids of Karelia region (Bibikova et al., 2005). The alkaline granites and nepheline syenites of the Kola region belongs to A-granites, has low Y/Nb and Yb/Ta ratios typical to enriched mantle EM-2. Nepheline syenite corresponds to analogous OIB magma source (Zozulya et al., 2005). Noble gases of ilmenite from alkaline granites reflect also contributions of mantle reservoir with model Sm-Nd data for the rocks from 2.9-2.8 Ga and εNd from -2.5 to +0.5. Based on all isotope-geochemical features there are a presence of the long intraplate plume magmatism in the late Achaean time in the Baltic Shield.

Development of the main Kola Paleoproterozoic rifting Imandra-Varzuga belt are associated with mafic layered Pt-bearing intrusions was started from 2.53 Ga (Nitkina et al., 2006) to 2.40 Ga.The primary magma source for the ultramafic-mafic-anorthosite massifs have enriched mantle reservoir EM-1, model Sm-Nd ages of the WR protolith from 3.1-2.8 Ga, εNd from -3.1 to -1.1, low initial Sr from 0.704-0.703 and mantle noble gases ratios. The duration of the formation of composite individual intrusions was about 130 Ma (Mitrofanov & Bayanova, 1999; Mitrofanov et al., 2004).

Early Proterozoic global mafic intraplate igneous activity is known not only into the Baltic Shield but in the Superior and Wyoming provinces and according the data of L.Heaman (1997) is the result from the breaking up of the oldest supercontinent.

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