Fragments of Paleoproterozoic LIPs in the Eastern Fennoscandia: implications for the life span of the Lapland-Kola Ocean

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Eastern Fennoscandia comprises the Archean Kola-Murmansk (KMP) and Karelian (KP) provinces, separated by the ca. 1.95-1.85 Ga Lapland-Kola orogen (LKO). New geochronological, geochemical, and isotopic data for 2.50-1.86 Ga mafic dykes and sills in the KMP in comparison with the KP are considered in the framework of the Lapland-Kola Ocean that predates the LKO. The 2500 Ma event that was likely coeval with the Mistassini LIP [1] was manifested by emplacement of doleritic dyke swarms and layered intrusions in the KMP, and ca. 2.5 Ga mafic dykes in the KP. The 2400 Ma mafic dykes and sills in the KMP form two groups of high- and low-Mg tholeiites. Together with the 2405 Ma doleritic dykes [2] and Vetreny Belt komatiites [3] in the KP they belong to the 2400 Ma LIP. Undated ferropicritic dykes scattered in the northern KMP are likely correlated with the 2.0 Ga Pechenga-Onega event [4]. These dykes have OIB geochemical affinity and can be regarded as products of melting of a deep-seated mantle source. The 1860 Ma mafic sills are represented by low-Ti tholeiites enriched in LREE. Intraplate mafic rocks of this age have not been yet found in other parts of Fennoscandia; they can be correlated with the Circum Superior LIP [5]. According to the available data, a temporal gap in intraplate mafic igneous events is recognized in the KMP at 2.4-2.0 Ga. At the same time, the KP was affected by numerous magmatic events at 2.3, 2.2, and 2.1 Ga [6]. These differences are probably related to the existence of the Lapland-Kola Ocean, which separates the KP and KMP in the Paleoproterozoic.

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