Two eclogite associations have been recognized within Belomorian TTG gneisses: (1) the subduction-type Salma association and (2) Gridino eclogitized mafic dykes. Protoliths of the Salma eclogites represent a sequence comprising basalts, gabbro, Fe-Ti gabbro and troctolites, formed at ~2.9 Ga in a slow-spreading ridge setting. The main subduction and eclogite-facies events occurred between ~2.87 and ~2.82 Ga (Mints et al., 2014).

The high-pressure metamorphosed Gridino dyke swarm comprises a major group of Mesoarchean mafic dykes intruded within the Mesoarchean continental crust of the Southern margin of the Kola craton. The thick dyke of olivine and quartz-bearing metagabbro-norite preserves relic igneous textures and minerals and was metamorphosed but displays clearly visible chilled margins with the host gneiss. The metagabbro-norite dykes are cut by completely metamorphosed Fe-metagabbro dykes. The emplacement depth and temperature of the magma that formed the olivine- and quartz-bearing metagabbro-norite dykes (Dokukina and Konilov, 2011), were estimated. Hot mafic melt (1100-1200°C) intruded an upper level of the crust under amphibolite facies conditions (5 kbar and 600 °C) but no deeper. Then dykes and felsic country rock underwent metamorphism successively in eclogite (minimum pressure 16-17.5 kbar), high-pressure granulite (13-10 kb and 800-750°C), and amphibolite (7.9-9.6 kb, 530-700°C) facies. The U–Pb age of igneous zircons from of the latest dykes, the geochronological samples were taken from the Fe-metagabbro dykes and gave time span of mafic magma intrusions of 2.87-2.82 Ga (Dokukina et al., 2012; 2014).

Our opinion is an injection of mafic magma into an active continental margin setting, recorded by the Gridino dyke swarm, is attributed to subduction of a mid-ocean ridge, commencing at 2.87 Ga. Crustal delamination of the active margin and subsequent involvement of the lower crust in subduction between 2.87 and 2.82 Ga ago caused high-pressure metamorphism of the Gridino dykes, culminating in eclogite-facies conditions (minimum pressure 16-17.5 kbar) between 2.82 and 2.78 Ga and accompanying amalgamation of the Karelia, Kola and Khetolamba blocks and formation of the Mesoarchean Belomorian accretionary-collisional orogen (Mints et al., 2014).

**References**


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