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Mesoarchean Gridino Mafic Dykes Swarm of the Belomorian Eclogite Province of the Fennoscandian Shield (Russia)

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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 preserves relic igneous textures and minerals and was metamorphosed but displays clearly visible chilled margins with the host gneiss. The metagabbro dykes is cut and cut by completely metamorphosed Fe-metagabbro dykes. The emplacement depth and temperature of the magma that formed the olivine- and quartz-bearing gabbro 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 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

- Dokukina, K.A., Bayanova, T.B., Kaulina, T.V., et al., 2012. The Belomorian eclogite province: the sequence of events and the age of magmatic and metamorphic rocks of the Gridino eclogite association. *Russian Geology and Geophysics* 53: 1023–1054.
- Dokukina, K.A., Kaulina, T.V., Konilov, A.N., et al., 2014. Archean to Palaeoproterozoic high-grade evolution of the Belomorian Eclogite Province in Fennoscandian Shield (Gridino area): geochronological evidences. *Gondwana Research* 25: 585–613.
- Dokukina, K.A., and Konilov, A.N., 2011. Metamorphic evolution of the Gridino mafic dyke swarm (Belomorian eclogite province, Russia). In: Dobrzhinetskaya LF, Faryad SW, Wallis S (Eds.), *Ultrahigh-Pressure Metamorphism. 5 Years After the Discovery of Coesite and Diamond*. Elsevier, pp. 579–621.
- Mints, M.V., Dokukina, K.A., and Konilov, A.N., 2014. The Meso-Neoproterozoic Belomorian eclogite province: Tectonic position and geodynamic evolution. *Gondwana Research*, 25: 561–584.

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