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Mafic, Ultramafic and Carbonatitic Dykes in the Southern Siberian Craton with Age of ca 1 Ga: Remnants of a New Large Igneous Province?

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Virtual absence of igneous complexes with ages between 1.8 Ga and 0.8 Ga in southern part of the Siberian Craton allowed to Gladkochub et al. (2010) to formulate a hypothesis of long magmatic quiescence. Most reliable plate tectonic reconstructions suggest that at about 1 Ga this region was located in inner part of Rodinia supercontinent (Li et al., 2008). However, new findings of rare mafic, ultramafic and carbonatitic dykes with K-Ar, Ar-Ar and Sm-Nd ages at about 1 Ga (Ivanov et al., 2012; Savelyeva et al. 2016) suggest that the long magmatic quiescence is shorter than it was thought before and the total duration of this quiescence period depends much on our incomplete knowledge of the geological record. In this presentation we provide geochemical data on ca 1 Ga dykes to show that they resemble a flood basalt association with an island arc-like continental basalts, high-Mg picrites and/or meimechites and carbonatites.

One studied region is located the Sharyzhalgai area of the south-western part of the Siberian Craton. We found there a doleritic dyke with fresh pyroxene and plagioclase and accessory mica, pyrite and apatite. K-Ar plagioclase age of this dyke is 1018 ± 35 Ma (Ivanov et al., 2012). Ar-Ar on two aliquots yielded, though slightly discordant, age values within the age obtained by K-Ar method (Ivanov et al., 2012).

Another studied region is located in the territory of the Baikal range of the south-eastern part of the Siberian Craton. There we discovered a dyke swarm, which includes calcite, dolomite and dolomite-ankerite carbonatites and subordinate picrites and meimechite like rocks (Savelyeva et al. 2016). Age of the carbonate dykes is defined by clear Ar-Ar plateau of 1017.4 ± 3.2 Ma on amphibole from a contact zone of one of the carbonatitic. This age is supported by Sm-Nd isochron (MSWD 0.16) of 1049 ± 110 Ma on whole-rock carbonatites (Savelyeva et al. 2016).

Similar U-Pb age of 1005 ± 4 Ma was reported on

baddeleyite from a dolerite sill in Sette-Daban area of the eastern Siberian Craton (Rainbird et al., 1998). Taken all together, intrusions of the same ca 1 Ga age in the Sharyzhalgai, Baikal range and Sette-Daban areas show compositional variations similar to, for example, Permian-Triassic Siberian large igneous province (LIP). Thus we forward the idea that these intrusions are probable remnants of the same, previously non identified LIP, which formed near the boundary between Middle and Late Neoproterozoic.

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