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Proterozoic Dyke Swarms of the Siberian Craton and Their Geodynamic Implications

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We present a summary of late Paleoproterozoic to Neoproterozoic mafic magmatism in the Siberian craton which allows us distinguish following main pulses of mafic dyke emplacement:

1) 1860 – 1850 Ma mafic dykes are localized within the southern (Baikal uplift) and south-eastern (Aldan shield) parts of the Siberian craton. Their emplacement was controlled by post-collisional extension (see references in Gladkochub et al., 2010).

2) ca 1750 Ma dyke swarms occur at the southern (Baikal uplift), south-eastern (Aldan terrane) and northern (Anabar shield) margins of the craton and can be considered as branches of large radial dyke swarm related to huge mantle plume activity.

3) ca 1500 Ma mafic dyke swarms occur in the northern part of the Siberian craton (Anabar shield and Olenek uplift) only. These swarms and mafic intrusions from other ancient cratons such as Congo, San Francisco and Baltica which were located near to northern Siberia and close to each other (Pisarevsky et al., 2014) can be united into a LIP linked to a mantle plume (Ernst et al., 2013; Ernst, 2014; Gladkochub et al., 2016).

4) ca 1350 Ma mafic dyke swarm is exposed at the southern (Baikal uplift) margin of the craton only. These dykes were generated during a plume-related Mesoproterozoic intra-continental extension, and likely represent part of the plumbing system of LIP (Ernst, 2014).

5) ca 1000 Ma mafic intrusions of south-eastern Siberia are associated with formation of the passive continental margin along SE flank of the Siberian craton.

6) 740 – 715 Ma dyke swarms of the southern part of the Siberian craton (Sharizhalgai, Biryusa, and Baikal terranes) correspond to the initial stages of rifting between Siberia and Laurentia in frame of Rodinia.

7) 650–610 Ma mafic dykes of the southern (Sharizhalgai, Urik terrane), and south-eastern (Aldan shield) parts of the Siberian craton were emplaced during an advanced stage of Rodinia breakup and development of the passive margins along southern Siberia.

The time–space 'barcode' of mafic magmatic events shows significant differences between northern and southern Siberia. This phenomena could be explain by long -time (1.2 Ga) (Ernst et al., 2016) existing of the southern part of the Siberian craton near the northern Laurentia in the inner part of Nuna (Columbia) and further in Rodinia. In contrast to southern part of Siberia, its northern flank was located in marginal part of these supercontinents and never depends on any processes related to assembly and breakup of these supercontinents.

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