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The new paleomagnetic and Sm-Nd isotopic data from North Siberian Proterozoic sills: Siberia and Laurentia from Columbia to Rodinia.

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Apparent polar wander paths are powerful means for deciphering of tectonic history of the Earth lithosphere and its structural elements. At the same time APWP's can be used as a tool for dating of different geological events and objects. Importance of APWP's especially increases when dealing with Precambrian where possibilities of many other methods of dating become limited. Whereas Proterozoic APWP's of North American, East European and Australian ancient platforms are more or less developed, Siberian Apparent Polar Wander Path is at the first stage of its elaboration. Proterozoic and, especially, Mezo- and Paleoproterozoic paleomagnetic poles are scarce and for long time intervals are practically absent. Thus every new reliable Siberian paleomagnetic pole of Proterozoic age is of paramount importance for elaboration of Proterozoic APWP of the Siberian platform.

To obtain such the pole we have carried out joint paleomagnetic and Sm-Nd geochronological investigation of Late Precambrian magmatic complex of northern part of the Anabar Uplift (northern Siberian platform). In total, sixteen diabase and dolerite subvolcanic intrusions (dykes and sills) exposed along the Fomich river valley have been studied, one of them has been dated by Sm-Nd method. Clear paleomagnetic record is found in 15 intrusions. Thermal demagnetization isolates two magnetic components. The first of them is parallel to the recent geomagnetic field at the site and is removed in the low to middle temperature range. The second one (HTC) is isolated at higher temperatures (up to 600°C) and has dual magnetic polarities. Some features of demagnetization behavior, probably indicating partial self-reversal of magnetization, are revealed in several samples. Intrusions means form relatively tight cluster, which average direction corresponds to paleomagnetic poles with coordinates: Plat=-19.2ºN, Plong=77.8ºE, dp/dm = 3.0º/5.9°. Two polarity distribution of HTC vectors, no resemblance to paleomagnetic poles of younger age, relative proximity to poles of close age, obtained by Ernst (Ernst et al., 2000), observed signs of self-reversal, indicating, probably, thermoremanent nature of magnetization – all these allow us to consider the paleomagnetic pole as reflecting the direction of geomagnetic field of time of intrusions emplacement. Five points Sm-Nd isochrone, obtained for one of the studied intrusions, yields age 1513±51(2δ) Ma.

New paleomagnetic pole along with others obtained earlier for Late Mezoproterozoic-Early Neoproterozoic (Pavlov et al., 2002) can be used to test their compatibility with hypothesis of Siberia-Laurentia coexistence within large continental landmass, which, probably, survived break up of the Paleoproterozoic supercontinent and became later the part of Rodinia. The comparison of nearly coeval Meso-Neoproterozoic (1500-950 Ma) paleomagnetic poles of Laurentia and Siberia indicates obvious coordination in general trends of these cratons movements and, thus, can be considered as argument in favor of this hypothesis.

Our paleomagnetic pole being compared with the most close by age Laurentian one (1476 Ma: Meert and Stuckey, 2002) allows Siberian-Laurentian relative position suggested by Condie (Condie, 2002) and is compatible with Siberian-Laurentian within-Rodinian reconstruction, proposed by Pavlov (Pavlov et al., 2002).

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