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Geochronological and paleomagnetic studies of small carbonatite intrusions of the Udzha uplift (Tomtor massif, northeast of the Siberian platform)

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Paleomagnetic data obtained from Neoproterozoic glacial and glacier-associated sedimentary rocks indicate that they were formed at near equatorial latitudes. Based on these data, the Snowball Earth hypothesis was proposed [Kirschvink, 1992]. According to this hypothesis, during the Neoproterozoic glaciations, the entire planet (including the oceans) was completely covered with ice. Although evidence is emerging that does not support this hypothesis, there is still no conclusive evidence that it is not true [Sansjofre et al., 2011].

It is worth noting that the Snowball earth hypothesis is based on paleomagnetic data. At the same time, the available paleomagnetic data for the Neoproterozoic-Early Cambrian [Meert, Van der Voo, 2001; Shatsillo et al, 2005; Abrajevitch, Van der Voo, 2010; Pavlov et al., 2018] difficult to interpret in terms of the Geocentric Axial Dipole hypothesis. This imposes serious restrictions on the possibility of correctly constructing paleomagnetic reconstructions.

For the development and testing of a model of the geomagnetic field of the Neoproterozoic, it is necessary to obtain a lot of high-quality paleomagnetic data. Data from well-dated magmatic bodies are especially valuable.

Within the framework of this work, we obtained paleomagnetic data from three carbonatite dikes (7 to 30 cm thickness) exposed in the Udzha river bank on the Udzha uplift in the northeastern part of the Siberian platform. These dikes are associated with the large alkaline Tomtor massif located 15 km to the west. Ar/Ar dating of phlogopite megacrysts gives an intrusion age of the dikes of 706.1±8.8 Ma. Coordinates of the virtual geomagnetic pole, calculated from the direction of the high-temperature component of magnetization: Φ=-20.7°; Λ=88.6°; A95=3.4°.

Our report will present preliminary interpretation of these data, as well as their comparison with paleomagnetic data on close-aged objects in Siberia.

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