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New Permian-Triassic inclination shallowing corrected paleomagnetic pole of the East European Platform and its significance for the GAD-hypothesis

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One of the key challenges which are traditionally encountered in studying the paleomagnetism of terrigenous sedimentary strata is the necessity to allow for the effect of shallowing of paleomagnetic inclinations which takes place under the compaction of the sediment at the early stages of diagenesis and most clearly manifests itself in the case of midlatitude sedimentation. Traditionally, estimating the coefficient of inclination flattening (f) implies routine re-deposition experiments and studying their magnetic anisotropy (Kodama, 2012), which is not possible in every standard paleomagnetic laboratory. The Elongation–Inclination (E/I) statistical method for estimating the coefficient of inclination shallowing, which was recently suggested in (Tauxe and Kent, 2004), does not require the investigation of the rock material in a specially equipped laboratory but toughens the requirements on the paleomagnetic data and, primarily, regarding the volume of the data, which significantly restricts the possibilities of the post factum estimation and correction for inclination shallowing.

We present the results of the paleomagnetic reinvestigation of the some key sections of the Upper Permian and Lower Triassic rocks located on the East European Platform. The obtained paleomagnetic data allowed us to estimate the coefficient of inclination shallowing by the E/I method and calculate a new P-Tr paleomagnetic pole for Europe. The absence of a statistically significant difference between the mean Siberian, European and North American Permian-Triassic paleomagnetic poles allow us to conclude that ~252 Ma the configuration of the Earth's magnetic field was predominantly dipole. We believe that the assumption of the non-dipolarity of the geomagnetic field at the Permian-Triassic boundary, which has been repeatedly discussed in recent decades (Van der Voo and Torsvik, 2001; Bazhenov and Shatsillo, 2010; Veselovskiy and Pavlov, 2006), arose due to the failure to take into account the effect of inclination shallowing in the paleomagnetic record of stable Europe (East European Platform and West European Basin).

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