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Paleomagnetism of terrigenous rocks of the Volynian series (Ediacaran) from Podolia (Ukraine)

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We present the results of palaeomagnetic study of Ediacaran terrigenous rocks from the SW part of East European Craton (EEC), Podolia (Ukraine). Samples are represented by red tufits of Grushkinska suite by Volhynian series, which is comparable to the upper part of the Ediacaran age by the international stratigraphic scale. Samples for paleomagnetic studies were taken at the reference section of the Grushkinsky suite of the Volhynia series in the village of Grushka (48.45°N 28°E). A total of 50 oriented core samples were selected. For the entire collection of samples, the standard procedure for paleomagnetic studies was applied. The samples underwent stepwise temperature demagnetization. Demagnetization showed that all samples are completely demagnetized at a temperature close to 700°C. The results of demagnetization showed that additionally to the viscous components of the magnetization released up to 200°C, four more stable components of NRM are released: CLM-1–component, relatively low temperature, in the range of deblocking temperatures of 200–360°C. It is characterized by south-south-west declination and negative inclination (D/I = 197.9/-28.6); CLM-2–component, is allocated in the same temperature range as component CLM-1 (200-360°C), is characterized by south-south-west declination and positive inclination (D/I = 202.4/31); CMH–component, is strictly allocated in the range of unlocking temperatures of 590–630°C. It is characterized by northwestern declination and positive inclination (D/I = 311/18.9); CH –component, a bipolar high-temperature component, is released in the temperature range of 650–700°C. The middle direction of the forward and reverse polarity is characterized by north-north-west declination and positive inclination (D/I = 296.4/71.2). The directions of normal and reverse polarity of this component are closely antipodal and successfully pass the reversal test (γ/γ_c = 7.85/8.82), class “B” in accordance with [McFadden & McElhinny, 1990].

The coordinates of the virtual geomagnetic poles for the two low-temperature components, respectively, are located close to the Permian (Φ/Λ = -53.7/357.9) and Silurian part (Φ/Λ = -21.8/4.9) of the apparent polar wander path for the EEC [Torsvik et al., 2012]. The VGP, calculated from the middle-high-temperature component, is located in the Caribbean region (Φ/Λ = 33.8/271.4) and the VGP for the relatively high temperature component is located in the eastern part of the North Atlantic (Φ/Λ = -52.5/149.1) that close to the another paleomagnetic determinations with ages about 550 Ma and 570 Ma respectively for different parts of EEC.

New data demonstrate the palaeomagnetic information content of the studied rocks and the

possibility of their more detailed study in order to analyze anomalous palaeomagnetic data in the ediacaran and study the evolution of the Earth's geomagnetic field.

The analysis of directions and poles indicates that the paleomagnetic results do not contradict the data on the extremely high variability of the geomagnetic field in the studied time interval.

The new paleomagnetic determinations correspond to the previous results obtained by other authors for different regions of the East European platform, thereby supplementing them.