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Current update of the magnetostratigraphic scheme of the key Ordovician section of the Moyero River and the behavior of the geomagnetic field on the eve of the Moyero superchron

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There are different points of view on the origin of the geomagnetic superchrons. According to some of them the onset of the superchron is a consequence of the gradually changing conditions on the core-mantle boundary, others consider the superchrons as an accidental state of the geomagnetic field arising from the non-linear stochastic nature of the geodynamo process. This issue is of crucial importance for the development of the modern geodynamo models, for our understanding of the geomagnetic field evolution. If the first point of view is true, then we can expect the relatively gradual change of the geomagnetic reversal frequency when approaching the superchron. If the onset of superchron is an accidental event – we should observe no regular changes in the geomagnetic field behavior and, in particular, in geomagnetic reversal frequency. Thus the study of the geomagnetic reversal frequency on eve of superchrons can be very useful for testing various conceptions and different geodynamo models describing the geomagnetic field evolution.

Numerous studies of changes of geomagnetic reversal frequency just before the youngest Cretaceous superchron result in rather ambiguous conclusions and require additional data from other superchrons. Second by age – Kiaman superchron – is rather difficult to study mainly due to the limited number of suitable sections. On the contrary, the third Phanerosic superchron – superchron Moyero seems to be very interesting for such studies as in Siberia there are a number of sections which have been formed over the time preceding the Moyero superchron and in its beginning. One of them - the carbonate-terrigenous section of Moyero River is perhaps the most promising ones to obtain the detailed magnetostratigraphic record of the geomagnetic polarity changes on the eve of the third Phanerozoic superchron. This section is very well exposed, composed often by favorable for paleomagnetism lithologies and its Tremadocian part (recall that Tremadoc is the time immediately preceding the Moyero superchron) has thickness which is unusually high for platforms.

Over the past few years, we have conducted an extensive paleomagnetic study of the Moyero section, and in this report we demonstrate its preliminary new magnetostratigraphic scheme, which represents a significant update to our previous scheme published more than a quarter of a century ago (Pavlov and Gallet, 1996). The available Tremadocian magnetostratigraphic data from the Chinese Tangshan section (Yang et al., 2002) do not contradict our results.

Our data, in particular, indicate rather low geomagnetic reversal frequency during the Tremadoc, that can be considered as probable evidence for the gradual change of conditions on the core-mantle boundary on the eve of the Moyero superchron.