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Magnetostratigraphy of the Danian stage from the Saratov Volga region

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For the first time, magnetostratigraphic data has been obtained from the Klyuchevskaya member constituting the lowermost of the Danian from the Saratov Volga region. The Klyuchevskaya member has been recognized as a local stratigraphic unit in the lowermost of the Lower Syzran subformation; with a certain degree of conditionality, the member is regarded as the oldest Paleogene deposit in the Volga Right Bank region near Saratov [1]. The criterion for the member isolation lies in the carbonate contents of the constituent gaizes and gaize-like clays, as opposed to the carbonate-free gaizes from the Lower Syzran subformation. Scanty macro- and micropaleontological finds indicate that the Klyuchevskaya member corresponds to the lowermost of the Danian (not younger than the zone NP3 according to nannoplankton), but preclude any precise determinations of its stratigraphic age.

The paleomagnetic description of the deposits (from the uppermost Maastrichtian to the lowermost of the Lower Syzran subformation inclusively) in the stratotype region of the Klyuchevskaya member occurrence is based on the study of the oriented samples from 66 levels. Characteristic magnetization components, corresponding to the field normal or reverse polarity, were recognized in most samples. In some cases, projections of the magnetization vectors in the course of demagnetization by alternating field or by temperature were displaced along the great-circle arc, which was interpreted as the presence of a magnetization component corresponding to the reverse polarity within the sample.

The Klyuchi–Teplovka composite magnetostratigraphic section is composed of three alternating magnetozones, identified as the analogues of the chrons C29n, C28r and C28n. Thereby, it has been substantiated, that formation of the Klyuchevskaya member took place at the beginning of the Danian age (zones NP2-NP3 according to nanoplankton).

A depositional break represented by hardgrounds occurs between the Cretaceous and the Paleogene in the study area [2]; its extent can’t be determined from the available paleontological data. Comparison of the acquired magnetostratigraphic data with the Geological Time Scale shows the Klyuchi-Teplovka section to lack any analogues of the chron C29r. This enables us to estimate the break minimum duration as corresponding to the C29r duration – 0.722 million years [3].

Distribution of the axes of magnetic susceptibility ellipsoids in the studied sections corresponds to the magnetic texture of the deposits formed on a gentle slope: the minimum axes of the magnetic ellipsoids take up subvertical positions, while the maximum axes display weak ordering along the line perpendicular to the inclination of the sedimentation surface [4].

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