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The Matuyama-Brunhes reversal in the loess-paleosol series of the Otkaznoe section (Terek-Kuma Lowland)

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The loess-paleosol series (LPS) of the Eastern Ciscaucasian region are unique within the Eastern European plain. In terms of stratigraphic completeness and thickness, they are almost comparable to the loess-paleosol series of China and Central Asia. The loess-paleosol series of the Ciscaucasian region have been forming for over 700-800 ka, and their thickness ranging from 10-30 m in the west (Sea of Azov) to 100-140 m in the east (Terek–Kuma Lowland) [1]. To date, a detailed chronostratigraphic scheme for the Upper Quaternary loess of the Ciscaucasian region has been established [2]. However, the Middle and Lower Neopleistocene loess-paleosol series have not been as extensively studied, leading to challenges in connecting them to the chronostratigraphic scheme of the Eastern European plain and correlating with the marine oxygen-isotope stages (MIS) [3].

The Matuyama–Brunhes magnetic polarity transition is one of the most significant and widely used chronostratigraphic markers in the Quaternary period (approximately 780 ka). Identifying the Matuyama–Brunhes boundary in Quaternary sedimentary sections enables to determine geochronological constraints on the sequences and carry out stratigraphic correlations of them. In this regard, during the summer of 2023, we carried out fieldwork on loess-paleosol series of the Otkaznoe section (44.17° N, 43.51° E), which is located within the Terek-Kuma Lowland, eastern side of the Otkaznoe reservoir. For a detailed study of the Matuyama–Brunhes transition, 74 oriented samples were continuously selected from the lower part of the section and cut into standard paleomagnetic specimens (2x2x2 cm) in the laboratory. In total, 270 stratigraphic levels were studied, with 3 to 5 specimens from each level. All magnetic measurements were conducted at the Institute of Physics of the Earth RAS (Laboratory for Geomagnetic Field and Rock magnetism) according to standard protocols.

As a result of paleomagnetic studies, a detailed record of the parameters of the geomagnetic field has been obtained (declination and inclination of the characteristic component of remanent magnetization (ChRM), latitude of the virtual geomagnetic pole (VGP)) for the transition zone of the Matuyama–Brunhes reversal. The M/B boundary in the Otkaznoe section is established, which allows us to designate the stratigraphic position of the Eopleistocene and Neopleistocene boundary in this section.

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