

The 2022 INQUA LoessFest

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Loess deposits at Luochuan



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Rock-magnetic properties of Late Quaternary loess-paleosol sequence of Tajikistan (Khonako-II section)

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Abstract: Climate dynamics in Central Asia during the Quaternary is a fascinating topic and can be reconstructed from the study of loess-paleosol sequences. The Tajikistan loess-paleosol series are a unique paleogeographic archive that consists of glacial (loess) stages and interglacial periods (paleosols). These series usually contain several developed paleosols that are usually united in pedocomplexes (PC) separated by thin units of loess. Up to 40 pedocomplexes were described in the well-known Khovaling loess plateau (Dodonov, 2002).

We studied the loess section of Honako-II, which reflects periods of warming and cooling at least over the last 1.5 Ma, containing up to 24 PC's. We reconstructed climate dynamics using petromagnetic proxies. In this work, we studied rock magnetic properties using magnetic susceptibility and anisotropy method and minerals characteristic of the rocks magnetization.

Methods. The AMS measurement was carried out on the MFK-1 kappabridge (AGICO, Czech Republic) in three mutually perpendicular planes that define the magnetic susceptibility ellipsoid (with rotation about these axes). The Anisoft42 program was used for computer processing of the measurement results. In addition to studying the anisotropy of the magnetic susceptibility, we measured the mass-normalized magnetic susceptibility on the MFK-1 kappabridge to verify the correlation of the studied units of loess-paleosol sequences with the MIS.

Results. We will present first results of paleoclimatic reconstructions for the region based on the study of petromagnetic characteristics of the section and reflect the importance of this data for studying the evolution of the natural environment of the western part of Central Asia in the Middle and Late Pleistocene. The studied part of the section is represented by two pedocomplexes, which reflect the last two macrocycles. An analysis of the magnetic susceptibility curve made it possible to correlate the upper pedocomplex with MIS 5, and the second with MIS 7. It was found that the magnetic texture of the loess-paleosol series of Khonako-II in the upper part of the section represents a contrast record that could reflect the wind directions in the Late Quaternary.

Keywords: Tajikistan: Loess-paleosol sequences: Late Quaternary; Magnetic minerals;

Magnetic susceptibility.

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Reference

Dodonov A.E. 2002. Quaternary of Middle Asia: Stratigraphy, Correlation, Paleogeography. Moscow. GEOS. 250 p. (In Russian).