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High-resolution particle size analyses applied to late Quaternary loess deposits at Orkutsay, Uzbekistan, Western Tien-Shan

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The loess deposits in the proximity of Tashkent (Uzbekistan) are one of the most promising widespread terrestrial climate and environmental archives of the Pleistocene in Central Asia, in addition to the loess of southern Tajikistan and the loess in the region of Almaty (Kazakhstan).

In this paper we present high resolution particle-size data from the upper part of the long-studied loess record at Orkutsay (Uzbekistan). During the fieldwork samples for grain size and magnetic susceptibility were taken at 2 cm and 5 cm intervals from the loess. Particle size measurements of all samples were made on a Beckman Coulter LS 13320 PIDS laser sizer with auto-prep station to provide a dynamic range that spans from 0.04 to 2000 μm and ensure accuracy and reproducibility.

The granulometric results show a maximum in the fine and middle silt fraction and allow a clear distinction between cold and dry, and warm cycles. They show an important coherence between the type of dust sedimentation and the prevailing climate. Loess layers, which are associated with cold climate conditions, are dominated by the deposition of coarser dust particles. In contrast, finer airborne material has been deposited within the pedocomplexes that represent temperate interstadial or interglacial environments.
Our results demonstrate the potential of the aeolian dust record at Orkutsay to decipher impacts of past climatic changes on terrestrial ecosystems and to understand climate feedback processes in continental interiors such as Central Asia.