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Dynamics of past aeolian dust deposition in Central Asia: a case study from the loess deposits of southeast Kazakhstan

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Aeolian mineral dust plays a decisive role in the atmospheric system and has a significant influence on the radiation and heat balance of the Earth. The Central Asian deserts and steppes are one of the major source areas for airborne dust in the northern hemisphere. However, the nature of the aeolian dust and the processes that determine its origin, transport and impact are not fully understood.

A key to a better understanding of these mechanisms are the wide spread loess deposits throughout Central Asia. Loess-Palaeosol sequences provide detailed information on the dynamics of dust sedimentation over short- to long-termed time scales.

The aim of our investigation is the examination and comparison of loess sequences along the arid belt of Central Asia. This paper focuses on the results of the loess section Remisowka in SE-Kazakhstan. Highly resolved granulometric analyses give an insight to the regional dust dynamics during the Middle and Upper Pleistocene and show the strong relation of the type of dust sedimentation to the climatic characteristics of the region. To set up a more reliable chronological framework we combined different dating methods as luminescence and radiocarbon dating as well as amino acid racemization. Particularly the amino acid geochronology approach allows a better chronological placement of variations within the dust sedimentation dynamics.

Grain size variations show that the dust sedimentation responded very sensitively to

climatic changes during past warm and cold dry climates, reflecting regional to hemispheric signals. Highly resolved grain size analyses fundamentally contribute to an understanding of the dynamics of aeolian dust transport.