

# Continental dust accumulation in Central Asia: using high resolution luminescence dating to identify gross discontinuities in deposition.

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The loess-palaeosol series of Central Asia records the history of subaerial sedimentation over the last 2 million years. These thick loess-palaeosol deposits are usually regarded as complete, an important prerequisite for a detailed study of the paleoclimatic changes that occurred during the accumulation of these deposits. The significant thickness, large number of palaeosols, and the resulting impressive chronological framework make it possible to carry out detailed paleogeographic reconstructions over a long period of time. These sediments also record the presence and absence of human activity throughout the deposition period, and so record some of the earliest human migrations and occupations of Central Asia. As part of a major NordForsk funded project ‘Timing and Ecology of the Human Occupation in Central Asia’ (THOCA; [www.thoca.org](http://www.thoca.org)), we have studied several important sections on the Khovaling loess plateau (Kuldara and Khonako-III sections) in Tajikistan; this will allow us to develop a chronostratigraphic scheme for the entire Central Asian region.

In order to provide an independent timescale for palaeoclimatic studies and to check the completeness of the sedimentary record, 70 luminescence samples for Kuldara site and 130 samples for Khonako-III were collected using stainless steel tubes down to below the PC2 complex. Using conventional sample preparation techniques, we extracted quartz and feldspar in the coarse-silt and/or fine sand (40-63/63-90 µm) range. Using conventional sample preparation techniques, we extracted quartz and feldspar in the coarse-silt and/or fine sand (40-63/63-90 µm) range. Dose rates were determined using high resolution gamma spectrometry and are typical for loess in Tajikistan (~3 Gy/ka to silt-size d quartz grains). High dose rates limit the use of the OSL signal from quartz to the last ~40 ka, but the high temperature feldspar signal (post IR IR measured at 290°C after prior stimulation at 200°C) has been used to provide a detailed luminescence chronology for Tajikistan loess-palaeosol site back to ~250 ka. Comparison with quartz ages over the first 40 ka is used to confirm the resetting of this more difficult to bleach feldspar signal.

High resolution luminescence dating has identified several hiatus in the sedimentary sequences: Kuldara shows major breaks of up to 100 ka, with the most of L2 and the entire PC2 and L3 units missing; a small hiatus was detected at Khonako-III (at the bottom of PC 1) of ~10 ka. These discontinuities had not been previously identified, leading to gross errors in palaeosol identification, and so in presumed chronology.

The Khovaling loess plateau sections are known to reflect the regional features of loess/palaeosol sequences. As a result of the development of a detailed numerical chronology for these sections, we are now able to correlate regional features with global events, and relate these to such important phenomena as pedocomplex formation, the development of petro- and paleomagnetic records, and human activity.