



## **The aeolian sedimentary system in the northern Qilian Shan and Hexi Corridor (N-China) – geomorphologic, sedimentologic and climatic drivers**

Veit Nottebaum, Frank Lehmkuhl, and Georg Stauch

RWTH Aachen University, Department of Geography, Chair of Physical Geography and Geoecology, Aachen, Germany  
(v.nottebaum@geo.rwth-aachen.de)

The formation of aeolian deposits depends on the influence of climatic factors but also on non-climatic controls, such as local geomorphological setting and tectonic activity. Unravelling the environmental history needs a careful consideration of a set of sections to capture spatial variability and a detailed investigation of depositing processes and chronology.

Along the northern margin of the Qilian Shan mountain range 22 OSL-dated loess and aeolian sand sections and additional surface samples reveal the interactions between climatic, geomorphologic and sedimentologic factors. Thin loess covers (1-2 m) occur in elevations of 2000 to 3800 m asl, which were mainly accumulated during the Holocene. End-member modelling of loess grain size data exhibits three dominant aeolian transport pathways representing local transport from fluvial storages, dust storm contribution and background dust deposition. Their relative contributions show a clear dependence on geomorphological setting, and additionally, synchronous trends throughout the Holocene. Their relative changes allow conclusions about Holocene environmental conditions.

Discontinuous archives (aeolian sand, lacustrine, and alluvial deposition) in the lower forelands of the Qilian Shan show a distinct spatial pattern contrasting western and eastern forelands. The comparison of OSL ages exhibits high sediment accumulation (2 m/ka) in the drier western part during the Late Glacial, while the lack of Holocene ages indicates sediment discharge / deflation. In contrast, moister areas in the eastern foreland yield scattered Holocene ages. This indicates high sediment dynamics, benefiting from fluvial reworking and thus provided sediment availability. Fluvial sediment supply plays an important role in sediment recycling. Meanwhile, western forelands lack efficient sand sources and fluvial reworking agents.

The study exemplifies the complex sedimentary systems acting along mountain to foreland transects which often host sedimentary palaeoenvironmental archives. Sand availability, vegetation cover, the presence (or absence) of perennial fluvial activity and potential tectonic activity followed by rapid discharge of sediment have to be thoroughly evaluated when interpreting aeolian palaeoenvironmental archives. Conclusions drawn from these loess and aeolian sand sections are used to set up a model of aeolian transport and deposition in this environmentally sensitive (semi-) arid region.