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Reconstruction of sediment pathways by variations in sediment characteristics within the Donggi Cona lake catchment, Tibetan Plateau, China

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The Chinese Loess Plateau has been described in literature extensively and the provenance of the loess has been studied by many authors. The often bimodal grain-size distribution of Chinese loess points to sediment transport based on two transport processes, and the sand seas in the interior of China seem to be a possible source for the large amounts of loess. However, only few studies focus on aeolian deposits on the Tibetan Plateau. The aeolian sediments on the Tibetan Plateau are coarse compared to their Chinese counterparts. This suggests that the sediments are deposited closer to their source areas.

This study focuses on the provenance of terrestrial (aeolian and fluvial) sediments in the Donggi Cona lake catchment. The sediments are studied after grain size using a laser counter, and after their chemical composition using X-ray analysis (Sb, Sn, Cd, Ag, Sr, Rb, Pb, Se, As, Hg, Zn, Cu, Ni, Co, Fe, Mn, Cr, V, Ti, Sc, Ca and K), laboratory analysis (Ca) and elemental analysis (C, N and S).
Based on these data, the sediment pathways in the catchment will be reconstructed. Second aim is to find out if the sediments originate from local sources (in-catchment), regional sources or if the sediments are transported over longer distances. Possible in-catchment sediment source areas are the dry former lake bed and alluvial fan sediments. More distal sources could be the sand seas on the northern side of the Tibetan Plateau in China. Dating of the sediments can give an indication of the periods of (enhanced) aeolian transport on the Tibetan Plateau.
Reconstruction of the sediment pathways within the catchment can be problematic, because the sediment records are short (meters, compared to hundreds of meters in central China) and the sediments are often mixed due to slope processes. Nevertheless, some deposits show several periods of soil formation that point to changing aeolian transport conditions. Future research will focus on the changing sediment pathways during time.

This study is part of the DFG-project SPP1372 (Tibetan Plateau: Formation - Climate- Ecosystems). Our study focuses on the landscape and lake-system response to Late Quaternary monsoon dynamics along the northern margin of the Tibetan Plateau. We specifically concentrate on terrestrial sediment cascades in the Donggi Cona lake catchment. The data will be compared to lake records from Donggi Cona. Further study will focus on the changes in the influence of the monsoon and westerly systems on lake catchments along the northern side of the Tibetan Plateau, by the study of two other lake catchments.