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Holocene aeolian sediments on the NE Tibetan Plateau

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The semiarid climate of the northeastern Tibetan Plateau supports the formation of different types of aeolian sediments and landforms during the Holocene. Aeolians silts and sands in the catchment of the Donggi Cona in an elevation above 4000m to 4800 m asl reflect variable climate conditions during that time as well as different sediment sources. Based on 51 OSL datings and catchment wide geomorphological mapping a complex pattern of long and short distance sediment transport has been reconstructed. Only few aeolian archives are preserved from the late Pleistocene in this mountain environment indicating cold and dry climate conditions which prevented a continuous accumulation. During the early Holocene a phase of increased aeolian sedimentation of sand at the slopes of the mountains has been reconstructed. The sand originated from a large alluvial fan which was highly active during the Pleistocene. In addition, a thin loess cover is preserved at a few sites in the neighboring mountains ranges. The sedimentation of the loess started around 2000 years later than the sedimentation of the sand at the foot slope. Both archives are related to an increase in precipitation at the northern margin of the Tibetan Plateau which was related to a strengthening of the Asian Monsoon during that time. The wetter climate conditions favored the development of a vegetation cover which leads to the trapping and fixation of the aeolian sediments. However, with a further strengthening of the Monsoon systems these archives subsequently eroded due to higher run off and accumulated as colluvial and fluvial deposits in the basins. These phase lasted until 6 ka. A second aeolian period started at around 3 ka with the formation new dunes in the basins. This period can be associated with dry and cold climate of the late Holocene supporting the reactivation of the sand in the area. This might be further enhanced by an increased human impact by grazing during the late Holocene and resulting vegetation degradation and soil erosion. Furthermore additional new sediment sources have been available due to falling lake levels of the nearby Donggi Cona. This research has been done in the frame of the project ‘Landscape and Lake-System Response to Late Quaternary Monsoon Dynamics on the Tibetan Plateau - Northern Transect’ which has been founded by the German Science Foundation (DFG) as part of the SPP 1372: Tibetan Plateau – Formation, Climate, Ecosystems.