



## **Tapping the Late Pleistocene-Holocene environmental change and alluvial geoarchaeology in Central Asia**

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We integrate the environmental history derived from spatial-temporal variability of multi proxies and the prehistory of arid lands from archaeological data in Central Asia in order to determine the relationship between the Holocene river dynamics, climate change and floodwater farming. This study addresses to developing fluvial achieves and geoarchaeological records from the Talgar catchment, a south-bank tributary of the Ili River and the Talas catchment, a east-bank tributary of the Syr Darya River, in the southern Kazakhstan. The catchments of these steppe rivers flowing northwest had favorable habitats for farming from the Eneolithic to the medieval period as appears from human settlement histories documented with archaeological surveys and in some cases excavations. The river development has been reconstructed over the last 20,000 years and the key archaeological sites have been dated with radiocarbon. Periods of Holocene river aggradation and high water in downstream Lake Balkhash and Aral Sea correspond with cooler and wetter neoglacial episodes while river entrenchment and floodplain soil development are associated with warmer and drier conditions. Floodwater farming in the Talgar River reached its height in the late Iron Age (400-200 cal. BC) with more than 70 settlement sites and 700 burial mounds, and in the Talas River during the medieval period. This corresponds to a period of reduced flood flows, river stability and glacier retreat in the Tien Shan headwaters. A new hydroclimatic-based model for the spatial and temporal dynamics of floodwater farming is proposed, which explains settlement patterns since the first documented use of irrigation in the Iron Age and medieval times. The undertaken research highlights the Holocene human adaptations to the environmental change of floodplains in Central Asia.