



## **Impact of climate variability on human activities in the Aral Sea Basin during the late Holocene**

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The Aral Sea Basin is a critical area for unravelling the influence of climate variability and anthropogenic impact on environmental change. Based on a high-resolution multi-proxy approach performed on organic and inorganic proxies, the chronology of climate change of the last 2000 years was established for the Aral Sea Basin and western Central Asia. Dinoflagellate cyst assemblages from a sediment core retrieved in the northern part of the Aral Sea were used to reconstruct lake-level and salinity variations both reflecting the hydrographic development of the Aral Sea during the past 2000 years as controlled by the river run-off from Pamir and Tien Shan, which is ultimately controlled by westerly activities and melting temperatures. Furthermore, we performed high-resolution pollen analyses to quantify moisture conditions in the hinterland as controlled by humidity brought on NE trajectories from the Eastern Mediterranean during late winter and early spring. Finally, with high-resolution geochemical and microfacies analyses we assessed the role and the scope of wind dynamics onto sedimentation in the Aral Sea, and linked variations in detrital input to changing dynamics as controlled by the Siberian High Pressure Cell during early spring time. Combined with the settlement history of the last few 1000 years we improved the understanding of the forcing factors regulating climate variability and modulating human activities in the Aral Sea Basin. An important lake-level fall occurred during the 13<sup>th</sup>

century, as inferred from dinoflagellates cyst assemblages, and corresponds to the time period when Kerderi (a settlement at an altitude of 32 m a.s.l. still partly under water today) was built and Pulzhaj, in the southern part of the Aral Sea, was reoccupied. There is clear evidence for a climatic cause for the resettlement events, which onward may have been further amplified by human activities (war, irrigation).