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Holocene climate and landscape evolution in central Mongolia

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Research on Holocene climate evolution in Central Asia has been largely restricted to the deserts of northwestern China and the boreal areas along the Mongolian-Russian border. Yet, only few studies have been conducted to understand the reaction of the vast, extremely continental steppe areas on climatic fluctuations and more information is required to understand the interplay of monsoon and westerlies in this region.

We studied Holocene climate and landscape evolution in the Ugii Nuur basin (47°44'N, 102°46'E), Mongolia, using lake sediments and terrestrials sediments. The study site gains relevance not only because it is situated in the poorly investigated region of Mongolia. Moreover, it is part of the Orkhon Valley that hosts various archeological sites that document an anthropogenic influence for the last ~ 3000 years.

Our results show that the Ugii Nuur basin experienced climatic fluctuations that led to dryer periods than present during the Early and Middle to Late Holocene. These phases most likely led to an activation of dune fields while wetter periods point at increased dust trapping by a denser vegetation cover. The juxtaposition of denser vegetation and dust sources suggest a rather complex relationship between climatic evolution and Earth surface processes. How humans have effected this system since their first settling in this area remains to be elucidated.