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Mid-late Holocene hydroclimate variation in the source region of the Yangtze River revealed by lake sediment records

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The headwater region of the Yangtze River serves as major constituent of Chinese Water Tower and is critical in providing fresh water for hundreds of millions of people living downstream. Hydrological variation is mainly influenced by environmental changes. Therefore, a good understanding of climate changes in the source region of the Yangtze River (SRYR) is of great significance. Here, we provide a lacustrine sediment core from Saiyong Co in SRYR, northeastern Tibetan Plateau, China, to reconstruct hydrological variation and the main influencing factors based on the analysis of grain size, scanning XRF, loss on ignition (LOI), which cover the past 6 ka. It is remarkable that total organic matter (LOI-550) exhibits opposite patterns regarding to the PC1 of XRF, which represents the allochthonous input, indicating the majority of organic matter was mainly yielded within the lake. Clustering of palaeohydrological proxies, such as the reduced PC1 and increase in median grain size, seems coincide with the weakened strength of the Indian summer monsoon, which suggest a generally dry trend in the SRYR during the mid-late Holocene. However, short pulses of outrageous period occurred at 3.8-3.2 ka BP and 1.5-1.0 ka BP. The abrupt increase in PC1 and very coarse silt indicate the lake catchment became more humid with higher surface runoff, which is consistent with weaker lake productivity. The inferred hydrological change in SRYR since 6 ka BP not only have significant environmental influence, but also agree with other sequences from Tibetan Plateau and the adjacent regions This study provides long-term records of paleoenvironmental evolution which is particularly significant to understand recent and to predict future hydrological change in SRYR.