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Mid- to Late Holocene climate development in Central Asia as revealed from multi-proxy analyses of sediments from Lake Son Kol (Kyrgyzstan)

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A mid-Holocene shift from predominantly wet to significantly drier climate conditions, attributed to the weakening of the Asian summer monsoon (ASM), is documented in numerous palaeoclimate records from the monsoon-influenced parts of Asia, e.g. the Tibetan Plateau and north- and southeastern China. In contrast, Holocene climate development in the arid regions of mid-latitude Central Asia, located north and northwest of the Tibetan Plateau, is less well-constrained but supposed to have been influenced by a complex interaction between the mid-latitude Westerlies and the ASM. Hence, well-dated and highly resolved palaeoclimate records from Central Asia might provide important information about spatio-temporal changes in the regional interplay between Westerlies and ASM and thus aid the understanding of global climate teleconnections. As a part of the project CADY (*Central Asian Climate Dynamics*), aiming at reconstructing past climatic and hydrological variability in Central Asia, several sediment cores were recovered from alpine Lake Son Kol (41°48'N, 75°12'E, 3016 m a. s. l.) in the Central Tian Shan of Kyrgyzstan. A radiocarbon-dated sediment sequence of 154.5 cm length, covering approximately the last 6000 years, was investigated by using a multi-proxy approach, including sedimentological, (bio)geochemical, isotopic and micropalaeontological analyses. Preliminary proxy data indicate hydrologically variable but predominantly wet conditions until ca. 5100 cal. a BP, characterized by the deposition of finely laminated organic-carbonatic sediments. In contrast to monsoonal Asia, where a distinct trend towards drier conditions is observed since the mid-Holocene, the hydrologically variable interval at Lake Son Kol was apparently followed by an only short-term dry episode between ca. 5100 and 4200 cal. a BP. This is characterized by a higher δD of the C29 n-alkanes, probably reflecting increased evapotranspiration. Also pollen, diatom and ostracod data point towards drier climate conditions. Higher δ^{15}N values during this period may also reflect increased evaporation but could also be related to dust input of NO_x, being in agreement with high amounts of fine-grained minerogenic material. Further periods of higher δ^{15}N values and contents of fine-grained minerogenic material occurred at 3600–3000 and 2000–1600 cal. a BP. However, as biogeochemical data indicate no further distinct dry episodes since about 4200 cal. a BP, these intervals most probably reflect increased dust deposition. Finally, a trend towards wetter climate conditions can be observed during the last ca. 1500 years, reflected by high ostracod and diatom diversity and (bio)geochemical data. The absence of a pronounced drying trend since the mid-Holocene, as observed in monsoonal Asia, is largely consistent with results from other regional palaeoclimate records and might reflect the predominant influence of the strengthening mid-latitude Westerlies on regional climate since this time.