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Tracing Holocene hydrological changes in the Central European lowlands

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Assessing future regional hydrological changes requires a good understanding of different components of the water cycle in a landscape (e.g. glaciers, lakes, rivers, peatlands, and vegetation) and how they have developed in the past. However, not all hydrological responses are directly driven by climate. A specific archive or hydrological proxy could indicate hydrological shifts also when vegetation changes, because certain types of land cover affect groundwater recharge and runoff differentially. In addition, humans can alter regional hydrological cycles when affecting drainage systems or land cover, especially in landscapes with a long history of human impact. Hence, local water level changes can reflect feedbacks between catchment and vegetation characteristics and human impact superimposed by climate change on multiple temporal scales (Dietze et al., 2016).

The central European lowlands (i.e. N Germany and N Poland) represent an ideal area to test these interactions. It is a geologically young landscape with abundant lakes and peatlands formed during and after the last deglaciation. Land cover and human settlement history is well-known. Lakes are mainly groundwater-fed and show a high sensitivity to water balance changes across different time scales (Kaiser et al., 2015). Here, we assess the current state of paleohydrological knowledge by presenting an overview of published approaches to reconstruct relative and absolute water level changes in the area. We assess what proxy information is available (locations, time periods and resolution, type of proxy, quality of age models) and what drivers of paleohydrological change have been discussed. We will test a statistical approach to combines records of different sites into regional composites that can be compared with regional records of vegetation history, paleohydrological information from models and proxies for human land cover change. This study is a further step towards quantification of the influence of certain drivers on paleohydrological change across time scales in such a landscape.

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