

## **Paleolimnological record of the climate and pre-historic settlement from chalk karst region (Chełm Hills, SE Poland)**

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The multi-proxy study (subfossil Cladocera and Ostracoda, palynology, sediment chemistry, stable isotopes) of the sedimentological record from three, closely situated, shallow lakes reveals multiple interactions between the lake ecosystems and the main drivers of their mid- and late-Holocene development – climate changes and human actions within their vicinity. Such multi-proxy studies, built upon four complete cores obtained from three nearby situated sites, provide us with a unique advantage/opportunity to disentangle climate and human influence, as well as to trace in detail the ecosystem response. Starting from the Atlantic period, the favourable natural conditions of the Chełm Hills region (mainly rich, workable soils) attracted early settlement more than did nearby regions. This settlement grouped with close vicinity to natural water sources: lakes and small river valleys. Despite the rather low impact of the early settlement on the natural environment, its traces can be made visible from the pollen record of lake archives, as well as from eutrophication signals revealed by subfossil Cladocera and Ostracoda. In this study, three main settlement phases were noted. Herein, hemp retting practices were identified for all the lakes. This is put forward as the most profound factor in this lake ecosystem development (resulting, among other issues, in severe anoxia) and therefore, it was studied in detail as well as the issue of its further recovery.