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Short-term Holocene climate oscillations recorded in Lake Gościąż sediments, Central Poland

Alicja Bonk (1), Michał Słowiński (1), Rik Tjallingii (2), Agnieszka M. Noryśkiewicz (3), Katarzyna Luberda-Durnaś (4), Markus Schwab (2), Mateusz Kramkowski (1), Achim Brauer (2), and Mirosław Błaszkiewicz (1)

(1) Institute of Geography PAS, Department of Environmental Resources and Geohazards, Warsaw, Poland, (2) GFZ German Research Centre for Geosciences, Potsdam, Germany, (3) Institute of Archelogy, Nicolaus Copernicus University, Toruń, Poland, (4) Institute of Geological Sciences, Polish Academy of Sciences, Kraków, Poland

The 2015 drilling of Lake Gościąż (52o35'N, 19o21'E) provides a crucial eastward extension of existing paleoclimatic and paleoenvironmental records based on annually laminated sediments of lakes Meerfelder maar, Rehwiese, Tiefer See and Czechowskie. Modern high-resolution analysing techniques of the varved sediments of Lake Gościąż will provide new details on the natural response to Holocene climate changes. The lake located in the Płock Basin (Central Poland) and belongs to a complex of four connected lakes, which are connected by the Ruda River and form the Na Jazach lake system. Lake Gościąż consists of a smaller northern basin (Tobyłka Bay) and the main basin with a maximum depth of 22 m.
A set of cores collected from the deepest part of the main basin provides, except of the topmost part, a continuous sequence of varved deposits down to glacial sands. The composite sediment profile was obtained by stratigraphic correlation based on macro- and microscopic comparison of well-preserved laminations and diagnostic horizons. The preliminary chronology and its uncertainty is based on multiple varve counting. The varve chronology is supported by radiocarbon datings and palynological analysis. Due to a lack of the plant remains in the lowermost part of the core, pollen biostratigraphy was used to determine Younger Dryas/Preboreal transition that is marked by the appearance of Alder.
The sediment record shows distinct sedimentological changes and shifts in the varve microstructure. The PXRD analysis reveals that these sedimentological changes show variations form results here. Additionally, these changes coincide with major shifts in geochemical records obtained from μXRF core scanning that reveal several short-term Holocene oscillations. Climatic events as 8.2 ka, 4.2 ka, and 2.8 ka seem to be apparent in the XRF records. However, further studies have to be taken to describe the duration of the oscillations and their influence on the lake system and the landscape.
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