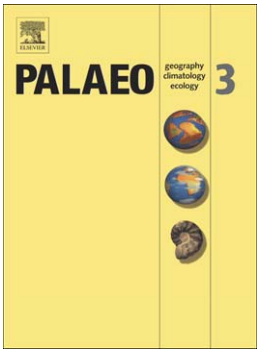

Reconstructing climate change and ombrotrophic bog development during the last 4000 years in northern Poland using biotic proxies, stable isotopes and trait-based approach

M. Lamentowicz, M. Gałka, Ł. Lamentowicz, M. Obremska, N. Kühl, A. Lücke, V.E.J. Jassey

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Lamentowicz M.[1,2], Gałka M.[2], Lamentowicz Ł.[3], Obremska M.[4], Kühl N.[5], Lücke A.[6], Jassey V.E.J.[1,2,7,8]

[1] Laboratory of Wetland Ecology and Monitoring, Faculty of Geographical and Geological Sciences, Adam Mickiewicz University, Dzięgielowa 27, PL–61 680 Poznań, Poland, phone number: +48618296212, email: mariuszl@amu.edu.pl

[2] Department of Biogeography and Paleoecology, Adam Mickiewicz University, Dzięgielowa 27, 61-680 Poznań, Poland

[3] Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland

[4] Institute of Geological Sciences, Polish Academy of Sciences, Twarda 51/55, 00-818 Warsaw, Poland

[5] Steinmann Institute of Geology, Mineralogy and Paleontology, University of Bonn, Nussallee 8, D-53115 Bonn, Germany

[6] Institute of Bio- and Geosciences, IBG-3: Agrosphere, Forschungszentrum Jülich, D-52425 Jülich, Germany

[7] School of Architecture, Civil and Environmental Engineering (ENAC), Ecole Polytechnique Fédérale de Lausanne EPFL, Ecological Systems Laboratory (ECOS), Station 2, 1015 Lausanne, Switzerland

[8] Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), Site Lausanne, Station 2, 1015 Lausanne, Switzerland

Abstract

In this study, we present a record spanning the last 4000 years from a Baltic bog (Kusowskie Bagno) in northern Poland. Using numerous biotic and abiotic proxies, such as testate amoebae (depth to water table reconstructions), stable carbon isotopes (^{13}C), plant macrofossils (proxies for local vegetation and mire surface wetness), pollen and spores (proxies for regional vegetation and human impact), We reconstructed and identified the regional hydro-climatic signal of Kusowskie Bagno bog and compared it to other bog records around the Baltic Sea. Our aims were to: 1) combine the species traits of bryophytes and testate amoebae, and more common proxies (isotopes, plant micro-and macro-remains) to infer past peatland development, 2) compare the hydro-climatic signal of Kusowskie Bagno bog to existing records around the Baltic Sea. We found that Kusowskie Bagno bog was very wet during the last 4000 years, and even drainage and peat exploitation had not disturbed its hydrology in northern part in the last 200 years. Carbon isotopes and plant macrofossils were significantly related to specific traits of testate amoebae, which in turn reflected the water table changes over the last 4000 years. Kusowskie Bagno recorded at least the following wet shifts: AD 250, 550, 850, 1250 and 1700, while wet conditions occurred during the Migration period at ca AD 550. Furthermore, the testate amoeba-based quantitative wetness reconstruction in Kusowskie Bagno bog resembles the pattern observed in other sites around the Baltic, i.e., Estonia, Finland, Ireland, northern Britain and the 7500-year record from the Stążki bog, northern Poland. Our results provided statistically validated evidence that interactions between plant and microbe need