



## **Anthropogenic impact on the sediment record from Lake Czechowskie (N-Poland) based on heavy metal contents in combination with high-resolution pollen and varve data: Geochemical background vs enrichment history and landsurface changes**

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For Czechowskie Lake, situated in a rural environment in N-Poland, we present a detailed heavy metal enrichment history for Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, and Zn for the last two hundred years at 1 cm intervals from an annually laminated sediment core and the near-by lake sediment record of Lake Głębczek. To determine local geogenic background values for the lake different types of Holocene lake sediments (e.g. calcareous gyttja, organic gyttja etc.) were analyzed for their heavy metal concentrations. On the base of these results enrichment factors were calculated that represent the anthropogenic heavy metal deposition. This data is supplemented by on average five year resolution pollen record for the last 700 years. Based on vegetation changes (e.g. arboreal % such as Pinus and Carpinus betulus; Cerealia %; charcoal pieces), heavy metal input (mainly Pb, Zn and Cd), varve thickness, and precise varve dating ( $\pm 3a$  years for the last 200a and  $\pm 8a$  years for the last 700a) five phases of significantly lower human activity interrupted by stronger human impact were distinguished. Strongest declines in anthropogenic pressure on the landscape are related to periods following war or economic regression and subsequent regeneration. Our results provide means to calculate and quantify with sub-decadal resolution anthropogenic impact as well as to define regional measures for a state of reference, reflecting natural conditions without human impact.