



Heavy Metal Enrichment History in annually laminated Lake Tiefer See (NE-Germany) and Lake Czechowskie (N-Poland)

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Within the Virtual Institute of Integrated Climate and Landscape Evolution Analyses (ICLEA) high-resolution geo-archives (e.g. lakes as natural data loggers) of the northeastern German and northern Polish lowlands are investigated to identify influences of land-use on the landscape evolution.

For two annually laminated lake sediment records, situated in rural environments in NE-Germany (Lake Tiefer See) and N-Poland (Czechowskie Lake), 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. Both lakes show a similar pattern of relatively low heavy metal concentrations if compared to the so-called index of geoaccumulation (Müller 1979), which is based on the average global metal content in shales (Turekian and Wedepohl, 1961). Only Pb, Zn and Cd show a clear parallel pattern of enrichment in both lakes starting around 1850 according to mainly atmospheric input due to increasing industrialization within the framework of the Industrial Revolution. Highest input for Cd, Zn, and Pb occur around 1960 to 1980 and thereafter a clear pattern of declining anthropogenic input is registered.

On the base of heavy-metal analysis of pre-industrial sediments and different sediment types (e.g. calcareous gyttja, organic gyttja etc.) the local and specific geogenic background values for various metals are determined. These results provide means to calculate and quantify with sub-decadal resolution anthropogenic heavy metal accumulations and enrichment factors as well as to define regional measures for a state of reference, reflecting natural conditions without human impact.

Müller, G. (1979): Schwermetalle in den Sedimenten des Rheins – Veränderungen seit 1971. *Umschau* 79: 778-783.

Turekian, K. and Wedepohl, K. (1961): Distribution of the elements in some major units of the earth's crust. *Bull. Geol. Soc. Am.* 72: 175-192.