



Stable isotope record in annually laminated lake sediments from Lake Żabińskie (NE Poland) for the last millennium.

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Stable isotope record of carbon (^{13}C) and oxygen (^{18}O) has been analysed from an annually laminated sediment from Lake Żabińskie (Mazurian Lakeland, NE Poland) with high resolution (1-3 yrs).

The sediment layers which were formed in each year during the last millennium contain information about environmental changes in the past. The calcite layers are formed in lake sediment in warm months of the year, therefore the reconstruction of summer climate variables in the past is potentially possible. The investigation of correlation between isotope dataset and instrumental climate data for years 1897-2008 AD confirmed that theory. The record of temperature, precipitation and SPEI (Standardised Precipitation Evaporation Index) coefficient, which is a combination of both temperature and precipitation, was tested. The strongest linear correlations were found for most samples for June, July, August (JJA) months but in some cases the correlation coefficient was stronger when also May was taken into account. For the whole 120-yr series the correlation between $\delta^{18}\text{O}$ and average JJA temperature is 0.007, average JJA precipitation is 0.16 and average JJA SPEI is 0.20. Analyzing the results for 1897-2008 we can distinguish period 1960-2008 with relevantly stronger correlations: $R(\text{temperature}) = 0.19$, $R(\text{precipitation}) = 0.20$ and $R(\text{SPEI}) = 0.45$. This period is connected with cessation of human activity close to Lake Żabińskie.

Reconstruction of climate variables for the last millennium was made using transfer function obtained for calibration period (1897-2008). Reconstructions showed that known climate extremes like Medieval Warm Period, Little Ice Age with Sporer (1420-1570), Maunder (1645-1715) and Dalton (1790-1820) Minimum was recorded in sediment from Lake Żabińskie.

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<http://www.climpol.ug.edu.pl>