



Recent climatic instability in Poland and effect of Little Ice Age on human activities

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We present a multi-proxy study carried out on a one-metre core retrieved from SŁ owinskie BŁ oto, an ombrotrophic mire located in Pomerania (North Poland). Multi-proxy analyses of lead isotopic geochemistry, pollen, testate amoebae, plant macrofossils (including *Sphagnum* species) and AMS ¹⁴C dating were used to reconstruct human impact and climate changes during the last ca. 1300 years. Several proxies show extreme environmental changes during the Little Ice Age (LIA). Principal component analysis performed on plant macrofossils indicates important water table fluctuation with a trend to dry conditions between 50.5 cm and 16.5 cm (*i.e.* from ca. A.D. 1200 to ca. A.D. 1980), intercalated by several short term wet shifts. Pollen data show the beginning of Medieval deforestation at ca. A.D. 1200 along with the beginning of *Secale* cultivation. Furthermore, testate amoebae show water table fluctuations in the mire with predominating dry conditions. Calculation of soil dust flux using titanium allowed us to record both the deforestation and the LIA, peaking at maximum dust flux values of 200 $\mu\text{g cm}^{-2} \text{yr}^{-1}$, which are four times higher than the early medieval

background flux values. Peat accumulation rates were also lowest during this period, reflecting disturbance in peat accumulation. Lead isotopes indicate that the predominant anthropogenic lead source is the mining of Polish Pb-Zn ores. However, lead and sulphur enrichment factors record minimum values during the LIA, which suggests that this climatic deterioration may have impacted upon local mining activities.