Reconstructing 1,500 years of sediment history from North Poland using Pb isotopes

HEIDI B. BABOS[1,2,3], STUART BLACK[3], ALEKS PLUSKOWSKI[3], ALEX BROWN[4], ANTHONY CHAPPAZ[1,2,4]

[1]Department of Earth and Atmospheric Science, Central Michigan University, Mt. Pleasant, MI, USA

[2]Institute for Great Lakes Research, Central Michigan University, Mt. Pleasant, MI, USA

[3]Department of Archaeology, School of Archaeology, Geography and Environmental Sciences, University of Reading, Whiteknights, Reading, Berkshire, UK

[4] Department of Chemistry and Biochemistry, Central Michigan University, Mt. Pleasant, MI, USA

Lead (Pb) isotopes can be used to identify natural versus anthropogenic sources of lead[1]. Few studies involve pre-industrial environmental records in North-Eastern Europe. This gap in knowledge limits our understanding of Pb sources and the importance of human activities over the last 1,500 years for the region. Two lake cores were collected from Lake Radzyń Chełmiński with a nearby Teutonic Castle, and Lake Rywałd, representing a pristine environment. The sediment cores were analysed for total Pb concentration and Pb isotope ratios ($^{206}Pb/^{207}Pb$, $^{208}Pb/^{206}Pb$, $^{208}Pb/^{207}Pb$). Each lake core also had extensive ^{14}C dates giving high resolution chronologies. Our data suggests the Pb isotopic signature for both lakes was strongly influenced by regional Pb-Zn mining activities occurring in South-Western Poland. Significant shifts in Pb concentration and isotopic signature were recorded as early as the 10th century and during the Crusading period.

[1] Tyszka, Pietranik, Kierczak, Ettler, Mihaljevič, & Weber (2012), *Applied Geochemistry*, *27*(6), 1089–1100.