

Reconstructing Zn pollution sources in the Irish atmosphere from its biogeochemistry in ombotrophic peat

Carolina Rosca^{1*}, Emma L Tomlinson¹, Ronny Schoenberg², and Balz S Kamber¹

¹Department of Geology, Trinity College Dublin, Dublin

²Department of Geochemistry, University of Tuebingen, Germany

**presenting author (crosca@tcd.ie)*

The global demand for Zn has increased dramatically during the last 3 decades. This has resulted in significant pollution of the Earth's surface environment, evident as increases in Zn concentrations in the top layers of many surface archives, such as ice cores, snow packs, soil sections, peat cores, and lake sediment cores. Because Zn is a ubiquitous metal in a vast range of industrial products, ranging from sun-screen, plastics, car tires, anti-corrosion skins etc., there is a diversity of Zn sources, making it difficult to unravel and quantify different contributions deposited into a particular site.

The aim of this study was to reconstruct the airborne Zn pollution from local and transregional sources over Ireland – one of the most significant Pb-Zn mining nations in Europe. To this end, we have investigated the depositional history of Zn over the last 500 years into the ombotrophic (rain-fed) peat of the Liffey Head bog, Wicklow Mountains. Our results show a continuous increase in anthropogenic Zn from 0.9 ppm to 4.1 ppm between 1525AD and present day. We also investigated the isotope composition of the deposited Zn and found an evolution from originally heavy ($\delta^{66}\text{Zn}_{\text{JMC-Lyon}}=0.8\text{‰}$) to significantly lighter ($\delta^{66}\text{Zn}_{\text{JMC-Lyon}}=0.2\text{‰}$) values in the most recent peat, in general agreement with findings of other peat studies around the northern Hemisphere. These observations, combined with other metal concentration histories (Pb, Cd, Ag) will be discussed in terms of source, Irish mining history, and Zn mobility within the core.