

Anthropogenic and geogenic lead budget of sediments from An Loch Mór, Inis OíRR , W. Ireland.

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Preliminary results of geochemical investigations of lake sediments from An Loch Mór, Inis OíRR, the smallest of the Aran Islands that lie off the western coast of Ireland, are presented. Sediment sources include drift, carbonate bedrock, surface and groundwater inflow, and aeolin input (sea spray, dust). The lead isotopic composition was determined for 25 sediment samples and local bedrock, soils, and dunes. The clay-dominated lowermost samples fall in a tight cluster in the lead isotope diagram. The remaining sediment samples with $Pb/Sc < 5$ (geogenic background) define a linear trend in the $^{206}Pb/^{204}Pb$ - $^{207}Pb/^{204}Pb$ and $^{206}Pb/^{204}Pb$ - $^{208}Pb/^{204}Pb$ diagrams that, in comparison to the lead of the clay section, is slightly offset to more radiogenic compositions. This offset is due to c. 5-10% contribution of carbonate bedrock lead to the total lead budget of the sediments. On the basis of the distinct Pb isotope composition, local sources as an explanation for the linear Pb trend can be excluded. We propose, the lead trend is defined by two remote components, that have been accessible for wind erosion on a regional or even global scale. The radiogenic component is isotopically similar to the clay samples. The lead trend may be highly determined by temporal variation in these two different sources, which in turn, might be related to variation in prevailing wind patterns and vegetation cover. Sediment samples with $Pb/Sc > 5$ fall off this lead trend to less radiogenic lead compositions. These samples show 2-4 times higher lead contents than normal samples. The largest lead anomalies correspond to 19th century industrialization, and Roman lead mining activities and silver cupellation. In the latter case the isotopic composition of the excess lead indicates that it could be derived from Iberian and/or British Roman mining sites.