

“Non-traditional” stable isotope analysis as tracer to identify sources and sinks of inorganic contaminants in riverine environments

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Environmental monitoring of complex ecosystems requires reliable and sensitive techniques in order to identify the source, fate and sink of inorganic, anthropogenic contaminants in e.g. aquatic ecosystems.

This contribution presents large scale isotopic data of B, Zn, Sr, Nd and Pb, measured via MC ICP-MS, for water and sediment samples of two major European rivers (Rhine, Elbe). The aim was to apply stable isotope analysis as new, potential tracer to elucidate processes involving anthropogenic metal emissions, as well as to characterize the catchment areas for further studies.

Within this context we analyzed the Zn isotopic composition, to potentially trace anthropogenic Zn emission on a large regional scale. The combination of dissolved B and Sr isotopic compositions may be used to distinguish different inputs into river systems, and provide insight into possible sources of B inputs. Furthermore, Sr, Nd and Pb isotope data can give valuable information for source attribution of sediment masses

Our results clearly indicate that the exclusive focus on the quantitative analysis of metal contamination within the context of environmental research provides only limited information. The progress achieved in isotope ratio analysis over the last decade therefore opens valuable additional information for environmental scientists.