



## **Multi-isotope tracers to investigate processes in the Elbe, Weser and Ems river catchment using B, Mo, Sr, and Pb isotope ratios assessed by MC ICP-MS**

Johanna Irrgeher (1), Anna Reese (1,2), Tristan Zimmermann (1,2), Thomas Prohaska (3), Anika Retzmann (3), Michael E. Wieser (4), Andreas Zitek (3), and Daniel Proefrock (1)

(1) Helmholtz-Centre Geesthacht, Institute of Coastal Research, Marine Bioanalytical Chemistry, Max-Planck Str. 1, 21502 Geesthacht, Germany, (2) University of Hamburg, Department of Chemistry, Inorganic and Applied Chemistry, Martin-Luther-King-Platz 6, 20146 Hamburg, Germany, (3) University of Natural Resources and Life Sciences Vienna, Dept. of Chemistry, Division of Analytical Chemistry, VIRIS Laboratory, A-3430 Tulln, Austria, (4) University of Calgary, Dept. of Physics and Astronomy, Stable Isotope Laboratory, 2500 University Dr NW, Calgary, Alberta, T2N 1N4, Canada

Environmental monitoring of complex ecosystems requires reliable sensitive techniques based on sound analytical strategies to identify the source, fate and sink of elements and matter. Isotopic signatures can serve to trace pathways by making use of specific isotopic fingerprints or to distinguish between natural and anthropogenic sources. The presented work shows the potential of using the isotopic variation of Sr, Pb (as well-established isotopic systems), Mo and B (as novel isotopic system) assessed by MC ICP-MS in water and sediment samples to study aquatic ecosystem transport processes.

The isotopic variation of Sr, Pb, Mo and B was determined in different marine and estuarine compartments covering the catchment of the German Wadden Sea and its main tributaries, the Elbe, Weser and Ems River. The varying elemental concentrations, the complex matrix and the expected small variations in the isotopic composition required the development and application of reliable analytical measurement approaches as well as suited metrological data evaluation strategies. Aquatic isoscapes were created using ArcGIS<sup>®</sup> by relating spatial isotopic data with geographical and geological maps. The elemental and isotopic distribution maps show large variation for different parameters and also reflect the numerous impact factors (e.g. geology, anthropogenic sources) influencing the catchment area.