From source to sink: A multi-isotope approach to investigate riverine inputs into the German North Sea

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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 and understand pollution dynamics and the discharge characteristics of riverine inputs into the German Bight representing a complex, anthropogenically impacted aquatic ecosystem. The presented work shows the potential of using the isotopic variation of Sr, Pb, Mo and B assessed by MC ICP-MS in water and sediment samples to study aquatic ecosystem transport processes. Different marine and estuarine compartments (sampled between 2014 and 2017), covering the catchment of the German Wadden Sea and its main tributaries, the Elbe, Weser and Ems River, were analysed. The elemental and isotopic distribution maps, created using ArcGIS®, show large variation for different parameters and also reflect the numerous impact factors (e.g. geology, anthropogenic sources) influencing the catchment area.