

Secondary mobilisation of heavy metals in overbank sediments

Overbank sediments are a widely used sampling medium for geochemical mapping and ore exploration. In industrial areas, the pollution history of a river catchment is generally reflected in the geochemical signature of pollutants in overbank sediments.

The secondary (chemical) mobilisation of heavy metals in overbank sediments may however affect the geochemical record carried by the sediments that were deposited over time. This can negatively affect the reconstruction of the pollution history of the river catchment and the deduction of background values for trace elements. Post depositional mobilisation is also important from an environmental point of view because leaching of heavy metals from overbank sediments can affect the quality of surface waters and groundwater and thus act as a secondary source of pollution.

The susceptibility of contaminated soils and sediments to chemical remobilisation is mainly dependent on changes in pH, redox, salinity and DOC. Data on heavy metal emission into a river located in central Belgium were combined with geochemical analysis and ¹³⁷Cs dating of overbank sediments to reconstruct the pollution history of the river catchment. Heavy metal mobility in overbank sediments was studied by single and sequential extractions and leaching tests. A considerable remobilisation of Cd was apparent from the data. As confirmed in leaching tests, the elevated CaCl₂ content of the riverwater significantly enhanced the mobilisation of especially Cd and Cu, Ni, Zn to a lesser extent. Although the discharge of heavy metals into the river has drastically decreased during the last few years, the contaminated overbank sediments still represent a considerable environmental hazard