Cu-Zn-Pb multi isotopic characterization of a small watershed (Loire river basin, France)

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Tackling metal pollution in surface water is a major environmental, public health and economic issue. Knowledge of the behavior of metals, such as Cu, Zn and Pb in sediments and dissolved load, is a key factor to improve the management of rivers. The goal of this study is to use the Cu-Zn-Pb multi-isotopic signature to track the pollutions in surface water, and to understand the complex processes causing the metals mobilization and transport in environment. As case study, we chose a small watershed impacted by the releases rich in metals coming from a Plant Treatment Waste Water. A sampling of these liquid effluents as well as dissolved load and sediments from upstream to downstream was achieved for one year and a half. For dissolved load, a "grab" sampling and an integrated sampling using passive samplers DGT were carried. The labile fraction of sediments was Isotopic also investigated. ratios were measured using a MC-ICPMS at the BRGM, after a protocol of purification. The Pb, Cu and Zn isotopic analyses of sediments and dissolved load showed the contribution of anthropogenic pollution in these natural samples. The Cu and Zn isotopic compositions of the labile sediment fraction were impacted by the physico-chemical processes which take place from upstream to downstream in the river (dissolution...).