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# Metal fractionation study on suspended particulate matter of a river system affected by smelting-waste drainage: The Lot-Garonne River system (France)

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The fractionation of particulate trace metals was investigated during one year of monthly sampling of suspended particulate matter (SPM) at eight sites along the Lot-Garonne fluvial system, known for its polymetallic pollution. The metal fractionation in five operationally defined fractions (exchangeable/carbonate, Fe/Mn oxides, organic matter/sulfides, acid soluble, residual) was determined using a multiple single extraction approach. This approach showed that Cd, Zn, Pb and Cu were mainly associated with acid soluble phases (84-95%, 65-88%, 61-82% and 55-80% of the respective total metal content), and therefore showed a high mean potential of mobilization and bioavailability. In the Riou-Mort River, draining the smelting-wastes, Zn, Cd and Mn showed high mobility as they were little associated with the residual fraction (1-2%) and mainly bound to the ‘exchangeable’ fraction of SPM (60-80%), probably weakly adsorbed on amorphous freshly-precipitated sulfide and/or oxide phases. Upstream and downstream of the anthropogenic source of metallic pollution, Mn and Cd, and Zn to a lesser extent, remained highly reactive. The other trace metals were mainly associated with the residual fraction and thus less mobile. However, the multiple single extraction scheme revealed that the most reactive transport phases were non-selectively extracted by the conventional extractants used here. These selectivity problems could not have been observed if sequential extraction was used.