



Mercury sedimentary record and solid phase speciation in reservoir lake sediments (Lot river system, south-west France)

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This work presents historic (~50 years) Hg records and particulate Hg speciation in sediment cores from a reservoir lake of the Lot River downstream from the confluence with the Riou-Mort River draining a small watershed polluted by former mining and ore treatment. Total Hg concentrations in the dated (137Cs) contaminated sediments are up to 30 mg.kg⁻¹, i.e. more than 300-fold higher than geochemical background measured in the same riverbed of a reference site in the upper Lot River, reflecting the evolution of industrial activities in Riou-Mort watershed. Despite a strong decrease of particulate Hg concentrations in the upper sediment since the early nineties, concentrations remain high compared to background values. Mercury concentrations are closely correlated with those of organic carbon and sulphur in sediments of the reference site and in the upper sediment layers of the contaminated site. In the deeper and heavily contaminated sediments, Hg is not correlated with organic carbon or sulphide concentrations. Selective extractions (modified Tessiers method) aimed to extract Hg associated with iron and manganese oxy-hydroxydes (0.1M ascorbate, pH 8) and the organic matter/sulphides (H₂O₂). Additionally, organo-chelated mercury was extracted by 1M KOH as this fraction has been reported to be strongly correlated with methylation potential. Ascorbate extracted Hg represents up to 30% of total Hg in the upper sediment of the contaminated site and was not detectable in the deeper, reduced sediment. Mercury extracted by H₂O₂ represents ~70% of total Hg, whatever the total concentration. Comparison of H₂O₂ and KOH extracted Hg fractions shows important differences, suggesting that Hg in the contaminated sediment is rather associated with sulphides than with organic matter.