



Trace metal geochemistry in a fresh water lake sediment

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Trace metal (Zn, Ni, Pb, Co, Cd) geochemistry was studied in the sediments of Haringvliet Lake, a coastal freshwater lake in the southwest of the Netherlands. This lake is part of the Rhine-Meuse river delta and has elevated trace metal concentrations due to anthropogenic sources in the watershed. Trace metal concentrations were determined in pore water and sediment extractions. Total trace metal sediment profiles correspond with input estimates based on historical trace metal concentrations observed in suspended particulate matter in the lake. Although trace metals do not exhibit a net physical redistribution in the sediment, there is evidence that reducing conditions in the sediment result in a transfer from oxide to sulfide binding phases. Extractions show that Ni and Co are associated with pyrite. Additionally, pore water speciation calculations suggest the formation of trace metal-monosulfides (Zn, Pb, Co, Cd). Acid volatile sulfide (AVS) was determined in the sediment and shows evidence of seasonal dissolution/oxidation. This suggests that under some conditions trace metal-sulfides may also act as a metal source. A diagenetic reactive transport model was applied to examine the rates of metal release and removal in the sediment.