

Fractionation and potential risk of heavy metals in surface sediment of Nansi Lake, China

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ABSTRACT

Fractionation of heavy metals in sediments can provide information on potential hazards of heavy metals. In this paper heavy metal pollution and release risk have been investigated by comparing total concentrations and fractionation of heavy metals (Cd, Cr, Cu, Fe, Pb, Mn and Zn) in Nansi Lake and the adjacent river sediments. Five chemical fractionations were extracted using Tessier's sequential extraction technique. The percentage of carbonate and exchangeable fractions to the total content in sediment metals were measured. The data denoted that most sediment in Nansi Lake suffered certain pollution from heavy metals to some extent. The average concentrations of metals showed that the sediment was severely impacted by Cr and Zn, moderately impacted by Cd, Pb, Cu and Mn, and then slightly impacted by Fe. According to the risk assessment code, when carbonate and exchangeable fractions are 31–50% or more than 50%, the sedimentary metal presented a high or very high risk, respectively. The results indicated that Cd, Pb, Zn and Cr are potentially more mobile and at high or very high risk. In contrast, most Cu and Mn (65.38% and 53.85%) showed a medium risk, while iron was dominantly associated with residual fractions, therefore was immobile and most appeared no risk (61.54%) or low risk (34.62%).

Keywords: Heavy metals; Sediment; Total content; Fractionation; Pollution; Potential risk

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