长江下游不同源沉积物中重金属特征及生态风险

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中文关键词 沉积物 重金属来源 生态风险 长江下游

英文关键词 source of heavy metal ecological risk the lower reaches of the Yangtze River

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中文摘要

不同来源沉积物中重金属的污染特性差异明显，影响了它们的危害程度.采集长江下游市政、矿山、工业及港口来源的沉积物，并用ICP-AES测定常量元素，原子吸收光谱测定Cu、Zn、Pb、Cd、Cr 5种重金属.结果表明，重金属在市政来源中含量中等且分布相对均匀，矿山来源的以Cu、Pb为主，工业来源的金属含量均较高，港口来源Cd的含量最高.重金属均有一定的富集，尤其是Cd的富集系数，最高达到7.3.通过重金属与常量元素的主成分分析研究了沉积物中重金属的来源，发现市政来源的重金属主要来自雨水冲刷城市下垫面及管道内壁，矿山来源重金属的特点由矿山开采及尾矿淋滤决定，工业来源重金属大多由机械碎屑和金属溶解产生，港口来源重金属主要是密集的运输船与车辆气体排放引起.采用Hakanson的生态风险指数法对不同来源沉积物中重金属进行风险评价，其单因子生态危害程度为Cd>Cu>Pb>Cr>Zn，综合潜在生态风险指数表明，不同来源重金属的危害程度依次为港口源>工业源>矿山源>市政源.

英文摘要

：Characteristics of heavy metals in sediments from different sources are significant varied,which impact on the degree of damage for aquatic system. Samples from municipal, mining, industrial and port sources in the lower reaches of the Yangtze River were analyzed for major elements and Cu, Zn, Pb, Cd, Cr by ICP-AES and AAS. The results showed that the concentrations were moderately and relatively uniform for heavy metals in the municipal source, Cu, Pb were dominated for the mine source. Five metals had higher concentrations in industrial source, and Cd was the highest in sediments from port source. The enrichment factors of heavy metals in sediments were high, especially Cd, up to 7.3.Through principal component analysis of major elements and heavy metals, it is concluded that heavy metals of municipal source stem from the erosion of road surface and inner pipeline in cities, heavy metals of mine source come from the mining and the leaching of tailings, heavy metals of industrial source are mostly generated by mechanical debris and metal dissolution, heavy metals of port sources are mainly from the transport ships and the intensive gas emissions from vehicles. The ecological risks of these sediments were evaluated with the Hakanson ecological risk index. It is concluded that the single factors of the ecological hazards for metals are Cd>Cu>Pb>Cr>Zn, the comprehensive index of potential ecological risks for metals from different sources decrease with port source>industrial source>mine source>municipal source.