

Potential Ecological Risk Assessment of Selected Heavy Metals in Sediments of Tidal Flat Marsh, the Case Study: Shuangtai Estuary, China

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Abstract : Heavy metals in sediments can cause adverse ecological effects while it exceeds a given criteria. The present study investigated sediment environmental quality, pollutant enrichment, ecological risk, and source identification for copper, cadmium, lead, zinc, mercury, and arsenic in the sediments collected from tidal flat marsh of Shuangtai estuary, China. The arithmetic mean integrated pollution index, geometric mean integrated pollution index, fuzzy integrated pollution index, and principal component score were used to characterize sediment environmental quality; fuzzy similarity and geo-accumulation Index were used to evaluate pollutant enrichment; correlation matrix, principal component analysis, and cluster analysis were used to identify source of pollution; environmental risk index and potential ecological risk index were used to assess ecological risk. The environmental qualities of sediment are classified to very low degree of contamination or low contamination. The similar order to element background of soil in the Liaohe plain is region of Sanjiaozhou, Honghaitan, Sandaogou, Xiaohe by pollutant enrichment analysis. The source identification indicates that correlations are significantly among metals except between copper and cadmium. Cadmium, lead, zinc, mercury, and arsenic will be clustered in the same clustering as the first principal component. Copper will be clustered as second principal component. The environmental risk assessment level will be scaled to no risk in the studied area. The order of potential ecological risk is As > Cd > Hg > Cu > Pb > Zn.

Keywords : ecological risk assessment, heavy metals, sediment, marsh, Shuangtai estuary

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