



Metal pollution and ecological risk assessment in the surface sediments of Anping Harbor, Taiwan

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ABSTRACT

Surface sediments from 10 stations were sampled in Anping Harbor for heavy metals (Hg, Pb, Cd, Cr, Cu, Zn, and Al), water content, organic matter, total grease as well as grain size. Geo-accumulation index (I_{geo}), enrichment factor (EF), effect range median quotient, and potential ecological risk index were applied to estimate the degree of metal contamination and the potential ecological risk in sediments. The mean metals concentration with standard deviations (mg/kg) in the surface sediments was 0.28 ± 0.17 of Hg, 0.40 ± 0.27 of Cd, 202 ± 260 of Cr, 99 ± 102 of Cu, 36 ± 16 of Pb, and 257 ± 194 of Zn. For spatial distribution of heavy metals, a relatively high metal content was observed in the Bamboo River mouth region and it progressively decreased towards the harbor region. The estimates of I_{geo} and EF revealed that sediments of Bamboo River mouth were severely metal contamination. Results showed that upstream industrial and municipal wastewater discharges along the river bank may be the major sources of pollution. For the potential ecological risk assessment, the river mouth of Anping Harbor showed considerable ecological risk, while the other areas posed low and moderate ecological risk. This study can provide valuable information for developing future strategies for the management of river mouth and harbor.

Keywords: Ecological risk; Enrichment factor; Geo-accumulation index; Heavy metals; Sediment

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