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Interseasonal distribution and partitioning of heavy metals in subtidal sediment of Qua Iboe Estuary and associated Creeks, Niger Delta (Nigeria)

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Abstract

An analysis of the distribution and chemical forms of selected metals: cadmium (Cd), chromium (Cr), copper (Cu), nickel (Ni) and lead (Pb) in subtidal sediments of Qua Iboe Estuary and adjourning creeks, collected between June 2000 and January 2001, were studied using a sequential chemical extraction method. The concentration of metals in each extracted fraction was determined using inductively coupled plasma spectrometer (ICP-AES). Pb, Cd and Cu appear to be the most abundant metal in the sediments of the systems, and are predominantly associated with the residual, organic and oxidisable phases. Results indicate that there are also insignificant components that are bound to both the exchangeable and carbonates fractions. Ni is largely associated with bioavailable phases with insignificant bound to organic matter and residual fractions. In general, an insignificant component of Cd and Pb are bound to organic matter phase. Moreover, speciation results indicate that metal contamination in the ecosystems investigated primarily comes from human-mediated sources. Thus, based on index of geoaccumulation calculated, sediments of these ecosystems have been classified as uncontaminated by Cr, Cu and Ni, strongly contaminated by Pb and extremely contaminated by Cd.

Keywords

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