

Distribution of heavy metals in core sediments in a tropical mangrove estuary and their environmental risk to the biota

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The study documents the comprehensive account on distribution and possible sources of heavy metals in core sediments (<63 μm particle size) from the Indian Sunderban mangrove wetland to evaluate geochemical processes influencing their distribution and possible environmental consequences. Inductively coupled Plasma Atomic Emission Spectrometer (ICP-AES) was employed to determine concentration of seven metals (Cd, As, Cr, Mn, Zn, Al and Pb) whereas total mercury was analyzed by cold vapor atomic absorption spectrometry (CVAAS). An erratic behavior of the heavy metal distribution in sediment core was pronounced which might be ascribed to the metal deposition in coastal sediments through natural processes (erosion and atmospheric deposition) and anthropogenic activities (fishing, boating and tourist activities). Values of organic carbon showed very strong positive correlations with most of the metals as revealed by correlation matrix (r) values. The intermetal relationship revealed the identical behavior of metal during its transport in the estuarine environment. Mercury concentration showed lack of any spatial variability with an almost uniform decreasing trend from surface to deep cores. The resulting compositional data set was tested by principal component analyses and cluster analyses. Pollution load index (PLI) and index of Geoaccumulation (I_{geo}) revealed overall low values but the enrichment factors (EFs) for Pb were typically high for all the stations. The mean concentrations of As, Zn and to some extent Cu exceeded the Effects-Range Low (ER-L) values indicating that there may be some ecotoxicological risk to biota living in the sediments.

Biography

S. K. Sarkar is currently serving as the Professor and Head of the Department of Marine Science, University of Calcutta, India. Presently he is conducting research work in the field of environmental geochemistry and coastal pollution and ecotoxicology. Dr. Sarkar is acting as the Principal Investigator of collaborative research projects dealing with various aspects in marine ecology and pollution, funded by national and international agencies. He has authored more than 80 research papers published in journals of repute. He has presented his research findings in many international conferences.

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