

Research Paper :

Characteristics and distribution of elements in the sediments of manakudy estuary south west Coast of India

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ABSTRACT

Characteristics and distribution of elements in the sediments of manakudy estuary has been studied. Based on their nature, five stations have been ear marked for sampling. Station I is situated between the Estuarine mouth bed and bridge. Station II is located near the mangrove forest and north of previous station. Station III is characterized by the presence of agricultural farm lands. A few salt pans are present on the eastern bank of station IV. The last station V is located near the river basin. Nearly 25 samples have been collected. The Maximum value of Organic carbon and Nitrogen were observed in station III. The low C/N ratio may be due to lack of suspended matter in the estuary. The higher alkalinity observed in station II and III indicated the influence of sewage discharge from coir retting units. Concentration of calcium and magnesium were higher in station I and the concentration of iron and aluminum were higher in station V. The trace metal concentration were higher in the central part of the estuary compared to other regions.

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Estuary is a transition zone between land and sea as well as fresh water and salt water. The chemistry and ecology of an estuarine system are entirely different from the fluvial as well as the marine system. Estuarine wetlands protect water quality by filtering pollutants and sediment and serve as buffers that protect adjacent land areas from flooding and erosion (Kate Johnson, 2003).

Geochemical studies of bottom sediments of water bodies like rivers, estuaries and marine basins are very helpful in understanding the different sediment sources and element distribution pattern. Many geochemical studies have been carried out on the shelf and slope sediments of the south west coast of India (Paul, 2001). An interesting aspect of the inner shelf of south west coast of India is, its varying shelf gradient and wave climate which have immense effect on the sediment distribution pattern. Apart from this, the daily rise and fall of the tides and the movement of salt water, influence the characteristics and composition of the sediments (Prakash, 2000). Rivers, the major source of irrigation are used as repositories for disposal of domestic sewage, industrial effluents containing toxic substances, heavy metals and agricultural run-off. The amount of freshwater flowing into an estuary varies from season to season and from year to year. Moreover in the estuary the water carrying agricultural, industrial and domestic wastes are deposited as sediment (Daskalakis and O'Connor, 1995).

Organic carbon plays a major role in the distribution and retention of trace elements in the sediments. Organic

carbon in riverine and estuarine sediments is controlled mostly by the rate of organic to inorganic constituents, primary productivity, composition and texture of the sediments. Textural control over total organic carbon is indicated by the correlation of total organic carbon with sand, silt and clay percentages of the sediments. Association of total organic carbon with clay minerals is of particular significance in estuarine sediments. The major nutrient elements of environmental concern in sediments are nitrogen and phosphorus. Both are present in organic and inorganic forms. Plant nutrients like calcium, magnesium, sodium, potassium and phosphorus are present in the minerals and in solution. Oxygen, silicon and aluminum occur as constituents of minerals and as oxides. Iron occurs mainly in the form of oxides and ferro magnesium minerals. The trace elements create a major ecological crisis. They are non-degradable and often accumulate through tropic level causing a deleterious biological effect. Metals may be present in the estuarine system as dissolved species, free ions or forming organic complexes with humic and fulvic acids. Sediments accumulate contaminants and may act as long term storage for metals in the environment. Sediments are important sinks of various pollutants and play a significant role in the remobilization of contaminants in aquatic systems between water and sediment (Hafidzin, 2006.)

The objective of the present work is to examine the distribution of elements in the sediments of the Manakudy estuary and their pollution levels influenced by natural