

## **Dissolved and Particulate Iron and Manganese**

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Estuarine systems are potential sites of chemical and geochemical alterations, and often serve as filters of river-derived materials. Goa is an important mineral producing area. Iron ore mining and export forms the backbone of the states economy. The Mandovi – Zuari estuarine system, the entire network formed by the Mandovi and Zuari rivers including the Kumbharjua Canal, is extensively used for the transport of iron and manganese ores. The intensive mining activities, run off from the mineralized zones during the wet season, leaching from mines, extensive barge traffic plying along the rivers transporting the ores from the hinterland to Mormugao harbor contribute substantially to the input of these metals in this estuarine system. A study of the distribution and seasonal variation of trace metals, mainly in estuarine (dissolved and particulate) environment and sediments in wet and dry seasons, was carried out to assess the probable influence of mining on the concentrations of these metals.

Using inverse distance weighting the spatial distributions of the particulate and dissolved concentrations of Fe and Mn were mapped along the salinity gradient of the two rivers. Significant seasonal signals were observed in the spatial variations of their concentration and partitioning of Fe and Mn between dissolved and particulate fractions. Removal of metals from both fractions was observed in the mixing zone, which was reflected by their enhanced observed concentrations in sediments. The equilibrium distribution of Fe and Mn in this estuarine system was assessed based on their partition coefficients,  $K_D$ . Higher partition coefficients observed for Fe in both the rivers indicated it to be the more strongly bound than Mn. Partition coefficients ( $K_D$ ) calculated for the Fe and Mn in the two rivers exhibited a decrease with increase in SPM concentration, consistent with the so called ‘particle concentration effect’.