

Assessment of heavy metal pollution and human risk in the Mahanadi River sediments, India

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The densely populated deltaic regions of the Mahanadi River basin are vulnerable to contamination by sewage, industrial waste, and agricultural runoff. The current study provided a systematic way to assess the level of heavy metal pollution in sediment and its effect on people's health in this area. The granulometric study revealed a relatively high energy condition at both the sites (site1 and site2). According to the heavy metal assessment, sites 1 and 2 suggested Co and Pb contamination, respectively. Statistical parameters such as principal component analysis and cluster dendrogram analysis revealed a mixed source at site1 and the dominance of a mafic source at site2. Based on the Enrichment factor, Co showed a moderate to significant enrichment at site1 and Co, Pb and Zn showed significant enrichment at site2 indicating anthropogenic pollution, possibly from agriculture land due to extensive use of pesticides in the investigated region. In the study region, the human health risk indicated no considerable non-carcinogenic risk for adults or children. However, carcinogenic risk in adult and children due to Pb and Cr, respectively posed a mild threat. The exposure pathway for both non-carcinogenic and carcinogenic risk was via oral ingestion. The each day intake of these chronic metals has to be examined as their collective effect could result in various health complications for children and adults. Therefore, necessary steps should be taken to get rid of the potential health risk in future in the study area.

