Heavy Metal Accumulation in Marine Sediments - An Assessment in ONGC's Blocks in Krishna-Godavari Basin, Bay of Bengal

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Abstract—Heavy metals can be termed as conservative pollutants, introduce into the aquatic systems as a result of the weathering of soils and rocks, from under water volcanic eruption and other anthropogenic activities. Thereby it changes the natural concentration of metals in seawater resulting in a ten or even hundred fold increase near the source of an effluent discharge. While some metals like manganese (Mn), copper (Cu), iron (Fe) and zinc (Zn) are biologically important for marine life, others like lead (Pb), mercury (Hg), cadmium (Cd), Nickel (Ni) and chromium (Cr) are non-essential and become toxic at higher concentrations. Associated to particulate matters, heavy metals tends to stay in solution for a very long time, but they will end up in the sediments, therefore concentrations in the sediments are often higher than those in solution. In the sediments, these particles may form an important secondary source of contamination, even after the primary source has disappeared. Therefore, there is a need for timescale monitoring of the levels of these metals in all the marine resources, so as to establish the trends that could be linked to anthropogenic activities.

The paper mainly focuses on the study of the concentration of non-essential heavy metals in sea sediment around the operational areas of ONGC in eastern offshore area. The distribution of heavy metals in the sediments of ONGC's exploratory blocks in Bay of Bengal has been investigated. Surface sediment samples collected from 03 blocks of Krishna-Godavari Basin, Bay of Bengal and digested samples were analysed by ICP-MS for Cr, Cu, As, Cd and Pb. Comparison of results in studied 03 blocks with various sediment quality guidelines is discussed to assess the present contamination. It reveals that sediments in study area are not contaminated with respect to analysed heavy metals. Generated data will assist in future for proactive measures and minimise the impact of anthropogenic sources.

A statistical analysis in terms of Relative Contamination Factors and Pollution Load Index has also been done in the paper.