

Metal contamination recorded in the sediment of the semi-closed Bakar Bay (Croatia)

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This study presents metal levels in the sediments of the Bakar Bay, with the main goal to evaluate the nowadays anthropogenic influence, as well as such an influence during the last decades. Sediments profiles at 7 sampling points were taken. Chemical contents in bulk sediment were obtained for 55 elements using ICP, ICP-MS and AAS methods. Concentrations of selected elements were evaluated by factor statistical analyses to identify their source. Also, metal enrichment factor and geoaccumulation index were calculated. Spatial distribution maps for three sediment layers were constructed indicating the sources of anthropogenic inputs in the last thirty years. The distribution of contaminants indicated two main anthropogenic sources: the city of Bakar and the bulk cargo terminal. Measured metal concentrations in sediment were compared with concentrations in other sediments from the Adriatic Sea. In addition, set of sediment quality guidelines was also applied in order to predict the probability of adverse biological effects on the benthic community. Results revealed that the risk for benthic organisms is negligible; the exception is small area in front of the city of Bakar

where this risk exists. The factor analysis clearly demonstrate the segregation between metals of natural origin resulted from soil and bedrock weathering (Li, Al, Cr, Sc), and with two anthropogenic source originating from the city of Bakar and bulk cargo terminal (Hg, Pb, Zn, Ag, Sn, Fe).

Hg (max 0.65 mg/kg) is found to be the heaviest contaminant, followed by Pb (max 71.5 mg/kg), Cu (89.3 mg/kg) and Zn (156 mg/kg). However, this study show that Bakar Bay is less polluted than general public expected.

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