Evidence of anthropogenic contamination by chromium preserved in estuarine sediments, Jaboatão River, Pernambuco, Brazil

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The Jaboatão river estuarine area, located in the southern coast of Pernambuco, Northeastern Brazil, is a fairly industrialized and populated area, being a potential receptor of pollutants. The sub-recent geochemical evolution registered in the estuarine sediments was investigated by the use of a 50 cm long core sample collected in the bottom of the river. The core was divided in 5 cm intervals and the samples were analyzed for major and trace elements (Si, Al, Fe, Mn, Mg, Ca, Na, K, Ti, As, Cr, Cu, Hg, Ni, Pband Zn), LOI and sediment grain size distribution. Enrichment Factors (FE) have been calculated to identify possible contaminated levels when compared to reference values. The results were statistically treated (Principal Components Analysis-PCA) which divided the sample into three groups according to its depth position: bottom, middle and surface. The metallic species concentrations, except for Cr, which reached values as high as 743 mg.Kg-1, are within the range of non-impacted environments as reported in the literature. Chromium concentration reached preliminary alert levels according to international environmental agencies, whereas the other analyzed species do not show toxicity. The enrichment factor shows a Severe Enrichment for Cr, being above the ERL (Effects Range Low) limit, surpassing in some points the value of ERM (Effects Range Mean), suggesting the need for environmental monitoring, as its concentrations already indicates an alert situation for the estuary sediments. Chromites was not found in the heavy minerals fraction and do not exist ultrabasic/ultramafic rocks upstream of the estuary. These facts suggest that Cr enrichment has not a geogenic origin, therefore it could be related to industrial discharges into the river Jaboatão.Within a global view, the estuarine sediments of the Jaboatão river can be classified as good quality in terms of contamination by heavy metals, however, already signs of a steady accumulation of environmental chromium passive.

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