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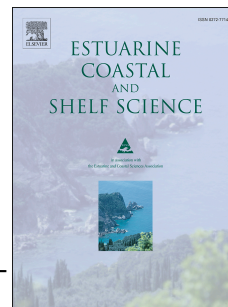
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Trace elements from the Central Pacific Mexican shelf: geochemical associations and anthropogenic influences

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Abstract

Baselines for major and trace elements were determined from surface sediment samples from sites located along the Central Pacific Mexican Shelf (CPMS; 16.7 to 20.45° N). This study area is next to the biggest harbours in Mexico, for example touristic (Puerto Vallarta and Acapulco), touristic and industrial (Manzanillo), and industrial harbours (Lázaro Cárdenas). The industrial harbours have been expanding, transporting tonnes of materials to Asia and North and South America. Oceanographic campaigns were conducted to obtain sediment from depths ranging from 56 to 159 m. The grain size was predominately fine fraction (< 63 µm; mean 56 µm ± 30%). More than 50 elements were analysed, and methods were validated with certified reference materials. The results extracted the iron ore signal; enrichment and the association between Fe and Co, Cr, Cu, Mg, Mn, Mo, Ni, V, and Zn were determined for the sediments. Arsenic is enriched in the CPMS; the Normalized Enrichment Factor average (NEF_{AV}) for As is NEF_{AV} = 8 ± 7. However the ratio between As and Cs indicates a natural origin in the most of the sites. Cadmium, Mo, and Ag were significantly correlated with C_{org}-enhanced precipitation of sulfide-reactive metals. Moreover, an anthropogenic influence was detected for Hg (NEF_{AV} = 4.3 ± 1.5) and Ag (NEF_{AV} = 8.5 ± 2.6) in the shelf near the heavily industrialized harbour of Lázaro Cárdenas.

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