

Micro-element speciation in sediments from the Khai River – Nha Trang Bay estuarine system (South China Sea)

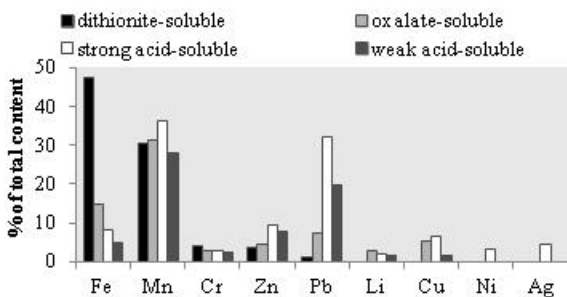
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Materials and Methods. Major and trace elements contents were determined in surface sediments collected in 2010-2013 along the salinity gradient in the Khai River - Nha Trang Bay estuarine system. In order to assess the potential metal (Fe, Mn, Li, Cr, Zn, Cu, Pb, Ni, Co and Ag) bioavailability in sediments, sediments were subjected to the selective extractions by 2M nitric acid, 25% acetic acid, sodium dithionite, oxalate-ammonium buffer solution, 0.1 M sodium pyrophosphate.

Discussion of Results. According to the sediment quality guidelines and reference background values, the total contents of Cu, Pb, Ni and, especially Ag exceeded significantly the hazardous levels and showed the non-conservative distribution in sediments along the salinity gradient. According to the comparative extractability from sediments ($Ag < Ni < Co < Li < Cu < Cr < Fe < Zn < Pb < Mn$), the elements that were studied can be divided in three groups. Ag, Ni, Co, Li, Cr, Cu are low-labile and mainly occur in the residual phase. Therefore, the earlier found anomalous total contents of Cu, Ni and Ag may be related to the enhanced content of metal-rich detrital heavy minerals. Fe and Zn are moderately labile and are associated with crystalline Fe/Mn oxides and resistant organic compounds that may be a treat in the long term. Mn and Pb are labile and mostly held in ion exchange positions, bound to easily soluble amorphous Fe/Mn compounds and weakly held in organic matter. The high levels of acid soluble, alkali soluble and easily reducible fractions exhibited by Pb may indicate pollution from anthropogenic origin.



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