

Metal(oid)s content in surface sediments from Central Chile (~35°S): An environmental assessment.

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The study of the diagenetic behaviour of substances deposited in coastal sediments associated with river discharge and coastal upwelling provides insight into how variations in local oceanographic conditions modulate the transport, accumulation and deposition of substances in sediments. This knowledge is key to interpreting and reconstructing variations in oceanographic processes and their relation to past climatic changes. This study aimed to analyse the spatial distribution of trace elements in surface sediments deposited off the coast of central Chile (~35°S). A sampling campaign was conducted on a spatial grid of 15 stations located in 5 sectors (Maguillines 'MAG', Constitución 'CON', Huenchullami 'HUE', Mataquito 'MAT', Iloca 'ILO') and at depths between 20 and 90 m. Sediments were recovered with an Ekman box-core and inorganic analyses were performed by ICP-OES (As, Cd, Cu, Hg, Mo, Ni, Pb, V and Zn). A series of environmental indices were estimated to assess the environmental quality of the study area (Geo_{index}, Enrichment Factor, Pollution Load Index). Univariate/multivariate statistical analyses were performed to assess the influence of oceanographic conditions on the spatial distribution of inorganic elements in surface sediments. The order of abundance was Cu>Zn> Pb>V> Mo> Ni>As>Cd >Hg. A pattern of increasing inorganic element content with depth was observed for Ni, Mo and V, while a diffuse pattern was observed for As, Cd, Cu, Hg, Pb and Zn. Principal Component Analysis (PCA) showed that PC1 and PC2 explained 71% of the variance. PC1 and PC2 allow us to differentiate the sampling sectors into two groups (group 1: CON, HUE; group 2: MAT, ILO, MAG), whose differentiation could be explained, in general terms, by the higher content of redox-sensitive metals (V, Ni, Mo, Zn). From a geochemical point of view, the similarity dendrogram allowed us to associate the sampling sectors into two large groups: one represented by MAT and MAG, and a subgroup represented by ILO, HUE and CON. The analysis of inorganic elements allowed us to identify differences in the spatial distribution of inorganic elements that are useful in the process of calibrating geochemical indicators in surface sediments present in the coastal zone of the Maule Region.

