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Record of diagenesis of rare earth elements and other metals in a transitional sedimentary environment

Miguel Caetano, Ricardo Prego, Carlos Vale, Hilda de Pablo & Ana Judith Marmolejo Rodríguez

The vertical distribution of trace and rare earth elements (REE) was studied in a sediment core from the Vigo Ria (NW Iberian Peninsula) where sedimentation patterns have changed during the last century. The depth profiles of Al, Ca and Corg (particulate organic carbon) point to three distinct sedimentary units: (a) the upper sediment unit that consists of fine grained material rich in organic matter (3–4% of Corg); (b) a transitional layer between 75 and 105 cm where an almost linear decrease of Al and Corg content was observed; (c) a deep sediment unit composed of coarser material. Ratios of Fe, Mn, Zn, V, Ni, As, Cd and REE to Al showed a well-defined maximum between 75 and 105-cm depth and relatively constant values in the upper and deeper sediment units. Within the transitional layer the extractable (hydroxylamine/acetic acid) fraction of Mn decreased gradually indicating that, as sedimentation progressed, authigenic Mn oxyhydroxides were reduced and Mn(II) diffused towards the surface. Otherwise, a clear maximum of extractable Fe implies that a diagenetic signal has been preserved. The extractable fraction of trace elements and REE showed a similar depth profile with a maximum in the transitional layer, denoting that they were scavenged into diagenetic Fe. Moreover, several lines of evidence indicate that this REE scavenging is selective, with preferential retention of light-REE (LREE) with respect to heavy-REE (HREE) in the transitional region where oxyhydroxides were generated.

Palabras clave: Trace metals, Transitional sedimentary layer, Diagenesis, sediments, Rare earth elements

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