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Solid-phase chemical fractionation of selected trace metals in some Galician continental margin sediments

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The study of the distribution of Fe, Mn and some trace metals is important to assess the diagenetic evolution of a specified area. The involvement of Fe and Mn in early diagenetic processes leads to the mobility of redox-sensitive elements within the sediments. Particularly, this study aims at apprehending the major forcing factors which govern the spatial and vertical distributions of some redox-sensitive elements (Fe, Mn, Cu, Ba, Ni, etc) in six cores from the Galician Bank slope. This area constitutes a singular sedimentary context where early diagenetic processes can be easily identified due to the low detrital inputs from the continental shelf. Selective chemical extractions were carried out to determine the major phases for these elements using a combination of sequential extractions protocols, specifically oriented to assess the distribution bound to amorphous oxyhydroxides, crystalline oxides, carbonates, sulphide and residual phases.

These procedures have allowed to identify and evaluate the mobility of trace metals during early diagenesis in this environment. The distribution and chemical behaviour of Mn and Fe differ significantly. Low chemical mobility of iron in the sedimentary record is illustrated by relatively uniform depth profiles and an important proportion (76 %, on average) in the residual chemical phase. Conversely, Mn is mostly present in reducible phases and bound to carbonates. The strong dependence of Mn distribution on chemical conditions is expressed by a marked enrichment in the oxic layers of the sediment. Similar behaviours to Mn were exhibited for other trace metals, especially Ba and Cu.