Time-Series (1991-2014) Trends of Technology-Critical Elements Accumulation in Mussels from a Urban Coastal Area (Vigo Ria, NW Iberian Peninsula)

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Abstract

There are a number of trace elements that were considered just as laboratory curiosities but now, however, are key components for the development of new technologies. For most of these elements, the present understanding of their environmental concentrations, transport and bioaccumulation is scarce. In order to shed further light in this area, we present in this study the time-series (1991-2014) trends in concentrations of several technology-critical elements (TCEs) in mussel samples (*Mytilus galloprovincialis*) collected in an urban beach from the Vigo Ria (NW Iberian Peninsula).
The TCEs analyzed were Pt, Ta, Nb and the rare earth elements (REEs: Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Er, Tm, Yb, Lu). The only element that showed a significant temporal trend linked to human activities was Pt, an element whose environmental inputs has been linked to its use in catalytic converters in cars. For the other elements, no evident trend was observed. However, it was found a clear increase with time of the light-to-heavy ratios of rare earth elements (LREEs/HREEs). The hydrological conditions (e.g. upwelling events, renewal of water) in this coastal area appear to have an major influence on the variation of the rare earth element ratios in mussels with time. Accordingly, the influence of natural processes on the bioaccumulation of TCEs in coastal areas will be discussed.

Keywords: Technology, critical elements, Bioaccumulation, Mussels, Coastal Areas

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