Copper, zinc and lead isotopes in mollusks to trace metallic marine coastal contaminations

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Metal concentrations in bivalve mollusks are commonly monitored to track temporal and spatial trends in the metal bioavailability in coastal and marine environments. In this work, we evaluated the applicability of the isotopic information of Cu, Zn and Pb in 6 species of bivalve mollusks (*Crassostrea gigas, Mytilus edulis, Mytilus galloprovincialis, Donax trunculus, Cerastoderma edule, Ruditapes decussatus)* to trace the origin of metallic contaminations on the French coasts. Specimen were acquired from the sample collection of the French Mussel Watch program (ROCCh), collected in the same environmental conditions (same site at the same time) to track potential biological elemental and isotopic fractionations. Also, 7 marine sites with different hydrodynamics (estuary mouth, open and closed bay, closed lagoon, marine lake) and various anthropogenic pressures were studied to observe the isotopic signal recorded in the mollusks.

Results show contrasting isotope signatures between species of up to 1.5‰ for Cu, and 0.6‰ for Zn indicating that Cu and Zn speciation, geochemical conditions and biological uptake may impact the isotope record in bivalve tissues. As expected, Pb isotopes reflected the mixing isotope source processes. Despite Cu and Zn source tracking is not straightforward, isotope signatures in bivalves have potential to become a useful environmental indicator.