
Contribution to the evaluation of Technology Critical Elements (TCE) contamination in the coastal ecosystems of the Provence-Alpes-Côte d'Azur region

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Résumé

Technology Critical Elements, such as Platinum group (PGE) and Rare Earth elements (REE), represent a non-traditional group of emerging contaminants that are naturally occurring in aquatic media. They are increasingly used in new technologies (renewable energies, electronics, health care products, chemicals, aeronautics...). Some recent studies highlight the perturbation of their natural cycle due to anthropic activities. However, few data are available to evaluate their impacts on coastal ecosystems, particularly in urban and industrial areas. This lack of knowledge is mainly due to the low concentration ranges in monitored natural water systems. Moreover, various physico-chemical processes affecting their behaviors from their sources, along with their environmental transfers, and more particularly towards marine ecosystems are poorly known. Hence, the aim of this study will be (i) to establish the background concentrations of those elements in coastal ecosystems, ii) to characterize the composition and temporal changes in marine ecosystems, and (iii) to investigate biogeochemical processes that control the behaviour of these emerging contaminants in marine ecosystems (speciation/bioavailability/bioaccumulation relations). The first step of the project will be devoted to mapping and characterizing the evolution of contamination along the Mediterranean coastline through retrospective analyses of archived samples ("mussel tissues" and "sediment" specimen banks) and "current" contamination through ongoing sampling as part of marine contamination monitoring programs at national and regional levels (i.e. ROCCHSED, ROCCHMV, SUCHIMED...). This poster will present analytical methodologies proposed for platinum by adsorptive Cathodic Stripping Voltammetry (AdSV) and platinum group elements by triple quadrupole inductively coupled plasma mass spectrometry ICP-QQQ-MS. First results from analysis of surface sediments collected during SUCHIMED 2021 sampling campaign will be presented and discussed. The workshop study area includes PACA (region Provence Alpes Côte d'Azur) coastline (from the Gulf of Fos to the Port-Cros National Park). This area constitutes a continuum of urbanized sites, and military/civilian industrial-port sites as well as natural areas and small agricultural watersheds.

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Mots-Clés: Emerging contaminants, Technology Critical Elements, contamination, marine ecosystems, sediments