



HAL
open science

Editorial: Advances in metals and trace elements isotopes measurements, experiments and application in environmental sciences

David Amouroux, Nathalie Vigier

► To cite this version:

David Amouroux, Nathalie Vigier. Editorial: Advances in metals and trace elements isotopes measurements, experiments and application in environmental sciences. *Frontiers in Environmental Chemistry*, 2022, 3, 10.3389/fenvc.2022.1046468 . hal-03954289

HAL Id: hal-03954289

<https://hal.science/hal-03954289>

Submitted on 26 Jan 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License



OPEN ACCESS

EDITED AND REVIEWED BY
Robert Peter Mason,
University of Connecticut, United States

*CORRESPONDENCE
David Amouroux,
david.amouroux@univ-pau.fr
Nathalie Vigier,
nathalie.vigier@obs-vlfr.fr

SPECIALTY SECTION
This article was submitted to Inorganic
Pollutants,
a section of the journal
Frontiers in Environmental Chemistry

RECEIVED 16 September 2022
ACCEPTED 22 September 2022
PUBLISHED 10 October 2022

CITATION
Amouroux D and Vigier N (2022),
Editorial: Advances in metals and trace
elements isotopes measurements,
experiments and application in
environmental sciences.
Front. Environ. Chem. 3:1046468.
doi: 10.3389/fenvc.2022.1046468

COPYRIGHT
© 2022 Amouroux and Vigier. This is an
open-access article distributed under
the terms of the [Creative Commons
Attribution License \(CC BY\)](#). The use,
distribution or reproduction in other
forums is permitted, provided the
original author(s) and the copyright
owner(s) are credited and that the
original publication in this journal is
cited, in accordance with accepted
academic practice. No use, distribution
or reproduction is permitted which does
not comply with these terms.

Editorial: Advances in metals and trace elements isotopes measurements, experiments and application in environmental sciences

David Amouroux^{1*} and Nathalie Vigier^{2*}

¹Institut des Sciences Analytiques et de Physico-chimie pour l'Environnement et les matériaux, Université de Pau et des Pays de l'Adour, E2S UPPA, CNRS, IPREM, Pau, France, ²Laboratoire Océanographique de Villefranche-sur-Mer (LOV), CNRS, Sorbonne Université, Villefranche-sur-Mer, France

KEYWORDS

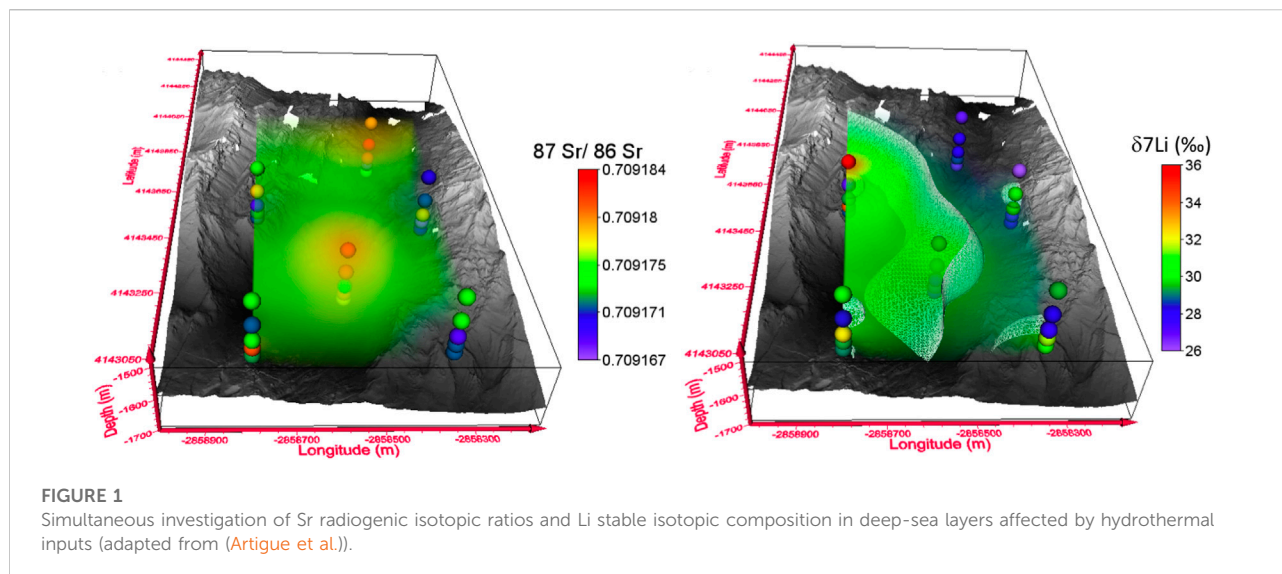
metals, trace element, isotopes, environment, pollution, biogeochemistry, fractionation

Editorial on the Research Topic

Advances in metals and trace elements isotopes measurements, experiments and application in environmental sciences

The isotopic composition of trace metals and elements can be used to characterize their sources of emission and to trace the physicochemical or biological processes that these elements undergo. Precise measurements of trace metals and their isotopic compositions are pre-required for such research issues. Regarding the processes leading to fractionation between isotopes and thereby to a modification of the isotopic composition, the main mechanisms of isotopic fractionations result from physicochemical reactions such as redox transformations, the dissolution or precipitation of minerals and/or neoformed phases (eg. oxy-hydroxides). Added to this are the effects associated with living organisms that, for their development, can integrate metals into their metabolism and be also the cause of strong isotopic fractionations. The development of multi-collector inductively coupled plasma instruments (MC-ICP-MS) has made it possible to accurately and repeatably measure the isotopic composition of trace metals and elements whose (small) variations in isotopic abundance obey the laws of mass dependent fractionation. In addition, few non-traditional elements, such as Hg, have been identified to exhibit specific isotopic fractionation that do not follow such basic rules (i.e. mass independent isotopic fractionation).

This Research Topic aimed to promote specific studies on stable and meta-stable isotopes of metals and trace elements that have been recently developed and integrated into environmental sciences and pollution research. Isotopic composition of trace metals



and elements requires methodological development in order to be applicable to various environments from pristine to more polluted areas. In addition, the isotopic information should provide unique insight into both their environmental sources and their physico-chemical or biological pathways. Altogether, isotopic composition combined with speciation of trace elements and metals are important information that could be used to investigate their pathways and impact.

The scope of this Research Topic, was thus to address specific investigations related, to both trace elements and metals method developments and to the study of their potential applications in environmental and pollution sciences. This special issue covered a wide range of isotope systems, from non-traditional stable isotopes (Lacan et al.; Artigue et al.; Pinzone et al.) to radiogenic systems (Yamakawa et al.; Artigue et al.; Pham et al.). It includes papers showing fine analytical developments for isotopic measurements and for validation with reference materials (Lacan et al.; Yamakawa et al.). One study unravels the trophic transfer and impact of metabolic processes on Hg isotopes (Pinzone et al.). Another study demonstrates the possibility to use Li and Sr isotopes (Figure 1) to monitor in barely documented extreme environments the extent of deep hydrothermal plumes (Artigue et al.). Finally the coupling of Nd isotopes with hydrological tracers in Equatorial Pacific allows to highlight land-ocean interactions affecting specific water layers

(Pham et al.). These original investigations open new avenues of research in environmental sciences combining stable and radiogenic isotopes of trace metals and elements.

Author contributions

DA and NV wrote the editorial text and select the figure.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.