Influence of vegetation type and climate on native selenium distribution and speciation in soils

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Context and objective

The long-lived radioisotope ^{79}Se is found in high level nuclear wastes for which a geological disposal in deep clay formations is considered to be a safe option [1]. The safety assessment of such waste disposal involves the understanding of Se transfert in soil. Se mobility and bio-availibility are strongly dependent on its speciation and binding to soil fractions [2]. The inorganic species become increasingly mobile in the order Se (-II)<Se (0)<SeIV<Se (VI) (Fig. 1).

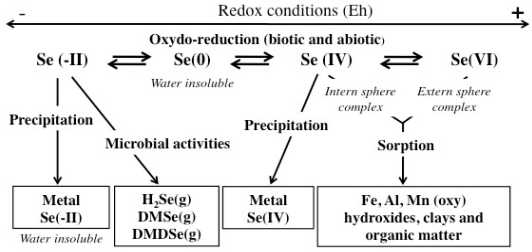

Figure 1: Biogeochemistry of selenium in soil [2]

The aim of this study is to assess the impact of two environmental factors on native Se species distribution in soils: i) the vegetation type (grassland, forest and culture) and induced organic matter modification (content and nature); ii) the climate (montain; oceanic temperate; warm, cold and temperate continental) where soils were developped.

Analytical methodology

To determine trace Se species distribution in the studied natural soils, our methodology, previously developed, was based on extraction by selective reagents and on sensitive analytical method. Results of total Se distribution among the operationnally defined fractions were compared to literature studies [3, 4]. This study originality resides in Se speciation determination in each soil fraction.

[1] ANDRA, (2007) *Phys. Chem. Earth*. **32**, 1–537. [2] Séby *et al*. (1997) *Sci. Total Environ*. **207**, 81–90. [3] Coppin *et al*. (2006) *Biol. Fertil. Soils* **42**, 379–386. [4] Tan *et al*. (2002) *Sci. Total Environ*. **284**, 227–235.

EarthChem: Next generation of data services in geochemistry

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Geochemical online databases such as PetDB, SedDB, NAVDAT, and GEOROC have created digital data services that give researchers easy access to comprehensive, thematically focused compilations of analytical data for igneous, metamorphic, or sedimentary rocks, and that allow them to extract from these compilations within minutes new synthesis data sets as defined by their own criteria. The next level of data services was developed by EarthChem, offering a central access point to geochemical data in federated geochemical databases, with tools to search, filter, retrieve, and visualize the data, in order to integrate data access across systems, further data discovery and support data analysis.

EarthChem has now started to develop its next generation of data services, responding to the growing demands for user-based data contributions, long-term data archiving, interoperability, and expanded data coverage. Large emphasis is placed on the development of tools that help investigators organize and manage their data in a way that minimizes their efforts to submit data and metadata to EarthChem, and that also supports quality control of user contributions to the EarthChem Repository.

The new EarthChem Repository will provide data storage and stewardship for the widest range of geochemical data sets and data collections, with a data publication service that will allow users to obtain Digital Object Identifier for Scientific Primary Data (STD-DOI) to make their submitted data citable as publications.

The new EarthChem data services are meant to encourage data contributions by investigators to ensure more efficient and timely growth of the data collections, to help researchers comply with existing and emerging requirements for data publication and data reporting by publishers and funding agencies, and to improve data quality.

A new service-oriented architecture will be developed for the EarthChem Data Engine as the next generation portal that will offer a superior range of options and possibilities for interaction and data exchange with other systems. In addition, EarthChem will create new digital content, expand partnerships, and continue to promote the implementation of more open and standardized data reporting in geochemistry.