
Geochemical environmental archives for human-environmental observatories

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Abstract

Knowledge of background fluxes and concentrations of potentially harmful trace elements (PHTE) are of primordial importance to understand present concentrations and transfers of anthropogenic PHTE. It is well known that wetlands exposed to environmental contamination act as both sink and as sources of PHTE. Understanding the biogeochemical cycling of the PHTE is therefore crucial for environmental risk assessment purposes, for retro-observation analysis or for prediction of natural hazards.

In an integrative effort, our project RETROW (REtrotrajectories : TRee Rings, Otoliths and Wetlands) deals with various environmental archives in three areas under low to high anthropogenic pressure, which are part of the Human-Environment Observatory (OHM – Observatoire Homme-Milieu in French) effort coordinated by the CNRS: the OHM Haut-Videssos (French Pyrénées, the OHM Estarreja (NW Portugal) and the OHM Nunavik (N Canada).

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In the first phase of RETROW, we established PHTe baselines and trends in Haut-Videssos and Estarreja. In the second phase of RETROW, we will investigate the isotopic signals of mercury and lead in environmental archives collected in the three OHM.

Thanks to the high-resolution environmental archives and the isotopic fingerprinting, it is a unique opportunity to reconstruct the isotopic signal of Hg and Pb, two of the most harmful trace metals in the OHMs. Pb and Hg isotopes will therefore provide a unique opportunity to trace the sources of these two metals and decipher between natural and anthropic origin, and/or between local and remote sources. The isotopic data in our well-constrained environmental records could then be confronted to data obtained within other disciplines (archeology, history, paleoecology) and to present monitoring.