

# LabEx DRIIHM

Dispositif de Recherche Interdisciplinaire sur les Interactions Hommes-Milieux



CNRS - Observatoires Hommes-Milieux - Investissements d'avenir

*Projet de recherche*

## CABAC - Contamination Ancienne dans les Biotes Actuels de montagne

### Session

2020

### Co-leader(s)

Gaël LE ROUX (DR EcoLab/CNRS), Didier GALOP (DR GEODE/CNRS), Francois-Xavier D'ABZAC (CR GET/CNRS), Séverine JEAN-DUPY (MCF EcoLab/INPT)

### Project type

Projet OHM

### OHM(s) involved

- OHM Pyrénées Haut Vicdessos

### Keywords

[Mountain ecosystems](#) [Legacy contaminants](#) [Geochemical tracers](#) [Aquatic food-chain](#) [Dynamic biosensors](#) [Fish otoliths](#)

Biogéochimie, Biologie, Écologie, Paléoenvironnement

By combining paleoecology, geochemistry, and ecotoxicology, CABAC will provide a new understanding of the links between source – exposure – bioaccumulation in a context of legacy contamination in the contemporary environment, all made possible by implementing Pb-, C- & N-isotopes as geochemical tracers across environmental compartments and food-chain niches. The objective of CABAC is to use fish as dynamic biosensors of

impending changes in contaminant exposure and to assess the utility of fish otoliths as (mobile) natural archives of contamination in high-altitude mountain ecosystems. Specifically, CABAC aims to develop a novel and innovative method that will couple Laser and MC-ICP-MS, and thus measure the isotopic signatures stored in otoliths of mountain fish (e.g. Pb, Sr), which will be combined with existing data from previous OHM studies on trace metals in soil, peat and lake sediment. This will allow us to reconstruct the contamination history of the area, the contaminant exposure over the lifetime of each individual, as well as decipher potential shifts in contaminant sources over time (including seasonal changes such as snowmelt or flooding). Such information is of paramount importance in order to successfully predict and protect future ecosystem health in frontier ecosystems (i.e. high-altitude mountain environments). The output of CABAC will also be made available to mountain stakeholders thus optimizing the risk assessment of contaminant exposure towards human health (i.e. risk of legacy contamination towards recreational anglers as well as mountain tourism in general).

## **Leader**

Sophia Hansson

Sophia V. HANSSON (CR, CNRS – EcoLab UMR 5245), an ecogeochemist working at the interface of ecology, ecotoxicology, and geochemistry. Her publication record reflects her wide expertise in holistic and interdisciplinary studies on the environment – biota – contaminant interactions, and her previous work have pioneered the approach of combining paleo-records with contemporary biota to assess the long-term impact of mining derived legacy contamination. She is an AXA research fund fellow, a Marie Curie/Prestige/Campus France fellow and has coordinated research projects in e.g. Sweden, Alaska, France, and Greenland. She has published over 20 scientific articles in international journals, including several book chapters, and was recently recruited to the CNRS CID Section no52.

## **Participants**

Gaël

Le Roux

Gael LE ROUX (DR, CNRS - EcoLab UMR 5245) is an isotope biogeochemist with great expertise in studies on the accumulation and dispersion of inorganic pollutants at different temporal and spatial scales, as well as in coupling of radiochemistry and isotope geochemistry with archeology/paleoecology.

Didier

## Galop

Didier GALOP (DR, CNRS - GEODE UMR 5602) is a paleo-ecologist with long and extensive experience in studies of long-term relationships and co-evolutions between environment and societies. Many of his works are based on an interdisciplinary retro-observation of socio-ecological processes that combine multi-proxy analysis of paleo records (e.g. pollen, non-pollinated microfossils) with ecohistorical studies (e.g. textual archives, ancient maps).

## Francois-Xavier

## D'ABZAC

François-Xavier D'ABZAC (CR, CNRS, GET UMR 5563) is a geochemist with extensive experience in atomic, molecular and optical physics as well as in laser technology, such as LA-ICP-MS analysis.

## Severine

## JEAN-DUPY

Séverine JEAN-DUPUY (MCF, INP ENSAT) is an ecotoxicologist specialized towards aquatic fresh water biota, with extensive experience on the impact of (anthropogenic)/chemical contaminants on biological assemblages, with a particular interest in the interactions of contaminants with each other and with other stressors.