

## Legacy pollutants in the contemporary environment; From old mines to brown trouts

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BLAST FROM THE PAST-TEAM<sup>12</sup>

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High altitude soils are often shallow and thus fragile to erosional processes. Mountainous areas are therefore sensitive to humanly induced environmental changes (e.g. mining, forestry) and to climate change. Due to their geological properties and resources mountain environments have often been exploited since the beginning of metallurgy and the Pyrenees are no exception. Trace metal concentrations in the Ariège region, where extensive mining (Ag, Fe) occurred from the Antiquity to the 19<sup>th</sup> century, indicate that  $\geq 600$  tons of anthropogenic lead is stored in peat and organic soils on the Pyrenean northern slopes. Similar conclusions can be drawn for other metals (Zn, Bi). The fate of these trace elements in relation to climate or abrupt environmental changes (e.g. flood, clear cutting) is poorly understood. Once released from surrounding soils the catchment can be highly enriched in the bioavailable fraction of these metals causing a bioaccumulation in river biota. Preliminary results show that levels of tot-Hg in brown trout (*Salmo trutta*) from our study sites surpasses literature values by 10 times or more. By linking data from atmosphere – soil – peat – water – sediment – biota, and the transfer between these continuums, we are studying the fate of legacy pollutants (Pb, Ag, Bi, Sb, Hg, As and U) in three mountain catchments (Etangs de Bassies, Largentière and Bernadouze) all located in the french Pyrenees. We aim to infer the potential risk these elements pose on river biota (e.g. fish) and to do so we combine traditional geochemical analysis (ICP-OES, HR-ICP-MS) with stable isotopes (Pb and Hg,  $\delta^{13}\text{C}$  &  $\delta^{15}\text{N}$ ) and analysis of radiocarbon and radionuclides ( $^{210}\text{Pb}$ ,  $^{137}\text{Cs}$ ,  $^{241}\text{Am}$  and  $^7\text{Be}$ ) to investigate the origin of these elements. We are also studying the bioaccumulation within the catchments i.e. the transfer of metals from the water and organic substrate to the river biota (e.g. fish). Our goal is to assess the potential harmful exposure these legacy pollutants may pose to the environment, to humans and to society at large.