Dynamic of sediments-associated heavy metals: example of a mining-impacted watershed equipped with a hydroelectric dam

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In dam contexts, sediments usually accumulate in large volumes and may play a crucial role in the quality of aquatic ecosystems [1]. Metallic elements (ME) of natural or anthropogenic origin are one of the major sources of contamination within the sedimentary reservoirs. Hydroelectric reservoir operations (normal, peculiar or punctual) and natural phenomena (floods, drawdown, erosion, etc) may impact the quality of these sedimentary stocks notably by the resuspension of contaminated sediments [2]. Few studies have been carried out on the modification of the environment in dam contexts and on the effect of the dissolution/mobilization of the metal-bearing phases due to the reworking of the sediments [1, 2]. In that way, a spatial and temporal study was carried out on the environmental quality of sediments and waters. They belonged to a watershed affected by former mining activities and where *c.a.* 1 century of sediments have been accumulated in a dam reservoir. A multi-scale approach was promoted to study the behavior, stability and mobility of ME in sediments during their accumulation and remobilization. A preliminary characterization of the ME distribution and speciation was carried out on the oxic stream sediments and waters at the watershed scale. Despite the fact that obvious anthropogenic activities may be the principal source of the metallic contamination, this first step is essential to identify the importance, if any, of other natural sources to the pollution as well as to establish the quality of some of the most sensible environmental compartments at a given moment before examining the contamination chronics. It is also a essential prerequesite to characterize the mobility of the ME that depends on the ME speciation.

The identification of the ME origins, their present form and their stability will allow in the near future to understand the ME dynamic at the watershed scale and within a downstream dam reservoir through detailed geochemical and mineralogical analysis.

[1] Frémion et al. (2016), *Sci. Total Environ.* 547, 282-294. [2] Frémion et al. (2016), *Sci. Total Environ.* 562, 201-215.