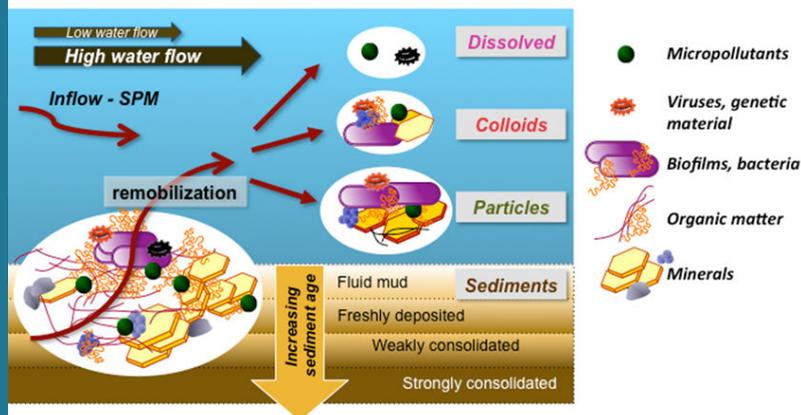


MOBISED

Taking a multidisciplinary approach to studying the remobilisation of polluted river sediment



Inspiration

Managing surface water resources is one of the greatest challenges of the 21st century. Water is a resource that is under growing pressure as the global population rises, and the natural supply, in the form of precipitation, is becoming increasingly variable and uncertain with climate change. Besides the context of water supply for the population, the management of aquatic ecosystems has numerous environmental implications, at different spatial and temporal scales.

Achieving and maintaining clean water bodies remains challenging due to the presence of contaminated sediment in many areas. In the past, hazardous contaminants from municipal and industrial wastewater effluents and agriculture were discharged into water bodies and accumulated within the streambed sediment. This means that historical contaminants are buried in sediment at various depths and could be released into the water ('resuspended') due to increased flow, detrimentally impacting aquatic ecosystems. The depth of the sediment that could be stirred up ('remobilised') is highly dependent on sediment features, and is made more likely by intense and sudden discharges of water. In the context of climate change and the increasing occurrence of heavy rainfall, sediment in small streams could be more frequently re-suspended, with remobilisation of deep and contaminated layers likely.

Innovation

Taking advantage of the recent creation of a research cooperation network between Luxembourg and the Lorraine region in France, the MOBISED project aims to study the remobilisation of sediment in a small river in the north-east of France historically affected by mining and industrial activity. The objective of the project is to understand the mechanisms involved in sediment remobilisation and its effect on water quality. To achieve this goal, the project will take a multidisciplinary approach involving the detailed characterisation of sediment, a detailed description of hydroclimatology and river hydrodynamics, controlled experiments on sediment resuspension and high resolution sampling during high flow events, and the monitoring of riverbed morphology and modelling of sediment transportation.

The MOBISED project is original in its combined quantitative and qualitative approaches. Different kinds of contaminants will be thoroughly investigated, in order to compare the behaviour of organic, metallic and bacterial species upon sediment remobilisation. The chemical and microbial composition of bed sediments and suspended solids will be characterised at global, microscopic and molecular levels to provide insights into sediment-contaminant interactions and the cohesive strength of sediment. Mineral, microbial and organic markers of streambed sediment as well as inflowing sediment will be investigated in order to determine the origin of sediment flows and implement the hydrodynamic models to quantify the erosion, transport and deposition processes of the sediment in the riverbed.

Impact

The results of MOBISED will provide public and private river managers with decision-making assistance regarding sediment management, impact on river functioning and the return on river modifications. In the mid- to long-term, the reference status that will be established in this study will provide the prerequisite necessary for restoration operations (dam removal, river restoration) in the studied river system.

Partners

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