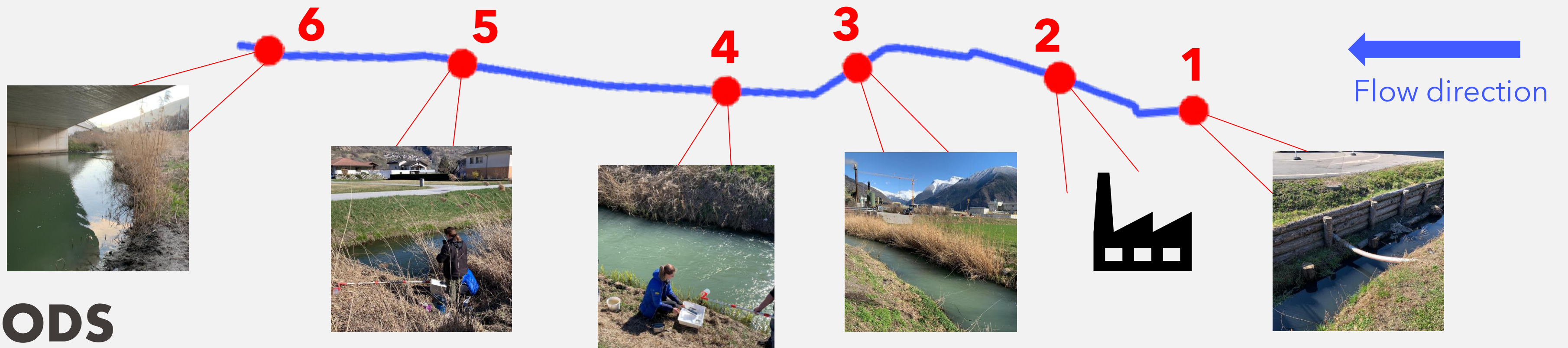


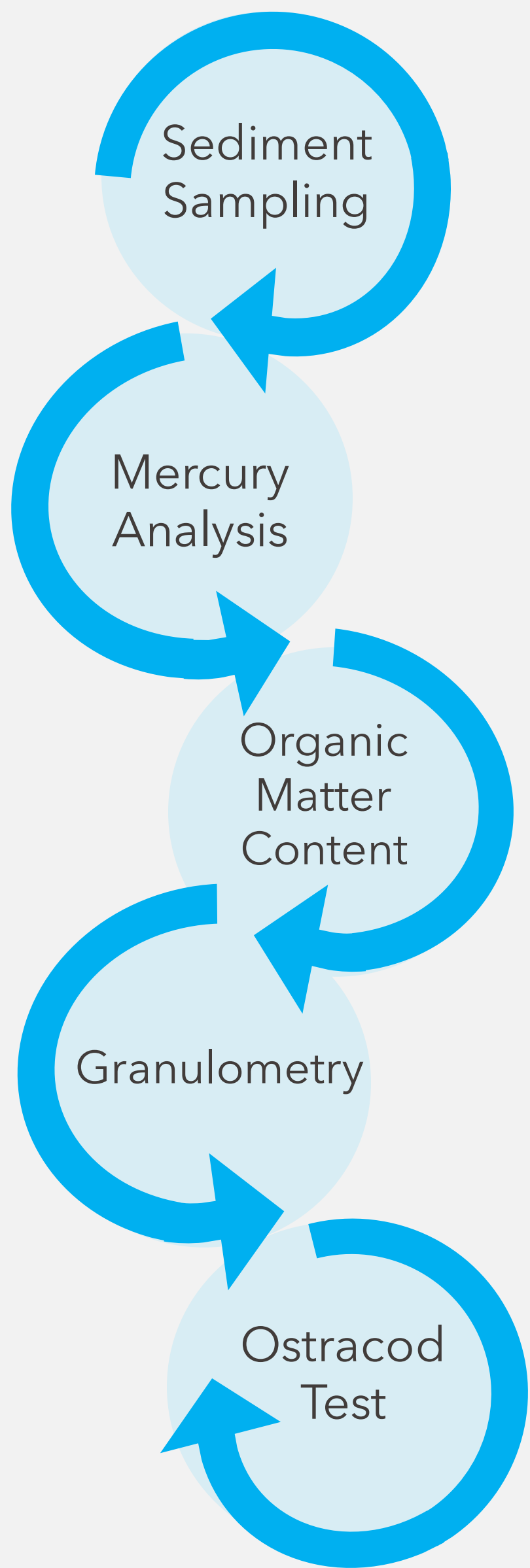
Design Project – SIE 2024

Ecotoxicological risk of a mercury pollution

OBJECTIVES : the aim of this project was to make an ecotoxicological assessment of the mercury contained in sediments downstream of a chemical industry in Valais. Mercury presence in those sediments is attributable to the past discharge of industrial wastewater into the studied canal.



METHODS



Sediments as mercury sink

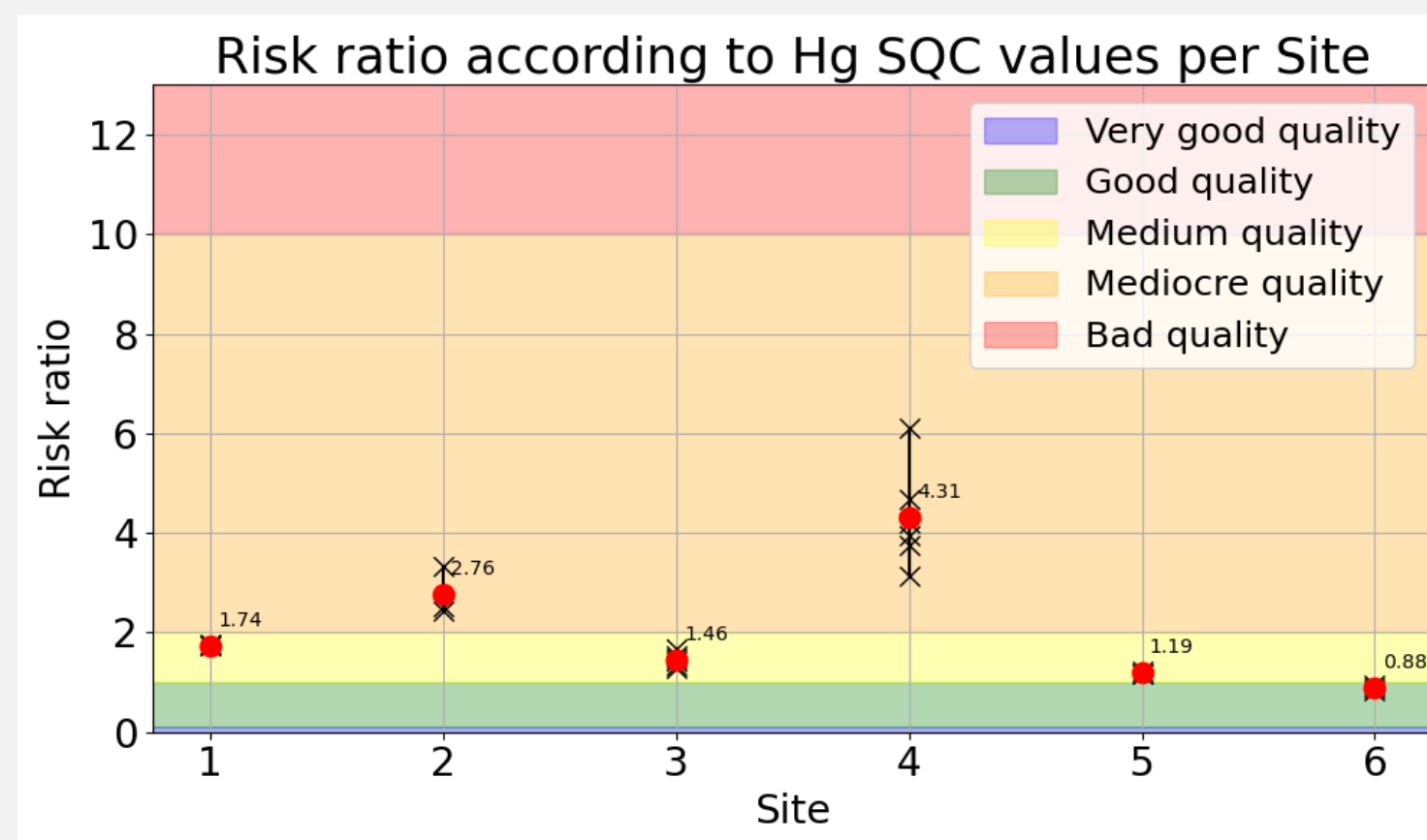
Mercury is a non-essential element and bioaccumulates in aquatic organisms, leading to toxic effects. It adsorbs onto organic and inorganic particles which eventually accumulate in sediments, making sediments the primary reservoir of mercury in aquatic systems.

Ostracods as Environmental Indicators

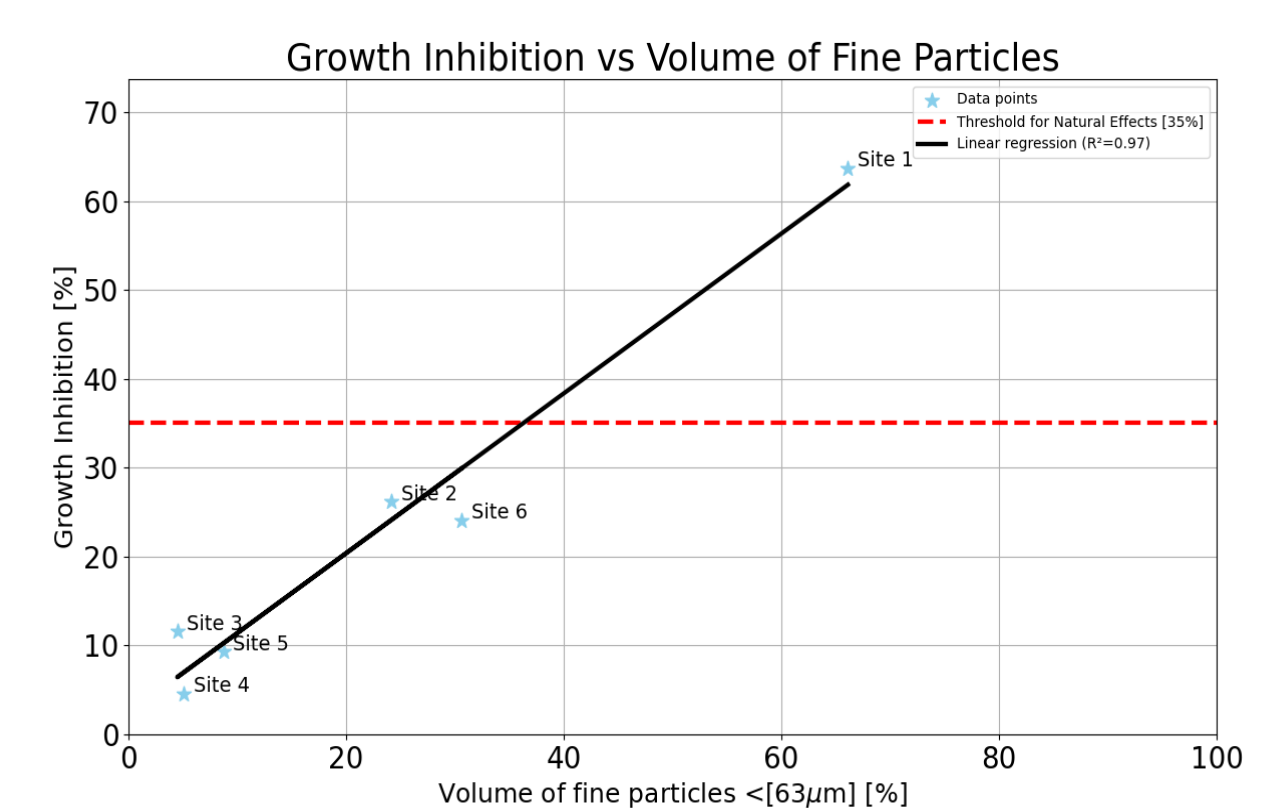
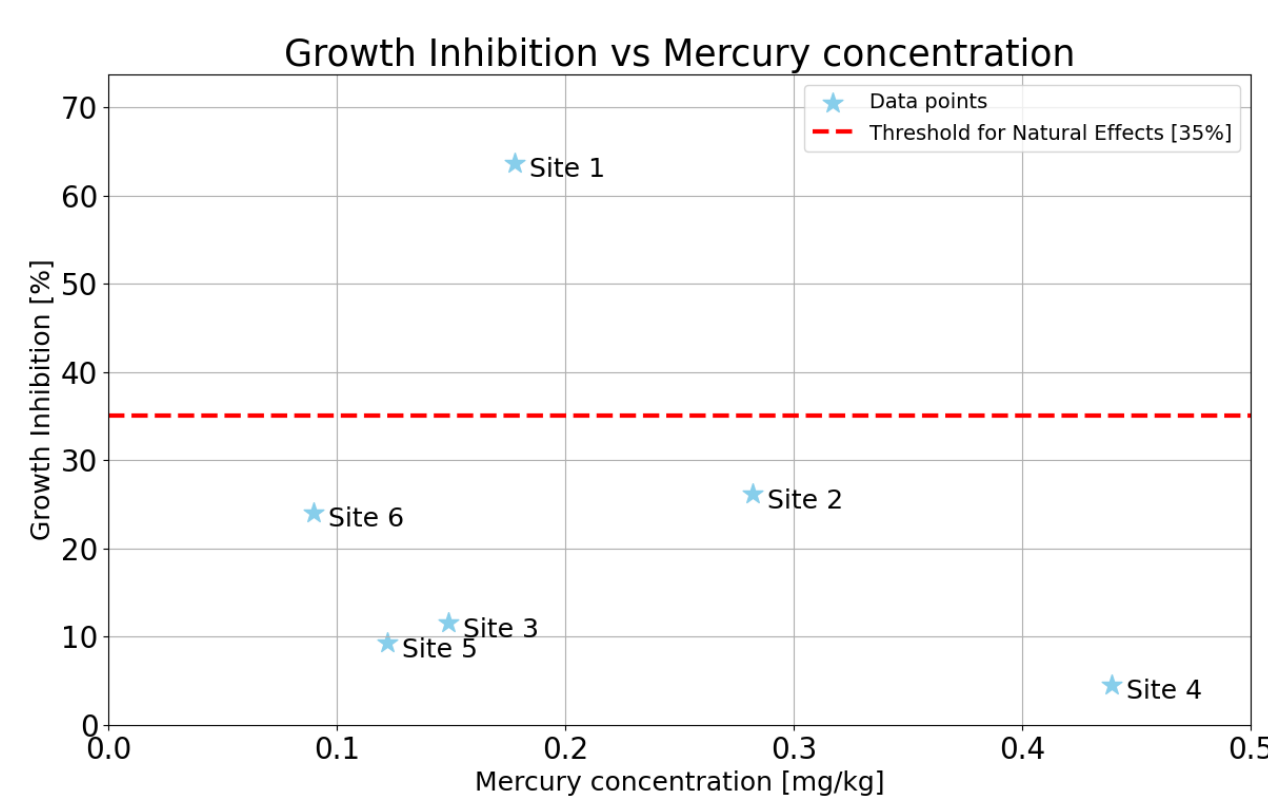
Ostracods are small crustaceans and serve as environmental indicators in ecotoxicology due to their sensitivity to pollutants like mercury and hydrocarbons. Their sensitivity includes other parameters as well, such as sediment granulometry. They are crucial to ecosystems as omnipresent primary consumers.



RESULTS



The **risk ratio** indicates how many times the sediment quality criteria (SQC) has been exceeded, potentially causing **ecotoxicological impacts on benthos**. Mercury has an estimated SQC of 0.102 mg/kg (including background concentrations). This value was exceeded by 4.36 times at site 4.



No correlation was found between **ostracod growth inhibition** and **mercury concentration**. However a clear **relationship** between **ostracod growth inhibition** and the **granulometry** of the sediments was observed, showing greater growth inhibition for finer particles.

Unexpected Results !

Site 1, situated upstream of the industry, showed the highest ostracod growth inhibition. Further chemical analysis were made and revealed a **C10-C40 hydrocarbons and PAHs pollution**.

CONCLUSION

Even if mercury concentrations are not alarming, SQC values are still exceeded meaning there is a risk for the benthic fauna which lives in the top layer of sediments (~15 cm). Additionally, sediment mixing from anthropogenic activities, resuspension due to extreme events such as floods or even natural bioturbation may present a potential risk for mercury resuspension. A better sampling methodology is recommended for further analysis, including core samples to get deeper as well as stratified sediments layers.