TU066 Integrated sediment risk assessment by correlating metal bioaccumulation to DGT passive sampling and varying sediment properties

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The management and remediation of contaminated sediments is a rather complex subject in which integrated assessment methods have been experienced to be crucial for ensuring a decent balance between reasonable costs and environmental benefits and safety. In this regard, the importance of the actual bioavailability of sediment bound contaminants became more and more apparent during the last decades as highly contaminated sites can be characterized with a low toxic potential due to low ratios of weakly bound or free contaminant fractions. For metals, the analysis of parameters such as pore water concentrations, acid extractable metals (AEM), acid volatile sulphides (AVS) and organic carbon have been experienced to be useful predictors, however with varying effectiveness (especially in more oxidized surface sediments) between the different metals. A promising alternative has been found in passive sampling devices, including Diffusive Gradient in Thin film samplers (DGTs). DGT passive samplers give an indication of metal flux behaviour between the different compartments over time and the concentration of bioavailable metal fractions in the sediment by binding divalent metals, weakly-bound to the sediment or present in the pore water, on a chelex ion-exchange resin. In February and March 2019, a laboratory experiment will be conducted in which the toxic potential of a set of about 20 different natural sediments with known biochemical properties (fresh and brackish) will be tested. This will be done by taking the different indicative parameters into account, including pore water concentrations, AVS, AEM and total metal concentrations. The different parameters will be compared to metal concentrations measured by DGT passive samplers. Furthermore, two mussel species (*Corbicula fluminea* and *Dreissena bugensis*) and two sediment digesting worm species (*Hediste diversicolor* and *Lumbriclulus variegatus*) will be exposed to the sediments over 28d. The former parameters will be compared and correlated to the total metal body burden and mortality of the exposed organisms. The results of this study are expected to increase the insights in metal release behaviour over time, the accumulation of such by benthic organisms, and the ability of DGT passive samplers to predict bioaccumulation concentrations. The study aims at contributing to the improvement of water system management and remediation activities for both freshwater and brackish aquatic systems.