Advancements in assessment of contaminated sediment remobilization risks in unnavigable watercourses in Flanders, Belgium

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Introduction

In Flanders a policy to remediate contaminated sediments in unnavigable waters is in development [1]. A procedure to evaluate contaminated sediments was developed and is evaluated conducting some pilot investigations. In order to decide if remediation is necessary two rounds of investigation are developed. In a first round the amount, concentration, origin and dimensions of the contaminating sediments are described. The second round focusses on the possible risks on human and ecological health, but also on possible risks resulting from the transport of contaminated sediment.

Methods

An important part of the risk evaluation comprises the possibility of re-mobilisation of contaminated sediments. A recent study conducted in Flanders focused on the assessment of remobilization risk. A pragmatic evaluation procedure [2] was developed to asses the stability of the contaminated sediment volumes.

On the other hand, a large modeling study in Flanders will be carried out during 2013-2016 to address deposition and resuspension issues in unnavigable rivers. This study includes possible measures to steer sedimentation and to estimate future sedimentation volumes.

Both studies are complementary and will give some tools to improve sediment management in Flanders.

Results and discussion

The monitoring study which assessed the remobilization risk focused on the use of different devices to obtain a pragmatic and easy reproducable risk parameter. Monitoring is performed for different pilot sites in Flanders, and the critical shear stress is withhold as risk parameter.

The modeling study identified several bottlenecks for modeling sedimentation and resuspension for large scale areas, such as stability and calibration issues. But it is the appropriate method to estimate sediment and pollutant load for a storm with a certain retour period. With sensitivity analysis, critical model parameters, such as critical shear stress, sediment settling velocity and specific gravity could be obtained.

Both approaches are complementary to obtain better insights in the resuspension risks of contaminated sediment. With monitoring campaigns, values for the critical model parameters could be identified, and with the calibrated sediment transport models the risk for resuspension must be assessed.

Recommendations

Although more insight is obtained in remobilization risks of contaminated sediments in Flanders, a lot of work remains to be done. First, there is need for extra measurements on the contaminated areas. These measurements (e.g. shear stress, density) should give a more detailed view on the stability of the sediment volumes). Other necessary measurements are water samples during flood events, to assess the resuspension rate and the biochemical quality of the suspend matter.

Second, the (1D) modeling approach is a simplified approach with risk for low model efficiency. More detailed approaches should be considered. Also, measures to reduce contamination risk (such as capping) should be investigated with the modeling approach.

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References

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