



## **Suspended sediment concentration in the Lower Sea Scheldt (Belgium): long term trends and relation to mud disposal**

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In this presentation, results from different monitoring and research projects (OMES, MONEOS, Flexible Disposal and Marine-Fluvial mud ratio) will be integrated to increase the insight in the trends and relation between mud disposal and the increasing sediment concentrations (SSC) in the Lower Sea Scheldt.

In the Scheldt Estuary, major projects have been carried out in the past decade, among which the third deepening of the navigation channel and the opening of the Deurganck dock. Maintenance dredging is carried out to guarantee a minimum navigation depth.

A rising trend in the volume of mud dredged in the Lower Sea Scheldt is observed since 2006, the year after the opening of the Deurganck Dock. The trend is explained by increasing mud volumes dredged in this dock and on a nearby sill. This volume culminated in 2011 (4.8 million m<sup>3</sup>) when the depth of this dock was increased to its design depth. The dredged mud is disposed upstream, quickly to be resuspended.

Near the mud disposal location, yearly averaged SSC (measured at 4.5 m above bed) tripled between 2005 and 2011 (108 to 348 mg/L), and SSC peaks increased even stronger. A multivariate regression model indicated a strong correlation between mud disposal volumes and timing and observed SSC. Mud disposal volumes and SSC were somewhat lower again after 2011.

The SSC increase raises an alert with regard to the risk for a regime shift towards a hyperturbid system. Increasing SSC may indeed decrease the hydraulic resistance initiating a feedback mechanism that results in further increasing SSC values.

It thus appears that more mud is being circulated: the Deurganck dock acts as mud sink, from which the mud is - after dredging and disposal - resuspended. The mud may have different sources: fluvial or marine influx. The increasing SSC might not only be related to the mud disposal, but also to changing tidal characteristics that enhance the influx of marine suspended sediments. To elucidate this, an analysis of the marine fraction in soil and suspended sediments has also been performed.