



## **Factors controlling the sediment trapping efficiency of a freshwater tidal wetland**

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Many freshwater tidal wetlands suffer from drowning due to sea level rise, increased river discharge or land subsidence in combination with sediment starvation. This drowning may be attenuated by enhancing the sediment input into a wetland or the sediment trapping efficiency within a wetland. The objective of this study is to identify this trapping efficiency (defined as the proportion of the incoming sediment that is deposited or trapped in the area) and the controlling factors for a recently re-opened freshwater tidal wetland polder in the Biesbosch inland delta in the southwest of the Netherlands. The wetland receives water and sediment from the Nieuwe Merwede River, a distributary of the Rhine River in the Netherlands.

Water and sediment budgets were established for several events between July 2014 and March 2015, including a river discharge event, windstorm events, and different tidal ranges. Water levels, discharges and suspended sediment concentrations were measured automatically at the in- and outlet of the area at an interval of 10 minutes. The discharge was measured using Horizontal Acoustic Doppler Profilers calibrated using Vertical Acoustic Doppler Profiler measurements during regular field visits. The suspended sediment concentrations were measured using turbidity meters which were calibrated using water samples collected during the field campaigns.

The area is mainly functioning as a side channel with a small storage capacity. The water balance of the area is primary influenced by the tidal water level variation at the in- and outlet points of the area. The tidal water level variation has a larger impact when the river discharge is low, while wind strength and direction further enhance or reduce the water flow through the area.

The former polder area receives on average 48.8 ton per day, which corresponds to an average sediment trapping efficiency of 0.3. Although the amount of sediment trapped within the area increases at higher river discharge, there is no relation between river discharge and the trapping efficiency at a daily timescale. This is due to the tidal water level variation and wind influence at low discharge.