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Long term modeling of the Western Scheldt/ shoal margin collapses





Applied and Engineering Sciences

What are shoal margin collapses?

Occurrence on the inner side of a bend
 Flow slides: liquefaction or breaching
 ~1M m³ eroded sediment ⇒ perturbation



Objective

Part 1 (Van Dijk et al., 2018, Earth Surface Processes & Landforms)

- Characterize shoal margin collapses in the Western Scheldt
- Part 2 (Van Dijk et al., 2nd review, JGR Earth Surface)
- Implement universal parameterisations of collapses;
- Test effects of perturbations by collapses on the channel-shoal morphodynamics



Western Scheldt model setup

- Part from Delft3D-NeVla
- 2 years hydrodynamic simulation with MorFac of 20
 Repeated hydrodynamic boundaries (two spring-neap tidal
- Tested 2 scenarios:

cycles)

- meteorite impact scenario (10 locations),
- continuous yearly collapses



Changes in the channel network



Channel displacement over time



Bed elevation differences against control run

In summary

Collapses affect:

- Changing the channel network, switching main and secondary channel
- Changes bed elevation; connecting channels => main channel
- Increase channel migration of the secondary channels
 Collapses might explain differences between
 observations and model simulations

How does dredging and dumping affect the channelshoal morphodynamics?