## Sediment import and export processes in a simplified estuary

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#### Introduction

- Is the Western Scheldt sediment importing or exporting?
- And what are the driving forces behind changes in changes in sediment import/export

## A simple estuary; Inspiration on earlier work

• Hibma et al., (2003), Van der Wegen & Roelvink (2008)

80 km → 5 km

#### Van der Wegen & Roelvink (2008)

#### • 1D profile model: 80 km long basin



#### General:

- A few studies exist that can simulate a change from sediment import/export, but with changing forcing SLR (Van der Wegen 2013), Closure of basin (Dastgheib, 2012)
- No studies exist (?) that can simulate a natural change from import to export or vv under same forcing conditions; Goal of this study.

#### Western Scheldt 1654



### Model





#### Water level development in

#### estuary



#### Water discharge at mouth of

#### estuary



### Sand import/export at mouth



### Sand import/export at mouth



### Mud import/export at mouth



#### Mud import/export at mouth



#### Mud import becomes export





#### Mud import becomes export

#### Marine mud import (o-600 years):



4000

#### Fluvial mud export:



# Effect on Sand import/export with SLR and sand mining



# Effect on Mud import/export with SLR and sand mining



### Conclusions

- We have simulated transitions from sediment import to export (vv) for both sand and mud -> intertidal areas crucial
- Sand import/export depending on transition towards equilibrium conditions
- Mud import/export depending on accomodation space: no more accomodation space then mud is flushed to towards sea