

Reconstructing the sediment budget of the western Scheldt 1860-1955

G. Dam^{1,2}, M. Van der Wegen^{1,3}, M. Taal³, A. Van der Spek³, & B. Blik²

¹ UNESCO-IHE, dam@svasek.com, m.vanderwegen@unesco-ihe.org

² Svašek Hydraulics, blik@svasek.com

³ Deltares, marcel.taal@deltares.nl, ad.vanderspek@deltares.nl

Management of the Scheldt estuary requires understanding of the long-term sediment fluxes. Many policy related questions are directly or indirectly linked to this subject. Examples are: dredging and disposal strategy, sand mining issues and the observed increase in tidal range with negative impacts on many user functions. Until recently, data analyses suggested that the Scheldt was a sand importing estuary. In this research we investigate the period 1860-1955 using available topographic data and a 3D subsurface model of TNO–Geological Survey of The Netherlands, called GeoTop. We could reconstruct which type of sediment was deposited in this period, including the side branches that were reclaimed in this period. Based on all information we conclude that the estuary in fact has been a sand exporting estuary for the last two centuries. The sand export is mainly related to expanding channels in the western part of the estuary, which seem not to be equilibrium yet (Figure 1) with the hydrodynamics. Furthermore, we conclude that there has been a mud import in the estuary, which was deposited in bars and the side branches (Figure 2).

In order to understand the processes better, a process-based morphological sand-mud model was set up for this period based on Dam et al. (2016) and Dam & Blik (2013). The model simulates the 1860-1955 period and confirms the sand export and mud import.

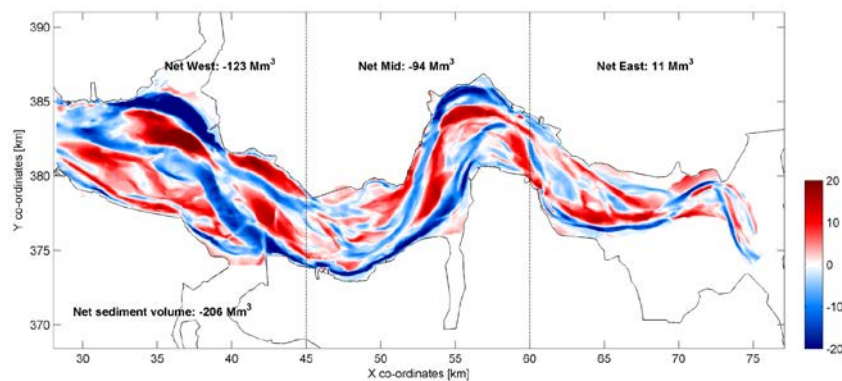


Figure 1: Erosion/sedimentation (meters) and net volume per section 1860-1955 based on measurements

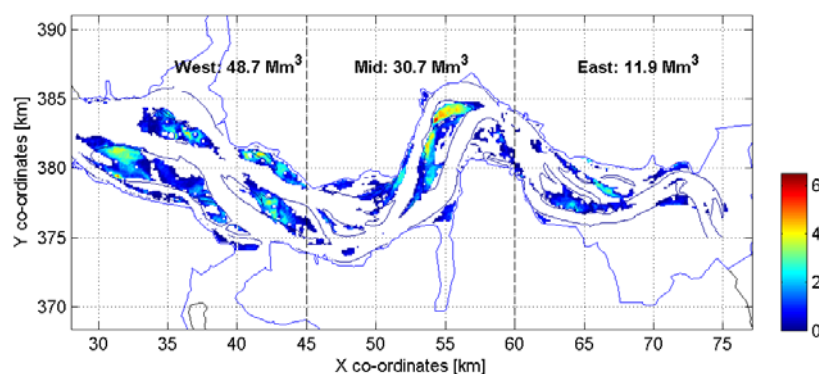


Figure 2: Clay deposition (meters) and total volume per section 1860-1955 based on GeoTop data.

References

- Dam, G., Van der Wegen, M. Labeur, R.J. and Roelvink, D. (2016). Modeling centuries of estuarine morphodynamics in the Western Scheldt estuary. *Geophysical Research Letters*, Volume 43, Issue 8, pp. 3839-3847, doi:10.1002/2015GL066725.
- Dam, G., Blik, A.J. (2013) Using a sand-mud model to hindcast the morphology near Waarde, The Netherlands, *Maritime Engineering*, Vol. 166, pp. 63-75, doi: 10.1680/maen.2011.43.