Influence of anthropogenic measures on large-scale estuarine morphodynamics

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We investigate the influence of the embankment of tidal basins (anthropogenic measures) on large-scale estuarine morphodynamics. To this end, we employ a depth-averaged numerical morphodynamic model to describe the hydrodynamics and resulting morphodynamic evolution. We find that the embankment of a tidal basin can profoundly impact the location and orientation of the main channel the estuary and the location and orientation of the elongated tidal banks (tidal delta) in the mouth region.

Our model findings are compared with historical bathymetrical data of the Scheldt estuary, which is a tidally dominated estuary is located at the border between The Netherlands and Belgium. The estuary has a profound economic value, providing e.g. maritime access to several ports in Belgium and The Netherlands. Over the past two centuries, the geometry and bathymetry of the Scheldt estuary have profoundly evolved, a.o. due to anthropogenic measures such as land reclamation. Comparing modelling results with historical bathymetrical data appears to support our findings.

Keywords: morphodynamics; estuary; tidal delta; anthropogenic measures