Multi-Scale modelling of storm surge events in the Scheldt North Sea River-Ocean continuum

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In the context of global warming, we anticipate an increase in the intensity of compound events involving storm surges, tides, and river discharge, potentially amplifying coastal damage, especially in estuarine regions. This emphasizes the urgent need to understand the intricate interactions within the river-ocean continuum, a traditionally challenging field to model. The challenge lies in the diverse scales of processes, both temporal and spatial, that span this continuum. Our focus is on examining how small-scale changes in the Scheldt river-estuary and the atmosphere influence the physical processes in the North Western Continental Shelf and Belgian Bight of the North Sea. Specifically, we are focused on the potential threats posed by storm surge events from the North Sea infiltrating the Scheldt. We developed an unstructured grid model of the continuum to better understand processes during storm surge events. Our model demonstrates a reasonable ability to replicate observed water elevations and tidal components, contributing to a clearer understanding of the intricate land-sea connection.