HIGH RESOLUTION MORPHOLOGICAL MODELLING
FOR BEACH NOURISHMENT AT SOPHIA BEACH

Sophia beach is located in the Eastern Scheldt estuary, just east of the Storm Surge barrier. The beach is eroding and measures need to be taken to secure the safety of the hinterland. To investigate possible nourishments Rijkswaterstaat has asked Svašek Hydraulics to set up a coupled FINEL2D-SWAN morphological model to predict the effects of such measures.

A representative wave climate has been applied in an online structured SWAN model which was update every hour with the hydromorphological FINEL2D model. For the latter an Eastern Scheldt model has been set up, incorporating the storm surge barrier to a high degree of accuracy, while focusing computational effort – by way of the flexible unstructured grid – on Sophia Beach. Finally Engelund-Hansen's (1967) equations have been applied to compute bed level changes. Results show realistic spatial patterns and have been calibrated to match overall erosion rate of Sophia beach.
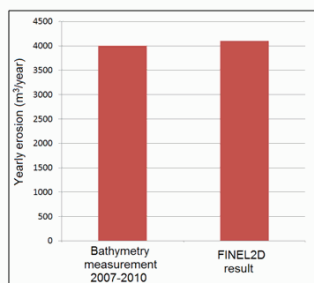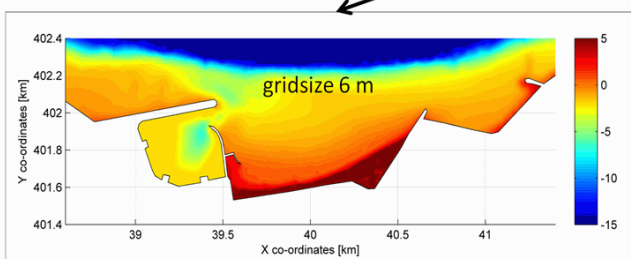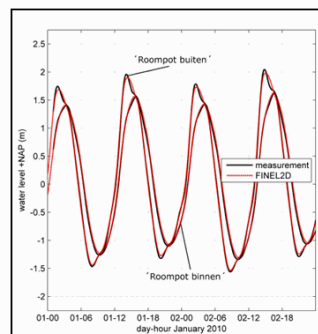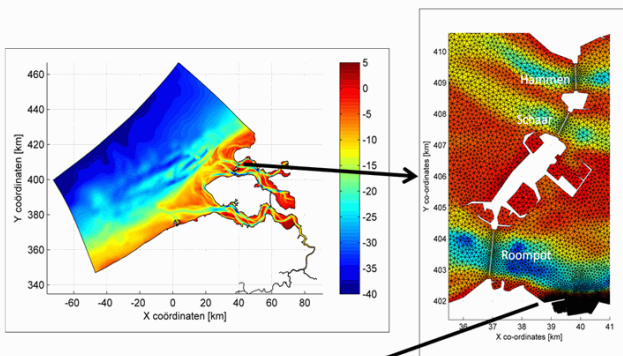
The results have been used in decision making regarding nourishment of Sophia Beach which will provide a preferable alternative to reinforcements of dikes. A range of scenarios have been set-up, providing insight into the effects of different nourishment schemes and the possibility to reduce erosion by constructing small embankments.

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