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MEDIUM-TERM MORPHODYNAMIC MODELLING OF MUD AND SAND IN THE TIDAL BASIN JADEBUSEN

Markus Witting, Christof Wehmeyer

Coastal Research Station of Lower Saxony, An der Mühle 5, 26548 Norderney, Ostfriesland, Germany. Tel: (+49) 4932 916146, e-mail: markus.witting@nlwkn-ny.niedersachsen.de

The tidal basin Jadebusen is part of the German Northsea coast in the southern German Bight. It consists roughly one-third of muddy, intertidal flats, one-third of sandy flats and one third of tidal channels. Therefore the sediment composition is very heterogeneous. For dike constructions sand mining projects in the range of 2 $*10^6$ m^3 have been carried out in Jadebusen and are planned in future. A quick refilling of the last sand pit could be observed during several months in 1997.

In order to clarify the mechanisms of the refilling process in relation to the location of a planned sand pit and its effects on the nearby dike, a morphodynamic modelling study is carried out. The model Delft3D-online is used in this study, which uses the approach of Partheniades (WL Delft, 2003) for cohesive sediments and a formula for sand transport (van Rijn, 2005). The model works with 3 sediment fractions (van Ledden et al. 2004, 2006) and is fully coupled in respect to the interaction of waves, currents and bottom changes.

The study addresses the issue of the determination of the initial grain size distribution (Hirschhäuser, 1998, Escobar et al., 2006) in Jadebusen. Here aerial observations of tidal flat types in combination with measured grading curves build the basis for pre-sorting runs with the morphodynamic model. The pre-sorting of the measured/observed grain size distribution provides a sound initial distribution without unrealistically strong bottom changes at the beginning of the morphodynamic simulation.

Mainly the study shows the impact of various setting for the cohesive transport parameters (Boon et al., 2002) on the validation parameters such as suspended sediment concentrations and the refilling process of the sand pit in 1997. A high sensitivity can be observed regarding the parameters of the cohesive transport formula. Also the specified background concentration of suspended matter and the roughness values are shown to have a strong effect on the validation parameters and on the resulting bed level changes.

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