



Morphodynamics of Wadden Sea areas – Field measurements and modelling

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The Wadden Sea areas of the North Sea Coast are affected by intense morphodynamic processes. Especially in the mouths of the estuaries changes of sedimentation and erosion occur on different time scales. These changes challenge the decision makers in the Port Authorities, because of the high importance of adequate waterway depths. The Hamburg University of Technology runs extensive measurements to collect data on a tidal flat area in the mouth of the estuary Elbe, which is the approach to the port of Hamburg. The results of the field study provide a fundamental information data set to design a numerical morphodynamic model.

Since July 2006 water levels, waves, flow velocities and flow directions are being recorded continuously in high resolution as well as the concentration of suspended sediments. In frequent intervals the bathymetry of the investigation area is determined with a multi-beam echo sounder.

The main goal of the research project is to improve the knowledge about morphodynamic processes on tidal flats. Conclusions about the morphodynamic development in the researched area can be drawn based on both, current measuring data and historical surveying data. For longer observation periods the investigation area shows a constant development. Shorter time scales instead indicate a greater variability of the morphology. A shift of the main creek's axis in the investigation area of 300 meters in five weeks was recorded. Especially during lower water levels large amounts of sediments are transported. Two recorded heavy storm surges did not have significant impacts on the morphology. Derived from the field data certain patterns of sediment transport

depending on the water level could be observed.

The paper and the presentation will include a description of the investigation area and the field measurements. Then the results will be discussed and the creation of the numerical model will be described. The results of the model will be evaluated and conclusions will be drawn on the basis of both, the field measurements and the model. Closing recommendations for further research will be given.