MATHEJA CONSULT

Königsberger Str. 5 • 30938 Burgwedel / OT Wettmar • Tel: + 49 5139 / 402799 - 0 • Fax: + 49 5139 / 402799 - 8 • www.matheja-consult.de • kontakt@matheja-consult.de

Sediment Transport and Hydrodynamics in the Elbe Estuary between Geesthacht and Scharhörn after Construction of DOW Jetty near Stade

Client: Ports of Lower Saxony GmbH & Co. KG
Location: Elbe Estuary near Stade
Scope of Work: Variation of sediment transport, tidal currents and water levels after construction of the jetty
Methodology: 3D hydronumerical model Modell der Tideelbe zwischen Geesthacht und Scharhörn (DELFT 3D)

INTRODUCTION

DOW Deutschland Anlagengesellschaft mbH plans a power plant at the left embankment of the Elbe Estuary north of Stadersand with a capacity of 920MWel (Fig. 1).

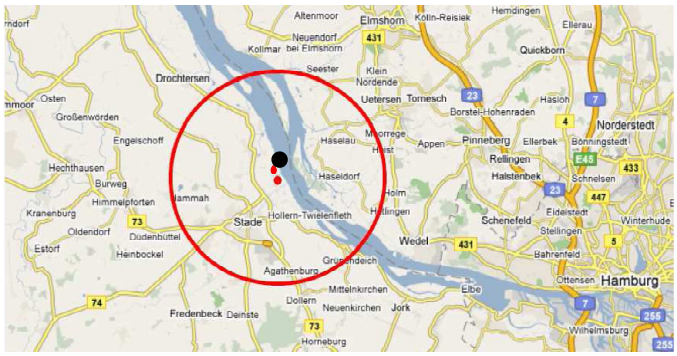

Fig. 1: Location of the planned Power Plant near Stade

Therefore, the Ports of Lower Saxony GmbH & Co. KG plans a jetty to supply coal fort he power plant (approx. 2.5 Mio. tons/a).

Thus, variations of sediment transport, tidal currents and water levels had to be calculated.

METHODOLOGY

A hydronumerical 3D model on top of DELFT3D was setup between Scharhörn and Geesthacht (Fig. 2).

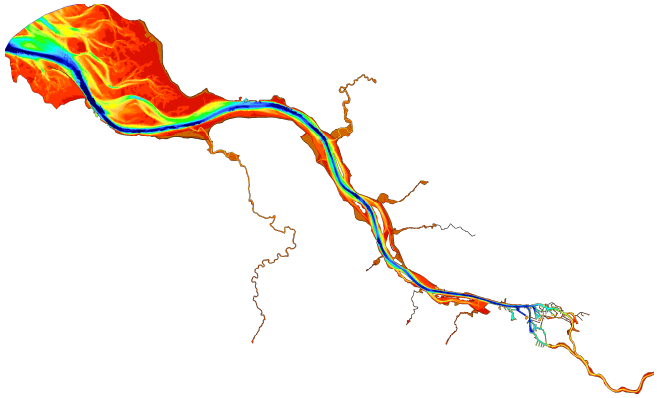

Fig. 2: Hydronumerical 3D Model between Geesthacht and Scharhörn

The model was calibrated for different scenarios and current measurements with ADCP (Fig. 3).

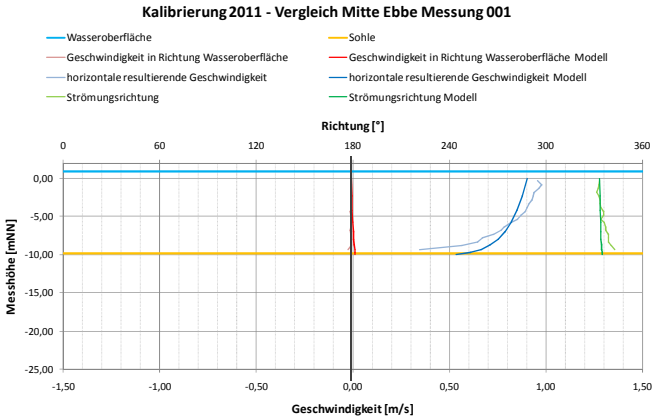

Fig. 3: Comparison of measured (vertical ADCP measurements) and calculated profiles of current velocities

RESULTS

The analysis has shown, that variations of water levels and current velocities and current directions are restricted to the local area of the jetty and the access area. Thus, changes of the bathymetry are small and limited to area nearby (Fig. 4).

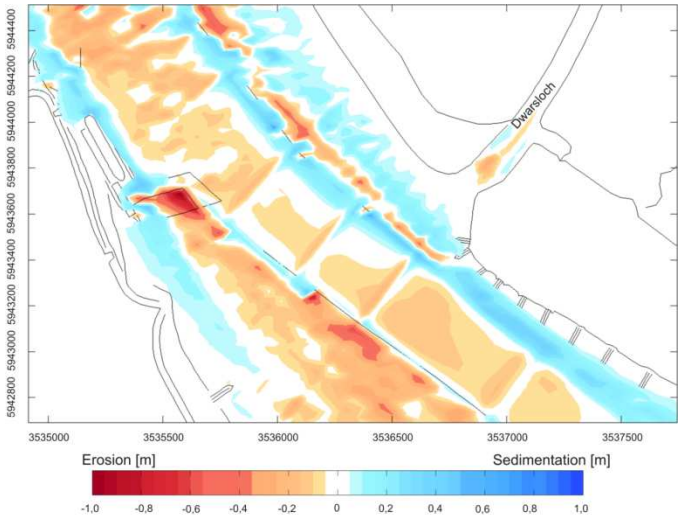

Fig. 4: Differences in bathymetry between Actual Situation and Variant 1 after a mean Spring-Neap-Cycle near Dwarsloch