

# Dynamics of the German Bight

## Simulation of the German Bight dynamics and the impact of extreme flood events

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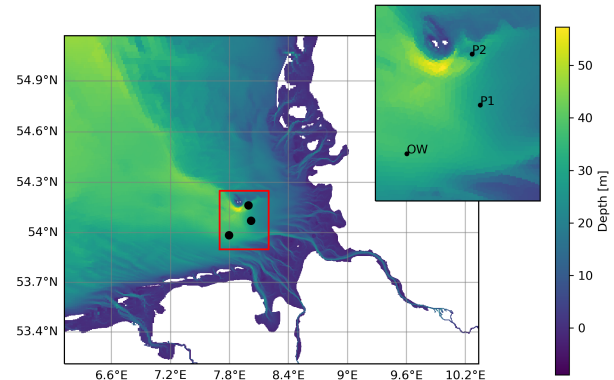
physical features on observed variability in biology and sediment transport in the 2013 flood event [3].

### In Short

- Effect of extreme flood events including the 2013 Elbe flood on the German Bight hydrodynamics will be investigated
- Stratification, destratification processes in the German Bight will be studied
- Numerical results will be used in the future to study the effect of physical features on observed variability in biology and sediment transport in the German Bight

This application is part of the BMBF funded project “Modular System for Shelves and Coasts (MOSSCO)”, phase II. The main aim of the second phase of the project (MOSSCO Synthesis, 2016-2019) is to apply the developed modular infrastructure in phase I to a number of coastal studies. These studies will address research questions arising from the interplay of biogeochemical, ecological, and sedimentary processes within the coastal transition zone. One of the regions of interest is the German Bight (GB) and therefore a high resolution model of this area is setup. The model domain is shown in Figure 1.

The numerical model is based on the hydrodynamic model of GETM, “General Estuarine Transport Model”[1]. The model is setup with a focus on Elbe and Weser estuaries and Helgoland. The Elbe estuary is modelled up to the Geesthacht weir. The setup has a 300 meter resolution in the inner German Bight which allows for adequate resolution of physical features such as fronts and eddies. The model results will be used to study the dynamics of the GB, specifically, the stratification and destratification processes. Observations in summer 2016 of vertical density structure in three nearby stations south of Helgoland (P1,P2 and OW shown in Figure 1), demonstrate different dynamics, with two stations (P1 and P2) showing periods of stratification and one station (OW) being vertically mixed. The high resolution model will be used to investigate the processes that result in this different behavior [2]. The second research aim is to investigate the effect of 2013 Elbe flood on the hydrodynamics of the GB region using the numerical model. The results of this study will be later used to evaluate the effect of



**Figure 1:** Model domain, bathymetry and location of observational stations P1, P2 and OW.

### WWW

<http://www.mossco.de/>

### More Information

- [1] H. Burchard and K. Bolding, *GETM: A General Estuarine Transport Model; Scientific Documentation* European Commission, Joint Research Centre, Institute for Environment and Sustainability, 2002.
- [2] K. Purkiani, J. Becherer, G. Flöser, U. Gräwe, V. Mohrholz, H. M. Schuttelaars, and H. Burchard. Numerical analysis of stratification and destratification processes in a tidally energetic inlet with an ebb tidal delta, *Journal of Geophysical Research: Oceans*, vol. 120, no. 1, pp. 225–243, 2015.
- [3] O. Kerimoglu, R. Hofmeister, J. Maerz, R. Rietzmüller, and K. W. Wirtz. The acclimative biogeochemical model of the southern north sea. *Biogeosciences*, vol. 14, no. 19, p. 4499, 2017.

### Project Partners

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