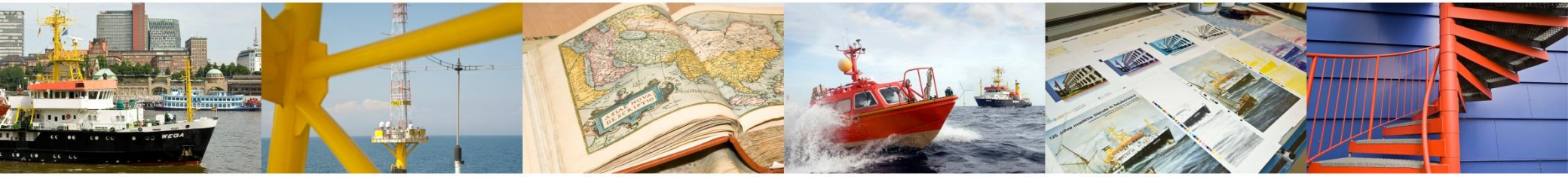
BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Regional Climate Modelling @ BSH



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Introduction

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

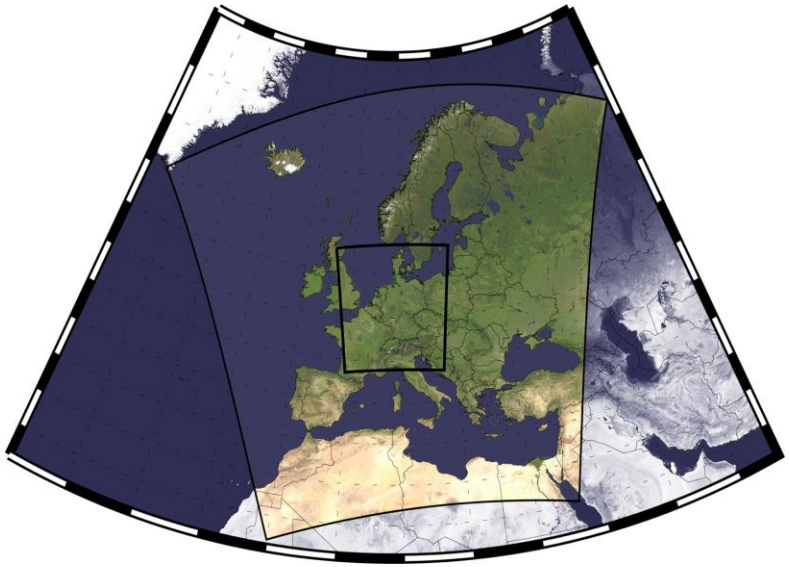
- **ProWaS (Pilot project on climate, waterways and shipping): 2-year project (7/2017-6/2019) in close cooperation with DWD**
- **Coupled regional climate model ROAM 1.0: NEMO Nordic V3.3+COSMO-CLM coupled with OASIS**
- **Evaluation of ocean component:**
- **20-year hincast run (1996-2015) with:**
  1. **NEMO V3.3, NEMO-Nordic 2nm setup, done**
  2. **HBM, BSH nested forecast setup (3nm+0.5nm), almost done**
  3. **NEMO V3.6, HZG GCOAST setup, in preparation**

Hindcast specifications

- Atmospheric Forcing: COSMO REA6
- Boundary conditions: ERA-Interim/
  ORAS4 SSTs/SICs
- Tidal amplitudes for M2, S2, N2, …harmonics: OSU Tidal Inversion Software (*Egbert et al.,1994*)
- Surface river runoff: E-HYPE (corrected via regression to observations in the German Bight)

Atmospheric Forcing: COSMO REA6

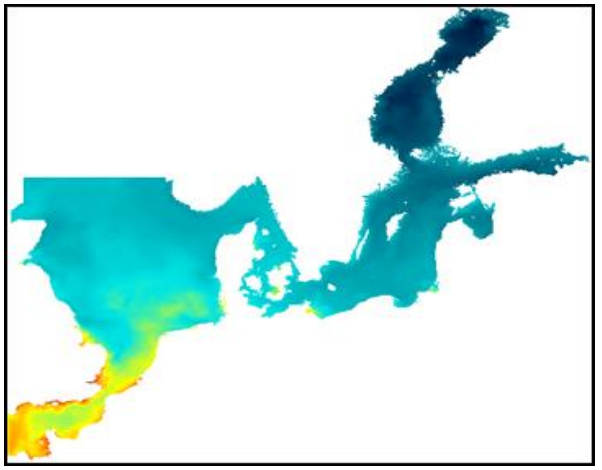
- Regional atmospheric reanalysis, carried out by DWD and University of Bonn (*Bollmeyer et al., 2015*)
- CORDEX EU-11 area
- 0.055° grid spacing (6 km), rotated spherical
- 40 vertical layers
- time period:1996 - 2015
- Boundary conditions: ERA-Interim/ ORAS4 SSTs/SICs
- Continuous assimilation of observed data (atmospheric profiles, rain rates, snow depth, soil moisture, …)



COSMO REA6 domain

NEMO-Nordic based on NEMO V3.3 (from SMHI)

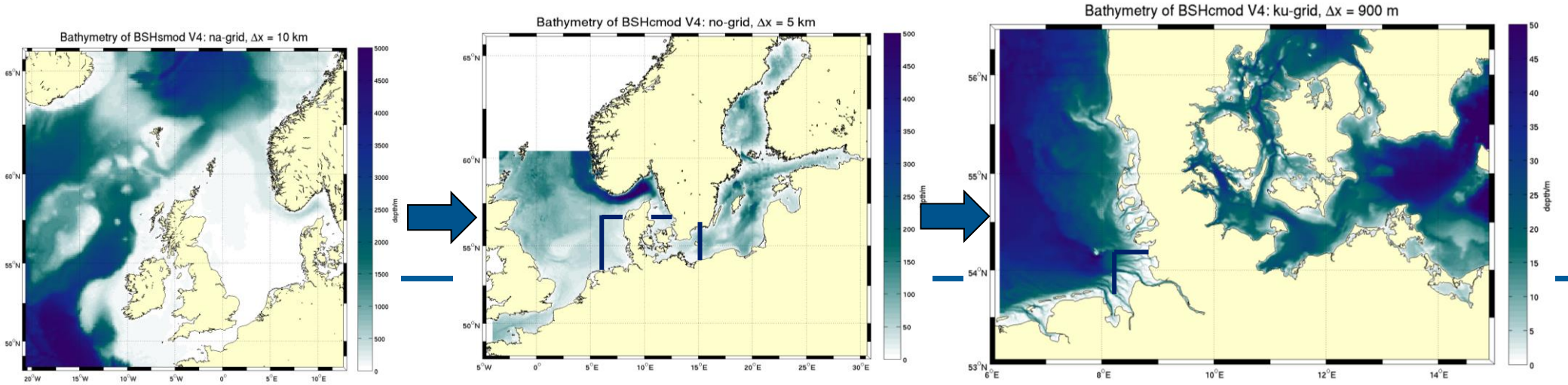
- **N**ucleus for **E**uropean **M**odelling of the **O**cean (*Madec et al. 2011*)
- Discretisation of primitive equations on Arakawa C-Grid
- Regional configuration for North- and Baltic Sea: **2 sm horizontal grid**, 56 vertical z-layers → **NEMO-Nordic V3.3**
- Sea Ice module: LIM3 (*Vancoppenolle et al., 2009*)
- Atmospheric forcing: CORE bulk formulation (*Large & Yeager, 2004*) → short & long wave radiation, 2m temperature, u- & v-wind, specific humidity, precipitation



NEMO Nordic domain

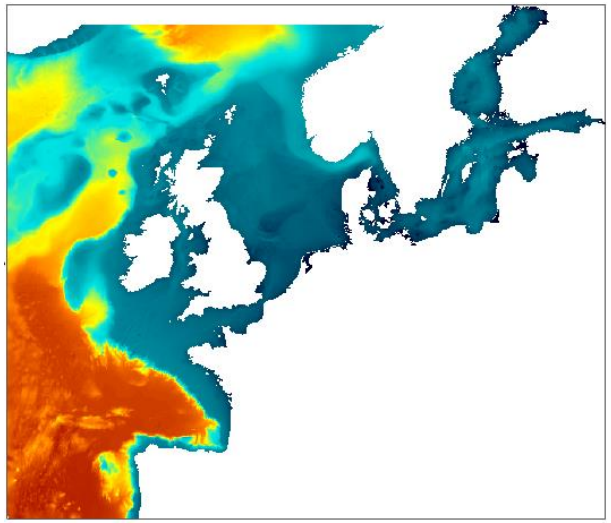
HBM BSH

- HIROMB-BOOS-Model
- Discretisation of primitive equations on Arakawa C-Grid
- Regional nested configuration for North-/Baltic Sea: **3 sm/0.5 nm** horizontal grid, 36 layers → **HBM**
- Sea Ice module
- Atmospheric forcing: bulk formulation →
  cloud cover, 2m temperature, sea level pressure,
  u- & v-wind, specific humidity, precipitation



NEMO GCOAST based on NEMO V3.6 (from HZG)

- **N**ucleus for **E**uropean **M**odelling of the **O**cean (*Madec et al. 2011*)
- Discretisation of primitive equations on Arakawa C-Grid
- Regional configuration for North-/Baltic Sea: **2 nm horizontal grid**, 50 s-layers → **NEMO V3.6 stable**
- Sea Ice module: LIM3 (*Vancoppenolle et al., 2009*)
- Atmospheric forcing: bulk formulation → short & long wave radiation, 2m temperature, u- & v-wind, specific humidity, precipitation



NEMO GCOAST bathymetry

Visions/Expectations for BMIP

What we are interested in:

- Differences in bathymetries, e.g. Danish straits
- Barotropic transport compared to sea level differences
- Ensemble spread ($\Rightarrow$uncertainty) in different parameters/regions
- Water level around the Baltic (means & extremes)

What we are not interested in:

- Model competition
- Pointing to problems without proper analysis/understanding

Thank you very much!

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