

Factsheet Circulation model BSH-HBMnoku

This is a short overview of the key facts of the circulation model BSH-HBMnoku. For detailed questions, please contact us on opmod@bsh.de.

Forecast

A forecast for the North Sea and Baltic Sea is calculated four times a day on regular lon/lat grids. Starting from the analysis times 00 UTC and 12 UTC, this forecast extends 120 hours into the future, and starting from the analysis times 06 UTC and 18 UTC, a 78-hour forecast is calculated.

Products

(Data availability from 01.01.2016 up to 120 hours into the future) in netcdf-format (resp. as ASCII-time series at individual positions)

- Water level (15-min., 2D-array)
- Currents (15-min., 3D-array)
- Temperature (hourly, 3D-array)
- Salinity (hourly, 3D-array)
- Sea ice concentration and thickness (6-hourly, 2D-array)
- Sea ice drift velocity (6-hourly, 2D-array)

Grid resolution and coverage (see Figure 1)

- Coarser grid (NO) covers the entire Baltic Sea and is limited in the North Sea at 4°W and 60°15'N. Resolution: Horizontal 3 nautical miles (approximately 5 km), vertically up to 36 depth layers.
- Finer, high-resolution grid (KU) of the German Bight and western Baltic Sea. The area includes 6°12'E to 14°54'E and 53°13'N to 56°24'N. Resolution: horizontal 0.5 nautical miles (approximately 900 m), vertically up to 25 depth layers.

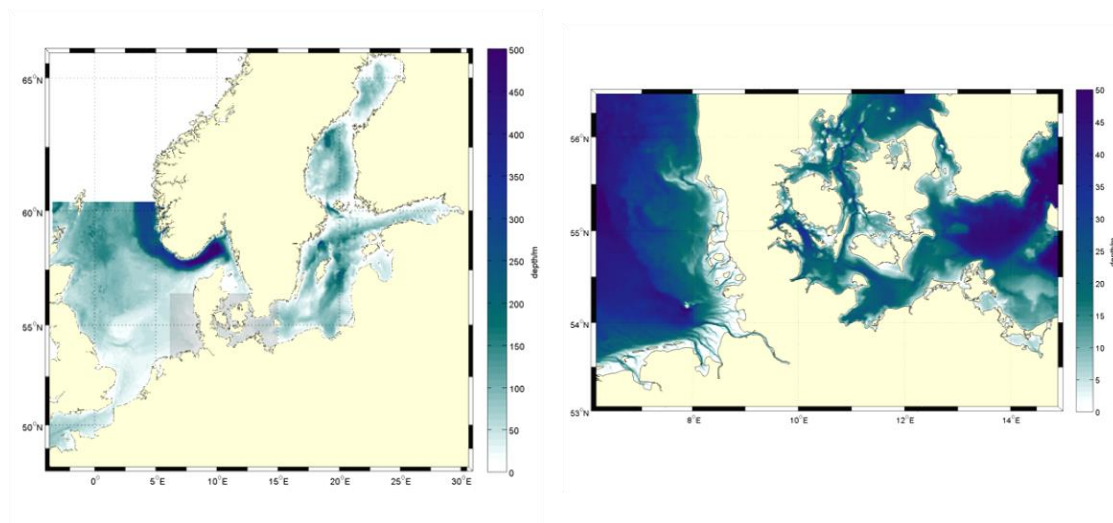


Figure 1: Bathymetry of the coarser grid of the North Sea and Baltic Sea (left) and the finer, high-resolution grid of the for the German Bight and the western Baltic Sea (right). Note the data gap in the left image which is completed by the fine data on the right side.

Data is available on the **product grid** and the **native (model) grid**

- On **product grid**, all data is interpolated to fixed water depths and the cell centre. These water depths are located at 0 (surface data, i.e. top model layer without interpolation), 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21.5, 24.5, 27.5, 30.5, 33.5, 37.5, 42.5, 47.5, 52.5, 57.5, 62.5, 67.5, 72.5, 77.5, 82.5, 87.5, 92.5, 97.5, 105, 120, 150, 200, 300, 450 and 650 m.
- The **native grid** is an Arakawa-C grid with dynamic (variable) vertical coordinates. The layer thicknesses are therefore variable in space and time. The position of data points is described in figure 2.

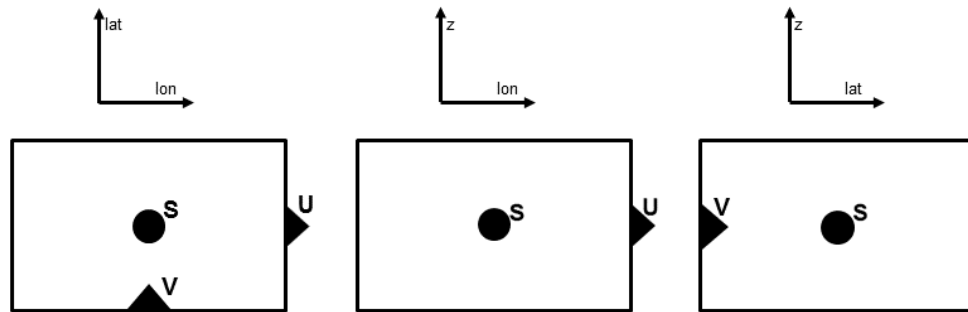


Figure 2: Position of the data points in the original grid - temperature and salt data are positioned at point S, the eastward current component at point U and the northward current component at point V

Forcing/boundary data

- Meteorological forcing is the actual, operational weather forecast of the German Weather Service (DWD, ICON model).
- Discharge data of 80 rivers is calculated for German rivers from measured data and for all other rivers from model data of the discharge model EHYPE of the Swedish Meteorological and Hydrological Institute.
- At the open model boundary (northern North Sea and English Channel), tides are given from 19 partial constituents, as well as a wind surge input from the BSH's North Atlantic model and climatological values for temperature and salinity.

Literature

- Brüning, Thorger; Li, Xin; Schwichtenberg, Fabian and Lorkowski, Ina (2021): An operational, assimilative model system for hydrodynamic and biogeochemical applications for German coastal waters. Hydrographische Nachrichten/Journal of Applied Hydrography, Nr. 118, S. 6-15
- Brüning, Thorger; Janssen, Frank et al. (2014): Operational Ocean Forecasting for German Coastal Waters. Die Küste, Nr. 81, S. 273–290