

NOOS annual report 2017

Member report – Denmark, DMI

November 2017

Country	Denmark
Institution	Danish Meteorological Institute
Observations	<p><i>Status:</i></p> <ul style="list-style-type: none">• National tide gauge network. 90 sites, ~half owned by DMI, half by other national or local agencies. DMI acts as data centre for all.• 3 belt sea moorings for ocean current in three depth. Not being maintained properly, the future of these remains to be decided.• Remote sensing: daily SST/SST-anomaly maps.
Modelling	<p><i>Status:</i></p> <p>The past year has mainly been maintenance, responding to changing environment (NWP/HPC), solidifying existing activities, and limiting our responsibilities. Model development has been kept at a minimum. Marine ecology scientific work terminated.</p> <p>Operational</p> <ul style="list-style-type: none">• Ocean circulation. HBM model code optimized for HPC is used in two settings<ul style="list-style-type: none">○ Storm surge: 3 nested grids (3 n.m.to 0.5 n.m.) plus a fjord module. A 5 day forecast is updated every 6 hours. Once a year a surge-free (tidal) run is carried out for use in NOOS surge forecast exchange. Off-line Lagrangian drift/dispersion model (BSHdmod) for substances and objects interfaced.○ Copernicus: 4 nested grids (3 n.m.to 0.5 n.m). A 2½ day forecast is updated every 12 hours. Enhanced vertical resolution to properly resolve benthic processes and Baltic salt intrusions. Marine ecology model (ERGOM) coupled.• SMHI E-hype3 hydrological model for daily run-off and bioloads interfaced to HBM.• Waves: WAM cy4.5 model code, used in one setting:<ul style="list-style-type: none">○ Nested North Atlantic set-up, extending to the American East Coast for distant swell propagation, but with focus on regional (NW Shelf/Baltic) and Domestic Waters in 3n.m to 0.5 n.m resolution. More fjord systems included. <p><i>New initiatives:</i></p> <ul style="list-style-type: none">• New sea level validation practice. Focus on user's needs rather than science and/or new public management. <p><i>Pre-operational</i></p> <ul style="list-style-type: none">• New weather forcing: Harmonie + ECMWF. DMI-Hirlam phased out.• Osisaf as ice data source for wave modeling: Needs more quality checks.• Wave model ensembles• Wave model with Gaussian grid for Greenland/Arctic wave forecasting <p><i>Under development</i></p> <ul style="list-style-type: none">• Storm surge model resolution increase in eastern North Sea. Horizontal and

vertical.

- Storm surge model fully nested, with embedded fjord module rather than add-on.
- HBM code work on vertical turbulence
- Pdaf data assimilation for HBM ocean model
- New method for ocean model ice dynamics
- Assess the benefit of assimilating blended tide gauge – altimetry sea level analysis in storm surge model

Planning:

- NEMO to be examined as a possible future operational ocean model.
- Storm surge and wave model ensembles using COMEPS

Status:

- Ocean forecast service (www.dmi.dk, ocean.dmi.dk), including
 - Sea level
 - Tide
 - Water temperature at beaches
 - Surface salinity
 - Sea ice
 - Sea state
 - (Marine ecology)
- Ocean monitoring service, including
 - Sea level
 - Tide
 - Daily SST map
 - (Marine ecology)
- Ftp box service (for NOOS):
 - Tide gauge data
 - Wave buoy data
 - Sea level forecast at North Sea ports
 - Wave forecast at buoy locations
 - Modelled transport for North Sea cross-sections
 - Modelled hydrodynamics for North Sea multi-model ensemble
- in-NOOS service
 - Responsible for noos.cc North Sea – Baltic Sea region real-time synoptic sea level information system. Maintenance level is low due to lack of internal technical support.

New initiatives:

- “Free Data” initiative aims to make publically available any DMI owned data, be it real-time or archive, observed or modelled. The project sleeps, funding bieng discussed.
- Climate atlas for future climate adaption. Funded.

National projects

MEMC: On-going national co-operation on marine ecological modelling (DTUaqua, DCE, DMI)

GUDP-VIND: Tool development for fisheries planning, combining hydrographical and marine ecological information.

DABAI: Test case on combining storm surge and a high res. static inundation model.

COHERENT: Development of software tools, data, and recommendations for effective coastal hazard risk reduction and management, to be presented at a multidisciplinary digital platform.

TASSEEF: Develop new tools to assess the environmental effects of fishing.

International projects

Copernicus: EU Marine Core Service project, Baltic physics and ecosystem.

Mona Lisa 2: Operational metocean service for e-navigation.

ESA-CCL: long-term SST re-analysis from satellite

Jcomm: Wave/wind forecast quality intercomparison exercise

EfficienSea2: Innovative solutions for safer and more efficient water-borne operations. Wave ensemble

Baltic Sea Basin Checkpoint: Examine current data collection, observation, surveying, sampling and data assembly programs in the Baltic Sea basin, assess and demonstrate how they can fit into challenge areas.

EU-Maritime CISE 2020: Test bed to establish systems to better share marine information among platforms and institutes

CLAIM: Cleaning marine Litter by developing and Applying Innovative Methods – a H2020 project, coordinated by HCMR. DMI will use HBM-WAM-drift models to simulate the fates of the plastic litters in the Baltic Sea. Very high resolution modelling (a few hundred meter resolution), impact of eddies and waves on litter drift will be studied.

C3S_422_Lot2_Deltares (CoDEC): Coastal Dataset for Evaluation of Climate impact – a C3S contract, coordinated by Deltares. DMI will provide met forcing and work on simulation of extreme storm surge events both in the past and future scenarios.

Additional information

<http://ocean.dmi.dk> DMI ocean products, studies and services.

<http://research.dmi.dk/home/research-topics/ocean> DMI ocean research projects