NOOS annual report 2016

Member report – Denmark, DMI

November 2016

Country **Denmark**

Institution **Danish Meteorological Institute**

Observations

Status:

- National tide gauge network. 82 sites, ~one half managed by DMI, one half by other national or local agencies linked up. 38 are doubly equipped, most with radar (primary) and pressure (secondary) sensor.
- 3 belt sea moorings for ocean current. Not maintained properly.
- Remote sensing data: SST, with SST anomaly as by-product.

New initiatives:

- Altimetry sea level product for assimilation and/or climate studies.

Modelling

Status:

Operational

- Ocean HBM model code optimized for HPC
- Storm surge: baroclinic 3-dim.circulation model (HBM) using 3 nested grids (3 n.m., 1 n.m, 0.5 n.m.) and a fjord module, 4x daily for a 5 day forecast plus a once-a-year surge-free (tidal) run.
- MyOcean: baroclinic 3-dim.coupled circulation and marine ecology model (HBM+ERGOM) using 4 nested grids (3 n.m., 1 n.m, 0.5 n.m, 1 n.m), 2x daily for a 2½ day forecast. Enhanced vertical resolution to properly resolve benthic processes.
- Interfaced with SMHI E-hype3 hydrological model for run-off and bioloads
- Lagrangian drift/dispersion model (BSHdmod) for substances and objects
- Tidal potential added to model equations. This enables large-scale model use.
- Waves: WAM in nested North Atlantic set-up, including American East Coast for distant swell propagation, but with focus on regional and Domestic Waters.

New initiatives:

- Work on new sea level validation practice. Focus on user's needs rather than science and/or new public management.

Under development:

- New weather forcing: Harmonie + ECMWF. No future DMI mesoscale model to be maintained.
- New ice data source for wave modeling: Osisaf
- Wave model in double resolution
- Wave model ensembles
- Wave model with Gaussian grid for Greenland/Arctic wave forecasting
- 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:

- The upcoming year will mainly be maintenance, adhering to changing environment, and solidifying existing activities. New initiatives will be kept at a minimum.

Status:

- Responsible for noos.cc North Sea – Baltic Sea region real-time synoptic sea level information system, including 14, with a potential 15 countries. Unsure if this can be maintained at DMI due to lack of technical support. To be clarified.
- 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
  - Web responsibility transferred to BSH.

New initiatives:

- Modelled surface hydrography for multi-model ensemble prediction
- DMI "Free Data" initiative aims to make publically available any DMI owned data, be it real-time or archive, observed or modelled. The project sleeps.

National projects

MEMC: National co-operation on marine ecological modelling (DTUaqua, DCE, DMI)
GUDP-VIND: Tool development for fisheries planning, combining hydrographical and marine ecological information.
VARSKO: Feasibility study, combining storm surge and geodetic height and inundation models for in-land risk assessment of salt water intrusion.
TASSEEF: Develop new tools to assess the environmental effects of fishing

International projects

MyOcean, 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
EfficienSea 2: Innovative solutions for safer and more efficient water-borne

	operations. Baltic Sea 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
Additional information	http://ocean.dmi.dk DMI ocean products, studies and services. http://research.dmi.dk/home/research-topics/ocean DMI ocean research projects