



CMEMS BAL MFC wave forecasts system – quality, improvements and future prospects

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The BAL MFC (Baltic Monitoring and Forecasting Centre) provides high resolution wave forecasts for the Baltic Sea as part of the Copernicus Marine Service. The BAL MFC wave forecast is run with WAM using grid with a horizontal resolution of ca. 1 nmi (1.852 km) having an open boundary at the Skagerrak. Wind forcing is provided by FMI's numerical weather prediction system HARMONIE (2.5 km resolution). The present version (V3) of wave forecast system accounts for the seasonal ice cover by excluding grid points that have ice concentration of over 30 % from calculations. The next upgrade introduces a method, with which waves can be forecast to partly ice-covered areas, for example drift ice zones. A similar method to attenuate wave energy in partially ice-covered areas is applied as in the coastal archipelago areas of the Baltic Sea.

The quality of the BAL MFC wave forecasting system was evaluated by comparing a two year simulation period, 2015-2016, against measured wave data from the Baltic Sea. The forecast parameters had good quality. The significant wave height was slightly overestimated by the model and the peak period showed accuracy typical to this sea area. The capability of the BAL MFC wave forecast system was further evaluated by simulating the storm 'Toini' (Jan 11th 2017), which caused high waves in the Baltic Proper. The highest hindcast value of significant wave height at the Northern Baltic Proper buoy location during the storm was 7.8 m, which was a good match to the measured maximum value of 8.0 m.

As longer forecast length is of interest to the CMEMS user community, the accuracy of wave forecasts using wind forcing from ECMWF deterministic forecast was studied. The results showed that using ECMWF forcing resulted to much lower values of forecast significant wave height. For example during the storm Toini, the highest forecast value was only 6.2 m. Increasing the maximum value of wind wave coupling increased the significant wave height, but not enough to match to the accuracy of the wave forecast run with HARMONIE forcing.

Presently the effect of the surface currents on the wave model results in the Baltic Sea is studied and preliminary results of WAM forced with surface currents from the Baltic Sea NEMO setup will be presented.