Prediction of biogeochemical processes in the Baltic Sea with a new Nemo4.2.1-FABM-ERGOM model system

The Baltic Monitoring and Forecasting Centre (BAL-MFC) of the Copernicus Marine Service, produces Forecasts for physical and biogeochemical parameters in the Baltic Sea. The biogeochemical forecasting product provides 5-10 day forecasts and a two-year archive for 17 biogeochemical variables for the Baltic Sea area with a spatial resolution of 2 km. For the product update in November 2024, we developed and configured a new forecasting model system. The model system consists of the 3D ocean model NEMO (version 4.2.1), which is one-way coupled to the ecosystem model ERGOM. ERGOM is coupled to NEMO via the Framework for Aquatic Biogeochemical Models (FABM). For the new model system, we newly integrated FABM in NEMO4.2.1 and implemented the BAL-MFC ERGOM version in the FABM system. Additionally, we extended the BALMFC ERGOM version by introducing coloured dissolved organic matter (CDOM), hydrogen sulphide and iron-phosphates as state variables. The focus of the ERGOM update was to improve the simulation of biogeochemical processes in the deep basins of the Baltic Sea, which are typically anoxic. Here, we will present first validation results from the updated NEMO-FABM-ERGOM system for a two-year period. These results indicated that we were able to improve the model performance in comparison to in-situ data for several key variables, including oxygen, chlorophyll and nutrients. Especially, the nutrient dynamics in anoxic regions are better represented.

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