Towards an integrated forecasting system for pelagic fisheries

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First results of a coupled modeling system for the pelagic fisheries are being presented. The system consists currently of two main building blocks: ERSEM providing the biogeochemical environment and the SLAM model within the framework IBMlib, modeling dynamics of the sandeel larvae life stage., implemented in the enlarged domain of the North Sea.

While ERSEM is a model for the lower trophic level of the marine ecosystem with various classes of phytoplankton, zooplankton and bacteria and independent cycles for all macronutrients, carbon and chlorophyll, based on the continuum hypothesis in a Eulerian framework, the SLAM model is an individual based model (IBM) with a Lagrangian approach. An interface has been developed to couple the two fundamentally different approaches (currently working off-line) providing the trophic link between the plankton and the fish level and inserting the individual based model into a realistic dynamic model for the physical and biogeochemical environment. A reparameterisation of the biogeochemical model is proposed with particular focus on the representation of the plankton community structure and the trophic dynamics.

The integrated approach allows for the analysis of the pathways in the system to investigate the propagation of changes in the physical and biogeochemical environment and to identify the major impacts on the higher trophic level, in this case the sand-eel population, demonstrated here on the base of hindcast data.