

High-resolution coastal modeling of harmful algae bloom advection

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Abstract

Harmful algae blooms (HAB) are recurrent phenomena in the Kattegat-Skagerrak area. Some harmful algae, such as the genera *Pseudochattonella*, *Prymnesium*, and *Chrysochromulina* cause fish mortalities. Other harmful algae, e.g. the dinoflagellate genera *Dinophysis* and *Alexandrium*, and the diatom genus *Pseudo-nitzschia*, produce phycotoxins that may accumulate in bivalves causing closures of mussel harvesting areas. Knowledge of advection patterns of HAB is of high interest to the aquaculture industry in Sweden, Norway, and Denmark. One option is to apply numerical modeling; however, the HAB advection between the open sea and the complex archipelagos and fjord systems is challenging to model due to the large range of spatial scales involved. Here we use a series of nested models from 1 nm resolution Nemo-Nordic that covers the Baltic Sea and North Sea down to 50 m resolution local model of Orust-Tjörn area on the Swedish Skagerrak coast, which will provide the three-dimensional velocity field and the thermohaline variables for particle tracking of HAB advection paths as well as heat and salt balance. The modeling approach and preliminary model validation will be presented.

Keywords:

Harmful algae blooms, coastal modeling, particle tracking

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