Geophysical Research Abstracts
Vol. 13, EGU2011-9138, 2011
EGU General Assembly 2011

High-resolution modelling of sea-ice and ocean dynamics in the Nordic Seas

Dorotea Iovino, Christophe Herbaut, and Marie-Noelle Houssais
LOCEAN - Université Pierre et Marie Curie, Paris, France (dilod@locean-ipsl.upmc.fr / +33 (0)1 44 27 38 05)

The mechanisms that regulate the variability of the fresh water reservoir in the Arctic Ocean/Nordic Seas system and the export to the North Atlantic are an essential ingredient of the present climate.
To study the processes linking the fresh water variability north of the Greenland Scotland Ridge to the overflows across the sill and the Atlantic Thermohaline Circulation, a new regional ice-ocean model was developed based on NEMO.
A realistic coupled ice-ocean model (ORCA-LIM2) of the Atlantic/Arctic oceans is used with a horizontal resolution of 1/4º, forced by reanalysis ERA-Interim during 1989-2009. This "eddy-permitting" configuration allows the study of inter-basin interactions and the role of mesoscale processes as overflows and eddies.
A second configuration includes a mesh refinement for the ice-ocean model over the Nordic Seas by a local increase of horizontal resolution (1/16º, "eddy-resolving"). AGRIF is used to control the two-way nesting. Within the domain of the high-resolution nested grid, the model depicts detailed spatial structure of sea-ice cover and ocean circulation, and more realistic flows through the small channels highlighting the impact of small-scale (topographic, dynamic, thermodynamic) features on the North Atlantic mean circulation.
The simulated seasonal variations of sea-ice, hydrography and ocean circulation are compared with available observations, demonstrating the skill of the model in simulating the variations occurring in the Nordic Seas.