Geophysical Research Abstracts, Vol. 8, 08857, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08857

Development and validation of a Barents Sea ice-ocean forecasting system

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Local and detailed sea ice information, including ice drift, ice concentration and ice thickness will, in the future, be essential for safe navigation and operations in the Barents and Kara Seas. To support these needs, a regional high-resolution coupled ice-ocean model has been established for the Barents and Kara Seas with a grid cell resolution of about 5 km. The model system consists of an improved version of Hybrid Coordinate Ocean Circulation Model (HYCOM), coupled to NERSC ice model based on the Elastic Visco Plastic (EVP) rheology by Hunke and Dukowicz (1997) for the dynamic part. It uses atmospheric forcing data from the European Center for Medium range Weather Forecasting (ECMWF). The boundary conditions are given by TOPAZ, forecasting system for the Atlantic and the Artic Oceans. The model is validated against a collection of west Russian hydrographic database gathered by the INTAS-4620 project “The Nordic Seas in the Global Climate System” and compared favorably with remotely sensed ice concentrations. The model developments are the first step toward an accurate ice-ocean forecasting system of the Barents and Kara Seas.