



## **Sensitivity studies of the Arctic-North Atlantic ice-ocean coupled model**

Elena Golubeva, Valentina Malakhova, and Dina Yusupova

Institute of Computational Mathematics and Mathematical Geophysics SB RAS, Mathematical Modelling of the Oceanic, Atmospheric Physics and Environment, Novosibirsk, Russian Federation (elen@ommfao.ssc.ru)

An improved modeling of the Arctic climate system is necessary to clarify the role of the Arctic in the global climate system. A regional coupled ice – ocean model developed in the Institute of Computational Mathematics and Mathematical Geophysics of the Siberian Branch of the Russian Academy of Sciences is used for the investigation of climate variability of the Arctic Ocean. In numerical run designed according to Arctic Ocean Model Intercomparison Project (AOMIP) this model captures the main features of the thermohaline circulation and climate variability of the Arctic Ocean for the period from 1948 to 2007. On the basis of the numerical experiment, we found that there were heating and cooling periods in the Atlantic water layer, the model reproduces the regimes of freshened water accumulation in the Canadian Basin in the period of anticyclonic gyre of surface waters and the regime of its outflow through the Fram Strait and Canadian Archipelago channels in the period of cyclonic gyre. The model results indicate that the reconfiguration of the water circulation of surface and intermediate layers of the ocean caused by a phase shift of the North Atlantic circulation started in the mid-1970s.

In this report we try to pay attention to some critical points and uncertainties in modeling the Arctic Ocean circulation. According to our experience based on one numerical model we focused on numeric, sub-grid parameterizations and initial fields. The main goal is to indicate how choice of advection and mixing schemes and parameter values may affect the Arctic Ocean circulation in the numerical model. Two numerical experiments were carried out to demonstrate a sensitivity of the Arctic circulation pattern to initial temperature and salinity distribution.