



A high resolution fully coupled atmosphere ocean sea ice model to investigate polynya processes in the Laptev Sea

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Dramatic environmental changes are forecasted to occur in the Shelf areas of the Siberian Arctic during this century. The circumpolar polynyas are of vital importance for the ice production and feedback processes regarding energy and water budget. Thus, they play a crucial role in the Arctic Climate as well as the global ocean circulation. The characteristics of the polynya processes are examined within the BMBF founded project "Polynya systems face changes" (2007-2010) which is embedded in the IPY-project "Complex Investigations of Seasonal Cycle in the Arctic Seas". Therefore, the non-hydrostatic atmospheric model COSMO (Consortium for Small-scale Modeling, Deutscher Wetterdienst) is being coupled with the Finite Element Sea Ice Ocean Model (FESOM, Alfred Wegener Institute) for the Laptev Sea with a horizontal resolution of 5 km. Stand-alone simulations of the atmospheric as well as the sea ice model are presented for polynya case studies in the Laptev Sea in spring 2007. Satellite data with a horizontal resolution of 1km (MODIS) enable proper sea ice initial conditions as well as an accurate verification of sea ice changes. The simulated impact of the polynyas is analysed regarding the atmospheric energy and water cycle. Possibilities and difficulties of the coupling are pointed out and the further approach is illustrated.