Geophysical Research Abstracts, Vol. 8, 07063, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07063

A finite element global coupled sea ice-ocean model

R. Timmermann (1), S. Danilov (1) and J. Schröter (1)

(1) Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany (rtimmerm@awi-bremerhaven.de)

A finite element dynamic-thermodynamic sea-ice model has been coupled to the Finite Element Ocean Model (FEOM). As a first step, the coupled model (now the Finite Element Sea Ice - Ocean Model, FESOM) has been configured in a circumpolar domain covering the Southern Ocean between the coast of Antarctica and 48°S using an almost regular grid with about 180 000 nodes. Simulations have been performed for idealized test cases and for realistic daily atmospheric forcing. Ice concentration datasets derived from the SSM/I passive microwave sensor, ice thickness information derived from upward looking sonars (ULS) and the ASPeCt dataset, and oceanographic atlas data have been used to validate the model. The coupled model yields stable integrations for many decades and gives very reasonable results. The FEOM code has been extensively revised to achieve a better computational performance. Using this new code, the model is now set up on a global grid with a horizontal resolution focussed on the Southern Ocean and particularly on the Antarctic continental shelves and slopes. This model setup will be used to adress questions related to decadal variability in high latitudes and to the role of the Southern Ocean in the global thermohaline circulation and in possible future climate change. In the framework of a project related to the GRACE mission that aims at a more accurate description of the geoid, an analysis of bottom pressure anomalies and circulation in the South Atlantic is performed. Here, the grid will be further refined to establish an eddy-resolving area in part of the Atlantic sector of the Antarctic Circumpolar Current (ACC). Furthermore, the Single Evolutive Interpolated Kalman Filter (SEIK) is currently being implemented to allow for the assimilation of sea ice data in the coupled model.