Geophysical Research Abstracts, Vol. 7, 10399, 2005
SRef-ID: 1607-7962/gra/EGU05-A-10399
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Applications of the finite element ocean model (FEOM) to the Labrador Sea

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Finite element models provide flexibility with respect to vertical and horizontal resolution. In the context of ocean models this property is appealing since proper representation of ocean currents depends on the nodal density. It has been shown that an incorrect pathway for the North Atlantic Current (NAC) leads to serious errors in heat fluxes that must be corrected if the ocean model is to be coupled to an atmospheric model. A specific example is the inability of most coarse and eddy-permitting ocean models to correctly reproduce the path of the NAC in the Northwest Corner region around Flemish Cap.

The Finite Element Ocean Model (FEOM) was applied to the North Atlantic using variable resolution (ranging from 1 degree to 1/4 degree), focussing on an improved representation of important topographic features. We present model results of the three dimensional circulation pattern with a focus on the representation of the main currents in the Northwest Corner. We also examine the conservation of water mass properties on the spatially varying grid.