Geophysical Research Abstracts, Vol. 7, 07306, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07306

Inverse finite-element ocean circulation model (IFEOM)

D. Sidorenko, S. Danilov, G. Kivman, J. Schroeter

Alfred-Wegener-Institute, Bremerhaven, Germany (dsidorenko@awi-bremerhaven.de / Tel. +49(471)48311757)

The inverse finite element ocean model (IFEOM) is intended for estimates of ocean circulation by assimilating hydrographic data. It is based on a steady-state version of the finite element ocean general circulation model FEOM (Danilov et al., 2004). It solves steady momentum equations for velocity and sea surface height field, and treats the advective-diffusive tracer balance as a soft constraint. IFEOM seeks for density field, wind stress, and velocities at open boundaries which give minimum to its objective function. The latter penalizes residuals in the tracer equation, deviations of model variables from data available and also misfit between diagnosed deep pressure gradient and the pressure gradient of the forward run of FEOM. The deep pressure gradient constraint is applied below 2000 m and turns to be crucial in keeping the integral properties of the diagnosed circulation consistent. The physical motivation behind this constraint is that the deep ocean circulation is relatively stable and should not be influenced much by assimilation. The model and its adjoint are presented. They were applied to estimate the circulation of the North Atlantic by assimilating several climatological datasets.