Geophysical Research Abstracts, Vol. 7, 04889, 2005
SRef-ID: 1607-7962/gra/EGU05-A-04889

Studying the Impact of Eddy-induced Transport Velocities on Numerical Float Trajectories

Y. Friocourt (1,2), B. Blanke (1), S. Speich (1) and S. Drijfhout (2)

(1) Laboratoire de Physique des Oceans, Brest, France, (2) Royal Netherlands Meteorological Institute, De Bilt, the Netherlands, (yann.friocourt@univ-brest.fr),

Observations and numerical studies have shown that, on average, tracers in the ocean are not advected by the large-scale velocity field, but, more exactly, by an effective transport velocity. In isopycnal coordinates, this effective transport velocity equals the sum of the mean Eulerian velocity and of an eddy-induced velocity. The latter corresponds to the temporal correlation between fluctuations of isopycnic thickness and isopycnal transport.

Lagrangian analyses of numerical simulations consist in advecting numerical floats with the velocity and tracer fields computed by an ocean model. Generally, these floats are advected by the Eulerian mean model fields. In this study, we investigate for two high-resolution ocean models the impact of adding eddy-induced transport velocities in trajectory calculations. Reference movements, against which all test trajectories are checked, integrate the full time variability of the model.

In a spin-up situation, the eddy-induced transport velocity is found of the same order of magnitude as the Eulerian mean velocity all over the domain and at all depths below the mixed layer. Reconstructed trajectories are significantly improved when the eddy-induced transport velocity is included in their calculation. As the model gets closer to equilibrium, the eddy-induced transport velocity diminishes. For sampling times of a few weeks, it remains of the same order of magnitude as the Eulerian mean velocity, but only in the upper layers.