



A parametrization of eddy tracer flux constrained by the energy balance

P. Cessi

Scripps Institution of Oceanography UCSD, La Jolla, CA USA (pcessi@ucsd.edu)

A parametrization for eddy tracer fluxes for use in coarse-grid models is developed and tested against eddy-resolving simulations. The development is based on the assumption that the eddies are adiabatic (except near the surface) and the observation that the flux of buoyancy is effected by barotropic, depth-independent eddies. Like the previous parametrizations of Gent and McWilliams (GM) and Visbeck et al. (VMHS), the horizontal flux of tracer is proportional to the local large-scale horizontal gradient of tracer, through a transfer coefficient assumed to be given by the product of a typical eddy velocity scale and a typical mixing length. The proposed parametrization differs from GM and VMHS in the selection of the eddy-velocity scale, which is based on the kinetic energy balance of baroclinic eddies. The three parametrizations are compared to eddy-resolving computations in a variety of forcing configurations and for several sets of parameters. The VMHS and the new parametrizations perform best in the tests considered here.