Geophysical Research Abstracts
Vol. 21, EGU2019-5142, 2019
EGU General Assembly 2019

Tackling numerical mixing in a 1/4° global NEMO with tides

Alex Megann (1) and Maria Luneva (2)

(1) National Oceanography Centre, Marine Systems Modelling, Southampton, United Kingdom (apm@noc.ac.uk), (2) National Oceanography Centre, Marine Systems Modelling, Liverpool L3 5DA, UK

The eddy-permitting 1/4° resolution in NEMO is known to suffer from significant numerical diapycnal mixing. A major contribution to this is ascribed to truncations in the advection scheme: transient vertical motions from partially-resolved eddies, internal tides and near-inertial waves lead to spurious mixing of tracers in the model, where in the real ocean such motions manifest mainly as adiabatic heave and do not lead directly to significant mixing.

The primary objectives of the RENUMERATE project are: (a) to assess the contribution of tidal motions to numerical mixing in a tidally-forced global 1/4° NEMO configuration; and (b) to assess the effects of a suite of numerical improvements on this mixing. The latter include selected higher-order advection schemes, along with the z∼ ("z-tilde") modification to the vertical coordinate, which replaces eulerian flows across the vertical coordinate surfaces on time scales less than a few days with displacements of the coordinate surfaces themselves. Preliminary results will be presented, including estimates of the effective numerical diffusivity in each of the configurations and the effect of numerical mixing on model drifts.