Geophysical Research Abstracts, Vol. 8, 05049, 2006
SRef-ID: 1607-7962/gra/EGU06-A-05049


# Realistic simulation of Mediterranean Overflow Water (MOW) depth penetration using a purely z-level model

D. Dietrich (1), Y-H Tseng (2), R. Medina (3), M. Liste (3), M. Olabarriet (3), **S. Piacsek** (4), A. Mehra (5), R. Haney (6)

(1) AcuSystems, Inc, Albuquerque, NM, 87112, USA, (2) Lawrence Berkeley National Laboratory, UC, Berkeley, CA, 94720, USA, (3) Ocean and Coastal Research Group, University of Cantabria, Santander, Spain, (4) Oceanography Division, Naval Research Laboratory, Stennis Space Center, MS, 39529, (5) Environmental Modeling Center, NCEP/NWS, NOAA, Camp Springs, MD., 20746, USA, (6) Dept of Meteorology, Naval Postgraduate School, Monterey, CA, 93943, USA

Numerical results are presented from a fourth-order-accurate, purely z-level model having no partial cells or special bottom boundary layer submodel. The model is applied in the framework of six two-way-coupled grids spanning the North Atlantic Ocean, Mediterranean Sea, Caribbean Sea and Gulf of Mexico. Because of the great reduction in memory storage and CPU time afforded by the variable grid distribution, the model could be efficiently executed on a personal computer. The principal results include: (1) volume exchange of ˜1.05 SV between relatively fresh North Atlantic water (Strait of Gibraltar Overflow Water, SGOW) and denser, saltier Mediterranean Sea Overflow Water (MOW); (2) an MOW depth penetration depth to ˜1,000m along the Atlantic Coast of the Iberian Peninsula, after which it spreads further offshore at that depth; (3) time mean SGOW jet path and fluctuations close to observations; and (4) realistic results in all six subdomains. Excessive dilution of density current material, which has limited the MOW depth penetration to ˜500m in previous z-modeling efforts, appears to have been avoided by proper choice of mixing and the accurate numerical approximations employed. The widely published assumption that z-level models have great difficulty in density current simulations due to excessive dilution seems to be repudiated by the present results on sinking and spreading of MOW.