An assessment of vertical mixing schemes in comparison with observations in the European shelf.

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Using the NEMO-shelf model of the Atlantic Marginal Domain with 7km resolution (AMM7) we examine 5 different turbulent closures structural functions, based on the k-epsilon version of the Generic Length Scale Model: Galperin,1988 type closure ,two models by the Canuto group (2001, ab), two by Kantha and Clayson (1994,2004) The AMM7 model realistically reproduces tides and shelf sea processes in the upper and benthic layers, depth of mixed layer and pycnocline. The results have been compared with scanfish temperature sections and direct turbulence observations during 1998-2009All models show high correlations of pycnocline depth and bottom temperature with observations in, however 'less diffusive' Kantha Clayson and Galperin models have much smaller biases in bottom temperature, while more diffusive Canuto models better predicts pycnocline depth. All models underestimate dissipation rate of turbulent kinetic energy in the mixed layer and pycnocline at least by an order and have good agreement with observations in the bottom boundary layer. We discuss the effects of Stock's drift velocity and Langmure circulations in the upper layer and internal waves in pycnocline.