A PARTIAL-CELL GENERAL CIRCULATION MODEL OF THE MEDITERRANEAN SEA

D. Nayagum(1,2), B. Alhammoud(1,2), P. Testor(1), K. Béranger(1,2), N. Hamad(3)

(1) Laboratoire d’Océanographie Dynamique et de Climatologie (LODYC), Université Pierre et Marie Curie, tour 26, boîte 100, 4 place Jussieu 75252 Paris Cedex 05, France, (2) ENSTA, Unité de Mécanique(UME), Chemin de la Hunière, 91761 Palaiseau Cedex, France, (3) Laboratoire d’Océanographie et Biogéochimie (LOB), Antenne LOB-COM-CNRS, BP 330, F-83507 La Seyne-sur-Mer, France (ndlod@lodyc.jussieu.fr/Fax: +33.(0)1.44.27.71.59)

We investigate the influence of partial-cells representation of topography in a high resolution model of the Mediterranean Sea (MED16). Discrete z-level ocean models suffer from a poor representation of slopes that are less than the grid cell aspect ratio deltaz/deltax. Partial cells, by allowing to fill partially bottom-most grid cells, enable to resolve gently sloping topography. In particular, f/H contours are better represented, which could have important dynamical consequences.

The MED16 model has been developed in the framework of the Mercator project. The numerical code is an extended version of the primitive equation model OPA (LODYC, Paris). It uses a 1/16 degree horizontal grid mesh and 43 vertical levels. Two simulations are performed with (MED16PC) and without partial-cells (MED16). The two configurations are initiated with the MEDATLAS climatology and forced by the daily air-sea fluxes from ECMWF analysis.

The modification of mesoscale and basin scale circulations on the general Mediterranean Sea circulation are analysed by comparing these two simulations. Results show that the barotropic components of the circulation are improved in MED16PC as a consequence of a better representation of f/H contours particularly in the Algerian basin. Mesoscale circulations are more intense and more coherent in MED16PC simulations due to a smoother representation of topography. Comparison with SST images suggest that MED16PC performs better simulations.