

COMPACT FINITE DIFFERENCE FOR OCEAN MODELLING.

C. Kazantsev (1) and E. Blayo (2)

(1) Université H. Poincaré Nancy1, Institut Elie Cartan, BP 239, 54506 Vandoeuvre-lès-Nancy Cedex, France, (2) IMAG, Laboratoire de Modélisation et Calcul, BP 53, 38041 Grenoble Cedex 9, France.

`kazanc@iecn.u-nancy.fr`, `blayo@imag.fr`

The interest of compact finite difference schemes is examined in the context of ocean modelling. The properties of different families of compact schemes are investigated and compared to conventional second-order centered schemes. Analytical and experimental results are presented, first for several types of oceanic processes (inertia-gravity and Rossby waves, Munk and Stommel boundary layer models...), and then for a high resolution turbulent 2-D ocean model.

Interestingly, it is shown that increasing the order of the schemes does not necessarily lead to improved results. However, a fourth-order family is found to be a good compromise, which improves significantly the quality of the results with regard to second-order centered schemes with a little increase of the cost of computation.