

The Application of Reduced Grid for Global Ocean Modeling

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ABSTRACT

Decreasing in cell size associated with the convergence of meridians near the poles is the most time step restrictions or limitations of many global climate models which has been solved with explicit finite difference schemes. In this paper, reduced grid has been applied to keep the longitudinal width of cells for three-dimensional primitive equations of ocean-climate model. In this type of grid, which includes sub-grids, the number of cells is reduced at high latitudes and the sub-grids interact at interfaces along their boundaries. So, the finite-difference techniques have been extended to these interfaces. The reduced grid allows an increased time steps and reduces the execution time about 20 percent. Besides of using the spherical grid, high-frequency modes from the high-latitudes solution have been filtered. Results have been speeded up by parallel computers and showing small effects on the solution while an improvement of execution time has been reconfirmed.