Geophysical Research Abstracts, Vol. 8, 10090, 2006
SRef-ID: 1607-7962/gra/EGU06-A-10090

Numerical grid generation for ocean modeling.

E. Hill, D. Enderton and **C. Hill**

Earth Atmospheric and Planetary Sciences, Massachusetts Institute of Technology

We present a general numerical approach for conformally mapping an irregular domain such as an ocean basin on a sphere, and look at applications of the generated grids to ocean modeling and coupled ocean-atmosphere modeling. Using this technique we show that time to solution for a given problem is reduced because the resulting grids can be made more isotropic than those produced by standard gridding approaches. For coupled models our approach allows aligned atmospheric and ocean grids to be generated, which avoids troubling general rotations that are otherwise required for air-sea flux computations. Our approach is rooted in defining a hierarchy of sub-regions that cover the domain to be discretized. Equations are solved for each sub-region to generate locally orthogonal grids that can then be stitched together using a coloring algorithm that ensures cyclic grid lines are connected. We describe the use of this approach to produce more efficient global ocean model configurations at both coarse and fine resolutions for ocean only and coupled modeling work.