

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Extension of Brinkman Penalization for Ocean Circulation Modeling using Adaptive Wavelet Collocation Method¹ SHANON RECKINGER, OLEG V. VASILYEV, University of Colorado — This work improves the representation of continental topology and bottom bathymetry for use in ocean circulation models through an extension of the Brinkman penalization method. Due to the complicated geometry inherent in ocean boundaries, the stair-step representation used in the majority of current global ocean circulation models causes large accuracy and stability problems. Brinkman penalization is a numerical technique used to enforce no slip boundary conditions through the addition of a term to the governing equations. When coupled with the Adaptive Wavelet Collocation Method, which solves the penalized equations on a temporally and spatially varying mesh, the flow near the boundary can be well defined for less computational cost. The talk presents an extension of this technique to slip boundary conditions and is applied to the various sets of equations that govern ocean circulation. The solution using this new penalization converges to the numerical solution with traditional boundary conditions similarly to the order η convergence of the Brinkman penalization method that enforces no slip conditions.

¹This work was supported by DOE-CCPP (DE-FG02-07ER64468).

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Date submitted: 05 Aug 2009

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