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The effects of topography on thermohaline adjustment

E. O'Rourke (1,2), C. Hughes (1) and R. Williams (2)

(1) Proudman Oceanographic Laboratory, Liverpool, UK (2) Department of Earth & Ocean Sciences, University of Liverpool, Liverpool, UK (eaor@pol.ac.uk / Fax: +44 151 795 4801 / Phone: +44 151 795 4951)

A clear signal in sea level pressure is seen in satellite altimetry (Hughes & Meredith, 2006) along the western boundary of the North Atlantic. This is also the propagation pathway of coastal trapped waves. The detection of such waves may be an important indicator of rapid climate change in the North Atlantic as they reach the equator in a matter of months in comparison to the decadal timescale of the advective response.

Numerical calculation of the structure and behaviour of coastal trapped waves as they propagate southwards suggest that they do not adequately represent the signal. Therefore we are investigating whether barotropic adjustment plays an important role.

An idealised model study has been devised using the MIT Global Circulation Model (MITGCM). The model is setup with two layers, a simplified stratification profile and a selection of idealised topographies.

With vertical sidewalls at all boundaries the results obtained are comparable to Johnson & Marshall (2002). Further experimentation with a number of different topographic configurations has yielded many interesting differences which will be examined and discussed.