



The role of bottom pressure torques on the interior pathways of North Atlantic Deep Water

John 'Paul' Spence (1), Oleg Saenko (2), Willem Sijp (1), and Mathew England (1)

(1) Climate Change Research Centre, UNSW, Sydney, Australia, (2) Canadian Centre for Climate Modelling and Analysis, Environment Canada, Canada

Four versions of the same global climate model, one with horizontal resolution of $1.8^\circ \times 3.6^\circ$ and three with $0.2^\circ \times 0.4^\circ$, are employed to evaluate the role of ocean bottom topography and viscosity on the spatial structure of the deep circulation. This study is motivated by several recent observational studies that find subsurface floats injected near the western boundary of the Labrador Sea most often do not continuously follow the Deep Western Boundary Current (DWBC), in contrast to the traditional view that the deep water formed in the North Atlantic predominantly follows the DWBC. It is found that with imposed large viscosity values, the model reproduces the traditional view. However, as viscosity is reduced and the model bathymetry resolution increased, much of the North Atlantic Deep Water (NADW) separates from the western boundary and enters the low-latitude Atlantic via interior pathways distinct from the DWBC. It is shown that bottom pressure torques play an important role in maintaining these interior NADW outflows.