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Dr. Amy Bower: Deep Western Boundary Current

BOUNCE

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Project Summary

In this study, hydrography, tracer measurements and float observations were combined to obtain the first comprehensive description of the North Atlantic Deep Western Boundary Current (DWBC) variability over a large path segment. The hydrographic portion consisted of two occupations (six months apart) of six finely resolved sections across the DWBC from the Grand Banks of Newfoundland to Cape Hatteras. Over this distance (roughly 1700 km) the DWBC encounters diverse conditions, including variations in bottom slope and roughness, as well as proximity to the Gulf Stream. The main objectives of the hydrographic study were to determine the synoptic velocity and water mass structure of the DWBC in order to investigate the nature and cause of the observed variability. Lagrangian RAFOS floats were launched at different locations in the DWBC during the hydrographic cruises and tracked for two years. The main objectives of the Lagrangian study were to determine fluid parcel pathways in the DWBC and identify regions of exchange with the interior. A total of 30 floats were launched, half in the upper chlorofluorocarbon (CFC) maximum associated with Upper Labrador Sea Water (~800 meters) and half near the deep CFC maximum associated with Denmark Straits Overflow Water (~3000 meters).

Manuscripts

Western Boundary Currents
Imawaki, S., A.S. Bower, L. Beal, and B. Qiu, 2013. In: Ocean Circulation and Climate - a 21st Century Perspective, 2nd Edition. Gerold Siedler, Stephen M. Griffies, W. John Gould, and John Church (eds.). Academic Press.

Lagrangian observations of the Deep Western Boundary Current in the North Atlantic Ocean. Part I: Large-scale pathways and spreading rates.
Bower, A. S. and H. D. Hunt, 2000a. *Journal of Physical Oceanography*, 30(5), 764-783.

Lagrangian observations of the Deep Western Boundary Current in the North Atlantic Ocean. Part II: The Gulf Stream-Deep Western Boundary Current crossover.
Bower, A. S. and H. D. Hunt, 2000b. *Journal of Physical Oceanography*, 30(5), 784-804.

Technical Report

Boundary Current Experiment I & II RAFOS Float Data Report 1994-1997.
Hunt, H. D. and A. S. Bower, 1998. Woods Hole Oceanographic Institution, Technical Memorandum WHOI-98-06, Woods Hole, Massachusetts, 105 pp.

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