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Dr. Amy Bower: Atlantic Climate and Circulation Experiment

Warm Water Pathways and Intergyre Exchange

co-PIs: Amy Bower and Phil Richardson (WHOI)

Project Summary

The North Atlantic Current, which transports subtropical water northeastward from the Gulf Stream, and the Poleward Eastern Boundary Current, which carries Mediterranean Outflow Water northward along the European continental slope have been proposed as the two most likely sources of the warm, salty water that is transformed into intermediate and deep water in the subpolar region. We studied the circulation in this region using isopycnal, acoustically-tracked RAFOS floats that were deployed in these two currents with the overall goal of describing the pathways of warm water towards the subpolar region. Our specific objectives were to 1) provide a quantitative description of the bifurcation of the North Atlantic Current east of the Mid-Atlantic Ridge; 2) assess the importance of meridional eddy fluxes, compared to large-scale advection, in the northward flux of heat and salt in the northeastern North Atlantic; and 3) establish the degree of continuity of the Poleward Eastern Boundary Current to the entrance to the Norwegian Sea and the fate of the Mediterranean Outflow Water carried by this current.

Manuscripts

Discrete eddies in the northern North Atlantic as observed by looping RAFOS floats.
Shoosmith, D. R., P. L. Richardson, A. S. Bower, and H. T. Rossby, 2005. *Deep Sea Research II*, 52, 627-650.

Directly measured mid-depth circulation in the northeastern North Atlantic Ocean.
Bower, A. S., B. Le Cann, T. Rossby, W. Zenk, J. Gould, K. Speer, P. Richardson, M. D. Prater, and H.-M. Zhang, 2002. *Nature*, 419, 603-607.

Movies of Sea Surface Height and RAFOS Float Trajectories

Eastern Boundary Floats

Iceland Basin Eddy

Crossing Mid-Atlantic Ridge

Non-Referreed Publications

Bower, A. S., P. L. Richardson, H. D. Hunt (WHOI), T. Rossby, M.D. Prater, H.-M. Zhang, S. Anderson-Fontana, P. Perez-Brunius, and P. Lazarevich (URI), 2000. Warm Water Pathways in the Subpolar Region: An overview of the ACCE RAFOS Float Program. *International WOCE Newsletter*, March 2000.

T. Rossby, M.D. Prater, H.-M. Zhang, S. Anderson-Fontana, P. Perez-Brunius, P. Lazarevich (URI), Bower, A.S., P. L. Richardson, and H. D. Hunt (WHOI), 2000. Warm Water Pathways in the Subpolar Region: Some Case Studies. *International WOCE Newsletter*, March 2000.

Posters

Directly-measured mid-depth circulation in the Northeastern North Atlantic Ocean
Bower, A. S., B. LeCann, T. Rossby, W. Zenk, J. Gould, K. Spear, P. L. Richardson, M. D. Prater, and H.-M. Zhang, 2002. *Presented at WOCE, March 2002.*

Looping ACCE RAFOS Floats in Eddies
Richardson, P. L., D. Slater, A. S. Bower, and H. T. Rossby, 2001. *Presented at AGU, Spring 2001.*

Technical Reports

Warm Water Pathways and Intergyre Exchange in the Northeastern North Atlantic: ACCE RAFOS Float Data Report, November 1996-November 1999
Furey, H., A. Bower, and P. Richardson, 2001. WHOI Tech. Report WHOI-01-17, 153 pp.

Investigating Eddies in North Atlantic RAFOS Float Data
Slater, D., A. Bower, and P. Richardson, 2001. Woods Hole, MA, 50 pp.

Data Sets

WFDAC Subsurface Float Data Archive

Subsurface Float Data Assembly Center: storage center for subsurface float data 1989-present.
» Visit Website

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Mail: Woods Hole Oceanographic Institution, 266 Woods Hole Road, Woods Hole, MA 02543, USA.
E-Contact: info@whoi.edu; press relations: media@whoi.edu, tel. (508) 457-2000
Problems or questions about the site, please contact webdev@whoi.edu