

Atlantic Meridional Overturning Circulation: Monitoring ocean mass and heat transport with ADCPs on commercial vessels

Kathleen Donohue[†]; Charlie Flagg; Tom Rossby; Jessica Worst

[†] Graduate School of Oceanography, USA

Leading author: kdonohue@gso.uri.edu

Two acoustic Doppler current meter-equipped vessels operating in the North Atlantic monitor poleward fluxes at critical locations. It is contemporary GPS-based heading that has allowed accurate ocean-velocity measurements from these high-speed vessels. This has opened up a whole new framework for ocean observation: repeat measurement of currents along the same line thereby building up a context for understanding oceanic variability over a wide range of space and time scales. In this poster we review past and ongoing activities on the container vessel *Oleander* and the deep sea ferry, *Norrna*. The *Oleander* ADCP, in operation since Fall 1992, shows that the Gulf Stream has been quite stable over this time yet evinces weak inter-annual variations in transport likely linked to the state of the NAO. It also has found the Sargasso Sea to exhibit quite large interannual variations in westward transport south of the Gulf Stream. Through geostrophy, surface fluxes are calculated from altimeter sea surface height and compared to the *Oleander* in-situ velocity measurements. Comparing regional fluxes proved challenging due to both rapid shifts in Gulf Stream position and a mismatch between the horizontal scales resolved by altimeter and the ADCP-measured velocities. By defining fixed regions across the *Oleander* line where variability in sea surface height is minimal, surface-flux estimates produced strikingly similar results between the two systems with correlations greater than 0.85 for the Gulf Stream region and greater than 0.94 and in the Slope and Sargasso Seas. The *Norrna*, operating out of the Faroes between Iceland and Denmark, is giving us a detailed view of inflow into the Nordic Seas and has already revealed interannual variability in the Faroe-Shetland Channel. Interestingly, the net flow through the Channel appears to be to the south during summer months.