The Oleander Project: Sustained Observations of Ocean Currents in the NW Atlantic Between New York and Bermuda

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Since late 1992, high-horizontal resolution upper-ocean velocity has been sampled by an acoustic Doppler current profiler (ADCP) mounted in the hull of the container vessel CMV Oleander, which operates on a weekly schedule between New Jersey and Bermuda. In addition to velocity, the Oleander Project includes monthly expendable bathythermograph (XBT) sections. The XBT and thermosalinograph (TSG) program are no longer maintained by the National Marine Fisheries Service. The Oleander Program has taken over that responsibility. We continue to deliver data via the Oleander website (links below) and have included several downloadable files of Gulf Stream North Wall position and upper ocean fluxes along the Oleander line.

Our goal is to provide a framework for the development and testing of new concepts afforded by the systematic and sustained measurements of ocean currents across four distinct regions: the continental shelf, slope sea, Gulf Stream, and northwestern Sargasso Sea. Specifically, our objectives include 1) to continue the Oleander velocity program to elucidate long-term climatological variability; 2) to enhance the existing program with an expanded XBT temperature measurement program; 3) to provide near-real-time processed data distribution to enable broad community participation in scientific analysis; and 4) to investigate the linkages between these oceanographic regimes and their connections to large-scale forcing fields.

Recent results

The Oleander dataset shows no evidence of a decrease in Gulf Stream transport -- in contrast to recent claims of a Gulf Stream slow-down (Rossby et al. 2014; Figure 1). The Oleander ADCP measurements allow us to define a well-constrained definition of Gulf Stream width. The linear least square fit to surface layer Gulf Stream flux yields a 0.13% negative trend per year. Assuming geostrophy, this corresponds to a sea level decrease of 0.03 m over the 20-year period. But, these estimates are not significantly different from zero at the 95% confidence level.

A combination of *in situ* and satellite measurements were used to track various different proxies of Gulf Stream position (Sanchez-Franks et al. 2015). Local measures of Gulf Stream path are then compared with a meridionally averaged Gulf Stream position index to verify that the estimates are internally consistent. Gulf Stream transport and position are also compared to Florida Current transport. Results indicate the Florida Current does not have a detectable signal in the Gulf Stream east of Cape Hatteras.

Online data

ADCP: http://po.msrc.sunysb.edu/Oleander/
TSG: http://po.msrc.sunysb.edu/Oleander/TSG/TSG.html
XBT: http://po.msrc.sunysb.edu/Oleander/TSG/TSG.html
Oleander line: http://www.po.gso.uri.edu/rafos/research/ole

Bibliography

Sanchez-Franks, A., C. N. Flagg, and T. Rossby, 2015: A comparison of transport and position between the Gulf Stream east of Cape Hatteras and the Florida Current. *J. Mar. Res.*, in press.