Gyre-scale Circulation and Coupling in the North Atlantic and North Pacific Oceans

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Principal Investigator: Kathryn A. Kelly
while at:
Woods Hole Oceanographic Institution
Woods Hole, MA 02543

currently at:
Applied Physics Laboratory
University of Washington, Seattle, WA 98195
206-543-9810; kkelly@apl.washington.edu

I proposed to examine the annual cycle of intensity, latitudinal position and amount of meandering in the Gulf Stream, and compare the altimetric cycle with seasonal transport estimates from hydrographic data. That study resulted in a manuscript which is under revision for the *Journal of Physical Oceanography*; abstract is given below. We also proposed to examine large-scale fluctuations which alter the strength and location of the currents at gyre boundaries in the North Pacific. This research has been continued under contract NAGW-5225 with the University of Washington.

Seasonal Variations of Sea Surface Height in the Gulf Stream

Kathryn A. Kelly, Sandipa Singh, and Rui Xin Huang
Department of Physical Oceanography, Woods Hole Oceanographic Institution,
Woods Hole, Massachusetts

Based on more than four years of altimetric SSH data, the Gulf Stream shows distinct seasonal variations in intensity and latitudinal position, with a seasonal range in the SSH difference across the Gulf Stream of 0.14 m and a seasonal range in position of 0.42° latitude. The seasonal variations are most pronounced west (upstream) of about 63°W, near the Gulf Stream's warm core. The changes in the SSH difference across the Gulf Stream are successfully modeled as a steric response to ECMWF heat fluxes, provided seasonal position changes are accounted for, to reconcile the Lagrangian measure of intensity with Eulerian forcing fields. It is suggested that advection may also contribute to the seasonal changes in SSH. Consistent with the interpretation of SSH variations as steric, comparisons with hydrographic data suggest the fall maximum SSH difference is from the upper 250 m of the water column. The maximum volume transport, above 2000 m, is in the spring. Zonally averaged indices used to quantify seasonal changes in the Gulf Stream that are analogous to changes in the atmospheric Jet Stream.