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Structure and Variability of the Florida Current at 27°N: April 1982–July 1984

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ABSTRACT

Results of a two-year field experiment as part of the SubTropical Atlantic Climate Studies (STACS) program in the Straits of Florida are presented. Temperature and absolute ocean current observations were obtained by PEGASUS acoustic current profilers over 16 cruises during which repeated cross sections of the Florida Current were made at 27°N. Results are shown for the mean velocity and temperature fields, the perturbation horizontal kinetic energy and potential energy fields and for those energy conversion terms that could be computed directly from the data. The barotropic and baroclinic energy conversion terms, although small, indicate that the flow is stable for both types of perturbations. A 1arge part of the variability is contributed by short time scales (one week or less).

The average and standard deviation of northward volume transport by the Florida Current during these cruises was $(31.7 \pm 3.0) \times 10^6$ m^3 s^{-1}. Barotropic and baroclinic contributions to the total heat flux across the North Atlantic Ocean at 27°N are computed for each cruise and for the two-year average of all cruises. With the use of previous estimates of the midbasin baroclinic and Ekman heat fluxes, the total average northward heat flux from the observations is $(1.29 \pm 0.21) \times 10^{15}$ W.

To compare STACS data with results from a recent numerical model by Anderson and Corry, Florida Current transport are resolved in a simple manner into barotropic and baroclinic modes. Although the barotropic mode is considerably more variable than the baroclinic, the basic annual signal obtained from the model also appears in the

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STACS observations. In particular, a rapid transport decrease in the fall with a secondary decrease in the spring are found in both model and observations.

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