Abstract View

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Heat Transport into the North Atlantic Ocean North of 32°N Latitude

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ABSTRACT

Direct velocity and temperature measurements obtained on a bimonthly basis from September 1980 to May 1983 in the Gulf Stream at 73°W longitude were used in combination with historical hydrographic and current meter data across the remainder of the ocean to obtain an annual mean estimate, as well as seasonally averaged estimates, of poleward heat transport in the North Atlantic Ocean at 32°N latitude. The annual mean heat transport was found to be northward across 32°N with a magnitude of $(1.38 \pm 0.19) \times 10^{15}$ W and with an annual cycle of abut 0.4×10^{15} W from its minimum in the first half of the year to its maximum in the second half. The main contribution to the annual cycle comes from the Gulf Stream.

The heat transport at 32°N was also examined in terms of the mass transport of different temperature classes. This analysis shows that the heat transport into the North Atlantic basin is due to a diagonal cell in which a net amount of warm water flows northward in the upper layers in the western boundary current, and is balanced by a southward return flow at deeper levels in the central ocean. Our results are consistent with those of Hall and Bryden, who have estimated the mean meridional Atlantic heat transport at 24.5°N.