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Observations of the Boundary Current System at 26.5°N in the Subtropical North Atlantic Ocean *

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ABSTRACT

Five current meter moorings and four horizontal electric field records spanning June 1990–February 1992 are used to describe the mean structure and variability of the vertically averaged velocity field and volume transport extending 425 km east of Abaco, The Bahamas, at 26.5°N. Examination of zonal and meridional velocity sections shows that, while meandering may explain part of the variability, there is substantial evidence for pulsation of the core DWBC velocity in the record. Intermittently strong northward flow is observed 225 km east of Abaco that is significantly coherent and out of phase with the currents closer to the boundary at periods of 50–100 d and longer, suggesting recirculation. This is never observed 315 km offshore. At 380 km offshore and extending east at least 60 km, a strong, dominantly southward flow is observed that is coherent with both that near Abaco (in phase) and in the intervening recirculation zone (out of phase) at long periods. The net mean transport (over 17 months) from Abaco to 325 km offshore, spanning the recirculation region, is -17 Sv ($\text{Sv} \equiv 10^6 \text{ m}^3 \text{ s}^{-1}$). The transport exhibits robust annual variability, and correction for the bias from the annual cycle in the 17-month dataset reduces the net mean transport at 325 km to -13.6 Sv . Allowing for a northward Antilles Current transport of 5.1 Sv yields a mean southward DWBC transport corrected for local recirculation of about 18.5 Sv, in approximate agreement with the thermohaline input from the northern North Atlantic. Comparison of transport time series from the Florida Current with that extending 125 km east of Abaco demonstrates significant and out of phase coherence over the period range 100–250 d. The coherence decreases as the Abaco transport is integrated farther to

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