Abstract View

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# Hydrographic and Current Observations on the Continental Slope and Shelf of the Western Equatorial Atlantic

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ABSTRACT

Hydrographic and current-profiling data from December 1980 and current-meter data obtained between September 1980 and November 1981 from the continental slope and shelf of the western equatorial Atlantic between 2° and 7° N are used to describe the character of the North Brazil Coastal Current (NBCC) system. Hydrographic data and the profiling results show that the NBCC has three distinct branches during the Boreal fall. In the near-surface a strong current flows northwestward parallel to the coast at least as far as 6°N. Current speed within the near-surface NBCC over a one-year period were between 75 and 250 cm $s^{-1}$, while the transport in December 1980 was between 15 and 20 ($\times 10^6$ $m^3$ $s^{-1}$). There was a southeastward near-surface flow farther offshore, which appears to be the return of the NBCC, the ultimate destination of which is the North Equatorial Countercurrent. Offshore of the southeastward flow was a portion of a low-salinity lens of Amazon water. The waters within and below the thermocline down to the depth of our observations (500 m) turned offshore toward the east within the survey area at about 3.5°N. Water property anomalies within these deeper waters clearly differentiated waters of North and South Atlantic origin. Current profile data indicated that the water within the thermocline turned offshore somewhat before the subthermocline waters. The distinction between thermocline and subthermocline waters is consistent with historic data which show the thermocline water as supplying the Equatorial Undercurrent while the waters characteristic of the subthermocline are found north of the equator in subthermocline countcurrents.

As these flows entered the survey region the transport in thermocline was approximately $10 \times 10^6$ m$^3$ s$^{-1}$, while the subthermocline transport was approximately $20 \times 10^6$ m$^3$ s$^{-1}$; thus the total transport of the NBCC shortly after it crossed the equator was about $50 \times 10^6$ m$^3$ s$^{-1}$. Over the 400 m isobath, 10 month mean currents decreased from about 125 cm s$^{-1}$ at 20 m depth to 25 cm s$^{-1}$ at 275 m depth, with most of the shear occurring in the thermocline. The current variability was dominated by along-isobath subtidal oscillations, which decreased only somewhat below the themocline.

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