Abstract View

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Antarctic Bottom Water Flux in the Equatorial Western Atlantic*

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ABSTRACT

A moored array at the equator in the western basin of the Atlantic provides a 604-day time series of abyssal currents and temperatures spanning the full breadth of the Antarctic Bottom Water (AABW) flowing from the Brazil Basin to the Guiana Basin. Mean AABW transport is estimated to be 2.0 Sv (Sv $\equiv 10^6$ m^3 s^{-1}), comprising organized westward flow of 2.24 Sv and return flow of 0.24 Sv. The low-frequency variability is dominated by a quasi-annual transport cycle of amplitude 0.9 Sv and a 120-day period of amplitude 0.6 Sv. Maximum transports occur in September–October, while minimum transports occur in February–March. Allowing for this quasi-annual cycle and extrapolating the 604-day record to a full two years adds about 7% to the estimated mean AABW transport. The array also provides limited sampling in the overlying lower North Atlantic Deep Water (LNADW), where a southern boundary intensified flow of LNADW gives the strongest recorded mean speed through the array, 9.9 cm s^{-1} into the Brazil Basin. The LNADW records also have a quasi-annual cycle with strong LNADW flow episodes occurring in April–May. Time series of temperature indicate that the LNADW/AABW transition layer rises and falls in synchrony with the quasi-annual AABW transport cycle (uplifted transition layer during strong AABW transport periods). An observed overall warming trend appears to be accompanied by a decline in AABW transport.