



Abstract View

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Mean Flow and Variabilities in the Deep Western Boundary Current

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ABSTRACT

The Deep Western Boundary Current (DWBC or Western Boundary Undercurrent) was observed for over 100 days by an L-shaped array of current meters along and across the Blake Escarpment. The measurements show a mean southward flow, which at its core, 10 km east of the break of the escarpment, reaches a maximum of 22 cm s^{-1} at a depth of 2500 m. The mean flow decreases to zero at the break and 6 cm s^{-1} 50 km east of the escarpment. The core of the current decreases to 15 cm s^{-1} near the bottom and to zero at 800 m depth. The mean southward volume transport is estimated to be $24 \times 10^6 \text{ m}^3 \text{ s}^{-1}$ (24 Sv).

Two fluctuations in the southward current with amplitudes of the same order as the mean flow are observed. Below 200 m these events are consistent with the flow patterns of southward-moving anticyclonic features. The much reduced current observed might not reflect actual large reductions in the volume transport of the DWBC.

The array measurements, together with a SOFAR float that got caught in the DWBC, document a cyclonic eddy between 1000 and 2000 m during the passage of the two anticyclonic features. There is no clear relationship between this eddy and the two deeper features.

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