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Deep-Flow Variability at Drake Passage

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ABSTRACT

A rotary empirical orthogonal function analysis of the currents measured in central Drake Passage during DRAKE 79 shows that the deep (2500 m) flow has the same spatial and temporal structure as the flow at 500 m, suggesting that current variability in this region penetrates to the bottom. However, comparison of the time amplitude of the corresponding modes indicates that the variability of the 2500 m flow resulting from north to south shifts in the location of the Polar Front lap that at 500 m by one to three days. This implies that the Polar Front slopes to the east or south (looking up from the bottom). A similar time structure was associated with the flow variations detected at moorings located downstream of a line of seamounts that extend into central Drake Passage. Additionally, the presence of mesoscale features (warm- and cold-core rings and meanders) can block or enhance the deep flow through the narrow channels separating the seamounts in Drake Passage. Such episodic changes in transport through channels has implications for deep water exchange between ocean basins, as determined from short-term current meter observations.

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