



Abstract View

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Current System South and East of the Grand Banks of Newfoundland

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ABSTRACT

During April–June 1972 three ships conducted a survey of the region between the Grand Banks and the Mid-Atlantic Ridge, including a grid of hydrographic stations, and two long lines of near-bottom current-meter moorings across the Gulf Stream and North Atlantic Current, respectively. The purpose was to map the property distributions and current field where the Gulf Stream branches, in greater detail and with less ambiguity than hitherto; that material is described here. Worthington's hypothesis that the primary current system there is not a branching Gulf Stream but portions of two separate (and nongeostrophic) gyres is criticized at length in terms of the observed property distributions; it is shown that, given a moderate degree of lateral mixing, they are consistent with the branching, geostrophic flow field, and that there is no need to abandon established physics in order to rationalize them. The deep motions recorded by the current meters on the North Atlantic Current line were roughly suggestive of the prevailing flow field inferred at shallower levels. No evidence of the Gulf Stream was found on the other line, however: rather, there was a burst of low-frequency eddy flow, which masked any prevailing extension of the Stream into the near-bottom water.

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