



## Abstract View

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# Ocean Currents along a Nearshore Frontal Zone on the Continental Shelf of the Southeastern United States

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### ABSTRACT

River and estuarine discharges mix to form a frontal zone along a 400 km length of the coast of the south-eastern United States. The frontal width extends from the coast outward 10–20 km. Two ships, anchored across the frontal zone during autumn, obtained simultaneous hourly profiles of currents and density for, five consecutive tidal cycles. The frontal zone contained a baroclinic coastal current flowing southward. The flow was strongly convergent; more water entered on the coastal side than exited on the seaward side. Much of the inflow was apparently turned southward. Thus, the frontal zone acted as a dynamic barrier that inhibited the advection of mixed river discharge farther offshore.

A thermal wind relationship suitably predicted vertical shear through the frontal zone. Bottom friction seemed to play only a secondary role. Data suggest that the baroclinic coastal current was modified by the presence of a barotropic current seaward of the frontal zone. The force responsible for the barotropic current must be an alongshore pressure gradient acting northward due either to wind set-up against the Florida coast or to the fall in steric sea level along the western edge of the Gulf Stream.

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