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Florida Current Meanders: A Close Look in June–July 1984

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ABSTRACT

During the Florida Atlantic Coast Transport Study (FACTS), the time and space scales of energetic fluctuations of the Florida Current were observed with current meter moorings and acoustically tracked velocity profilers (PEGASUS). The most energetic fluctuations for the downstream velocity component occurred at the outer shelf break with water depths of 75 to 200 m, decreasing both to the inner shelf and the open water.

In June–July 1984 three large eddy–meander events were observed with satellite imagery, current meters and PEGASUS. During the latest, northward velocities are the shelf break decreased from about 100 cm s^{-1} to near zero, with southward flow occurring on the onshore side of the front along the sloping bottom topography. The associated offshore meander increased the transport across the section from 20 to 42 Sv ($1 \text{ Sv} = 10^6 \text{ m}^3 \text{ s}^{-1}$) within 5 days. The onshore component of the flow first appeared on the east side of the Gulf Stream and then penetrated the entire shelf width to the 15 m isobath. A large amount of 18°C water was advected from the east. Upwelling occurred along the western slope with southward flow of 30 cm s^{-1} .

Northward propagation speeds for the three events were estimated to $40\text{--}60 \text{ cm s}^{-1}$ from satellite imagery and current meters separately.

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