



## Abstract View

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# Velocity and Hydrographic Structure of a Gulf Stream Warm-Core Ring

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### ABSTRACT

The hydrographic and velocity structure of Gulf Stream warm-core ring 81D are investigated using a deep CTD–O<sub>2</sub> section through the ring together with horizontal currents at 100 m depth obtained with an acoustic-Doppler system. The pycnocline within the ring is depressed 500 m below that of the surrounding Slope Water and maximum currents at 100 m approach 2 m s<sup>-1</sup> at a radius of 70–80 km from the ring center. Water-mass analysis reveals that the waters in the central core of the ring are similar to the Sargasso Sea and distinct from the Slope Water to depths of 1300 m. Near the surface, the central core is rotating as a solid body approximately once every 3.6 days. The azimuthal currents at 100 m were combined with the gradient current relationship to obtain the absolute dynamic topography of the ring. The sea surface in the ring center is 70 dynamic centimeters above that in the Slope Water and ring currents decrease quickly with increasing depth to undetectable levels below 2000 m. The ring is less dense than the Slope Water below 100 m, but actually dense near the surface, resulting in a weak subsurface velocity maximum. There is also a suggestion of a weak barotropic cyclone 120 km to the northeast of the center of 81D.

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