Abstract View

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Observations of Internal Kelvin Waves Trapped Round Bermuda

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ABSTRACT

Observations of the vertical and horizontal structure of motions near Bermuda have been made with two long-term moored arrays, one relatively far from and the other close to the island. Although not coincident in time, both arrays see horizontally coherent motions at 11 frequency bands ranging in period from 405 to 9.8 h. Only a peak at 26.1 h appears to be significant in the autospectra and, on several grounds, this is identified with the fundamental island-trapped mode (vertically and azimuthally).

Additional resonant subinertial periods are at roughly 45, 54 and 90 h and these are vertical modes 2, 3 or 4 and azimuthal modes 1 or 2 propagating clockwise. The superinertial modes have less internal consistency but appear to have higher order vertical and azimuthal structures and both senses of azimuthal phase propagation.

The subinertial vertical structure is modal and can be rationalized with baroclinic wave dynamics on a sloping bottom by defining an effective bottom depth as some reasonable average over the offshore decay scale.

The subinertial motions are coherent with the surface wind stress and the phase between this forcing and the response changes by 180° across the trapped wave frequency bands consistent with a resonant system. The *Q* of the 26.1 h peak is at least 20 implying that dissipation has only a slight influence on the dynamics.