Abstract View

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Observations of Hurricane-Generated, Near-Inertial Slope Modes

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ABSTRACT

Velocity Profiles and current meter measurements taken near Site D(39°10′N, 70°00′W) on the continental rise south of New England are used to study the variability of the near-inertial wave field along a sloping bottom. While the typical vertical scales of the waves are on the order of 100 m, some energetic downward propagating near-inertial features are observed with unusually large vertical scales, on the order of the ocean depth. Comparison with an internal wave model on a linear bottom slope shows that these energetic waves are dominated by the lowest three downward and seaward printing dynamical "slope" modes. The lowest mode arrives first at Site D from the north, the higher modes follow several days later.

The observed scales and propagation directions suggest that the energetic near-inertial waves were generated by a hurricane and then reflected at the steep continental slope to the north of Site D. The low-order, flat-bottom modes that usually dominate the far-field response of a hurricane are changed by the sloping bottom into "slope" modes, which then propagate toward deeper water. Energy intensification of these modes towards the bottom suggests that sloping bottoms may play a significant role in the near-inertial wave field below the main thermocline.