## Abstract View

Volume 11, Issue 1 (January 1981)

**Journal of Physical Oceanography**
Article: pp. 87–106 | Abstract | PDF (1.34M)

# Near-Inertial Internal Waves Observed on the Outer Shelf in the Middle Atlantic Bight in the Wake of Hurricane Belle

**Dennis A. Mayer**

*Atlantic Oceanographic and Meteorological Laboratories, NOAA, Miami, FL 33149*

**Harold O. Mofjeld**

*Pacific Marine Environmental Laboratory, NOAA Seattle, WA 98105*

**Kevin D. Leaman**

*Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL 33149*

(Manuscript received June 11, 1980, in final form October 3, 1980)

DOI: 10.1175/1520-0485(1981)011<0087:NIIWOO>2.0.CO;2

ABSTRACT

On 10 August 1976 Hurricane Belle passed rapidly over the highly stratified shelf of the New York Bight. Records from Aanderaa current-meter moorings show that the response to the hurricane depended strongly on bathymetry. At deeper stations (~ 70 m depth), intense, first-mode, internal near-inertial oscillations were generated at frequencies ~ 1% less than the local inertial frequency. At shallower stations (~ 50 m depth), only weak, heavily damped second-mode oscillations were observed in the current records, with no corresponding inertial signals in temperature. In the Hudson Shelf Valley, inertial motion occurred only near the surface. This was probably due to topographic effects. The divergence and curl of the wind stress contributed equally to the forcing. The response at the deeper stations is consistent with Geisler's (1970) theory for the open ocean in which a hurricane leaves a wake of internal-inertial oscillations if it travels faster than the internal phase speed and if its horizontal scale is comparable to the internal Rossby radius. The observed frequency shifts (subinertial motion) and observed relative vorticity are consistent with Mooer's (1975a) theory that relative and planetary vorticities combine to give an effective inertial frequency. Here it is suggested that lack of strong inertial motion at the shallower stations is due to a lack of resonance and the likelihood that frictional effects are more important in shallower water, resulting in a more heavily damped response.

top


Headquarters: 45 Beacon Street Boston, MA 02108-3693
DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826
amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718
Allen Press, Inc. assists in the online publication of *AMS* journals.