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A Near-Inertial Internal Wave Spectrum for the Sargasso Sea in Late Summer

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ABSTRACT

Independent estimates of the frequency–wavenumber spectrum of near-inertial waves for the Sargasso Sea in late summer were made using 8 time series of horizontal velocity from a single moored vertical array and 58 vertical profiles of horizontal velocity from a horizontal array of expendable velocity profilers. The profiler data were analyzed to produce an internal wave frequency-wavenumber spectrum with sufficient resolution to resolve the details of the inertial peak and compute the vertical energy flux. Comparison with the lower resolution spectrum from the moored array shows qualitative agreement; the differences are most likely due to biases in both techniques and to intermittency of the internal wave field.

These data reveal a marked asymmetry of the near-inertial internal wave field, with a net downward energy flux of $0.12 \pm 0.12 \text{ ergs cm}^{-2} \text{ s}^{-1}$. The downward propagating waves have more energy, a larger horizontal scale and a lower frequency than the upward propagating waves. The magnitude of the downward energy flux is comparable to the net input of energy into surface inertial currents, confirming the likely importance of the wind as an energy source for near-inertial internal waves.

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