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The Dynamic Balance of Internal Waves

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ABSTRACT

For oceanic internal waves with vertical scales larger than 1 m the evolution of the spectrum is adequately described by weak-interaction theory. Based on simple physical arguments, a model for internal-wave energy dissipation predicts dissipation as weak ever the some scales, for reasonable values of the total dissipation. Assuming dissipation at small scales, such as in our proposed model, and generation at large scales, a consistent dynamic balance with a constant downscale energy flux under nonlocal nonlinear interactions reproduces the observed spectral dependencies. A small-scale break point at which the total shear reaches a given value, and beyond which dissipation is important, is determined by the level and bandwidth of the energy-containing waves.

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