## Abstract View

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# Interaction between Internal Waves and Mesoscale Flow

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ABSTRACT

Interaction with mesoscale currents is found to provide an effective mechanism for transporting internal wave energy in the $f_0$–$2f_0$ band ($f_0$ is the inertial frequency) to high vertical wavenumbers. This mechanism complements the transport mechanisms proposed by McComas, Bretherton, and Müller, which are operative at higher frequencies. The mesoscale interaction is expressed as a diffusion process in internal-wave wavenumber space. This assumes a separation of space scales, weak interaction theory, and an ensemble average over specific realizations. Following the model of McComas *et al.*, phenomenological energy input is assumed at low vertical wavenumbers and dissipation at high vertical wavenumbers. A quasi-steady state internal-wave spectrum is calculated. This is similar to that proposed by Garrett and Munk. Energy input to the internal wave field from mesoscale currents is predicted to be $\approx 4\times10^{-3}$ m$^2$ s$^{-1}$ for an rms current of 10 cm s$^{-1}$. Horizontal and vertical eddy viscosities are predicted to be 40 and $5\times10^{-3}$ m$^2$ s$^{-1}$, respectively. A Richardson number of 1/7 is also calculated. Dissipation and energy input are predicted to scale with mesoscale energy, but the internal-wave energy level appears to be rather insensitive to this.