

Abstract Submitted
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Harmonic generation by nonlinear refraction of a single internal wave mode with rotation SCOTT WUNSCH, Johns Hopkins University — Weakly nonlinear theory is used to explore the dynamics of a mode-1 internal tide in variable stratification with rotation. Nonlinear refraction at the pycnocline generates a perturbation which is forced with double the original frequency and wavenumber. The dynamics of the perturbation are analogous to a forced harmonic oscillator, with the steady state solution matching the forcing frequency and wavenumber. The perturbation exhibits resonance when its frequency is close to a natural frequency of the system. Enhanced dissipation due to the harmonic occurs near resonance, and its contribution to ocean tidal dissipation may be significant in some environments. The results are relevant to recent observations of harmonics of the diurnal tide in the South China Sea. More generally, nonlinear refraction may contribute to the dissipation of oceanic internal tides and the transfer of energy to smaller scales.

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