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Energy Dissipation in Reflecting Internal Waves[1] BRUCE RODENBORN, MATTHEW CALVERT, VRINDA DESAI, Centre College — Internal wave reflection from a uniform sloping boundary is often analyzed using linear or a weakly nonlinear inviscid theory (Dauxois and Young, J. Fluid Mech., 390, 1999). We previously characterized internal wave intensity in experiments and simulations using the integrated kinetic energy density and found our data did not match theory (Rodenborn et al. Phys., Fluids, 23, 2011). However, an algorithm by Lee et al. (Phys. Fluids, 26, 2014) determines the energy flux of internal waves using just velocity field measurements. We used this method to confirm our earlier results but also analyze the energy dissipation by comparing the energy flux into and out of a surface above the reflection region. We find high rates of energy dissipation that peak at the critical angle where the dissipation rate is $O(90\%)$. The high rates of dissipation occur in both the experiments and numerical simulations, even when the numerical wave amplitude is small and the viscosity is reduced by an order of magnitude. This result may help to explain the eroding of continental slopes to the local angle of tidally generated internal waves (Cacchione et al., Science 296, 2002).

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