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Lee Waves in Shear Flow[1] YUE WU, AMALA MAHADEVAN, Woods Hole Oceanographic Institution, ERIC KUNZE, NorthWest Research Associates, AMIT TANDON, UMass Dartmouth — Numerical simulations of internal lee waves generated by a bottom-intensified geostrophic jet over topography have been conducted to investigate lee-wave generation, dissipation and re-absorption into mean shears. Roughly 1 TW of wind-work drives the ocean circulation, out of which up to 20-75% might be dissipated through internal lee-wave generation. Lee-wave energy was thought to be lost to turbulence locally near their generation, but recent observations suggest suppression of turbulence, with dissipation rates one order of magnitude below predicted values. Wave action conservation suggests that internal waves can exchange energy with the sheared mean flow, which might explain this discrepancy. We revisit Reynolds-decomposed energy conservation equations and numerically examine whether a fraction of lee-wave energy is re-absorbed back into sheared mean flow. This research quantifies the role of topographic lee waves in dissipating versus redistributing balanced energy in the ocean.

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