Abstract Submitted
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Aspects of Energetics of Stratified Turbulent Wakes[1] NIDIA CRISTINA REYES GIL, Cornell University, KRISTOPHER ROWE, Argonne National Laboratory, PETER DIAMESSIS, Cornell University, GREG THOMSEN, Wandering Wakhs Research — The study of the turbulent wake generated by a bluff body moving through a stably stratified fluid has important applications in physical oceanography and marine engineering. Significant progress has been made towards understanding the structure and dynamics of the turbulent wake core, as well as the internal gravity wave (IGW) radiation emitted by the wake. Analysis of terms in the wake kinetic energy (KE) budget has demonstrated that viscous dissipation is a stronger sink than IGW radiation before $Nt = 10$, while the latter dominates during the mid-to-late non-equilibrium (NEQ) regime. Nevertheless, these processes do not close the wake KE budget: the largest gap occurring early in the NEQ regime. For a series of implicit large eddy simulations — spanning body-based initial Reynolds number $Re = 5 \times 10^3$, 10^5 and 4×10^5, and Froude number $Fr = 4$, 16 and 64 — we calculate the complete KE budget of a stratified turbulent wake. The relative importance of viscous dissipation, IGW radiation, buoyancy flux, and nonlinear transport as sinks for wake KE is analyzed for different stages of the wake life cycle. Subsequently, numerical dissipation will be quantified and its impact compared to the physical processes in the KE budget.

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