Abstract Submitted
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The Age of a Wake DAVID LEWIS, TIMOUR RADKO, None — This study attempts to quantify decay rates of stratified wakes in active oceanic environments, characterized by the presence of intermittent turbulence and double-diffusive convection. The investigation is based on a series of direct numerical simulations of wakes produced by a sphere uniformly propagating in stratified two-component fluids. We examine and compare the evolution of wakes in fluid systems that are initially quiescent, double-diffusively unstable, or contain preexisting turbulence. Model diagnostics are focused primarily on dissipation of turbulent kinetic energy (ε) and thermal variance (χ). Analysis of decay patterns of ε and χ indicates that microstructure generated by an object of D = 0.6 m in diameter moving at the speed of U = 0.02 m/s could be detected, using modern high resolution profiling instruments, for 0.5–0.7 h. Convective overturns are shown to be particularly effective in terms of dispersion of microscale wake signatures. Extrapolation of model results to objects of ∼10 m in diameter propagating with speeds of ∼10 m/s suggests that this form of detection is feasible for at least 4 h after the object's passage through the monitored areas.

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