

Abstract Submitted
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The response of an ocean front to small-scale turbulence

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Fronts, or regions with large horizontal density gradients, are common features of the upper ocean. Ocean fronts are hotspots for air/sea exchange and marine life. Observations indicate elevated levels of small scale turbulence at fronts, which nevertheless often have a stable density stratification. The dynamical processes that govern this stratification are not well understood. We consider the evolution of an initially balanced front to an imposed turbulent viscosity and diffusivity. Over long times the dominant balance is found to be the quasi-steady Turbulent Thermal Wind (TTW) balance with time-evolution due to an advection-diffusion balance in the buoyancy equation. We use the leading order balance to analytically determine similarity solutions for the spreading of a front and compare our results with numerical simulations.

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