

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

The role of turbulence in the equilibration of a symmetrically unstable front JOHN TAYLOR, RAFFAELE FERRARI, Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology — The evolution of a lateral density front in the surface mixed layer of the ocean is examined using numerical simulations. When the horizontal density gradient is sufficiently large so that the mixed layer potential vorticity becomes negative, symmetric instability develops. Once the symmetric instability becomes finite amplitude, a secondary shear instability forms and rapidly breaks down into turbulence. The vertical turbulent fluxes efficiently transport heat and momentum across the mixed layer and stabilize the primary symmetric instability. The length and time scales associated with the onset of the secondary shear instability are accurately predicted by a linear stability analysis.

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Date submitted: 05 Aug 2008

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