

Abstract Submitted  
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**Interaction between double diffusion and differential diffusion in a stratified turbulent flow**<sup>1</sup> CHRIS REHMANN, Iowa State University — Experiments were used to explore the interaction between salt fingering and differential diffusion. Studies of ocean mixing have demonstrated preferential transport (or differential diffusion) of heat when a flow stratified with stable profiles of temperature and salinity is stirred weakly. Therefore, in a flow with an initial density ratio  $R_\rho$  large enough to inhibit fingering, differential diffusion could reduce  $R_\rho$  enough that salt fingers form. Experiments with stirring rods were conducted and characterized by  $R_\rho$  and a turbulent Richardson number  $Ri_T$ . For  $1 < R_\rho < 3$ , salt finger fluxes dominated and caused the salinity to mix faster than the temperature. For  $R_\rho > 4$ , differential diffusion fluxes dominated and caused temperature to mix faster than salinity. As expected from previous experiments, effects of differential diffusion were stronger for large  $Ri_T$ . However, although stronger turbulence was expected to disrupt salt fingers, effects of fingering were stronger for small  $Ri_T$ . Mixing efficiencies were largest for conditions conducive to differential diffusion.

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