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Horizontal convection with mechanical stirring ROSS GRIFFITHS, Australian National University, KIAL STEWART, Johns Hopkins University, GRAHAM HUGHES, Australian National University — The effects of turbulent mixing on convective circulation forced by a horizontal gradient of buoyancy at the surface is examined using laboratory experiments in which a salt flux is introduced at the surface, at one end of a box, and a freshwater buoyancy condition is applied over the rest of the surface. Horizontal rods are oscillated and yo-yoed continuously through the water column, providing a diffusivity that can be calibrated. The convection reaches a stationary state having zero net salt flux. We find that for small stirring rates the small but finite volume flux from the dense source is significant and a virtual source correction is required to take this into account. The density stratification and overturning volume transport are consistent with a theoretical model for high Rayleigh numbers: the transport ψ increases with diffusivity κ ($\psi g \sim g\kappa^{1/4}$). The results show that vertical mixing in the boundary layer is important, particularly in setting the density of the interior and the overturning rate. However, interior mixing is unimportant, which raises an interesting question over whether abyssal mixing rates in the ocean play any significant role in setting the abyssal ocean density or the transport in the Meridional Overturning Circulation.

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