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Buoyancy-induced mixing caused by a dense fluid in a narrow vertical channel D.D.J.A. VAN SOMMEREN, BPI & DAMTP, U. of Cambridge, C.P. CAULFIELD, (BPI & DAMTP), ANDREW W. WOODS, (BPI) — We consider the turbulent mixing caused by a constant flux of dense saline fluid at the top of a long, relatively thin vertical tank with square cross-section, filled initially with either a homogeneous or salt-stratified fluid, such that the incoming fluid is more dense than the fluid at the base of the tank. The dynamics of buoyancy-induced turbulent mixing is strongly influenced by the confined geometry of a vertical tank. Dalziel et al (*Phys. Fluids* **20**, 065106 2008) found that the turbulent diffusion coefficient is not constant but rather decreases as the strength of the unstable density gradient driving the flow decreases. The vertical propagation of the first front of the turbulent dense fluid is therefore characterized by a $t^{2/5}$ power law. In our work, we apply image analysis to retrieve the propagation speed of the first front, and also to obtain density profiles along the length of the tank for the early- and late-times. We analyze both the propagation speed and the density profiles for a homogeneous and stratified environment. We investigate hereby the influence of the density of the fluid flux relative to the fluid density in the tank, and the length scale of the stratification. We briefly compare and contrast the dynamics of a single- (saline) and double-phase (particle-laden) dense fluid flux.

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