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Stability criterion for stably-stratified turbulent shear flows: Results of conditional averaging ROBERT ECKE, Los Alamos National Laboratory, PHILIPPE ODIER, Ecole Normale Superieure de Lyon — Oceanic overflows, wind-driven thermocline layers and river estuaries are geophysical examples of stably-stratified shear flows. Our experimental realization of such flows consists of a turbulent wall-bounded shear flow with lighter fluid injected at initial downstream velocity between 4 and 8 cm/s over a quiescent heavier fluid. We measure planar velocity and density fields usingPIV and PLIF, respectively. We consider 4 cases with initial bulk Richardson Number $0.25 < Ri_b < 1$ and determine the fraction of unperturbed interface defined using a Thorpe length analysis. We explore different definitions of gradient Richardson Number Ri_g evaluated and conditionally averaged over unperturbed interface. A conventional choice in linear stability theory is Ri_{g_0} where the gradients are evaluated at the interface position. Another that we denote Ri_{g_m} (consistent with Miles-Howard (MH) criterion) corresponds to the minimum value of Ri_g as a function of vertical position. The second definition allows excellent comparison with linear stability theory and the MH criterion. For small Ri, there is robust Kelvin-Helmholtz instability (KHI) whereas for larger Ri_g interfacial overturning is intermittent with infrequent KHI events and more frequent Holmboe instability.

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