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Mixing and drift by air bubbles crossing an interface of a stratified medium L. DIAZ-DAMACILLO, A. RUIZ-ANGULO, R. ZENIT, Universidad Nacional Autonoma de Mexico — The dynamics of a single air bubble crossing the horizontal interface separating two different-density stagnant Newtonian miscible liquids are studied experimentally. Both liquids were water-glycerin mixtures. The bottom fluid was saturated with salt to make it denser the upper one. The size of the bubbles was widely varied to obtain a wide range of shapes from spherical to toroidal. The Planar Laser-Induced Flourescence (PLIF) technique was used to quantify the drift volume across the interface. When the bubble crosses the interface, it drags some amount of the heavy fluid into the upper lighter fluid. For small bubbles, the drift volume returns to the bottom liquid after sometime with negligible mixing. The dragged volume is inversely proportional to the bubble Reynolds number. For larger bubbles, the drift volume becomes unstable, which leads to mixing. Considering a balance of inertial, viscous and buoyant forces, we propose a dimensionless number to identify the onset of instability.

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