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A numerical investigation of the interaction between a horizontal density gradient and an oscillating turbulent flow[1] STEVEN KAPTEIN, MATIAS DURAN-MATUTE, Eindhoven Univ of Tech, VINCENZO ARMENIO, Universita degli studi di Trieste, FEDERICO ROMAN, IEFLUIDS S.r.l., HERMAN CLERCX, Eindhoven Univ of Tech — In coastal areas, river outflow provides a large buoyancy input that leads to strong horizontal density gradients. These density gradients are associated to complex hydrodynamics such as, penetration of fresh water currents in the ocean, coastal currents or strain-induced periodic stratification. One key governing mechanism is the interaction between stirring by the tides and horizontal density gradients which influences mixing . In order to investigate this mechanism and gain new insight into the mixing process, wall-resolving large eddy simulation (LES) are performed. The tide is simulated using a horizontal oscillating pressure gradient that acts perpendicular to a horizontal (unstable) linear density gradient. A decomposition of the density allows to apply periodic boundary conditions in the streamwise and spanwise directions, for both the velocity and the density. As the Reynolds number is limited by the computational time required for LES, simulations are performed for different values of the Richardson number.

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