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The role of helicity in stratified turbulence CECILIA RORAI, DUANE ROSENBERG, ANNICK POUQUET, PABLO D. MININNI, National Center for Atmospheric Research (NCAR) — In magnetohydrodynamics (MHD) helicity plays an important role in the generation of large-scale magnetic fields; in atmospheric sciences, it has been claimed to be responsible for the stability of supercell thunderstorms, while in homogeneous and isotropic turbulence it is known to delay the energy decay but leave the statistical properties of the flow unaltered, thus being considered marginally relevant. However, recent numerical calculations have demonstrated that when rotation is introduced in the system, helicity plays an essential role. We report preliminary results on a numerical study of freely decaying strongly stratified turbulence, as occurs in the atmosphere and oceans, in the presence of helicity. The Boussinesq equations are integrated in a periodic domain with different initial conditions: a non-helical Taylor-Green flow, a fully helical Beltrami flow, and random flows with a tunable helicity. Different values of the Reynolds and Froude numbers are selected. The question we address is how these different initial velocity fields and helicity values affect the evolution of turbulence in terms of excitation of internal waves, energy decay and isotropic and anisotropic energy spectra.

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