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Turbulent transport across an interface between dry and humid air in a stratified environment DANIELA TORDELLA, LUCA GALLANA, FRANCESCA DE SANTI, SILVIO DI SAVINO, RENZO RICCHIARDONE, MICHELE IOVIENO, Department of Mechanical and Aerospace Engineering, Politecnico di Torino, Italy — The transport of energy and water vapor across a thin layer which separates two decaying isotropic turbulent flows with different kinetic energy and humidity is considered. The interface is placed in a shearless stratified environment in temporal decay. This system reproduces a few aspects of small scale turbulent transport across a dry air/moist air interface in an atmospheric like context. In our incompressible DNS at $Re_\lambda = 250$, Boussinesq's approximation is used for momentum and energy transport while the vapor is modeled as a passive scalar (Kumar, Schumacher & Shaw 2014). We investigated different stratification levels with an initial Fr between 0.8 and 8 in presence of a kinetic energy ratio equal to 7. As the buoyancy term becomes of the same order of the inertial ones, a spatial redistribution of kinetic energy, dissipation and vapor concentration is observed. This eventually leads to the onset of a well of kinetic energy in the low energy side of the mixing layer which blocks the entrainment of dry air. Results are discussed and compared with laboratory and numerical experiments. *A posteriori* estimates of the eventual compression/expansion of fluid particles inside the interfacial mixing layer are given (Nance & Durran 1994).

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