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Impact of turbulence on cloud microphysics of water droplets population MINA GOLSHAN, FEDERICO FRATERNALE, MARCO VANNI, DANIELA TORDELLA, Dept. of Applied Science and Technology, Politecnico di Torino, Torino, Italy — This work focuses on the turbulent shear-less mixing structure of a cloud/clear-air interface with physical parameters typical of cumulus warm clouds. We investigate the effect of turbulence on the droplet size distribution, in particular we focus on the distribution's broadening and on the collision kernel. We performed numerical experiments via Direct Numerical Simulations (DNS) of turbulent interfaces subject to density stratification and vapor density fluctuation. Specifically, an initial super-saturation around 2% and a dissipation rate of turbulent kinetic energy of $100 \text{ cm}^2/\text{s}^3$ are set in the DNSs. The Taylor's Reynolds number is between 150 and 300. The total number of particles is around 5-10 millions, matching an initial liquid water content of $0.8 \text{ g}/\text{m}^3$. Through these experiments, we provide a measure of the kernel of collisional integral operators to be compared with literature models [Saffman Turner, 1955] and possibly used inside drops' Population Balance Equations (PBE) that include both processes of drops' growth by condensation/evaporation and aggregation.

Prefer Oral Session
 Prefer Poster Session

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