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**Turbulent growth of cloud droplets without collisions** ALBERTO DE LOZAR, LUKAS MUESSLE, JUAN PEDRO MELLADO, Max Planck Institute for Meteorology — It is believed that the increase of droplet collisions due to turbulence is key for the initiation of rain in warm clouds. In particular, the turbulence enhancement of collisions might explain how some lucky droplets grow from 20 to 50 micrometers, a regime in which neither condensation nor collisions due to settling are effective. Stratocumulus clouds, however, do not fit in this picture because typical turbulence dissipation rates are too low to enhance collisions appreciably, but at the same time these clouds produce significant drizzle. We explore the possibility that long-wave radiation causes a significant part of the droplet growth in stratocumulus. In our simulations the bulk properties of the cloud are calculated in the Eulerian field, while at the same time some droplets are tracked using a Lagrangian scheme. The advantage of our formulation is that condensation-evaporation processes are assumed to be infinitely fast, and do not need to be resolved explicitly. This allows us to investigate domains hundreds of meters wide for several minutes, thus resolving the relevant scales for radiative cooling. In this talk we will show results of how the droplet size distribution evolves due to radiation and turbulence, using one billion Lagrangian droplets.

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