Finding the Favorite Regions for Droplets to Collide in a Turbulent Flow: Lab Data and DNS

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This talk starts at the scale of cloud fields, demonstrating the newly available computational power of multiple GPUs which enable high resolution LES of moist convection encompassing a very large domain. Next we zoom in to scale of individual clouds and focus on the processes that occur near the edge of clouds. Moving further downscale to the scale of cloud droplets, we address the question to what extent the mean dissipation rate can suffice to parametrize the overall collision statistics in turbulent clouds, and consider the role of strongly inhomogeneous local dissipation rates associated with high Reynolds number flow. Studying DNS and lab data of turbulent multi-phase flow, we investigate the relation between the local dissipation rate and the occurrence of collisions, and determine the regions of the flow which, in terms of local dissipation rate and vorticity characteristics, are most favorable for collisions to occur.

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