Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Effects of Homogenous Isotropic Turbulence on the Droplet Size Distribution and Clustering RACHAEL HAGER, MER SAVAS, UC-Berkeley — In clouds, the main growth mechanism of droplets with diameters 10-50 μm, known as the size-gap, is collision and coalescence. Atmospheric turbulence is known to increase the droplet growth rate in this range by enhancing the relative velocity between droplets and the formation of droplet clustering, thus increasing the droplet collision rate. The purpose here is to understand further how isotropic, homogeneous turbulence affects the evolution of the droplet size spectrum and the droplet concentration characteristics in the size-gap. Two sets of experiments are conducted in a 40-cm Eaton box, at the center of which homogeneous turbulence is generated. Flow images are taken of aluminum-oxide particles ranging from 0.5–5 μm in various flow conditions using a continuous wave laser sheet. Particle clustering and flow structures are examined for a range of Stokes numbers, where clustering is quantified using the radial distribution function. Secondly, droplets with an average diameter of $\sim 10\mu m$ are injected into the turbulence box under various flow conditions. PDA is used to study the development of the droplet size distribution in isotropic, homogeneous turbulence.

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Date submitted: 31 Jul 2017 Electronic form version 1.4