Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Simulated statistics of polydisperse sedimenting inertial particles in a turbulent flow under experimental conditions[1] LIAN-PING WANG, HOSSEIN PARISHANI, U. Delaware, BOGDAN ROSA, Institute of Meteorology and Water Management, Poland, COLIN BATESON, ALBERTO ALISEDA, U. Washington, WOJCIECH GRABOWSKI, NCAR — In recent years, point-particle based or hybrid direct numerical simulations (DNS) have increasingly been used to study pair statistics of inertial particles relevant to turbulent collision of cloud droplets. Equivalent experiment data are rare but are slowly becoming available. In this talk, we will discuss simulated statistics of sedimenting inertial particles under conditions similar to our parallel wind-tunnel experiment (to be reported here by Bateson et al.). The key parameters to be matched are flow Reynolds number, dissipation rate, particle Stokes number, and dimensionless settling velocity. A prescribed droplet size distribution will be used in the simulation to reproduce the polydisperse condition in the experiment. High-resolution DNS will be used to maximize the computational domain size. Single-particle and particle-pair statistics (e.g., fluctuation velocities, radial distribution function, relative velocity statistics) will be compared to the experimental data. Statistics obtained from lower dimensions will be linked to statistics in three dimensions.

[1]Work supported by NSF and NCAR.

Lian-Ping Wang
University of Delaware

Date submitted: 07 Aug 2009 Electronic form version 1.4