

ATS/CIRA Colloquium

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Visiting ATS from NCAR

**A Comprehensive Observational Study
of Graupel and Hail Properties**

Hosted by Chris Kummerow

Friday, Feb. 9, 2018

ATS room 101

Discussion will begin at 11:15 a.m.

Refreshments will be served at 10:45 a.m. in the weather lab

In this seminar, I will describe the general properties of graupel (rimed particles < 0.5 cm) and hail, based on observations. I will then report on my work that uses novel approaches to estimate the fall characteristics of hail. Three-dimensional volume scans of hailstones of sizes from 2 to 7 cm were printed in 3D models (I'll show some in my seminar) using ABS plastic, and their terminal velocities were measured in the Mainz vertical wind tunnel. To simulate graupel, some of the hailstone models were printed with dimensions of 0.2-0.5 cm, and their terminal velocities measured. From these experiments, together with earlier observations, I've parameterized the properties of graupel and hail for a wide range of particle sizes and heights (pressures) in the atmosphere. The wind tunnel observations, together with the combined total of more than 2800 hailstones for which the mass and cross-sectional area were measured, has been used to develop size-dependent relationships for the terminal velocity, mass flux, and kinetic energy of realistic hailstones.

Also in my seminar, I'll fill you in on work that I've unraveled (going back to data from the mid 1930's), to try and understand why the insurance and building industries use "outdated" data to estimate and repair hail damage.

Link to colloquia page: <https://www.atmos.colostate.edu/colloquia/>