When studying the influence of microphysics on the near-surface buoyancy tendency in convective thunderstorms, in-situ measurements of microphysics near the surface are essential and those are currently not provided by most weather radars. In this study, the deployment of mobile microphysical probes in convective thunderstorms during the second Verification of the Origins of Rotation in Tornadoes Experiment (VORTEX2) is examined. Microphysical probes consist of an optical Ott Particle Size and Velocity (PARSIVEL) disdrometer that measures particle size and fall velocity distributions and a surface observation station that measures wind, temperature, and humidity. The mobile probe deployment allows for targeted observations within various areas of the storm and coordinated observations with ground-based mobile radars. Quality control schemes necessary for providing reliable observations in severe environments with strong winds and high rainfall rates and particle discrimination schemes for distinguishing between hail, rain, and graupel are discussed. We demonstrate how raindrop-size distributions for selected cases can be applied to study size-sorting and microphysical processes. The study revealed that the raindrop-size distribution changes rapidly in time and space in convective thunderstorms. Graupel, hailstones, and large raindrops were primarily observed close to the updraft region of thunderstorms in the forward- and rear-flank downdrafts and in the reflectivity hook appendage. Close to the updraft, large raindrops were usually accompanied by an increase in small-sized raindrops, which mainly occurred when the wind speed and standard deviation of the wind speed increased. This increase in small drops could be an indicator of raindrop breakup.

Link to colloquium videos and announcement page: http://www.atmos.colostate.edu/dept/colloquia.php