

ATS/CIRA Colloquium

Markus Petters

from North Carolina State University

Hosted by Sonia Kreidenweis

3 p.m. Thursday, Nov. 17

ATS 101 and Microsoft Teams

Do clouds nucleate on glassy aerosols?

The importance of amorphous glassy phase states has long been recognized by the scientific community. About a decade and a half ago, a suite of first studies showed that glassy phase states are common in atmospheric particles. These initial studies identified several important implications for the atmospheric sciences. First, slowing the rate of water condensation onto particles due to the presence of a glassy outer shell may increase the supersaturation required to activate such particles into cloud droplets. Second, glassy organic particles have been shown to promote heterogeneous ice nucleation under upper free tropospheric conditions. Third, glassy particles slow intraparticle mixing, thus kinetically limiting chemical reactions. These findings motivated a decade of intense research seeking to answer the newly emerged science questions of how glassy aerosols influence multiphase atmospheric chemistry as well as affecting the microphysics of warm and cold cloud formation. In this seminar I invite you to join me on a guided tour through this fascinating decade of discovery. I will show how technical challenges have been solved, which hypotheses have been confirmed, which have been called into question, and which open questions remain.

About the speaker

Markus Petters is a professor of atmospheric science at NC State University. He received his M.S. in soil science and Ph.D. in atmospheric science from the University of Wyoming. His research focuses on suspended particulate matter in the 5 to 5000 nm size range. A particular emphasis is research on the physical chemistry of particles, with focus on the influence of chemical composition on phase transitions and cloud formation under atmospheric conditions. His group researches areas spanning instrument development, laboratory measurements, field observations, and process-level model development. Prof. Petters serves on the editorial advisory board for the journal *Aerosol Science and Technology* and is an editor of *Atmospheric Chemistry and Physics*. He received the Kenneth T. Whitby Award for contributions to *Aerosol Science and Technology* awarded by the American Association for Aerosol Research in 2015.