

# **Characterization of cloud condensation nuclei and their representation in models**

SONIA M. KREIDENWEIS<sup>1\*</sup> AND  
SUSAN C. VAN DEN HEEVER<sup>1</sup>

<sup>1</sup>Department of Atmospheric Science, Colorado State University, Ft. Collins, CO 80523, USA (\*correspondence: sonia@atmos.colostate.edu)

Observations of the number concentrations, size distributions, supersaturation spectra, and chemical compositions of cloud condensation nucleating (CCN) particles have become more widely available over the past decade. These indicate surprisingly similar effective hygroscopicities in many regions, as well as the frequent occurrence of very small particles in the population. Larger particles, capable of serving as “giant CCN”, are in contrast understudied, and their role in precipitation formation is not well understood. Observational data for CCN are reviewed. The development and implementation of realistic aerosol properties and aerosol-cloud interactions in models relies strongly on these data, but the full CCN spectrum is not well constrained by available measurement methods. Also, most CCN data have been obtained from surface measurements whereas models testing impacts of aerosols on precipitation must make assumptions about the three dimensional distribution of the aerosol. We present results from a few selected modeling studies demonstrating potential shortfalls in our present understanding of, and representation of, aerosol-cloud interactions.