

MMM SEMINAR SERIES



Tiny Particles, Massive Clouds: Can aerosol changes really have large impacts on deep convective clouds?

Zachary J. Lebo
University of Oklahoma

Deep convective clouds are responsible for ravaging winds, torrential rains, large hail, and tornadoes. It is thus no surprise that any changes in the updraft strength of these clouds due to anthropogenic influences would receive considerable attention in the scientific community. One way in which humans could influence the updraft strength of these clouds is through the emission of aerosol particles that act as cloud condensation nuclei. Over the last 20 years, a myriad of studies have been published that suggest the potential strengthening, or invigoration, of deep convective clouds owing to increased aerosol concentrations; at the same time, other studies have shown little to no impact of changes in aerosol concentrations. This begs the question; can aerosol changes really have large impacts on deep convective clouds?

In this talk, I will present an overview of mechanisms by which changes in aerosol loading could influence the strength of deep convective cloud updrafts. Using idealized model simulations, these mechanisms will be scrutinized to identify potential changes in updraft strength due to increased aerosol loadings, with a comparison to several published studies in the literature. A key criticism of many studies on the topic is that they have focused on limited observational data or case study modeling studies, as well as having convoluted environmental and aerosol properties. As a result, this talk will conclude with a presentation of recent observational analyses and modeling studies aimed at understanding aerosol impacts on deep convective cloud properties over seasonal time periods using recent field campaign observations and long-term high-resolution ensemble model simulations.

Thursday, 21 November 2024, 2:00PM

Refreshments 1:45PM

Please also join colleagues for refreshments and informal discussion after the seminar until 3:30pm

NCAR-Foothills Laboratory, 3450 Mitchell Lane

FL2-1022, Large Seminar

Seminar will also be live webcast

<https://operations.ucar.edu/live-mmm>

Participants may ask questions during the seminar via Slido.