

CGD SEMINAR



DATE: Tuesday, 7 February 2017

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: The Importance of Cloud Microphysics
for Climate Forcing and Feedbacks

SPEAKER: Andrew Gettelman, NCAR/CGD

ABSTRACT:

Potential changes in cloud radiative effects are the largest uncertainty in climate forcing, and in climate response to that forcing (feedbacks). Many of these effects are a consequence of fundamental cloud microphysical processes. This talk will illustrate how cloud microphysics are important for climate forcing and feedback, and how microphysics creates interactions between forcing and feedback that need to be accounted for. Aerosol particles in the atmosphere act as cloud condensation nuclei, and aerosol populations thus affect cloud drop number, and resulting cloud brightness and lifetime in complex ways through cloud microphysics. These aerosol cloud interactions are the largest uncertainty in anthropogenic climate forcing, and recent experiments and proposed observations to constrain simulations will be discussed. Cloud responses to changes in their environment, called cloud feedbacks, are the largest uncertainty in predicting future levels of energy absorption, as small changes in cloud properties can have large radiative feedbacks. These feedbacks are dependent on changes to the cloud environment (temperature, humidity, turbulence), but they are also dependent on cloud microphysical processes that regulate cloud drop number and mass. Recent work with models shows the sensitivity of climate to representation of these cloud microphysical processes. Furthermore, the forcing and feedback effects are not independent: aerosols respond to climate and an 'aerosol mediated cloud feedback' has been identified that needs to be accounted for in assessments of future climate.

Live webcast: <http://www.fin.ucar.edu/it/mms/ml-live.htm>

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