



Convective Processes Working Group

Leaders

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Schedule

- **Preliminary Group Description, Mission, Objectives, Research Themes**
- **1-Slide Overviews of Ongoing Research**
- **Discussion**
 - **Adjustment of mission, objectives, themes?**
 - **Addressing group challenges**
 - **Potential for sub-groups based on themes**

Description

This working group seeks to improve the representation of convective cloud processes and properties (e.g., cloud cover, precipitation, life cycle, dynamics, microphysics) in multi-scale models (GCMs, NWP, LAMs, CRMs, LES) with an ultimate goal of reducing associated uncertainties in climate simulations. Research topical areas include: (1) convective vertical velocity, (2) convective system transitions, and (3) cloud-aerosol-precipitation-radiation interactions, involving both direct observations and retrievals of environmental and cloud properties, as well as process parameterization improvement and development.

Mission

The mission of the Convective Processes Working Group is to document from observations and modeling, and thereby develop understanding of, the dynamical, thermodynamical, microphysical, and radiative processes that together determine the evolution of convective cloud systems from formation to dissipation, and to translate this understanding into methods for representing convective cloud processes in numerical weather and climate models.

Objectives

- 1. Identify guiding science questions regarding convective cloud life cycles that are based on model uncertainties/limitations, that can be addressed using ARM observations, and that support broader programmatic objectives outlined in the ASR Science Plan.**
- 2. Facilitate, organize, and maximize the efforts of individual Principal Investigator projects towards answering these broader scientific questions through the formation and organization of subgroups with similar and complementary research goals.**
- 3. Identify, prioritize, and help implement observational campaigns, measurement strategies, and data products that are needed to understand convective cloud life cycle processes and better represent them in models.**

Research Themes

Vertical Velocity

- Sensitivity to Environmental Conditions
- Expanding Observational Retrievals
- Two-way Interactions with Microphysics

Convective System Transitions

- Shallow to Deep (Liquid to Ice, Entrainment)
- Mesoscale Organization (Life Cycle)
- Role of Cold Pools

Parameterization Development

- Convective/Stratiform/Anvil Structural Life Cycle
- System Propagation
- Microphysics
- Turbulence

Group Challenges

General

Why do we exist as a group? How will we operate moving forward (including at the 2018 PI Meeting) to maximize the chances of meeting our objectives?

Specific

1. Connecting the convection modeling community (especially the DOE ACME model) to ARM data.
<https://www.arm.gov/news/facility/post/37196>
2. Improving communication and cooperation between meteorological and cloud-aerosol communities studying convection.
3. Using the supersite/continuous modeling strategy to benefit the science of deep convection.