ARM

CLIMATE RESEARCH FACILITY

New Tools to Bridge the Gap between Models and Observations

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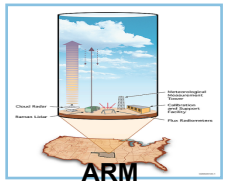
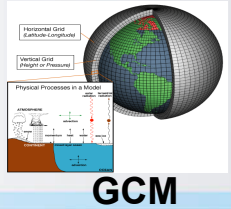
Challenges:





- Significant scale-gap between data and GCMs – ***how to bridge the gap?***
- Difficulties in observing/retrieving critical parameters (entrainment rates/ cold pool/vertical velocity/microphysical properties) – ***Observational strategy and algorithm developments, also means the comparison is indirect.***
- Data uncertainty – ***Error bars is needed***
- Differences in how a climate model represents a geophysical field and what ARM instruments see -- ***how to mimic the observations? - Simulator***
- General lack of tools to facilitate use of field data in diagnosing model deficiencies and helping model development – ***Process-oriented metrics/diagnostics***

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Agenda

- ARM/ASR modeling testbeds (Shaocheng Xie) (15 min)
- Tools for finding, merging, downloading, and processing ARM data (ADI, Py-ART, discovery tools) (Laura Riihimaki/Scott Collis) (20 min)
- ARM diagnostics packages (Shaocheng Xie)
  - ARM diagnostics package for GCMs (Chengzhu Zhang) (10 min)
  - LES diagnostics package (Andy Vogelmann/Tami Toto) (10 min)
  - Discussion (10)
- ARM simulators (Scott Collis)
  - Cloud radar simulator for GCMs (Yuying Zhang) (5 min)
  - Simulators for LES/CRMs (Pavlos Kollias) (5 min)
  - Discussion (10 min)
- New VAPs for supporting cloud modeling studies (Laura Riihimaki) (20min)
- Wrap-up (Shaocheng Xie/Laura Riihimaki/Scott Collis) (5 min)

Discussion Topics

- Comments on the ARM/ASR efforts to develop and use these modeling and data processing/discovery tools
- How are we going to effectively utilize these tools in support of cloud and aerosol studies conducted by ASR?
- Is it a good idea to have a designed area for distributing the tools and associated ARM data to the ASR/ARM community? Any support or maintenance that we should provide?
- Should we build a test case library particularly for the CESD modeling testbeds?
- Effort to address data uncertainty quantification?
- Any missing areas that we need to make an effort to address?