New Tools to Bridge the Gap between Models and Observations

Co-Chairs: Shaocheng Xie, Laura Riihimaki, and Scott Collis
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**
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) (20 min)
• 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?