Breakout Session Report
ARM/ASR User and PI Meeting
March 16-20, 2015

Session Title: CAPI Plenary
Session Date: Monday, March 16, 2015
Session Time: 1:00–5:00pm
Summary Authors: Steve Ghan and Rob Wood

Main Discussion

This year, CAPI's dedicated session was held as a single plenary session, with the following four subsessions:

Separating aerosol effects on clouds from other conditions affecting clouds: Wojtek Grabowski presented a novel way to test aerosol impacts in CRMs using a piggybacking approach. Found some effects in low clouds, but almost no invigoration effect with one microphysics scheme and a weak one with a different scheme. Jiwen Fan using a piggybacking approach on an MC3E case. Zhanqing Li showed attempts to stratify aerosol-cloud correlations by meteorological effects.

Future field experiments: Some discussion of possible G-1 experiment at the ENA site to examine the CCN budget, aerosol-cloud interactions, and to provide in-situ observations for evaluation of surface-based remote sensing retrievals of cloud microphysics, turbulence and drizzle.

VAPs, measurements and instruments: Laura Riihimaki led a discussion. There is a need for a drizzle VAP and a number of promising approaches are being explored by ASR PIs. There is a new cloud droplet concentration VAP, and work is taking place in the infrastructure to produce an improved CCN profile. There will be an effort at SGP to bring Raman and HSRL together for 3-wavelength aerosol profile that could further improve a CCN profile VAP. IN Closure experiment ideas were mentioned for SGP. The German Halo research aircraft flew in Go-Amazon and has good data on convective cloud properties and outflow. Laura mentioned that there are plans for an aerosol properties best estimate, being worked on by Connor Flynn.

Poster summaries. Roughly 15 very short (1-2 minute) presentations were made by CAPI scientists.

Key Findings

Piggybacking, nudging of winds or specifying winds are effective ways of isolating effects of different microphysics on clouds, complementing observational methods that rely on data stratification and sampling aerosol before cloud formation. Good progress applying piggybacking to MC3E simulation with different microphysics schemes.

Retrieval of droplet number and drizzle, including estimates of uncertainty, are key retrieval needs for CAPI. There has been excellent progress on both. There is a new cloud droplet concentration VAP available, and work is taking place in the infrastructure to produce an improved CCN profile.

Decisions

Piggybacking will be used to isolate aerosol effects on clouds for all cloud microphysics schemes in WRF simulations of MC3E.

Issues

The CAPI deep convection effort needs to coordinate case studies better with the CLWC Mesoscale Convective Organization group.

The Raman lidar at the Azores may not produce much useful data below 600-900 m, which may make it difficult to use to connect surface CCN with that at cloud base.

Needs

Aircraft sampling of aerosol and cloud over Azores to provide much-needed information to distinguish between various new drizzle retrievals and other cloud microphysical estimates from surface remote sensing.

Future Plans

The representation of cloud-aerosol-precipitation interactions in climate models continues to be highly dependent on the representation of clouds. The CAPI group therefore finds its members working ever more closely with members of the Cloud Lifecycle Working Group.