

ARM Deep Convection Cloud Break-out Session (8 November 2006)

11 participants (highest attendance ever ?)

Deep convection cloud sub-group discussed and endorsed
the proposal for the precipitation IOP (May-June 2009 at SGP)

(Midlatitude Continental Convective Clouds Experiment - MC³E)

main objective: is to collect a comprehensive data set on clouds precipitation and environmental atmospheric parameters for the model community for evaluating and improving convection parameterizations in models (CRMs, LSMs)

key instruments: scanning and vertically-pointing cloud / precipitation radars, enhanced surface meteorology, precipitation measurements, radiosonde soundings, aerosondes, OK mesonet

New instrumentation

Joss-Waldvogel impact disdrometers (RD-80) were deployed at the SGP and TWP Darwin sites (instrument mentor: M.-J. Bartholomew)

The deep-convection cloud sub-group endorsed the PI's VAP

JWD VAPs: surface rainfall DSDs (in 20 size bins)

rainfall rates, LWC

radar reflectivities at S, C, X, K_a and W-bands

Potential uses of JWD data (besides providing a continuous surface precipitation record) include:

validation of rainfall retrievals and model simulations,
scanning radar calibrations

developing appropriate Z-R, LWC-Z, K_{DP} -R relations

Two UMD scientific presentations dealing with MODIS cloud / light precipitation retrievals show that

1. Accounting for the vertical profiles of characteristic drop size leads to an improvement in LWP retrievals
2. Higher aerosol optical depths results in smaller ice particle sizes in upper parts of deep convective clouds
3. Higher topography leads to an increase of these sizes

Technique development:

Rainfall rate profiling using the attenuation approach was applied to MMCR measurements

Validating the attenuation-based method with ground-based measurements and precipitation scanning radars indicated robust retrievals for $R > 4$ mm/h for both stratiform and convective rains when strong slanted patterns of reflectivity in height-time cross-section are not present

Deep convection cloud sub-group endorses the ARM Volume-Imaging Array (AVA) radar concept (two scanning polarimetric Doppler X-band radars + a scanning polarimetric Doppler K_a -band radar

Deep convection cloud sub-group is also interested in collaboration between ARM and CASA projects

The NEXRAD products (reflectivity, Doppler velocity) presented in a Cartesian grid (e.g., 2 km x 2 km) around the SGP site would be a useful precipitating cloud VAP

Deep convection cloud sub-group



Precipitating cloud sub-group