

Cloud Properties Value-Added Products

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ARM Aerosol/Cloud Properties working group meeting

Fall 2008

Landsdowne, VA



ARM Evaluation Products

<http://www.db.arm.gov/cgi-bin/PIP/pips.pl>

AEROSOL BEST ESTIMATE – Profiles of aerosol extinction, single scatter albedo, asymmetry parameter etc.. (PI: C. Flynn)

MPL NOR – lidar detected cloud boundaries (PI: C. Flynn)

BBHRP - Broadband Heating Rate Profile Project (PI: E. Mlawer)

Mergesonde - MergeSonde VAP of Continuous Water Vapor Profiles (PI: M. Jensen)

Microbase-PI - Cloud Microbase Profiles-Instantaneous (PI) for ARM sites (PI: M. Jensen)

MWRRET - Improved Microwave Radiometer Retrievals of Cloud Liquid Water and Precipitable Water Vapor (PI: D. Turner)

SurfSpecAlb- Best Estimate of Broadband and Narrowband Downwelling Irradiance, Upwelling Irradiances, and Surface Albedo for the ARM SGP Central Facility (PI: C. Long)

WACR-ARSCL - Cloud boundaries, radar reflectivity, doppler velocities, and spectral width from 95 GHz W-Band ARM Cloud Radar (WACR) and MPL observations from the Niamey AMF deployment (PI: M. Jensen)

Active Remote Sensing of CLOUDS (ARSCL)

Developer: Karen Johnson

- cloud boundaries, hydrometeor height distributions and estimates of their radar reflectivities, vertical velocities, and Doppler spectral widths

- “Old” ARSCL – Availability via ARM archive

 - SGP – 11/1996 thru 4/2008

 - NSA – 3/1998 thru 11/2007 [4/08 limited release]

 - TWP-C1 – 7/99 - 2/05, 5/06 - 6/07

 - TWP-C2 – 11/98 - 1/06, 10/06 – 6/07

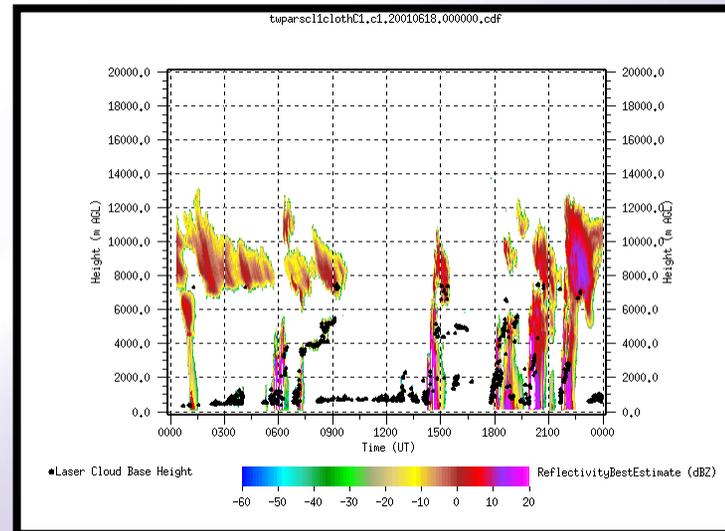
 - TWP-C3 – 1/03, 11/2005 thru 5/08

- WACR – ARSCL

Evaluation Product

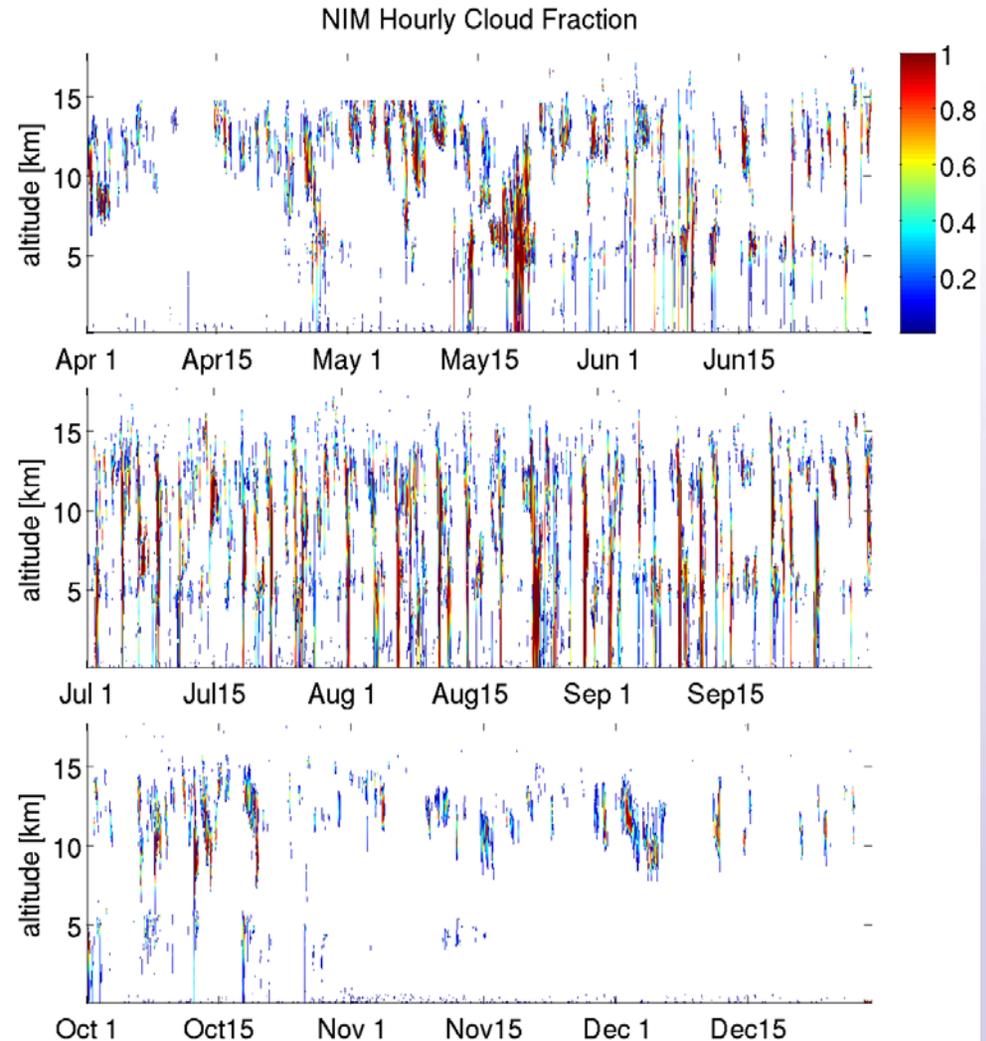
 - NIM – 3/2006 thru 12/2006

 - FKB – 3/2007 thru 12/2007



ARM 2nd Quarter Metric – Cloud Occurrence Freq.

- Hourly profiles of cloud occurrence frequency
- Wet and Dry Seasons
- Convective cloud cycles
- deep convection vs. mid-level convection



Microphysical Active Remote Sensing of CLouds (MicroARSCL)

Developer: Edward Luke

Principle Spectral Peak:

- Reflectivity w/ uncertainty
- Mean Doppler velocity w/ uncertainty
- Spectral width w/ uncertainty
- Skewness and kurtosis
- Left and right slope
- Subpeak velocities and magnitudes *
- Total subpeak count

Cloud boundaries, masks of hydrometeors, insect clutter, saturation

Non-overlapping Secondary Peaks:

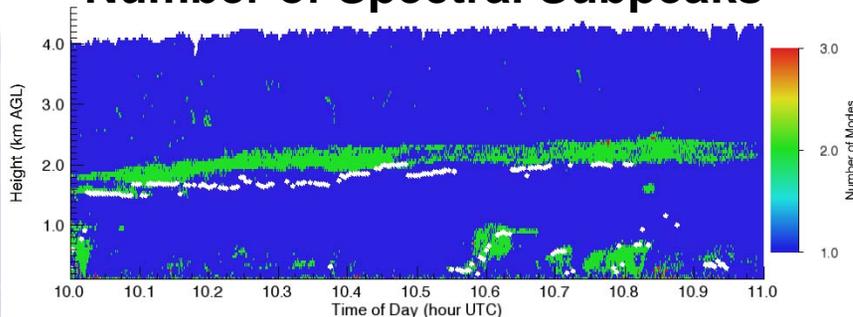
- Reflectivity **
- Mean Doppler velocity **
- Spectral width **
- Total peak count

Evaluation Products:

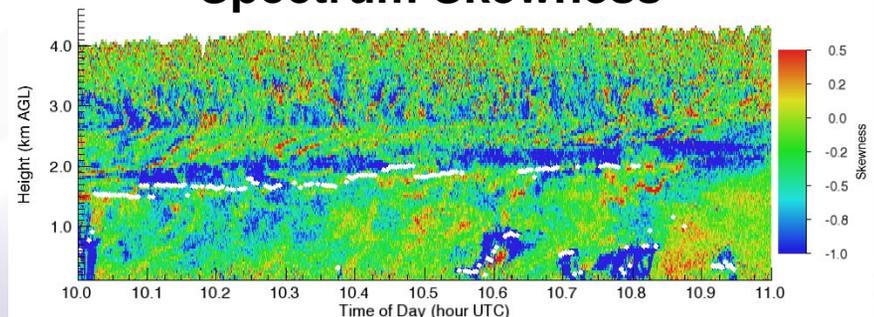
- SGP May 2007 through March 2008
- NSA October 2004 and April 2008

* up to three subpeaks ** up to two peaks
peaks

Number of Spectral Subpeaks

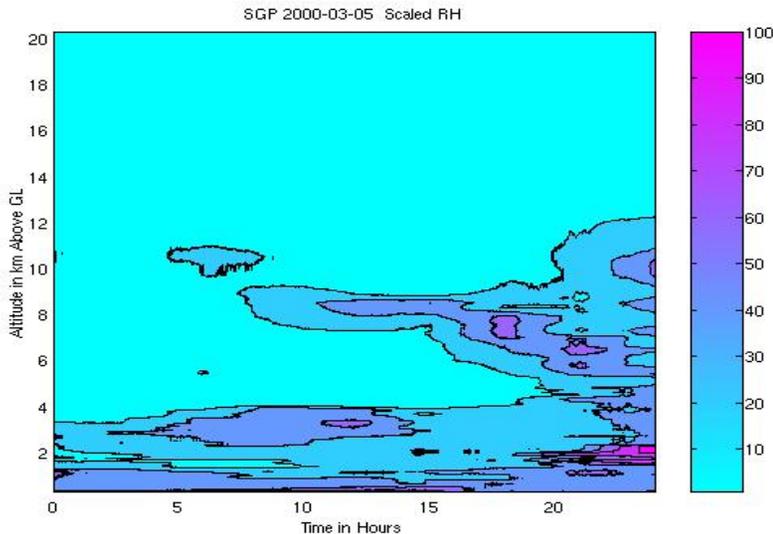


Spectrum Skewness



Merged Sounding (MS) Ver. 1 [developer: D. Troyan]

Uses a combination of radiosonde profiles, MWR integrated water vapor, surface meteorology and ECMWF model output to provide a thermodynamic profile of the atmosphere at one minute intervals



- 1 minute time intervals
- 266 altitude levels (greater resolution at surface) to 20 km
- temperature
- humidity
- pressure
- horizontal winds

Availability

SGP – 2000 thru 2007

NSA – 2003 thru 2007

TWP C1 – 2000 thru 2007

TWP C2 – 2002 thru 2007

TWP C2 – 2002 thru 2007

PYE – 2005

NIM – 2006

FKB - 2007

Merged Sounding Ver. 2

Development nearly complete

- Milosevich humidity corrections (RS-80 sondes)
- Increase height of MS
- ECMWF T corrections

Continuous Baseline Microphysical Retrieval (MICROBASE) [developer: M. Dunn]

- Provides time-continuous information on cloud location, liquid and ice water contents, and effective droplet sizes as a function of height (10 sec., 20 min.)
- Uses ARSCL, Merged Sounding, MWRRET with a combination of previously published microphysical parameterizations

Availability

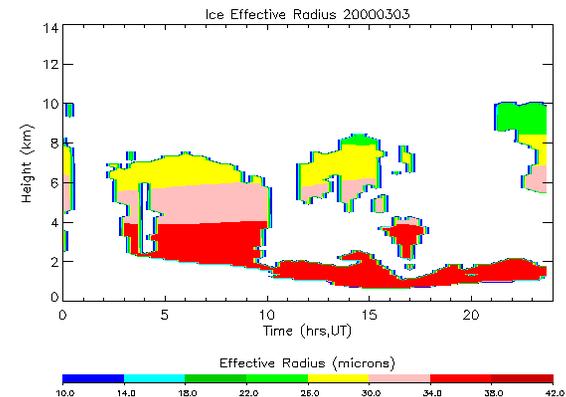
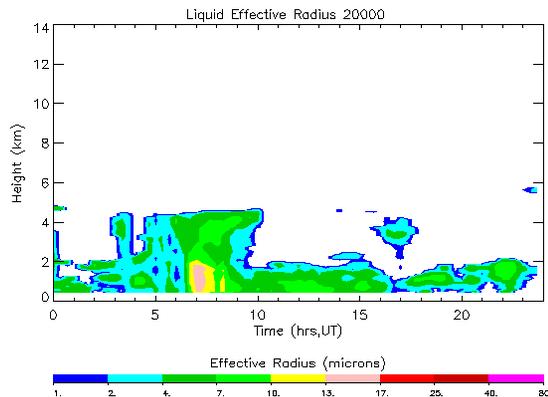
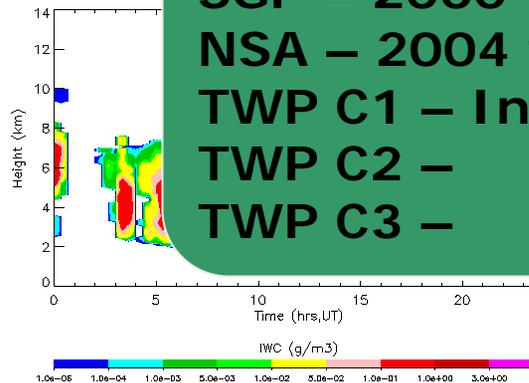
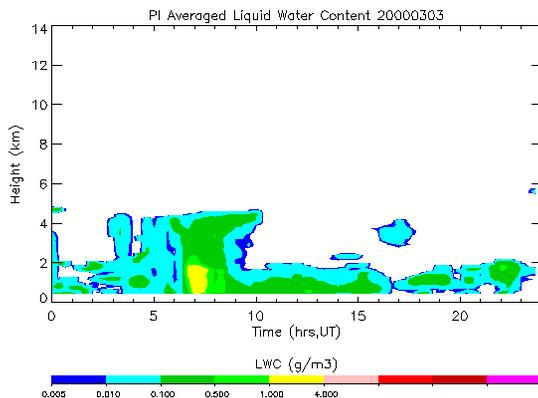
SGP – 2000 thru 2007

NSA – 2004 thru 2007

TWP C1 – In progress

TWP C2 –

TWP C3 –



- ◆ **Cloud Classification –**
(cloudclass1wang)
- ◆ - provides cloud phase and type (i.e. Cu, Ac, DC etc.) classification for individual cloud layers
- ◆ - 3 years available at SGP (1999-2001)
- ◆ - Will be available as an Evaluation Product shortly

PI products

<http://www.db.arm.gov/cgi-bin/PIP/pips.pl>

- Deadtime Corrected Disdrometer Data (PI: M. J. Bartholomew)
- Merged MMCR – WSR-88D Reflectivities at SGP – (PI: X. Dong)
- Cloudnet Project – (PI: R. Hogan)
- Tropical Cloud Properties and Radiative Heating Profiles (PI: Mather)
- Atmospheric State, Cloud Microphysics & Radiative Flux – (PI: J. Mace)

Have datasets to share with ARM community?

Contact Mike Jensen or Connor Flynn.

VAP discussions

- Tonight 7:30 to 9:30 (**Breakout Room #1**)
VAP/Infrastructure recommendations discussion –
Mather

- Wednesday 7:30 to 9:30 PM

- Lidar Instrument Group** (Comstock) (**Breakout Room #1**)

- 7:30 to 8:30 Instrument Status from the lidar mentors
- Newsome, Coulter, Morris

- Begin discussion of instrument hardware needs

- 8:30 to 9:30 Finalize recommendation for MPL cloud boundary products

- Needs from ARSCL (Johnson)

- Discussion – Higher order products