

Cloud Properties Value-Added Products - Progress and Current Status

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ARM Science Team Meeting

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ARM Evaluation Products

http://www.arm.gov/data/vaps_all.php

"Evaluation Products" Tab

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

Cloud Classification - cloud phase and type (PI: J. Comstock)

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

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

MicroARSCL - Detailed MMCR Doppler spectrum summaries (PI: M. Jensen)

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

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)

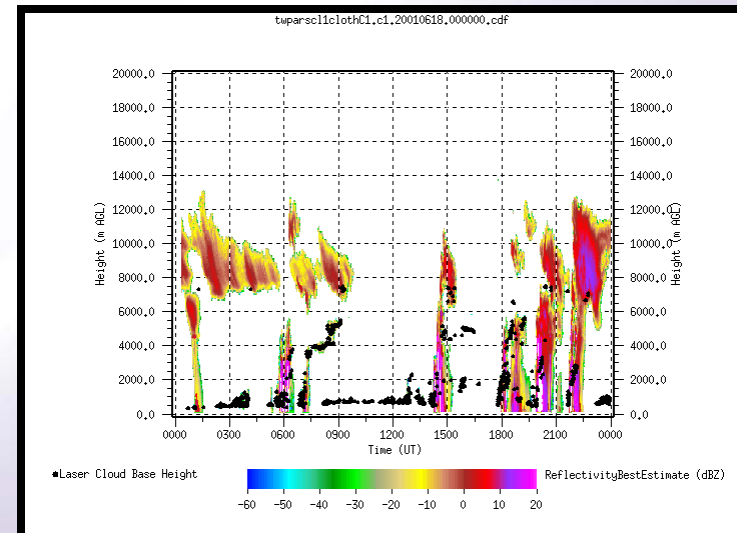
Active Remote Sensing of CLOUDS (ARSCL)

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

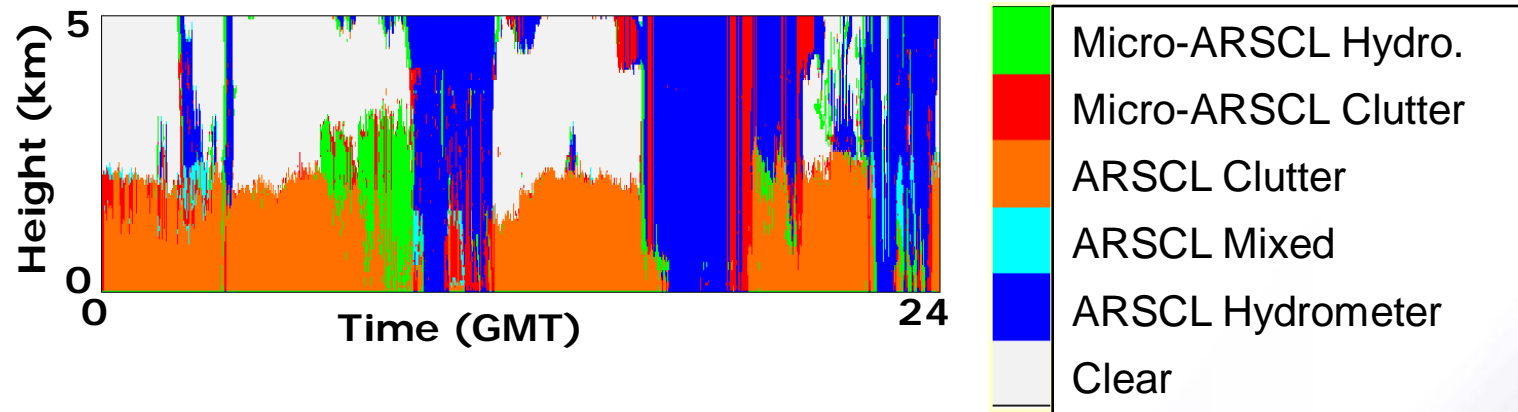
- WACR - ARSCL Evaluation Product
 - NIM - 3/2006 thru 12/2006
 - FKB - 3/2007 thru 12/2007



"Turbo" ARSCL

Towards Near Real-Time Availability With Enhanced Accuracy (See Johnson et al.)

The goal is to speed delivery of the widely-used ARSCL product while improving the accuracy of cloud boundaries.



Do "hands-on" corrections add value?

Solution #1: Acquire MPL Cloud Masks from automated source

Solution #2: Include Micro-ARSCL

Solution #3: Graphical user interface for any "hands on" QC

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

Non-overlapping Secondary Peaks:

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

Evaluation Products:

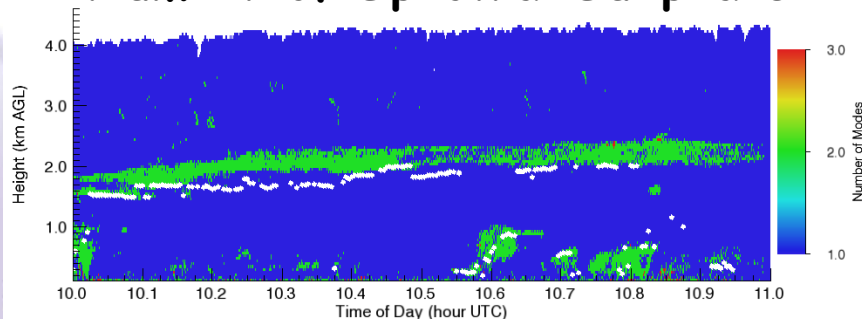
- SGP May 2007 through May 2008
- Other sites, times to follow shortly

Cloud boundaries, masks of hydrometeors, insect clutter, saturation

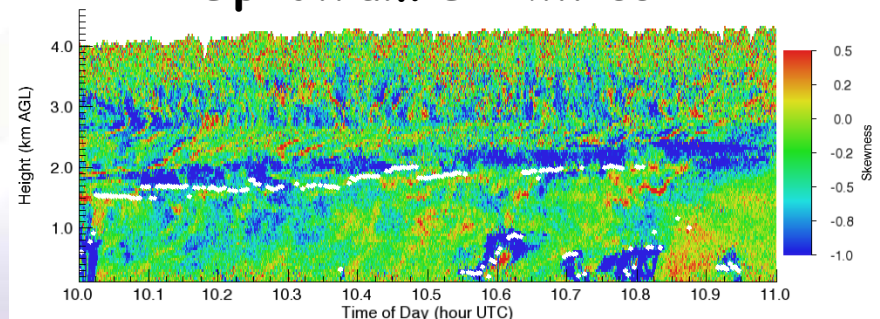
* up to three subpeaks
peaks

** up to two peaks

Number of Spectral Subpeaks

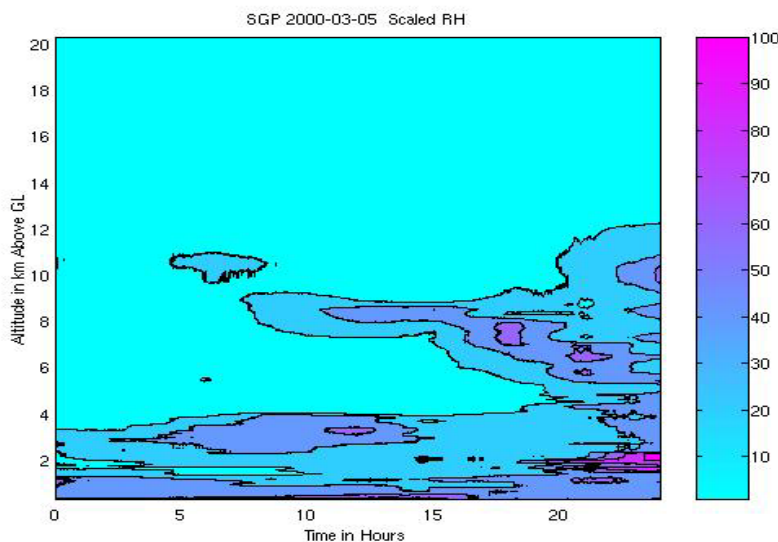


Spectrum Skewness



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 - 7/1996 thru 2008

NSA - 2002 thru 2007

TWP C1 - 2000 thru 2007

TWP C2 - 2002 thru 2007

TWP C3 - 2002 thru 2007

PYE - 2005

42 years total!!

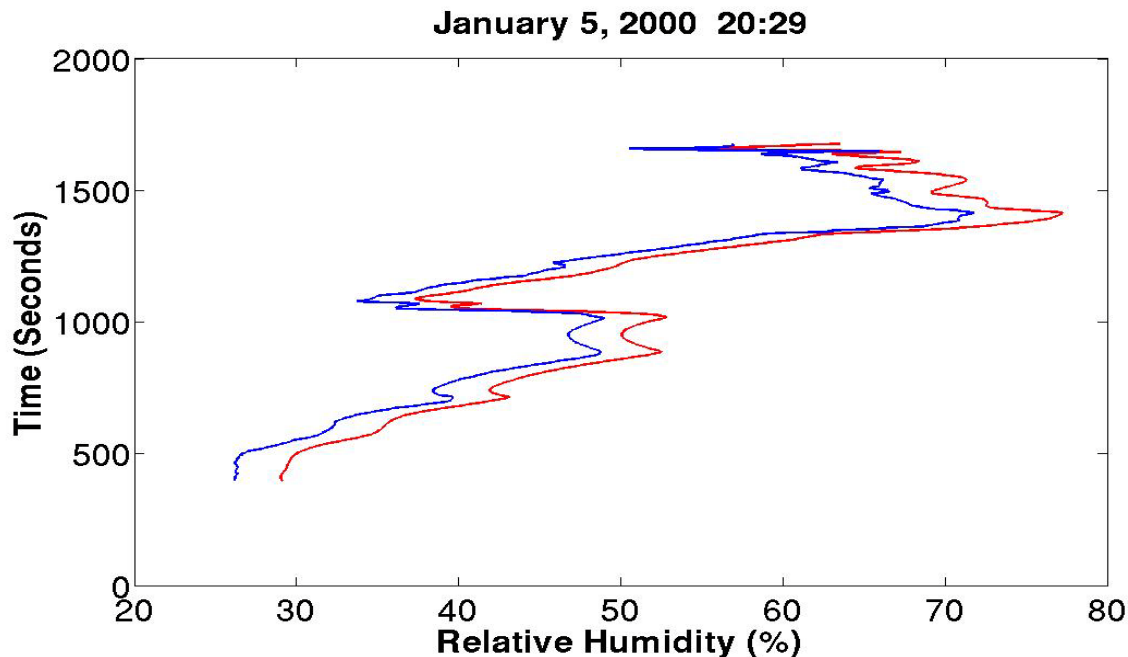
NIM - 2006

FKB - 2007

Merged Sounding Ver. 2

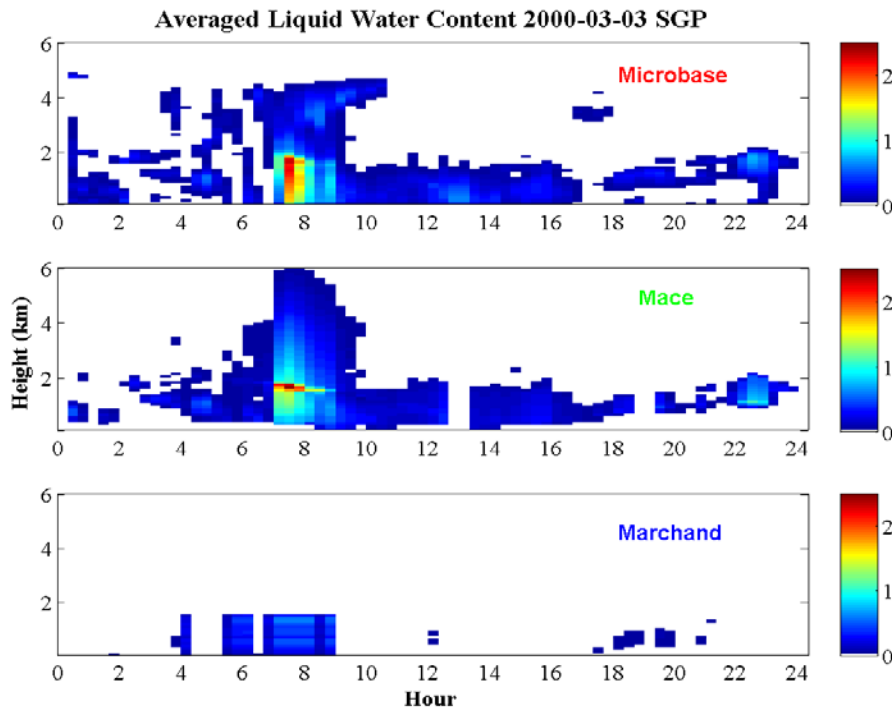
Development nearly complete

- Milosevich humidity corrections (RS-80 sondes) [Trojan et al. poster]
- 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 - 200004-05, 2002-2004

TWP C2 -

TWP C3 - 200601-03

- ◆ **Cloud Classification VAP** - (cloudclass1wang)
[PI: J. Comstock]
(Wang and Sassen, 2001)
- ◆ - provides cloud phase and type (i.e. Cu, Ac, DC etc.) classification for individual cloud layers
- ◆ Released as an evaluation product
Available for SGP 1999-2001

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 (mjensen@bnl.gov)