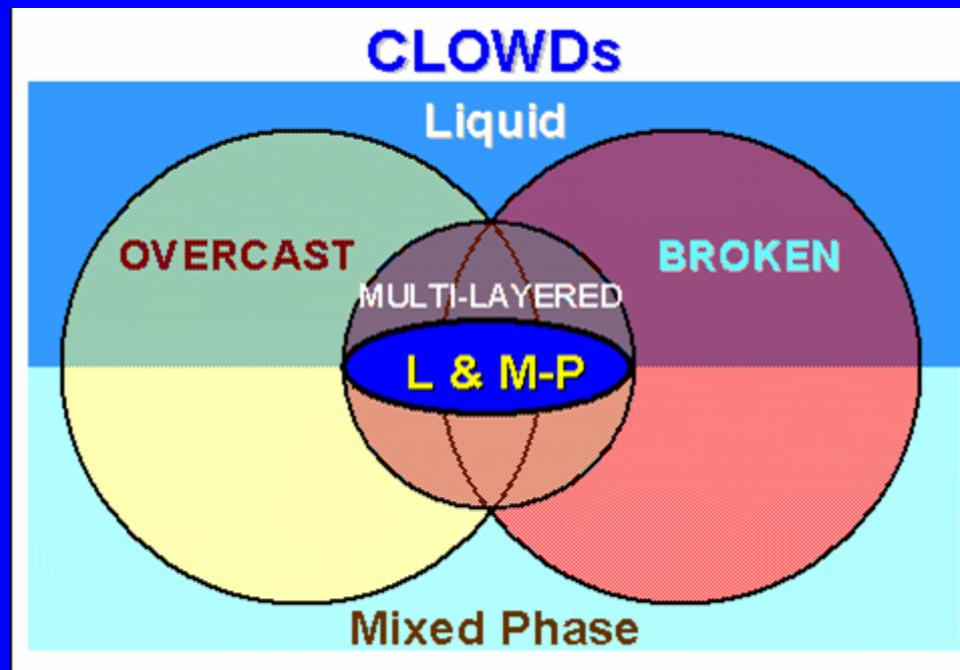


CLOWD Update

Radiative Processes Working Group, Fall 2007

**Andy Vogelmann, Dave Turner
& Jennifer Comstock**

Plus CLOWD PI Contributors



THIN LIQUID WATER CLOUDS

Their Importance and Our Challenge

BY D. D. TURNER, A. M. VOGELMANN, R. T. AUSTIN, J. C. BARNARD, K. CADY-PEREIRA,
J. C. CHIU, S. A. CLOUGH, C. FLYNN, M. M. KHAIYER, J. LIJEGREN, K. JOHNSON,
B. LIN, C. LONG, A. MARSHAK, S. Y. MATROSOV, S. A. MCFARLANE, M. MILLER,
Q. MIN, P. MINNIS, W. O'HIROK, Z. WANG, AND W. WISCOMBE

Turner et al. (BAMS, 2007)

OUTLINE

1. Update on CLOWD Efforts
... How get them in to VAPs?
2. Validation needs “truth”
3. Build modeler interface



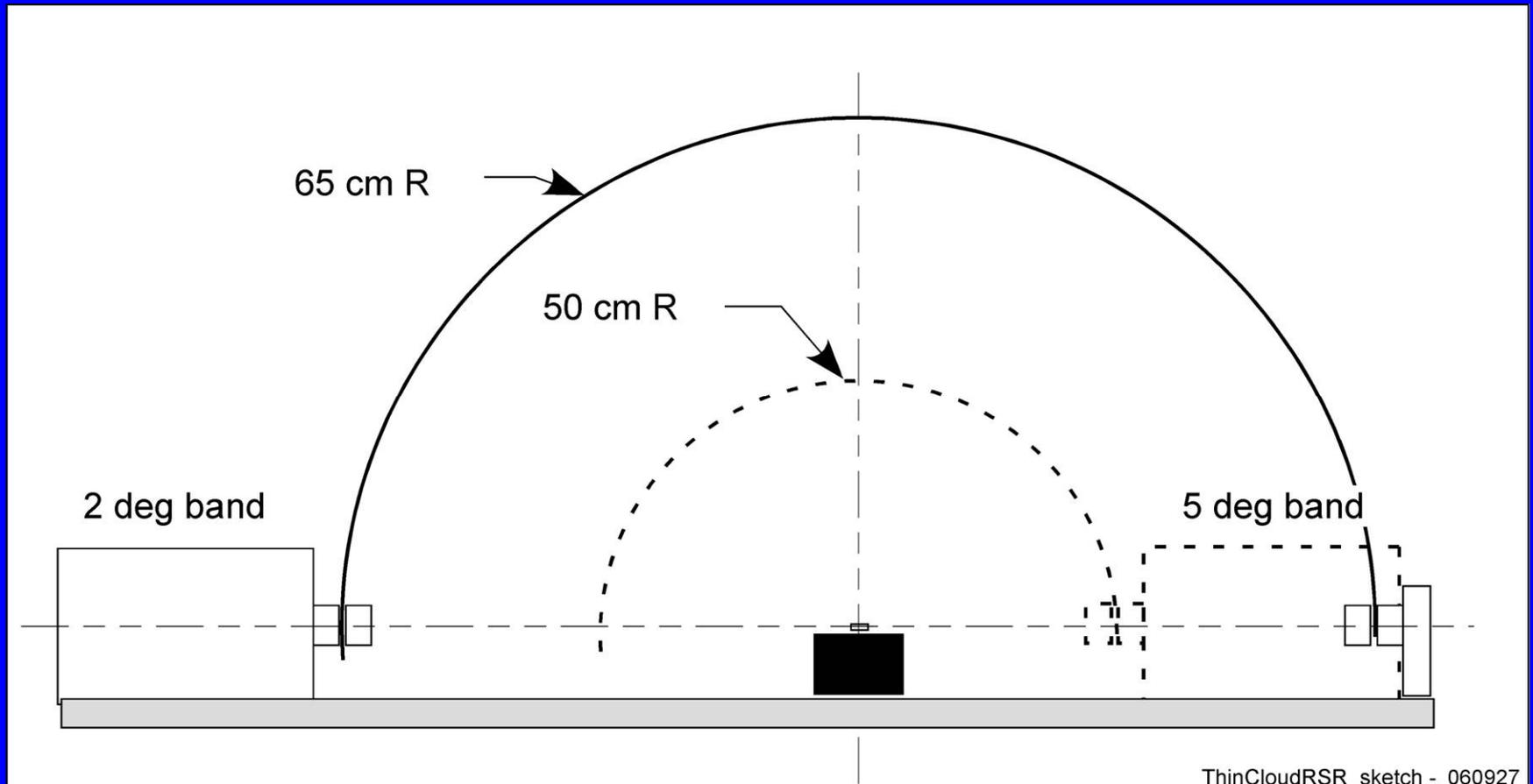
1. Update on CLOWD Efforts

- TC-RSR Development**
- PI efforts Highlights**
- VAPs & Individual Efforts**

1. Update on CLOWD Efforts

Thin-Cloud Rotating Shadowband Radiometer (TC-RSR) Development Underway

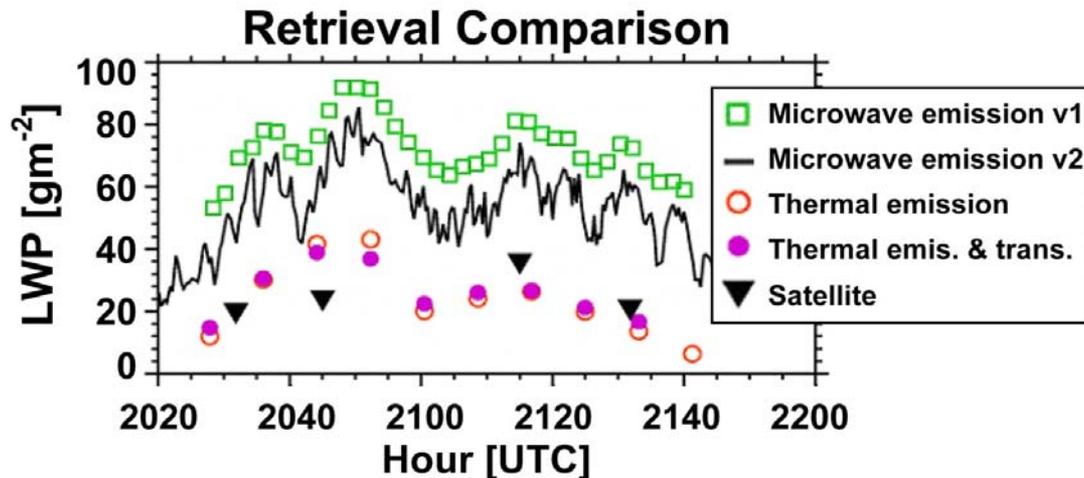
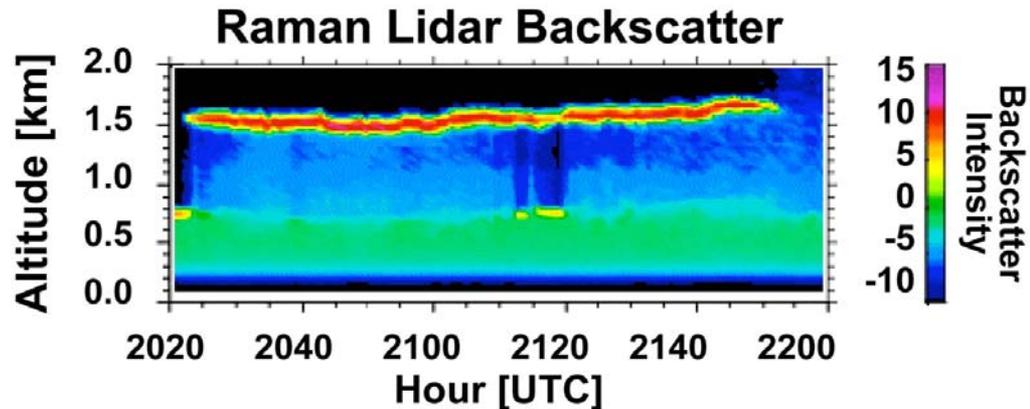
Mike Reynolds, Andrew Vogelmann, Q. Min,
MJ Bartholomew, Ray Edwards & Scott



1. Update on CLOWD Efforts

The Highlight Parade!

A Surprising Problem with Thin Liquid Water Clouds



Turner and 21 Co-Authors (*BAMS*, 2007)

CLOUD VAPs & Plans

CLOUD Regime	VAPs	Initiatives					
		S	M	L	LWP	Tau	Reff
Liquid water (Only)							
Overcast	MFRSR Diffuse	⊗	⊗	⊗	⊗	⊗	⊗
Broken (or overcast)	MWRRET	⊗	⊗	⊗	⊗	⊗	⊗
Mixed Phase							
Broken or overcast	MPL	⊗	⊗	⊗	⊗	⊗	⊗
Multi-Layered (w/ or mixed)							
Broken or overcast	Microbase	⊗	⊗	⊗	⊗	⊗	⊗

KEY	
S="Small";	LWP < 25 gm ⁻²
M="Medium";	25 < LWP < 100 gm ⁻²
L="Large";	LWP > 100 gm ⁻²
□	No retrieved information
⊗	Uncertain quality
⊗	Good quality, maybe by indirect method
■	Best quality
?	Under development; Anticipate high quality

All methods might not have been tested on true CLOUD types (the really thin stuff)

... How get them in to VAPs?

2. Validation needs “truth”

- Cloud MW Dielectric Properties - AMF/COPS MWR IOP
- Flux Closure - Beginning BBHRP Study
- Microphysics - Proposed RACORO IOP

RACORO Proposed

Routine

Aerial Vehicle Program (AVP)

Clouds with Low Optical Water Depths (CLOWD)

Optical

Radiative

Observations

Steering Committee

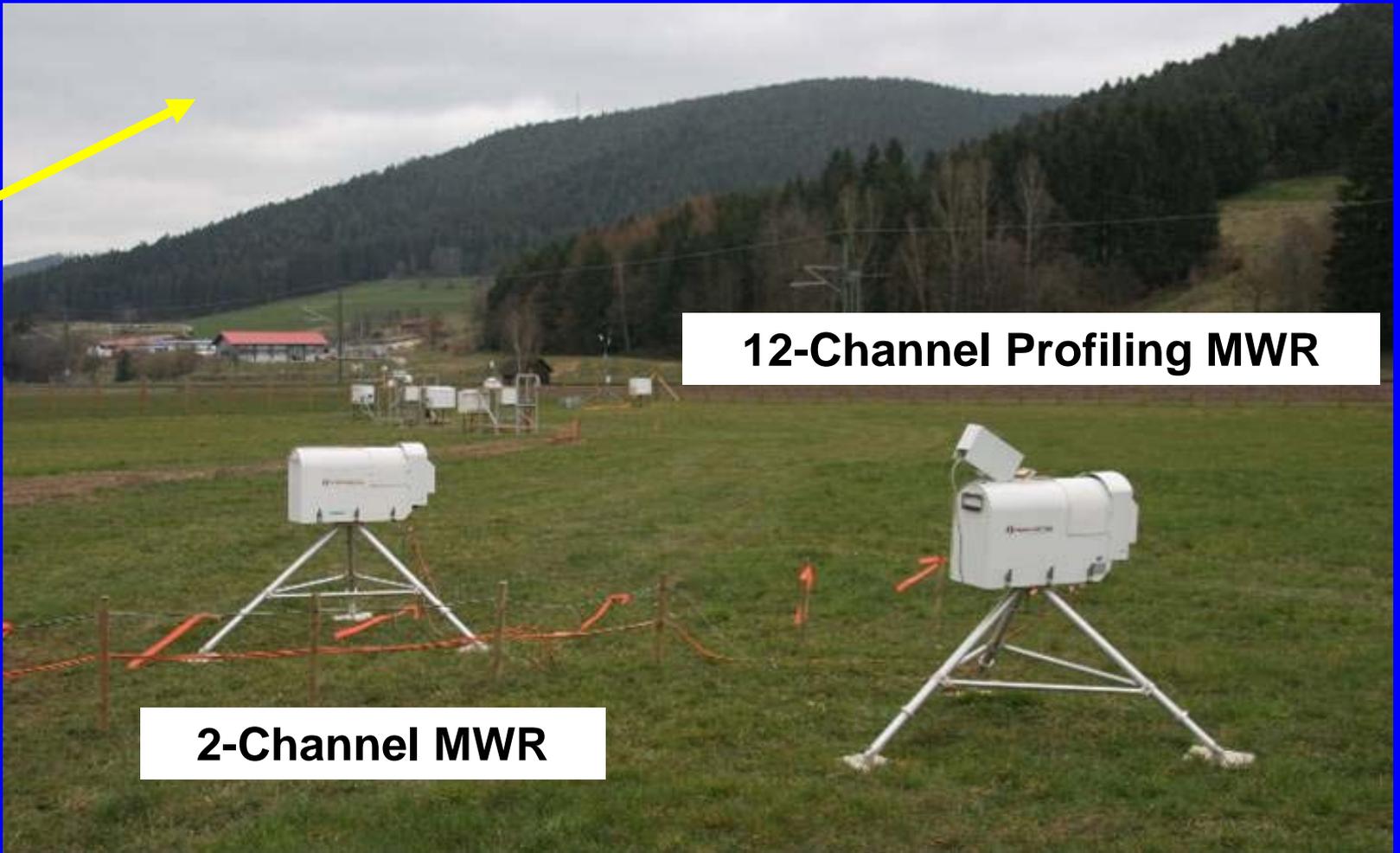
Andrew Vogelmann, Greg McFarquhar, John Ogren, Dave Turner,
Jennifer Comstock, Graham Feingold, Chuck Long

Additional Contributors

Greg Roberts, Scripps Institution of Oceanography, UCSD



Cloud Microwave Validation Experiment in Support of CLOUD -- 90/150 MWR at COPS



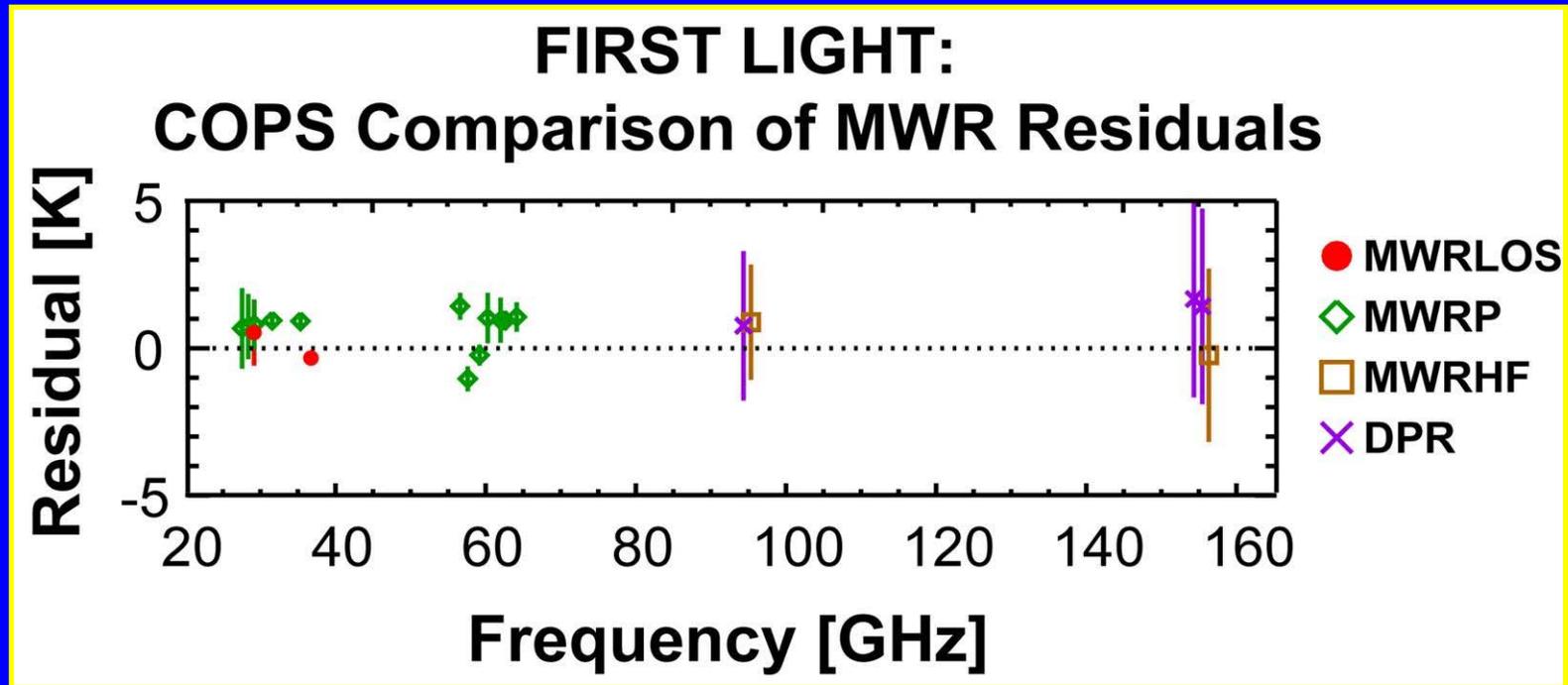
12-Channel Profiling MWR

2-Channel MWR

AMF/COPS Facility site -- Heselbach, Germany

Cloud Microwave Validation Experiment in Support of CLOWD

First step – Clear-sky verification. Next Step – Clouds...



**PLEASE,
JOIN THE PARTY!!**

Dave Turner, Susanne Crewell &
Ulrich Löhnert (Univ. of Cologne),
Maria Cadeddu & Andrew Vogelmann

CLOWD-BBHRP

(Broadband Heating Rate Profiles)

Initial Discussions

Eli Mlawer, Jen Comstock, Tim Shippert,
Dave Turner, and Andy Vogelmann

Objectives

1. Use BBHRP to evaluate CLOWD retrievals
 - Use residuals for statistics per CLOWD type
2. BBHRP calculations for CPWG CLOWD simulations
 - Need periods where variational analyses exist
 - Potential routine WRF simulations at the SG
 - Possible CLOWD types of particular potential interest e.g., MBL (VOCALS), NSA (IPY)

CLOWD Cases

- **Overcast, single-layered warm cloud**
- Broken, single-layered warm cloud
- Broken mixed-phase cloud & Multi-level clouds

Potential CLOWD-BBHRP Study Periods

1. Point Reyes (AMF)

- **Excellent CLOWD dataset**
- **Would need work to get VAPs (merged sounding, aerosol BE)**

2. SGP – Inputs for about 3 years are ready

- **Microbase & merged sounding almost done for 2000 to 2002**
- **Aerosol best estimate (BE) about ready, too**

3. NSA

- **CLOWDs frequent**
- **Would need work to get VAPs (merged sounding, aerosol BE)**

4. COPS (AMF)

- **CLOWDs were found to be frequent**
- **Plentiful additional remote sensing obs**



Hello **Andrew Vogelmann**

[Edit](#) [Attach](#) [Printable](#)

[ARM Wiki](#) » [CLOWD](#) » [Web Home](#)

02 Sep 2007 - 00:28 GMT - Andrew Vogelmann

CLOWD Wiki

- ↓ [Welcome](#)
- ↓ [Topic Map](#)

Welcome

To start a new topic, use the [topic creator](#) or send email to wikiadmin@arm.gov. When creating a topic, please remember to keep the topic name as **short** and **succinct** as possible - you can always elaborate on the name by using a more verbose topic title. Please also avoid starting a topic name with **Web** as this is reserved for topics used to administer the CLOWD wiki. If a link to the new topic should appear in the left navigation bar, add this line to the top of your topic: `<!-- TopDisplay -->`

To be sent a daily email digest of additions/changes to the **CLOWD** wiki, add your name and email address to the [Notifications](#) topic. Please note that this *only* applies to the **CLOWD** wiki.

Topic Map

- [Cops Mwr](#)
- [Heating Rates](#)
- [Retrieval Comparisons](#)

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- Wiki Home
- Wiki Configuration

- Aerosol WG
- CLOWD

- < New Topic >
- < Notifications >
- Heating Rates

Tools & Reference

- Change Password
- Users Guide
- Text Formatting

Questions?