

# Cloud Properties Working Group Low Clouds Update

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# Instruments

- 90/150 GHz microwave radiometer
  - Deployed during COPS AMF
  - Exploring calibration w/ DPR (Crewell & Löhnert)
  - See COPS Breakout, Wednesday evening
- 183 GHz (GVR) deployed at the NSA
  - Neural network algorithm to retrieve PWV & LWP (Maria Cadeddu)
  - Potential VAP candidate (RPWG)
- 3-channel MWR to be deployed
  - 23, 31, and 90 GHz, with an option to add 183 GHz
- Scanning WACR (94 GHz radar) at SGP
- TC-RSR (Thin-Cloud Rotating Shadowband Radiometer)
  - 6 narrow spectral bands (415, 500, 610, 660, 870, and 940 nm)
  - Prototype developed & deployed at the SGP in January
  - See Bartholomew poster

# Update on Value Added Products

- GOAL: Recommend a retrieval (or suite) for operational implementation.
- CLOWD (Clouds with Low Optical Water Depth)
  - Evaluate retrieval classes
    - Examine under various conditions
      - Broken vs. overcast
      - Water vs. mixed phase
      - Single vs. multi-layered
    - Cloud phase determination
      - Cloud Classification VAP



## CLOWD Cases

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

## CLOWD-BBHRP Study Periods

### 1. Point Reyes (AMF)

- **Overcast**

### 2. COPS (AMF)

- **Broken & Overcast (warm)**

### 3. NSA

- **Overcast Mixed-Phase**

### 4. SGP

- **Multiple cases – Nine multi-year data set**
- **Inputs for about 3 years are already ready**
- **Microbase, Merged Sounding, & Aerosol BE**

# Retrieval Validation

## Start with Flux Closure for Overcast, Warm Clouds

- Past: Turner et al. BAMS (2007)
- CLOUD BBHRP retrieval intercomparison
- Pt. Reyes – warm, stratiform clouds
- Flux closure: Compare modeled surface & TOA fluxes with observations
- Further discussion in Tuesday's BBHRP session

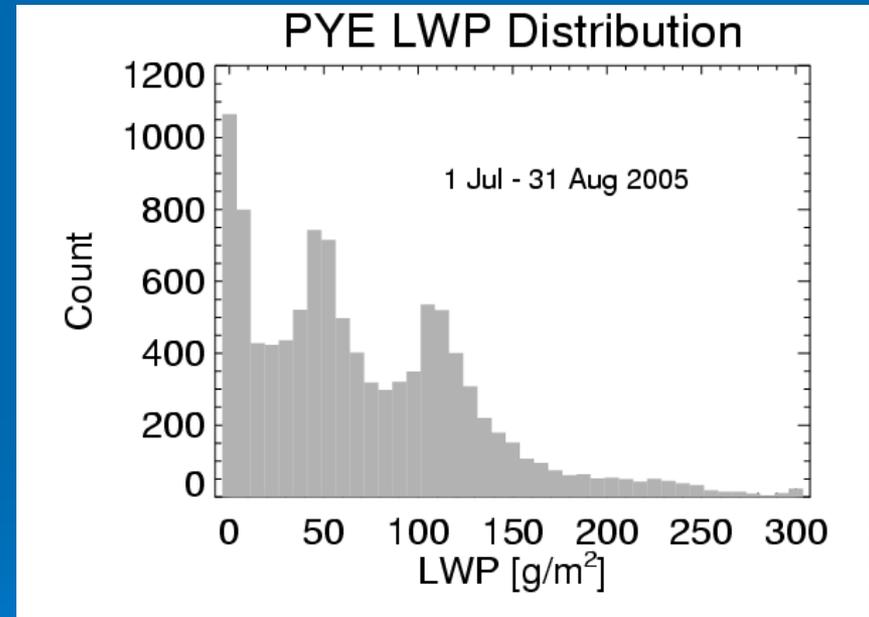


Figure courtesy D. Turner

# RACORO – SGP 2009

Routine Aerial Vehicle Program (AVP)

Clouds with Low Optical Water Depths (CLOWD)

Optical Radiative Observations

- Fly pre-determined flight tracks over the SGP 2 to 3 times/week for 9 months (CIRPAS Twin Otter)
- Conduct long-term, routine flights in boundary layer, liquid-water clouds at SGP to measure
  - Microphysical properties
  - Optical properties and radiative fluxes, and
  - Associated aerosol prop. & atmospheric state
- Long-term statistics
  - Help develop & evaluate ARM retrievals
  - Improve our understanding of boundary layer clouds & their interactions with aerosols & radiative fluxes
- Breakout Session: Thursday afternoon