

Liquid Clouds Status: Summary of the CLOWD/RACORO and Microwave Instrument Group

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New Microwave Radiometers Coming

- Open competition, Radiometrics selected
- New systems will have:
 - 3 frequencies (23.8, 31, 90 GHz)
 - Matched FOVs ($\sim 3^\circ$)
 - 1-2 s temporal resolution
 - Improved rain mitigation
- 2 systems this FY

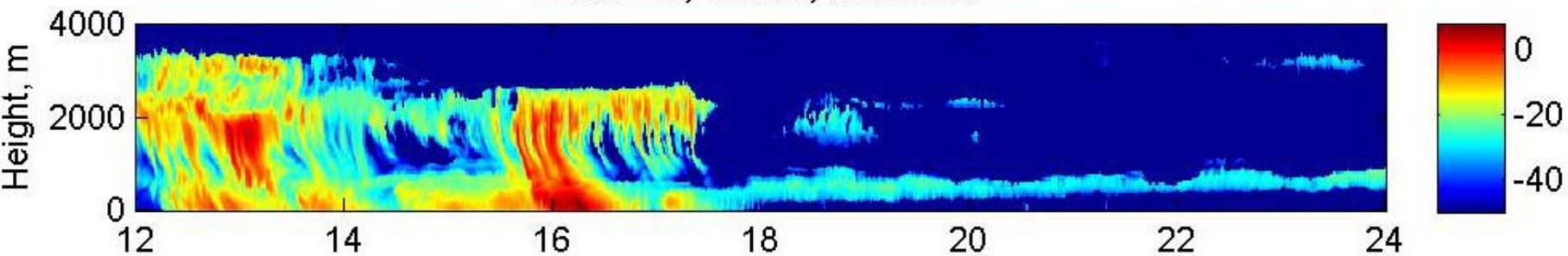
Emphasis at Higher Frequencies

- Learning to calibrate at 90/150 GHz
- Improving our clear sky RT models
 - Modifications to the water vapor continuum required in 4 commonly used models
- Discussed (briefly) approach to evaluate liquid water absorption models, esp. at supercooled temperatures
- Will need to update MWRRET to use 90 GHz; will require some ARM development effort

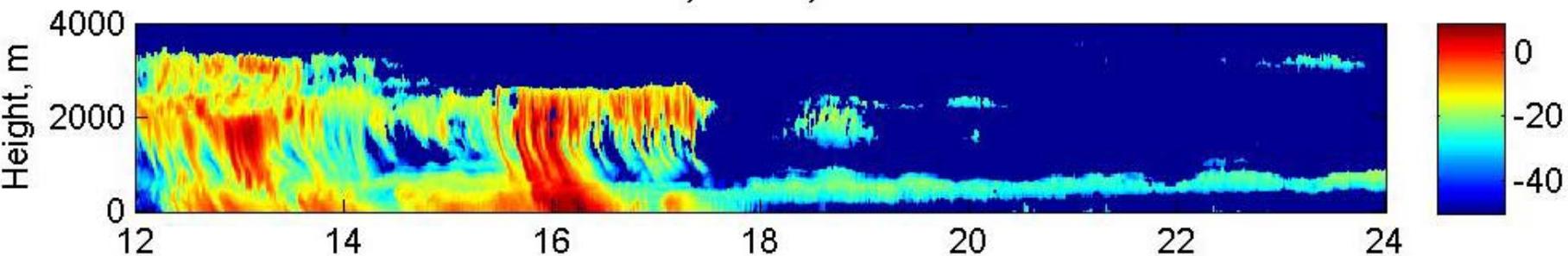
Retrieving Profiles of LWC

- From passive zenith microwave radiometer observations: NO
 - In very thick clouds ($LWP \gg 300 \text{ g/m}^2$) there is ~1.3 independent pieces info if using 90/150 GHz and 20-30 GHz obs
 - Otherwise, only 1 independent piece of info (LWP)
 - Tomographic approach has promise
- Dual-wavelength differential absorption methods (K and W band) looks promising
 - Need to improve S/N ratio by averaging
 - Need to use complicated inversion technique
 - Very sensitive to calibration of both radars
 - First results show method insensitive to drizzle

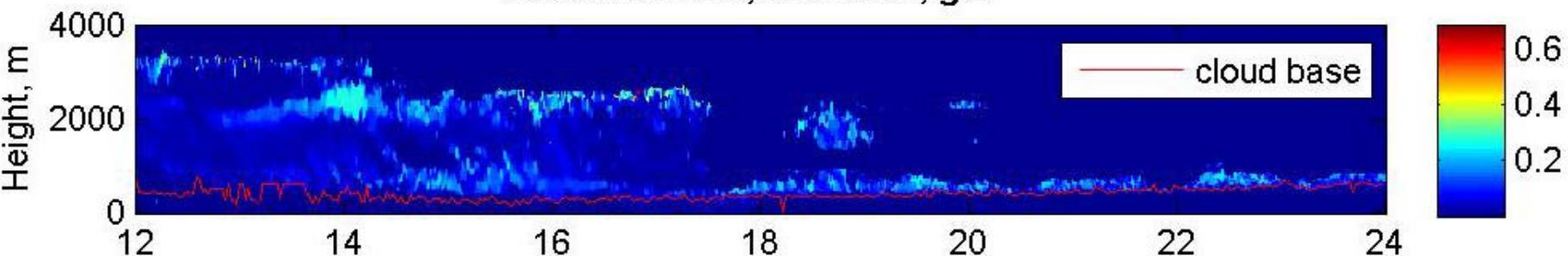
Z vs time, WACR, 20060506



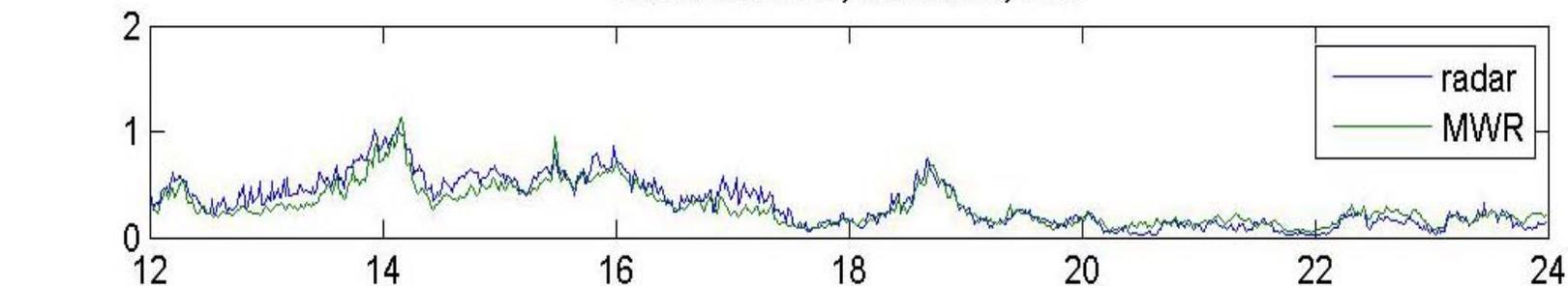
Z vs time, MMCR, 20060506



Retrieved LWC, 20060506, gm^{-3}



Retrieved LWP, 20060506, mm



CLOWD BBHRP

- St / StCu cases first
 - Pt. Reyes dataset
- Evaluating 6 different methods
 - Clouds very low, cloud radar not calibrated
- All 6 cases not fully processed through framework yet
- Initial results look very interesting
 - Should be able to say something pretty definitive about strengths / weaknesses
 - Should have this completed by STM
- Some discussion on next cloud type to tackle

RACORO

- Routine AVP flights over SGP
 - ~300 hrs with CIRPAS Twin Otter
 - Wide variety of in-situ probes and radiometers
- Science and operations plan being written; should be available for comment in ~ 1 month
 - Steering group had long meeting to work details
- NASA / LaRC will perform joint experiment in June with HSRL and polarized radiometer
- Discussion on 90/150 GHz radiometer: remain at SGP to support RACORO or move to NSA to get data on supercooled liquid clouds