ARM Cloud Radar VAPs

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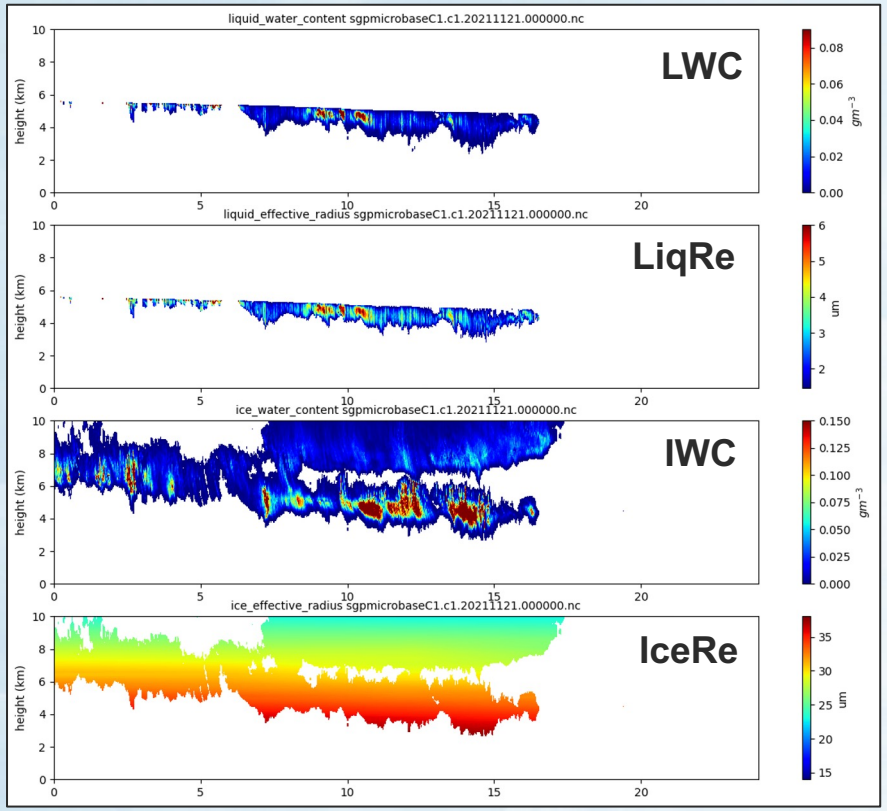


ARM Cloud Radars

Vertically-pointing radars

- **KAZR / KAZR2: KaBand ARM Zenith Radars**
- **MWACR: Mobile W-Band ARM Cloud Radar**

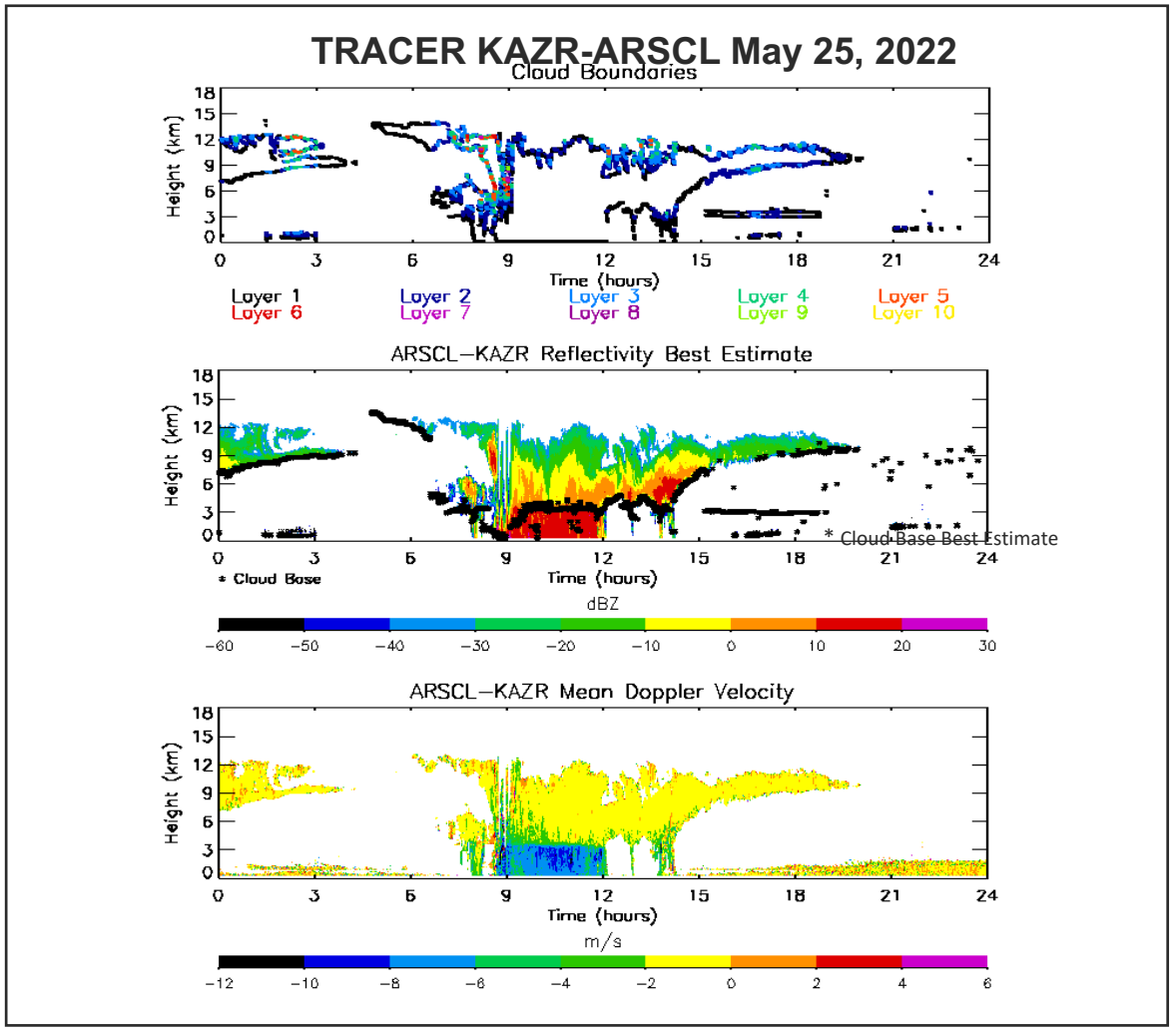
Scanning Cloud Radars

- **SACR / SACR2: Scanning ARM Cloud Radars, at 3 frequencies: Ka, W, or X**
  - Deployed as 2 on a shared pedestal,
    - KaSACR / WSACR , or
    - KaSACR / XSACR

Active Remote Sensing of Clouds (ARSCL) VAP

Contact: ***Karen Johnson, kjohnson@bnl.gov***

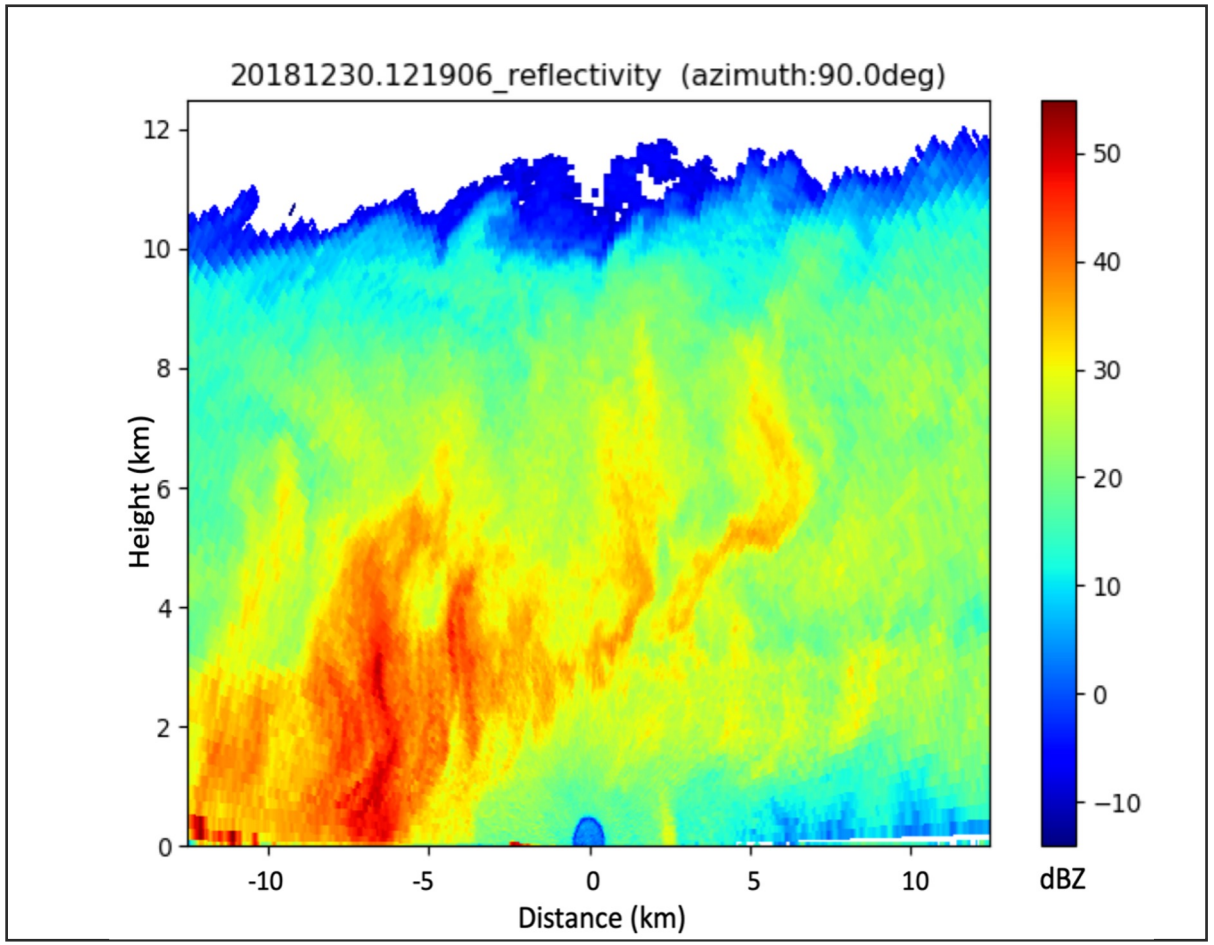
- ARSCL is available at the ARM Archive for all fixed and AMF sites with KAZR or MWACR, including the recent TRACER, SAIL, and MOSAiC campaigns.
- The VAP provides cloud boundaries, gaseous attenuation correction, and mean Doppler velocity corrections.
- ARSCL is initially produced as an uncalibrated '.c0' versions, then later as a calibrated '.c1' version. Both are reliable for cloud boundaries, layers and other properties.
- Data are available within 1-2 months of data collection.
- A full ARSCL refresh, Python conversion, selective open sourcing, and many enhancements are slated for FY23.



Scanning ARM Cloud Radar Grid (SACRGRID) VAPs

Contact: ***Meng Wang, mwang@bnl.gov***

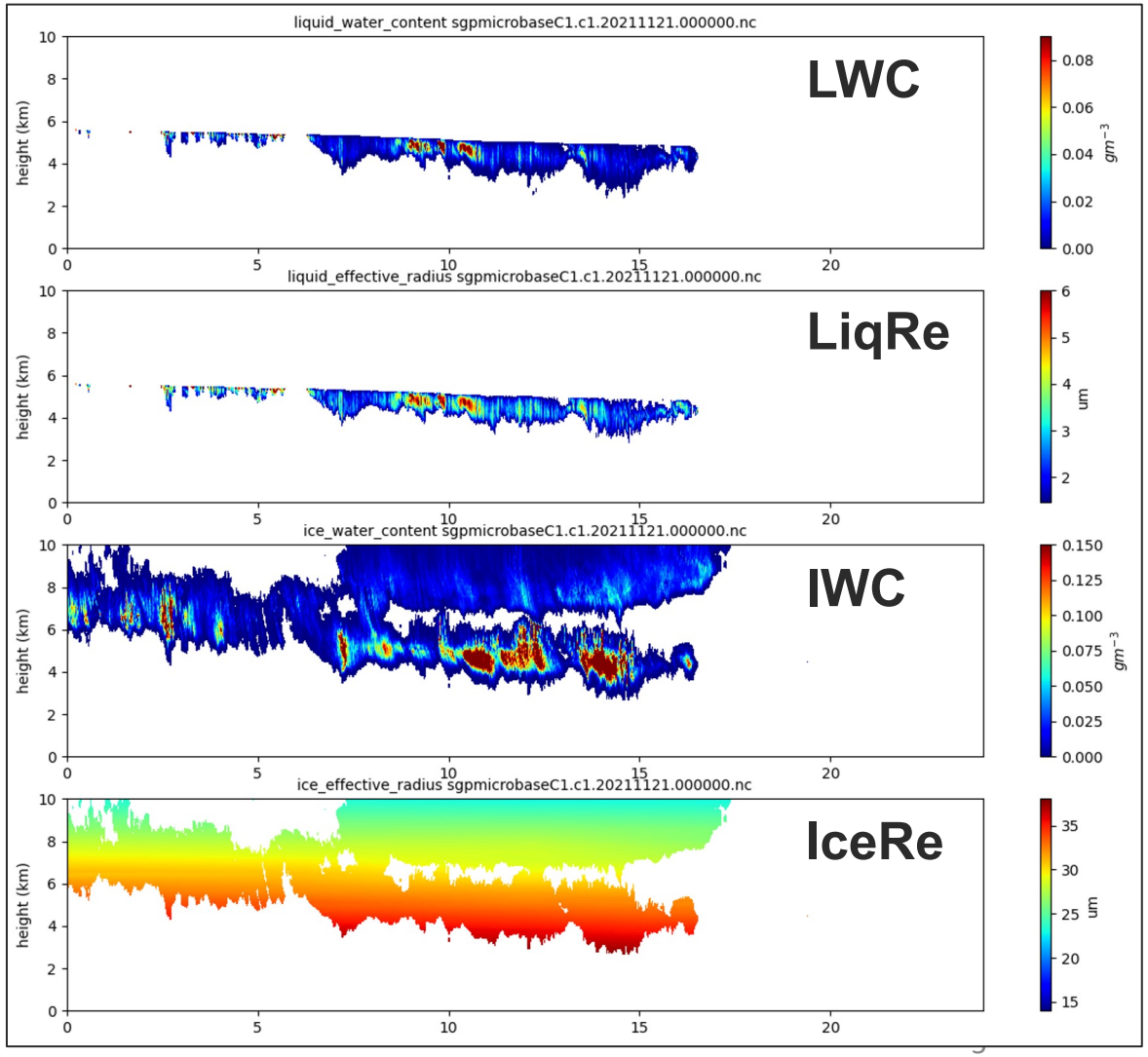
- SACRGRID provides radar moments on a Cartesian grid for both range-height indicator (RHI) scans and plan-position indicator (PPI) scans.
- The VAP also applies a significant echo mask and gaseous attenuation correction.
- Calibrated (c1 level) products (fields such as Z, MDV) are available for CACTI:
  - KASACRGRIDRHI, for the Ka-band SACR
  - XSACRGRIDRHI, for the X-band SACR.
- TRACER, COMBLE and other sites also available.



Continuous Baseline Microphysical Retrieval (MICROBASE) VAP

Contact: ***Meng Wang: mwang@bnl.gov***

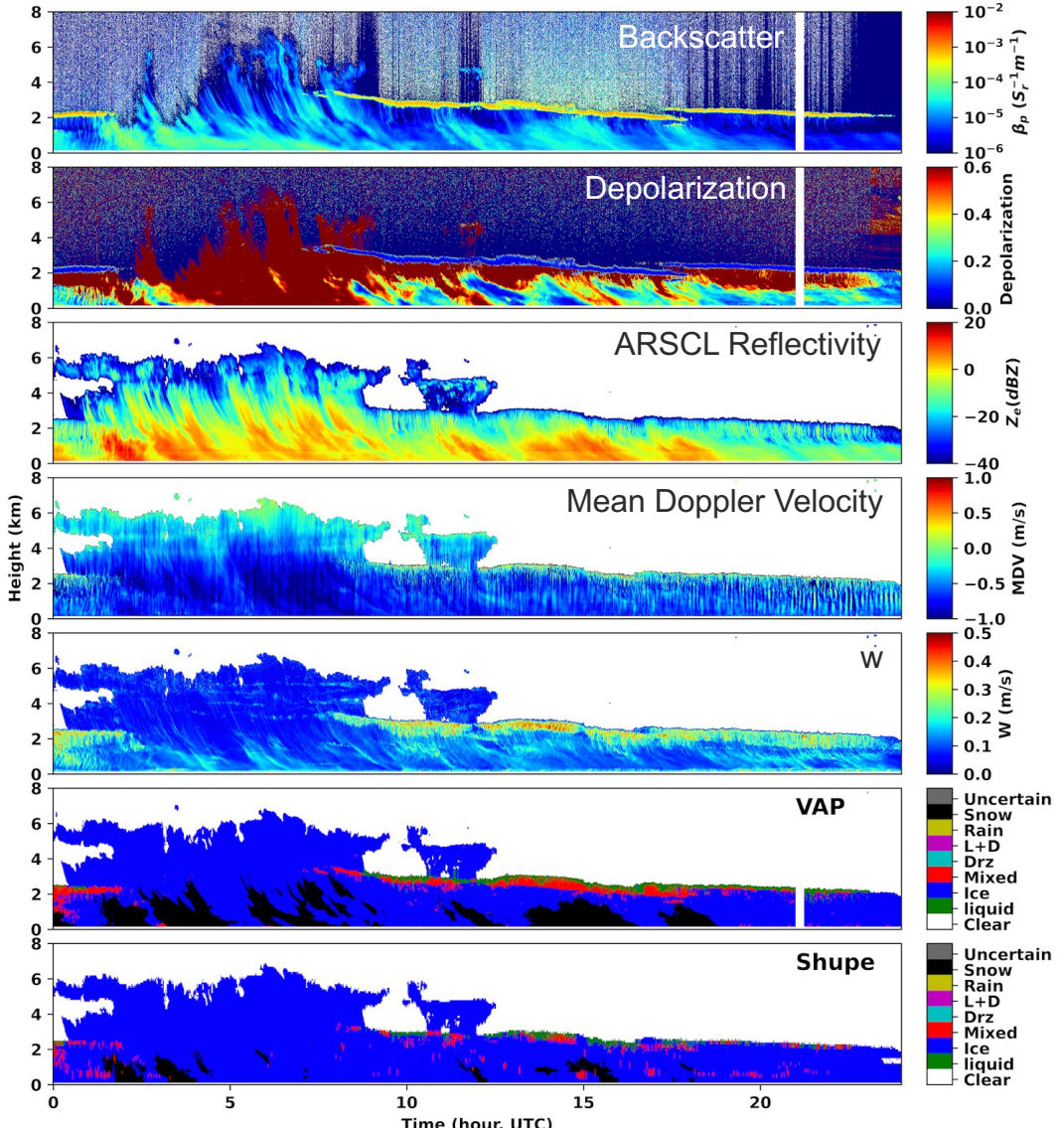
- MICROBASE is available again at SGP, ENA, PVC, ASI, GAN, and other ARM sites in the ARM Archive.
- This VAP provides “baseline” retrievals for:
  - Liquid Water Content (LWC),
  - Ice Water Content (IWC),
  - Effective Size (De)
- The updated VAP includes additional uncertainty quantification, with additional validation/closure efforts planned for FY23.



Cloud Hydrometeor Thermodynamic Phase Classification (ThermoCldPhase) VAP

Contact: **Damao Zhang, damao.zhang@pnnl.gov**

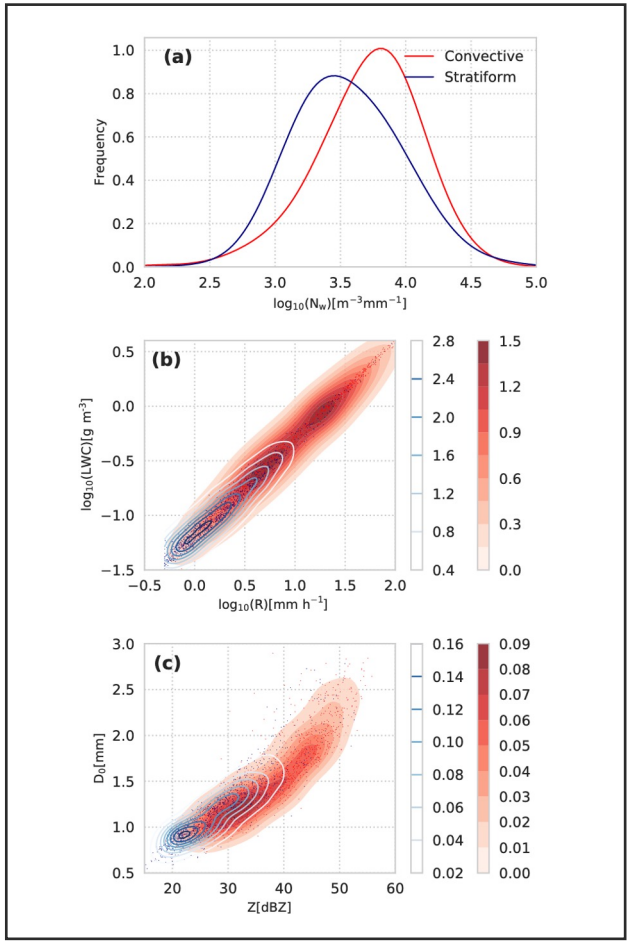
- The multisensor method (Shupe 2007) uses measurements from depolarization lidar, cloud radar, microwave radiometer, and temperature sounding
- Cloud hydrometeors are classified as ice, snow, mixed-phase, liquid, drizzle, or rain
- Cloud layers are classified as ice ($frc_{ice}>0.9$), mixed-phase ($0.1<frc_{ice}<0.9$), or liquid ($frc_{ice}<0.1$)
- Data is available at the NSA site (2018-2020) and for COMBLE (ANX)



LASER / VIDEO DISDROMETER VAPs

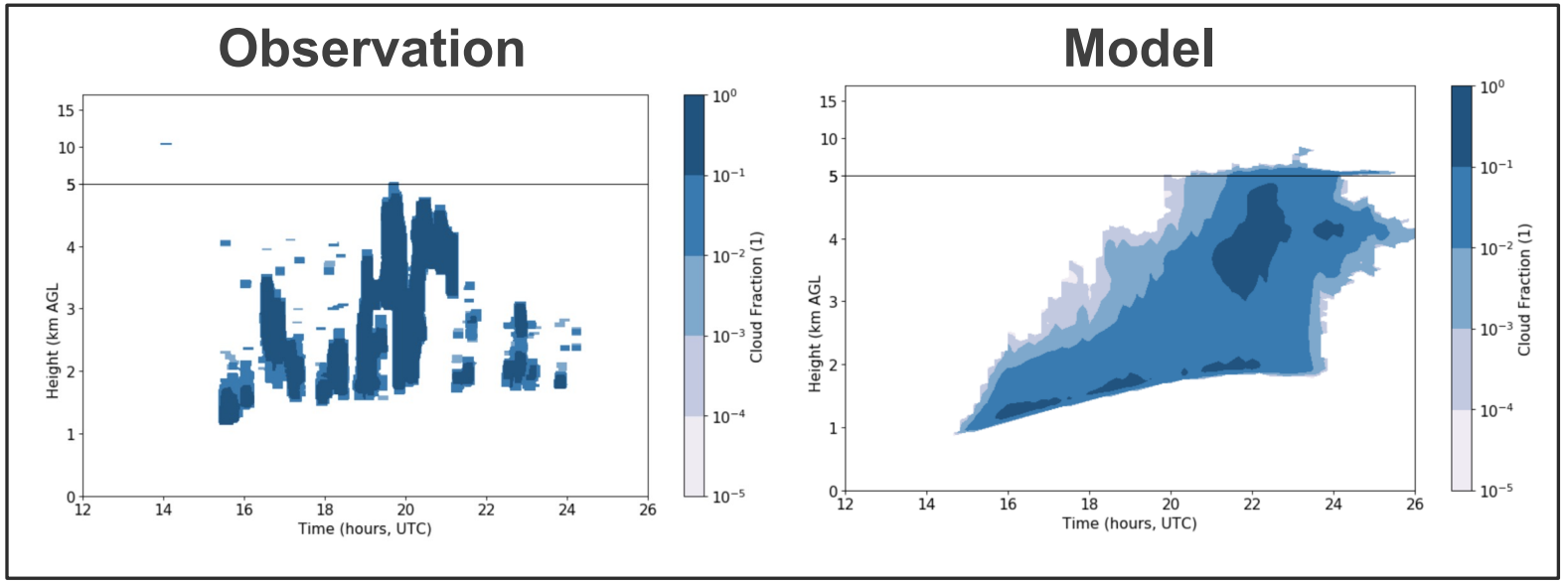
Contact: ***Aifang Zhou, azhou@bnl.gov***

- LDQUANTS and VDISQUANTS data is available now at the ARM Archive (Baseline product).
- The products estimate rainfall rates and several geophysical quantities, parameterized DSD fits (gamma or exponential assumption type methods) following ARM long-term efforts.
- Radar-equivalent quantities, including dual-polarization radar quantities (e.g., Reflectivity Factor Z, Differential Reflectivity ZDR) are also calculated. Useful in conjunction with radar-based products.
- Available daily at all fixed ARM sites in liquid precipitation conditions, as well as AMFs such as TRACER, CACTI, GoAmazon, and SAIL.



LASSO-O Bundles

Contact: ***Bill Gustafson, william.gustafson@pnnl.gov***



- The initial Large-Eddy Simulation (LES) ARM Symbiotic Simulation and Observation (LASSO) projects enables users to compare models with ARM observations collected at the SGP site during shallow cumulus events.
- Bundles consist of LES outputs for each event (95 shallow cumulus events observed from 2015-2019 over the SGP site), and the items needed to reproduce the LES results.
- Observations from those shallow cumulus events, and skill scores / diagnostic details identifying how the LES behaved.