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ARM Radars at COMBLE

June 25, 2020

ARM Radar Team

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U.S. DEPARTMENT OF ENERGY BATTELLE

PNNL is operated by Battelle for the U.S. Department of Energy

ARM Radars at ANX

KAZR Ka-band zenith radar

Ka/W-SACR dual-frequency Ka/W-band scanning cloud radar

Radar Uptime and Data Availability

- KAZR (zenith-pointing)
  - Single polarization
  - Moments and Spectra
- Ka/W-SACR (scanning)
  - Dual polarization
  - Moments and Spectra

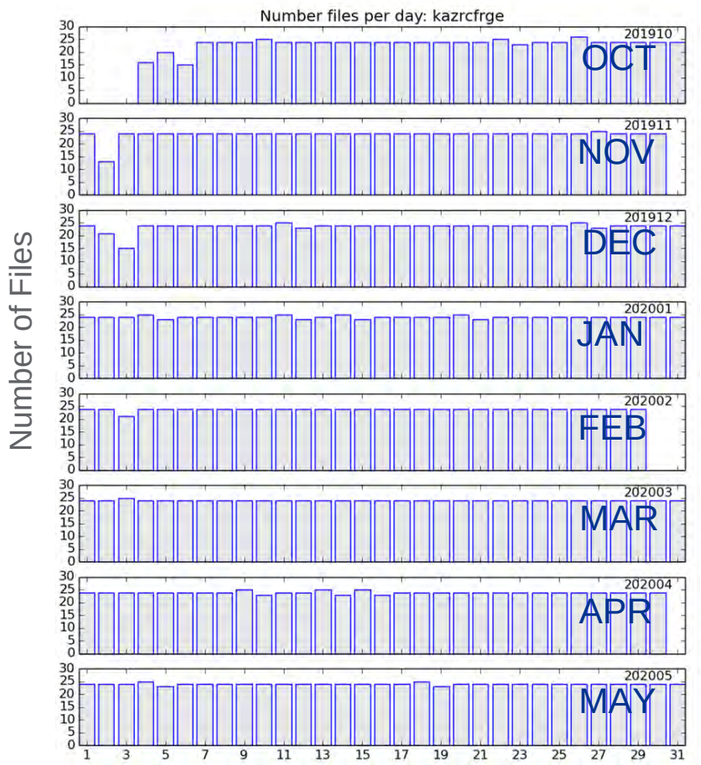
All Radars:

Excellent uptime and performance

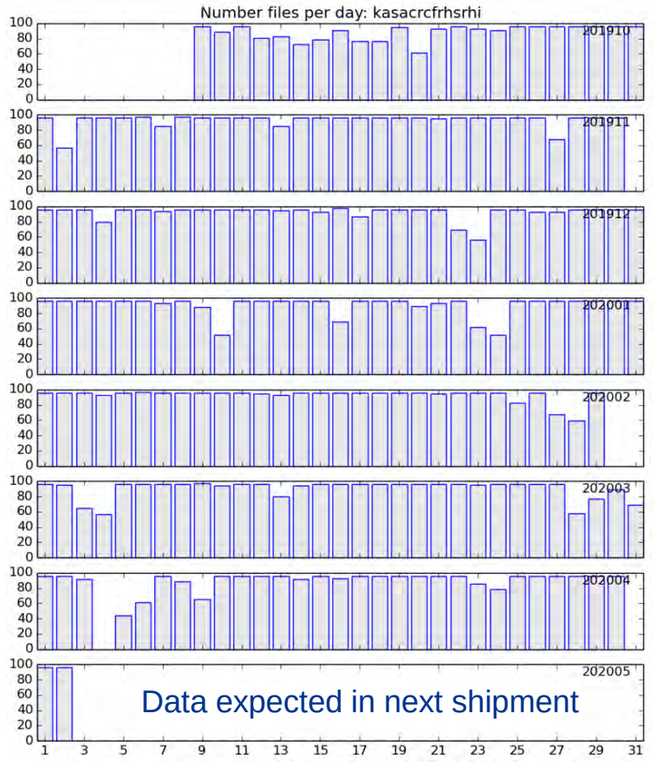
Number of data files per day, each month

(Similar for each radar mode, scan type, and for spectra)

KAZR



Ka-SACR HSRHI



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SACR Scan Types

- **PPIV**
  - WSW – East low-elevation Scans
  - 4 times / hour
- **HSRHI**
  - Scans NE Quadrant
  - 4 times / hour
- **VPT** (zenith-pointing)
  - 4 times / hour

PPIV
@ 00, 15, 30, 45 past hour

Elevation (FIXED)	Azimuth
0.0	240 – 90
0.5	90 – 240
1.0	240 - 90
2.0	90 - 240

HSRHI
@ 5, 20, 35, 50 min past hour

Elevation	Azimuth (FIXED)
0 - 90	0
90 - 0	30
0 - 90	60
90 - 0	90

VPT
@ 8, 23, 38, 53 past hour

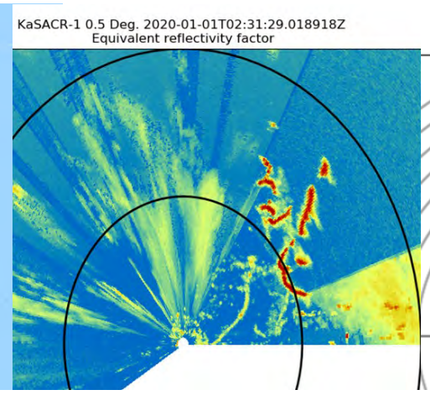
Elevation (FIXED)	Azimuth (FIXED)
90	N/A

KaSACR Relative Calibration Tracking

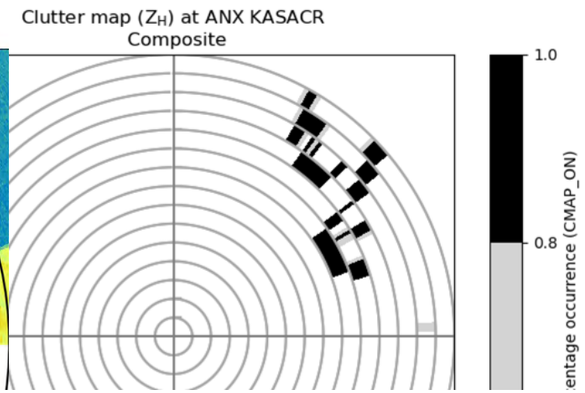
eRCA technique uses stability of ground clutter to gauge changes in radar reflectivity

Hunzinger et al. 2020, AMT
https://www.atmos-meas-tech.net/13/3147/2020/

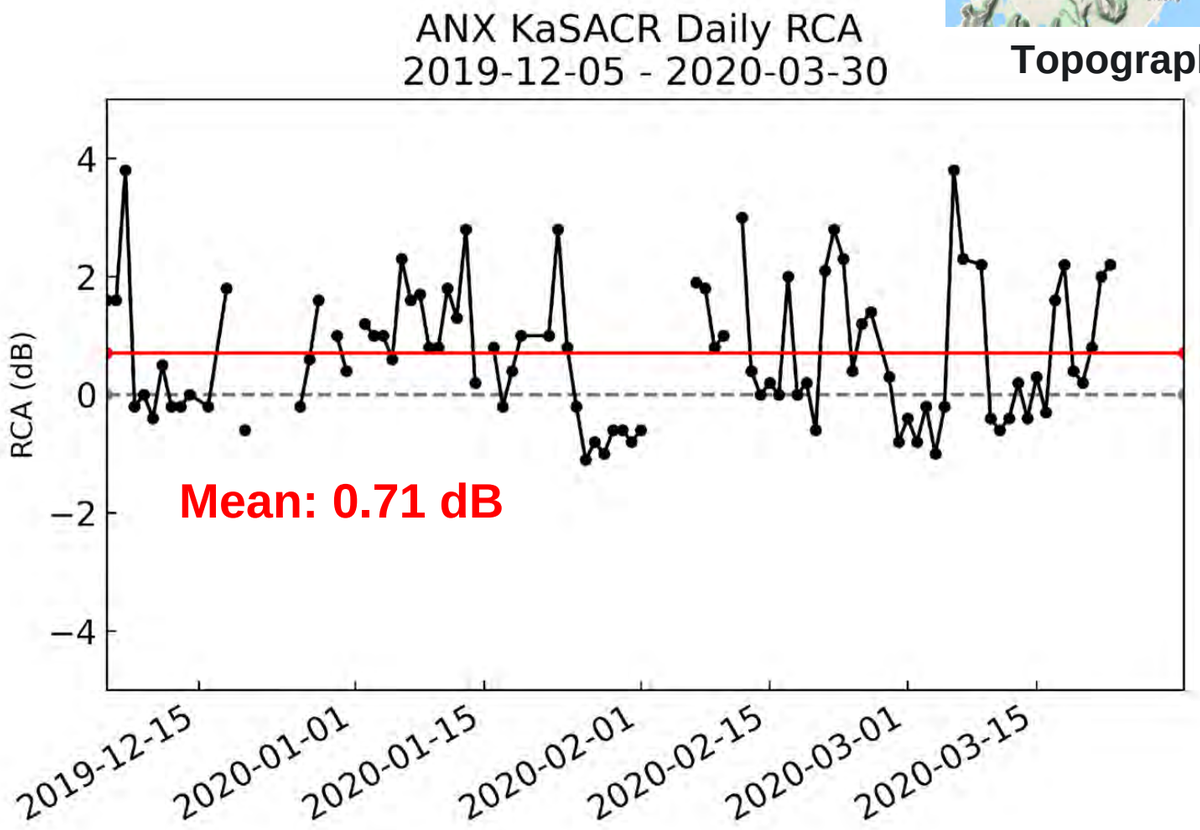
Topography

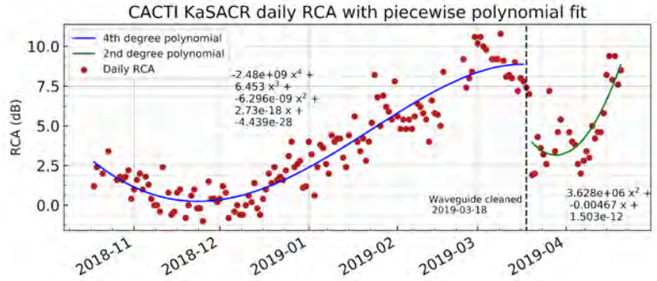


Reflectivity (PPI)



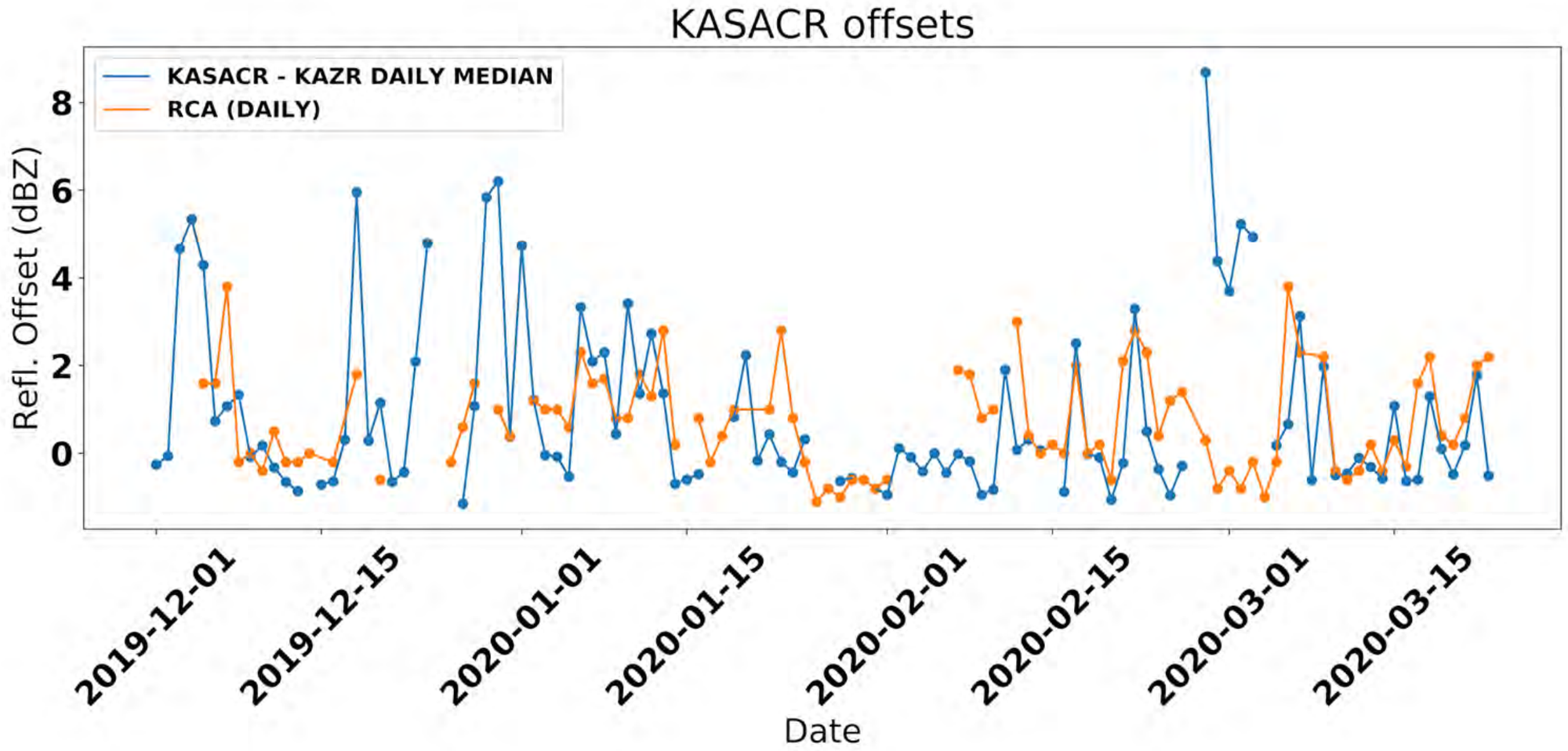
Composite clutter map (PPI)





- **KaSACR at CACTI had many more issues and large (up to 12 dB) offsets**
- **COMBLE eRCA offsets within +/- 4 dB, average of < 1 dB**

KaSACR-KAZR Reflectivity Comparison

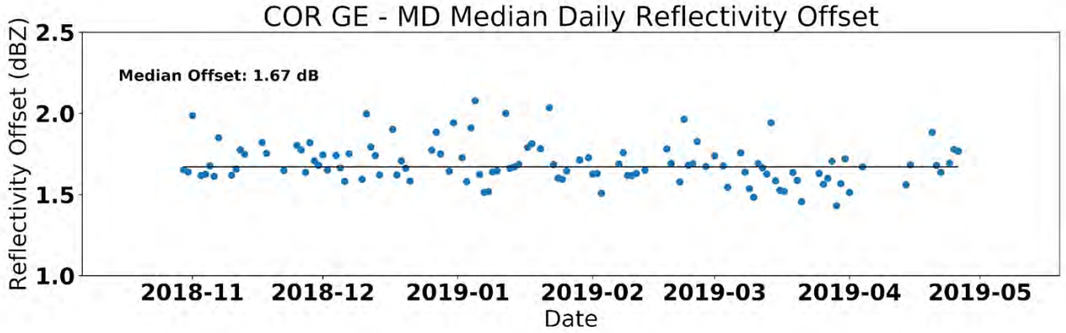


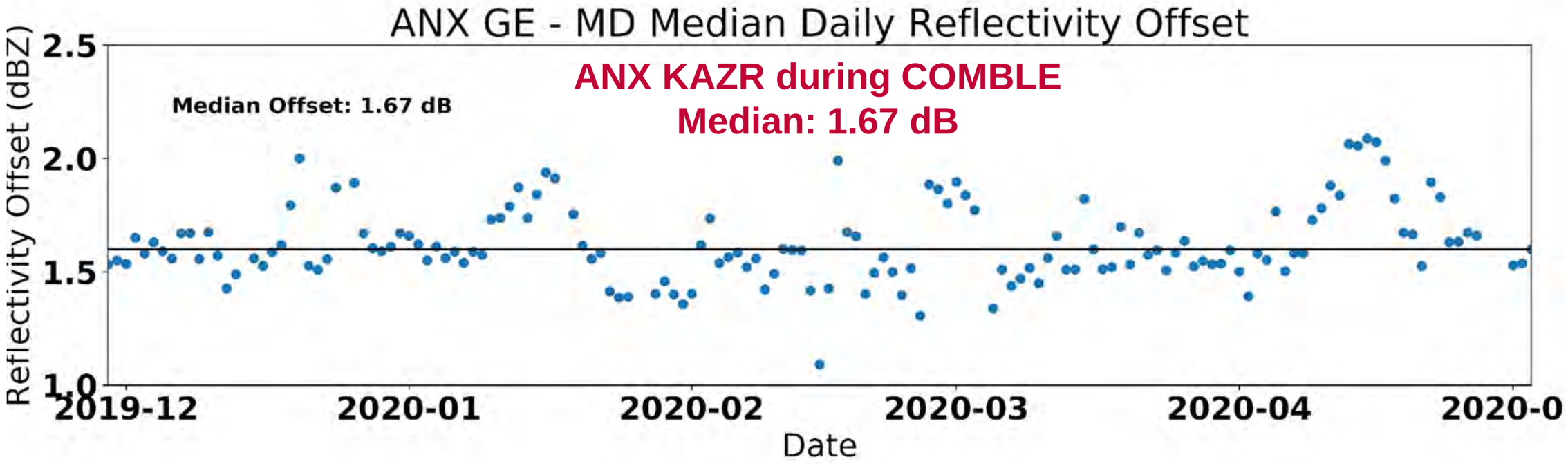
KAZR Mode Comparison

general (GE) reflectivity – moderate (MD) reflectivity

- **Consistent median offset between COR and ANX**

COR KAZR during CACTI
Median: 1.67 dB





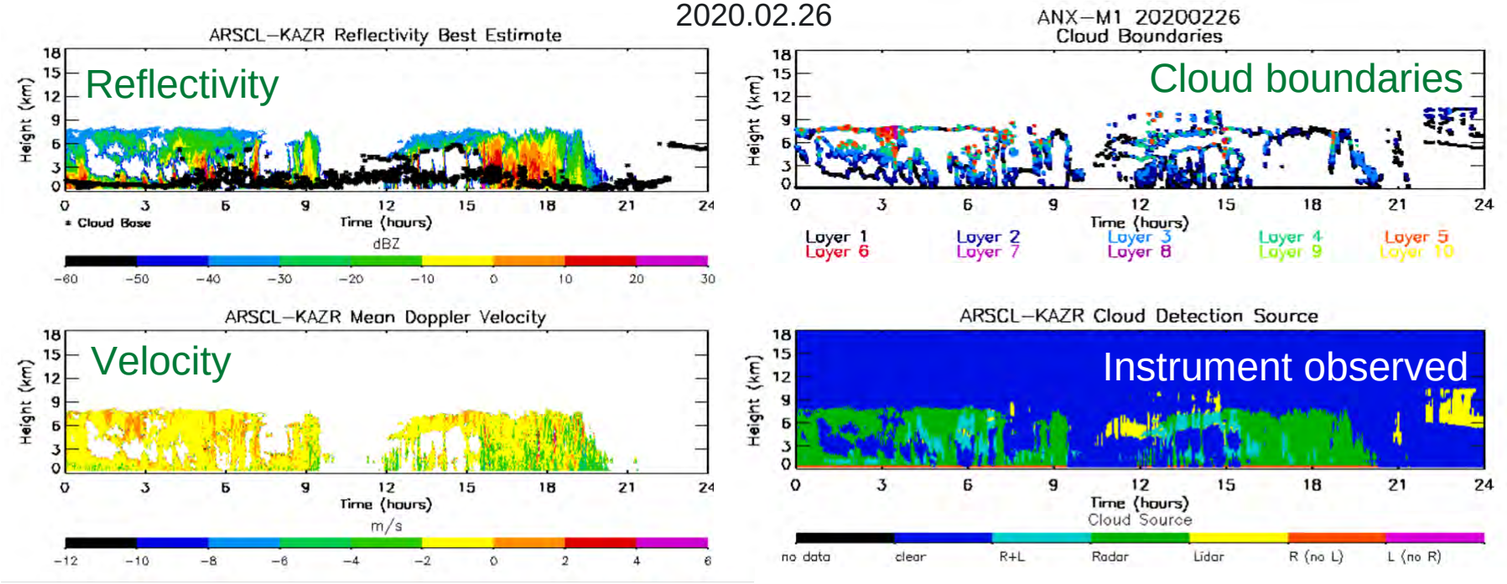
ANX KAZR during COMBLE
Median: 1.67 dB

COMBLE VAPs:

- KAZR-ARSCL VAP
  - Cloud boundaries and radar moments
  - January – May ready
  - Archived soon
- SACRGRID VAP
  - Cartesian-gridded SACR moments
  - Processing underway for Ka-SACR

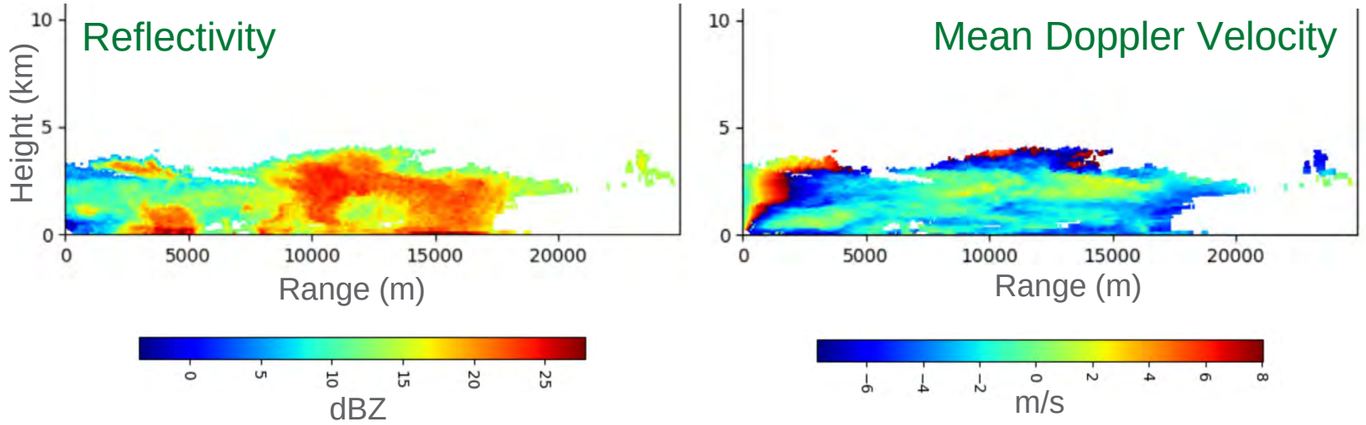
ANX KAZR-ARSCL

2020.02.26



ANX KaSACR-GRID

2020.02.11:0420



COMBLE Calibration Plans

- B1 datastream effort
  - eRCA technique
  - Radar cross comparisons
  - Disdrometer-radar comparisons
  - Disdrometer-RWP comparisons
  - Metadata/event classification

✓ Time periods
✓ Data availability (radar, disdrometer, sonde)
✓ Precipitation type
✓ Temperature
✓ Other….?

✓ Contact us if experienced/interested in event classification metadata effort

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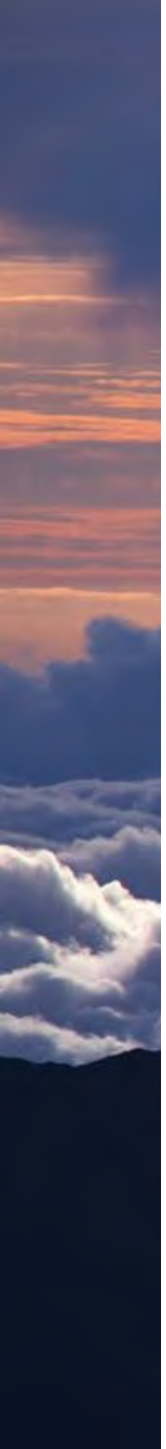
Thank you

Further questions?

Contact radar@arm.gov



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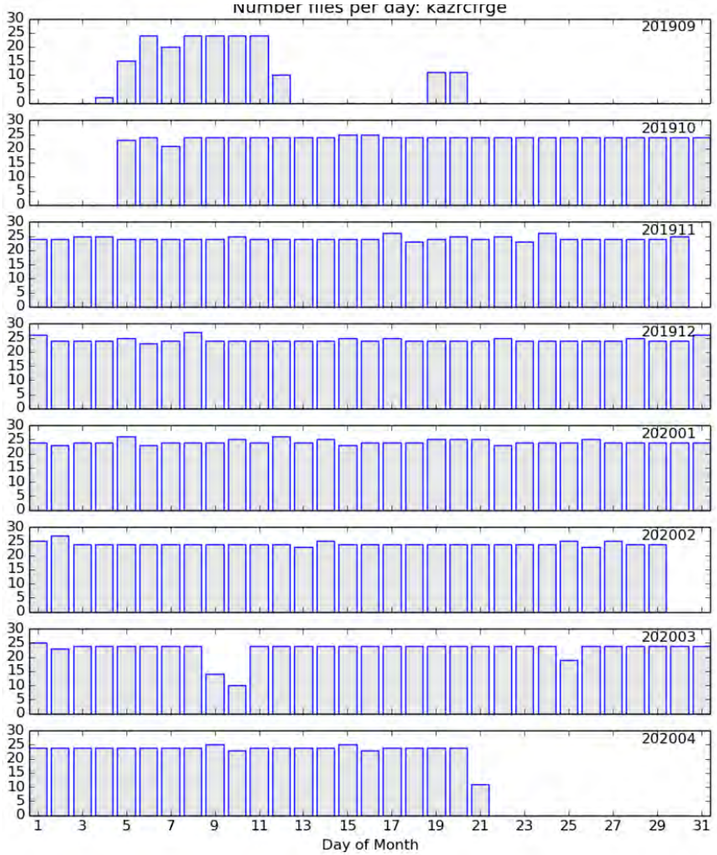
Backup

MOSAiC ARM Radars Update

KAZR GE

Moments files/day

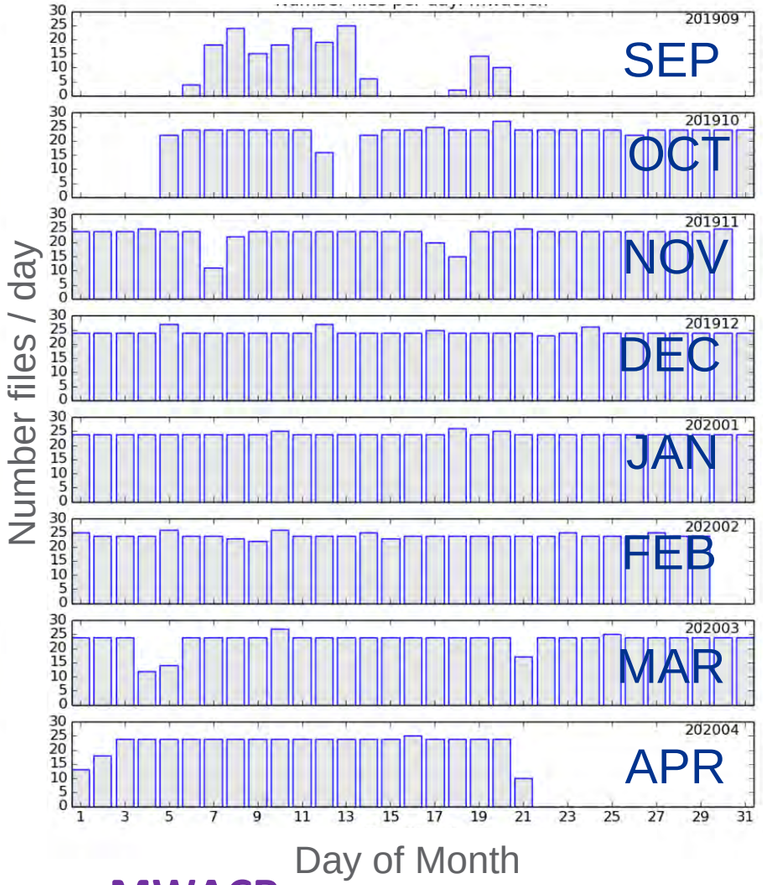


KAZR:

- Single polarization
- Moments and Spectra

MWACR

Moments files/day

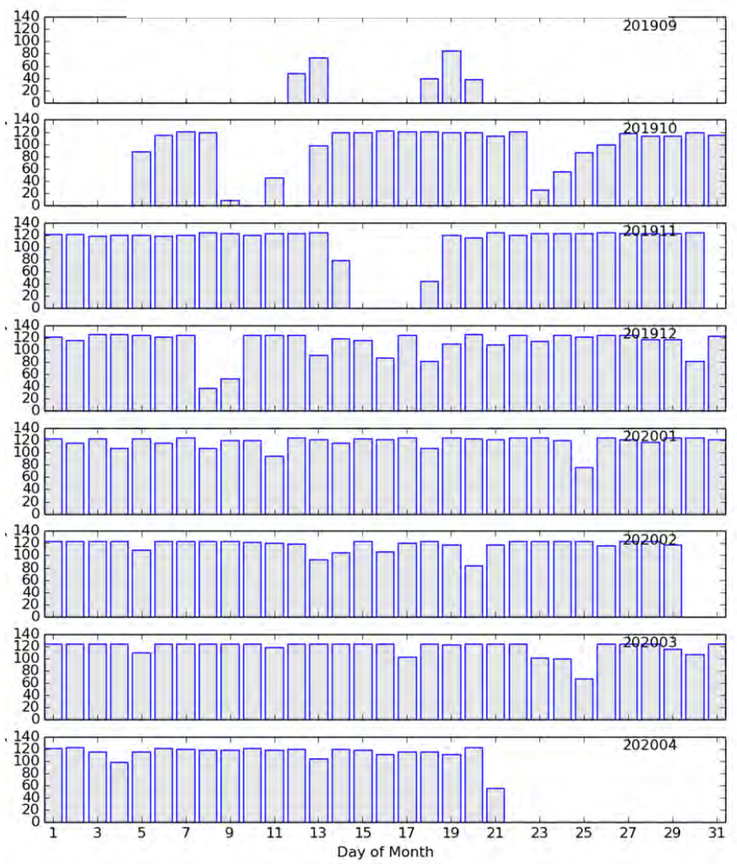


MWACR:

- Single polarization
- Moments and Spectra

Ka-SACR PPIV

Moments files/day



Ka-SACR (no X-band):

- Dual polarization
- Moments only

MOSAiC KAZR Mode Comparison