Title: PERiLS 2022 UAH MAPNet MAX Mobile Radar Data

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1.0 Dataset Overview

The UAH Mobile Atmospheric Profiling Network (MAPNet) Mobile Alabama X-Band radar (MAX) is a mobile radar platform that has an X-Band radar and a mounted surface station. Data from MAX was collected during each IOP unless otherwise noted. Locations and operating times are as follows:

> IOP 1
> Time Period: 2022/03/22 1636Z to 2022/03/22 2313Z
> Location: 33.1325, -88.495401 elevation: 67 m
>
> IOP 2
> Time Period: 2022/03/30 1515Z to 2022/03/31 0205Z
> Location: 33.8400270, -88.640854 elevation: 98 m
>
> IOP 3
> Time Period: 2022/04/05 1142Z to 2022/04/05 1753Z
> Location: 32.277645, -86.346100 elevation: 67 m
>
> IOP 4
> Time Period: 2022/04/13 1551Z to 2022/04/13 2208Z
> Location: 36.282502,-89.499301 elevation: 85 m

2.0 Instrument Description:

For detailed information regarding MAX, see the link below:
https://www.nsstc.uah.edu/mapnet/facilities/max.php

3.0 Data Collection and Processing:

Data was collected following the PERiLS scan strategy outlined below:

- Volume scans completed were broken into shallow and deep scans in a sequence of: shallow, deep, shallow, shallow, deep and repeated every 10 min.
- Shallow Scan Sequence - 0.5°, 1.2°, 1.9°, 2.6°, 3.5°, 4.5°, 5.5°, 7°
- Deep Scan Sequence - 0.5°, 1.2°, 1.9°, 2.6°, 3.5°, 8°, 11°, 14°
- For a QLCS > 50 km range: PRF 1200 Hz, Pulse width of 0.8 microseconds
- For a QLCS < 50 km range: PRF 1500 Hz, Pulse width of 0.4 microseconds

* The PRF and pulse width changes were added after IOP 1. IOP1 followed the same schedule, but only used PRF of 1200 Hz and PW of 0.8.

Calibration

A ZDR bias correction using the DOE Pyart python library was applied to the data during post-processing. This corrected field is provided within the data file. No other QC was applied to the data.

4.0 Data Format

The ZDR corrected data was converted to netCDF format following the CFRadial format. The file naming convention is as follows:

RAW_NA_000_100_20180319191517.nc

Where RAW indicates the file type, 100 indicates the scan type (100 = fuill volume; 50 = bird bath) 20180319 indicates the date in the format YYYYMMDD, and 191517 indicates the time in the format HHMMss.

File Parameters:

Field Name	Desciption	Units
total_power	Total returned power	dBZ
reflectivity	Reflectivity Factor	dBZ
velocity	Mean Doppler radial velocity	m/s
spectrum_width	Doppler Spectrum Width	m/s
differential_reflectivity	Log differential reflectivity (ZDR)	dB
specific_differential_phase	Specific Differential Phase (KDP)	Deg/km
differential_phase	Differential Phase (PhiDP)	degrees
normalized_coherent_power	Signal-Quality-Index	ratio
cross_correlation_ratio	Correlation Ratio (RhoHV)	ratio
c_zdr	Corrected Log differential reflectivity (ZDR)	ratio

5.0 Data Remarks

During IOP1, MAX had pedestal motor issues and scans did not begin until 1626 UTC for this IOP. Refer to the MAX IOP log for IOP1 for more details.

Data can be easily read by using common packages such as UCAR RadX and Solo3, as well as DOE pyart python package.

6.0 References:

Helmus, J.J. & Collis, S.M., (2016). The Python ARM Radar Toolkit (Py-ART), a Library for Working with Weather Radar Data in the Python Programming Language. Journal of Open Research Software. 4(1), p.e25. DOI: http://doi.org/10.5334/jors.119