Title: DELTA 2024 UAH MAPNet RaDAPS 915 MHz Radar Wind Profiler (RWP) Dataset

Authors:

Preston Pangle   preston.pangle@uah.edu   University of Alabama In Huntsville
Kevin Knupp(PI)   kevin.knupp@uah.edu   University of Alabama In Huntsville

1.0 Dataset Overview

The UAH Mobile Atmospheric Profiling Network (MAPNet) Rapidly Deployable Atmospheric Profiling Systems (RaDAPS) was deployed with the RWP for IOP 1 of DELTA. This dataset contains all RaDAPS radar wind profiler consensus data recorded by the radar wind profiler mounted on the RaDAPS platform. Logbooks are provided for the user's reference for any data collection notes, issues, timing, etc.

> IOP 1
> Time Period: 2024/02/27 2335 to 2024/02/28 0812Z
> Location: 38.038133, -88.084000elevation: 119 m Heading: 179 deg

2.0 Instrument Overview

The Rapidly Deployable Atmospheric Profiling System (RaDAPS) facility is a converted medium duty ambulance that is designed to provide high resolution boundary layer (BL) kinematics, thermodynamics, and retrieve aerosol and cloud characteristics. The configuration includes a Radiometrics 915 MHz Radar Wind Profiler (RWP), a Vaisala CL51 lidar ceilometer, Radiometrics 35-channel Microwave Profiling Radiometer (MPR), OTT Hydromet Parsivel disdrometer, Metek Micro Rain Radar, and a telescoping 6-meter surface measurements tower with a Vaisala WXT 520 mounted to it (temperature/RH, pressure, wind, pressure, and precipitation). The radar wind profiler onboard RaDAPS operates by sampling along six beams at 23.5 degrees off-vertical and one vertical beam. Wind profiles are acquired every 5 and 60 minutes to heights from 126 m- 5km.
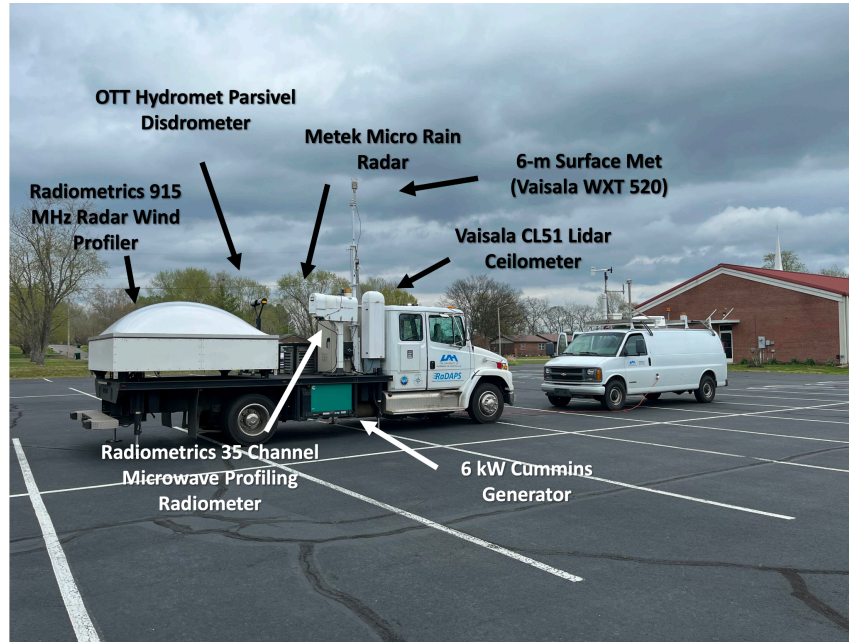
Fig 1. The RaDAPS Platform

3.0 Data Collection and Processing

The data files provided are Radiometrics processed files. Processed data files are created every 5 and 60 minutes. The Radiometrics software (ASPEN) generates wind products derived from the radar's beam moments. After generating the wind products, the software assigns a QC tag to the data based on the beam moments. The QC tag ranges from 0-1 where 0 is low confidence and 1 is high confidence. No additional processing has been performed. Although headings are manually entered and checked, users are encouraged to verify headings before using the data.

4.0 Data Format

NetCDF files are provided. There will be one netCDF file for each time resolution even if the instrument operated for multiple days. The netCDF naming convention is as follows: MIPS_915_YYYYMMDD_resolution.nc where:

RaDAPS -> Platform
915   -> Instrument
YYYY -> 4-digit UTC year
MM   -> 2-Digit UTC month
DD   -> 2-digit UTC day
Resolution -> Time resolution of data (5 minutes or 60 minutes)

NetCDF files include 2-dimensional variables of U, V, W wind components, averaged beam moments, and also includes instrument metadata. The files contain the following parameters:

Identifier	Units	Description
beamElevation	Degrees	Elevation off-Zenith of the beams
number_of_beams	unitless	Number of beams used
decimalTime	hours	UTC decimal time from 00Z
epochTime	seconds	Seconds since 1970/01/01 00Z
Longitude	Degrees	Degrees East
height	meters	Height of record above ground level
latitude	degrees	Latitude of the instrument
longitude	degrees	Longitude of the instrument
altitude	Meters AGL	Elevation of the instrument
lowPRF	microseconds	Low-mode PRF
highPRF	microseconds	High-mode PRF
lowFirstGate	Meters AGL	Height of the first gate for the low mode
highFirstGate	Meters AGL	Height of the first gate of the high mode
lowGateSpace	meters	Gate spacing for the low mode
highGateSpace	meters	Gate spacing for the high mode
u	m/s	U wind component
v	m/s	V wind component
w	m/s	W wind component
qcTag	unitless	Quality control tag for winds, higher is better
Vel_i; i= beam #	m/s	Beams 1-6 radial velocity
SNRl_i; i= beam #	dB	Beams 1-6 radial signal-to-noise ratio
Backscatter_i; i= beam #	unitless	Beams 1-6 radial backscatter
SW_i; i= beam #	m/s	Beams 1-6 radial spectrum width