Title: Verification of the Origins of Rotation in Tornadoes Experiment-Southeast 2018 (VORTEX-SE_2018) ULM Mobile Radiosonde Data Set

Author: Todd Murphy
Department of Atmospheric Science
University of Louisiana at Monroe
Phone: 318.342.3428
Email: murphy@ulm.edu

1.0 Dataset Overview

ULM utilized two mobile radiosonde systems to release radiosondes at locations around northern Louisiana (Figure 1) during VORTEX-SE_2018 Intensive Observation Periods (IOPs). The choices for the locations and times of the releases were made in collaboration with other VORTEX-SE PIs. This data set includes 25 high vertical resolution (5-second), quality controlled ULM mobile soundings released for the VORTEX-SE_2018 field phase (10 March to 13 April 2018).
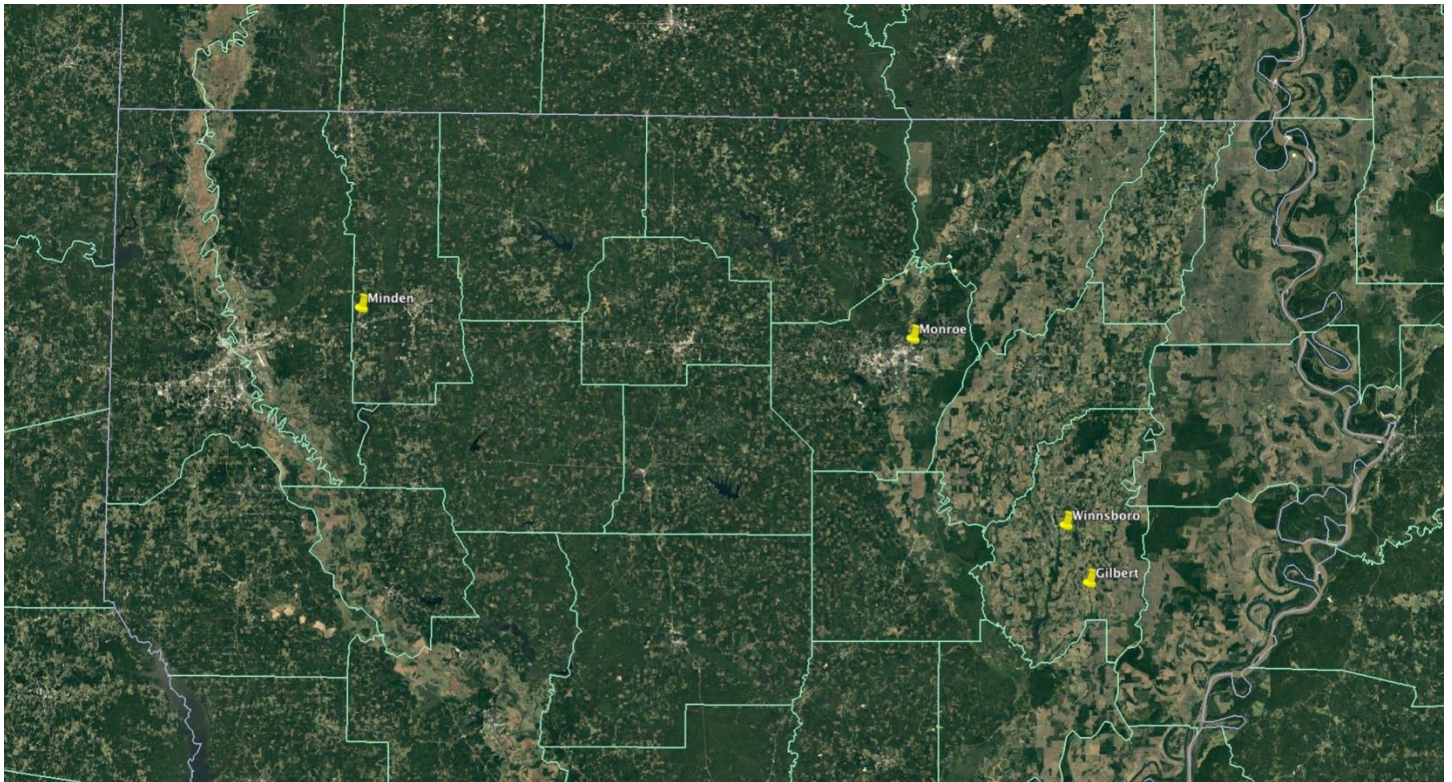

Figure 1. Location of the ULM mobile radiosonde sites.

2.0 Instrument Description

ULM utilized InterMet's iMet-1-ABxn 403 MHZ radiosondes with pressure sensor and GPS wind finding during VORTEX-SE_2018 and using iMetOS-II software version 03.90.0C.

Table 1: Manufacturer-stated accuracy and resolution for each of the variables sampled by the iMet-1-ABxn radiosondes (available from http://intermetsystems.com/ee/pdf/iMet-1-ABxn_Data_150316.pdf).

Temperature resolution	0.01 °C
Temperature accuracy	0.2 °C
Humidity resolution	0.1%
Humidity accuracy	5%
Pressure resolution	0.01 hPa
Pressure accuracy	0.5 hPa
Wind velocity accuracy	1.0 m/s
Position accuracy	10 m
Altitude accuracy	15 m

3.0 Data Collection and Processing
Data collection occurred at the sites shown in Figure 1. The raw iMet data were initially processed using the iMetOS-II software. Additional post-processing were performed that included filtering obvious outlier data and removing any data after balloon burst.

4.0 Data Format
The ULM post-processed data are given as CSV text files at five-second temporal resolution. The data are stored as individual files for each radiosonde launch. The file naming convention is:

YYYYMMDD_HHMMZ_ULM_CityState.txt where YYYY is the year, MM is the month, DD is the day, HHMM are the UTC hour and minute, and CityState indicate the approximate radiosonde launch location.

Each file contains a standard header (marked by #) that gives the following:

Line 1: Data set title
Line 2: Launch date, time, approximate launch location, and launch height (m MSL)
Line 3: Included variables (units)

An example header is given below:

VORTEX-SE 2017 ULM Radiosonde Data
2017-03-25, 1702 UTC, Hollywood, AL, 187 m MSL
latitude (deg),longitude (deg),UTC time (HH:MM:SS),height (m AGL),pressure (mb),temp (deg C),RH (%),dewpoint (deg C),wind speed (m/s),wind direction (deg)

Variables include the following:

Latitude	degree decimal format
Longitude	degree decimal format
Time	UTC (HHMMSS)
Height	m AGL
Pressure	mb
Temperature	°C
Relative humidity	%
Dewpoint	°C
Wind speed	m/s
Wind direction	degree from north

Missing data are marked with 9999.

5.0 Data Remarks

Surface data – Independent surface data were generally not collected. In some instances, ULM launched near locations where an ASOS or other ULM instrumented data were available and these values were used for surface data or secondary confirmation. Otherwise, the radiosonde measurements near the surface were inserted as "surface measurements" and data from a Kestrel 3500 was used as secondary confirmation.

Other issues:

20180328_2044_ULM_WinnsboroLA   sounding terminated near 345mb due to signal loss; did not reach tropopause

20180328_2133_ULM_MonroeLA   sounding terminated near 760mb due to software error

20180328_2159_ULM_WinnsboroLA	sounding terminated near 550mb due to sensor failure above this level
20180407_0028_ULM_GilbertLA	sounding terminated near 534mb due to signal loss
20180413_2021_ULM_MindenLA	sounding terminated near 209mb due to signal loss; did not reach tropopause
20180413_2231_ULM_MindenLA	sounding terminated near 312mb due to signal loss; did not reach tropopause
20180414_0015_ULM_MindenLA	sounding terminated near 248mb due to signal loss; did not reach tropopause
20180414_0015_ULM_MonroeLA	sounding terminated near 368mb due to sensor failure above this level
20180414_0201_ULM_MindenLA	sounding terminated near 271mb due to signal loss; did not reach tropopause
20180414_0503_ULM_MindenLA	sounding terminated near 369mb due to signal loss; did not reach tropopause
20180414_0648_ULM_MonroeLA	sounding terminated near 327mb due to signal loss; did not reach tropopause