

Title – NOAA PSL DELTA 2024 Field Study; Radar Wind Profiler, Radio Acoustic Sounding System, and Surface Meteorology Data

Authors

| Author | Email | Institution | ORCID |
|-------------|--|-------------|---|
| Jim Wilczak | james.m.wilczak@noaa.gov | NOAA PSL | 0000-0002-9912-6396 |
| Dan Gottas | daniel.gottas@noaa.gov | NOAA PSL | |
| Allen White | allen.b.white@noaa.gov | NOAA PSL | |

1.0 Dataset Description

This dataset contains data from four sites with radar wind profiler, radio acoustic sounding system, and surface meteorology measurements that were deployed during the Propagation, Evolution and Rotation in Linear Storms (PERiLS) experiment in Oakdale, LA, Columbia, LA, Greenwood, MS, Starkville, MS, and Courtland, AL. At all four sites, radar wind profiler operating at 915 MHz are deployed. At Courtland, AL, a radar wind profiler operating at 449 MHz is additionally deployed. All instruments are operationally since spring 2022, some of them even earlier, and are operated continuously (with exception to Columbia, LA location which is no longer active). The PERiLS field study ended in 2023, but the deployed instruments have been re-purposed for use for the Detecting and Evaluating Low-level Tornado Attributes (DELTA) field study. In this dataset, the data ranges from Jan 1, 2024 to Apr 15, 2024. (Note: SubHourly data only ranges from Jan 1, 2024 to ~Mar 25, 2024 and is only available for gwo and stf sites).

Data status: Final

Time period:

Oakdale, LA: Jan 1, 2024 - Apr 15, 2024
Greenwood, MS: Jan 1, 2024 - Apr 15, 2024
Starkville, MS: Jan 1, 2024 - Apr 15, 2024
Courtland, AL: Jan 1, 2024 - Apr 15, 2024

Site identifier:

Oakdale, LA: acp
Greenwood, MS: gwo
Starkville, MS: stf
Courtland, AL: ctd

Site information:

Oakdale, LA: https://psl.noaa.gov/data/obs/sites/view_site_details.php?siteID=acp
Greenwood, MS: https://psl.noaa.gov/data/obs/sites/view_site_details.php?siteID=gwo
Starkville, MS: https://psl.noaa.gov/data/obs/sites/view_site_details.php?siteID=stf
Courtland, AL: https://psl.noaa.gov/data/obs/sites/view_site_details.php?siteID=ctd

Physical location:

Oakdale, LA: 30.746645 N, 92.686859 W, 32 m above mean sea level
Greenwood, MS: 33.495967 N, 90.089298 W, 47 m above mean sea level
Starkville, MS: 33.430225 N, 88.845552 W, 95 m above mean sea level
Courtland, AL: 34.66 N, 87.35 W, 187 m above mean sea level

Data Frequency:

Wind profiler: ~54-minute average every 60 min (hourly)
Radio acoustic sounding system: ~5-minute average every 30 minutes
Surface meteorology: 2-minute average every 2 minutes

Data set restrictions: none

2.0 Instrument Description

Radar wind profiler, Instrument description:

<https://psl.noaa.gov/data/obs/instruments/WindProfilerDescription.html>

Radio acoustic sounding system, Instrument description:

<https://psl.noaa.gov/data/obs/instruments/RadioAcousticSoundingSystem.pdf>

Surface meteorology, Instrument descriptions:

On the site-information pages listed above, instruments are listed under the 'Active Instruments' link while the measurements are still ongoing, and under the 'Inactive Instrument' link after the measurements finished. Each "Instrument Name" is linked to the manufacturer documentation.

3.0 Data Collection and Processing

Data are collected continuously. Processing is done with an inhouse software. To assure high quality, the data were quality controlled for ground clutter (Jordan et al. 1997), radio frequency interference, intermittent hard targets (Bianco et al. 2013) and second trip echos. The wind profiles are available with two different vertical resolutions (high-resolution and low-resolution mode), with high-resolution mode having a higher vertical resolution but less vertical range and vice versa.

Hourly wind profiles are uploaded. The hourly wind profiles are considered the most accurate because they are based on a higher sample size and are less affected by ground clutter.

Outages:

Radar915/WwWindTemp/acp — missing 1 file:

Date range: 24-01-01 to 24-04-24

T24095.CNS

4.0 Data Format

Radar wind profiler

File format: https://psl.noaa.gov/data/obs/data/view_data_type_info.php?DataTypeID=52

Radio acoustic sounding system

File format: https://psl.noaa.gov/data/obs/data/view_data_type_info.php?DataTypeID=53

Surface meteorology

Oakdale, LA:

https://psl.noaa.gov/data/obs/data/view_data_type_info.php?DataTypeID=14&SiteID=acp

Greenwood, MS:

https://psl.noaa.gov/data/obs/data/view_data_type_info.php?DataTypeID=14&SiteID=gwo

Starkville, MS:

https://psl.noaa.gov/data/obs/data/view_data_type_info.php?DataTypeID=14&SiteID=stf

Courtland, AL:

https://psl.noaa.gov/data/obs/data/view_data_type_info.php?DataTypeID=14&SiteID=ctd

The file naming conventions are as follows: sssYYJJJ.type

where sss = 3-letter site identifier; YY = 2-digit year; JJJ = 3-digit day of the year; type = 'windhr' (for hourly wind profiler data), 'windsubhr' (for subhourly wind profiler data), 'vtemp' (for radio acoustic sounding system data), and 'met' (for surface meteorology data)

The time stamp of all data is in UTC.

5.0 Data Remarks

None

6.0 References

Bianco, L., D. Gattas, and J. M. Wilczak, 2013: Implementation of a Gabor transform data quality-control algorithm for UHF wind profiling radars. J. Atmos. Oceanic Technol., 30, 2697-2703

Jordan, J. R., R. J. Latatit, and D. A. Carter, 1997: Removing ground and intermittent clutter contamination from wind profiler signals using wavelet transforms. J. Atmos. Oceanic Technol., 14, 1280-1297.

7.0 Appendix

GCMD keywords

| | | | | | | |
|---------------|----------------------|-------|-----------------|--|--|--------------------------------------|
| EARTH SCIENCE | SPECTRAL/ENGINEERING | RADAR | RADIAL VELOCITY | | | 829e91f4-f351-4012-bb0a-208302fb11c2 |
|---------------|----------------------|-------|-----------------|--|--|--------------------------------------|

| | | | | | | |
|----------------------|----------------------|-------------------------|--------------------------|---------------------|-------------------|--------------------------------------|
| EARTH SCIENCE | SPECTRAL/ENGINEERING | RADAR | RADAR REFLECTIVITY | | | 46975e66-863a-49c9-b673-b2e099a04c85 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC WINDS | UPPER LEVEL WINDS | WIND DIRECTION | | 272ffe8a-2949-4b58-bb81-52cb1c879f4a |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC WINDS | UPPER LEVEL WINDS | WIND SPEED | | 661591b3-6685-4de7-a2a4-9ce8ae505044 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC TEMPERATURE | UPPER AIR TEMPERATURE | VIRTUAL TEMPERATURE | | 3afb06fa-96b7-4bf4-a6b7-b5fa626afc04 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC PRESSURE | SURFACE PRESSURE | | | b54de5cd-4475-4c7b-acbc-4eb529b9396e |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC TEMPERATURE | SURFACE TEMPERATURE | AIR TEMPERATURE | | f634ab55-de40-4d0b-93bc-691bf5408ccb |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC WATER VAPOR | WATER VAPOR INDICATORS | HUMIDITY | RELATIVE HUMIDITY | a249c68f-8249-4285-aad2-020b3c5aefc3 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC WINDS | SURFACE WINDS | WIND SPEED | | a92f49f3-e2ee-4ef4-b064-39311ffb95d3 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC WINDS | SURFACE WINDS | WIND DIRECTION | | e987550e-d443-48eb-93eb-0bc47a62d4b4 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC RADIATION | INCOMING SOLAR RADIATION | | | 6b3be650-6625-40b5-9b40-9e7c8a9fd336 |
| EARTH SCIENCE | ATMOSPHERE | ATMOSPHERIC RADIATION | NET RADIATION | | | 50ee8910-449b-46c8-a59b-1cd76d632b44 |
| EARTH SCIENCE | ATMOSPHERE | PRECIPITATION | PRECIPITATION AMOUNT | | | cad5c02a-e771-434e-bef6-8dced38a68e8 |