

**Title:** NSSL Lightning Mapping Array Data - Raw

**Author(s)**

Vanna C. Chmielewski

NOAA/OAR National Severe Storms Laboratory

120 David L. Boren Blvd.

Norman, OK 73072

ORCID: 0000-0002-3065-4801

[vanna.chmielewski@noaa.gov](mailto:vanna.chmielewski@noaa.gov)

Zachary Barney

NOAA/OAR National Severe Storms Laboratory

[zachary.barney@noaa.gov](mailto:zachary.barney@noaa.gov)

Joseph M. Berry IV

Cooperative Institute for Severe and High-Impact Weather Research and  
Operations, University of Oklahoma

NOAA/OAR National Severe Storms Laboratory

[joseph.berry@noaa.gov](mailto:joseph.berry@noaa.gov)

Kristin Calhoun

NOAA/OAR National Severe Storms Laboratory

[kristin.calhoun@noaa.gov](mailto:kristin.calhoun@noaa.gov)

Doug Kennedy

NOAA/OAR National Severe Storms Laboratory

[doug.kennedy@noaa.gov](mailto:doug.kennedy@noaa.gov)

Jacquelyn Ringhausen

Cooperative Institute for Severe and High-Impact Weather Research and  
Operations, University of Oklahoma

NOAA/OAR National Severe Storms Laboratory

ORCID: 0000-0002-5077-6259

[jacquelyn.ringhausen@noaa.gov](mailto:jacquelyn.ringhausen@noaa.gov)

Vicente Salinas

Cooperative Institute for Severe and High-Impact Weather Research and  
Operations, University of Oklahoma

NOAA/OAR National Severe Storms Laboratory

ORCID: 0000-0002-7690-6154

[vicente.salinas@noaa.gov](mailto:vicente.salinas@noaa.gov)

Christopher Schneider

Cooperative Institute for Severe and High-Impact Weather Research and  
Operations, University of Oklahoma

NOAA/OAR National Severe Storms Laboratory

[christopher.schneider@noaa.gov](mailto:christopher.schneider@noaa.gov)

Michael Stock

Cooperative Institute for Severe and High-Impact Weather Research and  
Operations, University of Oklahoma

NOAA/OAR National Severe Storms Laboratory

ORCID: 0000-0001-9333-6790

[michael.stock@noaa.gov](mailto:michael.stock@noaa.gov)

Sean Waugh

NOAA/OAR National Severe Storms Laboratory

[sean.waugh@noaa.gov](mailto:sean.waugh@noaa.gov)

## 1.0 Data Set Description

- Introduction: Lightning Mapping Array (LMA) sensors were deployed at pre-designated locations for each IOP. The array consisted of up to 8 GTRI sensors (Units N-X), 8 NSSL sensors (Sites 1-8, symbols a-h) and 1 TTU sensor (r). The network was operated by Georgia Tech Research Institute, National Oceanic and Atmospheric Administration / Office of Atmospheric Research / National Severe Storms Laboratory and OU / CIWRO staff with invaluable assistance from SUNY Oswego faculty and students. Data set includes Level 0 (raw binary) files for each NSSL station.
- Creation date: 27 June 2023
- Data Status: Final
- Time period: All data for NSSL stations from 5 November 2022 to 2 February 2023.
- Physical location of the measurements: All sensor locations centered around 43.59, -75.72 as listed below and in each corresponding Level 1 file header (see complimentary dataset) surrounding the New York Tug Hill Plateau
  - Sta\_info: A Site 1                    43.9077669 -75.7100771 358.94
  - Sta\_info: B Site 2                    43.5299437 -75.4711200 509.00
  - Sta\_info: C Site 3                    43.3470481 -75.7544386 142.61
  - Sta\_info: D Site 4                    43.6868811 -75.2862067 363.88
  - Sta\_info: E Site 5                    43.7922631 -76.1979789 64.44
  - Sta\_info: F Site 6                    43.2532712 -75.5339088 121.89
  - Sta\_info: G Site 7                    43.5298968 -75.8189444 272.80
  - Sta\_info: H Site 8                    43.6456100 -76.0141589 248.88
- Data file intervals: 10 minutes

## 2.0 Instrument Description

- Each sensor records the timing and amplitudes of passively-received VHF (60-66 MHz for NSSL sensors) emissions by lightning (and any other sources) in 80 microsecond windows.
- Instrument photos:



NSSL sensor B at installation at Mohawk Hill, NY, 7 Nov 2022



NSSL sensor D at Camp Aldersgate, Greig, NY during LEE, 20 Dec 2022

### **3.0 Data Collection and Processing**

- Data was collected from each sensor remotely throughout the project period.

### **4.0 Data Format**

Binary files compressed with gzip of all VHF records per ten-minute period generated by rev4 LMA boards from LMA Technologies, LLC. File naming follow a L[station symbol]\_OKP\_[yymmdd]\_[HHMMSS].dat.gz naming convention

### **5.0 Data Remarks**

- PI's assessment of the data:

- During two periods, persistent cloud cover impacted the ability for the batteries to recharge during the day and caused intermittent sensor outages at various locations until batteries could be replaced, roughly: 25 Dec-10 Jan; 31 Jan-2 Feb.
- NSSL sensors A, B and E were damaged in a high wind event on 30 Nov 2022. Sensors A and B were repaired and operational on 15 Dec 2022. Sensor E was temporarily placed at a different location and returned to its original site 25 Jan 2023.
- NSSL sensor G at Redfield, NY experienced internal hardware failures starting on 6 Dec 2022, so sensor E was placed at the Redfield, NY location from 16 Dec-25 Jan 2023 while sensor G was undergoing repairs. Sensor G was replaced 25 Jan 2023.

## 6.0 References

- Chmielewski, V. C., and Bruning, E. C. (2016), Lightning Mapping Array flash detection performance with variable receiver thresholds, *J. Geophys. Res. Atmos.*, 121, 8600–8614, doi:10.1002/2016JD025159.
- Thomas, R. J., Krehbiel, P. R., Rison, W., Hunyady, S. J., Winn, W. P., Hamlin, T., and Harlin, J. (2004), Accuracy of the Lightning Mapping Array, *J. Geophys. Res.*, 109, D14207, doi:10.1029/2004JD004549.

## 7.0 Appendix

- Keywords: Atmospheric Electricity, Lightning, Lightning Mapping Array, Thunderstorm
- Alternate data access: Processed data are also archived at <https://data.nssl.noaa.gov/thredds/catalog/WRDD/OKLMA/deployments/LEE/catalog.html>!
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