Title – NOAA PSL Atmospheric Sounder Spectrometer for Infrared Spectral Technology (ASSIST) Radiances Data

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1.0 Data Set Description

This dataset contains data from two Atmospheric Sounder Spectrometer for Infrared Spectral Technology (ASSISTs) manufactured by LRTech (Rochette et al. 2009) that were deployed during the Propagation, Evolution and Rotation in Linear Storms (PERiLS) experiment in Columbia, LA, and Courtland, AL. The ASSISTs are operated continuously between the middle of February 2022 and the middle of May 2023. In this dataset, data between September 1 until the end of the deployment are available. From the ASSIST radiances, temperature and humidity profiles as well as liquid water path can be retrieved with the optimal estimation physical retrieval (TROPoe, Turner and Löhnert 2014; Turner and Blumberg 2019; Turner and Löhnert 2021). The retrieved thermodynamic quantities will be available in a separate dataset.

- Data status: Final
- Time period:
    - Columbia, LA: 1 September 2022 – 20 May 2023
    - Courtland, AL: 1 September 2022 – 18 May 2023
- Physical location:
    - Columbia, LA: 32.124322 N, 92.055569 W, 20 m above mean sea level
    - Courtland, AL: 34.66 N, 87.35 W, 187 m above mean sea level
- Data Frequency: continuous
- Data set restrictions: none

2.0 Instrument Description

The ASSISTs are passive spectrometers that receive downwelling infrared radiation between the wavelengths of 3.3 and 19 μm (520-3000 cm^{-1}) at a spectral resolution of about 0.5 wavenumber (Knuteson et al. 2004a,b). The instruments have a hatch that closes during precipitation events to protect the fore optics, which inhibits measurements during rain or snow.

3.0 Data Collection and Processing

Data are collected continuously. No data processing outside of the LRTech software was performed for the radiance data. The serial number of the ASSIST deployed at Columbia is ASSIST7 and at Courtland ASSIST8.

Data availability is given in Fig. 1 for the period September 1 2022 to May 20 2023. Data gaps occurred due to power failures, AC and laptop issues.
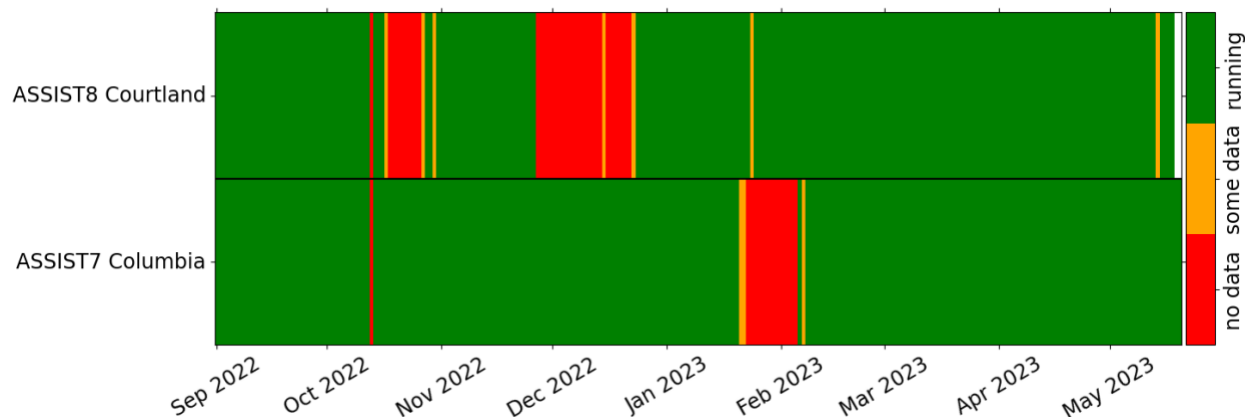
4.0 Data Format

Three types of files are included in this dataset, so called 'summary', 'chA', and 'chB' files. They are in netcdf format and are provided by the instrument manufacturer. They contain all the necessary variables to retrieve thermodynamic profiles.

The file naming conventions for the files are as follows:
NOAA_PSL_ASSIST_Columbia_yyyymmdd_summary.cdf
NOAA_PSL_ASSIST_Courtland_yyyymmdd_summary.cdf
NOAA_PSL_ASSIST_Columbia_yyyymmdd_chA.cdf
NOAA_PSL_ASSIST_Courtland_yyyymmdd_chA.cdf
NOAA_PSL_ASSIST_Columbia_yyyymmdd_chB.cdf
NOAA_PSL_ASSIST_Courtland_yyyymmdd_chB.cdf

with
yyyy: Year
mm: Month
dd: Day

The time stamp of all data is in UTC.

5.0 Data Remarks
None

6.0 References

Knuteson, R., and Coauthors, 2004a: Atmospheric emitted radiance interferometer. Part I: Instrument design. J. Atmos. Oceanic Technol., 21, 1763–1776, https://doi.org/10.1175/JTECH-1662.1.

Knuteson, R., and Coauthors, 2004b: Atmospheric emitted radiance interferometer. Part II: Instrument performance. J. Atmos. Oceanic Technol., 21, 1777–1789, https://doi.org/10.1175/JTECH-1663.1.

Rochette, L., W. L. Smith, M. Howard, and T. Bratcher, 2009: ASSIST, atmospheric sounder spectrometer for infrared spectral technology: Latest development and improvement in the atmospheric sounding technology. Imaging spectrometry XIV, Vol. 7457 of, SPIE, 9–17.

Turner, D. D., and U. Löhnert, 2014: Information content and uncertainties in thermodynamic profiles and liquid cloud properties retrieved from the ground-based atmospheric emitted radiance interferometer (AERI). J. Appl. Meteor. Climatol., 53, 752–771, https://doi.org/10.1175/JAMC-D-13-0126.1.

Turner, D. D., and W. G. Blumberg, 2019: Improvements to the AERIoe thermodynamic profile retrieval algorithm. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 12, 1339–1354, https://doi.org/10.1109/JSTARS.2018.2874968.

Turner, D. D., and U. Löhnert, 2021: Ground-based temperature and humidity profiling: Combining active and passive remote sensors. Atmos. Meas. Tech., 14, 3033–3048, https://doi.org/10.5194/amt-14-3033-2021.

7.0 Appendix

GCMD keywords

EARTH SCIENCE	SPECTRAL/ENGINEERING	INFRARED WAVELENGTHS	INFRARED RADIANCE			69f475b6-42af-4822-ae57-6c8fd8ebad4a