

CAMP2Ex HSRL-2 ReadMe

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Organization: NASA Langley Research Center

Instrument Name: HSRL-2

Mission: CAMP2Ex

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Platform: NASA P3B

Location: GPS Lat, Lon, and Alt included in the Nav_Data records

Associated Data: Additional folders provide information used to process and locate the HSRL-2 data products

/State: parameters interpolated to HSRL-2 curtains from MERRA2 (see <http://gmao.gsfc.nasa.gov/>)

Temperature, K, atmospheric temperature

Pressure, atm, atmospheric pressure

Number_Density, per cubic meter, molecular number density

/Nav_Data: other navigational data is also included besides what is listed below

gps_time, time of the data products from 0 UT on the flight day

gps_alt, m, aircraft altitude from GPS

gps_lat, degrees, latitude N from GPS

gps_lon, degrees, longitude E from GPS

Data Info: 10 second profiles, higher resolution files are available upon request. All data products have been interpolated to the same uniform altitude grid (DataProducts/Altitude) and horizontally averaged or interpolated to the GPS times (Nav_Data/gps_time). Horizontal and vertical resolutions of the data products are found in the attributes of each scientific data set.

Instrument Info: High Spectral Resolution Lidar (HSRL-2), see <https://science.larc.nasa.gov/lidar/>

Uncertainty: Uncertainty values are not included in this release, they will be provided in the next release

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Stipulations on Use: This is Final data. Users are strongly encouraged to consult the PI and/or DM prior to use.

Revision: R0/R1

The .h5 files are Panoply friendly. A color table file has been generated to make curtain plots similar to those in the archive. File is CAMP2EX-HSRL2_P3B_PanoplyColorTable.rgb

Comments on Data:

20190824 – not a full flight of data, stopped lidar from transmitting due to dirty window

20190829 – issues with 355nm during middle of flight, all 355nm products blanked between about 24.3-25.7 UTC

20190904 – seed laser problems, all 355nm products blanked

20190908 – seed laser problems, all 355nm products blanked

Several flights have residual clouds remaining in the data products that have been cloud screened.

ICARTT format files are provided that include:

Aerosol Optical Thickness (AOT); Revision R1 at both 355nm and 532nm. Both clear-sky AOT and above cloud AOT are included, as well as the lower and upper altitudes that bound these clear-sky and above cloud layers corresponding to these AOT values. Cloud top height is available in these files. Updated files have no change to data, just fixing standard variable names in the header.

Mixed Layer Heights (MLH); Revision R0 derived from 532nm cloud screened aerosol backscatter profiles when the aircraft is higher than 2km. MLH is reported in meters, above ground level. Given the variety of ways to define, retrieve, and use MLH, as well as the difficulty in determining MLH in complex atmospheric conditions, the MLH provided in these files may or may not be useful for a given application. We strongly recommend that users consult the introduction and

methodology found in Scarino, A. J. et al.: *Comparison of Mixed Layer Heights from Airborne High Spectral Resolution Lidar, Ground-based Measurements, and the WRF-Chem Model during CalNex and CARES*, *Atmos. Chem. Phys.*, 14, 5547-5560, <https://doi.org/10.5194/acp-14-5547-2014>, 2014.

DEM altitude is provided in this file, which is the ground altitude above mean sea level based on the 1km GLOBE Digital Elevation Map dataset based on the GPS latitude and longitude. Also included in this file are mean 532 nm backscatter and extinction at three different layers: lowest 300m, within the MLH, and a 500m above MLH.

Compressed folder ('CAMP2EX-HSRL2- images_P3B_2019_R0_MLH.zip') contains MLH plots for all flights.