

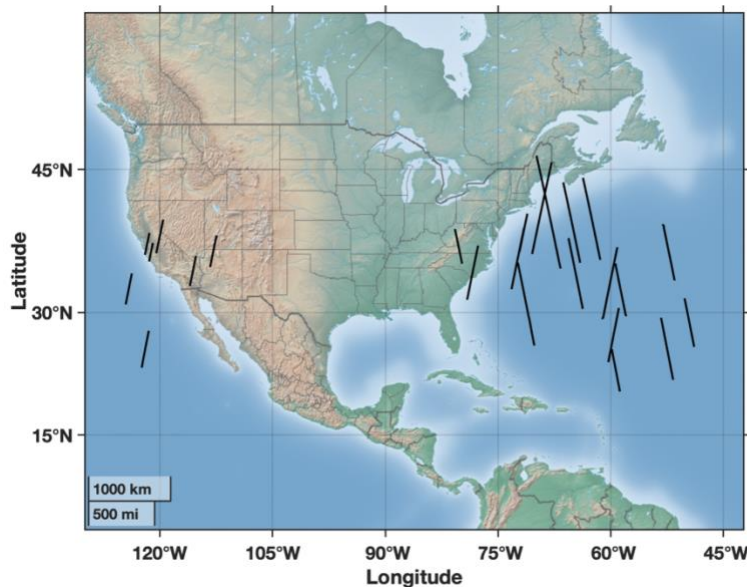


EarthCARE-LaRC Lidar Underflights ReadMe

October 23, 2025



The [Atmospheric Lidar \(ATLID\) on the European Space Agency \(ESA\) EarthCARE \(Cloud, Aerosol, Radiation Explorer\) mission](#) launched on 28 May 2024 has provided global, high-resolution profiles of aerosols and clouds since it became operational on 8 August 2024. Since 16 August 2024, the [NASA Langley Research Center \(LaRC\) Airborne Lidar Group](#), includes the High Spectral Resolution Lidar (HSRL-2) and the High Altitude Lidar Observatory (HALO), has been deployed on the NASA G-III and NASA ER-2 for 24 underflights of the EarthCARE satellite to provide validation measurements for the ATLID data products. This data repository includes the HSRL-2 and HALO data files for the underflights, as well as information on the corresponding EarthCARE orbit number(s), start and stop times for the underflights, and whether it was a day- or night-time flight.



PIs: Hair, Dr. Johnathan, Nehrir, Dr. Amin, and Shingler, Dr. Taylor J.

Organization: NASA Langley Research Center

Instrument Name: NASA HSRL-2 and HALO

Mission: Multiple beginning in 2024

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Platform: Multiple, see table below

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 data products

/State: parameters interpolated to HSRL curtains from GMAO (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. All data products have been interpolated to the same uniform altitude grid above sea level (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.

DOI(s): If a Mission has a DOI, it is also located within the Global Attributes of the individual HDF5 file.

Instrument Info: Multiwavelength High Spectral Resolution Lidar (HSRL-2/-2) and High Altitude Lidar Observatory (HALO) aerosol/cloud measurements, see <https://science-data.larc.nasa.gov/lidar/instruments.html> For more information, see Barton-Grimley, R. A., et al. (2022), Hair, J.W., et al. (2008), and Nehrir, A. R., et al. (2018).

HSRL-2 DM Contact Info: Amy Jo Scarino (amy.jo.scarino@nasa.gov); Marta Fenn (marta.a.fenn@nasa.gov)

HSRL-2 DM Contact Info: James Collins (james.e.collins@nasa.gov)

Project Info: <https://www-air.larc.nasa.gov/missions/earthcare-airbornelidar-underflights/index.html>

Stipulations on Use: Users are STRONGLY ENCOURAGED to contact the HSRL-2 and HALO team before using the data for advice specific to the desired application. Please use DOI, if available, or Data Archive URL for citation.

Revision: Mission Specific, see HDF5 files for file version status

EarthCARE File Information



Information on EarthCARE data files is available here: <https://earth.esa.int/eogateway/missions/earthcare/data>

DOI: See Data Set Specifications on the EarthCARE data site, will vary upon instrument, data level, and release id

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Underflight Table

NOTE: If interested in obtaining NightBLUE field processed data files, please contact Amy Jo Scarino (amy.jo.scarino@nasa.gov) for the data archive login credentials.

Date	Mission	MissionLongName	Aircraft	Lidar	EarthCARE Orbit Number(s)	Start Time	End Time	Day/ Night
8/16/2024	ARCSIX	Arctic Radiation-Cloud-Aerosol-Surface Interaction Experiment	G-III	HALO	01242D	18.995	19.5432	D
9/8/2024	PACE-PAX	Plankton, Aerosol, Cloud, ocean Ecosystem Postlaunch Airborne eXperiment	ER-2	HSRL-2	01602D	22.307	22.6462	D
9/17/2024	PACE-PAX	Plankton, Aerosol, Cloud, ocean Ecosystem Postlaunch Airborne eXperiment	ER-2	HSRL-2	01742D	22.226	22.5292	D
9/23/2024	PACE-PAX	Plankton, Aerosol, Cloud, ocean Ecosystem Postlaunch Airborne eXperiment	ER-2	HSRL-2	01835D	21.5274	22.0523	D
9/26/2024	PACE-PAX	Plankton, Aerosol, Cloud, ocean Ecosystem Postlaunch Airborne eXperiment	ER-2	HSRL-2	01882D	22.1384	22.6858	D
9/30/2024	PACE-PAX	Plankton, Aerosol, Cloud, ocean Ecosystem Postlaunch Airborne eXperiment	ER-2	HSRL-2	01944D	21.844	22.3479	D
10/30/2024	WHYMSIE-APEX	Westcoast & Heartland Hyperspectral Microwave Sensor Intensive Experiment – Active and Passive Profiling EXperiment	G-III	HALO	02411E	21.7603	22.4399	D

11/13/2024	WHYMSIE-APEX	Westcoast & Heartland Hyperspectral Microwave Sensor Intensive Experiment – Active and Passive Profiling EXperiment	G-III	HALO	02629D	22.1924	22.7146	D
9/4/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07217D	18.8222	19.8861	D
9/5/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07232D & 07232E	17.4333	18.5672	D
9/7/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07255A & 07255B	4.3756	5.5144	N
9/8/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07271A & 07271B	5.4711	6.7008	N
9/9/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07286B	4.68	5.5	N
9/10/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07302B	5.5183	6.2165	N
9/11/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07318B	5.5283	6.76	N
9/12/2024	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07333B	4.9953	5.9394	N
9/14/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07365B	6.8725	7.3642	N
9/15/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07380B	4.9625	6.5406	N
9/17/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07411B	2.1619	6.2258	N
9/18/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07426B	4.6064	5.3933	N
9/19/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07442B	4.1881	5.4019	N
9/22/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07497D	18.2314	19.4953	D
9/23/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07512D	18.0989	18.9708	D
9/25/2025	NightBLUE	Nighttime Bermuda Lidar Underflights of EarthCARE	G-III	HSRL-2	07544D	19.1410	19.8651	D

References

Barton-Grimley, R. A., Nehrir, A. R., Kooi, S. A., Collins, J. E., Harper, D. B., Notari, A., Lee, J., DiGangi, J. P., Choi, Y., and Davis, K. J.: Evaluation of the High Altitude Lidar Observatory (HALO) methane retrievals during the summer 2019 ACT-America campaign, *Atmos. Meas. Tech.*, 15, 4623–4650, <https://doi.org/10.5194/amt-15-4623-2022>, 2022.

Hair, J. W. et al.: Airborne High Spectral Resolution Lidar for profiling aerosol optical properties. *Appl. Opt.* 47, 6734-6752, [doi:10.1364/AO.47.006734](https://doi.org/10.1364/AO.47.006734), 2008.

Nehrir, A., Notari, A., Harper, D., Fitzpatrick, F., Collins, J., Kooi, S., Antill, C., Hare, R., Barton-Grimley, R. A., Hair, J., Ferrare, R., Hostetler, C., and Welch, W.: The High Altitude Lidar Observatory (HALO): A multi-function lidar and technology test-bed for airborne and space-based measurements of water vapor and methane, NASA Earth Science Technology Office, https://esto.nasa.gov/techportfolio/pdf/additionalInfo/1914_Nehrir/Nehrir_ESTF2018_A1P2.pdf (last access: 23 Oct 2025), 2018.