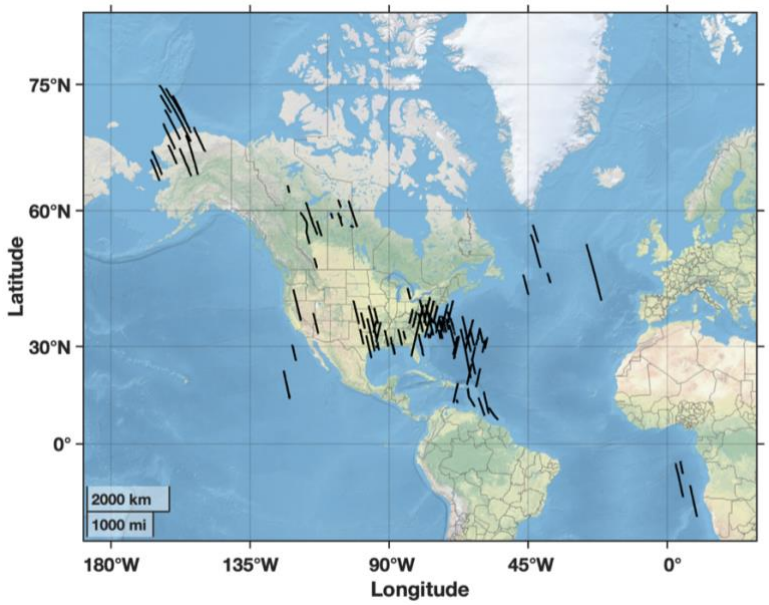
CALIPSO-HSRL Underpasses ReadMe

July 30, 2025

The Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) instrument on the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) spacecraft has provided global, high-resolution profiles of aerosols and clouds since it became operational on 13 June 2006. From 14 June 2006 to 18 August 2022, the NASA Langley Research Center (LaRC) High Spectral Resolution Lidar (HSRL) has been deployed on several NASA aircraft for a total of 147 underpasses of the CALIPSO satellite to provide validation measurements for the CALIOP data products. This data repository includes the HSRL data files for the underpasses, as well as information on the corresponding CALIPSO track, start and stop times for the underpasses, and whether it was a day- or night-time flight. See references for a sampling of publications that have assessed the CALIOP data products using the NASA LaRC HSRL.



PIs: Hair, Dr. Johnathan, Ferrare, Dr. Richard, Hostetler, Dr. Chris. A., and Shingler, Dr. Taylor J.
Organization: NASA Langley Research Center
Instrument Name: NASA HSRL-1 and HSRL-2
Mission: Multiple from 2006-2022
PIs Contact Info: johnathan.w.hair@nasa.gov; richard.a.ferrare@nasa.gov; chris.a.hostetler@nasa.gov; taylor.j.shingler@nasa.gov
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 HSRL file.
ARCTAS: 10.5067/ASDC/SUBORBITAL/ARCTAS_AircraftRemoteSensing_BE200_HSRL_Data_1
DISCOVER-AQ: 10.5067/ASDC/SUBORBITAL/DISCOVERAQ_Maryland_AircraftRemoteSensing_UC12_HSRL_Data_1
DEVOTE: 10.5067/ASDC/SUBORBITAL/DEVOTE_AircraftRemoteSensing_UC12_HSRL_Data_1
NAAMES: 10.5067/ASDC/NAAMES_AerosolCloud_AircraftRemoteSensing_Data_1
ORACLES: 10.5067/ASDC_DAAC/ORACLES_AerosolCloud_AircraftRemoteSensing_Data_1
ACEPOL: 10.5067/SUBORBITAL/ACEPOL2017/AircraftRemoteSensing_HSRL2_Data_1
CAMP2Ex: 10.5067/Airborne/CAMP2Ex_Aerosol_AircraftRemoteSensing_P3_Data_1
ACTIVATE: 10.5067/ASDC/ACTIVATE_AerosolCloud_AircraftRemoteSensing_KingAir_Data_1
CALIPSO-NVF: 10.5067/SUBORBITAL/CALIPSO-NVF/DATA001
Instrument Info: Multiwavelength High Spectral Resolution Lidar (HSRL-1/-2) aerosol/cloud measurements, see https://science-data.larc.nasa.gov/lidar/instruments.html For more information, see Hair, J.W., et al. (2008).
DM Contact Info: Amy Jo Scarino (amy.jo.scarino@nasa.gov)
Project Info: https://espo.nasa.gov/asia-aq/ https://www-air.larc.nasa.gov/missions/asia-aq/index.html
Stipulations on Use: Users are STRONGLY ENCOURAGED to contact the HSRL team before using the data for advice specific to the desired application. Please use DOI, if available, or Data Archive URL for citation.
Revision: R0, Final Data

CALIPSO File Information
CALIOP data files are archived at the Atmospheric Science Data Center (ASDC) at the NASA Langley Research Center.
CALIPSO DOI: 10.5067/CALIOP/CALIPSO/CAL_LID_L1-Standard-V5-00
Contact: Brian Getzewich (brian.j.getzewich@nasa.gov); Mark Vaughan (mark.a.vaughan@nasa.gov)

Date	Mission	MissionLongName	Aircraft	Lidar	CALIPSO Filename	Start Time	End Time	Day/ Night
6/14/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-001.2006-06-14T07-16-55ZN.hdf	6.5194	7.8417	N
6/21/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-06-21T07-23-14ZN.hdf	7.1604	8.0778	N
6/23/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-06-23T07-10-50ZN.hdf	6.9727	7.5	N
6/25/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-06-25T06-58-31ZN.hdf	6.6564	7.5437	N
6/28/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-06-28T18-09-12ZD.hdf	18.0519	19.0474	D
6/30/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-06-30T17-56-53ZD.hdf	18.1607	19.5577	D
7/18/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-07-18T17-44-02ZD.hdf	18.425	18.54	D
8/2/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-08-02T18-39-08ZD.hdf	18.4944	19.659	D
8/8/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-08-08T07-21-50ZN.hdf	5.4756	8.2473	N

8/10/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-08-10T07-09-21ZN.hdf	6.96	8.7686	N
8/17/06	CC_VEX	CALIPSO-CloudSat Validation Experiment	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-08-17T17-54-54ZD.hdf	18.2491	20.3506	D
8/28/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-08-28T19-14-18ZD.hdf	19.7301	19.8661	D
9/4/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-04T19-19-52ZD.hdf	18.57	19.13	D
9/6/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-06T19-07-19ZD.hdf	18.9046	19.9628	D
9/13/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-13T19-12-45ZD.hdf	18.7997	20.0795	D
9/17/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-17T08-08-01ZN.hdf	7.4631	8.811	N
9/20/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-20T19-18-12ZD.hdf	18.8544	20.6822	D
9/22/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-22T19-05-38ZD.hdf	18.9252	21.6419	D
9/24/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-24T08-13-23ZN.hdf	8.0033	9.1866	N
9/27/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-27T19-23-34ZD.hdf	19.2522	20.4077	D
9/28/06	GOMACCS	Gulf of Mexico Atmospheric Composition and Climate Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2006-09-28T18-27-52ZD.hdf	18.5267	19.2763	D
1/17/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-01-17T17-38-41ZD.hdf	18.0436	18.65	D
1/26/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-01-26T06-53-32ZN.hdf	6.821	7.3901	N

5/11/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-05-11T17-38-37ZD.hdf	18.04	18.2	D
5/23/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-05-23T18-04-04ZD.hdf	18.52	18.81	D
6/3/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-03T19-24-51ZD.hdf	19.2577	20.4666	D
6/5/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-05T19-12-31ZD.hdf	19.4127	20.5649	D
6/10/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-10T19-31-09ZD.hdf	19.7415	20.9442	D
6/12/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-12T19-18-45ZD.hdf	19.2893	20.0347	D
6/14/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-14T19-06-26ZD.hdf	19.0088	20.1196	D
6/19/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-19T19-24-57ZD.hdf	19.745	20.0365	D
6/21/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-21T19-12-33ZD.hdf	19.3916	20.044	D
6/26/07	CHAPS	Cumulus Humulis Aerosol Process Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-06-26T19-30-58ZD.hdf	19.3077	20.8347	D
7/19/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-07-19T17-57-19ZD.hdf	17.1	18.7699	D
7/26/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-07-26T18-03-05ZD.hdf	18.3339	18.667	D
8/4/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-08-04T17-56-18ZD.hdf	17.3944	18.225	D
8/11/07	CALIPSO Validation	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2007-08-11T18-01-55ZD.hdf	18.1028	19.372	D
1/24/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-01-24T17-14-18ZD.hdf	16.5689	17.68	D
1/26/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-01-26T17-02-04ZD.hdf	17	18.4739	D
1/28/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-01-28T16-49-50ZD.hdf	16.1834	17.41	D

1/29/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-01-29T17-33-13ZD.hdf	18.9346	19.1706	D
1/31/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-01-31T17-21-04ZD.hdf	16.53	17.9705	D
2/1/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-02-01T18-04-23ZD.hdf	17.4	19.0242	D
2/3/08	CARIBBEAN	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-02-03T17-52-14ZD.hdf	17.2415	18.8037	D
3/13/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-03-13T18-02-29ZD.hdf	18.07	18.57	D
3/17/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-03-17T17-38-16ZD.hdf	18.4163	19.209	D
4/1/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-01T21-53-44ZD.hdf	22.7	23.9	D
4/3/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-03T21-41-40ZD.hdf	22.48	23.675	D
4/6/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-06T22-12-59ZD.hdf	22.215	23.46	D
4/8/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-08T22-00-51ZD.hdf	22.12	23.15	D
4/9/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-09T22-44-14ZD.hdf	23.0585	23.9569	D
4/10/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-10T21-48-47ZD.hdf	22.71	24.4	D

4/12/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-12T21-36-38ZD.hdf	22.4	23.21	D
4/13/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-13T22-20-01ZD.hdf	21.6692	22.32	D
4/15/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-15T22-07-57ZD.hdf	22.35	23.434	D
4/16/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-16T22-51-21ZD.hdf	22.58	23.82	D
4/17/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-17T21-55-49ZD.hdf	22.69	23.22	D
4/19/08	ARCTAS1	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-04-19T21-43-40ZD.hdf	21.5	22.9	D
6/24/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-06-24T18-17-26ZD.hdf	20.1	20.85	D
6/25/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-06-25T19-00-45ZD.hdf	18.5	19.84	D
6/28/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-06-28T19-31-39ZD.hdf	20.2679	20.538	D
6/29/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-06-29T20-14-52ZD.hdf	20.0367	20.33	D
6/30/08	ARCTAS2	Arctic Research of the Composition of the Troposphere	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-06-30T19-19-15ZD.hdf	19.31	20.07	D

		from Aircraft and Satellites						
7/2/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-07-02T19-06-51ZD.hdf	20.7	20.9	D
7/3/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-07-03T19-50-09ZD.hdf	20.25	21.03	D
7/8/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-07-08T20-08-35ZD.hdf	17.57	18.275	D
7/8/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-07-08T20-08-35ZD.hdf	20.275	21.7	D
7/9/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-07-09T19-12-58ZD.hdf	18.82	19.228	D
7/10/08	ARCTAS2	Arctic Research of the Composition of the Troposphere from Aircraft and Satellites	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-07-10T19-56-16ZD.hdf	18.8622	20.3822	D
10/16/08	BIRMINGHAM	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2008-10-16T17-56-43ZD.hdf	18.28	18.81	D
1/22/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-01-22T07-03-21ZN.hdf	6.5053	8.686	N
1/29/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-01-29T07-10-18ZN.hdf	7.05	7.8931	N
1/31/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-01-31T06-58-10ZN.hdf	6.95	7.8405	N
2/5/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-02-05T07-17-11ZN.hdf	6.8	7.98	N
2/7/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-02-07T07-05-07ZN.hdf	6.6767	8.1	N
2/9/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-02-09T06-52-59ZN.hdf	6.770486	7.407963	N

3/23/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-03-23T07-35-37ZN.hdf	7.5669	8.25	N
3/27/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-03-27T07-11-25ZN.hdf	7.1	8.1	N
3/31/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-03-31T06-47-18ZN.hdf	7.1539	7.7383	N
4/5/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-04-05T07-06-28ZN.hdf	6.9418	7.8	N
4/17/09	CAL VAL 2009	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-04-17T07-32-37ZN.hdf	7.1439	8.17	N
6/5/09	RACORO	Routine AAF Clouds with Low Optical Water Depths (CLOWD) Optical Radiative Observations	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-06-05T18-58-44ZD.hdf	18.75	19.4	D
6/17/09	RACORO	Routine AAF Clouds with Low Optical Water Depths (CLOWD) Optical Radiative Observations	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-06-17T19-23-23ZD.hdf	20.35	21.38	D
6/24/09	RACORO	Routine AAF Clouds with Low Optical Water Depths (CLOWD) Optical Radiative Observations	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-06-24T19-29-25ZD.hdf	19.7993	20.321	D
6/26/09	RACORO	Routine AAF Clouds with Low Optical Water Depths (CLOWD) Optical Radiative Observations	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-06-26T19-17-02ZD.hdf	19.6	20.6	D
9/28/09	RACORO	Routine AAF Clouds with Low Optical Water Depths (CLOWD) Optical Radiative Observations	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2009-09-28T17-41-41ZD.hdf	17.1851	17.48	D
4/10/10	CALNEX	California Nexus	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-04-10T06-51-19ZN.hdf	6.3	7.59	N
4/11/10	CALNEX	California Nexus	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-04-11T07-34-42ZN.hdf	7.55	7.98	N

4/15/10	CALNEX	California Nexus	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-04-15T07-10-20ZN.hdf	6.75	8.27	N
4/19/10	CALNEX	California Nexus	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-04-19T06-45-57ZN.hdf	6.8721	7.3258	N
4/22/10	CALNEX	California Nexus	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-04-22T07-17-07ZN.hdf	7.15	7.82	N
7/10/10	CARES	Carbonaceous Aerosol and Radiative Effects Study	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-07-10T18-54-37ZD.hdf	18.98	19.675	D
8/11/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-11T17-13-37ZD.hdf	17.3842	18.6	D
8/16/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-16T17-31-41ZD.hdf	17.6869	19.21	D
8/18/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-18T17-19-08ZD.hdf	15.8465	18.2	D
8/20/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-20T17-06-35ZD.hdf	17.0721	18.82	D
8/22/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-22T06-14-15ZN.hdf	6.294	7.8491	N
8/24/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-24T06-01-41ZN.hdf	5.33	7.01	N
8/26/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-26T05-49-08ZN.hdf	5.24	6.8	N
8/27/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-08-27T17-12-02ZD.hdf	17.01	18.3	D
9/28/10	CARIBBEAN 2010	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2010-09-28T18-46-57ZD.hdf	18.9311	19.764	D
3/19/11	DISCOVERAQ	Deriving Information on Surface Conditions from COlumn and VERtically Resolved Observations Relevant to Air Quality	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2011-03-19T06-53-15ZN.hdf	6.6	7.5158	N
3/26/11	DISCOVERAQ	Deriving Information on Surface Conditions from COlumn and VERtically Resolved	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2011-03-26T07-00-17ZN.hdf	6.75	7.45	N

		Observations Relevant to Air Quality						
4/2/11	DISCOVERAQ	Deriving Information on Surface Conditions from COlumn and VERtically Resolved Observations Relevant to Air Quality	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2011-04-02T07-07-20ZN.hdf	5.86	7.42	N
10/4/11	DEVOTE	Development and Evaluation of Satellite Validation Tools by Experimenters	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2011-10-04T17-37-09ZD.hdf	17.95	18.56	D
10/8/11	DEVOTE	Development and Evaluation of Satellite Validation Tools by Experimenters	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2011-10-08T18-50-57ZD.hdf	18.94	20.31	D
3/23/12	CAL VAL 2012	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2012-03-23T06-41-29ZN.hdf	6.81	7.6999	N
3/26/12	CAL VAL 2012	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2012-03-26T07-12-38ZN.hdf	6.95	8.36	N
3/30/12	CAL VAL 2012	CALIPSO Validation Flights	KingAir	HSRL-1	CAL_LID_L1-Standard-V5-00.2012-03-30T06-48-21ZN.hdf	5.9	8.0835	N
10/17/12	Azores	CALIPSO Validation Flights	P3B	HSRL-1	CAL_LID_L1-Standard-V5-00.2012-10-17T14-00-09ZD.hdf	16.350278	17.9	N
6/10/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-10T17-21-23ZD.hdf	16.9369	18.55	D
6/12/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-12T06-29-13ZN.hdf	5.79	7.075	N
6/12/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-12T17-09-04ZD.hdf	17.03	18.2	D
6/14/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-14T06-16-54ZN.hdf	5.63031	7.08425	N
6/14/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-14T16-56-45ZD.hdf	17.1	18.14	D
6/16/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-16T06-04-35ZN.hdf	5.5	6.75	N

6/18/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-18T05-52-17ZN.hdf	5.65	6.45	N
6/19/14	Bermuda	CALIPSO Validation Flights	UC12	HSRL-1	CAL_LID_L1-Standard-V5-00.2014-06-19T17-15-26ZD.hdf	17.392	18.071	D
11/17/15	NAAMES	North Atlantic Aerosols and Marine Ecosystems Study	C130	HSRL-1	CAL_LID_L1-Standard-V5-00.2015-11-17T14-58-35ZD.hdf	13.7	14.16	D
4/8/16	AITT	Airborne Instrument Technology Transition Funded Flights	ER2	HSRL-2	CAL_LID_L1-Standard-V5-10.2016-04-08T20-59-33ZD.hdf	21.1	21.8	D
4/13/16	AITT	Airborne Instrument Technology Transition Funded Flights	ER2	HSRL-2	CAL_LID_L1-Standard-V5-10.2016-04-13T21-18-44ZD.hdf	20.64	22.03	D
4/19/16	AITT	Airborne Instrument Technology Transition Funded Flights	ER2	HSRL-2	CAL_LID_L1-Standard-V5-10.2016-04-19T20-42-23ZD.hdf	20.57	21.8	D
5/18/16	NAAMES	North Atlantic Aerosols and Marine Ecosystems Study	C130	HSRL-1	CAL_LID_L1-Standard-V5-00.2016-05-18T15-17-20ZD.hdf	14.3	16.3	D
5/27/16	NAAMES	North Atlantic Aerosols and Marine Ecosystems Study	C130	HSRL-1	CAL_LID_L1-Standard-V5-00.2016-05-27T15-11-33ZD.hdf	15.26	15.93	D
5/30/16	NAAMES	North Atlantic Aerosols and Marine Ecosystems Study	C130	HSRL-1	CAL_LID_L1-Standard-V5-00.2016-05-30T15-42-33ZD.hdf	19.6	20.83	D
9/18/16	ORACLES	ObseRvations of Aerosols above CLouds and their intEractionS	ER2	HSRL-2	CAL_LID_L1-Standard-V5-10.2016-09-18T13-13-48ZD.hdf	12.8	14.5	D
9/20/16	ORACLES	ObseRvations of Aerosols above CLouds and their intEractionS	ER2	HSRL-2	CAL_LID_L1-Standard-V5-10.2016-09-20T13-01-09ZD.hdf	13.06	14.56	D
8/13/17	ORACLES	ObseRvations of Aerosols above CLouds and their intEractionS	P3B	HSRL-2	CAL_LID_L1_Standard-V5-00.2017-08-04T13-11-26ZD.hdf	9.3454178	15.472918	D
9/20/17	NAAMES	North Atlantic Aerosols and Marine Ecosystems Study	C130	HSRL-1	CAL_LID_L1_Standard-V5-00.2017-09-20T17-27-05ZD.hdf	18.690833	18.804722	D
10/26/17	ACEPOL	Aerosol Characterization from Polarimeter and Lidar	ER2	HSRL-2	CAL_LID_L1_Standard-V5-00.2017-10-26T20-15-46ZD.hdf	20.430139	21.319167	D
8/30/19	CAMP2EX	Clouds, Aerosol, and Monsoon Processes - Philippines Experiment	P3B	HSRL-2	CAL_LID_L1-Standard-V5-00.2019-08-31T05-10-07ZD.hdf	4.9955564	6.1486119	D

8/26/20	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1_Standard-V5-00.2020-08-26T18-12-06ZD.hdf	16.930139	17.313472	D
8/28/20	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1-Standard-V5-00.2020-08-28T17-49-07ZD.hdf	18.02153	18.69931	D
9/23/20	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1_Standard-V5-00.2020-09-23T17-45-24ZD.hdf	18.044306	18.772083	D
3/4/21	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1-Standard-V5-00.2021-03-04T18-02-41ZD.hdf	18.5042	18.8626	D
3/12/21	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1-Standard-V5-00.2021-03-12T18-10-30ZD.hdf	18.317361	19.607639	D
3/30/21	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1-Standard-V5-00.2021-03-30T18-03-14ZD.hdf	18.072361	19.586389	D
5/19/21	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	UC12	HSRL-2	CAL_LID_L1-Standard-V5-00.2021-05-19T18-24-50ZD.hdf	18.5853	19.2021	D
1/12/22	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-01-12T18-18-47ZD.hdf	18.764861	20.369167	D
5/18/22	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-05-18T18-33-29ZD.hdf	18.180556	19.347361	D
5/21/22	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the western ATlantic Experiment	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-05-21T18-47-23ZD.hdf	18.796806	19.794028	D
6/13/22	ACTIVATE	Aerosol Cloud meTeorology Interactions oVer the	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-06-13T18-21-17ZD.hdf	16.456111	19.785833	D

		western ATlantic Experiment						
8/7/22	CALIPSO NVF	CALIPSO Night Validation Flights	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-08-07T07-26-31ZN.hdf	5.7454167	8.1856944	N
8/10/22	CALIPSO NVF	CALIPSO Night Validation Flights	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-08-10T07-39-40ZN.hdf	7.11875	8.3327778	N
8/12/22	CALIPSO NVF	CALIPSO Night Validation Flights	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-08-12T07-15-36ZN.hdf	6.695	7.93875	N
8/17/22	CALIPSO NVF	CALIPSO Night Validation Flights	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-08-17T07-04-36ZN.hdf	6.5852778	7.6168056	N
8/18/22	CALIPSO NVF	CALIPSO Night Validation Flights	KingAir	HSRL-2	CAL_LID_L1-Standard-V5-00.2022-08-18T07-41-44ZN.hdf	7.0758333	8.3841667	N

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