GOTHAAM Project Report

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The GOTHAAM field campaign was held in Islip, NY from 16 July to 30 August, 2025. This report summarizes the overall project payload, instrument status, and issues encountered during the project. All known events at the time of this report were outlined here to provide data users additional information on the data quality. The users should not expect all questionable data to be identified at the initial data release. It is hoped that this information will facilitate use of the data as the research concentrates on specific flights and times.

This report includes all RAF supplied instrumentation on the NSF NCAR C-130 and is organized into the following sections. Section I provides a general overview of the data collected and lists recurring problems, general limitations and systematic biases in the standard RAF measurements. A discussion of the performance of RAF specialized instrumentation will be provided separately, along with the data release. Section II lists issues encountered during each research flight. Section III includes the final payload configuration.

Please note that virtually all measurements made on the aircraft require some sort of airspeed correction or the systems simply do not become active while the aircraft remains on the ground. None of the data collected while the aircraft is on the ground should be considered valid.

Information on the processing algorithms used to produce the final dataset can be found at: https://www.eol.ucar.edu/content/raf-bulletins

I. General Data Notes

The project data has undergone the data quality process after the completion of the project. When instruments experience issues or problems, the time intervals are noted in this section for user's information. In those instances, the intervals have been filled as "missing data (code -32767)". In situations where the instrument was down, the data will be missing for the entire flight.

1. NetCDF File Changes

Particle probe histograms and size-distributions have changed some from past conventions. For GOTHAAM this change applies to the CDP and 2DC. Up until 2022 the histograms and size-distributions had a legacy unused bin added at the small end. For example, the CDP is a 30 channel probe, but the data was stored as 31 bins. This has been removed, and now the 30 channel probe will have 30 bins in the NetCDF file. The bin sizing is still in the NetCDF file as an attribute to the size-distribution, called CellSizes, and remains as 31 end point elements (for the CDP). For more information on this change, plus general information on RAF NetCDF conventions, please visit: https://field.eol.ucar.edu/docs/raf/software/netCDF.html

2. Position and Altitude Data

The GPS derived variables GGLAT, GGLON, and GGALT are the most accurate and precise variables for the latitude, longitude, and altitude information. GPS status and quality can be determined using the GGSTAT and GGQUAL variables.

3. Three Dimensional Winds

In the GOTHAAM campaign, the C-130 was flown primarily in two configurations: 1) a "clean" configuration (flaps and landing gear retracted) but at a slower-than-standard airspeed (~94 m/s), termed the GOTHAAM configuration, and 2) a "dirty" configuration (flaps at 50% with landing gear retracted) at ~72 m/s airspeed down the Hudson corridor, termed the Hudson configuration. Additionally, missed approaches were flown in the Hudson configuration with gear down, though these periods make up a small percentage of the data set. These configurations are important as they introduce slight changes in the pressure distribution on the radome, which influences the calibration of vertical and horizontal angles of flow past the aircraft.

To address this, wind calibration maneuvers were flown at the RAF standard research airspeed (~135 m/s), in the GOTHAAM configuration, and in the Hudson configuration during the test flights. For angle-of-attack (AoA), two calibrations were performed, one for the clean, GOTHAAM configuration and one for the dirty, Hudson configuration. The vertical wind speed (biases in particular) is very sensitive to aerodynamic state and these calibrations. The GOTHAAM configuration calibration was applied when dry-air Mach # >= 0.24, with the Hudson configuration calibration applied when dry-air Mach # < 0.24. A flag was added to our data files ("ATTACKFLG") to indicate when each calibration was applied: ATTACKFLG == 1 when the Hudson configuration calibration was applied and 0 when the GOTHAAM configuration calibration was applied. Transitions between these calibrations, as indicated by ATTACKFLG, can result in discontinuities in vertical wind speed. However, this generally happens during transitions between the two configurations (unsteady flight) or during missed approaches when landing gear were extended (not addressed in calibrations). In both of these situations, vertical wind quality degradation is expected anyway, and so these data should be used very carefully if at all. Otherwise, vertical winds are full quality and usable in fluxes and publications.

In this data release, an error was discovered in the research true airspeed measurement. This error was ~0.8 m/s in the GOTHAAM configuration (about double our typical uncertainty) and ~2 m/s in the dirty Hudson configuration. These airspeed errors directly project onto the horizontal winds, resulting in errors there of the same magnitude. These errors will be fixed in a subsequent release.

Generally, wind observations are the highest quality when flying straight-and-level and not climbing or descending. Fluxes should be mainly computed in such flights. In previous campaigns, vertical winds are generally high quality in steady climb and descent, with a small bias (0.2 m/s) in descent. Quality of all wind components is degraded during turns and unsteady flight.

4. Humidity

Humidity measurements are made by the Vertical Cavity Surface-Emitting Laser (VCSEL) hygrometer and two thermo-electronic dew point sensors. VCSEL collected high quality data for most of the GOTHAAM project and is used as the reference measurement for all humidity analyses. All VCSEL variables end with _VXL. The other dew point sensors (DPT and DPB) contain occasional artificial overshooting along with instances of severe oscillations over the course of several flights with resultant unusable observations. They should only be used in cases where the VCSEL is not available.

5. Temperature

The reference air temperature (ATX) for GOTHAAM is set to ATF1, which is the unheated, fast response temperature probe. The probe functioned well throughout the project and there are no issues with the data.

6. Radiation

The upward-looking Kipp & Zonen radiometers performed well throughout the project, as did the stabilized platform on which they are mounted. Irradiance values in the visible (VISTC) and infrared (IRTC) bands show normal variations. VISTC and IRTC values are removed from the data files when the aircraft pitch or roll exceeds the limits of the stabilized platform, so there are occasional gaps in the time series. It should also be noted that VISTC is zero during nighttime flight, which occurred during portions of RF05-RF21.

The Wintronics KT19.85 radiation pyrometers provide radiometric surface (RSTB, RSTB1) and sky (RSTT) temperatures. Overall the sensors performed well throughout GOTHAAM. A bias between the two downward-looking sensors is noted. Differences between RSTB and RSTB1 are on the order of a few tenths of a degree (Celsius) at times. While such differences are within the specified uncertainty of these sensors, It is not clear why there is a discrepancy. It is noted that differences are larger in segments with high variability and smaller when measurements are steady (e.g., over the ocean). The size of the difference also appears to be positively correlated with radiometric surface temperature, i.e., larger differences occur at warmer surface temperatures. The reasons for this discrepancy are under investigation, but given that the size of the discrepancy is usually within the specified uncertainty, there are no concerns about using the data for research purposes.

7. Gas Phase Measurements

RAF flew Fast Ozone, QCL, and Picarro instrumentation for gas phase measurements on GOTHAAM, providing measurements of Ozone, CO, N2O, CO2, and CH4. All instruments performed well, with the exception of some issues during RF16 and RF17. See the flight summaries below for more information.

8. Cloud Probe Suite

The cloud probes on GOTHAAM performed well, with no major issues. The cloud probe suite for GOTHAAM included a CDP, 2DC, King probe, and Rosemount Icing Probe, all wing-mounted instruments. The King probe (PLWCC) provides a measure of bulk hot wire liquid water content. The Rosemount icing probe (RICE) gives an indication of the presence of supercooled water by its oscillation frequency. The Cloud Droplet Probe (CDP) is a forward scattering spectrometer probe that measures coarse mode aerosol and liquid water droplets between about 2 - 50 microns, reporting measure of total number concentration across that size range as well as concentration size distributions in 30 bins across that range. It should be kept in mind that CDP sizing is calibrated for water droplets, so there will be increased uncertainties in the sizing of coarse mode aerosol. The 2DC is an optical array probe (OAP) with a resolution of 25 microns that provides total and size resolved concentration, as well as cross-sectional area from black and white particle imagery, over the size range from approximately 25 - 1000 microns. Note that the first two size bins of the 2DC have been excluded in final data due to the larger instrument uncertainties with constraining particle concentration and size in these bins. 2DC variables appended with an “A” include all accepted particles, 2DC variables appended with an “R” include only accepted particles that meet a roundness criteria of 0.5, giving an indication of the sphericity of the particles.

While most flights contain few or no clouds, some flights, particularly later in the project, did encounter a number of cloud passes. RF10 notably encountered rain almost the entire duration of the pass down the Hudson. To support those instruments that are sensitive to in-cloud measurements, a cloud flag has been included in the final LRT data file. Definitions of a "cloud" may vary by the researcher depending on the science they are after. For the purposes here, "cloud" is defined rather liberally with a LWC > 0.005 g/m^3 on the CDP and 2DC. Most clouds encountered were warm (liquid) in phase.

The cloud flag variables include three variables at 1 Hz: a cloud flag (CLOUDFLG), a cloud flag with a buffer (CLOUDBUFFER), and a cloud classification flag (CLOUDCLASS).

CLOUDFLG will be 0 or 1: 1 = "cloud" was detected in that second, 0 = no cloud.

CLOUDBUFFER is the cloud flag with a +/- 3 second buffer around the cloud pass for ease of use with inlets that might have a slight time offset. 1 = "cloud"+/- buffer, 0 = no cloud.

CLOUDCLASS is a simple temperature based indicator:
0 = no cloud
2 = warm cloud, haze, or rain precip (T > 0 C). Note, the researcher needs to look at OAP imagery and other cloud probes to assess between haze, warm cloud, and precipitation.
3 = possible mixed phase cloud/precip (-40 < T < 0 C). Note, the researcher needs to look at OAP imagery, RICE, etc. to verify if it is actually a mixed phase cloud. (Note that this was only encountered on GOTHAAM test flights.)
4 = ice cloud or ice precipitation (T < -40 C). Note, the researcher needs to look at OAP imagery and other cloud probes to assess between ice cloud and ice precipitation. (Note that ice clouds or precipitation were not encountered in GOTHAAM.)

These flags are aimed toward inlet blanking use, so the definition of a "cloud" for determining whether to apply the cloud flag was generous to include just a wisp of a cloud or precipitation. If there are requests for alternate formulations or levels of strictness, it can be adjusted for specific needs. Please reach out to Sarah Woods at RAF for inquiries in interpreting the cloud probe data.

9. RAF Aerosol Suite

RAF supplied a Solid Diffuser Inlet (SDI), a cabin-mounted UHSAS, a wing-mounted PCASP, and a CN Counter for GOTHAAM. A report on aerosol instrument performance will be provided separately later this year.

SDI: The SDI performed well throughout the campaign, maintaining isokinetic flow conditions during 99.5% of total research flight time, with all 21 research flights exceeding 95% isokinetic conditions. An isokineticity quality flag is available in the final netCDF files. Note that the SDI flow was set to 100 SLPM for TF01 and TF02, and was then set to 250 SLPM for all the research flights.

UHSAS: The UHSAS, sampling from the SDI, operated reliably throughout GOTHAAM. Size bin edges correction derived from PSL bead calibrations conducted before and after the campaign have been applied to the final data. Post-campaign analysis suggests a potential decrease in detection efficiency relative to a laboratory reference instrument; however, this did not affect the sizing accuracy of the measurements and its impact on reported concentrations is currently under investigation.

PCASP: Size bin edges derived from Post-GOTHAAM PSL bead calibrations have been applied to the final data. The instrument deicing system was not active during GOTHAAM, which may have resulted in reduced drying of the sampled aerosol compared to standard operating conditions (see Strapp et al. 1992). In addition, recently updated instrument hardware limited the ability to perform complete data quality control; this is currently under investigation in collaboration with the manufacturer (DMT). On several flights, PCASP total particle concentration (CONC_RPI) exceeded CN-Counter total number concentration (CONCN). This is physically unrealistic, as the PCASP measures a subset of the aerosol size distribution detected by the CN Counter. This anomaly is likely due to PCASP measurement uncertainties and is currently under investigation.

Data have not been filtered for clouds; cloud particles may shatter on the leading edge of the inlet, producing elevated particle counts above the aerosol background and possibly skewing the size distribution.

CN Counter: The CN Counter sampled from the SMAI inlet, which is designed to reject splash and shatter artifacts from cloud particles. The instrument operated reliably throughout GOTHAAM. On RF03, an in-flight flow adjustment between 15:21 and 15:29 UTC caused the inlet flow to drop well below its nominal value; CN data during this period should be discarded. CN data from 15:29 UTC through the end of RF03 may have elevated uncertainty due to non-nominal bypass flow configuration; the bypass flow was set to its maximum value (12.5 LPM) as no in-flight flow measurement was available; users should account for this non-nominal flow configuration when using CN data from the remainder of that flight.

Note that data are not corrected to international STP (0°C, 1013.25 hPa). The reference temperatures used for flow corrections are ambient: 25°C for the UHSAS, 21°C for the CN

Counter, and 0°C for the PCASP. Users should apply appropriate corrections when comparing across instruments.

II. Individual Flight Summary

Date, takeoff time, landing time, and notes for each research flight are listed in the table below. In all cases the date is when the flight departed as some flights landed after midnight. All times are UTC.

RF01					
Date:	7/22/25	**Takeoff:**	12:52	**Landing:**	17:55
Flight Notes					
Cameras not started until 1323.					

RF02					
Date:	7/23/25	**Takeoff:**	14:43	**Landing:**	19:36
Flight Notes					
No reported issues					

RF03					
Date:	7/24/25	**Takeoff:**	14:52	**Landing:**	19:02
Flight Notes					
RSTT: Unrealistic spikes in the sensor have been blanked out for the following times: 16:07:07 - 16:07:10, 16:31:28 - 16:31:34, 18:08:49 - 18:08:53, and 18:24:14 -18:24:20. CN Counter stopped 1520 - 1540 to troubleshoot flow issue.					

RF04					
Date:	7/25/25	**Takeoff:**	13:59	**Landing:**	19:23
Flight Notes					
No reported issues					

RF05					
Date:	7/29/25	**Takeoff:**	16:54	**Landing:**	22:16
Flight Notes					
No reported issues					

RF06					
Date:	7/30/25	**Takeoff:**	17:02	**Landing:**	22:52
Flight Notes					
No reported issues					

RF07					
Date:	8/3/25	**Takeoff:**	21:05	**Landing:**	03:02
Flight Notes					
Cameras stopped at 0001, night detected.					

RF08					
Date:	8/4/25	**Takeoff:**	21:28	**Landing:**	02:54

Flight Notes
No camera images at night.

RF09					
Date:	8/5/25	**Takeoff:**	21:20	**Landing:**	02:54
Flight Notes					
Fix installed to continue to record camera images after dark.					

RF10					
Date:	8/6/25	**Takeoff:**	21:21	**Landing:**	02:49
Flight Notes					
No reported issues					

RF11					
Date:	8/8/25	**Takeoff:**	17:52	**Landing:**	00:28
Flight Notes					
No reported issues					

RF12					
Date:	8/12/25	**Takeoff:**	00:57	**Landing:**	06:15
Flight Notes					
Cameras started at 0101.					

RF13					
Date:	8/13/25	**Takeoff:**	01:09	**Landing:**	06:51
Flight Notes					
No reported issues					

RF14					
Date:	8/15/25	**Takeoff:**	01:53	**Landing:**	07:31
Flight Notes					
VCSEL: No data 0305-0307 DPB: Bad data for entire flight					

RF15					
Date:	8/16/25	**Takeoff:**	02:32	**Landing:**	08:28
Flight Notes					
VCSEL: Drops out briefly at 0345 DPB: Bad data for entire flight					

RF16					
Date:	8/19/25	**Takeoff:**	03:54	**Landing:**	09:17
Flight Notes					
Fast Ozone: No measurements for this flight due to power issue at startup QCL Aerodyne: No data until around 0440 due to power issue at startup					

RF17					
Date:	8/22/25	**Takeoff:**	06:19	**Landing:**	12:12
Flight Notes					
Fast Ozone: No data for last 1.6 hours of flight					

RF18					
Date:	8/23/25	**Takeoff:**	07:40	**Landing:**	13:03
Flight Notes					
No reported issues					

RF19					
Date:	8/24/25	**Takeoff:**	07:39	**Landing:**	13:31
Flight Notes					
VCSEL: Many dropouts. No data after 1240 due to low laser power.					

RF20					
Date:	8/27/25	**Takeoff:**	08:42	**Landing:**	14:03
Flight Notes					
VCSEL: No data until a few minutes into the flight, good data after that.					

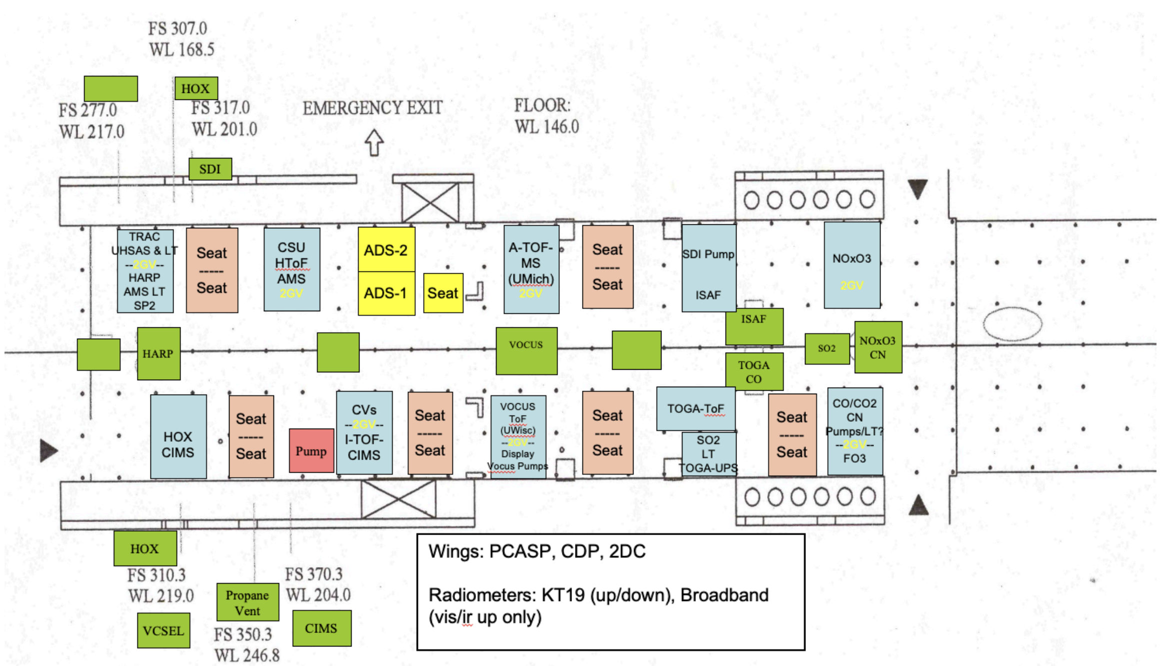
RF21					
Date:	8/28/25	**Takeoff:**	09:04	**Landing:**	15:16

Flight Notes
No reported issues

III. Project Payload and Calendar

The final payload configuration and the actual deployment calendar are included in this section for reference. The nomenclature for flight designations are: (1) ferry flights (FF); (2) research flights (RF). During operations, RAF staff are required to take a Hard Down Day (HDD) after no more than six consecutive working days.

C-130 Layout for GOTHAAM
03/06/2025



Schedule for GOTHAAM, Jul-Aug 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7/13 HDD	7/14	7/15	7/16 FF01	7/17 Unpack	7/18	7/19
7/20 HDD	7/21	7/22 RF01	7/23 RF02	7/24 RF03	7/25 RF04	7/26
7/27 HDD	7/28	7/29 RF05	7/30 RF06	7/31	8/1	8/2 HDD
8/3 RF07	8/4 RF08	8/5 RF09	8/6 RF10	8/7	8/8 RF11	8/9 HDD
8/10	8/11 RF12	8/12 RF13	8/13	8/14 RF14	8/15 RF15	8/16 HDD
8/17	8/18 RF16	8/19	8/20 HDD	8/21	8/22 RF17	8/23 RF18
8/24 RF19	8/25 HDD	8/26	8/27 RF20	8/28 RF21	8/29	8/30 FF02

IV. Variable Names

A list of variable names and short descriptions is included below. This list does not encompass everything in the NetCDF files. It omits housekeeping variables.

Time	Time of measurement
ABSPEC_VXL	VCSEL Absorption Spectrum
CDP058	CDP arithmetic midpoint bin size in diameter
CDP058_bnds	lower and upper bounds for CDP
ACDP_LPO	CDP Raw Accumulation (per cell)
ADIFR	Vertical Differential Pressure, Radome
PCAS108	PCASP arithmetic midpoint bin size in diameter
PCAS108_bnds	lower and upper bounds for PCASP
AS200_RPI	SPP-200 (PCASP) Raw Accumulation (per cell)
UHSAS059	UHSAS arithmetic midpoint bin size in diameter
UHSAS059_bnds	lower and upper bounds for UHSAS
AUHSAS_RO	UHSAS Raw Count Histogram
AVGTRNS_LPO	CDP Average Transit Time
BDIFR	Horizontal Differential Pressure, Radome
CH4C_PIC	Picarro Methane Mixing Ratio (Corrected)
CNTEMP	BCN Counter Inlet Temperature
CNTS	TSI CN Counter Output
CO2C_PIC	Picarro Carbon Dioxide Mixing Ratio (Corrected)
CO_PIC	PICARRO Carbon Monoxide Dry Mole Fraction
CO_QCL	QCL Carbon Monoxide Dry Mole Fraction
DRFTA IRS	Drift Angle
FCN	Raw BCN Counter Sample Flow Rate
FLOW_SDI	SDI Volumetric Flow
GGALT	Reference GPS Altitude (MSL)
GGALTSD	Standard Deviation of Reference GPS Altitude (MSL)
GGLAT	Reference GPS Latitude
GGLATSD	Standard Deviation of Reference GPS Latitude
GGLON	Reference GPS Longitude
GGLONSD	Standard Deviation of Reference GPS Longitude
GGNSAT	Reference GPS number of satellites used in solution
GGQUAL	Reference GPS Qual, 0=inval,1=GPS,2=DGPS,5=FRTK
GGSPD	Reference GPS Ground Speed
GGTRK	Reference GPS Track Angle
GGVEW	Reference GPS Ground Speed Vector, East Component

GGVNS	Reference GPS Ground Speed Vector, North Component
GGVSPD	Reference GPS Vertical Speed
GSPD	IRS Aircraft Ground Speed
H2O_PIC	PICARRO water vapor dry mole fraction
H2O_QCL	QCL water vapor dry mole fraction
IRTHT	Pyrgeometer (IR) Housing Temperature, Top
LAT	IRS Latitude
LON	IRS Longitude
MFLOW_SDI	SDI Mass Flow
MODE_VXL	VCSEL Mode
N2OA_QCL	Aerodyne Mini 108 Ambient FSO Nitrous Oxide Mixing Ratio
N2O_QCL	QCL nitrous oxide dry mole fraction
PCAB	Interior Cabin Static Pressure
PCN	BCN Counter Inlet Pressure
PITCH	IRS Aircraft Pitch Angle
PLWC	Raw PMS-King Liquid Water Content Output
PREF_RPI	SPP-200 Laser Reference Voltage
PSFD	Raw Static Pressure, Fuselage
PSFRD	Raw Static Pressure, Fuselage
QCFR	Raw Dynamic Pressure, Fuselage Right
REJDOF_LPO	CDP Rejected Particle Count (Outside Depth-of-Field)
RICE	Raw Icing-Rate Indicator
ROLL	IRS Aircraft Roll Angle
RSTB	Radiometric Surface Temperature
RSTB1	Radiometric Surface Temperature
RSTT	Radiometric Sky/Cloud-Base Temperature
SETPT_SDI	SDI Mass Flow Set Point
TCABCV	Cabin Temperature, Video Rack
THDG	IRS Aircraft True Heading Angle
TKAT	IRS Aircraft Track Angle
UACC_RO	UHSAS Accumulation Time
UCURR_RO	UHSAS Laser Current
UFLW_RO	UHSAS Flow
ULSRTEMP_RO	UHSAS Laser Temperature
UPRGFLW_RO	UHSAS Purge Flow
UREF_RO	UHSAS Reference Intensity
USCAT_RO	UHSAS Background Scatter
VEW	IRS Ground Speed Vector, East Component
VNS	IRS Ground Speed Vector, North Component
VSPD	IRS Vertical Speed
XICN	BCN Isokinetic Side Flow Rate

AKRD	Attack Angle, Radome Diff. Pressure
AKY	Attack Angle, Radome Diff. Pressure
ATF1	Ambient Temperature, Unheated
ATTACK	Attack Angle, Radome Diff. Pressure
ATTACKFLG	Flag when flaps at 50%, to alter coefficients for AKRD
ATX	Ambient Temperature, Unheated
CCDP_LPO	CDP Concentration (per cell)
CONCD_LPO	CDP Concentration (all cells)
CONCN	Condensation Nuclei (CN) Concentration
CONCP_RPI	PCAS Concentration (all cells)
CONCU100_RO	UHSAS Concentration in the optical block, .1 micron and bigger
CONCU500_RO	UHSAS Concentration in the optical block, .5 micron and bigger
CONCU_RO	UHSAS Concentration in the optical block (all cells)
CONCV_VXL	VCSEL Moisture Number Density
CS200_RPI	SPP-200 (PCASP) Concentration (per cell)
CUHSAS_RO	UHSAS Concentration in the optical block (per cell)
DBARD_LPO	CDP Mean Particle Diameter
DBARP_RPI	PCAS Mean Particle Diameter
DBARU_RO	UHSAS Mean Particle Diameter
DBZD_LPO	CDP Calculated Reflectivity
DISPD_LPO	CDP Dispersion (sigma/dbarx)
DISPP_RPI	PCAS Dispersion (sigma/dbarx)
DISPU_RO	UHSAS Dispersion (sigma/dbarx)
DPXC	Dew/Frost Point Temperature (Reference)
DP_DPT	Dew/Frost Point Temperature
DP_VXL	Dew/Frost Point Temperature (VCSEL)
DVALUE	D-VALUE (GGALT - PALT)
EWX	Ambient Water Vapor Pressure (Reference)
EW_DPT	Ambient Water Vapor Pressure
EW_VXL	Ambient Water Vapor Pressure (VCSEL)
FCNC	Corrected BCN Counter Sample Flow Rate
GEOPTH	Geopotential height [MSL]
IRTC	Corrected Infrared Irradiance, Top
LATC	GPS-Corrected Inertial Latitude
LONC	GPS-Corrected Inertial Longitude
MACHFR	Aircraft Mach Number, Fuselage Right
MACHX	Aircraft Mach Number, Fuselage Right
MR	Mixing Ratio, T-Electric
PALT	NACA Pressure Altitude (m)
PALTF	NACA Pressure Altitude (feet)
PFLWC_RPI	PCAS Corrected Flow

PLWCC	Corrected PMS-King Liquid Water Content
PLWCD_LPO	CDP Water/Ice Content
PSFC	Corrected Static Pressure, Fuselage
PSFDC	Corrected Static Pressure, Fuselage Digital
PSX	Raw Static Pressure, Fuselage
PSXC	Corrected Static Pressure, Fuselage
PVOLP_RPI	PCASP Equivalent Volume
PVOLU_RO	UHSAS Equivalent Volume
QCFC	Corrected Dynamic Pressure, Fuselage
QCFRC	Corrected Dynamic Pressure, Fuselage Right
QCRC	Corrected Dynamic Pressure, Radome
QCX	Raw Dynamic Pressure, Fuselage Right
QCXC	Corrected Dynamic Pressure, Fuselage Right
REFFD_LPO	CDP Effective Diameter
RHODT	Absolute Humidity, T-Electric
RHUM	Relative Humidity
SDIQUAL_SDI	SDI data quality flag (1=isokinetic,0=anisokinetic)
SOLAZ	Solar Azimuth Angle
SOLDE	Solar Declination Angle
SOLEL	Solar Elevation Angle
SOLZE	Solar Zenith Angle
SSLIP	Sideslip Angle, Reference
SSRD	Sideslip Angle, Radome Diff. Pressure
TASDRY	Aircraft True Airpseed, Dry Air
TASFLG	True Airpseed Humidity Correction Flag
TASFR Aircraft	True Airspeed, Fuselage Right
TASX Aircraft	True Airspeed, Reference
TCNTD_LPO	CDP Total Counts (all cells)
TCNTP_RPI	PCAS Total Counts (all cells)
TCNTU_RO	UHSAS Total Counts (all cells)
THETA	Potential Temperature
THETAE	Equivalent Potential Temperature
THETAP	Pseudo-adiabatic Equivalent Potential Temperature
THETAQ	Wet Equivalent Potential Temperature
THETAV	Virtual Potential Temperature
TVIR	Virtual Temperature
UIC	GPS-Corrected Wind Vector, East Component
UXC	GPS-Corrected Wind Vector, Longitudinal Component
VEWC	GPS-Corrected Inertial Ground Speed Vector, East Component
VIC	GPS-Corrected Wind Vector, North Component
VISTC	Corrected Visable Irradiance, Top

VMR_VXL	Volume Mixing Ratio
VNSC	GPS-Corrected Inertial Ground Speed Vector, North Component
VYC	GPS-Corrected Wind Vector, Lateral Component
WDC	GPS-Corrected Horizontal Wind Direction
WIC	GPS-Corrected Wind Vector, Vertical Gust Component
WINDSFLG	Winds Quality (0=good, 1-3=bad inputs, 4-6=icing)
WIX	GPS-Corrected Wind Vector, Vertical Gust Component
WIY	GPS-Corrected Wind Vector, Vertical Gust Component
WSC	GPS-Corrected Horizontal Wind Speed
XICNC	Corrected CN Isokinetic Side Flow Rate
F2DC003_P2D	Fast2DC_v2 arithmetic midpoint bin size in diameter
F2DC003_P2D_bnds	Lower and upper bounds for Fast2DC_v2
interarrival_endpoints	Interarrival Time Accumulation, All Particles Including Rejection
C2DCA_LPI	Fast 2DC Concentration per Channel, All Particles
C2DCR_LPI	Fast 2DC Concentration per Channel, Round Particles
CONC2DCA_LPI	Total Fast 2DC Concentration, All Particles
CONC2DCR_LPI	Total Fast 2DC Concentration, Round Particles
PLWC2DCR_LPI	Fast 2DC Liquid Water Content, Round Particles
PLWC2DCA_LPI	Fast 2DC Liquid Water Content, All Particles
DBAR2DCR_LPI	Fast 2DC Mean Particle Diameter, Round Particles
DBAR2DCA_LPI	Fast 2DC Mean Particle Diameter, All Particles
DBZ2DCR_LPI	Fast 2DC Calculated Reflectivity, Round Particles
DBZ2DCA_LPI	Fast 2DC Calculated Reflectivity, All Particles
REFF2DCR_LPI	Fast 2DC Effective Radius, Round Particles
REFF2DCA_LPI	Fast 2DC Effective Radius, All Particles
SFC_SRTM	Elevation of the Earth's surface below the aircraft position
ALTG_SRTM	Altitude of the aircraft above the Earth's surface
CLOUDFLG	Cloud Detection Flag
CLOUDBUFFER	Cloud Detection Flag with +/- 3s Buffer
CLOUDCLASS	Cloud Classification based on Temperature
FO3_RAF	Chemiluminescence ozone dry mole fraction