

ATL09 Product Data Dictionary

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Group: /		
Conventions	(Attribute)	CF-1.6
citation	(Attribute)	SET_BY_META
contributor_name	(Attribute)	Thomas E Neumann (thomas.neumann@nasa.gov), Thorsten Markus (thorsten.markus@nasa.gov), Suneel Bhardwaj (suneel.bhardwaj@nasa.gov) David W Hancock III (david.w.hancock@nasa.gov)
contributor_role	(Attribute)	Instrument Engineer, Investigator, Principle Investigator, Data Producer, Data Producer
creator_name	(Attribute)	SET_BY_META
date_created	(Attribute)	SET_BY_PGE
date_type	(Attribute)	UTC
description	(Attribute)	This data set (ATL09) contains calibrated, attenuated backscatter profiles, layer integrated attenuated backscatter, and other parameters including cloud layer height and atmospheric characteristics obtained from the data. The data were acquired by the Adv
featureType	(Attribute)	trajectory
geospatial_lat_max	(Attribute)	0.0
geospatial_lat_min	(Attribute)	0.0
geospatial_lat_units	(Attribute)	degrees_north
geospatial_lon_max	(Attribute)	0.0
geospatial_lon_min	(Attribute)	0.0
geospatial_lon_units	(Attribute)	degrees_east
granule_type	(Attribute)	ATL09
hdfversion	(Attribute)	SET_BY_PGE
history	(Attribute)	SET_BY_PGE
identifier_file_uuid	(Attribute)	SET_BY_PGE
identifier_product_doi	(Attribute)	10.5067/ATLAS/ATL09.001
identifier_product_doi_authority	(Attribute)	http://dx.doi.org
identifier_product_format_version	(Attribute)	SET_BY_PGE
identifier_product_type	(Attribute)	ATL09
institution	(Attribute)	SET_BY_META
instrument	(Attribute)	SET_BY_META
keywords	(Attribute)	SET_BY_META
keywords_vocabulary	(Attribute)	SET_BY_META
level	(Attribute)	L3A
license	(Attribute)	Data may not be reproduced or distributed without including the citation for this product included in this metadata. Data may not be distributed in an altered form without the written permission of the ICESat-2 Science Project Office at NASA/GSFC.
naming_authority	(Attribute)	http://dx.doi.org
platform	(Attribute)	SET_BY_META
processing_level	(Attribute)	L3A
project	(Attribute)	SET_BY_META
publisher_email	(Attribute)	SET_BY_META

publisher_name	(Attribute)	SET_BY_META		
publisher_url	(Attribute)	SET_BY_META		
references	(Attribute)	SET_BY_META		
short_name	(Attribute)	ATL09		
source	(Attribute)	SET_BY_META		
spatial_coverage_type	(Attribute)	Horizontal		
standard_name_vocabulary	(Attribute)	CF-1.6		
summary	(Attribute)	SET_BY_META		
time_coverage_duration	(Attribute)	SET_BY_PGE		
time_coverage_end	(Attribute)	SET_BY_PGE		
time_coverage_start	(Attribute)	SET_BY_PGE		
time_type	(Attribute)	CCSDS UTC-A		
title	(Attribute)	SET_BY_META		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
ds_surf_type COMPACT	INTEGER (5)	Surface Type Dimension Scale	1	Dimension scale indexing the surface type array. Index=1 corresponds to Land; index = 2 corresponds to Ocean; Index = 3 corresponds to SeaIce; Index=4 corresponds to LandIce; Index=5 corresponds to InlandWater Flag Values: ['1', '2', '3', '4', '5'] Flag Meanings: ['land', 'ocean', 'seaice', 'landice', 'inland_water']
Group: /ancillary_data				
Description	(Attribute)	Contains information ancillary to the data product. This may include product characteristics, instrument characteristics and/or processing constants.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atlas_sdp_gps_epoch COMPACT	DOUBLE (1)	ATLAS Epoch Offset	seconds since 1980-01-06T00:00:00.000000Z Operations	Number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch (2018-01-01:T00.00.00.000000 UTC). Add this value to delta time parameters to compute full gps_seconds (relative to the GPS epoch) for each data point.
control CONTIGUOUS	STRING (1)	Control File	1 Operations	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds.
data_end_utc COMPACT	STRING (1)	End UTC Time of Granule (CCSDS-A, Actual)	1 Derived	UTC (in CCSDS-A format) of the last data point within the granule.
data_start_utc COMPACT	STRING (1)	Start UTC Time of Granule (CCSDS-A, Actual)	1 Derived	UTC (in CCSDS-A format) of the first data point within the granule.
end_cycle COMPACT	INTEGER (1)	Ending Cycle	1 Derived	The ending cycle number associated with the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission.
end_delta_time COMPACT	DOUBLE (1)	ATLAS End Time (Actual) time	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the last data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the

				number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
end_geoseg COMPACT	INTEGER (1)	Ending Geolocation Segment	1 Derived	The ending geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation.
end_gpssow COMPACT	DOUBLE (1)	Ending GPS SOW of Granule (Actual)	seconds Derived	GPS seconds-of-week of the last data point in the granule.
end_gpsweek COMPACT	INTEGER (1)	Ending GPSWeek of Granule (Actual)	weeks from 1980-01-06 Derived	GPS week number of the last data point in the granule.
end_orbit COMPACT	INTEGER (1)	Ending Orbit Number	1 Derived	The ending orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth.
end_region COMPACT	INTEGER (1)	Ending Region	1 Derived	The ending product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent.
end_rgt COMPACT	INTEGER (1)	Ending Reference Groundtrack	1 Derived	The ending reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
granule_end_utc COMPACT	STRING (1)	End UTC Time of Granule (CCSDS-A, Requested)	1 Derived	Requested end time (in UTC CCSDS-A) of this granule.
granule_start_utc COMPACT	STRING (1)	Start UTC Time of Granule (CCSDS-A, Requested)	1 Derived	Requested start time (in UTC CCSDS-A) of this granule.
qa_at_interval COMPACT	DOUBLE (1)	QA Along-Track Interval	1 control	Statistics time interval for along-track QA data.
release COMPACT	STRING (1)	Release Number	1 Operations	Release number of the granule. The release number is incremented when the software or ancillary data used to create the granule has been changed.
start_cycle	INTEGER	Starting Cycle	1	The starting cycle number associated with

COMPACT	(1)		Derived	the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission.
start_delta_time COMPACT	DOUBLE (1)	ATLAS Start Time (Actual) time	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the first data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
start_geoseg COMPACT	INTEGER (1)	Starting Geolocation Segment	1 Derived	The starting geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation.
start_gps_sow COMPACT	DOUBLE (1)	Start GPS SOW of Granule (Actual)	seconds Derived	GPS seconds-of-week of the first data point in the granule.
start_gpsweek COMPACT	INTEGER (1)	Start GPSWeek of Granule (Actual)	weeks from 1980-01-06 Derived	GPS week number of the first data point in the granule.
start_orbit COMPACT	INTEGER (1)	Starting Orbit Number	1 Derived	The starting orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth.
start_region COMPACT	INTEGER (1)	Starting Region	1 Derived	The starting product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent.
start_rgt COMPACT	INTEGER (1)	Starting Reference Groundtrack	1 Derived	The starting reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
version COMPACT	STRING (1)	Version	1 Operations	Version number of this granule within the release. It is a sequential number corresponding to the number of times the granule has been reprocessed for the current

release.

Group: /ancillary_data/atmosphere

Description	(Attribute)	Contains general ancillary parameters.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
a_m1 COMPACT	FLOAT (3)	a_m1	meters Atmosphere ATBD	a_m, anisotropy factor, to use for pass 1 (day, night, twilight)
a_m2 COMPACT	FLOAT (3)	a_m2	meters Atmosphere ATBD	a_m, anisotropy factor, to use for pass 2 (day, night, twilight)
aclr_use_atlas COMPACT	INTEGER (1)	ALR Use ATLAS Flag	1 Operations	Flag to control the computation of the aclr_true parameter. Flag Values: ['0', '1'] Flag Meanings: ['non_water_uses_gnome', 'non_water_uses_ATLAS_ASR']
alpha_day_pce1 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Day PCE1	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE1/day)
alpha_day_pce2 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Day PCE2	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE2/day)
alpha_day_pce3 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Day PCE3	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE3/day)
alpha_night_pce1 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Night PCE1	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE1/night)
alpha_night_pce2 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Night PCE2	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE2/night)
alpha_night_pce3 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Night PCE3	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE3/night)
alpha_twilight_pce1 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Twilight PCE1	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE1/twilight)
alpha_twilight_pce2 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Twilight PCE2	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE2/twilight)
alpha_twilight_pce3 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor Twilight PCE3	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE3/twilight)
asr_cal_factor COMPACT	FLOAT (1)	ASR CAL factor	1 Atmosphere ATBD	Calibration factor for ASR computation
atlas_bandpass_fw COMPACT	FLOAT (1)	ATLAS Bandpass Filter Width	nm Atmosphere ATBD	The ATLAS bandpass filter width.
atlas_tele_fov COMPACT	FLOAT (1)	ATLAS Telescope Field of View	radians Atmosphere ATBD	The ATLAS telescope field of view.
backg_max_solar_elev COMPACT	FLOAT (1)	Background maximum solar elevation angle	degrees Atmosphere ATBD section 3.3.4	Background maximum solar elevation angle in Method 1 bkgd comp
backg_min_solar_elev COMPACT	FLOAT (1)	Background minimum solar elevation angle	degrees Atmosphere ATBD section 3.3.4	Background minimum solar elevation angle in Method 1 bkgd comp

backg_select COMPACT	INTEGER (1)	background method used	1 Atmosphere ATBD section 3.3.4	The background method used in calculation of NRB Flag Values: ['1', '2', '3'] Flag Meanings: ['method1', 'method2', 'method3']
bs_extinc_backs COMPACT	FLOAT (1)	Blowing Snow to Extinction Backscatter Ratio	sr Atmosphere ATBD	blowing snow extinct to backscatter ratio
bs_lay_max_size COMPACT	FLOAT (1)	blowing snow maximum layer size	m Atmosphere ATBD	blowing snow maximum layer size
bs_thresh_scale COMPACT	FLOAT (1)	scale factor for blowing snow threshold	1 Atmosphere ATBD	scale factor for blowing snow threshold
bs_top_scale COMPACT	FLOAT (1)	scale factor for layer top threshold	1 Atmosphere ATBD	scale factor for layer top threshold
bs_wind_thres COMPACT	FLOAT (1)	scale factor for layer top threshold	m/s Atmosphere ATBD	minimum windspeed for blowing snow
cal_bot_ht COMPACT	FLOAT (1)	cal_bot_ht	m Atmosphere ATBD	Bottom height of calibration zone (m)
cal_default COMPACT	FLOAT (1)	Default calibration value	1 Atmosphere ATBD	Calibration constant default if it cannot be calculated from the data.
cal_lat_bound COMPACT	DOUBLE (1)	cal_lat_bound	degrees_north Atmosphere ATBD	Calibration constant latitude bound (deg_north)
cal_select COMPACT	INTEGER (1)	calibration method used	1 Atmosphere ATBD section 3.3.4	The calibration method used in calculation of NRB Flag Values: ['1', '2', '3'] Flag Meanings: ['method1', 'method2', 'method3']
cal_top_ht COMPACT	FLOAT (1)	cal_top_ht	m Atmosphere ATBD	Top height of calibration zone (m)
cutoff1 COMPACT	FLOAT (3)	cutoff1	1 Atmosphere ATBD	cutoff to use for pass 1 (day, night, twilight)
cutoff2 COMPACT	FLOAT (3)	cutoff2	1 Atmosphere ATBD	cutoff to use for pass 2 (day, night, twilight)
detector_efficiency COMPACT	FLOAT (1)	Detector Quantum Efficiency	1 Atmosphere ATBD	Detector quantum efficiency (Qe)
downsample1 COMPACT	FLOAT (3)	downsample1	bins Atmosphere ATBD	downsample to use for pass 1 (day, night, twilight)
downsample2 COMPACT	FLOAT (3)	downsample2	bins Atmosphere ATBD	downsample to use for pass 2 (day, night, twilight)
dtime_select COMPACT	INTEGER (1)	dead time factor used	1 Control	Deadtime factor used. Flag Values: ['1', '2'] Flag Meanings: ['dtime_fact1', 'dtime_fact2']
grd_search_width COMPACT	INTEGER (1)	Ground search width	bins Atmosphere ATBD, part 2 section 13.2	Ground search width in DDA surface finding algorithm
layer_flag_cp1 COMPACT	INTEGER (1)	Layer Flag CP 1	1 Atmosphere ATBD	Cloud_flag_ASR value used in the computation of the consolidated layer flag during daytime when cloud layers were detected.
layer_flag_cp2 COMPACT	INTEGER (1)	Layer Flag CP 2	1 Atmosphere ATBD	Cloud_flag_ASR value used in the computation of the consolidated layer flag during daytime when no cloud layers were detected.
layer_sep	INTEGER	minimum layer separation	bins	minimum layer separation

COMPACT	(1)		Atmosphere ATBD	
layer_thick COMPACT	INTEGER (1)	minimum layer thickness	bins Atmosphere ATBD	minimum layer thickness
lr_bsnow_fac CHUNKED	FLOAT (:)	Low rate blowing snow factor	1 Atmosphere ATBD	Low rate blowing snow scaling factor
max_layers COMPACT	INTEGER (1)	maximum cloud layers for a profile	bins Atmosphere ATBD	maximum cloud layers for a profile
neighborhood1 COMPACT	FLOAT (1)	neighborhood1	bins Atmosphere ATBD	neighborhood to use for pass 1
neighborhood2 COMPACT	FLOAT (1)	neighborhood2	bins Atmosphere ATBD	neighborhood to use for pass 2
normalization1 COMPACT	INTEGER_1 (1)	normalization1	1 Atmosphere ATBD	normalization flag to use for pass 1 Flag Values: ['0', '1'] Flag Meanings: ['true', 'false']
normalization2 COMPACT	INTEGER_1 (1)	normalization2	1 Atmosphere ATBD	normalization flag to use for pass 2 Flag Values: ['0', '1'] Flag Meanings: ['true', 'false']
num_passes COMPACT	INTEGER_1 (3)	number of passes	1 Atmosphere ATBD	Flag indicating if cloud detection algorithm does one pass or two passes (day, night, twilight) Flag Values: ['0', '1'] Flag Meanings: ['one', 'two']
phi_land COMPACT	FLOAT (1)	phi land	1 Atmosphere ATBD, part 1, section 4.6.2.3	Factor for correcting the potential clear sky ASR biases for land
phi_ocean COMPACT	FLOAT (1)	phi ocean	1 Atmosphere ATBD, part 1, section 4.6.2.3	Factor for correcting the potential clear sky ASR biases for ocean
planck_const COMPACT	DOUBLE (1)	Planck constant (h)	Js Atmosphere ATBD section 2	Planck constant (h)
proc_interval COMPACT	DOUBLE (1)	amount of data processed at one time	s Atmosphere ATBD	amount of data processed at one time
quantile1 COMPACT	FLOAT (3)	quantile1	1 Atmosphere ATBD	quantile to use for pass 1 (day, night, twilight)
quantile2 COMPACT	FLOAT (3)	quantile2	1 Atmosphere ATBD	quantile to use for pass 2 (day, night, twilight)
receiver_optical_throughput COMPACT	FLOAT (1)	Receiver Optics Throughput	1 Atmosphere ATBD	Nominal Receiver Optics Throughput
sigma1 COMPACT	FLOAT (3)	sigma1	meters Atmosphere ATBD	sigma to use for pass 1 (day, night, twilight)
sigma2 COMPACT	FLOAT (3)	sigma2	meters Atmosphere ATBD	sigma to use for pass 2 (day, night, twilight)
size_threshold1 COMPACT	FLOAT (3)	size_threshold1	bins Atmosphere ATBD	size_threshold, minimum cluster size, to use for pass 1 (day, night, twilight)
size_threshold2 COMPACT	FLOAT (3)	size_threshold2	bins Atmosphere ATBD	size_threshold, minimum cluster size, to use for pass 2 (day, night, twilight)
snow_age COMPACT	FLOAT (1)	Snow Age	hours Atmosphere ATBD	Age of the snow on the ground.
solar_flux COMPACT	FLOAT (1)	Solar Flux	W/(m ² nm)) Atmosphere ATBD	Solar flux at the top of the atmosphere at 532nm.
surf_min	INTEGER	minimum count for a surface type	counts	minimum count for a surface type to be

COMPACT	(1)	to be considered separate surface type	Atmosphere ATBD	considered separate surface type
surface_signal_source COMPACT	INTEGER (1)	Signal Source Flag	1 Atmosphere ATBD	Indicates the source of signal information used by ASR. Flag Values: ['1', '2'] Flag Meanings: ['use_atl04', 'use_atl03']
telescope_area COMPACT	DOUBLE (1)	Telescope Effective Area	sq meters Atmosphere ATBD	Effective collection area of telescope (At)
thresh_bias1 COMPACT	FLOAT (3)	thresh_bias1	photons* square meter/Joule Atmosphere ATBD	thresh_bias to use for pass 1 (day, night, twilight)
thresh_bias2 COMPACT	FLOAT (3)	thresh_bias2	photons* square meter/Joule Atmosphere ATBD	thresh_bias to use for pass 2 (day, night, twilight)
thresh_sensitivity1 COMPACT	FLOAT (3)	thresh_sensitivity1	1 Atmosphere ATBD	thresh_sensitivity to use for pass 1 (day, night, twilight)
thresh_sensitivity2 COMPACT	FLOAT (3)	thresh_sensitivity2	1 Atmosphere ATBD	thresh_sensitivity to use for pass 2 (day, night, twilight)
threshold_segment_length1 COMPACT	FLOAT (3)	threshold_segment_length1	bins Atmosphere ATBD	threshold_segment_length to use for pass 1 (day, night, twilight)
threshold_segment_length2 COMPACT	FLOAT (3)	threshold_segment_length2	bins Atmosphere ATBD	threshold_segment_length to use for pass 2 (day, night, twilight)

Group: /orbit_info

Description	(Attribute)	Contains orbit information.		
data_rate	(Attribute)	Varies. Data are only provided when one of the stored values (besides time) changes.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
crossing_time CHUNKED	DOUBLE (:)	Ascending Node Crossing Time time	seconds since 2018-01-01 POD/PPD	The time, in seconds since the ATLAS SDP GPS Epoch, at which the ascending node crosses the equator. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
cycle_number CHUNKED	INTEGER_1 (:)	Cycle Number	1 Operations	A count of the number of exact repeats of this reference orbit.
lan CHUNKED	DOUBLE (:)	Ascending Node Longitude	degrees_east POD/PPD	Longitude at the ascending node crossing.
orbit_number CHUNKED	UINT_2_LE (:)	Orbit Number	1 Operations	Unique identifying number for each planned ICESat-2 orbit.
rgt CHUNKED	INTEGER_2 (:)	Reference Ground track	1 POD/PPD	The reference ground track (RGT) is the track on the earth at which a specified unit vector within the observatory is pointed. Under nominal operating conditions, there will be no data collected along the RGT, as the RGT is spanned by GT3 and GT4. During slews or off-pointing, it is possible that ground tracks may intersect the RGT. The ICESat-2 mission has 1387 RGTs.
sc_orient CHUNKED	INTEGER_1 (:)	Spacecraft Orientation	1 POD/PPD	This parameter tracks the spacecraft orientation between forward, backward and transitional flight modes. ICESat-2 is

				<p>considered to be flying forward when the weak beams are leading the strong beams; and backward when the strong beams are leading the weak beams. ICESat-2 is considered to be in transition while it is maneuvering between the two orientations. Science quality is potentially degraded while in transition mode.</p> <p>Flag Values: ['0', '1', '2'] Flag Meanings: ['backward', 'forward', 'transition']</p>
sc_orient_time CHUNKED	DOUBLE (:)	Time of Last Spacecraft Orientation Change time	seconds since 2018-01-01 POD/PPD	<p>The time of the last spacecraft orientation change between forward, backward and transitional flight modes, expressed in seconds since the ATLAS SDP GPS Epoch. ICESat-2 is considered to be flying forward when the weak beams are leading the strong beams; and backward when the strong beams are leading the weak beams. ICESat-2 is considered to be in transition while it is maneuvering between the two orientations. Science quality is potentially degraded while in transition mode. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.</p>
Group: /profile_x				
Description	(Attribute)	Each group contains the segments for the strong beam of one Pair Track. As ICESat-2 orbits the earth, sequential transmit pulses illuminate six ground tracks on the surface of the earth. The track width is approximately 14m. The Atmosphere profiles are only reported for the strong beam. Profiles are numbered from the left to the right in the direction of spacecraft travel as: 1 for the left-most pair of beams; 2 for the center pair of beams; and 3 for the right-most pair of beams.		
data_rate	(Attribute)	See subgroups for individual data rates.		
Group: /profile_x/bckgrd_atlas				
Description	(Attribute)	Contains the ATLAS 50-shot background data and derivations.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bckgrd_counts CHUNKED	INTEGER (:)	ATLAS 50-shot background count	counts ATL03 ATBD Section 7.3	Onboard 50 shot background (200 Hz) sum of photon events within the altimetric range window.
bckgrd_counts_reduced CHUNKED	INTEGER (:)	ATLAS 50-shot background count - reduced	counts ATL03 ATBD Section 7.3	Number of photon counts in the 50-shot sum after subtracting the number of signal photon events, defined as in ATBD Section 5, in that span.
bckgrd_hist_top CHUNKED	FLOAT (:)	Top of the altimetric range window	meters ATL03 ATBD Section 7.3	The height of the top of the altimetric histogram, in meters above the WGS-84 ellipsoid, with all geophysical corrections applied. Parameter is ingested at 50-Hz, and values are repeated to form a 200-Hz array.
bckgrd_int_height CHUNKED	FLOAT (:)	Altimetric range window width	meters ATL03 ATBD Section 7.3	The height of the altimetric range window. This is the height over which the 50-shot sum is generated. Parameter is ingested at 50-Hz, and values are repeated to form a 200-Hz array.

bckgrd_int_height_reduced CHUNKED	FLOAT (:)	Altimetric range window height - reduced	meters ATL03 ATBD Section 7.3	The height of the altimetric range window after subtracting the height span of the signal photon events in the 50-shot span.
bckgrd_rate CHUNKED	FLOAT (:)	Background count rate based on the ATLAS 50-shot sum	counts / second ATL03 ATBD Section 7.3	The background count rate from the 50-shot altimetric histogram after removing the number of likely signal photons based on Section 5.
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts ATL02	Major Frame ID - The major frame ID is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID

Group: /profile_x/high_rate

Description	(Attribute)	Contains parameters related to Calibrated Attenuated Backscatter at 25 hz		
data_rate	(Attribute)	Data in this group is stored at a 25hz (25 per second) rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
aclr_true CHUNKED	FLOAT (:)	Clear sky ASR	1 Atmosphere ATBD	Clear sky initial surface reflectance based on GOME climatology or Cox-Munk model: see Fig 3.6.5 of the Atmosphere ATBD.
apparent_surf_reflec CHUNKED	FLOAT (:)	Apparent Surface Reflectance	1 Atmosphere ATBD	Apparent Surface Reflectance (ASR): Eqn 4.7
asr_cloud_probability CHUNKED	INTEGER (:)	ASR cloud probability	1 Atmosphere ATBD part 1 (section 4.6.2.3)	Probability of the occurrence of cloud based on the magnitude of the apparent surface reflectivity.
backg_c CHUNKED	FLOAT (:)	Background	counts Atmosphere ATBD	Background, in photons/bin, used in the NRB Computation.
backg_theoret CHUNKED	FLOAT (:)	Background (Theoretical)	photons/bin Atmosphere ATBD	The theoretical background, in photons/bin.
beam_azimuth CHUNKED	FLOAT (:)	beam azimuth	degrees_east ATL03 ATBD	Beam azimuth
beam_elevation CHUNKED	FLOAT (:)	beam elevation	degrees ATL03 ATBD	Beam elevation
bsnow_con CHUNKED	INTEGER_1 (:)	Blowing snow confidence	1 Atmosphere ATBD	Blowing snow confidence. -3=surface not detected; -2=no surface wind; -1=no scattering layer found; 0=no top layer found; 1=none-little; 2=weak; 3=moderate; 4=moderate-high; 5=high; 6=very high Flag Values: ['-3', '-2', '-1', '0', '1', '2', '3', '4', '5', '6'] Flag Meanings: ['surface_not_detected', 'no_surface_wind', 'no_scattering_layer_found',

				'no_top_layer_found', 'none_little', 'weak', 'moderate', 'moderate_high', 'high', 'very_high']
bsnow_dens CHUNKED	FLOAT (:)	Blowing snow density	1 Atmosphere ATBD	Blowing snow layer density
bsnow_h CHUNKED	FLOAT (:)	Blowing Snow layer thickness	meters Atmosphere ATBD	Blowing Snow layer thickness (height of top above surface)
bsnow_h_dens CHUNKED	FLOAT (:)	Blowing Snow layer thickness from density	meters Atmosphere ATBD	Blowing Snow layer thickness from density (height of top above surface)
bsnow_intensity CHUNKED	FLOAT (:)	Blowing snow intensity	meters/second Atmosphere ATBD part I (section 4.5.3)	Blowing snow intensity defined as the average scattering ratio within the blowing snow layer times the 10 m wind speed.
bsnow_od CHUNKED	FLOAT (:)	Blowing snow OD	1 Atmosphere ATBD	Blowing snow layer optical depth
bsnow_psc CHUNKED	INTEGER_1 (:)	Blowing snow PSC flag	1 Atmosphere ATBD Section 4.5	Blowing snow PSC flag. Indicates the potential for polar stratospheric clouds to affect the blowing snow retrieval, where 0=none and 3=maximum. This flag is a function of month and hemisphere and is only applied poleward of 60 north and south. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['none', 'slight', 'moderate', 'maximum_bsnow_PSC_affected']
cab_prof CHUNKED	FLOAT (: x 700)	Calibrated Attenuated Backscatter	1 Atmosphere ATBD	Calibrated Attenuated Backscatter from 20 to -1 km with vertical resolution of 30m (eqn 4.1)
cloud_flag_asr CHUNKED	INTEGER_1 (:)	Cloud Flag ASR	1 Atmosphere ATBD	Cloud flag (probability) from apparent surface reflectance. 0=clear with high confidence; 1=clear with medium confidence; 2=clear with low confidence; 3=cloudy with low confidence; 4=cloudy with medium confidence; 5=cloudy with high confidence Flag Values: ['0', '1', '2', '3', '4', '5'] Flag Meanings: ['clear_with_high_confidence', 'clear_with_medium_confidence', 'clear_with_low_confidence', 'cloudy_with_low_confidence', 'cloudy_with_medium_confidence', 'cloudy_with_high_confidence']
cloud_flag_atm CHUNKED	INTEGER_1 (:)	Cloud Flag Atm	1 Atmosphere ATBD	Number of layers found from the backscatter profile using the DDA layer finder.
cloud_fold_flag CHUNKED	INTEGER_1 (:)	Cloud Folding Flag	1 Atmosphere ATBD	Flag that indicates this profile likely contains cloud signal folded down from above 15 km to the last 2-3 km of the profile. See ATBD Table 3.9 for detailed flag value meanings Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['no_folding', 'goes5_indicates', 'profile_indicates', 'both_indicate']
column_od_asr CHUNKED	FLOAT (:)	Optical depth from ASR	1 Atmosphere ATBD	Optical depth of atmosphere column based on apparent surface reflectance and the assumed actual surface reflectance.
column_od_asr_qf CHUNKED	INTEGER_1 (:)	Optical depth ASR quality	1 Atmosphere ATBD	Total column optical depth from ASR quality flag. The total atmosphere column particulate optical depth can be computed from the apparent surface reflectance if the actual surface reflectance is well known. The flag indicates the surface type over which the flag

				is computed in the order from unable to compute (0 - no_surface_signal) to best quality (4=water). Flag Values: ['0', '1', '2', '3', '4'] Flag Meanings: ['no_signal', 'land', 'sea_ice', 'land_ice', 'water']
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 Atmosphere ATBD	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
dem_flag CHUNKED	INTEGER_1 (:)	dem source flag	1 Atmosphere ATBD	Indicates source of the DEM height. Values: 0=None, 1=Arctic, 2=GMTED, 3=MSS, 4=Antarctic. Flag Values: ['0', '1', '2', '3', '4'] Flag Meanings: ['none', 'arctic', 'gmted', 'mss', 'antarctic']
dem_h CHUNKED	FLOAT (:)	DEM Height	meters Atmosphere ATBD	Best available DEM (in priority of Arctic/Antarctic/GMTED/MSS) value at the geolocation point.
density_pass1 CHUNKED	FLOAT (: x 700)	Density profile - pass1	1 Atmosphere ATBD Part II	Density profiles from pass 1.
density_pass2 CHUNKED	FLOAT (: x 700)	Density profile - pass2	1 Atmosphere ATBD Part II	Density profiles from pass 2.
ds_layers COMPACT	INTEGER (10)	Cloud Layers Dimension Scale	counts Atmosphere ATBD	Dimension scale indexing the cloud layers.
ds_va_bin_h COMPACT	FLOAT (700)	VA Bin Height Dimension Scale	meters Atmosphere ATBD	Dimension scale containing the heights of the vertically-aligned bins.
dtime_fac1 CHUNKED	FLOAT (:)	dead_time_factor1	1 Atmosphere ATBD	Dead time correction factor for surface signal computed from radiometric lookup table.
dtime_fac2 CHUNKED	FLOAT (:)	dead_time_factor2	1 Atmosphere ATBD	Dead time correction factor for surface signal computed from ATBD equation 2.1.
latitude CHUNKED	DOUBLE (:)	Latitude of the ATM histogram latitude	degrees_north ATL03g ATBD	Latitude at the the top of the ATM histogram, WGS84, North=+, Derived from the geolocation of the ATM range window.
layer_attr CHUNKED	INTEGER_1 (: x 10)	Layer attribute flag	1 Atmosphere ATBD	Layer attribute flag for each of the possible 10 layers. Indicates (0) no_layer (1) cloud, (2) aerosol or (3) unknown. Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['no_layer', 'cloud', 'aerosol', 'unknown']
layer_bot CHUNKED	FLOAT (: x 10)	Height layer bottoms	meter Atmosphere ATBD	Height of bottom of detected layers
layer_con CHUNKED	INTEGER (: x 10)	Layer confidence flag	1 Atmosphere ATBD	Layer confidence flag for each layer
layer_conf_dens CHUNKED	FLOAT (: x 10)	Layer confidence from density	1 Atmosphere ATBD Part II, Section 11	The measure layer confidence from density-dimension algorithm is calculated for each detected cloud layer, quantifies the confidence of detection of a given layer from

				the density values. Layer_conf_dens fall between zero and 1. Confidence close to 1 is high, close to zero is low.
layer_dens CHUNKED	FLOAT (: x 10)	Layer Density	1 Atmosphere ATBD	Layer Density
layer_flag CHUNKED	INTEGER_1 (:)	Consolidated cloud flag	1 Atmosphere ATBD	This flag is a combination of multiple flags (cloud_flag_atm, cloud_flag_asr, and bsnow_con) and takes daytime/nighttime into consideration. A value of 1 means clouds or blowing snow are likely present. A value of 0 indicates the likely absence of clouds or blowing snow. Flag Values: ['0', '1'] Flag Meanings: ['likely_clear', 'likely_cloudy']
layer_ib CHUNKED	FLOAT (: x 10)	Layer integrated backscatter	1 Atmosphere ATBD	Layer integrated backscatter
layer_top CHUNKED	FLOAT (: x 10)	Height layer tops	meters Atmosphere ATBD	Height of top of detected layers
longitude CHUNKED	DOUBLE (:)	Longitude of the ATM histogram longitude	degrees_east ATL03g ATBD	Longitude at the the top of the ATM histogram, WGS84, East=+, derived from the geolocation of the ATM range window.
msw_flag CHUNKED	INTEGER_1 (:)	Multiple Scattering Warning Flag	1 Atmosphere ATBD	Multiple Scattering warning flag. The multiple scattering warning flag (ATL09 parameter msw_flag) has values from -1 to 5 where zero means no multiple scattering and 5 the greatest. If no layers were detected, then msw_flag = 0. If blowing snow is detected and its estimated optical depth is greater than or equal to 0.5, then msw_flag = 5. If the blowing snow optical depth is less than 0.5, then msw_flag = 4. If no blowing snow is detected but there are cloud or aerosol layers detected, the msw_flag assumes values of 1 to 3 based on the height of the bottom of the lowest layer: < 1 km, msw_flag = 3; 1-3 km, msw_flag = 2; > 3km, msw_flag = 1. A value of -1 indicates that the signal to noise of the data was too low to reliably ascertain the presence of cloud or blowing snow. We expect values of -1 to occur only during daylight. Flag Values: ['-1', '0', '1', '2', '3', '4', '5'] Flag Meanings: ['cannot_determine', 'no_layers', 'layer_gt_3km', 'layer_between_1_and_3_km', 'layer_lt_1km', 'blow_snow_od_lt_0.5', 'blow_snow_od_gt_0.5']
ocean_surf_reflec CHUNKED	FLOAT (:)	Ocean Surface Reflectance	1 Atmosphere ATBD	Ocean Surface Reflectance from Eqn 4.10 based on the Cox-Munk model.
pce_mframe_cnt CHUNKED	UINT_4_LE (:)	PCE Major frame counter	counts ATL02	Major Frame Counter - The major frame counter is read from the DFC and starts counting at DFC POR. The counter is used to identify individual major frames across diag and science packets. This counter can go for about 2.7 years before rolling over. It is in the first time tag science packet. Used as part of the photon ID
prof_dist_x CHUNKED	DOUBLE (:)	Along Track Distance	meters ATL03g ATBD, Section 3.4	Along-track distance from the equator crossing.
prof_dist_y	FLOAT	Across Track Distance from RGT	meters	Across-Track distance from the reference

CHUNKED	(:)		ATL03g ATBD, Section 3.4	ground track.
range_to_top CHUNKED	FLOAT (:)	Range	meters Atmosphere ATBD	Range from the spacecraft to the top of the atmosphere range window.
segment_id CHUNKED	INTEGER (:)	along-track segment ID number.	1 ATL03 ATBD, Section 3.1	A 7 digit number identifying the along-track geolocation segment number. These are sequential, starting with 1 for the first segment after an ascending equatorial crossing node.
sig_count_hi CHUNKED	INTEGER (:)	Count of Signa Heightsl - High	counts ATL03 ATBD, Section 5	Count of high-confidence signal photons
sig_count_low CHUNKED	INTEGER (:)	Count of Signal Heights - Low	counts ATL03 ATBD, Section 5	Count of low-confidence signal photons
sig_count_med CHUNKED	INTEGER (:)	Count of Signal Heights - Medium	counts ATL03 ATBD, Section 5	Count of medium-confidence signal photons
sig_h_mean_hi CHUNKED	FLOAT (:)	Mean of SignalHeights - High	meters ATL03 ATBD, Section 5	Mean height of high-confidence signal photons
sig_h_mean_low CHUNKED	FLOAT (:)	Mean of Signal Heights - Low	meters ATL03 ATBD, Section 5	Mean height of low-confidence signal photons
sig_h_mean_med CHUNKED	FLOAT (:)	Mean of Signa Heightsl - Med	meters ATL03 ATBD, Section 5	Mean height of medium-confidence signal photons
sig_h_sdev_hi CHUNKED	FLOAT (:)	SDev of Signal Heights -High	meters ATL03 ATBD, Section 5	SDev of the heights of high-confidence signal photons
sig_h_sdev_low CHUNKED	FLOAT (:)	SDev of Signal Heights -Low	meters ATL03 ATBD, Section 5	SDev of the heights of low-confidence signal photons
sig_h_sdev_med CHUNKED	FLOAT (:)	SDev of Signa Heightsl -Med	meters ATL03 ATBD, Section 5	SDev of the heights of medium-confidence signal photons
snow_ice CHUNKED	INTEGER (:)	Snow Ice Flag	1 Atmosphere ATBD	NOAA snow-ice flag. 0=ice free water; 1=snow free land; 2=snow; 3=ice Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['ice_free_water', 'snow_free_land', 'snow', 'ice']
solar_azimuth CHUNKED	FLOAT (:)	solar azimuth	degrees_east ATL03g ATBD	The direction, eastwards from north, of the sun vector as seen by an observer at the laser ground spot.
solar_elevation CHUNKED	FLOAT (:)	solar elevation	degrees ATL03g ATBD	Solar Angle above or below the plane tangent to the ellipsoid surface at the laser spot. Positive values mean the sun is above the horizon, while negative values mean it is below the horizon. The effect of atmospheric refraction is not included. This is a low precision value, with approximately TBD degree accuracy.
surf_refl_true CHUNKED	FLOAT (:)	Estimated Surface Reflectance	1 Atmosphere ATBD	The value of the clear-sky surface reflectivity to use in the computation of total column optical depth and cloud detection from the measures apparent surface reflectance (ASR).
surf_type	INTEGER_1	surface type	1	Flags describing which surface types this

CHUNKED	(: x 5)		ATL03 ATBD, Section 4	interval is associated with. 0=not type, 1=is type. Order of array is land, ocean, sea ice, land ice, inland water. Flag Values: ['0', '1'] Flag Meanings: ['not_type', 'is_type']
surf_type_igbp CHUNKED	INTEGER_1 (:)	IGBP Surface Type	1 Atmosphere ATBD, IGBP Surface Type	IGBP Surface Type
surface_bin CHUNKED	INTEGER (:)	Surface bin	1 Atmosphere ATBD section 3.3.5	Vertically aligned, NRB bin number of the detected surface return.
surface_h_dens CHUNKED	FLOAT (:)	Surface h from density	meters Atmosphere ATBD	Surface height from density
surface_height CHUNKED	FLOAT (:)	Surface height	meters Atmosphere ATBD section 3.3.5	Height of the detected surface bin.
surface_sig CHUNKED	FLOAT (:)	Surface signal count	counts Atmosphere ATBD section 3.3.5	Number of photons in the detected surface bin.
tx_pulse_energy CHUNKED	FLOAT (:)	Transmit Pulse Energy	Joules ATL02 ATBD, Section 7.2	Transmit energy, from the laser internal energy monitor, split into per-beam measurements.
Group: /profile_x/low_rate				
Description	(Attribute)	Contains parameters related to atmosphere characteristic at 1 hz		
data_rate	(Attribute)	Data in this group is stored at a 1hz (1 per second) rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
bsnow_con CHUNKED	INTEGER_1 (:)	Blowing snow confidence	1 Atmosphere ATBD	Blowing snow confidence. -3=surface not detected; -2=no surface wind;-1=no scattering layer found; 0=no top layer found; 1=none-little; 2=weak; 3=moderate; 4=moderate-high; 5=high; 6=very high Flag Values: ['-3', '-2', '-1', '0', '1', '2', '3', '4', '5', '6'] Flag Meanings: ['surface_not_detected', 'no_surface_wind', 'no_scattering_layer_found', 'no_top_layer_found', 'none_little', 'weak', 'moderate', 'moderate_high', 'high', 'very_high']
bsnow_h CHUNKED	FLOAT (:)	Blowing Snow layer thickness	meters Atmosphere ATBD	Blowing Snow layer thickness (height of top above surface)
bsnow_intensity CHUNKED	FLOAT (:)	Blowing Snow Intensity	meters/second Atmosphere ATBD	Blowing snow intensity defined as the average scattering ratio within the blowing snow layer times the 10 m wind speed.
bsnow_od CHUNKED	FLOAT (:)	Blowing snow OD	1 Atmosphere ATBD	Blowing snow layer optical depth
bsnow_prob CHUNKED	FLOAT (:)	Blowing Snow Probability	1 Atmosphere ATBD Section 4.5.1	The probability of blowing snow based on meteorological data.
bsnow_psc CHUNKED	INTEGER_1 (:)	Blowing snow PSC flag	1 Atmosphere ATBD Section 4.5	Blowing snow PSC flag. Indicates the potential for polar stratospheric clouds to affect the blowing snow retrieval, where 0=none and 3=maximum. This flag is a function of month and hemisphere and is only applied poleward of 60 north and south.

				Flag Values: ['0', '1', '2', '3'] Flag Meanings: ['none', 'slight', 'moderate', 'maximum_bsnow_PSC_affected']
cal_c CHUNKED	FLOAT (:)	Calibration Constant	Photons*m ³ *sr / J Atmosphere ATBD	Calibration Constant (for each beam at 1 Hz)
delta_time CHUNKED	DOUBLE (:)	Elapsed GPS seconds time	seconds since 2018-01-01 telemetry	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_va_bin_h COMPACT	FLOAT (700)	VA Bin Height Dimension Scale	meters Atmosphere ATBD	Dimension scale containing the heights of the vertically-aligned bins.
latitude CHUNKED	DOUBLE (:)	Latitude of the ATM histogram latitude	degrees_north ATL03g ATBD	Latitude at the the top of the ATM histogram, WGS84, North=+, Derived from the geolocation of the ATM range window.
longitude CHUNKED	DOUBLE (:)	Longitude of the ATM histogram longitude	degrees_east ATL03g ATBD	Longitude at the the top of the ATM histogram, WGS84, East=+, derived from the geolocation of the ATM range window.
met_cldprs CHUNKED	FLOAT (:)	cloud_top_pressure pressure	Pa GEOS5 FPIT 2D DFPITT1NXSLV	Pressure of the highest cloud top at this location from GEOS5 data
met_ps CHUNKED	FLOAT (:)	Surface Pressure pressure	Pa GEOS5 FPIT 3D DFPITI3NVASM	Surface Pressure (Pa)
met_qv10m CHUNKED	FLOAT (:)	specific_humidity_at_10m specific_humidity	kg kg-1 GEOS5 FPIT 2D DFPITT1NXSLV	Specific humidity at 10 m above the displacement height
met_qv2m CHUNKED	FLOAT (:)	specific_humidity_at_2m specific_humidity	kg kg-1 GEOS5 FPIT 2D DFPITT1NXSLV	Specific humidity at 2 m above the displacement height
met_slp CHUNKED	FLOAT (:)	sea_level_pressure sea_level_pressure	Pa GEOS5 FPIT 3D DFPITI3NVASM	sea-level pressure (Pa)
met_t10m CHUNKED	FLOAT (:)	temperature_at_10m temperature	K GEOS5 FPIT 2D DFPITT1NXSLV	Temperature at 10m above the displacement height (K)
met_t2m CHUNKED	FLOAT (:)	temperature_at_2m temperature	K GEOS5 FPIT 2D DFPITT1NXSLV	Temperature at 2m above the displacement height (K)
met_tqi CHUNKED	FLOAT (:)	cloud_ice	kg m-2 GEOS5 FPIT 2D DFPITT1NXSLV	Total column cloud ice (Kg/m2)
met_tql CHUNKED	FLOAT (:)	cloud_liquid_water	kg m-2 GEOS5 FPIT 2D DFPITT1NXSLV	Total column cloud liquid water (kg/m2)
met_troppb CHUNKED	FLOAT (:)	blended_tropopause_pressure pressure	Pa GEOS5 FPIT 2D DFPITT1NXSLV	Blended tropopause pressure (pa)
met_tropt CHUNKED	FLOAT (:)	blended_tropopause_temperature temperature	K GEOS5 FPIT 2D DFPITT1NXSLV	Tropopause temperature (k)
met_ts	FLOAT	surface_temperature	K	Surface skin temperature (K)

CHUNKED	(:)	temperature	GEOS5 FPIT 2D DFPITT1NXSLV	
met_u10m CHUNKED	FLOAT (:)	Eastward_wind_at_10m eastward_wind	m s-1 GEOS5 FPIT 2D DFPITT1NXSLV	Eastward wind at 10m above the displacement height (m/s-1)
met_u2m CHUNKED	FLOAT (:)	Eastward_wind_at_2m eastward_wind	m s-1 GEOS5 FPIT 2D DFPITT1NXSLV	Eastward wind at 2m above the displacement height (m/s-1)
met_u50m CHUNKED	FLOAT (:)	Eastward_wind_at_50m eastward_wind	m s-1 GEOS5 FPIT 2D DFPITT1NXSLV	Eastward wind at 50m above the displacement height (m/s-1)
met_v10m CHUNKED	FLOAT (:)	Northward_wind_at_10m northward_wind	m s-1 GEOS5 FPIT 2D DFPITT1NXSLV	Northward wind at 10m above the displacement height (m/s-1)
met_v2m CHUNKED	FLOAT (:)	Northward_wind_at_2m northward_wind	m s-1 GEOS5 FPIT 2D DFPITT1NXSLV	Northward wind at 2m above the displacement height (m/s-1)
met_v50m CHUNKED	FLOAT (:)	northward_wind_at_50m northward_wind	m s-1 GEOS5 FPIT 2D DFPITT1NXSLV	Northward wind at 50m above the displacement height (m/s-1)
mol_backs_folded CHUNKED	FLOAT (: x 700)	Folded molecular transmission profile	m-1 sr-1 Atmosphere ATBD	Folded molecular transmission profile, 30 m resolution, , m-1 sr-1; 20 km to -1 km (equation 3.17)
mol_backscatter CHUNKED	FLOAT (: x 700)	Molecular backscatter profile	m-1 sr-1 Atmosphere ATBD	Molecular backscatter profile, 30 m resolution, 20 km to -1 km
molec_bkscat_p CHUNKED	FLOAT (: x 700)	Pressure profile	Pa Atmosphere ATBD	Pressure profiles from 20 km to -1 km
molec_bkscat_rh CHUNKED	FLOAT (: x 700)	Relative humidity profiles	percentage Atmosphere ATBD	Relative humidity profiles from 20 km to -1 km
molec_bkscat_t CHUNKED	FLOAT (: x 700)	Temperature profile	K Atmosphere ATBD	Temperature profiles from 20 km to -1 km
molec_trans CHUNKED	FLOAT (: x 700)	Molecular transmission profile	1 Atmosphere ATBD	Molecular transmission profile, 30 m resolution, 20 km to -1 km
surf_type CHUNKED	INTEGER_1 (: x 5)	surface type	1 ATL03 ATBD, Section 4	Flags describing which surface types this interval is associated with. 0=not type, 1=is type. Order of array is land, ocean, sea ice, land ice, inland water. Flag Values: ['0', '1'] Flag Meanings: ['not_type', 'is_type']

Group: /quality_assessment

Description	(Attribute)	Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_granule_fail_reason COMPACT	INTEGER (1)	Granule Failure Reason	1 Operations	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=Insufficient output data was generated; 3=TBD Failure; 4=TBD_Failure; 5=other failure. Flag Values: ['0', '1', '2', '3', '4', '5'] Flag Meanings: ['no_failure', 'PROCESS_ERROR', 'INSUFFICIENT_OUTPUT', 'failure_3', 'failure_4', 'OTHER_FAILURE']
qa_granule_pass_fail COMPACT	INTEGER (1)	Granule Pass Flag	1 Operations	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA.

Flag Values: ['0', '1']
Flag Meanings: ['PASS', 'FAIL']

Group: /quality_assessment/profile_x				
Description	(Attribute)	Contains per-profile quality assessment data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
asr_avg CONTIGUOUS	FLOAT (1)	ASR Average	1 Atmosphere ATBD	Apparent surface reflectance average
asr_max CONTIGUOUS	FLOAT (1)	ASR Maximum	1 Atmosphere ATBD	Apparent surface reflectance maximum
asr_min CONTIGUOUS	FLOAT (1)	ASR Minimum	1 Atmosphere ATBD	Apparent surface reflectance minimum
asr_std CONTIGUOUS	FLOAT (1)	ASR Standard Deviation	1 Atmosphere ATBD	Apparent surface reflectance stdev
cab_mol_avg CONTIGUOUS	FLOAT (1)	CAB molec Avg	1 Atmosphere ATBD	CAB/molec average
cld_asr_pct CONTIGUOUS	FLOAT (1)	Cloud ASR Percent	percent Atmosphere ATBD	Percent time clouds from ASR were detected
cld_avg CONTIGUOUS	FLOAT (1)	Cloud layer average	1 Atmosphere ATBD	Cloud layer average
cld_max CONTIGUOUS	INTEGER (1)	Cloud layer max	1 ATL04	Cloud layer max
cld_min CONTIGUOUS	INTEGER (1)	Cloud layer min	1 ATL04	Cloud layer min
cld_pct CONTIGUOUS	FLOAT (1)	Cloud Percent	percent Atmosphere ATBD	Percent time clouds were detected
cod_avg CONTIGUOUS	FLOAT (1)	COD Average	1 Atmosphere ATBD	Cloud Optical Depth average
cod_max CONTIGUOUS	FLOAT (1)	COD Maximum	1 Atmosphere ATBD	Cloud Optical Depth maximum
cod_min CONTIGUOUS	FLOAT (1)	COD Minimum	1 Atmosphere ATBD	Cloud Optical Depth minimum
delta_time CONTIGUOUS	DOUBLE (1)	Elapsed GPS seconds time	seconds since 2018-01-01 telemetry	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
osr_avg CONTIGUOUS	FLOAT (1)	OSR Average	1 Atmosphere ATBD	Ocean surface reflectance average
osr_max CONTIGUOUS	FLOAT (1)	OSR Maximum	1 Atmosphere ATBD	Ocean surface reflectance maximum
osr_min CONTIGUOUS	FLOAT (1)	OSR Minimum	1 Atmosphere ATBD	Ocean surface reflectance minimum
surf_pct CONTIGUOUS	FLOAT (1)	Percent Surface	percent ATL04	Percent time surface height was detected