ATL09 Product Data Dictionary

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Product Type: ATL09, Format Version : SET_BY_PGE

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)	0.0000000000000000
geospatial_lat_min	(Attribute)	0.0000000000000000
geospatial_lat_units	(Attribute)	degrees_north
geospatial_lon_max	(Attribute)	0.0000000000000000
geospatial_lon_min	(Attribute)	0.0000000000000000
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 Dataset)	INTEGER_4 (5)	Surface Type Dimension Scale (not_set)	1 not_set	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 Dataset)	DOUBLE (1)	ATLAS Epoch Offset (not_set)	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 Dataset)	STRING:100000 (1)	Control File (not_set)	1 Operations	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds.
data_end_utc (Compact Dataset)	STRING:27 (1)	End UTC Time of Granule (CCSDS-A, Actual) (not_set)	1 Derived	UTC (in CCSDS-A format) of the last data point within the granule.
data_start_utc (Compact Dataset)	STRING:27 (1)	Start UTC Time of Granule (CCSDS-A, Actual) (not_set)	1 Derived	UTC (in CCSDS-A format) of the first data point within the granule.
end_cycle (Compact Dataset)	INTEGER_4 (1)	Ending Cycle (not_set)	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 Dataset)	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 Dataset)	INTEGER_4 (1)	Ending Geolocation Segment (not_set)	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 Dataset)	DOUBLE (1)	Ending GPS SOW of Granule (Actual) (not_set)	seconds Derived	GPS seconds-of-week of the last data point in the granule.
end_gpsweek (Compact Dataset)	INTEGER_4 (1)	Ending GPSWeek of Granule (Actual) (not_set)	weeks from 1980-01-06 Derived	GPS week number of the last data point in the granule.
end_orbit (Compact Dataset)	INTEGER_4 (1)	Ending Orbit Number (not_set)	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 Dataset)	INTEGER_4 (1)	Ending Region (not_set)	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	INTEGER_4	Ending Reference Groundtrack	1	The ending reference groundtrack (RGT) number associated

(Compact Dataset)	(1)	(not_set)	Derived	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 Dataset)	STRING:27 (1)	End UTC Time of Granule (CCSDS-A, Requested) (not_set)	1 Derived	Requested end time (in UTC CCSDS-A) of this granule.
granule_start_utc (Compact Dataset)	STRING:27 (1)	Start UTC Time of Granule (CCSDS-A, Requested) (not_set)	1 Derived	Requested start time (in UTC CCSDS-A) of this granule.
qa_at_interval (Compact Dataset)	DOUBLE (1)	QA Along-Track Interval (not_set)	1 control	Statistics time interval for along-track QA data.
release (Compact Dataset)	STRING:80 (1)	Release Number (not_set)	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 (Compact Dataset)	INTEGER_4 (1)	Starting Cycle (not_set)	1 Derived	The starting 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.
start_delta_time (Compact Dataset)	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 Dataset)	INTEGER_4 (1)	Starting Geolocation Segment (not_set)	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_gpssow (Compact Dataset)	DOUBLE (1)	Start GPS SOW of Granule (Actual) (not_set)	seconds Derived	GPS seconds-of-week of the first data point in the granule.
start_gpsweek (Compact Dataset)	INTEGER_4 (1)	Start GPSWeek of Granule (Actual) (not_set)	weeks from 1980-01-06 Derived	GPS week number of the first data point in the granule.
start_orbit (Compact Dataset)	INTEGER_4 (1)	Starting Orbit Number (not_set)	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 Dataset)	INTEGER_4 (1)	Starting Region (not_set)	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 Dataset)	INTEGER_4 (1)	Starting Reference Groundtrack (not_set)	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 Dataset)	STRING:80 (1)	Version (not_set)	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 Dataset)	FLOAT (3)	a_m1 (not_set)	meters Atmosphere ATBD	a_m, anisotropy factor, to use for pass 1 (day, night, twilight)

a_m2 (Compact Dataset)	FLOAT (3)	a_m2 (not_set)	meters Atmosphere ATBD	a_m, anisotropy factor, to use for pass 2 (day, night, twilight)
aclr_use_atlas (Compact Dataset)	INTEGER_4 (1)	ALR Use ATLAS Flag (not_set)	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 (Compact Dataset)	FLOAT (1)	Scaling factor (a) (not_set)	1 Atmosphere ATBD section 2	Scaling factor (a) for computation of the magnitude of molecular folding.
asr_cal_factor (Compact Dataset)	FLOAT (1)	ASR CAL factor (not_set)	1 Atmosphere ATBD	Calibration factor for ASR computation
atlas_bandpass_fw (Compact Dataset)	FLOAT (1)	ATLAS Bandpass Filter Width (not_set)	nm Atmosphere ATBD	The ATLAS bandpass filter width.
atlas_tele_fov (Compact Dataset)	FLOAT (1)	ATLAS Telescope Field of View (not_set)	radians Atmosphere ATBD	The ATLAS telescope field of view.
backg_max_solar_elev (Compact Dataset)	FLOAT (1)	Background maximum solar elevation angle (not_set)	degrees Atmosphere ATBD section 3.3.4	Background maximum solar elevation angle in Method 1 bkgd comp
backg_min_solar_elev (Compact Dataset)	FLOAT (1)	Background minimum solar elevation angle (not_set)	degrees Atmosphere ATBD section 3.3.4	Background minimum solar elevation angle in Method 1 bkgd comp
backg_select (Compact Dataset)	INTEGER_4 (1)	background method used (not_set)	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 Dataset)	FLOAT (1)	Blowing Snow to Extinction Backscatter Ratio (not_set)	sr Atmosphere ATBD	blowing snow extinct to backscatter ratio
bs_lay_max_size (Compact Dataset)	FLOAT (1)	blowing snow maximum layer size (not_set)	m Atmosphere ATBD	blowing snow maximum layer size
bs_thresh_scale (Compact Dataset)	FLOAT (1)	scale factor for blowing snow threshold (not_set)	1 Atmosphere ATBD	scale factor for blowing snow threshold
bs_top_scale (Compact Dataset)	FLOAT (1)	scale factor for layer top threshold (not_set)	1 Atmosphere ATBD	scale factor for layer top threshold
bs_wind_thres (Compact Dataset)	FLOAT (1)	scale factor for layer top threshold (not_set)	m/s Atmosphere ATBD	minimum windspeed for blowing snow
cal_bot_ht (Compact Dataset)	FLOAT (1)	cal_bot_ht (not_set)	m Atmosphere ATBD	Bottom height of calibration zone (m)
cal_default (Compact Dataset)	FLOAT (1)	Default calibration value (not_set)	1 Atmosphere ATBD	Calibration constant default if it cannot be calculated from the data.
cal_lat_bound (Compact Dataset)	DOUBLE (1)	cal_lat_bound (not_set)	degrees_north Atmosphere ATBD	Calibration constant latitude bound (deg_north)
cal_select (Compact Dataset)	INTEGER_4 (1)	calibration method used (not_set)	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 Dataset)	FLOAT (1)	cal_top_ht (not_set)	m Atmosphere ATBD	Top height of calibration zone (m)
cloud_det_layer_thick (Compact Dataset)	INTEGER_1 (1)	Cloud minimum layer (not_set)	bins Atmosphere ATBD	A layer must be 3 bins thick to be considered a layer.
cutoff1 (Compact Dataset)	FLOAT (3)	cutoff1 (not_set)	1 Atmosphere ATBD	cutoff to use for pass 1 (day, night, twilight)
cutoff2 (Compact Dataset)	FLOAT (3)	cutoff2 (not_set)	1 Atmosphere ATBD	cutoff to use for pass 2 (day, night, twilight)
detector_efficiency (Compact Dataset)	FLOAT (1)	Detector Quantum Efficiency (not_set)	1 Atmosphere ATBD	Detector quantum efficiency (Qe)
downsample1 (Compact Dataset)	FLOAT (3)	downsample1 (not_set)	bins Atmosphere ATBD	downsample to use for pass 1 (day, night, twilight)
downsample2 (Compact Dataset)	FLOAT (3)	downsample2 (not_set)	bins Atmosphere ATBD	downsample to use for pass 2 (day, night, twilight)
dtime_select (Compact Dataset)	INTEGER_4 (1)	dead time factor used (not_set)	1 Control	Deadtime factor used. flag_values: 1, 2 flag_meanings : dtime_fact1 dtime_fact2
grd_search_width (Compact Dataset)	INTEGER_4 (1)	Ground search width (not_set)	bins Atmosphere ATBD, part 2 section 13.2	Ground search width in DDA surface finding algorithm
layer_flag_cp1 (Compact Dataset)	INTEGER_4 (1)	Layer Flag CP 1 (not_set)	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 Dataset)	INTEGER_4 (1)	Layer Flag CP 2 (not_set)	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 (Compact Dataset)	INTEGER_4 (1)	minimum layer separation (not_set)	bins Atmosphere ATBD	minimum layer separation
layer_thick (Compact Dataset)	INTEGER_4 (1)	minimum layer thickness (not_set)	bins Atmosphere ATBD	minimum layer thickness
max_layers (Compact Dataset)	INTEGER_4 (1)	maximum cloud layers for a profile (not_set)	bins Atmosphere ATBD	maximum cloud layers for a profile
neighborhood1 (Compact Dataset)	FLOAT (1)	neighborhood1 (not_set)	bins Atmosphere ATBD	neighborhood to use for pass 1
neighborhood2 (Compact Dataset)	FLOAT (1)	neighborhood2 (not_set)	bins Atmosphere ATBD	neighborhood to use for pass 2
normalization1 (Compact Dataset)	INTEGER_1 (1)	normalization1 (not_set)	1 Atmosphere ATBD	normalization flag to use for pass 1 flag_values: 0, 1 flag_meanings : true false
normalization2 (Compact Dataset)	INTEGER_1 (1)	normalization2 (not_set)	1 Atmosphere ATBD	normalization flag to use for pass 2 flag_values: 0, 1 flag_meanings : true false
num_passes (Compact Dataset)	INTEGER_1 (3)	number of passes (not_set)	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 Dataset)	FLOAT (1)	phi land (not_set)	1 Atmosphere ATBD, part 1, section 4.6.2.3	Factor for correcting the potential clear sky ASR biases for land
phi_ocean (Compact Dataset)	FLOAT (1)	phi ocean (not_set)	1 Atmosphere ATBD, part 1, section 4.6.2.3	Factor for correcting the potential clear sky ASR biases for ocean
planck_const (Compact Dataset)	DOUBLE (1)	Planck constant (h) (not_set)	Js Atmosphere ATBD section 2	Planck constant (h)
proc_interval (Compact Dataset)	DOUBLE (1)	amount of data processed at one time (not_set)	s Atmosphere ATBD	amount of data processed at one time
quantile1 (Compact Dataset)	FLOAT (3)	quantile1 (not_set)	1 Atmosphere ATBD	quantile to use for pass 1 (day, night, twilight)
quantile2 (Compact Dataset)	FLOAT (3)	quantile2 (not_set)	1 Atmosphere ATBD	quantile to use for pass 2 (day, night, twilight)
receiver_optical_throughput (Compact Dataset)	FLOAT (1)	Receiver Optics Throughput (not_set)	1 Atmosphere ATBD	Nominal Receiver Optics Throughput
sigma1 (Compact Dataset)	FLOAT (3)	sigma1 (not_set)	meters Atmosphere ATBD	sigma to use for pass 1 (day, night, twilight)
sigma2 (Compact Dataset)	FLOAT (3)	sigma2 (not_set)	meters Atmosphere ATBD	sigma to use for pass 2 (day, night, twilight)
size_threshold1 (Compact Dataset)	FLOAT (3)	size_threshold1 (not_set)	bins Atmosphere ATBD	size_threshold, minimum cluster size, to use for pass 1 (day, night, twilight)
size_threshold2 (Compact Dataset)	FLOAT (3)	size_threshold2 (not_set)	bins Atmosphere ATBD	size_threshold, minimum cluster size, to use for pass 2 (day, night, twilight)
snow_age (Compact Dataset)	FLOAT (1)	Snow Age (not_set)	hours Atmosphere ATBD	Age of the snow on the ground.
solar_flux (Compact Dataset)	FLOAT (1)	Solar Flux (not_set)	W/(m^2 nm)) Atmosphere ATBD	Solar flux at the top of the atmosphere at 532nm.
surf_min (Compact Dataset)	INTEGER_4 (1)	minimum count for a surface type to be considered separate surface type (not_set)	counts Atmosphere ATBD	minimum count for a surface type to be considered separate surface type
surface_signal_source (Compact Dataset)	INTEGER_4 (1)	Signal Source Flag (not_set)	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 Dataset)	DOUBLE (1)	Telescope Effective Area (not_set)	sq meters Atmosphere ATBD	Effective collection area of telescope (At)
thresh_bias1 (Compact Dataset)	FLOAT (3)	thresh_bias1 (not_set)	photons* square meter/Joule Atmosphere ATBD	thresh_bias to use for pass 1 (day, night, twilight)
thresh_bias2 (Compact Dataset)	FLOAT (3)	thresh_bias2 (not_set)	photons* square meter/Joule Atmosphere ATBD	thresh_bias to use for pass 2 (day, night, twilight)

thresh_sensitivity1 (Compact Dataset)	FLOAT (3)	thresh_sensitivity1 (not_set)	1 Atmosphere ATBD	thresh_sensitivity to use for pass 1 (day, night, twilight)
thresh_sensitivity2 (Compact Dataset)	FLOAT (3)	thresh_sensitivity2 (not_set)	1 Atmosphere ATBD	thresh_sensitivity to use for pass 2 (day, night, twilight)
threshold_segment_length1 (Compact Dataset)	FLOAT (3)	threshold_segment_length1 (not_set)	bins Atmosphere ATBD	threshold_segment_length to use for pass 1 (day, night, twilight)
threshold_segment_length2 (Compact Dataset)	FLOAT (3)	threshold_segment_length2 (not_set)	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 Dataset)	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 Dataset)	INTEGER_1 (:)	Cycle Number (not_set)	1 Operations	A count of the number of exact repeats of this reference orbit.
lan (Chunked Dataset)	DOUBLE (:)	Ascending Node Longitude (not_set)	degrees_east POD/PPD	Longitude at the ascending node crossing.
orbit_number (Chunked Dataset)	UINT_2_LE (:)	Orbit Number (not_set)	1 Operations	Unique identifying number for each planned ICESat-2 orbit.
rgt (Chunked Dataset)	INTEGER_2 (:)	Reference Ground track (not_set)	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 Dataset)	INTEGER_1 (:)	Spacecraft Orientation (not_set)	1 POD/PPD	This parameter tracks the spacecraft orientation between forward, backward and transitional flight modes. 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. flag_values: 0, 1, 2 flag_meanings : backward forward transition
sc_orient_time (Chunked Dataset)	DOUBLE (:)	Time of Last Spacecraft Orientation Change (time)	seconds since 2018-01-01 POD/PPD	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.
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 Dataset)	INTEGER_4 (:)	ATLAS 50-shot background count (not_set)	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 Dataset)	INTEGER_4 (:)	ATLAS 50-shot background count - reduced (not_set)	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 Dataset)	FLOAT (:)	Top of the altimetric range window (not_set)	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 Dataset)	FLOAT (:)	Altimetric range window width (not_set)	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 Dataset)	FLOAT (:)	Altimetric range window height - reduced (not_set)	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 Dataset)	FLOAT (:)	Background count rate based on the ATLAS 50-shot sum (not_set)	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 Dataset)	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 Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	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 Dataset)	FLOAT (:)	Clear sky ASR (not_set)	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 Dataset)	FLOAT (:)	Apparent Surface Reflectance (not_set)	1 Atmosphere ATBD	Apparent Surface Reflectance (ASR): Eqn 4.7
backg_c (Chunked Dataset)	FLOAT (:)	Background (not_set)	counts Atmosphere ATBD	Background, in photons/bin, used in the NRB Computation.
backg_theoret (Chunked Dataset)	FLOAT (:)	Background (Theoretical) (not_set)	photons/bin Atmosphere ATBD	The theoretical background, in photons/bin.
beam_azimuth (Chunked Dataset)	FLOAT (:)	beam azimuth (not_set)	degrees_east ATL03 ATBD	Beam azimuth
beam_elevation (Chunked Dataset)	FLOAT (:)	beam elevation (not_set)	degrees ATL03 ATBD	Beam elevation
bsnow_con (Chunked Dataset)	INTEGER_1 (:)	Blowing snow confidence (not_set)	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 Dataset)	FLOAT (:)	Blowing snow density (not_set)	1 Atmosphere ATBD	Blowing snow layer density
bsnow_h (Chunked Dataset)	FLOAT (:)	Blowing snow top h (not_set)	meters Atmosphere ATBD	Blowing snow layer top height
bsnow_h_dens (Chunked Dataset)	FLOAT (:)	Blowing snow h from density (not_set)	meters Atmosphere ATBD	Blowing snow layer height from density
bsnow_od (Chunked Dataset)	FLOAT (:)	Blowing snow OD (not_set)	1 Atmosphere ATBD	Blowing snow layer optical depth
bsnow_psc	INTEGER_1	Blowing snow PSC flag	1	Blowing snow PSC flag. Indicates the potential for polar

(Chunked Dataset)	(:)	(not_set)	Atmosphere ATBD Section 4.5	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 Dataset)	FLOAT (700, :)	Calibrated Attenuated Backscatter (not_set)	1 Atmosphere ATBD	Calibrated Attenuated Backscatter from 20 to -1 km with vertical resolution of 30m (eqn 4.1)
cloud_flag_asr (Chunked Dataset)	INTEGER_1 (:)	Cloud Flag ASR (not_set)	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 Dataset)	INTEGER_1 (:)	Cloud Flag Atm (not_set)	1 Atmosphere ATBD	Number of layers found from the backscatter profile using the DDA layer finder.
cloud_fold_flag (Chunked Dataset)	INTEGER_1 (:)	Cloud Folding Flag (not_set)	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 Dataset)	FLOAT (:)	Optical depth from ASR (not_set)	1 Atmosphere ATBD	Optical depth of atmosphere column based on apparent surface reflectance and the assumed actual surface reflectance.
column_od_asr_qf (Chunked Dataset)	INTEGER_1 (:)	Optical depth ASR quality (not_set)	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 Dataset)	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 Dataset)	INTEGER_1 (:)	dem source flag (not_set)	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 Dataset)	FLOAT (:)	DEM Height (not_set)	meters Atmosphere ATBD	Best available DEM (in priority of Arctic/Antarctic/GMTED/MSS) value at the geolocation point.
density_pass1 (Chunked Dataset)	FLOAT (700, :)	Density profile - pass1 (not_set)	1 Atmosphere ATBD Part II	Density profiles from pass 1.
density_pass2 (Chunked Dataset)	FLOAT (700, :)	Density profile - pass2 (not_set)	1 Atmosphere ATBD Part II	Density profiles from pass 2.
ds_layers (Compact Dataset)	INTEGER_4 (10)	Cloud Layers Dimension Scale (not_set)	counts Atmosphere ATBD	Dimension scale indexing the cloud layers.
ds_va_bin_h (Compact Dataset)	FLOAT (700)	VA Bin Height Dimension Scale (not_set)	meters Atmosphere ATBD	Dimension scale containing the heights of the vertically-aligned bins.
dtime_fac1 (Chunked Dataset)	FLOAT (:)	dead_time_factor1 (not_set)	1 Atmosphere ATBD	Dead time correction factor for surface signal computed from radiometric lookup table.
dtime_fac2 (Chunked Dataset)	FLOAT (:)	dead_time_factor2 (not_set)	1 Atmosphere ATBD	Dead time correction factor for surface signal computed from ATBD equation 2.1.
latitude (Chunked Dataset)	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 Dataset)	INTEGER_1 (10, :)	Layer attribute flag (not_set)	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 Dataset)	FLOAT (10, :)	Height layer bottoms (not_set)	meter Atmosphere ATBD	Height of bottom of detected layers
layer_con (Chunked Dataset)	INTEGER_4 (10, :)	Layer confidence flag (not_set)	1 Atmosphere ATBD	Layer confidence flag for each layer
layer_conf_dens (Chunked Dataset)	FLOAT (10, :)	Layer confidence from density (not_set)	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 Dataset)	FLOAT (10, :)	Layer Density (not_set)	1 Atmosphere ATBD	Layer Density
layer_flag (Chunked Dataset)	INTEGER_1 (:)	Consolidated cloud flag (not_set)	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 Dataset)	FLOAT (10, :)	Layer integrated backscatter (not_set)	1 Atmosphere ATBD	Layer integrated backscatter
layer_top (Chunked Dataset)	FLOAT (10, :)	Height layer tops (not_set)	meters Atmosphere ATBD	Height of top of detected layers
longitude (Chunked Dataset)	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 Dataset)	INTEGER_1 (:)	Multiple Scattering Warning Flag (not_set)	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 Dataset)	FLOAT (:)	Ocean Surface Reflectance (not_set)	1 Atmosphere ATBD	Ocean Surface Reflectance from Eqn 4.10 based on the Cox-Munk model.
pce_mframe_cnt (Chunked Dataset)	UINT_4_LE (:)	PCE Major frame counter (not_set)	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 Dataset)	DOUBLE (:)	Along Track Distance (not_set)	meters ATL03g ATBD, Section 3.4	Along-track distance from the equator crossing.
prof_dist_y (Chunked Dataset)	FLOAT (:)	Across Track Distance from RGT (not_set)	meters ATL03g ATBD, Section 3.4	Across-Track distance from the reference ground track.
range_to_top (Chunked Dataset)	FLOAT (:)	Range (not_set)	meters Atmosphere ATBD	Range from the spacecraft to the top of the atmosphere range window.
segment_id (Chunked Dataset)	INTEGER_4 (:)	along-track segment ID number. (not_set)	1 ATL03 ATBD, Section 3.1	A 7 digit number identifiying 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 Dataset)	INTEGER_4 (:)	Count of Signa Heightsl - High (not_set)	counts ATL03 ATBD, Section 5	Count of high-confidence signal photons
sig_count_low (Chunked Dataset)	INTEGER_4 (:)	Count of Signal Heights - Low (not_set)	counts ATL03 ATBD, Section 5	Count of low-confidence signal photons
sig_count_med (Chunked Dataset)	INTEGER_4 (:)	Count of Signal Heights - Medium (not_set)	counts ATL03 ATBD, Section 5	Count of medium-confidence signal photons
sig_h_mean_hi (Chunked Dataset)	FLOAT (:)	Mean of SignalHeights - High (not_set)	meters ATL03 ATBD, Section 5	Mean height of high-confidence signal photons

sig_h_mean_low (Chunked Dataset)	FLOAT (:)	Mean of Signal Heights - Low (not_set)	meters ATL03 ATBD, Section 5	Mean height of low-confidence signal photons
sig_h_mean_med (Chunked Dataset)	FLOAT (:)	Mean of Signa Heightsl - Med (not_set)	meters ATL03 ATBD, Section 5	Mean height of medium-confidence signal photons
sig_h_sdev_hi (Chunked Dataset)	FLOAT (:)	SDev of Signal Heights -High (not_set)	meters ATL03 ATBD, Section 5	SDev of the heights of high-confidence signal photons
sig_h_sdev_low (Chunked Dataset)	FLOAT (:)	SDev of Signal Heights -Low (not_set)	meters ATL03 ATBD, Section 5	SDev of the heights of low-confidence signal photons
sig_h_sdev_med (Chunked Dataset)	FLOAT (:)	SDev of Signa Heights -Med (not_set)	meters ATL03 ATBD, Section 5	SDev of the heights of medium-confidence signal photons
snow_ice (Chunked Dataset)	INTEGER_4 (:)	Snow Ice Flag (not_set)	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 Dataset)	FLOAT (:)	solar azimuth (not_set)	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 Dataset)	FLOAT (:)	solar elevation (not_set)	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 Dataset)	FLOAT (:)	Estimated Surface Reflectance (not_set)	1 Atmosphere ATBD	The value of the clear-sky surface reflectivity to use in the compuation of total column optical depth and cloud detection from the measures apparent surface reflectance (ASR).
surf_type (Chunked Dataset)	INTEGER_1 (5, :)	surface type (not_set)	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
surf_type_igbp (Chunked Dataset)	INTEGER_1 (:)	IGBP Surface Type (not_set)	1 Atmosphere ATBD, IGBP Surface Type	IGBP Surface Type
surface_bin (Chunked Dataset)	INTEGER_4 (:)	Surface bin (not_set)	1 Atmosphere ATBD section 3.3.5	Vertially aligned, NRB bin number of the detected surface return.
surface_h_dens (Chunked Dataset)	FLOAT (:)	Surface h from density (not_set)	meters Atmosphere ATBD	Surface height from density
surface_height (Chunked Dataset)	FLOAT (:)	Surface height (not_set)	meters Atmosphere ATBD section 3.3.5	Height of the detected surface bin.
surface_sig (Chunked Dataset)	FLOAT (:)	Surface signal count (not_set)	counts Atmosphere ATBD section 3.3.5	Number of photons in the detected surface bin.
tx_pulse_energy (Chunked Dataset)	FLOAT (:)	Transmit Pulse Energy (not_set)	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 Dataset)	INTEGER_1 (:)	Blowing snow confidence (not_set)	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 Dataset)	FLOAT (:)	Blowing snow top h (not_set)	meters Atmosphere ATBD	Blowing snow layer top height
bsnow_od (Chunked Dataset)	FLOAT (:)	Blowing snow OD (not_set)	1 Atmosphere ATBD	Blowing snow layer optical depth
bsnow_prob (Chunked Dataset)	FLOAT (:)	Blowing Snow Probability (not_set)	1 Atmosphere ATBD Section 4.5.1	The probability of blowing snow based on meteorological data.
bsnow_psc	INTEGER_1	Blowing snow PSC flag	1	Blowing snow PSC flag. Indicates the potential for polar

(Chunked Dataset)	(:)	(not_set)	Atmosphere ATBD Section 4.5	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 Dataset)	FLOAT (:)	Calibration Constant (not_set)	Photons*m^3 *sr / J Atmosphere ATBD	Calibration Constant (for each beam at 1 Hz)
delta_time (Chunked Dataset)	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 Dataset)	FLOAT (700)	VA Bin Height Dimension Scale (not_set)	meters Atmosphere ATBD	Dimension scale containing the heights of the vertically-aligned bins.
latitude (Chunked Dataset)	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 Dataset)	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 Dataset)	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 Dataset)	FLOAT (:)	Surface Pressure (pressure)	Pa GEOS5 FPIT 3D DFPITI3NVASM	Surface Pressure (Pa)
met_qv10m (Chunked Dataset)	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 Dataset)	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 Dataset)	FLOAT (:)	sea_level_pressure (sea_level_pressure)	Pa GEOS5 FPIT 3D DFPITI3NVASM	sea-level pressure (Pa)
met_t10m (Chunked Dataset)	FLOAT (:)	temperature_at_10m (temperature)	K GEOS5 FPIT 2D DFPITT1NXSLV	Temperature at 10m above the displacement height (K)
met_t2m (Chunked Dataset)	FLOAT (:)	temperature_at_2m (temperature)	K GEOS5 FPIT 2D DFPITT1NXSLV	Temperature at 2m above the displacement height (K)
met_tqi (Chunked Dataset)	FLOAT (:)	cloud_ice (not_set)	kg m-2 GEOS5 FPIT 2D DFPITT1NXSLV	Total column cloud ice (Kg/m2)
met_tql (Chunked Dataset)	FLOAT (:)	cloud_liquid_water (not_set)	kg m-2 GEOS5 FPIT 2D DFPITT1NXSLV	Total column cloud liquid water (kg/m2)
met_troppb (Chunked Dataset)	FLOAT (:)	blended_tropopause_pressure (pressure)	Pa GEOS5 FPIT 2D DFPITT1NXSLV	Blended tropopause pressure (pa)
met_tropt (Chunked Dataset)	FLOAT (:)	blended_tropopause_temperature (temperature)	K GEOS5 FPIT 2D DFPITT1NXSLV	Tropopause temperature (k)
met_ts (Chunked Dataset)	FLOAT (:)	surface_temperature (temperature)	K GEOS5 FPIT 2D DFPITT1NXSLV	Surface skin temperature (K)
met_u10m (Chunked Dataset)	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 Dataset)	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 Dataset)	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	FLOAT	Northward_wind_at_10m	m s-1	Northward wind at 10m above the displacement height (m/s-

(Chunked Dataset)	(:)	(northward_wind)	GEOS5 FPIT 2D DFPITT1NXSLV	1)
met_v2m (Chunked Dataset)	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 Dataset)	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 Dataset)	FLOAT (700, :)	Folded molecular transmission profile (not_set)	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 Dataset)	FLOAT (700, :)	Molecular backscatter profile (not_set)	m-1 sr-1 Atmosphere ATBD	Molecular backscatter profile, 30 m resolution, 20 km to -1 km
molec_bkscat_p (Chunked Dataset)	FLOAT (700, :)	Pressure profile (not_set)	Pa Atmosphere ATBD	Pressure profiles from 20 km to -1 km
molec_bkscat_rh (Chunked Dataset)	FLOAT (700, :)	Relative humidity profiles (not_set)	percentage Atmosphere ATBD	Relative humidity profiles from 20 km to -1 km
molec_bkscat_t (Chunked Dataset)	FLOAT (700, :)	Temperature profile (not_set)	K Atmosphere ATBD	Temperature profiles from 20 km to -1 km
molec_trans (Chunked Dataset)	FLOAT (700, :)	Molecular transmission profile (not_set)	1 Atmosphere ATBD	Molecular transmission profile, 30 m resolution, 20 km to -1 km
surf_type (Chunked Dataset)	INTEGER_1 (5, :)	surface type (not_set)	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 Dataset)	INTEGER_4 (1)	Granule Failure Reason (not_set)	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 Dataset)	INTEGER_4 (1)	Granule Pass Flag (not_set)	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 Dataset)	FLOAT (1)	ASR Average (not_set)	1 Atmosphere ATBD	Apparent surface reflectance average
asr_max (Contiguous Dataset)	FLOAT (1)	ASR Maximum (not_set)	1 Atmosphere ATBD	Apparent surface reflectance maximum
asr_min (Contiguous Dataset)	FLOAT (1)	ASR Minimum (not_set)	1 Atmosphere ATBD	Apparent surface reflectance minimum
asr_std (Contiguous Dataset)	FLOAT (1)	ASR Standard Deviation (not_set)	1 Atmosphere ATBD	Apparent surface reflectance stdev
cab_mol_avg (Contiguous Dataset)	FLOAT (1)	CAB molec Avg (not_set)	1 Atmosphere ATBD	CAB/molec average
cld_asr_pct (Contiguous Dataset)	FLOAT (1)	Cloud ASR Percent (not_set)	percent Atmosphere ATBD	Percent time clouds from ASR were detected
cld_avg (Contiguous Dataset)	FLOAT (1)	Cloud layer average (not_set)	1 Atmosphere ATBD	Cloud layer average
cld_max (Contiguous Dataset)	INTEGER_4 (1)	Cloud layer max (not_set)	1 ATL04	Cloud layer max
cld_min (Contiguous Dataset)	INTEGER_4 (1)	Cloud layer min (not_set)	1 ATL04	Cloud layer min
cld_pct (Contiguous Dataset)	FLOAT (1)	Cloud Percent (not_set)	percent Atmosphere ATBD	Percent time clouds were detected
cod_avg (Contiguous Dataset)	FLOAT (1)	COD Average (not_set)	1 Atmosphere ATBD	Cloud Optical Depth average

cod_max (Contiguous Dataset)	FLOAT (1)	COD Maximum (not_set)	1 Atmosphere ATBD	Cloud Optical Depth maximum
cod_min (Contiguous Dataset)	FLOAT (1)	COD Minimum (not_set)	1 Atmosphere ATBD	Cloud Optical Depth minimum
delta_time (Contiguous Dataset)	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 Dataset)	FLOAT (1)	OSR Average (not_set)	1 Atmosphere ATBD	Ocean surface reflectance average
osr_max (Contiguous Dataset)	FLOAT (1)	OSR Maximum (not_set)	1 Atmosphere ATBD	Ocean surface reflectance maximum
osr_min (Contiguous Dataset)	FLOAT (1)	OSR Minimum (not_set)	1 Atmosphere ATBD	Ocean surface reflectance minimum
surf_pct (Contiguous Dataset)	FLOAT (1)	Percent Surface (not_set)	percent ATL04	Percent time surface height was detected