ATL04 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)	ATL04 contains along-track normalized relative backscatter profiles of the atmosphere. The product includes full 532 nm (14 km) uncalibrated attenuated backscatter profiles at 25 times per second for vertical bins of approximately 30 meters. Calibration co
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)	ATL04
hdfversion	(Attribute)	SET_BY_PGE
history	(Attribute)	SET_BY_PGE
identifier_file_uuid	(Attribute)	SET_BY_PGE
identifier_product_doi	(Attribute)	10.5067/ATLAS/ATL04.001
identifier_product_doi_authority	(Attribute)	http://dx.doi.org
identifier_product_format_version	(Attribute)	SET_BY_PGE
identifier_product_type	(Attribute)	ATL04
institution	(Attribute)	SET_BY_META
instrument	(Attribute)	SET_BY_META
keywords	(Attribute)	SET_BY_META
keywords_vocabulary	(Attribute)	SET_BY_META
level	(Attribute)	L2
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)	L2A
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)	ATL04		
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_gpssow 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
aer_scat_rat COMPACT	FLOAT (1)	Aerosol Scattering Ratio	1 Atmosphere ATBD	Aerosol Scattering Ratio in the calibration zone (11
alpha_day_pce1 COMPACT	FLOAT (1)	Molecular Folding Scaling Factor	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	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	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	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	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	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	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	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	1 Atmosphere ATBD, part 1, section 3.3.2	Molecular Folding Scaling Factor (PCE3/twilight)
atlas_atm_hist_binsize COMPACT	FLOAT (1)	Histogram bin size (m)	meters Atmosphere ATBD	Nominal size of each ATM histogram bin, in meters
atlas_atm_hist_binsize_s COMPACT	DOUBLE (1)	Histogram bin size (s)	seconds Atmosphere ATBD	Nominal size of each ATM histogram bin, in seconds
atlas_atm_shot_sum_25hz COMPACT	INTEGER (1)	Number of shots at 25hz	counts Atmosphere ATBD	Number of shots summed to compute an ATM histogram at 25 hz (nominal)
atlas_atm_shot_sum_50hz COMPACT	INTEGER (1)	Number of shots at 50hz	counts Atmosphere ATBD	Number of shots summed to compute an ATM histogram at 50 hz (diagnostic)
atlas_n_atm_hist_bins COMPACT	INTEGER (1)	Number of histogram bins	counts Atmosphere ATBD	Number of ATM histogram bins
atlas_n_pce COMPACT	INTEGER (1)	Number of ATLAS PCEs	1 Atmosphere ATBD	Number of ATLAS PCE boards
atm_laser_wavelength_m COMPACT	DOUBLE (1)	Laser Wavelength (m)	meters Atmosphere ATBD	ATLAS Laser wavelength, in meters
atm_laser_wavelength_nm COMPACT	FLOAT (1)	Laser Wavelength (nm)	nm Atmosphere ATBD	ATLAS Laser wavelength, in nanometers
atm_processing_interval COMPACT	DOUBLE (1)	Seconds of ATM data processed in one chunk.	seconds Control	The number of seconds of ATM data processed in one chunk.
atm_pulse_ns	DOUBLE	Pulse Time	sq meters	The time between ATLAS pulses.

COMPACT	(1)		Atmosphere ATBD	
atm_tep_start COMPACT	DOUBLE (1)	TEP Window Start	ns Atmosphere ATBD	The start time of the TEP removal window.
atm_tep_width COMPACT	DOUBLE (1)	TEP Window Width	sq meters Atmosphere ATBD	The width of the TEP removal window.
back_f2 COMPACT	FLOAT (1)	Background Fact method2	1 Atmosphere ATBD section 3.3.4	Scaling factor in Method 2 background computation
backg_day_exp_factor COMPACT	FLOAT (1)	Background daytime exponent factor	1 Atmosphere ATBD section 3.3.4	Background daytime exponent factor in Method 1 bkgd comp
backg_day_scale_factor1 COMPACT	FLOAT (1)	Background daytime scaling factor 1	1 Atmosphere ATBD section 3.3.4	Background daytime scaling factor 1 in Method 1 bkgd comp
backg_day_scale_factor2 COMPACT	FLOAT (1)	Background daytime scaling factor 2	1 Atmosphere ATBD section 3.3.4	Background daytime scaling factor 2 in Method 1 bkgd comp
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_night_bkgd COMPACT	FLOAT (1)	Background nighttime background	1 Atmosphere ATBD section 3.3.4	Background nighttime background in Method 1 bkgd comp
backg_night_scale_factor COMPACT	FLOAT (1)	Background nighttime scaling factor	1 Atmosphere ATBD section 3.3.4	Background nighttime scaling factor in Method 1 bkgd comp
backg_nseg COMPACT	INTEGER (1)	Number of background segments in method 1	counts Atmosphere ATBD section 3.3.4	Number of background segments in method 1
backg_response_time COMPACT	FLOAT (1)	Background response time	1 Atmosphere ATBD section 3.3.4	Background response time 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']
backg_twilight_scale_factor COMPACT	FLOAT (1)	Background twilight scaling factor	1 Atmosphere ATBD section 3.3.4	Background twilight scaling factor in Method 1 bkgd comp
boltzmann_const COMPACT	FLOAT (1)	Boltzmann Constant	erg/K Atmosphere ATBD section 2	Boltzmann constant
cal_atm_trans COMPACT	FLOAT (1)	Cal Atm Trans	1 Atmosphere ATBD section 2	Particulate transmission from top of atmosphere to the calibration height (13 km)
cal_bot_ht COMPACT	FLOAT (1)	Bottom height of Cal zone	meters Atmosphere ATBD section 2	Bottom height of the calibration zone
cal_cloud_thres COMPACT	FLOAT (1)	Cal Cloud Threshold	counts Atmosphere ATBD section 2	Threshold for excluding NRB data in calibration zone.
cal_day_pce1	FLOAT	Daytime PCE1 CAL	1	Daytime calibration constant for pce1 in

COMPACT	(1)		Control	method 2
cal_day_pce2 COMPACT	FLOAT (1)	Daytime PCE2 CAL	1 Control	Daytime calibration constant for pce2 in method 2
cal_day_pce3 COMPACT	FLOAT (1)	Daytime PCE3 CAL	1 Control	Daytime calibration constant for pce3 in method 2
cal_default COMPACT	FLOAT (1)	Default CAL Constant	Photons*m^3 *sr / J Atmosphere ATBD section 2	Default atmosphere calibration constant. Used by default when no calibration data have been computed for an ATL04 granule.
cal_integ_time COMPACT	FLOAT (1)	Cal Integ Time	seconds Atmosphere ATBD section 2	Calibration integration time
cal_lat_bound COMPACT	DOUBLE (1)	Cal Latitude Bound	degrees Atmosphere ATBD section 2	The latitude boundary for calibration calculation
cal_night_pce1 COMPACT	FLOAT (1)	CAL Night PCE1	1 Control	Nighttime calibration constant for pce1 in method 2
cal_night_pce2 COMPACT	FLOAT (1)	CAL Night PCE2	1 Control	Nighttime calibration constant for pce2 in method 2
cal_night_pce3 COMPACT	FLOAT (1)	CAL Night PCE3	1 Control	Nighttime calibration constant for pce3 in method 2
cal_scat_ratio COMPACT	FLOAT (1)	Cal Scat Ratio	1 Atmosphere ATBD section 2	Calibration Zone (13 to 11 km) aerosol scattering ratio
cal_select COMPACT	INTEGER (1)	Calibration Algorithm Used	1 Control	Calibration algorithm used. Flag Values: ['1', '2', '3'] Flag Meanings: ['method1', 'method2', 'method3']
cal_solar_angle_limit COMPACT	FLOAT (1)	Cal Solar Angle Limit	degrees Atmosphere ATBD section 2	Minimum solar zenith angle for calibration calculation
cal_solar_elev_max COMPACT	FLOAT (1)	Maximim Solar Elevation	degrees Control	Maximum solar elevation angle in calibration method 2.
cal_solar_elev_min COMPACT	FLOAT (1)	Minimum Solar Elevation for CAL	degrees Control	Minimum solar elevation angle in calibration method 2.
cal_top_ht COMPACT	FLOAT (1)	Top height of Cal zone	meters Atmosphere ATBD section 2	Top height of the calibration zone
cal_twilight_pce1 COMPACT	FLOAT (1)	Twilight PCE1 CAL	1 Control	Twilight calibration constant for pce1 in method 2
cal_twilight_pce2 COMPACT	FLOAT (1)	Twilight PCE2 CAL	1 Control	Twilight calibration constant for pce2 in method 2
cal_twilight_pce3 COMPACT	FLOAT (1)	Twilight PCE3 CAL	1 Control	Twilight calibration constant for pce3 in method 2
chappius_coef COMPACT	FLOAT (1)	Chappius Coefficient	1 Atmosphere ATBD	Chappius ozone absorption coefficient
dead_time_sfac COMPACT	FLOAT (1)	Dead Time Signal Factor	1 Atmosphere ATBD section 2	Dead time signal factor
default_nrb_day COMPACT	FLOAT (3)	Daytime NRB Defaults	Photons m2/Joule Atmosphere ATBD	Default value for daytime NRB used to replace NRB values that are out of range for each pce for calibration method 3
default_nrb_night COMPACT	FLOAT (3)	Nighttime NRB Defaults	Photons m2/Joule Atmosphere ATBD	Default value for nighttime NRB - used to replace NRB values that are out of range for each pce for calibration method 3

default_nrb_twilight COMPACT	FLOAT (3)	Twilight NRB Defaults	Photons m2/Joule Atmosphere ATBD	Default value for twilight NRB - used to replace NRB values that are out of range for each pce for calibration method 3
deg2rad COMPACT	DOUBLE (1)	Degree to radians conversion	1 Globals	Degrees to radians conversion factor
detector_efficiency COMPACT	FLOAT (1)	Detector Quantum Efficiency	1 Atmosphere ATBD	Detector quantum efficiency (Qe)
dtime_select COMPACT	INTEGER (1)	dead time factor used	1 Control	Deadtime factor used. Flag Values: ['1', '2'] Flag Meanings: ['dtime_fact1', 'dtime_fact2']
fold_nbins COMPACT	INTEGER (1)	1	bins Atmosphere ATBD	Number of bins starting from end of raw profile to compute mean of signal to test for presence of cloud folding
fold_thresh_day COMPACT	FLOAT (1)	Daytime Folding Threshold	photons/bin Atmosphere ATBD	Raw signal level above which the mean of the last fold_nbins indicates the presence of cloud folding for daytime data
fold_thresh_night COMPACT	FLOAT (1)	Nighttime Folding Threshold	photons/bin Atmosphere ATBD	Raw signal level above which the mean of the last fold_nbins indicates the presence of cloud folding for nighttime data
gas_const_r COMPACT	DOUBLE (1)	Ideal gas constant R	1 Globals	Ideal gas constant (R)
grd_search_width COMPACT	INTEGER (1)	Ground Search Width	bins Atmosphere ATBD section 3.3.5	Ground detection search width
grd_thres_atl03 COMPACT	FLOAT (1)	Ground Threshold using ATL03 signal	photons/bin Atmosphere ATBD section 2	Threshold for Ground detection (photons/bin) when using ATL03-classified signal
grd_thres_sfac1 COMPACT	FLOAT (1)	grd_thres_sfac1	1 Atmosphere ATBD Section 3.3.5	Ground detection signal factor 1
grd_thres_sfac2 COMPACT	FLOAT (1)	grd_thres_sfac2	1 Atmosphere ATBD Section 3.3.5	Ground detection signal factor 2
ht_min COMPACT	FLOAT (1)	Minimum height to use in ATM profile	meters Atmosphere ATBD	Minimum height to use in ATM profile
king_fact COMPACT	FLOAT (1)	KING factor	1 Atmosphere ATBD	King factor for molecular transmission.
max_calib_day COMPACT	FLOAT (3)	Maximum Daytime Calibration	Photons*m3sr/J Atmosphere ATBD	Maximum calculated calibration value allowed for daytime for each pce for calibration method 3
max_calib_night COMPACT	FLOAT (3)	Maximum Nighttime Calibration	Photons*m3sr/J Atmosphere ATBD	Maximum calculated calibration value allowed for nighttime for each pce for calibration method 3
max_calib_twilight COMPACT	FLOAT (3)	Maximum Twilight Calibration	Photons*m3sr/J Atmosphere ATBD	Maximum calculated calibration value allowed for twilight for each pce for calibration method 3
max_nrb_day COMPACT	FLOAT (3)	Maximum Daytime NRB	Photons m2/Joule Atmosphere ATBD	Maximum daytime NRB accepted for filtered NRB data for each pce for calibration method 3
max_nrb_night COMPACT	FLOAT (3)	Maximum Nighttime NRB	Photons m2/Joule Atmosphere ATBD	Maximum nighttime NRB accepted for filtered NRB array for each pce for calibration method 3
max_nrb_twilight COMPACT	FLOAT (3)	Maximum Twilight NRB	Photons m2/Joule Atmosphere ATBD	Maximum twilight NRB accepted for filtered NRB array for each pce for calibration method 3

min_calib_day COMPACT	FLOAT (3)	Minimum Daytime Calibration	Photons*m3sr/J Atmosphere ATBD	Minimum calculated calibration allowed for daytime for each pce for calibration method 3
min_calib_night COMPACT	FLOAT (3)	Minimum Nighttime Calibration	Photons*m3sr/J Atmosphere ATBD	Minimum calculated calibration value allowed for nighttime for each pce for calibration method 3
min_calib_twilight COMPACT	FLOAT (3)	Minimum Twilight Calibration	Photons*m3sr/J Atmosphere ATBD	Minimum calculated calibration value allowed for twilight for each pce for calibration method 3
min_nrb_day COMPACT	FLOAT (3)	Minimum Daytime NRB	Photons m2/Joule Atmosphere ATBD	Minimum daytime NRB accepted for filtered NRB data for each pce for calibration method 3
min_nrb_night COMPACT	FLOAT (3)	Minimum Nighttime NRB	Photons m2/Joule Atmosphere ATBD	Minimum nighttime NRB accepted for filtered NRB data for each pce for calibration method 3
min_nrb_twilight COMPACT	FLOAT (3)	Minimum Twilight NRB	Photons m2/Joule Atmosphere ATBD	Minimum twilight NRB accepted for filtered NRB data for each pce for calibration method 3
molec_top_ht COMPACT	FLOAT (1)	Top height of molecular profile	meters Atmosphere ATBD	Top height of molecular profile.
nrb_average_period COMPACT	INTEGER (1)	NRB Averaging Period	seconds Atmosphere ATBD	Number of seconds to average the smoothed and filtered NRB array before computing the calibration constant for calibration method 3
nrb_smooth COMPACT	INTEGER (1)	NRB Smoothing	1 Atmosphere ATBD	Number of points to average the NRB data for calibration method 3
num_molec_bins COMPACT	INTEGER (1)	Number of bins in molecular profile	counts Atmosphere ATBD	Number of bins in molecular profile
num_va_bins COMPACT	INTEGER (1)	Number of vertically aligned bins	counts Atmosphere ATBD	Number of vertically aligned bins
ozone_const COMPACT	FLOAT (1)	Ozone column density constant	1 Atmosphere ATBD	Ozone column density constant
pi COMPACT	DOUBLE (1)	PI	counts Globals	PI
planck_const COMPACT	DOUBLE (1)	Planck constant (h)	Js Atmosphere ATBD section 2	Planck constant (h)
receiver_optical_throughput COMPACT	FLOAT (1)	Receiver Optics Throughput	1 Atmosphere ATBD	Nominal Receiver Optics Throughput
saa_latmax COMPACT	FLOAT (1)	SAA Maximum Latitude	degrees_north Atmosphere ATBD	Latitude maximum of box that encompasses the area affected by the South Atlantic Anomaly (SAA)
saa_latmin COMPACT	FLOAT (1)	SAA Minimum Latitude	degrees_north Atmosphere ATBD	Latitude minimum of box that encompasses the area affected by the South Atlantic Anomaly (SAA)
saa_lonmax COMPACT	FLOAT (1)	SAA Maximum Longitude	degrees_east Atmosphere ATBD	Longitude maximum of box that encompasses the area affected by the South Atlantic Anomaly (SAA)
saa_lonmin COMPACT	FLOAT (1)	SAA Minimum Longitude	degrees_east Atmosphere ATBD	Longitude minimum of box that encompasses the area affected by the South Atlantic Anomaly (SAA)
saa_scale_fac COMPACT	FLOAT (1)	SAA Scale Factor	1 Atmosphere ATBD	Scale factor for computing the background in method 1 within the south Atlantic anomaly box
speed_of_light COMPACT	DOUBLE (1)	Speed of light (c)	meters/second Globals	Speed of light (c)
telescope_area COMPACT	DOUBLE (1)	Telescope Effective Area	sq meters Atmosphere ATBD	Effective collection area of telescope (At)

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
va_top_ht COMPACT	FLOAT (1)	Top height of vertically aligned profile	meters Atmosphere ATBD	Top height of vertically aligned profile
Group: /meteorology_molec_bkscat				
Description	(Attribute)	Contains sampled GEOS5_FPIT meteorological model data and molecular backscatter. This data is created from the time/locations of the center profile.		
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
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.
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)

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
met_tropt CHUNKED	FLOAT (:)	blended_tropopause_temperature temperature	K GEOS5 FPIT 2D DFPITT1NXSLV	Tropopause temperature (k)
met_ts CHUNKED	FLOAT (:)	surface_temperature temperature	K GEOS5 FPIT 2D DFPITT1NXSLV	Surface skin temperature (K)
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
ozone_trans CHUNKED	FLOAT (: x 700)	Ozone transmission profile	1 Atmosphere ATBD	Ozone transmission profile, 30 m resolution, 20 km to -1 km
segment_id CHUNKED	INTEGER (:)	along-track segment ID number.	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.
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: /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 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	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)	Data in this group is stored at a 25hz (25 per second) rate.

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atm_rw_width_m CHUNKED	FLOAT (:)	Atmospheric Range Window Width	seconds ATL02	The range, in meters, from the Atmospheric range window start to the range window stop.
atm_tw_top CHUNKED	FLOAT (:)	Atmospheric Telemetry Window Top	meters ATL03g ATBD	The geolocated ellipsoidal height at the top of the Atmospheric range window
backg_mean2 CHUNKED	FLOAT (:)	Signal mean	counts Atmosphere ATBD section 3.3.4	Signal mean from method 2 (pb2 defined in Atmosphere ATBD part 1 section 2.3.4)
backg_method1 CHUNKED	FLOAT (:)	Background method 1	counts Atmosphere ATBD section 3.3.4	Background from method 1in photons/bin. (pb1 Defined in Atmosphere ATBD section 2.3.2)
backg_method2 CHUNKED	FLOAT (:)	Background method 2	counts Atmosphere ATBD section 3.3.4	Background from method 2 in photons/bin. (pb2 Defined in Atmosphere ATBD section 2.3.2)
backg_method3 CHUNKED	FLOAT (:)	Background method 3	counts Atmosphere ATBD section 3.3.4	Background from method 3 in photons/bin. (Defined in Atmosphere ATBD section 3.3.4)
backg_std_dev2 CHUNKED	FLOAT (:)	Background standard deviation 2	counts Atmosphere ATBD section 3.3.4	Background standard deviation from the selected method used (Sstd2 Defined in Atmosphere ATBD section 2.3.2)
beam_azimuth CHUNKED	FLOAT (:)	beam azimuth	degrees_east ATL03 ATBD	Beam azimuth
beam_elevation CHUNKED	FLOAT (:)	beam elevation	degrees ATL03 ATBD	Beam elevation
bg_sensitivity CHUNKED	FLOAT (:)	Background Sensitivity	events/sec ATL02 ATBD, Section 5.5.2	Receiver response per watt of continuous illumination in the passband from a diffuse source larger than the field of view, in the absence of any dead time effects.
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'] |
| 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.
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.
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.
nrb_bot_bin CHUNKED	INTEGER (:)	NRB Profile bottom valid bin	1 Atmosphere ATBD section 2.3	The ending (bottom) bin number within the 20 to -1 km vertically aligned profile where data are valid. Bin number starts at 1.
nrb_profile CHUNKED	FLOAT (: x 700)	NRB Profile	1 Atmosphere ATBD section 2.3	Normalize relative backscatter (NRB) profile vertically aligned to 20 to -1 km with vertical resolution of 30 m. (Photons km2/Joule)
nrb_top_bin CHUNKED	INTEGER (:)	NRB Profile top valid bin	counts Atmosphere ATBD section 2.3	The starting (top) bin number within the 20 to -1 km vertically aligned profile where data are valid. Bin number starts at 1.
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 CHUNKED	FLOAT (:)	Across Track Distance from RGT	meters ATL03g ATBD, Section 3.4	Across-Track distance from the reference ground track.
range_to_top CHUNKED	FLOAT (:)	Range	meters Atmosphere ATBD	Range from the spacecraft to the top of the atmosphere range window.
ret_sensitivity CHUNKED	FLOAT (:)	Return Sensitivity	events/pulse ATL02 ATBD, Section 5.5.2	Receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects.
sc_alt CHUNKED	DOUBLE (:)	Altitude	meters ATL03g ATBD, Section 3.4	Height of the spacecraft above the WGS84 ellipsoid.
segment_id CHUNKED	INTEGER (:)	along-track segment ID number.	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	INTEGER (:)	Count of Signa Heightsl - High	counts ATL03 ATBD, Section 5	Count of high-confidence signal photons
sig_count_low	INTEGER	Count of Signal Heights - Low	counts	Count of low-confidence signal photons

CHUNKED	(:)		ATL03 ATBD, Section 5	
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 Heights -Med	meters ATL03 ATBD, Section 5	SDev of the heights of medium-confidence signal photons
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_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']
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	Vertially aligned, NRB bin number of the detected surface return.
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.
surface_thres CHUNKED	FLOAT (:)	Surface signal threshold	photons Atmosphere ATBD section 3.3.5	Surface signal threshold
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/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/calibration				
Description	(Attribute)	Contains calibration data associated with a PCE strong beam.		
data_rate	(Attribute)	Data within this group stored at a low rate corresponding to the number of times ATLAS passes with the calibration boundary conditions (lat > 60 and solar_angle > 90)/		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
cal_c CHUNKED	FLOAT (:)	Calculated Calibration constant	Photons*m^3 *sr / J Atmosphere ATBD	Calculated calibration constant (one per beam, Defined by Atmosphere ATBD eqn 3.27)
cal_c_trans CHUNKED	FLOAT (:)	total transmission used	1 Atmosphere ATBD	The total transmission used to compute cal_const.

cal_con CHUNKED	INTEGER (:)	Calibration Confidence	1 Atmosphere ATBD	Calibration Confidence
cal_molec CHUNKED	FLOAT (:)	Molecular Backscatter used	m-1 sr-1 Atmosphere ATBD	Molecular Backscatter value used to compute cal_const.
cal_nrb CHUNKED	FLOAT (:)	NRB value used	1 Atmosphere ATBD	NRB value used to compute cal_const.
cal_ozone_trans CHUNKED	FLOAT (:)	Ozone transmission used	1 Atmosphere ATBD	Ozone transmission term used to compute cal_const.
delta_time CHUNKED	DOUBLE (:)	Calibration interval start time 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.
delta_time_end CHUNKED	DOUBLE (:)	Calibration interval end time time	seconds since 2018-01-01 Atmosphere ATBD	Number of GPS seconds since the ATLAS SDP epoch where the cal interval ended. The corresponding start time of the interval is delta_time. 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.
latitude CHUNKED	DOUBLE (:)	Calibration interval start Latitude latitude	degrees_north Atmosphere ATBD	Start Latitude of calibration interval.
latitude_end CHUNKED	DOUBLE (:)	Calibration interval end latitude	degrees_north Atmosphere ATBD	Stop Latitude of calibration interval.
longitude CHUNKED	DOUBLE (:)	Calibration interval start longitude longitude	degrees_east Atmosphere ATBD	Start Longitude of calibration interval.
longitude_end CHUNKED	DOUBLE (:)	Calibration interval end longitude	degrees_east Atmosphere ATBD	Stop Longitude of calibration interval.
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 quality assessment data for each profile		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
back1_avg CONTIGUOUS	FLOAT (1)	Background Method 1 Avg	counts Atmosphere ATBD	Background method 1 average
back1_max CONTIGUOUS	FLOAT (1)	Background Method 1 Max	counts Atmosphere ATBD	Background method 1 max
back1_min CONTIGUOUS	FLOAT (1)	Background Method 1 Min	counts Atmosphere ATBD	Background method 1 min
back2_avg CONTIGUOUS	FLOAT (1)	Background Method 2 Avg	counts Atmosphere ATBD	Background method 2 average
back2_max CONTIGUOUS	FLOAT (1)	Background Method 2 Max	counts Atmosphere ATBD	Background method 2 max
back2_min CONTIGUOUS	FLOAT (1)	Background Method 2 Min	counts Atmosphere ATBD	Background method 2 min
back3_avg CONTIGUOUS	FLOAT (1)	Background Method 3 Avg	counts Atmosphere ATBD	Background method 3 average
back3_max CONTIGUOUS	FLOAT (1)	Background Method 3 Max	counts Atmosphere ATBD	Background method 3 max
back3_min CONTIGUOUS	FLOAT (1)	Background Method 3 Min	counts Atmosphere ATBD	Background method 3 min
cal_c_avg CONTIGUOUS	FLOAT (1)	Average of the Calibration constant	Photons*m^3 *sr / J Atmosphere ATBD	Average of the calculated calibration constant (Defined by Atmosphere ATBD eqn 3.27)
cal_c_std CONTIGUOUS	FLOAT (1)	Standard Deviation of the Calibration constant	Photons*m^3 *sr / J Atmosphere ATBD	Standard Deviation of the calculated calibration constant (Defined by Atmosphere ATBD eqn 3.27)
delta_time CONTIGUOUS	DOUBLE (1)	QA start time 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.
ht_diff_avg CONTIGUOUS	FLOAT (1)	Ht Diff Avg	meters Atmosphere ATBD	Average of the surface height minus the DEM height
n_val_cal CONTIGUOUS	INTEGER (1)	Number valid calibration constants	counts Atmosphere ATBD	Number valid calibration constants
surf_pct CONTIGUOUS	FLOAT (1)	Surface Percentage	percent Atmosphere ATBD	Percent time surface height was detected
surf_sig_avg CONTIGUOUS	FLOAT (1)	Surface signal average	photons Atmosphere ATBD	Surface signal average
surf_sig_max CONTIGUOUS	FLOAT (1)	Surface signal max	photons Atmosphere ATBD	Surface signal max
surf_sig_min CONTIGUOUS	FLOAT (1)	Surface signal min	photons Atmosphere ATBD	Surface signal min
tx_nrg_avg CONTIGUOUS	FLOAT (1)	Average of the laser energy	joules Atmosphere ATBD	Average of the laser energy
tx_nrg_std	FLOAT	Standard Deviation of the laser	joules	Standard Deviation of the laser energy

| CONTIGUOUS | (1) | energy | Atmosphere ATBD | |