ATL04 Product Data Dictionary

Date Generated : 2020-10-21T15:56:55

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
level	(Attribute)	L2
short_name	(Attribute)	ATL04
title	(Attribute)	SET_BY_META
Group: /		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
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
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
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		
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		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
ds_surf_type COMPACT	INTEGER([5])	Surface Type Dimension Scale None	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 (Source: Dim Scale); (Meanings: [1 2 3 4 5]) (Values: ['land' 'ocean' 'seaice' 'landice' 'inland_water'])
Group: /ancillary_data		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(Dims) Fillvalue	long_name standard_name	units	description
atlas_sdp_gps_epoch COMPACT	DOUBLE([1])	ATLAS Epoch Offset None	seconds since 1980-01-06T00:00:00.000000Z	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. (Source: Operations)
control CONTIGUOUS	STRING([1])	Control File None	1	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds. (Source: Operations)
data_end_utc COMPACT	STRING([1])	End UTC Time of Granule (CCSDS-A, Actual) None	1	UTC (in CCSDS-A format) of the last data point within the granule. (Source: Derived)
data_start_utc COMPACT	STRING([1])	Start UTC Time of Granule (CCSDS-A, Actual) None	1	UTC (in CCSDS-A format) of the first data point within the granule. (Source: Derived)
end_cycle COMPACT	INTEGER([1])	Ending Cycle None	1	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. (Source: Derived)
end_delta_time COMPACT	DOUBLE([1])	ATLAS End Time (Actual) time	seconds since 2018-01-01	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. (Source: Derived)
end_geoseg COMPACT	INTEGER([1])	Ending Geolocation Segment None	1	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. (Source: Derived)
end_gpssow COMPACT	DOUBLE([1])	Ending GPS SOW of Granule (Actual) None	seconds	GPS seconds-of-week of the last data point in the granule. (Source: Derived)
end_gpsweek COMPACT	INTEGER([1])	Ending GPSWeek of Granule (Actual) None	weeks from 1980-01-06	GPS week number of the last data point in the granule. (Source: Derived)
end_orbit COMPACT	INTEGER([1])	Ending Orbit Number None	1	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. (Source: Derived)
end_region COMPACT	INTEGER([1])	Ending Region None	1	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.

				(Source: Derived)
end_rgt COMPACT	INTEGER([1])	Ending Reference Groundtrack None	1	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. (Source: Derived)
granule_end_utc COMPACT	STRING([1])	End UTC Time of Granule (CCSDS-A, Requested) None	1	Requested end time (in UTC CCSDS-A) of this granule. (Source: Derived)
granule_start_utc COMPACT	STRING([1])	Start UTC Time of Granule (CCSDS-A, Requested) None	1	Requested start time (in UTC CCSDS-A) of this granule. (Source: Derived)
qa_at_interval COMPACT	DOUBLE([1])	QA Along-Track Interval None	1	Statistics time interval for along-track QA data. (Source: control)
release COMPACT	STRING([1])	Release Number None	1	Release number of the granule. The release number is incremented when the software or ancillary data used to create the granule has been changed. (Source: Operations)
start_cycle COMPACT	INTEGER([1])	Starting Cycle None	1	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. (Source: Derived)
start_delta_time COMPACT	DOUBLE([1])	ATLAS Start Time (Actual) time	seconds since 2018-01-01	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. (Source: Derived)
start_geoseg COMPACT	INTEGER([1])	Starting Geolocation Segment None	1	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-

Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
				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. (Source: Derived)
start_gpssow COMPACT	DOUBLE([1])	Start GPS SOW of Granule (Actual) None	seconds	GPS seconds-of-week of the first data point in the granule. (Source: Derived)
start_gpsweek COMPACT	INTEGER([1])	Start GPSWeek of Granule (Actual) None	weeks from 1980-01-06	GPS week number of the first data point in the granule. (Source: Derived)
start_orbit COMPACT	INTEGER([1])	Starting Orbit Number None	1	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. (Source: Derived)
start_region COMPACT	INTEGER([1])	Starting Region None	1	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. (Source: Derived)
start_rgt COMPACT	INTEGER([1])	Starting Reference Groundtrack None	1	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. (Source: Derived)
version COMPACT	STRING([1])	Version None	1	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. (Source: Operations)
Group: /ancillary_data/atmosphere		Contains general ancillary parameters.		
data_rate	(Attribute)	Data within this group pertain to the granule in its entirety.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
aer_scat_rat COMPACT	FLOAT([1])	Aerosol Scattering Ratio None	1	Aerosol Scattering Ratio in the calibration zone (11 (Source: Atmosphere ATBD)
alpha_day_pce1 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE1/day) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_day_pce2	FLOAT([1])	Molecular Folding Scaling Factor	1	Molecular Folding Scaling Factor

COMPACT		None		(PCE2/day) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_day_pce3 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE3/day) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_night_pce1 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE1/night) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_night_pce2 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE2/night) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_night_pce3 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE3/night) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_twilight_pce1 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE1/twilight) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_twilight_pce2 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE2/twilight) (Source: Atmosphere ATBD, part 1, section 3.3.2)
alpha_twilight_pce3 COMPACT	FLOAT([1])	Molecular Folding Scaling Factor None	1	Molecular Folding Scaling Factor (PCE3/twilight) (Source: Atmosphere ATBD, part 1, section 3.3.2)
atlas_atm_hist_binsize COMPACT	FLOAT([1])	Histogram bin size (m) None	meters	Nominal size of each ATM histogram bin, in meters (Source: Atmosphere ATBD)
atlas_atm_hist_binsize_s COMPACT	DOUBLE([1])	Histogram bin size (s) None	seconds	Nominal size of each ATM histogram bin, in seconds (Source: Atmosphere ATBD)
atlas_atm_shot_sum_25hz COMPACT	INTEGER([1])	Number of shots at 25hz None	counts	Number of shots summed to compute an ATM histogram at 25 hz (nominal) (Source: Atmosphere ATBD)
atlas_atm_shot_sum_50hz COMPACT	INTEGER([1])	Number of shots at 50hz None	counts	Number of shots summed to compute an ATM histogram at 50 hz (diagnostic) (Source: Atmosphere ATBD)
atlas_n_atm_hist_bins COMPACT	INTEGER([1])	Number of histogram bins None	counts	Number of ATM histogram bins (Source: Atmosphere ATBD)
atlas_n_pce COMPACT	INTEGER([1])	Number of ATLAS PCEs None	1	Number of ATLAS PCE boards (Source: Atmosphere ATBD)
atm_laser_wavelength_m COMPACT	DOUBLE([1])	Laser Wavelength (m) None	meters	ATLAS Laser wavelength, in meters (Source: Atmosphere ATBD)
atm_laser_wavelength_nm COMPACT	FLOAT([1])	Laser Wavelength (nm) None	nm	ATLAS Laser wavelength, in nanometers (Source: Atmosphere ATBD)
atm_processing_interval COMPACT	DOUBLE([1])	Seconds of ATM data processed in one chunk. None	seconds	The number of seconds of ATM data processed in one chunk. (Source: Control)
atm_pulse_ns COMPACT	DOUBLE([1])	Pulse Time None	sq meters	The time between ATLAS pulses. (Source: Atmosphere ATBD)

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atm_tep_start COMPACT	DOUBLE([1])	TEP Window Start None	ns	The start time of the TEP removal window. (Source: Atmosphere ATBD)
atm_tep_width COMPACT	DOUBLE([1])	TEP Window Width None	sq meters	The width of the TEP removal window. (Source: Atmosphere ATBD)
back_f2 COMPACT	FLOAT([1])	Background Fact method2 None	1	Scaling factor in Method 2 background computation (Source: Atmosphere ATBD section 3.3.4)
backg_day_exp_factor COMPACT	FLOAT([1])	Background daytime exponent factor None	1	Background daytime exponent factor in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_day_scale_factor1 COMPACT	FLOAT([1])	Background daytime scaling factor 1 None	1	Background daytime scaling factor 1 in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_day_scale_factor2 COMPACT	FLOAT([1])	Background daytime scaling factor 2 None	1	Background daytime scaling factor 2 in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_max_solar_elev COMPACT	FLOAT([1])	Background maximum solar elevation angle None	degrees	Background maximum solar elevation angle in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_min_solar_elev COMPACT	FLOAT([1])	Background minimum solar elevation angle None	degrees	Background minimum solar elevation angle in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_night_bkgd COMPACT	FLOAT([1])	Background nighttime background None	1	Background nighttime background in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_night_scale_factor COMPACT	FLOAT([1])	Background nighttime scaling factor None	1	Background nighttime scaling factor in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_nseg COMPACT	INTEGER([1])	Number of background segments in method 1 None	counts	Number of background segments in method 1 (Source: Atmosphere ATBD section 3.3.4)
backg_response_time COMPACT	FLOAT([1])	Background response time None	1	Background response time in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
backg_select COMPACT	INTEGER([1])	background method used None	1	The background method used in calculation of NRB (Source: Atmosphere ATBD section 3.3.4); (Meanings: [1 2 3]) (Values: ['method1' 'method2' 'method3'])
backg_twilight_scale_factor COMPACT	FLOAT([1])	Background twilight scaling factor None	1	Background twilight scaling factor in Method 1 bkgd comp (Source: Atmosphere ATBD section 3.3.4)
boltzmann_const COMPACT	FLOAT([1])	Boltzmann Constant None	erg/K	Boltzmann constant (Source: Atmosphere ATBD section 2)
cal_atm_trans	FLOAT([1])	Cal Atm Trans	1	Particulate transmission from top of

COMPACT		None		atmosphere to the calibration height (13 km) (Source: Atmosphere ATBD section 2)
cal_bot_ht COMPACT	FLOAT([1])	Bottom height of Cal zone None	meters	Bottom height of the calibration zone (Source: Atmosphere ATBD section 2)
cal_cloud_thres COMPACT	FLOAT([1])	Cal Cloud Threshold None	counts	Threshold for excluding NRB data in calibration zone. (Source: Atmosphere ATBD section 2)
cal_day_pce1 COMPACT	FLOAT([1])	Daytime PCE1 CAL None	1	Daytime calibration constant for pce1 in method 2 (Source: Control)
cal_day_pce2 COMPACT	FLOAT([1])	Daytime PCE2 CAL None	1	Daytime calibration constant for pce2 in method 2 (Source: Control)
cal_day_pce3 COMPACT	FLOAT([1])	Daytime PCE3 CAL None	1	Daytime calibration constant for pce3 in method 2 (Source: Control)
cal_default COMPACT	FLOAT([1])	Default CAL Constant None	Photons*m^3 *sr / J	Default atmosphere calibration constant. Used by default when no calibration data have been computed for an ATL04 granule. (Source: Atmosphere ATBD section 2)
cal_integ_time COMPACT	FLOAT([1])	Cal Integ Time None	seconds	Calibration integration time (Source: Atmosphere ATBD section 2)
cal_lat_bound COMPACT	DOUBLE([1])	Cal Latitude Bound None	degrees	The latitude boundary for calibration calculation (Source: Atmosphere ATBD section 2)
cal_night_pce1 COMPACT	FLOAT([1])	CAL Night PCE1 None	1	Nighttime calibration constant for pce1 in method 2 (Source: Control)
cal_night_pce2 COMPACT	FLOAT([1])	CAL Night PCE2 None	1	Nighttime calibration constant for pce2 in method 2 (Source: Control)
cal_night_pce3 COMPACT	FLOAT([1])	CAL Night PCE3 None	1	Nighttime calibration constant for pce3 in method 2 (Source: Control)
cal_scat_ratio COMPACT	FLOAT([1])	Cal Scat Ratio None	1	Calibration Zone (13 to 11 km) aerosol scattering ratio (Source: Atmosphere ATBD section 2)
cal_select COMPACT	INTEGER([1])	Calibration Algorithm Used None	1	Calibration algorithm used. (Source: Control); (Meanings: [1 2 3]) (Values: ['method1' 'method2' 'method3'])
cal_solar_angle_limit COMPACT	FLOAT([1])	Cal Solar Angle Limit None	degrees	Minimum solar zenith angle for calibration calculation (Source: Atmosphere ATBD section 2)
cal_solar_elev_max COMPACT	FLOAT([1])	Maximim Solar Elevation None	degrees	Maximum solar elevation angle in calibration method 2. (Source: Control)
cal_solar_elev_min COMPACT	FLOAT([1])	Minimum Solar Elevation for CAL None	degrees	Minimum solar elevation angle in calibration method 2. (Source: Control)

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cal_top_ht COMPACT	FLOAT([1])	Top height of Cal zone None	meters	Top height of the calibration zone (Source: Atmosphere ATBD section 2)
cal_twilight_pce1 COMPACT	FLOAT([1])	Twilight PCE1 CAL None	1	Twilight calibration constant for pce1 in method 2 (Source: Control)
cal_twilight_pce2 COMPACT	FLOAT([1])	Twilight PCE2 CAL None	1	Twilight calibration constant for pce2 in method 2 (Source: Control)
cal_twilight_pce3 COMPACT	FLOAT([1])	Twilight PCE3 CAL None	1	Twilight calibration constant for pce3 in method 2 (Source: Control)
chappius_coef COMPACT	FLOAT([1])	Chappius Coefficient None	1	Chappius ozone absorption coefficient (Source: Atmosphere ATBD)
dead_time_sfac COMPACT	FLOAT([1])	Dead Time Signal Factor None	1	Dead time signal factor (Source: Atmosphere ATBD section 2)
default_nrb_day COMPACT	FLOAT([3])	Daytime NRB Defaults None	Photons m2/Joule	Default value for daytime NRB used to replace NRB values that are out of range for each pce for calibration method 3 (Source: Atmosphere ATBD)
default_nrb_night COMPACT	FLOAT([3])	Nighttime NRB Defaults None	Photons m2/Joule	Default value for nighttime NRB - used to replace NRB values that are out of range for each pce for calibration method 3 (Source: Atmosphere ATBD)
default_nrb_saa COMPACT	FLOAT([3])	Default NRB in SAA None	Photons m2/Joule	Default value for NRB used to replace NRB values that are out of range when in the South Atlantic Anomaly during nighttime for each pce for calibration method 3 (Source: Atmosphere ATBD)
default_nrb_twilight COMPACT	FLOAT([3])	Twilight NRB Defaults None	Photons m2/Joule	Default value for twilight NRB - used to replace NRB values that are out of range for each pce for calibration method 3 (Source: Atmosphere ATBD)
deg2rad COMPACT	DOUBLE([1])	Degree to radians conversion None	1	Degrees to radians conversion factor (Source: Globals)
detector_efficiency COMPACT	FLOAT([1])	Detector Quantum Efficiency None	1	Detector quantum efficiency (Qe) (Source: Atmosphere ATBD)
dtime_select COMPACT	INTEGER([1])	dead time factor used None	1	Deadtime factor used. (Source: Control); (Meanings: [1 2]) (Values: ['dtime_fact1' 'dtime_fact2'])
fold_nbins COMPACT	INTEGER([1])	1 None	bins	Number of bins starting from end of raw profile to compute mean of signal to test for presence of cloud folding (Source: Atmosphere ATBD)
fold_thresh_day COMPACT	FLOAT([1])	Daytime Folding Threshold None	photons/bin	Raw signal level above which the mean of the last fold_nbins indicates the presence of cloud folding for daytime data (Source: Atmosphere ATBD)
fold_thresh_night COMPACT	FLOAT([1])	Nighttime Folding Threshold None	photons/bin	Raw signal level above which the mean of the last fold_nbins indicates the presence of cloud folding for nighttime data

				(Source: Atmosphere ATBD)
gas_const_r COMPACT	DOUBLE([1])	Ideal gas constant R None	1	Ideal gas constant (R) (Source: Globals)
grd_search_width COMPACT	INTEGER([1])	Ground Search Width None	bins	Ground detection search width (Source: Atmosphere ATBD section 3.3.5)
grd_thres_atl03 COMPACT	FLOAT([1])	Ground Threshold using ATL03 signal None	photons/bin	Threshold for Ground detection (photons/bin) when using ATL03-classified signal (Source: Atmosphere ATBD section 2)
grd_thres_sfac1 COMPACT	FLOAT([1])	grd_thres_sfac1 None	1	Ground detection signal factor 1 (Source: Atmosphere ATBD Section 3.3.5)
grd_thres_sfac2 COMPACT	FLOAT([1])	grd_thres_sfac2 None	1	Ground detection signal factor 2 (Source: Atmosphere ATBD Section 3.3.5)
ht_min COMPACT	FLOAT([1])	Minimum height to use in ATM profile None	meters	Minimum height to use in ATM profile (Source: Atmosphere ATBD)
king_fact COMPACT	FLOAT([1])	KING factor None	1	King factor for molecular transmission. (Source: Atmosphere ATBD)
max_calib_day COMPACT	FLOAT([3])	Maximum Daytime Calibration None	Photons*m3sr/J	Maximum calculated calibration value allowed for daytime for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_calib_night COMPACT	FLOAT([3])	Maximum Nighttime Calibration None	Photons*m3sr/J	Maximum calculated calibration value allowed for nighttime for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_calib_twilight COMPACT	FLOAT([3])	Maximum Twilight Calibration None	Photons*m3sr/J	Maximum calculated calibration value allowed for twilight for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_nrb_day COMPACT	FLOAT([3])	Maximum Daytime NRB None	Photons m2/Joule	Maximum daytime NRB accepted for filtered NRB data for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_nrb_night COMPACT	FLOAT([3])	Maximum Nighttime NRB None	Photons m2/Joule	Maximum nighttime NRB accepted for filtered NRB array for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_nrb_saa COMPACT	FLOAT([3])	Maximum NRB in SAA None	Photons m2/Joule	Maximum NRB accepted for filtered NRB data when in the South Atlantic Anomaly during nighttime for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_nrb_twilight COMPACT	FLOAT([3])	Maximum Twilight NRB None	Photons m2/Joule	Maximum twilight NRB accepted for filtered NRB array for each pce for calibration method 3 (Source: Atmosphere ATBD)
max_photon COMPACT	INTEGER([1])	1 None	photons/bin	The photon level that the average of bin 50 to 200 of the raw profiles must exceed to be categorized as bad data. (Source: Atmosphere ATBD)
min_calib_day COMPACT	FLOAT([3])	Minimum Daytime Calibration None	Photons*m3sr/J	Minimum calculated calibration allowed for daytime for each pce for calibration method 3

				(Source: Atmosphere ATBD)
min_calib_night COMPACT	FLOAT([3])	Minimum Nighttime Calibration None	Photons*m3sr/J	Minimum calculated calibration value allowed for nighttime for each pce for calibration method 3 (Source: Atmosphere ATBD)
min_calib_twilight COMPACT	FLOAT([3])	Minimum Twilight Calibration None	Photons*m3sr/J	Minimum calculated calibration value allowed for twilight for each pce for calibration method 3 (Source: Atmosphere ATBD)
min_nrb_day COMPACT	FLOAT([3])	Minimum Daytime NRB None	Photons m2/Joule	Minimum daytime NRB accepted for filtered NRB data for each pce for calibration method 3 (Source: Atmosphere ATBD)
min_nrb_night COMPACT	FLOAT([3])	Minimum Nighttime NRB None	Photons m2/Joule	Minimum nighttime NRB accepted for filtered NRB data for each pce for calibration method 3 (Source: Atmosphere ATBD)
min_nrb_twilight COMPACT	FLOAT([3])	Minimum Twilight NRB None	Photons m2/Joule	Minimum twilight NRB accepted for filtered NRB data for each pce for calibration method 3 (Source: Atmosphere ATBD)
molec_top_ht COMPACT	FLOAT([1])	Top height of molecular profile None	meters	Top height of molecular profile. (Source: Atmosphere ATBD)
night_thresh_min COMPACT	FLOAT([1])	Night threshold minimum None	1	Night threshold 1 minimum (Source: Atmosphere ATBD)
nrb_average_period COMPACT	INTEGER([1])	NRB Averaging Period None	seconds	Number of seconds to average the smoothed and filtered NRB array before computing the calibration constant for calibration method 3 (Source: Atmosphere ATBD)
nrb_smooth COMPACT	INTEGER([1])	NRB Smoothing None	1	Number of points to average the NRB data for calibration method 3 (Source: Atmosphere ATBD)
num_molec_bins COMPACT	INTEGER([1])	Number of bins in molecular profile None	counts	Number of bins in molecular profile (Source: Atmosphere ATBD)
num_va_bins COMPACT	INTEGER([1])	Number of vertically aligned bins None	counts	Number of vertically aligned bins (Source: Atmosphere ATBD)
ozone_const COMPACT	FLOAT([1])	Ozone column density constant None	1	Ozone column density constant (Source: Atmosphere ATBD)
pi COMPACT	DOUBLE([1])	PI None	counts	PI (Source: Globals)
planck_const COMPACT	DOUBLE([1])	Planck constant (h) None	Js	Planck constant (h) (Source: Atmosphere ATBD section 2)
receiver_optical_throughput COMPACT	FLOAT([1])	Receiver Optics Throughput None	1	Nominal Receiver Optics Throughput (Source: Atmosphere ATBD)
saa_cal_fac COMPACT	FLOAT([1])	SAA Calibration Factor None	1	Factor to multiply the calibration constants by when within the SAA and the solar elevation angle is < calib_solar_elev_max in calibration method 3 (Source: Atmosphere ATBD)
saa_latmax COMPACT	FLOAT([1])	SAA Maximum Latitude None	degrees_north	Latitude maximum of box that encompasses the area affected by the South Atlantic Anomaly (SAA) (Source: Atmosphere ATBD)
saa_latmin	FLOAT([1])	SAA Minimum Latitude	degrees_north	Latitude minimum of box that

Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
COMPACT		None		encompasses the area affected by the South Atlantic Anomaly (SAA) (Source: Atmosphere ATBD)
saa_lonmax COMPACT	FLOAT([1])	SAA Maximum Longitude None	degrees_east	Longitude maximum of box that encompasses the area affected by the South Atlantic Anomaly (SAA) (Source: Atmosphere ATBD)
saa_lonmin COMPACT	FLOAT([1])	SAA Minimum Longitude None	degrees_east	Longitude minimum of box that encompasses the area affected by the South Atlantic Anomaly (SAA) (Source: Atmosphere ATBD)
saa_scale_fac COMPACT	FLOAT([1])	SAA Scale Factor None	1	Scale factor for computing the background in method 1 within the south Atlantic anomaly box (Source: Atmosphere ATBD)
speed_of_light COMPACT	DOUBLE([1])	Speed of light (c) None	meters/second	Speed of light (c) (Source: Globals)
telescope_area COMPACT	DOUBLE([1])	Telescope Effective Area None	sq meters	Effective collection area of telescope (At) (Source: Atmosphere ATBD)
va_top_ht COMPACT	FLOAT([1])	Top height of vertically aligned profile None	meters	Top height of vertically aligned profile (Source: Atmosphere ATBD)
Group: /meteorology_molec_bkscat		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(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(['Unlimited'])	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Atmosphere ATBD)
ds_va_bin_h COMPACT	FLOAT([700])	VA Bin Height Dimension Scale None	meters	Dimension scale containing the heights of the vertically-aligned bins. (Source: Atmosphere ATBD)
latitude CHUNKED	DOUBLE(['Unlimited'])	Latitude of the ATM histogram latitude	degrees_north	Latitude at the the top of the ATM histogram, WGS84, North=+, Derived from the geolocation of the ATM range window. (Source: ATL03g ATBD)
longitude CHUNKED	DOUBLE(['Unlimited'])	Longitude of the ATM histogram longitude	degrees_east	Longitude at the the top of the ATM histogram, WGS84, East=+, derived from the geolocation of the ATM range window. (Source: ATL03g ATBD)
met_cldprs CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	cloud_top_pressure pressure	Pa	Pressure of the highest cloud top at this location from GEOS5 data (Source: GEOS5 FPIT 2D DFPITT1NXSLV)

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met_ps CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Surface Pressure pressure	Pa	Surface Pressure (Pa) (Source: GEOS5 FPIT 3D DFPITI3NVASM)
met_qv10m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	specific_humidity_at_10m specific_humidity	kg kg-1	Specific humidity at 10 m above the displacement height (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_qv2m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	specific_humidity_at_2m specific_humidity	kg kg-1	Specific humidity at 2 m above the displacement height (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_slp CHUNKED	FLOAT(['Unlimited'])	sea_level_pressure sea_level_pressure	Pa	sea-level pressure (Pa) (Source: GEOS5 FPIT 3D DFPITI3NVASM)
met_t10m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	temperature_at_10m temperature	K	Temperature at 10m above the displacement height (K) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_t2m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	temperature_at_2m temperature	K	Temperature at 2m above the displacement height (K) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_tqi CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	cloud_ice None	kg m-2	Total column cloud ice (Kg/m2) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_tql CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	cloud_liquid_water None	kg m-2	Total column cloud liquid water (kg/m2) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_troppb CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	blended_tropopause_pressure pressure	Pa	Blended tropopause pressure (pa) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_tropt CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	blended_tropopause_temperature temperature	K	Tropopause temperature (k) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_ts CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	surface_temperature temperature	K	Surface skin temperature (K) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_u10m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Eastward_wind_at_10m eastward_wind	m s-1	Eastward wind at 10m above the displacement height (m/s-1) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_u2m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Eastward_wind_at_2m eastward_wind	m s-1	Eastward wind at 2m above the displacement height (m/s-1) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_u50m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Eastward_wind_at_50m eastward_wind	m s-1	Eastward wind at 50m above the displacement height (m/s-1) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_v10m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Northward_wind_at_10m northward_wind	m s-1	Northward wind at 10m above the displacement height (m/s-1) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_v2m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Northward_wind_at_2m northward_wind	m s-1	Northward wind at 2m above the displacement height (m/s-1) (Source: GEOS5 FPIT 2D DFPITT1NXSLV)
met_v50m CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	northward_wind_at_50m northward_wind	m s-1	Northward wind at 50m above the displacement height (m/s-1)

Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
				(Source: GEOS5 FPIT 2D DFPITT1NXSLV)
mol_backs_folded CHUNKED	FLOAT(['Unlimited', 700])	Folded molecular transmission profile None	m-1 sr-1	Folded molecular transmission profile, 30 m resolution, , m-1 sr-1; 20 km to -1 km (equation 3.17) (Source: Atmosphere ATBD)
mol_backscatter CHUNKED	FLOAT(['Unlimited', 700])	Molecular backscatter profile None	m-1 sr-1	Molecular backscatter profile, 30 m resolution, 20 km to -1 km (Source: Atmosphere ATBD)
molec_bkscat_p CHUNKED	FLOAT(['Unlimited', 700])	Pressure profile None	Pa	Pressure profiles from 20 km to -1 km (Source: Atmosphere ATBD)
molec_bkscat_rh CHUNKED	FLOAT(['Unlimited', 700])	Relative humidity profiles None	percentage	Relative humidity profiles from 20 km to -1 km (Source: Atmosphere ATBD)
molec_bkscat_t CHUNKED	FLOAT(['Unlimited', 700])	Temperature profile None	K	Temperature profiles from 20 km to -1 km (Source: Atmosphere ATBD)
molec_trans CHUNKED	FLOAT(['Unlimited', 700])	Molecular transmission profile None	1	Molecular transmission profile, 30 m resolution, 20 km to -1 km (Source: Atmosphere ATBD)
ozone_trans CHUNKED	FLOAT(['Unlimited', 700])	Ozone transmission profile None	1	Ozone transmission profile, 30 m resolution, 20 km to -1 km (Source: Atmosphere ATBD)
segment_id CHUNKED	INTEGER(['Unlimited'])	along-track segment ID number. None	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. (Source: ATL03 ATBD, Section 3.1)
surf_type CHUNKED	INTEGER_1(['Unlimited', 5])	surface type None	1	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. (Source: ATL03 ATBD, Section 4); (Meanings: [0 1]) (Values: ['not_type' 'is_type'])
Group: /orbit_info		Contains orbit information.		
data_rate	(Attribute)	Varies. Data are only provided when one of the stored values (besides time) changes.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
crossing_time CHUNKED	DOUBLE(['Unlimited'])	Ascending Node Crossing Time time	seconds since 2018-01-01	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. (Source: POD/PPD)
cycle_number	INTEGER_1(['Unlimited'])	Cycle Number	1	A count of the number of exact

CHUNKED		None		repeats of this reference orbit. (Source: Operations)
lan CHUNKED	DOUBLE(['Unlimited'])	Ascending Node Longitude None	degrees_east	Longitude at the ascending node crossing. (Source: POD/PPD)
orbit_number CHUNKED	UINT_2_LE(['Unlimited'])	Orbit Number None	1	Unique identifying number for each planned ICESat-2 orbit. (Source: Operations)
rgt CHUNKED	INTEGER_2(['Unlimited'])	Reference Ground track None	1	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. (Source: POD/PPD)
sc_orient CHUNKED	INTEGER_1(['Unlimited'])	Spacecraft Orientation None	1	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. (Source: POD/PPD); (Meanings: [0 1 2]) (Values: ['backward' 'forward' 'transition'])
sc_orient_time CHUNKED	DOUBLE(['Unlimited'])	Time of Last Spacecraft Orientation Change time	seconds since 2018-01-01	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. (Source: POD/PPD)
Group: /profile_x		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		

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Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
		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(Dims) Fillvalue	long_name standard_name	units	description
atm_rw_width_m CHUNKED	FLOAT(['Unlimited'])	Atmospheric Range Window Width None	seconds	The range, in meters, from the Atmospheric range window start to the range window stop. (Source: ATL02)
atm_tw_top CHUNKED	FLOAT(['Unlimited'])	Atmospheric Telemetry Window Top None	meters	The geolocated ellipsoidal height at the top of the Atmospheric range window (Source: ATL03g ATBD)
backg_mean2 CHUNKED	FLOAT(['Unlimited'])	Signal mean None	counts	Signal mean from method 2 (pb2 defined in Atmosphere ATBD part 1 section 2.3.4) (Source: Atmosphere ATBD section 3.3.4)
backg_method1 CHUNKED	FLOAT(['Unlimited'])	Background method 1 None	counts	Background from method 1in photons/bin. (pb1 Defined in Atmosphere ATBD section 2.3.2) (Source: Atmosphere ATBD section 3.3.4)
backg_method2 CHUNKED	FLOAT(['Unlimited'])	Background method 2 None	counts	Background from method 2 in photons/bin. (pb2 Defined in Atmosphere ATBD section 2.3.2) (Source: Atmosphere ATBD section 3.3.4)
backg_method3 CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Background method 3 None	counts	Background from method 3 in photons/bin. (Defined in Atmosphere ATBD section 3.3.4) (Source: Atmosphere ATBD section 3.3.4)
backg_std_dev2 CHUNKED	FLOAT(['Unlimited'])	Background standard deviation 2 None	counts	Background standard deviation from the selected method used (Sstd2 Defined in Atmosphere ATBD section 2.3.2) (Source: Atmosphere ATBD section 3.3.4)
beam_azimuth CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	beam azimuth None	degrees_east	Beam azimuth (Source: ATL03 ATBD)
beam_elevation CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	beam elevation None	degrees	Beam elevation (Source: ATL03 ATBD)
bg_sensitivity CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Background Sensitivity None	events/sec	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. (Source: ATL02 ATBD, Section 5.5.2)
cloud_fold_flag CHUNKED	INTEGER_1(['Unlimited']) INVALID_I1B	Cloud Folding Flag None	1	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 (Source: Atmosphere ATBD); (Meanings: [0 1 2 3]) (Values: ['no_folding' 'goes5_indicates' 'profile_indicates' 'both_indicate'])
delta_time	DOUBLE(['Unlimited'])	Elapsed GPS seconds	seconds since 2018-	Number of GPS seconds since the

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CHUNKED		time	01-01	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. (Source: Atmosphere ATBD)
dem_flag CHUNKED	INTEGER_1(['Unlimited']) INVALID_I1B	dem source flag None	1	Indicates source of the DEM height. Values: 0=None, 1=Arctic, 2=Global, 3=MSS, 4=Antarctic. (Source: Atmosphere ATBD); (Meanings: [0 1 2 3 4]) (Values: ['none' 'arctic' 'global' 'mss' 'antarctic'])
dem_h CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	DEM Height None	meters	Best available DEM (in priority of Arctic/Antarctic/Global/MSS) value at the geolocation point. (Source: Atmosphere ATBD)
ds_va_bin_h COMPACT	FLOAT([700])	VA Bin Height Dimension Scale None	meters	Dimension scale containing the heights of the vertically-aligned bins. (Source: Atmosphere ATBD)
dtime_fac1 CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	dead_time_factor1 None	1	Dead time correction factor for surface signal computed from radiometric lookup table. (Source: Atmosphere ATBD)
dtime_fac2 CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	dead_time_factor2 None	1	Dead time correction factor for surface signal computed from ATBD equation 2.1. (Source: Atmosphere ATBD)
latitude CHUNKED	DOUBLE(['Unlimited'])	Latitude of the ATM histogram latitude	degrees_north	Latitude at the the top of the ATM histogram, WGS84, North=+, Derived from the geolocation of the ATM range window. (Source: ATL03g ATBD)
longitude CHUNKED	DOUBLE(['Unlimited'])	Longitude of the ATM histogram longitude	degrees_east	Longitude at the the top of the ATM histogram, WGS84, East=+, derived from the geolocation of the ATM range window. (Source: ATL03g ATBD)
nrb_bot_bin CHUNKED	INTEGER(['Unlimited']) INVALID_I4B	NRB Profile bottom valid bin None	1	The ending (bottom) bin number within the 20 to -1 km vertically aligned profile where data are valid. Bin number starts at 1. (Source: Atmosphere ATBD section 2.3)
nrb_profile CHUNKED	FLOAT(['Unlimited', 700]) INVALID_R4B	NRB Profile None	1	Normalize relative backscatter (NRB) profile vertically aligned to 20 to -1 km with vertical resolution of 30 m. (Photons km2/Joule) (Source: Atmosphere ATBD section 2.3)
nrb_top_bin CHUNKED	INTEGER(['Unlimited']) INVALID_I4B	NRB Profile top valid bin None	counts	The starting (top) bin number within the 20 to -1 km vertically aligned profile where data are valid. Bin number starts at 1. (Source: Atmosphere ATBD section 2.3)

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pce_mframe_cnt CHUNKED	UINT_4_LE(['Unlimited'])	PCE Major frame counter None	counts	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 (Source: ATL02)
prof_dist_x CHUNKED	DOUBLE(['Unlimited'])	Along Track Distance None	meters	Along-track distance from the equator crossing. (Source: ATL03g ATBD, Section 3.4)
prof_dist_y CHUNKED	FLOAT(['Unlimited'])	Across Track Distance from RGT None	meters	Across-Track distance from the reference ground track. (Source: ATL03g ATBD, Section 3.4)
range_to_top CHUNKED	FLOAT(['Unlimited'])	Range None	meters	Range from the spacecraft to the top of the atmosphere range window. (Source: Atmosphere ATBD)
ret_sensitivity CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Return Sensitivity None	events/pulse	Receiver response per joule/return pulse in the field of view, in the absence of any deadtime effects. (Source: ATL02 ATBD, Section 5.5.2)
sc_alt CHUNKED	DOUBLE(['Unlimited'])	Altitude None	meters	Height of the spacecraft above the WGS84 ellipsoid. (Source: ATL03g ATBD, Section 3.4)
segment_id CHUNKED	INTEGER(['Unlimited'])	along-track segment ID number. None	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. (Source: ATL03 ATBD, Section 3.1)
sig_count_hi CHUNKED	INTEGER(['Unlimited'])	Count of Signa Heightsl - High None	counts	Count of high-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_count_low CHUNKED	INTEGER(['Unlimited'])	Count of Signal Heights - Low None	counts	Count of low-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_count_med CHUNKED	INTEGER(['Unlimited'])	Count of Signal Heights - Medium None	counts	Count of medium-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_h_mean_hi CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Mean of SignalHeights - High None	meters	Mean height of high-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_h_mean_low CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Mean of Signal Heights - Low None	meters	Mean height of low-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_h_mean_med CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Mean of Signa Heightsl - Med None	meters	Mean height of medium-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_h_sdev_hi CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	SDev of Signal Heights -High None	meters	SDev of the heights of high-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_h_sdev_low CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	SDev of Signal Heights -Low None	meters	SDev of the heights of low-confidence signal photons (Source: ATL03 ATBD, Section 5)
sig_h_sdev_med	FLOAT(['Unlimited'])	SDev of Signa Heights -Med	meters	SDev of the heights of medium-

CHUNKED	INVALID_R4B	None		confidence signal photons (Source: ATL03 ATBD, Section 5)
solar_azimuth CHUNKED	FLOAT(['Unlimited'])	solar azimuth None	degrees_east	The direction, eastwards from north, of the sun vector as seen by an observer at the laser ground spot. (Source: ATL03g ATBD)
solar_elevation CHUNKED	FLOAT(['Unlimited'])	solar elevation None	degrees	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. (Source: ATL03g ATBD)
surf_type CHUNKED	INTEGER_1(['Unlimited', 5])	surface type None	1	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. (Source: ATL03 ATBD, Section 4); (Meanings: [0 1]) (Values: ['not_type' 'is_type'])
surf_type_igbp CHUNKED	INTEGER_1(['Unlimited'])	IGBP Surface Type None	1	IGBP Surface Type (Source: Atmosphere ATBD, IGBP Surface Type)
surface_bin CHUNKED	INTEGER(['Unlimited']) INVALID_I4B	Surface bin None	1	Vertially aligned, NRB bin number of the detected surface return. (Source: Atmosphere ATBD section 3.3.5)
surface_conf CHUNKED	FLOAT(['Unlimited'])	Surface signal confidence None	1	The level of confidence in the surface signal magnitude and location for each beam. (1.0 - lowest confidence; 100.0 - highest confidence). (Source: Atmosphere ATBD section 3.3.5)
surface_height CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Surface height None	meters	Height of the detected surface bin. (Source: Atmosphere ATBD section 3.3.5)
surface_sig CHUNKED	FLOAT(['Unlimited'])	Surface signal count None	counts	Number of photons in the detected surface bin. (Source: Atmosphere ATBD section 3.3.5)
surface_thresh CHUNKED	FLOAT(['Unlimited'])	Surface signal threshold None	photons	Surface signal threshold (Source: Atmosphere ATBD section 3.3.5)
surface_width CHUNKED	INTEGER(['Unlimited'])	Surface signal width None	bins	The number of bins comprising the surface signal for each beam. (Source: Atmosphere ATBD section 3.3.5)
tx_pulse_energy CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Transmit Pulse Energy None	Joules	Transmit energy, from the laser internal energy monitor, split into per-beam measurements. (Source: ATL02 ATBD, Section 7.2)
Group: /profile_x/bckgrd_atlas		Contains the ATLAS 50-shot background data and derivations.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
bckgrd_counts	INTEGER(['Unlimited'])	ATLAS 50-shot background count	counts	Onboard 50 shot background (200

Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
CHUNKED		None		Hz) sum of photon events within the altimetric range window. (Source: ATL03 ATBD Section 7.3)
bckgrd_counts_reduced CHUNKED	INTEGER(['Unlimited'])	ATLAS 50-shot background count - reduced None	counts	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. (Source: ATL03 ATBD Section 7.3)
bckgrd_hist_top CHUNKED	FLOAT(['Unlimited'])	Top of the altimetric range window None	meters	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. (Source: ATL03 ATBD Section 7.3)
bckgrd_int_height CHUNKED	FLOAT(['Unlimited'])	Altimetric range window width None	meters	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. (Source: ATL03 ATBD Section 7.3)
bckgrd_int_height_reduced CHUNKED	FLOAT(['Unlimited'])	Altimetric range window height - reduced None	meters	The height of the altimetric range window after subtracting the height span of the signal photon events in the 50-shot span. (Source: ATL03 ATBD Section 7.3)
bckgrd_rate CHUNKED	FLOAT(['Unlimited'])	Background count rate based on the ATLAS 50-shot sum None	counts / second	The background count rate from the 50-shot altimetric histogram after removing the number of likely signal photons based on Section 5. (Source: ATL03 ATBD Section 7.3)
delta_time CHUNKED	DOUBLE(['Unlimited'])	Elapsed GPS seconds time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
pce_mframe_cnt CHUNKED	UINT_4_LE(['Unlimited'])	PCE Major frame counter None	counts	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 (Source: ATL02)
Group: /profile_x/calibration		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(Dims) Fillvalue	long_name standard_name	units	description

cal_c CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Calculated Calibration constant None	Photons*m^3 *sr / J	Calculated calibration constant (one per beam, Defined by Atmosphere ATBD eqn 3.27) (Source: Atmosphere ATBD)
cal_c_trans CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	total transmission used None	1	The total transmission used to compute cal_const. (Source: Atmosphere ATBD)
cal_con CHUNKED	INTEGER(['Unlimited']) INVALID_I4B	Calibration Confidence None	1	Calibration Confidence (Source: Atmosphere ATBD)
cal_molec CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Molecular Backscatter used None	m-1 sr-1	Molecular Backscatter value used to compute cal_const. (Source: Atmosphere ATBD)
cal_nrb CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	NRB value used None	1	NRB value used to compute cal_const. (Source: Atmosphere ATBD)
cal_ozone_trans CHUNKED	FLOAT(['Unlimited']) INVALID_R4B	Ozone transmission used None	1	Ozone transmission term used to compute cal_const. (Source: Atmosphere ATBD)
delta_time CHUNKED	DOUBLE(['Unlimited'])	Calibration interval start time time	seconds since 2018-01-01	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. (Source: Derived via Time Tagging)
delta_time_end CHUNKED	DOUBLE(['Unlimited'])	Calibration interval end time time	seconds since 2018-01-01	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. (Source: Atmosphere ATBD)
latitude CHUNKED	DOUBLE(['Unlimited'])	Calibration interval start Latitude latitude	degrees_north	Start Latitude of calibration interval. (Source: Atmosphere ATBD)
latitude_end CHUNKED	DOUBLE(['Unlimited'])	Calibration interval end latitude None	degrees_north	Stop Latitude of calibration interval. (Source: Atmosphere ATBD)
longitude CHUNKED	DOUBLE(['Unlimited'])	Calibration interval start longitude longitude	degrees_east	Start Longitude of calibration interval. (Source: Atmosphere ATBD)
longitude_end CHUNKED	DOUBLE(['Unlimited'])	Calibration interval end longitude None	degrees_east	Stop Longitude of calibration interval. (Source: Atmosphere ATBD)
Group: /quality_assessment		Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		

ATL04 Product Data Dictionary

Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
qa_granule_fail_reason COMPACT	INTEGER([1])	Granule Failure Reason None	1	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. (Source: Operations); (Meanings: [0 1 2 3 4 5]) (Values: ['no_failure' 'PROCESS_ERROR' 'INSUFFICIENT_OUTPUT' 'failure_3' 'failure_4' 'OTHER_FAILURE'])
qa_granule_pass_fail COMPACT	INTEGER([1])	Granule Pass Flag None	1	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA. (Source: Operations); (Meanings: [0 1]) (Values: ['PASS' 'FAIL'])
Group: /quality_assessment/profile_x		Contains quality assessment data for each profile		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
back1_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 1 Avg None	counts	Background method 1 average (Source: Atmosphere ATBD)
back1_max CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 1 Max None	counts	Background method 1 max (Source: Atmosphere ATBD)
back1_min CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 1 Min None	counts	Background method 1 min (Source: Atmosphere ATBD)
back2_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 2 Avg None	counts	Background method 2 average (Source: Atmosphere ATBD)
back2_max CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 2 Max None	counts	Background method 2 max (Source: Atmosphere ATBD)
back2_min CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 2 Min None	counts	Background method 2 min (Source: Atmosphere ATBD)
back3_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 3 Avg None	counts	Background method 3 average (Source: Atmosphere ATBD)
back3_max CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 3 Max None	counts	Background method 3 max (Source: Atmosphere ATBD)
back3_min CONTIGUOUS	FLOAT([1]) INVALID_R4B	Background Method 3 Min None	counts	Background method 3 min (Source: Atmosphere ATBD)
cal_c_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Average of the Calibration constant None	Photons*m^3 *sr / J	Average of the calculated calibration constant (Defined by Atmosphere ATBD eqn 3.27) (Source: Atmosphere ATBD)
cal_c_std CONTIGUOUS	FLOAT([1]) INVALID_R4B	Standard Deviation of the Calibration constant None	Photons*m^3 *sr / J	Standard Deviation of the calculated calibration constant (Defined by Atmosphere ATBD eqn 3.27) (Source: Atmosphere ATBD)
delta_time CONTIGUOUS	DOUBLE([1])	QA start time time	seconds since 2018-01-01	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.

				(Source: Derived via Time Tagging)
ht_diff_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Ht Diff Avg None	meters	Average of the surface height minus the DEM height (Source: Atmosphere ATBD)
n_val_cal CONTIGUOUS	INTEGER([1])	Number valid calibration constants None	counts	Number valid calibration constants (Source: Atmosphere ATBD)
surf_pct CONTIGUOUS	FLOAT([1]) INVALID_R4B	Surface Percentage None	percent	Percent time surface height was detected (Source: Atmosphere ATBD)
surf_sig_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Surface signal average None	photons	Surface signal average (Source: Atmosphere ATBD)
surf_sig_max CONTIGUOUS	FLOAT([1]) INVALID_R4B	Surface signal max None	photons	Surface signal max (Source: Atmosphere ATBD)
surf_sig_min CONTIGUOUS	FLOAT([1]) INVALID_R4B	Surface signal min None	photons	Surface signal min (Source: Atmosphere ATBD)
tx_nrg_avg CONTIGUOUS	FLOAT([1]) INVALID_R4B	Average of the laser energy None	joules	Average of the laser energy (Source: Atmosphere ATBD)
tx_nrg_std CONTIGUOUS	FLOAT([1]) INVALID_R4B	Standard Deviation of the laser energy None	joules	Standard Deviation of the laser energy (Source: Atmosphere ATBD)