

ATL07 Product Data Dictionary

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description	(Attribute)	The data set (ATL07) contains along-track heights for sea ice and open water leads (at varying length scales) after adjustment for geoidal, tidal variations, and inverted barometer effects.
level	(Attribute)	L3A
short_name	(Attribute)	ATL07
title	(Attribute)	SET_BY_META
Group: /		The data set (ATL07) contains along-track heights for sea ice and open water leads (at varying length scales) after adjustment for geoidal, tidal variations, and inverted barometer effects.
Conventions	(Attribute)	CF-1.6
citation	(Attribute)	SET_BY_META
contributor_name	(Attribute)	Ron Kwok (rkwok01@uw.edu), Alek Petty (alek.a.petty@nasa.gov), Jesse Wimert (jesse.wimert@us.kbr.com), Marco Bagnardi (marco.bagnardi@nasa.gov), Glenn Cunningham, David W Hancock III (david.w.hancock@nasa.gov), Jeff Lee (jeffery.e.lee@nasa.gov), Alvaro Ivanoff (alvaro.ivanoff-1@nasa.gov), Nathan Kurtz (nathan.t.kurtz@nasa.gov)
contributor_role	(Attribute)	Data Product Lead, Data Product Lead, Software Engineer, Data Analysis, Data Analysis, Software Engineer, Software Engineer, Software Support, Mission Scientist, Mission Scientist, Deputy Mission Scientist
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)	ATL07
hdfversion	(Attribute)	SET_BY_PGE
history	(Attribute)	SET_BY_PGE
identifier_product_doi	(Attribute)	10.5067/ATLAS/ATL07.001
identifier_product_doi_authority	(Attribute)	http://dx.doi.org
identifier_product_format_version	(Attribute)	SET_BY_PGE
identifier_product_type	(Attribute)	ATL07
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)	L3A		
project	(Attribute)	SET_BY_META		
publisher_email	(Attribute)	SET_BY_META		
publisher_name	(Attribute)	SET_BY_META		
publisher_url	(Attribute)	SET_BY_META		
references	(Attribute)	SET_BY_META		
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		
Group: /ancillary_data		Contains information ancillary to the data product. This may include product characteristics, instrument characteristics and/or processing constants.		
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-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/coarse_surface_finding		Contains ancillary parameters related to the coarse surface finding algorithm.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
bin_c COMPACT	FLOAT(1)	bin size coarse histogram None	meters	bin size of coarse histogram (Source: Sea Ice ATBD)
coarse_lb_wins COMPACT	FLOAT(1)	Coarse_LowerrBounds None	meters	Lower bound for signal photons when performing coarse tracking (Source: Sea Ice ATBD)
coarse_ub_wins COMPACT	FLOAT(1)	Coarse_UpperBounds None	meters	Upper bound for signal photons when performing coarse tracking (Source: Sea Ice ATBD)
l COMPACT	FLOAT(1)	segment length coarse None	meters	along track segment length coarse (Source: Sea Ice ATBD)
n_ph_min COMPACT	INTEGER(1)	Minimum Number of Photons None	1	Minimum number of photons required for coarse track segment (Source: Sea Ice ATBD)
th_d_bot COMPACT	FLOAT(1)	Bottom threshold distance from mode coarse None	meters	Bottom distance from mode coarse (Source: Sea Ice ATBD)
th_d_top COMPACT	FLOAT(1)	Top threshold distance from mode coarse None	meters	Top distance from mode coarse (Source: Sea Ice ATBD)
th_fm COMPACT	FLOAT(1)	threshold fraction of peak coarse None	1	fraction of histogram peak coarse (Source: Sea Ice ATBD)
th_pc COMPACT	FLOAT(1)	threshold percentage cloud cover coarse None	1	percentage cloud cover coarse (Source: Sea Ice ATBD)
th_tc COMPACT	FLOAT(1)	Threshold height deviations None	1	height deviations from surface or adjacent strong beam (Source: Sea Ice ATBD)
Group: /ancillary_data/fine_surface_finding		Contains ancillary parameters related to the fine surface finding algorithm.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
bin_f COMPACT	FLOAT(1)	bin size of fine histogram None	meters	bin size of fine histogram along track segment length (Source: Sea Ice ATBD)
delta_h_tab COMPACT	FLOAT(1)	h table spacing None	meters	the waveform table spacing for the height (h) dimension

				(Source: Sea Ice ATBD)
delta_w_tab COMPACT	FLOAT(1)	w table spacing None	meters	the waveform table spacing for the width (w) dimension (Source: Sea Ice ATBD)
h_diff_limit COMPACT	FLOAT(1)	Max Ht Difference None	meters	Maximum height difference between the two weighted Gaussian mean from the initial tracked height (units = meters) (Source: Sea Ice ATBD)
lb_h_tab COMPACT	FLOAT(1)	lower bound of h table None	meters	lower bound of h table (Source: Sea Ice ATBD)
lb_oc_switch_strong COMPACT	FLOAT(1)	Lower bound of overlapping control for strong beam None	photons/shot	Lower bound of photon rate overlapping control for strong beam when overlap is turned off (Source: ATBD section 4.2.2.4)
lb_oc_switch_weak COMPACT	FLOAT(1)	Lower bound of overlapping control for weak beam None	photons/shot	Lower bound of photon rate overlapping control for weak beam when overlap is turned off (Source: ATBD section 4.2.2.4)
lb_w_tab COMPACT	FLOAT(1)	lower bound of w table None	meters	lower bound of w table (Source: Sea Ice ATBD)
lb_win_s COMPACT	FLOAT(1)	lower bound window signal None	meters	window (Ws) containing signal photons (Source: Sea Ice ATBD)
n_photon_min COMPACT	FLOAT(1)	Minimum number of photons None	1	Minimum fraction of photons needed for tracking (Source: Sea Ice ATBD)
n_photon_trim COMPACT	INTEGER(1)	Min Photons None	1	Minimum number of photons for trimming leading/trailing bins (Source: Sea Ice ATBD)
n_s COMPACT	INTEGER(1)	number photons in W_s None	1	Number of photons to collect within W_s fine tracking window (Source: Sea Ice ATBD)
n_spec_scale COMPACT	FLOAT(1)	Specular Scaling Value None	1	Scaling parameter used for scaling value of N_SPECULAR for the weak beam. Specular returns for weak beam are defined as a shot having more photons than (N_SPECULAR/N_SPEC_SCALE) (Source: Sea Ice ATBD)
n_specular COMPACT	FLOAT(1)	number photons Specular returns None	1	Specular returns limits (Source: Sea Ice ATBD)
n_w COMPACT	INTEGER(1)	number of standard deviations None	1	number of standard deviations (Source: Sea Ice ATBD)
overlap_switch COMPACT	INTEGER(1)	Overlap Segments None	1	Use of overlapping height segments (1 = yes, 0 = no) (Source: Sea Ice ATBD); (Meanings: [0 1]) (Values: ['no', 'yes'])
tep_used_gt1_strong COMPACT	INTEGER(1)	TEP Table PCE1_Strong None	1	TEP used in table generation for strong beam of ground track 1 (1 or 3) (Source: Sea Ice ATBD)
tep_used_gt1_weak COMPACT	INTEGER(1)	TEP Table PCE1_Weak None	1	TEP used in table generation for weak beam of ground track 1 (1 or 3) (Source: Sea Ice ATBD)
tep_used_gt2_strong COMPACT	INTEGER(1)	TEP Table PCE2_Strong None	1	TEP used in table generation for strong beam of ground track 2 (1 or 3) (Source: Sea Ice ATBD)
tep_used_gt2_weak COMPACT	INTEGER(1)	TEP Table PCE2_Weak None	1	TEP used in table generation for weak beam of ground track 2 (1 or 3) (Source: Sea Ice ATBD)

tep_used_gt3_strong COMPACT	INTEGER(1)	TEP Table PCE3_Strong None	1	TEP used in table generation for strong beam of ground track 3 (1 or 3) (Source: Sea Ice ATBD)
tep_used_gt3_weak COMPACT	INTEGER(1)	TEP Table PCE3_Weak None	1	TEP used in table generation for weak beam of ground track 3 (1 or 3) (Source: Sea Ice ATBD)
ub_h_tab COMPACT	FLOAT(1)	upper bound of h table None	meters	the waveform upper bound for the height (h) dimension (Source: Sea Ice ATBD)
ub_length_strong COMPACT	INTEGER(1)	upper bound segment length strong None	1	upper bound of segment length strong beam (Source: Sea Ice ATBD)
ub_length_weak COMPACT	INTEGER(1)	upper bound segment length weak None	1	upper bound of segment length weak beam (Source: Sea Ice ATBD)
ub_oc_switch_strong COMPACT	FLOAT(1)	Upper bound of overlapping control for strong beam None	photons/shot	Upper bound of photon rate overlapping control for strong beam when overlap is turned off (Source: ATBD section 4.2.2.4)
ub_oc_switch_weak COMPACT	FLOAT(1)	Upper bound of overlapping control for weak beam None	photons/shot	Upper bound of photon rate overlapping control for weak beam when overlap is turned off (Source: ATBD section 4.2.2.4)
ub_w_tab COMPACT	FLOAT(1)	upper bound of w table None	meters	the waveform upper bound for the width (w) dimension (Source: Sea Ice ATBD)
ub_win_s COMPACT	FLOAT(1)	upper bound window signal None	meters	window (Ws) containing signal photons (Source: Sea Ice ATBD)
Group: /ancillary_data/sea_ice		Contains ancillary parameters related to sea ice.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
dist2land_min COMPACT	FLOAT(1)	minimum distance to land threshold dist2land_min	m	Minimum distance from land to process data. (Source: Operations)
geoseg_max COMPACT	INTEGER(1)	Maximum Segment Id None	1	Indicates the maximum segment_id to process (if specified in control). The actual maximum processed may be greater than specified. (Source: Operations)
geoseg_min COMPACT	INTEGER(1)	Minimum Segment ID None	1	Indicates the minimum segment_id to process (if specified in control) (Source: Operations)
inverted_barometer_switch COMPACT	INTEGER(1)	Inverted Barometer Switch inverted_barometer_switch	1	Switch determines which value of inverted barometer to use to correct photon heights before processing. If switch = 0, use inverted barometer computed using static mean_ocean_slp (1013.25 PA). If switch = 1, use dynamic inverted barometer computed using computed mean_ocean_slp (from ANC10 and ANC48, ancillary_data/sea_ice/mean_ocean_slp). (Source: Operations); (Meanings: [0 1]) (Values: ['static_inverted_barometer', 'dynamic_inverted_barometer'])
mean_ocean_slp COMPACT	FLOAT(1)	Mean Ocean Sea Level Pressure mean_ocean_slp	Pa	Mean ocean sea level pressure computed using SLP from ANC10 and ocean fraction mask from ANC48 (Source: Sea Ice ATBD, ANC10, ANC48)

min_segs_count COMPACT	INTEGER(1)	Minimum Segments Count None	1	ATL07 granules with less than this number of strong beam sea ice segments will be marked as failed. (Source: Sea Ice ATBD)
mss_extrapolate_max_dist COMPACT	FLOAT(1)	max distance for performing MSS extrapolation mss_extrapolate_max_dist	m	Maximum distance for extrapolating over missing MSS data. If set to 0, no extrapolation will be performed. (Source: Operations)
mss_interpolate_max_dist COMPACT	FLOAT(1)	max distance for performing MSS interpolation mss_interpolate_max_dist	m	Maximum distance for interpolating over a gap of missing MSS data. If set to 0, no interpolation will be performed. (Source: Operations)
oc_depth_max COMPACT	FLOAT(1)	maximum ocean depth oc_depth_max	m	Maximum ocean depth to process data. (Source: Operations)
proc_beam_pair1 COMPACT	INTEGER(1)	Processing Flag for Beam Pair 1 None	1	Indicates if beam pair 1 was processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_beam_pair2 COMPACT	INTEGER(1)	Processing Flag for Beam Pair 2 None	1	Indicates if beam pair 2 was processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_beam_pair3 COMPACT	INTEGER(1)	Processing Flag for Beam Pair 3 None	1	Indicates if beam pair 3 was processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_interval COMPACT	INTEGER(1)	Processing interval None	1	The number of 20 meter segments of data processed in one chunk (Source: Operations)
proc_podppd_flag_0 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 0 None	1	Indicates if regions with PODPPD_flag = 0 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_1 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 1 None	1	Indicates if regions with PODPPD_flag = 1 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_2 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 2 None	1	Indicates if regions with PODPPD_flag = 2 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_3 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 3 None	1	Indicates if regions with PODPPD_flag = 3 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_4 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 4 None	1	Indicates if regions with PODPPD_flag = 4 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_5 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 5 None	1	Indicates if regions with PODPPD_flag = 5 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_6 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 6 None	1	Indicates if regions with PODPPD_flag = 6 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
proc_podppd_flag_7 COMPACT	INTEGER(1)	Processing Flag POPPPD Flag Equal to 7 None	1	Indicates if regions with PODPPD_flag = 7 should be processed. (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])

si_conc_dist COMPACT	FLOAT(1)	max distance from ice covered grid None	meters	Maximum distance from ice covered grid-cell (daily gridded passive microwave SIC map) to process uncorrected segment height (Source: Sea Ice ATBD)
si_conc_min COMPACT	FLOAT(1)	Min SI Concentration Thresh None	1	Minimum sea ice concentration from the daily gridded passive microwave SIC map to produce corrected height estimate (Source: Sea Ice ATBD)
sic_filter_amsr2 COMPACT	INTEGER(1)	Flag for using AMSR2 SIC grid for filtering None	1	If flag is set to on, use the AMSR2 sea ice concentration file (ANC49) to filter regions of low sea ice concentration based on si_conc_min (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
sic_filter_ssmi COMPACT	INTEGER(1)	Flag for using SSMI SIC grid for filtering None	1	If flag is set to on, use the SSMI sea ice concentration file (ANC31) to filter regions of low sea ice concentration based on si_conc_min (Source: Operations); (Meanings: [0 1]) (Values: ['not_processed', 'processed'])
tide_extrapolate_max_dist COMPACT	FLOAT(1)	max distance for performing tide extrapolation tide_extrapolate_max_dist	m	Maximum distance for extrapolating over missing tide data. If set to 0, no extrapolation will be performed. (Source: Operations)
tide_interpolate_max_dist COMPACT	FLOAT(1)	max distance for performing interpolation tide_interpolate_max_dist	m	Maximum distance for interpolating over a gap of missing tide data. If set to 0, no interpolation will be performed. (Source: Operations)
Group: /ancillary_data/surface_classification		Contains ancillary parameters related to the surface classification algorithm.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
b1 COMPACT	FLOAT(1)	max backgr (gray ice) None	1	max backgr (gray ice) (Source: Sea Ice ATBD)
beam_gain COMPACT	FLOAT(6)	relative beam gain for beams 1 through 6 None	1	Relative gains for beams 1 through 6 where N is the beam number (Note: Beams 1, 3, and 5 are the strong beams) (Source: Sea Ice ATBD)
class_elev_max COMPACT	FLOAT(1)	surface classification elevation maximum class_elev_max	m	Maximum elevation for segment to be considered in surface classification. (Source: Sea Ice ATBD)
class_elev_min COMPACT	FLOAT(1)	surface classification elevation minimum class_elev_min	m	Minimum elevation for segment to be considered in surface classification. (Source: Sea Ice ATBD)
class_gap_time COMPACT	FLOAT(1)	surface classification gap time class_gap_time	s	Time between two segments to be considered a data gap. (Source: Sea Ice ATBD)
class_mean_flag COMPACT	INTEGER(1)	surface classification ssh height threshold switch class_mean_flag	0	Switch which determines how ssh height threshold is determined. (Source: Sea Ice ATBD)
class_noise_level COMPACT	FLOAT(1)	surface classification elevation maximum class_elev_max	m	Surface classification height noise level. (Source: Sea Ice ATBD)
contrast_filter_percentile COMPACT	FLOAT(1)	percentile of photon rate for contrast filter contrast_filter_percentile	1	percentile of collected photon rates to use in computation of contrast ratio (Source: Sea Ice ATBD)
contrast_filter_segment_type COMPACT	INTEGER(1)	segment types used for contrast filter contrast_filter_seg_type	1	Segment types used for collecting photon rates used in computing contrast ratio. If set to 0, all segment types are included. If set

				to 1, only sea ice segments used. (Source: Sea Ice ATBD); (Meanings: [0 1]) (Values: ['all_segments', 'sea_ice_segments_only'])
contrast_length_scale COMPACT	FLOAT(1)	Length around segment for contrast filter pr_ratio_extent	km	Before/after along-track distance from segment for calculating the contrast ratio (km) (Source: Sea Ice ATBD)
height_pct COMPACT	FLOAT(1)	Percentile Hts None	percentile	Percentile of sorted heights (Source: Sea Ice ATBD)
max_incidence_angle COMPACT	FLOAT(1)	max incidence angle None	degrees	maximum beam incidence angle for surface classification/freeboard calculation. If incidence angle (complement of beam_coelev angle) is greater than max_incidence_angle, height_segment_type will be set to -1. (Source: ATBD section 4.3.1.4)
p1 COMPACT	FLOAT(1)	pr (clouds) None	1	photon rate (clouds) (Source: Sea Ice ATBD)
p2 COMPACT	FLOAT(1)	pr (snow) None	1	photon rate (snow) (Source: Sea Ice ATBD)
p3 COMPACT	FLOAT(1)	pr (shadow) None	1	photon rate (shadow) (Source: Sea Ice ATBD)
p4 COMPACT	FLOAT(1)	pr (specular) None	1	photon rate (specular) (Source: Sea Ice ATBD)
pr_ratio_extent COMPACT	INTEGER(1)	Number of segments to examine around a dark lead segment for filtering pr_ratio_extent	count	Number of segments to examine both before and after a dark lead segment when filtering dark leads. (DEFUNCT) (Source: ATBD section 4.3.1.4)
ssh_proc_length COMPACT	FLOAT(1)	sea surface height process length None	m	length in meters of processing interval when performing surface classification (Source: Sea Ice ATBD)
th_pr_ratio COMPACT	FLOAT(1)	Minimum photon rate ratio for filtering th_pr_ratio	count	Photon rate ratio used to determine if lead candidate should be filtered. (Source: ATBD section 4.3.1.4)
theta_cntl COMPACT	FLOAT(1)	Solar elevation for use of background rate None	1	Solar elevation for controlling use of background rate (Source: Sea Ice ATBD)
theta_nlb COMPACT	FLOAT(1)	Solar elevation normalization lower bound None	degrees	Solar elevation normalization lower bound for use of normalized background rate (Source: ATBD section 4.3.1.4)
theta_ref COMPACT	FLOAT(1)	Solar elevation normalization angle None	degrees	Solar elevation normalization angle for use of normalized background rate (Source: ATBD section 4.3.1.4)
w1 COMPACT	FLOAT(1)	max width (dark smooth lead) None	meters	max width (dark smooth lead) (Source: Sea Ice ATBD)
w2 COMPACT	FLOAT(1)	max width (dark rough lead) None	meters	max width (dark rough lead) (Source: Sea Ice ATBD)
Group: /atlas_impulse_response		Contains parameters to characterize the ATLAS pulse shape, derived from the Transmitter Echo Pulse (TEP) data for the two PCEs that contain TEP events.		
Group: /atlas_impulse_response/pcex_spotx		Contains parameters to characterize the ATLAS pulse shape, derived from the Transmitter Echo Pulse data for a single PCE.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
tep_bckgrd CHUNKED	INTEGER(:)	TEP Background None	counts	The average number of counts in the TEP histogram bins, after excluding bins that likely contain the transmit pulse.

				(Source: ATL03)
tep_duration CHUNKED	DOUBLE(:)	TEP Duration None	seconds	The duration (or width) of data in the TEP histogram. Will generally be greater than 10 seconds. (Source: ATL03)
tep_hist CHUNKED	DOUBLE(:)	TEP Histogram None	counts	The normalized number of counts in each bin of the TEP histogram. (Source: ATL03)
tep_hist_sum CHUNKED	INTEGER_8(:)	TEP Histogram Sum None	counts	The total number of counts in the TEP histogram, after removing the background. (Source: ATL03)
tep_hist_time CHUNKED	DOUBLE(:)	TEP Histogram Time None	seconds	The times associated with the TEP histogram bin centers, measured from the laser transmit time. (Source: ATL03)
tep_tod CHUNKED	DOUBLE(:)	TEP Time Of Day time	seconds since 2018-01-01	The time of day at of the start of the data within the TEP histogram, in seconds since the ATLAS SDP GPS 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: ATL03)
Group: /gtx		This ground contains parameters and subgroups related a specific groundtrack.		
data_rate	(Attribute)	Each subgroup identifies its particular data rate.		
Group: /gtx/sea_ice_segments		Top group for sea ice segments as computed by the ATBD algorithm		
data_rate	(Attribute)	Data within this group are stored at the variable segment rate.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
delta_time CHUNKED	DOUBLE(:)	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: telemetry)
geoseg_beg CHUNKED	INTEGER(:)	Beginning GEOSEG None	1	Geolocation segment (geoseg) ID associated with the first photon used in this sea ice segment (Source: Sea Ice ATBD)
geoseg_end CHUNKED	INTEGER(:)	Ending GEOSEG None	1	Geolocation segment (geoseg) ID associated with the last photon used in this sea ice segment (Source: Sea Ice ATBD)
height_segment_id CHUNKED	INTEGER(:)	Identifier of each height segment None	1	Identifier of each height segment (Source: ATBD, section 5.2)

latitude CHUNKED	DOUBLE(:)	Latitude latitude	degrees_north	Latitude, WGS84, North=+, Lat of segment center (Source: ATBD, section 4.4)
longitude CHUNKED	DOUBLE(:)	Longitude longitude	degrees_east	Longitude, WGS84, East=+, Lon of segment center (Source: ATBD, section 4.4)
seg_dist_x CHUNKED	DOUBLE(:)	Along track distance None	meters	Along-track distance from the equator crossing to the segment center. (Source: Sea Ice ATBD)
Group: /gtx/sea_ice_segments/geolocation		Contains parameters related to geolocation.		
data_rate	(Attribute)	Data within this group are stored at the sea_ice_height segment rate.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
beam_azimuth CHUNKED	FLOAT(:) INVALID_R4B	beam azimuth None	degrees_east	The direction, eastwards from north, of the laser beam vector as seen by an observer at the laser ground spot viewing toward the spacecraft (i.e., the vector from the ground to the spacecraft). When the spacecraft is precisely at the geodetic zenith, the value will be 99999 degrees. (Source: Sea Ice ATBD)
beam_coelev CHUNKED	FLOAT(:) INVALID_R4B	beam co-elevation None	radians	Co-elevation (CE) is direction from the plane of the laser beam as seen by an observer located at the laser ground spot. (Source: Sea Ice ATBD)
height_segment_podppd_flag CHUNKED	INTEGER_1(:) 0	POD_PPD Flag None	1	Composite POD/PPD flag from ATL03 that indicates the quality of input geolocation products. Value is set as the highest podppd_flag value from ATL03 associated with this segment. A non-zero value may indicate that geolocation solutions are degraded or that ATLAS is within a calibration scan period (CAL). Possible non-CAL values are: 0=NOMINAL; 1=POD_DEGRADE; 2=PPD_DEGRADE; 3=PODPPD_DEGRADE; possible CAL values are: 4=CAL_NOMINAL; 5=CAL_POD_DEGRADE; 6=CAL_PPD_DEGRADE; 7=CAL_PODPPD_DEGRADE. (Source: ATL02, ANC04, ANC05, ATL03)
rgt CHUNKED	INTEGER_2(:)	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: Sea Ice ATBD)
sigma_h CHUNKED	FLOAT(:) INVALID_R4B	height uncertainty None	1	Estimated uncertainty for the reference photon bounce point ellipsoid height: 1-sigma (m). Error estimates for all other photons in the group are computed with the scale defined below. (Source: Sea Ice ATBD)
sigma_lat CHUNKED	FLOAT(:) INVALID_R4B	latitude uncertainty None	1	Estimated uncertainty for the reference photon bounce point geodetic latitude: 1-sigma (degrees). Applies to all other photons in the group (Source: Sea Ice ATBD)

sigma_lon CHUNKED	FLOAT(:) INVALID_R4B	longitude uncertainty None	degrees	Estimated uncertainty for the reference photon bounce point east longitude: 1-sigma (degrees). Applies to all other photons in the group. (Source: Sea Ice ATBD)
solar_azimuth CHUNKED	FLOAT(:)	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: Sea Ice ATBD)
solar_elevation CHUNKED	FLOAT(:)	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: Sea Ice ATBD)
Group: /gtx/sea_ice_segments/geophysical		Contains geophysical parameters and corrections used to correct photon heights for geophysical effects, such as tides.		
data_rate	(Attribute)	Data within this group are stored at the sea_ice_height segment rate.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
height_segment_dac CHUNKED	FLOAT(:) INVALID_R4B	Dynamic Atmosphere Correction None	meters	Dynamic Atmospheric Correction (DAC) includes inverted barometer (IB) effect. (Source: Sea Ice ATBD)
height_segment_dynib CHUNKED	FLOAT(:) INVALID_R4B	Dynamic inverted barometer effect dynamic inverted baromter	meters	Inverted barometer effect calculated from dynamic mean ocean sea level pressure (computed using ANC10 and ANC48, /ancillary_data/sea_ice/mean_ocean_slp) (Source: ATBD, section 4.2)
height_segment_earth CHUNKED	FLOAT(:) INVALID_R4B	Earth Tide None	meters	Solid Earth Tide. The solid earth tide height is in the tide-free system. (Source: Sea Ice ATBD)
height_segment_earth_free2mean CHUNKED	FLOAT(:) INVALID_R4B	Earth Tide Free-to-Mean conversion None	meters	Additive value to convert solid earth tide from the tide-free system to the mean-tide system. (Add to height_segment_eath to get the solid earth tides in the mean-tide system.) (Source: Sea Ice ATBD)
height_segment_geoid CHUNKED	FLOAT(:) INVALID_R4B	EGM2008 Geoid None	meters	Geoid height above WGS-84 reference ellipsoid (range -107 to 86m), based on the EGM2008 model. The geoid height is in the tide-free system. (Source: Sea Ice ATBD)
height_segment_geoid_free2mean CHUNKED	FLOAT(:) INVALID_R4B	EGM2008 Geoid Free-to-Mean conversion None	meters	Additive value to convert geoid heights from the tide-free system to the mean-tide system. (Add to height_segment_geoid to get the geoid heights in the mean-tide system.) (Source: Sea Ice ATBD)
height_segment_ib CHUNKED	FLOAT(:) INVALID_R4B	Inverted barometer effect None	meters	Inverted barometer effect calculated from surface pressure (Source: ATBD, section 4.2)
height_segment_load CHUNKED	FLOAT(:) INVALID_R4B	Load Tide None	meters	Load Tide - Local displacement due to Ocean Loading (-6 to 0 cm). (Source: Sea Ice ATBD)
height_segment_lpe CHUNKED	FLOAT(:) INVALID_R4B	Equilibrium Tide None	meters	Long period equilibrium tide self-consistent with ocean tide model (+-0.04m). (dependent only on time and latitude)

				(Source: Sea Ice ATBD)
height_segment_mss CHUNKED	FLOAT(:) INVALID_R4B	CryoSat-2/DTU13 Mean Sea Surface (tide free) None	meters	Mean sea surface height above WGS-84 reference ellipsoid (range: -68 to 65m), based on a CryoSat-2/DTU13 merged product (https://doi.org/10.5281/zenodo.4294047). The MSS height (from ANC15) is adjusted to be in a tide free reference system (subtracting the geoid_free2mean correction) to be consistent with the tide free ATL03 heights. (Source: Sea Ice ATBD)
height_segment_mss_interp_flag CHUNKED	INTEGER(:) INVALID_I4B	MSS interpolation flag mss_interp_flag	1	Flag marking where MSS has been interpolated (Source: Sea Ice ATBD); (Meanings: [0 1 2]) (Values: ['no_interpolation', 'interpolation', 'extrapolation'])
height_segment_ocean CHUNKED	FLOAT(:) INVALID_R4B	Ocean Tide None	meters	Ocean Tides including diurnal and semi-diurnal (harmonic analysis), and longer period tides (dynamic and self-consistent equilibrium) (Source: Sea Ice ATBD)
height_segment_pole CHUNKED	FLOAT(:) INVALID_R4B	Pole Tide None	meters	Pole Tide -Rotational deformation due to polar motion (-1.5 to 1.5 cm). (Source: Sea Ice ATBD)
height_segment_ps CHUNKED	FLOAT(:) INVALID_R4B	sea level pressure pressure	Pa	Sea Level Pressure (Pa) (Source: ATL09)
height_segment_t2m CHUNKED	FLOAT(:) INVALID_R4B	temperature_at_2m temperature	K	Temperature at 2m above the displacement height (K) (Source: ATL09)
height_segment_tide_interp_flag CHUNKED	INTEGER(:) INVALID_I4B	tide interpolation flag tide_interp_flag	1	Flag marking where ocean tide and LPE tide has been interpolated (Source: Sea Ice ATBD); (Meanings: [0 1 2]) (Values: ['no_interpolation', 'interpolation', 'extrapolation'])
height_segment_u2m CHUNKED	FLOAT(:) INVALID_R4B	Eastward_wind_at_2m eastward_wind	m s-1	Eastward wind at 2m above the displacement height (m/s-1) (Source: ATL09)
height_segment_v2m CHUNKED	FLOAT(:) INVALID_R4B	Northward_wind_at_2m northward_wind	m s-1	Northward wind at 2m above the displacement height (m/s-1) (Source: ATL09)
Group: /gtx/sea_ice_segments/heights		Contains parameters relating to the calculated surface height for one Ground Track. As ICESat-2 orbits the earth, sequential transmit pulses illuminate six ground tracks on the surface of the earth.		
data_rate	(Attribute)	Data within this group are stored at the sea_ice_height segment rate.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
across_track_distance CHUNKED	FLOAT(:)	Across Track Distance None	meters	Across track distance of photons averaged over the sea ice height segment. (Source: ATBD, section 4.2.4)
height_segment_asr_calc CHUNKED	FLOAT(:) INVALID_R4B	Calculated Apparent Surface Reflectivity None	1	Computed apparent surface reflectance for the sea ice segment. (Source: Sea Ice ATBD)
height_segment_confidence CHUNKED	FLOAT(:) INVALID_R4B	Surface height confidence None	1	Confidence level in the surface height estimate based on analysis of the error surface, defined as the mean-square difference between the height distribution and expected return (computed waveform table). The height_segment_confidence is computed as (min(error_surf) -

				mean(error_surf)). (Source: ATBD, section 4.2.4.2)
height_segment_contrast_ratio CHUNKED	FLOAT(:) INVALID_R4B	ratio of maximum photon rate to segment photon rate contrast_ratio	1	Ratio of maximum segment photon rate within an along-track distance of +/- contrast_length_scale to the photon rate of the current segment. (Source: ATBD)
height_segment_fit_quality_flag CHUNKED	INTEGER_1(:) -1	height Quality Flag None	1	Flag describing the quality of the results of the along-track fit. (-1=height value is invalid; 1=ngrid_w < wlength/2; 2=ngrid_w >= wlength/2; 3=ngrid_dt < dtlength/2; 4=ngrid_dt >= dtlength/2; 5=ngrid_dt >= (dtlength-2): where 1 is best and 5 is poor). Heights are reported even if this flag indicates the height is invalid. (Source: ATBD, section 4.2.4.2); (Meanings: [-1 1 2 3 4 5]) (Values: ['invalid', 'best', 'high', 'med', 'low', 'poor'])
height_segment_height CHUNKED	FLOAT(:) INVALID_R4B	height of segment surface h_surf	meters	Mean height from along-track segment fit determined by the sea ice algorithm. Ocean tides and inverted barometer corrections are also applied (see Appendix J of ATBD). The sea ice height is relative to the tide-free MSS. (Source: ATBD, section 4.2.2.4)
height_segment_height_uncorr CHUNKED	FLOAT(:) INVALID_R4B	height of segment with no additional geophysical corrections applied in ATL07 h_surf_uncorr	meters	Mean segment height with no additional geophysical corrections applied in ATL07 (see Appendix J of ATBD). (Source: ATBD, section 4.2.2.4)
height_segment_htcorr_skew CHUNKED	FLOAT(:) INVALID_R4B	Height Correction for Skew None	meters	height corection for skew (Source: ATBD, section 4.2.6)
height_segment_length_seg CHUNKED	FLOAT(:)	length of segment None	meters	along-track length of segment containing n_photons_actual (Source: ATBD, section 4.2.2.4)
height_segment_n_pulse_seg CHUNKED	INTEGER(:)	number of laser pulses None	1	number of laser pulses spanned to gather photons in sea ice segment, including specular returns. (Source: ATBD, section 4.2.2.4)
height_segment_n_pulse_seg_used CHUNKED	INTEGER(:)	number of laser pulses used None	1	number of laser pulses used in processing sea ice segment, excluding specular returns. Computed as number of laser pulses spanned (height_segment_n_pulse_seg) - number of specular shots excluded. (Source: ATBD, section 4.2.2.4)
height_segment_quality CHUNKED	INTEGER_1(:)	Height Segment Quality Flag None	1	Height segment quality flag, 1 is good quality, 0 is bad depending on fit, wguassian, or layer flag (Source: ATBD, section 4.2.4); (Meanings: [0 1]) (Values: ['bad_quality', 'good_quality'])
height_segment_rms CHUNKED	FLOAT(:) INVALID_R4B	height rms None	meters	RMS difference between sea ice modeled and observed photon height distribution (Source: ATBD, section 4.2.2.4)
height_segment_ssh_flag CHUNKED	INTEGER_1(:)	Sea Surface Flag None	1	Identifies the height segments that are candidates for use as sea surface reference in freeboard calculations in ATL10. 0 = sea ice; 1 = sea surface (Source: ATBD, section 4.3); (Meanings: [0 1]) (Values: ['sea_ice', 'sea_surface'])
height_segment_surface_error_est	FLOAT(:)	h surface error est	meters	Error estimate of the surface height

CHUNKED	INVALID_R4B	None		(Source: ATBD, section 4.2.2.4)
height_segment_type CHUNKED	INTEGER_1(:) INVALID_R4B	Segment surface type None	1	Value that indicates segment surface type as sea ice or different types of sea surface. (Source: ATBD, section 4.3); (Meanings: [0 1 2 3 4 5 6 7 8 9 -1]) (Values: ['cloud_covered', 'other', 'specular_lead_low_w_bkg', 'specular_lead_low', 'specular_lead_high_w_bkg', 'specular_lead_high', 'dark_lead_smooth_w_bkg', 'dark_lead_smooth', 'dark_lead_rough_w_bkg', 'dark_lead_rough', 'off_pointing'])
height_segment_w_gaussian CHUNKED	FLOAT(:) INVALID_R4B	width of best fit gaussian None	meters	width of best fit gaussian (Source: ATBD, section 4.2.4)
Group: /gtx/sea_ice_segments/stats		Contains parameters related to quality and corrections on the sea ice height paramters		
data_rate	(Attribute)	Data within this group are stored at the sea_ice_height segment rate.		
Label (Layout)	Datatype(Dims) Fillvalue	long_name standard_name	units	description
asr_25 CHUNKED	FLOAT(:) INVALID_R4B	Apparent Surface Reflectance 25hz None	1	Apparent surface reflectance at 25 hz, averaged to the sea ice segment. (Source: Sea Ice ATBD)
backgr_calc CHUNKED	FLOAT(:) INVALID_R4B	background count rate calculated None	hz	Calculated background count rate based on sun angle, surface slope, unit reflectance (Source: ATBD, section 4.2.3)
backgr_r_200 CHUNKED	FLOAT(:) INVALID_R4B	Background rate 200 hz None	hz	Background count rate, averaged over the segment based on ATLAS 50 pulse counts (Source: ATL09)
backgr_r_25 CHUNKED	FLOAT(:) INVALID_R4B	Background rate 25hz None	hz	Background count rate, averaged over the segment based on 25 hz atmosphere (Source: ATL09)
background_int_height CHUNKED	FLOAT(:) INVALID_R4B	Height of column used in background calculation 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: ATBD, section 7.3)
background_r_norm CHUNKED	FLOAT(:) INVALID_R4B	Normalized background (50- shot) None	hz	Background rate normalized to a fixed solar elevation angle (Source: ATBD section 4.3.1.3)
bsnow_con CHUNKED	INTEGER_1(:) INVALID_I1B	Blowing snow confidence None	1	Blowing snow confidence (Source: ATL09)
bsnow_h CHUNKED	FLOAT(:) INVALID_R4B	Blowing snow top h None	meters	Blowing snow layer top height (Source: ATL09)
cloud_flag_asr CHUNKED	INTEGER_1(:) INVALID_I1B	Cloud Flag ASR None	1	Cloud flag (probability) from apparent surface reflectance. 0=clear with high confidence; 1=clear with medium confidence; 2=clear with low confidence; 3=cloudy with low confidence; 4=cloudy with medium confidence; 5=cloudy with high confidence; 6=unknown (Source: Atmosphere ATBD); (Meanings: [0 1 2 3 4 5 6]) (Values: ['clear_with_high_confidence', 'clear_with_medium_confidence', 'clear_with_low_confidence', 'cloudy_with_low_confidence', 'cloudy_with_medium_confidence', 'cloudy_with_high_confidence', 'unknown'])
cloud_flag_atm	INTEGER_1(:)	Cloud Flag Atm	1	Number of layers found from the

CHUNKED	INVALID_I1B	None		backscatter profile using the DDA layer finder. (Source: Atmosphere ATBD)
dist2land CHUNKED	FLOAT(:) INVALID_R4B	distance to land dist2land	m	Distance to nearest land mass (anc35) (Source: Sea Ice ATBD)
ds_si_hist_bins CHUNKED	INTEGER(:)	Sea Ice Histogram Bins Dimension Scale None	1	Dimension scale indexing the sea ice histogram bins. The bin heights must be computed from information contained within the same group as the histogram. (Source: Sealce ATBD)
ds_yapc_hist_bins CHUNKED	INTEGER(:)	YAPC Histogram Bins Dimension Scale None	1	Dimension scale indexing the YAPC histogram bins. The histogram contains YAPC weight counts within 6 log-scale bins. (Source: Sealce ATBD)
exmax_mean_1 CHUNKED	FLOAT(:) INVALID_R4B	Exmax Mean 1 None	meters	exmax height mean 1 (Source: sea ice ATBD Appendix E)
exmax_mean_2 CHUNKED	FLOAT(:) INVALID_R4B	Exmax Mean 2 None	meters	exmax height mean 2 (Source: sea ice ATBD Appendix E)
exmax_mix CHUNKED	FLOAT(:) INVALID_R4B	Exmax Mix None	meters	exmax height mix ratio (Source: sea ice ATBD Appendix E)
exmax_stdev_1 CHUNKED	FLOAT(:) INVALID_R4B	Exmax Stdev 1 None	meters	exmax height standard deviation 1 (Source: sea ice ATBD Appendix E)
exmax_stdev_2 CHUNKED	FLOAT(:) INVALID_R4B	Exmax Stdev 2 None	meters	exmax height standard deviation 2 (Source: sea ice ATBD Appendix E)
fpb_avg_dt CHUNKED	FLOAT(:) INVALID_R4B	fpb correction average deadtime None	ns	FPB correction average dead time (Source: Sea Ice ATBD)
fpb_corr CHUNKED	FLOAT(:) INVALID_R4B	first photon bias correction None	meters	Estimated first-photon bias(fpb) correction to mean segment height (Source: Sea Ice ATBD)
fpb_corr_width CHUNKED	FLOAT(:) INVALID_R4B	fpb correction width None	ns	FPB correction width (Source: Sea Ice ATBD)
fpb_strength CHUNKED	FLOAT(:) INVALID_R4B	fpb correction strength None	photons/shot	FPB correction strength (Source: Sea Ice ATBD)
height_coarse_mn CHUNKED	FLOAT(:) INVALID_R4B	Coarse Track Height Mean None	meters	height mean of coarse tracker (using uncorrected ATL03 heights) (Source: sea ice ATBD , sect 4.2.1.2)
height_coarse_stdev CHUNKED	FLOAT(:) INVALID_R4B	Coarse Height Sdev None	meters	height standard deviation of coarse tracker (Source: sea ice ATBD , sect 4.2.1.2)
height_filter_05 CHUNKED	FLOAT(:) INVALID_R4B	Height Filter 5th Percentile None	meters	height fifth percentile used in the ssh height filter (Source: sea ice ATBD , sect 4.2.1.2)
height_filter_min CHUNKED	FLOAT(:) INVALID_R4B	Height Filter Min None	meters	height minimum used in the ssh height filter (Source: sea ice ATBD , sect 4.2.1.2)
hist_mean_h CHUNKED	FLOAT(:) INVALID_R4B	photon heights mean None	meters	Mean of the n_fit_photons heights (Source: ATBD, section 4.2.2.4)
hist_median_h CHUNKED	FLOAT(:) INVALID_R4B	trimmed photon heights median None	meters	Median of the n_fit_photons heights (Source: ATBD, section 4.2.3.1)
hist_photon_bin_size CHUNKED	FLOAT(:)	height histogram bin size None	meters	bin size of photon height histogram (Source: ATBD, section 4.2.2.4)
hist_photon_bottom CHUNKED	FLOAT(:)	height histogram minimum None	meters	lower bound of height histogram (Source: ATBD, section 4.2.2.4)
hist_photon_heights CHUNKED	INTEGER_2(:,:)	photon heights histogram None	1	Pre-trimmed histogram using n_photons_actual photon heights (Source: ATBD, section 4.2.2.4)

hist_photon_top CHUNKED	FLOAT(:) INVALID_R4B	height histogram maximum None	meters	upper bound of height histogram (Source: ATBD, section 4.2.2.4)
hist_w CHUNKED	FLOAT(:) INVALID_R4B	Segment histogram width estimate None	meters	Segment histogram width estimate (Source: ATBD, section 4.2.2.4)
ice_conc_amsr2 CHUNKED	FLOAT(:) INVALID_R4B	sea ice concentration from AMSR2 file None	1	sea ice concentration from daily AMSR2 sea ice concentration file (ANC49) (Source: ATBD, section 3.1.4)
ice_conc_ssmi CHUNKED	FLOAT(:) INVALID_R4B	sea ice concentration None	1	sea ice concentration from daily SSMI sea ice concentration file (ANC31) (Source: ATBD, section 3.1.4)
layer_flag CHUNKED	INTEGER_1(:) INVALID_I1B	Consolidated cloud flag None	1	This flag is a combination of multiple flags (cloud_flag_atm, cloud_flag_asr, and bsnow_con) and takes daytime/nighttime into consideration. A value of 1 means clouds or blowing snow are likely present. A value of 0 indicates the likely absence of clouds or blowing snow. (Source: Atmosphere ATBD); (Meanings: [0 1]) (Values: ['likely_clear', 'likely_cloudy'])
msw_flag CHUNKED	INTEGER_1(:) INVALID_I1B	Multiple Scattering Warning Flag None	1	Multiple Scattering warning flag. The multiple scattering warning flag (ATL09 parameter msw_flag) has values from -1 to 5 where zero means no multiple scattering and 5 the greatest. If no layers were detected, then msw_flag = 0. If blowing snow is detected and its estimated optical depth is greater than or equal to 0.5, then msw_flag = 5. If the blowing snow optical depth is less than 0.5, then msw_flag = 4. If no blowing snow is detected but there are cloud or aerosol layers detected, the msw_flag assumes values of 1 to 3 based on the height of the bottom of the lowest layer: < 1 km, msw_flag = 3; 1-3 km, msw_flag = 2; > 3km, msw_flag = 1. A value of -1 indicates that the signal to noise of the data was too low to reliably ascertain the presence of cloud or blowing snow. We expect values of -1 to occur only during daylight. (Source: Atmosphere ATBD); (Meanings: [-1 0 1 2 3 4 5]) (Values: ['cannot_determine', 'no_layers', 'layer_gt_3km', 'layer_between_1_and_3_km', 'layer_lt_1km', 'blow_snow_od_lt_0.5', 'blow_snow_od_gt_0.5'])
n_photons_actual CHUNKED	INTEGER_2(:) -1	Number of photons found for the segment None	1	Number of photons gathered (Source: ATBD, section 4.2.2.4)
n_photons_used CHUNKED	INTEGER_2(:) -1	Number of photons used for fit None	1	Number of photons in the trimmed histogram. (Source: ATBD, section 4.2.2.4)
oc_depth CHUNKED	FLOAT(:) INVALID_R4B	ocean depth oc_depth	m	Ocean depth (anc43). Note, negative value corresponds to ocean depth, positive value corresponds to above sea level. (Source: Sea Ice ATBD)
photon_rate CHUNKED	FLOAT(:) INVALID_R4B	photon rate None	photons/shot	Photon rate averaged over sea ice segment. Computed by dividing the number of photons in trimmed histogram (n_photons_used) by the number of used shots

				(height_segment_n_pulse_seg_used). (Source: ATBD, section 4.2.2.4)
trim_height_bottom CHUNKED	FLOAT(:) INVALID_R4B	minimum height of trimmed photons None	meters	minimum height of trimmed photons used in the surface calculation procedure (Source: ATBD, section 4.2.2.4)
trim_height_top CHUNKED	FLOAT(:) INVALID_R4B	maximum height of trimmed photons None	meters	maximum height of trimmed photons used in the surface calculation procedure (Source: ATBD, section 4.2.2.4)
yapc_knn_mean CHUNKED	FLOAT(:) INVALID_R4B	mean YAPC KNN value yapc_knn_mean	1	Mean YAPC KNN value from ATL03 gooses used in the ATL07 segment (Source: Sea Ice ATBD)
yapc_weight_ph_cts_n CHUNKED	INTEGER_2(:,:)	YAPC photon weights histogram yapc_weight_ph_cts_n	1	YAPC weight counts within 6 log-scale bins using all aggregated photons (bin1: 0-56, bin2: 57-133, bin3: 134-178, bin4: 179-210, bin5: 211-234, bin6: 235-255) (Source: ATBD, section 4.2.2.4)
yapc_weight_ph_mean_actual CHUNKED	FLOAT(:) INVALID_R4B	mean YAPC weight from all aggregated photons yapc_weight_ph_mean_actual	1	Mean YAPC weights from all photons aggregated within the ATL07 segment (pre-trimmed) (Source: Sea Ice ATBD)
yapc_weight_ph_mean_used CHUNKED	FLOAT(:) INVALID_R4B	mean YAPC weight from trimmed photons yapc_weight_ph_mean_used	1	Mean YAPC weights from trimmed photons within the ATL07 segment (post-trimmed) (Source: Sea Ice ATBD)
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(:)	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 CHUNKED	INTEGER_1(:)	Cycle Number None	1	A count of the number of exact repeats of this reference orbit. (Source: Operations)
lan CHUNKED	DOUBLE(:)	Ascending Node Longitude None	degrees_east	Longitude at the ascending node crossing. (Source: POD/PPD)
orbit_number CHUNKED	UINT_2_LE(:)	Orbit Number None	1	Unique identifying number for each planned ICESat-2 orbit. (Source: Operations)
rgt CHUNKED	INTEGER_2(:)	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(:)	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(:)	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: /quality_assessment		Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		
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'])