ATL10 Product Data Dictionary

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Product Type: ATL10, Format Version : SET_BY_PGE

Group: /		
Conventions	(Attribute)	CF-1.6
citation	(Attribute)	SET_BY_META
contributor_name	(Attribute)	Thomas E Neumann (thomas.neumann@nasa.gov), Thorsten Markus (thorsten.markus@nasa.gov), Suneel Bhardwaj (suneel.bhardwaj@nasa.gov) David W Hancock III (david.w.hancock@nasa.gov)
contributor_role	(Attribute)	Instrument Engineer, Investigator, Principle Investigator, Data Producer, Data Producer
creator_name	(Attribute)	SET_BY_META
date_created	(Attribute)	SET_BY_PGE
date_type	(Attribute)	UTC
description	(Attribute)	This data set (ATL10) contains estimates of sea ice freeboard, calculated using three different approaches. Sea ice leads used to establish the reference sea surface and descriptive statistics used in the height estimates are also provided. The data were a
featureType	(Attribute)	trajectory
geospatial_lat_max	(Attribute)	0.0000000000000000
geospatial_lat_min	(Attribute)	0.0000000000000000
geospatial_lat_units	(Attribute)	degrees_north
geospatial_lon_max	(Attribute)	0.0000000000000000
geospatial_lon_min	(Attribute)	0.0000000000000000
geospatial_lon_units	(Attribute)	degrees_east
granule_type	(Attribute)	ATL10
hdfversion	(Attribute)	SET_BY_PGE
history	(Attribute)	SET_BY_PGE
identifier_product_doi	(Attribute)	10.5067/ATLAS/ATL10.001
identifier_product_doi_authority	(Attribute)	http://dx.doi.org
identifier_product_format_version	(Attribute)	SET_BY_PGE
identifier_product_type	(Attribute)	ATL10
institution	(Attribute)	SET_BY_META
instrument	(Attribute)	SET_BY_META
keywords	(Attribute)	SET_BY_META
keywords_vocabulary	(Attribute)	SET_BY_META
level	(Attribute)	3A
license	(Attribute)	Data may not be reproduced or distributed without including the citation for this product included in this metadata. Data may not be distributed in an altered form without the written permission of the ICESat-2 Science Project Office at NASA/GSFC.
naming_authority	(Attribute)	http://dx.doi.org
platform	(Attribute)	SET_BY_META
processing_level	(Attribute)	L3A
project	(Attribute)	SET_BY_META
publisher_email	(Attribute)	SET_BY_META
publisher_name	(Attribute)	SET_BY_META
publisher_url	(Attribute)	SET_BY_META
references	(Attribute)	SET_BY_META
short_name	(Attribute)	ATL10
source	(Attribute)	SET_BY_META
spatial_coverage_type	(Attribute)	Horizontal
standard_name_vocabulary	(Attribute)	CF-1.6
summary	(Attribute)	SET_BY_META
time_coverage_duration	(Attribute)	SET_BY_PGE
time_coverage_end	(Attribute)	SET_BY_PGE
time_coverage_start	(Attribute)	SET_BY_PGE
time_type	(Attribute)	CCSDS UTC-A

title	(Attribute)	SET_BY_META		
Group: /ancillary_data				
Description	(Attribute)	Contains information ancillary to the data product. This may include product characteristics, instrument characteristics and/or processing constants.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
atlas_sdp_gps_epoch (Compact Dataset)	DOUBLE (1)	ATLAS Epoch Offset (not_set)	seconds since 1980-01-06T00:00:00.000000Z Operations	Number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS Standard Data Product (SDP) epoch (2018-01-01:T00.00.00.000000 UTC). Add this value to delta time parameters to compute full gps_seconds (relative to the GPS epoch) for each data point.
control (Contiguous Dataset)	STRING:100000 (1)	Control File (not_set)	1 Operations	PGE-specific control file used to generate this granule. To re-use, replace breaks (BR) with linefeeds.
data_end_utc (Compact Dataset)	STRING:27 (1)	End UTC Time of Granule (CCSDS-A, Actual) (not_set)	1 Derived	UTC (in CCSDS-A format) of the last data point within the granule.
data_start_utc (Compact Dataset)	STRING:27 (1)	Start UTC Time of Granule (CCSDS-A, Actual) (not_set)	1 Derived	UTC (in CCSDS-A format) of the first data point within the granule.
end_cycle (Compact Dataset)	INTEGER_4 (1)	Ending Cycle (not_set)	1 Derived	The ending cycle number associated with the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission.
end_delta_time (Compact Dataset)	DOUBLE (1)	ATLAS End Time (Actual) (time)	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the last data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
end_geoseg (Compact Dataset)	INTEGER_4 (1)	Ending Geolocation Segment (not_set)	1 Derived	The ending geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation.
end_gpssow (Compact Dataset)	DOUBLE (1)	Ending GPS SOW of Granule (Actual) (not_set)	seconds Derived	GPS seconds-of-week of the last data point in the granule.
end_gpsweek (Compact Dataset)	INTEGER_4 (1)	Ending GPSWeek of Granule (Actual) (not_set)	weeks from 1980-01-06 Derived	GPS week number of the last data point in the granule.
end_orbit (Compact Dataset)	INTEGER_4 (1)	Ending Orbit Number (not_set)	1 Derived	The ending orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth.
end_region (Compact Dataset)	INTEGER_4 (1)	Ending Region (not_set)	1 Derived	The ending product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent.
end_rgt (Compact Dataset)	INTEGER_4 (1)	Ending Reference Groundtrack (not_set)	1 Derived	The ending reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
granule_end_utc (Compact Dataset)	STRING:27 (1)	End UTC Time of Granule (CCSDS-A, Requested) (not_set)	1 Derived	Requested end time (in UTC CCSDS-A) of this granule.
granule_start_utc (Compact Dataset)	STRING:27 (1)	Start UTC Time of Granule (CCSDS-A, Requested) (not_set)	1 Derived	Requested start time (in UTC CCSDS-A) of this granule.

release (Compact Dataset)	STRING:80 (1)	Release Number (not_set)	1 Operations	Release number of the granule. The release number is incremented when the software or ancillary data used to create the granule has been changed.
start_cycle (Compact Dataset)	INTEGER_4 (1)	Starting Cycle (not_set)	1 Derived	The starting cycle number associated with the data contained within this granule. The cycle number is the counter of the number of 91-day repeat cycles completed by the mission.
start_delta_time (Compact Dataset)	DOUBLE (1)	ATLAS Start Time (Actual) (time)	seconds since 2018-01-01 Derived	Number of GPS seconds since the ATLAS SDP epoch at the first data point in the file. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
start_geoseg (Compact Dataset)	INTEGER_4 (1)	Starting Geolocation Segment (not_set)	1 Derived	The starting geolocation segment number associated with the data contained within this granule. ICESat granule geographic regions are further refined by geolocation segments. During the geolocation process, a geolocation segment is created approximately every 20m from the start of the orbit to the end. The geolocation segments help align the ATLAS strong a weak beams and provide a common segment length for the L2 and higher products. The geolocation segment indices differ slightly from orbit-to-orbit because of the irregular shape of the Earth. The geolocation segment indices on ATL01 and ATL02 are only approximate because beams have not been aligned at the time of their creation.
start_gpssow (Compact Dataset)	DOUBLE (1)	Start GPS SOW of Granule (Actual) (not_set)	seconds Derived	GPS seconds-of-week of the first data point in the granule.
start_gpsweek (Compact Dataset)	INTEGER_4 (1)	Start GPSWeek of Granule (Actual) (not_set)	weeks from 1980-01-06 Derived	GPS week number of the first data point in the granule.
start_orbit (Compact Dataset)	INTEGER_4 (1)	Starting Orbit Number (not_set)	1 Derived	The starting orbit number associated with the data contained within this granule. The orbit number increments each time the spacecraft completes a full orbit of the Earth.
start_region (Compact Dataset)	INTEGER_4 (1)	Starting Region (not_set)	1 Derived	The starting product-specific region number associated with the data contained within this granule. ICESat-2 data products are separated by geographic regions. The data contained within a specific region are the same for ATL01 and ATL02. ATL03 regions differ slightly because of different geolocation segment locations caused by the irregular shape of the Earth. The region indices for other products are completely independent.
start_rgt (Compact Dataset)	INTEGER_4 (1)	Starting Reference Groundtrack (not_set)	1 Derived	The starting reference groundtrack (RGT) number associated with the data contained within this granule. There are 1387 reference groundtrack in the ICESat-2 repeat orbit. The reference groundtrack increments each time the spacecraft completes a full orbit of the Earth and resets to 1 each time the spacecraft completes a full cycle.
version (Compact Dataset)	STRING:80 (1)	Version (not_set)	1 Operations	Version number of this granule within the release. It is a sequential number corresponding to the number of times the granule has been reprocessed for the current release.

Group: /ancillary_data/freeboard_estimation				
Description	(Attribute)	Contains ancillary parameters related to the surface classification algorithm.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
b_fr (Compact Dataset)	FLOAT (1)	b_fr (not_set)	meters Sea Ice ATBD	Bin size of the freeboard histogram
fbswath_fb_hist_max (Compact Dataset)	FLOAT (1)	Freeboard Histogram Maximum Height (not_set)	meters Sea Ice ATBD	Freeboard histogram maximum height bin center for any swath segment.
fbswath_fb_hist_min (Compact Dataset)	FLOAT (1)	Freeboard Histogram Minimum Height (not_set)	meters Sea Ice ATBD	Freeboard histogram minimum height bin center for any swath segment.
fill_height_pct (Compact Dataset)	FLOAT (1)	fill_height_pct (not_set)	1 Sea Ice ATBD	percentile of sorted heights (in fraction)
fill_snow_depth (Compact Dataset)	FLOAT (1)	fill_snow_depth (not_set)	1 Sea Ice ATBD	snow depth bias for fill segments
fill_ub_width (Compact Dataset)	FLOAT (1)	fill_ub_width (not_set)	meters Sea Ice ATBD	maximum width for fill segments (width of gaussian from fine tracking)
height_segment_fit_quality_flag_max (Compact Dataset)	INTEGER_4 (1)	Maximum Fit Quality to Use (not_set)	1 Sea Ice ATBD	The maximum height segment fit quality flag value for which an ATL07 sea ice segment is considered for use within the freeboard height computations.

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
height_segment_fit_quality_flag_min (Compact Dataset)	INTEGER_4 (1)	Minimum Fit Quality to Use (not_set)	1 Sea Ice ATBD	The minimum height segment fit quality flag value for which an ATL07 sea ice segment is considered for use within the freeboard height computations.
ht_thresh1 (Compact Dataset)	FLOAT (1)	height threshold 1 (not_set)	meters Sea Ice ATBD	Refsurf height difference threshold for low concentration cases
ht_thresh2 (Compact Dataset)	FLOAT (1)	height threshold 2 (not_set)	meters Sea Ice ATBD	Refsurf height difference threshold for consecutive estimates
ic_thresh1 (Compact Dataset)	FLOAT (1)	minimum ice concentration filter 1 (not_set)	1 Sea Ice ATBD	Minimum ice concentration for filtering reference surfaces
ic_thresh2 (Compact Dataset)	FLOAT (1)	minimum ice concentration filter 2 (not_set)	1 Sea Ice ATBD	Reference surfaces estimates filtered below this ice concentration
l (Compact Dataset)	FLOAT (1)	fb_seg_len (not_set)	meters Sea Ice ATBD	Along track swath segment length for freeboard calculations
lb_n_f (Compact Dataset)	INTEGER_4 (1)	lb_n_f (not_set)	1 Sea Ice ATBD	Lower bounds on number of SSH estimates
maxgapht (Compact Dataset)	FLOAT (1)	max gap height (not_set)	meters Sea Ice ATBD	Allowable height separation between refsurf heights across time gap
maxgaptime (Compact Dataset)	INTEGER_4 (1)	max gap time (not_set)	seconds Sea Ice ATBD	Maximum allowable time gap for interpolation
min_land_dist (Compact Dataset)	INTEGER_4 (1)	minimum distance from land (not_set)	km Sea Ice ATBD	Minimum distance from land for filtering reference surface
min_segs_count (Compact Dataset)	INTEGER_4 (1)	Minimum Segments Count (not_set)	1 Sea Ice ATBD	ATL10 granules with less than this number of strong beam sea ice segments will be marked as failed.
multi_beam_disable_flag (Compact Dataset)	INTEGER_4 (1)	miltibeam_disable_flag (not_set)	1 Sea Ice ATBD	disable multi-beam (intra-pair and inter-pair) freeboard calculations flag_values: 0, 1 flag_meanings : no yes
n_fillpass (Compact Dataset)	INTEGER_4 (1)	n_fillpass (not_set)	1 Sea Ice ATBD	Number of passes for gap filling
refsurf_h_offset1 (Compact Dataset)	FLOAT (1)	h_offset1 (not_set)	meters Sea Ice ATBD	height offset for fill refsurf bound check
refsurf_h_offset2 (Compact Dataset)	FLOAT (1)	h_offset2 (not_set)	meters Sea Ice ATBD	height offset for fill refsurf estimate
refsurf_sd_fill (Compact Dataset)	FLOAT (1)	ssh_sd_fill (not_set)	meters Sea Ice ATBD	Filled SSH stdev estimate
refsurf_slope_fill (Compact Dataset)	FLOAT (1)	ssh_slope_fill (not_set)	degrees Sea Ice ATBD	Filled SSH sloper estimate
refsurf_slope_ub (Compact Dataset)	FLOAT (1)	ssh_slope_ub (not_set)	degrees Sea Ice ATBD	Upper bound for SSH slope

Group: /freeboard_swath_segment				
Description	(Attribute)	Contains parameters related to quality and corrections on the the freeboard values		
data_rate	(Attribute)	Data within this group are stored at the freeboard swath segment rate.		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	GPS elapsed time (time)	seconds since 2018-01-01 ATBD section 5	The center time assigned to this freeboard swath segment (mean of all freeboard times), 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.
ds_si_hist_bins (Chunked Dataset)	INTEGER_4 (:)	Sea Ice Histogram Bins Dimension Scale (not_set)	1 SeaIce ATBD	Dimension scale indexing the sea ice histogram bins. The bin heights must be computed from information contained within the same group as the histogram.
fbswath_fb_height (Chunked Dataset)	FLOAT (:)	Freeboard mean swath-segment (not_set)	meters ATBD section 5	Mean of the Freeboard height-segments in freeboard swath-segment
fbswath_fb_hist (Chunked Dataset)	INTEGER_2 (200, :)	freeboard histogram (not_set)	1 ATBD section 5	Swath Freeboard (using fbswath reference surface height) histogram (distribution) for this freeboard swath-segment
fbswath_fb_length (Chunked Dataset)	FLOAT (:)	Length of freeboard swath-segment (not_set)	meters ATBD section 5	Length of freeboard swath-segment
fbswath_fb_sigma (Chunked Dataset)	FLOAT (:)	Freeboard standard deviation swath-segment (not_set)	meters ATBD section 5	Freeboard standard deviation of the height-segments in freeboard swath-segment

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
fbswath_fb_width (Chunked Dataset)	FLOAT (:)	Width of freeboard swath-segment (not_set)	meters ATBD section 5	Width of freeboard swath-segment
fbswath_lead_n_gt1l (Chunked Dataset)	INTEGER_4 (:)	Number of gt1l leads (not_set)	1 Sea Ice ATBD	Number of gt1l leads used for this swath's reference surface
fbswath_lead_n_gt1r (Chunked Dataset)	INTEGER_4 (:)	Number of gt1r leads (not_set)	1 Sea Ice ATBD	Number of gt1r leads used for this swath's reference surface
fbswath_lead_n_gt2l (Chunked Dataset)	INTEGER_4 (:)	Number of gt2l leads (not_set)	1 Sea Ice ATBD	Number of gt2l leads used for this swath's reference surface
fbswath_lead_n_gt2r (Chunked Dataset)	INTEGER_4 (:)	Number of gt2r leads (not_set)	1 Sea Ice ATBD	Number of gt2r leads used for this swath's reference surface
fbswath_lead_n_gt3l (Chunked Dataset)	INTEGER_4 (:)	Number of gt3l leads (not_set)	1 Sea Ice ATBD	Number of gt3l leads used for this swath's reference surface
fbswath_lead_n_gt3r (Chunked Dataset)	INTEGER_4 (:)	Number of gt3r leads (not_set)	1 Sea Ice ATBD	Number of gt3r leads used for this swath's reference surface
fbswath_lead_ndx_gt1l (Chunked Dataset)	INTEGER_4 (:)	Swath index gt1l first lead (not_set)	1 ATBD section 5	1-based index to first /gt1l/leads lead used in this swath's reference surface
fbswath_lead_ndx_gt1r (Chunked Dataset)	INTEGER_4 (:)	Swath index gt1r first lead (not_set)	1 ATBD section 5	1-based index to first /gt1r/leads lead used in this swath's reference surface
fbswath_lead_ndx_gt2l (Chunked Dataset)	INTEGER_4 (:)	Swath index gt2l first lead (not_set)	1 ATBD section 5	1-based index to first /gt2l/leads lead used in this swath's reference surface
fbswath_lead_ndx_gt2r (Chunked Dataset)	INTEGER_4 (:)	Swath index gt2r first lead (not_set)	1 ATBD section 5	1-based index to first /gt2r/leads lead used in this swath's reference surface
fbswath_lead_ndx_gt3l (Chunked Dataset)	INTEGER_4 (:)	Swath index gt3l first lead (not_set)	1 ATBD section 5	1-based index to first /gt3l/leads lead used in this swath's reference surface
fbswath_lead_ndx_gt3r (Chunked Dataset)	INTEGER_4 (:)	Swath index gt3r first lead (not_set)	1 ATBD section 5	1-based index to first /gt3r/leads lead used in this swath's reference surface
fbswath_refsurf_height (Chunked Dataset)	FLOAT (:)	Reference surface height for the freeboard swath-segment (not_set)	meters ATBD section 5	Reference surface computed by the weighted mean of leads in freeboard swath-segment
fbswath_refsurf_interp_flag (Chunked Dataset)	INTEGER_2 (:)	reference surface interpolation flag (not_set)	1 ATBD section 5	Identifies swath segments with reference surface height filled through interpolation. -1 = no valid refrence surface was determined; 0= refsur computed from leads in this swath; 1 = reference surface inferred from data not in this swath; 2 = previous or next adjacent reference surface was used; 3 = filled based on the the upper height minus an offset flag_values: -1, 0, 1, 2, 3 flag_meanings : no_surf leads_in_swath inferred neighbor_used upper_height_minus_offset
fbswath_refsurf_sigma (Chunked Dataset)	FLOAT (:)	sigma of freeboard swath-segment refsurf (not_set)	meters ATBD section 5	The sigma (standard deviation) of reference surface for this freeboard swath-segment. weighted combination of the lead sigmas in this beam for this swath segment
latitude (Chunked Dataset)	DOUBLE (:)	Center latitude of freeboard swath-segment (latitude)	degrees_north ATBD section 5	Center latitude of freeboard swath-segment (mean of all freeboard latitudes)
longitude (Chunked Dataset)	DOUBLE (:)	Center longitude of freeboard swath-segment (longitude)	degrees_east ATBD section 5	Center longitude of freeboard swath-segment (mean of all freeboard longitudes)
seg_dist_x (Chunked Dataset)	DOUBLE (:)	Along Track Distance (not_set)	meters Sea Ice ATBD	Along-track distance from the equator crossing to the segment center.

Group: /freeboard_swath_segment/gtx				
Description	(Attribute)	Contains freeboard estimate and associated height segment parameters computed by the swath reference surface.		

Group: /freeboard_swath_segment/gtx/swath_freeboard				
Description	(Attribute)	Contains freeboard estimate and associated height segment parameters computed by the swath reference surface.		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
fbswath_fb_confidence (Chunked Dataset)	FLOAT (:)	Freeboard confidence (not_set)	1 ATBD section 5	Confidence level in the freeboard estimate
fbswath_fb_height	FLOAT	Freeboard estimate	meters	estimate of the freeboard height based on entire swath

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
(Chunked Dataset)	(:)	(not_set)	ATBD section 5	
fbswath_fb_quality_flag (Chunked Dataset)	INTEGER_1 (:)	Flag describing the quality of the freeboard estimate (not_set)	1 ATBD section 5	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). flag_values: -1, 1, 2, 3, 4, 5 flag_meanings : invalid best high med low poor
fbswath_fb_sigma (Chunked Dataset)	FLOAT (:)	Freeboard sigma estimate (not_set)	meters ATBD section 5	Sigma (standard deviation) estimate of the freeboard height
fbswath_ndx (Chunked Dataset)	INTEGER_4 (:)	Index to freeboard swath segment (not_set)	1 ATBD section 5	The 1-based fbswath_nx identifies the swath associated with each element. There are the same number of elements in the group /freeboard_swath_segment and in each of the /GTx/freeboard_beam_segment group. The fbswath_nx identifies the fbswath_refsurf_height used to compute the fbswath_fb_height. It is the same index number that idenitifies the beam_refsurf_height to its swath and the beam_refsurf_height used to computed the beam_fb_height.
height_segment_id (Chunked Dataset)	INTEGER_4 (:)	Identifier of each height segment (not_set)	1 Sea Ice ATBD	Identifier of each height segment
latitude (Chunked Dataset)	DOUBLE (:)	Latitude (latitude)	degrees_north section 3.1.9	Latitude, WGS84, North=+, Lat of segment center
longitude (Chunked Dataset)	DOUBLE (:)	Longitude (longitude)	degrees_east section 3.1.9	Longitude, WGS84, East=+,Lon of segment center

Group: /gtx

Description	(Attribute)	Each group contains the segments for one Ground Track. As ICESat-2 orbits the earth, sequential transmit pulses illuminate six ground tracks on the surface of the earth. The track width is approximately 10m wide. Each ground track is numbered, according to the laser spot number that generates a given ground track. Ground tracks from the strong beams are therefore numbered 1, 3 and 5; ground tracks from the weak beams are numbered 2, 4 and 6. See ICESat-2 L2A ATBD.

Group: /gtx/freeboard_beam_segment

Description	(Attribute)	Contains freeboard estimate and associated height segment parameters for only the sea ice segments by beam.
data_rate	(Attribute)	Data within this group are stored at the freeboard swath segment rate.

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
beam_fb_height (Chunked Dataset)	FLOAT (:)	Beam Freeboard mean swath-segment (not_set)	meters ATBD section 5	Mean of the Freeboard height-segments in freeboard beam-segment
beam_fb_hist (Chunked Dataset)	INTEGER_2 (:, :)	Beam freeboard histogram (not_set)	1 ATBD section 5	Beam Freeboard (using beam fbswath reference surface height) histogram (distribution) for this freeboard beam-segment
beam_fb_length (Chunked Dataset)	FLOAT (:)	Length ofbeam freeboard swath-segment (not_set)	meters ATBD section 5	Length of freeboard beam-segment
beam_fb_sigma (Chunked Dataset)	FLOAT (:)	Beam Freeboard standard deviation swath-segment (not_set)	meters ATBD section 5	Freeboard standard deviation of the height-segments in freeboard beam-segment
beam_lead_n (Chunked Dataset)	INTEGER_4 (:)	Number of leads (not_set)	1 Sea Ice ATBD	Number of leads used for this beam reference surface
beam_lead_ndx (Chunked Dataset)	INTEGER_4 (:)	index first lead (not_set)	1 Sea Ice ATBD	1-based index to the first /GTx/leads lead used for this beam's reference surface.
beam_refsurf_alongtrack_slope (Chunked Dataset)	FLOAT (:)	reference surface along track slope (not_set)	degrees ATBD section 5	Reference surface height along track slope
beam_refsurf_height (Chunked Dataset)	FLOAT (:)	reference surface mean (not_set)	meters ATBD section 5	Reference surface height -weighted combination of leads in this beam for this swath segment
beam_refsurf_interp_flag (Chunked Dataset)	INTEGER_2 (:)	reference surface interpolation flag (not_set)	1 ATBD section 5	Identifies segments with reference surface height filled through interpolation. -1 = no valid refrence surface was determined; 0= refsur computed from leads in this swath; 1 = reference surface inferred from data not in this swath; 2 = previous or next adjacent reference surface was used; 3 = filled based on the the upper height minus an offset flag_values: -1, 0, 1, 2, 3 flag_meanings : no_surf leads_in_swath inferred neighbor_used upper_height_minus_offset
beam_refsurf_sigma (Chunked Dataset)	FLOAT (:)	reference surface sigma (not_set)	meters ATBD section 5	Reference surface height sigma (standard devaition) - weighted combination of lead sigmas in this beam for this swath segment
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 ATBD section 5	The center time assigned to this freeboard swath segment (mean of all freeboard times), in elapsed GPS seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
				Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
ds_si_hist_bins (Chunked Dataset)	INTEGER_4 (:)	Sea Ice Histogram Bins Dimension Scale (not_set)	1 SeaIce ATBD	Dimension scale indexing the sea ice histogram bins. The bin heights must be computed from information contained within the same group as the histogram.
fbswath_ndx (Chunked Dataset)	INTEGER_4 (:)	Index to freeboard swath segment (not_set)	1 ATBD section 5	The 1-based fbswath_nx identifies the swath associated with each element. There are the same number of elements in the group /freeboard_swath_segment and in each of the /GTx/freeboard_beam_segment groups. The fbswath_nx identifies the fbswath_refsurf_height used to compute the fbswath_fb_height. It is the same index number that idenitifies the beam_refsurf_height to its swath and the beam_refsurf_height used to computed the beam_fb_height.
latitude (Chunked Dataset)	DOUBLE (:)	Center latitude of freeboard swath-segment (latitude)	degrees_north ATBD section 5	Center latitude of freeboard swath-segment (mean of all freeboard latitudes)
longitude (Chunked Dataset)	DOUBLE (:)	Center longitude of freeboard swath-segment (longitude)	degrees_east ATBD section 5	Center longitude of freeboard swath-segment (mean of all freeboard longitudes)

Group: /gtx/freeboard_beam_segment/beam_freeboard

Description	(Attribute)	Contains freeboard estimate and associated parameters computed by its beam reference surface.		
data_rate	(Attribute)	Data within this group are stored at the variable segment rate.		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
beam_fb_confidence (Chunked Dataset)	FLOAT (:)	Freeboard confidence (not_set)	1 ATBD section 5	Confidence level in the freeboard estimate
beam_fb_height (Chunked Dataset)	FLOAT (:)	Freeboard estimate (not_set)	meters ATBD section 5	Estimate of the freeboard height based on the beam h reference
beam_fb_quality_flag (Chunked Dataset)	INTEGER_1 (:)	Flag describing the quality of the freeboard estimate (not_set)	1 ATBD section 5	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). flag_values: -1, 1, 2, 3, 4, 5 flag_meanings : invalid best high med low poor
beam_fb_sigma (Chunked Dataset)	FLOAT (:)	Freeboard sigma estimate (not_set)	meters ATBD section 5	estimate of the sigma (standard deviation) for each beam freeboard height
beam_refsur_ndx (Chunked Dataset)	INTEGER_4 (:)	Index to beam refsur (not_set)	1 ATBD section 5	1-based index to reference surface used for this freeboard height. Its value is identical to the fbswath_ndx. This index also idenifies the swath segment with which the beam freeboard associated.
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
geoseg_beg (Chunked Dataset)	INTEGER_4 (:)	Beginning GEOSEG (not_set)	1 Sea Ice ATBD	Geolocation segment (geoseg) ID associated with the first photon used in this sea ice segment
geoseg_end (Chunked Dataset)	INTEGER_4 (:)	Ending GEOSEG (not_set)	1 Sea Ice ATBD	Geolocation segment (geoseg) ID associated with the last photon used in this sea ice segment
height_segment_id (Chunked Dataset)	INTEGER_4 (:)	Identifier of each height segment (not_set)	1 Sea Ice ATBD	Identifier of each height segment
latitude (Chunked Dataset)	DOUBLE (:)	Latitude (latitude)	degrees_north Sea Ice ATBD	Latitude, WGS84, North=+, Lat of segment center
longitude (Chunked Dataset)	DOUBLE (:)	Longitude (longitude)	degrees_east Sea Ice ATBD	Longitude, WGS84, East=+,Lon of segment center
seg_dist_x (Chunked Dataset)	DOUBLE (:)	Along Track Distance (not_set)	meters Sea Ice ATBD	Along-track distance from the equator crossing to the segment center.

Group: /gtx/freeboard_beam_segment/geophysical

Description	(Attribute)	Contains geophysical parameters from ATL07 associated with the freeboard height.		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
height_segment_dac (Chunked Dataset)	FLOAT (:)	Dynamic Atmosphere Correction (not_set)	meters Sea Ice ATBD	Dynamic Atmospheric Correction (DAC) includes inverted barometer (IB) effect (From ATL07)
height_segment_earth (Chunked Dataset)	FLOAT (:)	Earth Tide (not_set)	meters Sea Ice ATBD	Solid Earth Tide(From ATL07)
height_segment_geoid (Chunked Dataset)	FLOAT (:)	EGM2008 Geoid (not_set)	meters Sea Ice ATBD	Geoid height above WGS-84 reference ellipsoid (range -107 to 86m), based on the EGM2008 model.(From ATL07)
height_segment_load (Chunked Dataset)	FLOAT (:)	Load Tide (not_set)	meters Sea Ice ATBD	Load Tide - Local displacement due to Ocean Loading (-6 to 0 cm).(From ATL07)
height_segment_lpe (Chunked Dataset)	FLOAT (:)	Equilibrium Tide (not_set)	meters Sea Ice ATBD	Long period equilibrium tide self-consistent with ocean tide model (+-0.04m).
height_segment_mss (Chunked Dataset)	FLOAT (:)	Mean Sea Surface (not_set)	meters Sea Ice ATBD	Mean sea surface height above WGS-84 reference ellipsoid. (From ATL07, includes tide-free geoid and mean dynamic topography
height_segment_ocean (Chunked Dataset)	FLOAT (:)	Ocean Tide (not_set)	meters Sea Ice ATBD	Ocean Tides including diurnal and semi-diurnal (harmonic analysis), and longer period tides (dynamic and self-consistent equilibrium)
height_segment_tide_pole (Chunked Dataset)	FLOAT (:)	Pole Tide (not_set)	meters Sea Ice ATBD	Pole Tide -Rotational deformation due to polar motion (-1.5 to 1.5 cm). (From ATL07)
latitude (Chunked Dataset)	DOUBLE (:)	Latitude (latitude)	degrees_north Sea Ice ATBD	Latitude, WGS84, North=+, Lat of segment center
longitude (Chunked Dataset)	DOUBLE (:)	Longitude (longitude)	degrees_east Sea Ice ATBD	Longitude, WGS84, East=+,Lon of segment center
Group: /gtx/freeboard_beam_segment/height_segments				
Description	(Attribute)	Contains height segment parameters from ATL07 associated with the freeboard height.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
asr_25 (Chunked Dataset)	FLOAT (:)	Apparent surface reflectance at 25 hz (not_set)	1 ATL07	Apparent surface reflectance at 25 hz, average to the sea ice segment
backgr_calc (Chunked Dataset)	FLOAT (:)	background count rate calculated (not_set)	hz ATL07	Calculated background count rate based on sun angle, surface slope, unit reflectance
backgr_r_200 (Chunked Dataset)	FLOAT (:)	background rate 200 hz (not_set)	hz ATL09	Background count rate, averaged over the segment based on ATLAS 50 pulse counts
backgr_r_25 (Chunked Dataset)	FLOAT (:)	background rate 25 hz (not_set)	hz ATL09	Background count rate, averaged over the segment based on 25 hz atmosphere
background_r_norm (Chunked Dataset)	FLOAT (:)	normalized background (50 shot) (not_set)	hz ATL07	Background rate normalized to a fixed solar elevation angle
bsnow_con (Chunked Dataset)	FLOAT (:)	Blowing snow confidence (not_set)	1 ATL09	Blowing snow confidence
bsnow_h (Chunked Dataset)	FLOAT (:)	Blowing snow top height (not_set)	meters ATL09	Blowing snow layer top height
cloud_flag_asr (Chunked Dataset)	INTEGER_1 (:)	cloud flag asr (not_set)	1 ATL09	Cloud flag (probability) from apparent surface reflectance. 0=clear with high confidence; 1=clear with medium confidence; 2=clear with low confidence; 3=cloudy with low confidence; 4=cloudy with medium confidence; 5=cloudy with high confidence flag_values: 0, 1, 2, 3, 4, 5 flag_meanings : clear_with_high_confidence clear_with_medium_confidence clear_with_low_confidence cloudy_with_low_confidence cloudy_with_medium_confidence cloudy_with_high_confidence
cloud_flag_atm (Chunked Dataset)	INTEGER_1 (:)	cloud flag atm (not_set)	1 ATL09	Number of layers found from the backscatter profile using the DDA layer finder
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01 Derived via Time Tagging	Number of GPS seconds since the ATLAS SDP epoch. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
				delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
height_segment_confidence (Chunked Dataset)	FLOAT (:)	Surface height confidence (not_set)	1 Sea Ice ATBD	Confidence level in the surface height estimate based on the number of photons; the background noise rate; and the error analysis (ATL07 h_confidence)
height_segment_height (Chunked Dataset)	FLOAT (:)	height of segment surface (not_set)	meters Sea Ice ATBD	Mean height from along-track segment fit detremined by the sea ice algorithm(ATL07 h_si)
height_segment_ib (Chunked Dataset)	FLOAT (:)	inverted barometer effect (not_set)	meters ATBD section 4.2	Inverted barometer effect calculated from surface pressure
height_segment_length_seg (Chunked Dataset)	FLOAT (:)	length of segment (not_set)	meters Sea Ice ATBD	Along-track length of segment containing n_photons_actual ATL07 length_seg)
height_segment_rms (Chunked Dataset)	FLOAT (:)	height rms (not_set)	meters Sea Ice ATBD	RMS difference between sea ice modeled and observed photon height distribution(ATL07 h_rms)
height_segment_ssh_flag (Chunked Dataset)	INTEGER_1 (:)	Sea Surface Height Flag (not_set)	1 Sea Ice ATBD	Identifiesthe height segments that are candidates for use as sea surface reference in freeboard calculations in ATL10. The flags are set as follows: 0 = sea ice; 1 = sea surface flag_values: 0, 1 flag_meanings : sea_ice ice_surface
height_segment_surf_sigma (Chunked Dataset)	FLOAT (:)	h surface sigma (not_set)	meters Sea Ice ATBD	Sigma (standard deviation) estimate of the surface height (ATL07 h_surface_error)
height_segment_type (Chunked Dataset)	INTEGER_1 (:)	Segment surface type (not_set)	1 ATBD section 4.3	Value that indicates segment surface type as sea ice or different types of sea surface. 0=cloud covered: rsurf flag_values: 0 flag_meanings : 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
height_segment_w_gaussian (Chunked Dataset)	FLOAT (:)	width of best fit gaussian (not_set)	meters Sea Ice ATBD	Width of best fit gaussian (ATL07 w_gaussian)
ice_conc (Chunked Dataset)	FLOAT (:)	sea ice concentration (not_set)	1 ATL07/ANC31	Sea ice concentration percentage
latitude (Chunked Dataset)	DOUBLE (:)	Latitude (latitude)	degrees_north Sea Ice ATBD	Latitude, WGS84, North=+, Lat of segment center
layer_flag (Chunked Dataset)	INTEGER_1 (:)	consolidated cloud flag (not_set)	1 ATL09	This flag is a combination of multiple flags (cloud_flag_atm, cloud_flag_asr, and bsnow_con) and takes daytime/nighttime into consideration. A value of 1 means clouds or blowing snow are likely present. A value of 0 indicates the likely absence of clouds or blowing snow. flag_values: 0, 1 flag_meanings : likely_clear likely_cloudy
longitude (Chunked Dataset)	DOUBLE (:)	Longitude (longitude)	degrees_east Sea Ice ATBD	Longitude, WGS84, East=+,Lon of segment center
msw_flag (Chunked Dataset)	INTEGER_1 (:)	multiple scattering warning flag (not_set)	1 ATL09	Multiple Scattering warning flag. The multiple scattering warning flag (ATL09 parameter msw_flag) has values from -1 to 5 where zero means no multiple scattering and 5 the greatest. If no layers were detected, then msw_flag = 0. If blowing snow is detected and its estimated optical depth is greater than or equal to 0.5, then msw_flag = 5. If the blowing snow optical depth is less than 0.5, then msw_flag = 4. If no blowing snow is detected but there are cloud or aerosol layers detected, the msw_flag assumes values of 1 to 3 based on the height of the bottom of the lowest layer: < 1 km, msw_flag = 3; 1-3 km, msw_flag = 2; > 3km, msw_flag = 1. A value of -1 indicates that the signal to noise of the data was too low to reliably ascertain the presence of cloud or blowing snow. We expect values of -1 to occur only during daylight. flag_values: -1, 0, 1, 2, 3, 4, 5 flag_meanings : cannot_determine no_layers layer_gt_3km layer_between_1_and_3_km layer_lt_1km blow_snow_od_lt_0.5 blow_snow_od_gt_0.5
photon_rate (Chunked Dataset)	FLOAT (:)	photon rate (not_set)	1 ATL07	Photon count rate, averaged over sea ice segment.
Group: /gtx/leads				
Description	(Attribute)	Contains parameters relating to the freeboard values.		
data_rate	(Attribute)	Data within this group are stored at the lead index rate.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
delta_time (Chunked Dataset)	DOUBLE (:)	Elapsed GPS seconds (time)	seconds since 2018-01-01	Center time of the lead in seconds since the ATLAS SDP GPS Epoch. The ATLAS Standard Data Products (SDP)

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
			Derived via Time Tagging	epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
latitude (Chunked Dataset)	DOUBLE (:)	Center latitude of lead (latitude)	degrees_north ATBD section 5	Center latitude of lead (mean of all sea surface height latitudes)
lead_height (Chunked Dataset)	FLOAT (:)	Lead height (not_set)	meters ATBD section 5	Lead height - weighted mean of consective sea surface heights used for this lead
lead_length (Chunked Dataset)	FLOAT (:)	Lead size (not_set)	meters ATBD section 5	Along-track length of this lead
lead_sigma (Chunked Dataset)	FLOAT (:)	Lead sigma estimate (not_set)	meters ATBD section 5	Lead height sigma (standard deviation) estimate - weighted combination of sea surface height sigmas used as leads in this beam for this swath segment
longitude (Chunked Dataset)	DOUBLE (:)	Center longitude of lead (longitude)	degrees_east ATBD section 5	Center longitude of lead (mean of all freeboard longitudes)
ssh_n (Chunked Dataset)	INTEGER_4 (:)	number of sea surface references (not_set)	1 ATBD section 5	Number of sea surface height segments used for this lead
ssh_ndx (Chunked Dataset)	INTEGER_4 (:)	index first sea surface (not_set)	1 Sea Ice ATBD	1-based index to the first freeboard element (i.e.first sea surface height segment) used for this lead

Group: /orbit_info				
Description	(Attribute)	Contains orbit information.		
data_rate	(Attribute)	Varies. Data are only provided when one of the stored values (besides time) changes.		

Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
crossing_time (Chunked Dataset)	DOUBLE (:)	Ascending Node Crossing Time (time)	seconds since 2018-01-01 POD/PPD	The time, in seconds since the ATLAS SDP GPS Epoch, at which the ascending node crosses the equator. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
cycle_number (Chunked Dataset)	INTEGER_1 (:)	Cycle Number (not_set)	1 Operations	A count of the number of exact repeats of this reference orbit.
lan (Chunked Dataset)	DOUBLE (:)	Ascending Node Longitude (not_set)	degrees_east POD/PPD	Longitude at the ascending node crossing.
orbit_number (Chunked Dataset)	UINT_2_LE (:)	Orbit Number (not_set)	1 Operations	Unique identifying number for each planned ICESat-2 orbit.
rgt (Chunked Dataset)	INTEGER_2 (:)	Reference Ground track (not_set)	1 POD/PPD	The reference ground track (RGT) is the track on the earth at which a specified unit vector within the observatory is pointed. Under nominal operating conditions, there will be no data collected along the RGT, as the RGT is spanned by GT3 and GT4. During slews or off-pointing, it is possible that ground tracks may intersect the RGT. The ICESat-2 mission has 1387 RGTs.
sc_orient (Chunked Dataset)	INTEGER_1 (:)	Spacecraft Orientation (not_set)	1 POD/PPD	This parameter tracks the spacecraft orientation between forward, backward and transitional flight modes. ICESat-2 is considered to be flying forward when the weak beams are leading the strong beams; and backward when the strong beams are leading the weak beams. ICESat-2 is considered to be in transition while it is maneuvering between the two orientations. Science quality is potentially degraded while in transition mode. flag_values: 0, 1, 2 flag_meanings : backward forward transition
sc_orient_time (Chunked Dataset)	DOUBLE (:)	Time of Last Spacecraft Orientation Change (time)	seconds since 2018-01-01 POD/PPD	The time of the last spacecraft orientation change between forward, backward and transitional flight modes, expressed in seconds since the ATLAS SDP GPS Epoch. ICESat-2 is considered to be flying forward when the weak beams are leading the strong beams; and backward when the strong beams are leading the weak beams. ICESat-2 is considered to be in transition while it is maneuvering between the two orientations. Science quality is potentially degraded while in transition mode. The ATLAS Standard Data Products (SDP) epoch offset is defined within /ancillary_data/atlas_sdp_gps_epoch as the number of GPS seconds between the GPS epoch (1980-01-06T00:00:00.000000Z UTC) and the ATLAS SDP epoch. By adding the offset contained within atlas_sdp_gps_epoch to

				delta time parameters, the time in gps_seconds relative to the GPS epoch can be computed.
Group: /quality_assessment				
Description	(Attribute)	Contains quality assessment data. This may include QA counters, QA along-track data and/or QA summary data.		
Label (Layout)	Datatype (Dimensions)	long_name (standard_name)	units source	description
qa_granule_fail_reason (Compact Dataset)	INTEGER_4 (1)	Granule Failure Reason (not_set)	1 Operations	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=Insufficient output data was generated; 3=TBD Failure; 4=TBD_Failure; 5=other failure. flag_values: 0, 1, 2, 3, 4, 5 flag_meanings : no_failure PROCESS_ERROR INSUFFICIENT_OUTPUT failure_3 failure_4 OTHER_FAILURE
qa_granule_pass_fail (Compact Dataset)	INTEGER_4 (1)	Granule Pass Flag (not_set)	1 Operations	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA. flag_values: 0, 1 flag_meanings : PASS FAIL