

GLAH08 Product Data Dictionary

File-Level (Global) Attributes

Attribute	Example Value
featureType	timeSeries
ShortName	GLAH08
title	GLAS/ICESat L2 Global Planetary Boundary Layer & Elevated Aerosol Layers (HDF5)
comment	The level 2 planetary boundary layer and elevated aerosol layer height data will be provided at a minimum of once per 4 seconds. Data granules will contain approximately 23 hours (14 orbits) of data.
summary	GLAH08 contains the heights of planetary boundary layer (PBL) and aerosol layers for researchers. Elevated aerosol layer height data consist of top and bottom heights for up to 5 layers below 20 km and for up to 3 layers above 20 km. Each GLAH08 file was created from an equivalent GLA08 binary file. The data used to create the GLAH08 values are contained in the equivalent GLAHxx files for the GLAxx files. See the provenance metadata for the creation of the GLA08.
license	http://nsidc.org/data/icesat/disclaimer.html
references	https://nsidc.org/data/gh02-gh07-gh08-gh09-gh10-gh11/versions/33/documentation (Guide Document for this product at NSIDC), http://nsidc.org/data/icesat/ (GLAS Product page at NSIDC)
AccessConstraints	Data may not be reproduced or distributed without including the CitationForExternalPublication for this product included in this Metadata. Data may not be distributed in an altered form without the written permission of the GLAS Science Team.
CitationforExternalPublication	The data used in this study were produced by the GLAS Science Team at the ICESat Science Investigator-led Processing System (I-SIPS) at NASA/GSFC. The data archive site is the NSIDC DAAC.
contributor_role	Data Originator, Investigator, Producer, Producer
contributor_name	David W. Hancock (David.W.Hancock@nasa.gov), Bob E Schutz (schutz@utcsr.ae.utexas.edu), Jay Zwally (Jay.Zwally@nasa.gov), John P DiMarzio (John.P.Dimarzio.1@nasa.gov)
creator_name	ICESat Science Investigator-led Processing System (I-SIPS)
creator_email	David.W.Hancock@nasa.gov
publisher_name	NSIDC User Services
publisher_email	nsidc@nsidc.org
publisher_url	http://nsidc.org/data/icesat/
platform	Ice, Cloud, and Land Elevation Satellite (ICESat)
instrument	Geoscience Laser Altimeter System (GLAS)
processing_level	2
date_created	2013-02-08T11:56:22

Attribute	Example Value
spatial_coverage_type	Horizontal
history	2011-06-20T15:27:20 glas_atm 6.0.1 GLA08_633_2103_002_0407_0_01_0001.DAT, 2013-02-08T11:56:22.000000Z GLA08_h5_convert Version 1.1 (February 2013) out/GLAH08_633_2103_002_0407_0_01_0001.H5
geospatial_lat_min	-90.0
geospatial_lat_max	90.0
geospatial_lon_min	-180.0
geospatial_lon_max	180.0
geospatial_lat_units	degrees_north
geospatial_lon_units	degrees_east
keywords	Earth Science > Atmosphere > Altitude > Planetary Boundary Layer Height > Aerosol Layer Height, Earth Science > Atmosphere > Aerosols > Aerosol Particle Properties > Aerosol Layer Height
keywords_vocabulary	GCMD Science Keywords Version 6.0
standard_vocabulary_name	CF-1.6
naming_authority	http://dx.doi.org/10.5067/ICESAT/GLAS/DATA201
project	Ice, Cloud, and Land Elevation Satellite (GLAS_HDF)
time_type	UTC
date_type	J2000
time_coverage_start	2003-11-18T01:51:38
time_coverage_end	2003-11-19T00:24:45
time_coverage_duration	81280
source	Satellite Measurements
HDFVersion	HDF5 1.8.9
identifier_file_uuid	599740C3-F062-4F49-A756-8A0DA37BC95B
identifier_product_doi	10.5067/ICESAT/GLAS/DATA201
identifier_product_type	GLAH08
identifier_product_format_version	1.0
Conventions	CF-1.6
institution	National Aeronautics and Space Administration (NASA)

Group: /Data_4s

This group contains data with a rate of once per 4 seconds. 4 second data may be indexed to the 1HZ data using the `i_rec_ndx` parameter in each respective time group.

Dimension Scales

	Label		Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
	DS_UTCTime_4s	DOUBLE (UNLIMITED)	Transmit Time of First Shot in frame in J2000 (time)	seconds	The transmit time of the first shot in the 4 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds.	Rel 33 GLAS Binary Data	NOT_SET	
	DS_Cloud_Layer_2	INTEGER (UNLIMITED)	Cloud Layer Index (NOT_SET)	NOT_SET	This array contains the cloud layer index, up to 2	Constants	NOT_SET	
	DS_Cloud_Layer_3	INTEGER (UNLIMITED)	Cloud Layer Index (NOT_SET)	NOT_SET	This array contains the cloud layer index, up to 3	Constants	NOT_SET	
	DS_Cloud_Layer_5	INTEGER (UNLIMITED)	Cloud Layer Index (NOT_SET)	NOT_SET	This array contains the cloud layer index, up to 5	Constants	NOT_SET	

Group: Data_4s/Time

This group contains the 1HZ index and time-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
i_rec_ndx	INTEGER (UNLIMITED)	GLAS Record Index (NOT_SET)	NOT_SET	Unique index that relates this record to the corresponding record(s) in each GLAS data product.	Rel 33 GLAS Binary Data	DS_UTCTime_4s				
shot_time_flg	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Shot time;0=shot time is transmit time;1=shot time is ground bounce time <table border="1" data-bbox="781 1509 1224 1698"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>transmit_time ground_bounce_time</td> </tr> </table>	flag values	flag_meanings	0, 1	transmit_time ground_bounce_time	Rel 33 GLAS Binary Data	DS_UTCTime_4s
flag values	flag_meanings									
0, 1	transmit_time ground_bounce_time									
gps_time_flg	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	GPS time;0=no delta gps time correction applied to shot time;1=delta gps time correction applied to shot time <table border="1" data-bbox="781 1850 1180 1982"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_applied applied</td> </tr> </table>	flag values	flag_meanings	0, 1	not_applied applied	Rel 33 GLAS Binary Data	DS_UTCTime_4s
flag values	flag_meanings									
0, 1	not_applied applied									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
pl_timing_flg	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Post-launch timing;0=no post-launch timing bias applied;1=post-launch timing bias applied - see header for value <table border="1" data-bbox="781 300 1179 436"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_applied applied</td> </tr> </table>	flag values	flag_meanings	0, 1	not_applied applied	Rel 33 GLAS Binary Data	DS_UTCTime_4s
flag values	flag_meanings									
0, 1	not_applied applied									
ddelay_flg	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Digitizer turn-on delay;0=digitizer turn-on delay accounted for in shot time - see header;1=digitizer turn-on delay not accounted for in shot time <table border="1" data-bbox="781 583 1179 720"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>applied not_applied</td> </tr> </table>	flag values	flag_meanings	0, 1	applied not_applied	Rel 33 GLAS Binary Data	DS_UTCTime_4s
flag values	flag_meanings									
0, 1	applied not_applied									
peaktp_flg	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Peak of transmit pulse;0=time to peak of transmit pulse accounted for in shot time;1=time to peak of transmit pulse not accounted for in shot time <table border="1" data-bbox="781 867 1179 1003"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>applied not_applied</td> </tr> </table>	flag values	flag_meanings	0, 1	applied not_applied	Rel 33 GLAS Binary Data	DS_UTCTime_4s
flag values	flag_meanings									
0, 1	applied not_applied									

Group: Data_4s/Geolocation

This group contains information relating to the GLAS campaign geolocation.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_lat	DOUBLE (UNLIMITED)	Profile Location, Latitude (latitude)	degrees_north	Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and north latitude, at the 0.25 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
d_lon	DOUBLE (UNLIMITED)	Profile Location, Longitude (longitude)	degrees_east	Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and north latitude, at the 0.25 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Group: Data_4s/Flags

This group contains flags at 1 per 4 sec.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description				
i_AttFlg3	INTEGER_1 (UNLIMITED)	Attitude Flag 3 (NOT_SET)	NOT_SET	Attitude Flag 3, 0=PAD used for geolocation, 1=PAD not used for geolocation. <table border="1" data-bbox="760 1829 1179 1965"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>PAD_used PAD_not_used</td> </tr> </table>	flag values	flag_meanings	0, 1	PAD_used PAD_not_used
flag values	flag_meanings							
0, 1	PAD_used PAD_not_used							

Label	Datatype (Dimensions)	long_name (standard_name)	units	description				
i_pscf_b20	INTEGER_1 (UNLIMITED, 5)	Layer Height Flag Below 20km (NOT_SET)	NOT_SET	<p>Layer Height Flag Below 20km. value 0 = not a Polar Stratospheric Cloud (PSC); value 1 = low likely; value 2 = medium likely; value 3 = high likely</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3</td> <td>not_PSC low_likely medium_likely high_likely</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3	not_PSC low_likely medium_likely high_likely
flag values	flag_meanings							
0, 1, 2, 3	not_PSC low_likely medium_likely high_likely							
i_pscf_a20	INTEGER_1 (UNLIMITED, 3)	Layer Height Flag Above 20km (NOT_SET)	NOT_SET	<p>Layer Height Flag Above 20km. value 0 = not a Polar Stratospheric Cloud (PSC); value 1 = low likely; value 2 = medium likely; value 3 = high likely</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3</td> <td>not_PSC low_likely medium_likely high_likely</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3	not_PSC low_likely medium_likely high_likely
flag values	flag_meanings							
0, 1, 2, 3	not_PSC low_likely medium_likely high_likely							
i4_aer_qf	INTEGER_1 (UNLIMITED, 5)	Layer Height Flag (NOT_SET)	NOT_SET	<p>quality flag at 1 per 4 sec: value 0 = aerosol layers were searched for, but not detected; value 13 = increasing goodness; value 14 = bad; value 15 = lower (<20 km) aerosol layers were not searched for.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15</td> <td>aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_11 found_12 found_13 found_14 aerosol_layers_not_searched</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_11 found_12 found_13 found_14 aerosol_layers_not_searched
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i4_aer_af	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>availability flag at 1 per 4 sec: Contains the number of elevated (excluding PBL) aerosol layers below 20 km from a 4 second average of the data. Value 0 = aerosol layers were searched for but not detected; value 15 = aerosol layers were not searched for.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15</td> <td>aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_11 found_12 found_13 found_14 aerosol_layers_not_searched</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_11 found_12 found_13 found_14 aerosol_layers_not_searched
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i4_aer_uf	INTEGER_1 (UNLIMITED, 5)	Layer Height Flag (NOT_SET)	NOT_SET	<p>use flag at 1 per 4 sec: value 0 = no saturated bins present in layer; value 1 = saturated bins present in layer and replaced with 1064 data; value 2 = saturated bins present in layer and not replaced with 1064 data</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064
flag values	flag_meanings							
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Label	Datatype (Dimensions)	long_name (standard_name)	units	description				
i_LRpbl_qf	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>quality flag at 1 per 4 sec: value 0 = PBL was searched for, but not detected; values 1 to 13 = increasing goodness; value 14 = bad; value 15 = PBL not searched for</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15</td> <td>LRpbl_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad LRpbl_not_searched</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	LRpbl_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad LRpbl_not_searched
flag values	flag_meanings							
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i_LRpbl_uf	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>use flag at 1 per 4 sec: value 0 = no saturated bins present in layer; value 1 = saturated bins in layer and replaced with 1064 data; value 2 = saturated bins present in layer and not replaced with 1064 data</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064data</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064data
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i_LRpbl_ccf	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>clear/cloudy flag at 1 per 4 sec: value 0 = clear; value 1 = cloudy</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>clear cloudy</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	clear cloudy
flag values	flag_meanings							
0, 1	clear cloudy							
i20_aer_qf	INTEGER_1 (UNLIMITED, 3)	Layer Height Flag (NOT_SET)	NOT_SET	<p>quality flag at 1 per 20 sec: value 0 = aerosol layers were searched for, but not detected; values 1 to 13 = increasing goodness; value 14 = bad; value 15 = upper (>20 km) aerosol layers were not searched for</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15</td> <td>aerosol_layers_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad upper_aerosol_layers_not_searched</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	aerosol_layers_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad upper_aerosol_layers_not_searched
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0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	aerosol_layers_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad upper_aerosol_layers_not_searched							
i20_aer_af	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>availability flag at 1 per 20 sec: Contains the number of aerosol layers found above 20 km from second average of the data. Value 0 = aerosol layers were searched for, but not detected; value 1 = aerosol layers were not searched for.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15</td> <td>aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_10 found_11 found_12 found_13 found_14 aerosol_layers_not_searched</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_10 found_11 found_12 found_13 found_14 aerosol_layers_not_searched
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0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	aerosol_layers_not_detected found_1 found_2 found_3 found_4 found_5 found_6 found_7 found_8 found_9 found_10 found_11 found_12 found_13 found_14 aerosol_layers_not_searched							

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	
i20_aer_uf	INTEGER_1 (UNLIMITED, 3)	Layer Height Flag (NOT_SET)	NOT_SET	use flag at 1 per 20 sec: value 0 = no saturated bins present in layer; value 1 = saturated bin present in layer and replaced with 1064 data; value 2 = saturated bins present in layer and replaced with 1064 data	
				flag values	flag_meanings
				0, 1, 2	no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064

Group: Data_4s/PBL

This group contains the 4 second PBL-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_LRpbl_pct	REAL (UNLIMITED)	Percentage of Saturated Bins in Low Resolution PBL Layer at 532 nm (NOT_SET)	NOT_SET	Percentage of Saturated Bins in Low Resolution PBL Layer at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_PBL_LR_pres	REAL (UNLIMITED)	Pressure of Low Resolution Planetary Boundary Layer Top at 532 nm (NOT_SET)	hPa	Pressure of Low Resolution Planetary Boundary Layer Top at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_PBL_LR_relh	REAL (UNLIMITED)	Relative Humidity of Low Resolution Planetary Boundary Layer Top at 532 nm (NOT_SET)	percent	Relative Humidity of Low Resolution Planetary Boundary Layer Top at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_PBL_LR_temp	REAL (UNLIMITED)	Temperature of Low Resolution Planetary Boundary Layer Top at 532 nm (NOT_SET)	degree Celsius	Temperature of Low Resolution Planetary Boundary Layer Top at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_LRpbl_grd	REAL (UNLIMITED)	Ground Detection for Low Res PBL at 532 nm (NOT_SET)	meters	The height above the reference ellipsoid of the ground used by the low res PBL processing algorithms.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_LRpbl_ht	REAL (UNLIMITED)	Low Resolution PBL Height at 532 nm (NOT_SET)	meters	Low resolution height of the planetary boundary layer, as derived from the aerosol structure; the low resolution data is averaged over 4 seconds.	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Group: Data_4s/Aerosol_1064

This group contains the 1064 aerosol-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Aer_ir_bot	REAL (UNLIMITED, 2)	Elevation of Bottom of Aerosol Layers Detected in 1064 nm (NOT_SET)	meters	Elevation of Bottom of Aerosol Layers Detected in 1064 nm.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_top	REAL (UNLIMITED, 2)	Elevation of Top of Aerosol Layers Detected in 1064 nm (NOT_SET)	meters	Elevation of Top of Aerosol Layers detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_bot_pres	REAL (UNLIMITED, 2)	Pressure of Bottom of Aerosol Layers Detected in 1064 nm (NOT_SET)	hPa	Pressure of Bottom of Aerosol Layers Detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_bot_relh	REAL (UNLIMITED, 2)	Relative Humidity of Bottom of Aerosol Layers Detected in 1064 nm (NOT_SET)	percent	Relative Humidity of Bottom of Aerosol Layers Detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_bot_temp	REAL (UNLIMITED, 2)	Temperature of Bottom of Aerosol Layers Detected in 1064 nm (NOT_SET)	degree Celsius	Temperature of Bottom of Aerosol Layers Detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_top_pres	REAL (UNLIMITED, 2)	Pressure of Top of Aerosol Layers Detected in 1064 nm (NOT_SET)	hPa	Pressure of Top of Aerosol Layers Detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_top_relh	REAL (UNLIMITED, 2)	Relative Humidity of Top of Aerosol Layers Detected in 1064 nm (NOT_SET)	percent	Relative Humidity of Top of Aerosol Layers Detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_ir_top_temp	REAL (UNLIMITED, 2)	Temperature of Top of Aerosol Layers Detected in 1064 nm (NOT_SET)	degree Celsius	Temperature of Top of Aerosol Layers Detected in 1064 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Group: Data_4s/Aerosol_532_above20

This group contains the 532 aerosol above 20km related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r20_aer_bot	REAL (UNLIMITED, 3)	20-40 KM Aerosol Layer Bottom at 532 nm (NOT_SET)	meters	The aerosol layer bottoms (20 - 40 KM in atmosphere) for up to 3 layers at 1 per 4 sec.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r20_aer_top	REAL (UNLIMITED, 3)	20-40 KM Aerosol Layer Top at 532 nm (NOT_SET)	meters	The aerosol layer tops (20 - 40 KM in atmosphere) for up to 3 layers at 1 per 4 sec.	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r20_aer_pct	REAL (UNLIMITED, 3)	Percentage of Saturated Bins in 20-40 KM Aerosol Layers at 532 nm (NOT_SET)	NOT_SET	Percentage of Saturated Bins in 20-40 KM Aerosol Layers at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_bot_a20_pres	REAL (UNLIMITED, 3)	Pressure of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm (NOT_SET)	hPa	Pressure of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_bot_a20_relh	REAL (UNLIMITED, 3)	Relative Humidity of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm (NOT_SET)	percent	Relative Humidity of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_bot_a20_temp	REAL (UNLIMITED, 3)	Temperature of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm (NOT_SET)	degree Celsius	Temperature of Bottom of Aerosol Layers Above 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_top_a20_pres	REAL (UNLIMITED, 3)	Pressure of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm (NOT_SET)	hPa	Pressure of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_top_a20_relh	REAL (UNLIMITED, 3)	Relative Humidity of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm (NOT_SET)	percent	Relative Humidity of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_top_a20_temp	REAL (UNLIMITED, 3)	Temperature of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm (NOT_SET)	degree Celsius	Temperature of Top of Aerosol Layers Above 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Group: Data_4s/Aerosol_532_below20

This group contains the 532 aerosol below 20km-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r4_aer_bot	REAL (UNLIMITED, 5)	Below 20 KM Aerosol Layer Bottom at 532 nm (NOT_SET)	meters	The aerosol layer bottoms (below 20 KM in atmosphere) for up to 5 layers at 1 per 4 sec.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r4_aer_top	REAL (UNLIMITED, 5)	Below 20 KM Aerosol Layer Top at 532 nm (NOT_SET)	meters	The aerosol layer tops (below 20 KM in atmosphere) for up to 5 layers at 1 per 4 sec.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r4_aer_pct	REAL (UNLIMITED, 5)	Percentage of Saturated Bins in Below 20 KM Aerosol Layers at 532 nm (NOT_SET)	NOT_SET	Percentage of Saturated Bins in Below 20 KM Aerosol Layers at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Aer_bot_b20_pres	REAL (UNLIMITED, 5)	Pressure of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm (NOT_SET)	hPa	Pressure of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_bot_b20_relh	REAL (UNLIMITED, 5)	Relative Humidity of Bottom of Aerosol Layers in Bottom 20km of Atm at 532 nm (NOT_SET)	percent	Relative Humidity of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_bot_b20_temp	REAL (UNLIMITED, 5)	Temperature of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm (NOT_SET)	degree Celsius	Temperature of Bottom of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_top_b20_pres	REAL (UNLIMITED, 5)	Pressure of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm (NOT_SET)	hPa	Pressure of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_top_b20_relh	REAL (UNLIMITED, 5)	Relative Humidity of Top of Aerosol Layers in Bottom 20km of Atm at 532 nm (NOT_SET)	percent	Relative Humidity of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s
r_Aer_top_b20_temp	REAL (UNLIMITED, 5)	Temperature of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm (NOT_SET)	degree Celsius	Temperature of Top of Aerosol Layers in Bottom 20km of Atmosphere at 532 nm	Rel 33 GLAS Binary Data	DS_UTCTime_4s

Group: /Data_1HZ

This group contains data with a rate of 1HZ. 1Hz data may be indexed to the 40HZ data using the `i_rec_ndx` parameter in each respective time group.

Dimension Scales

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
DS_UTCTime_1	DOUBLE (UNLIMITED)	Transmit Time of First Shot in frame in J2000 (time)	seconds	The transmit time of the first shot in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds.	Rel 33 GLAS Binary Data	NOT_SET

Group: Data_1HZ/Time

This group contains the 1HZ index and time-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
i_rec_ndx	INTEGER (UNLIMITED)	GLAS Record Index (NOT_SET)	NOT_SET	Unique index that relates this record to the corresponding record(s) in each GLAS data product.	Rel 33 GLAS Binary Data	DS_UTCTime_1

Group: Data_1HZ/Geolocation

This group contains information relating to the GLAS campaigns.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_lat	DOUBLE (UNLIMITED)	Profile Location, Latitude (latitude)	degrees_north	Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and north latitude, at the 1 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_1
d_lon	DOUBLE (UNLIMITED)	Profile Location, Longitude (longitude)	degrees_east	Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and north latitude, at the 1 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_1

Group: Data_1HZ/PBL

This group contains information relating to the PBL.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_PBL_Layer_ht	REAL (UNLIMITED)	PBL Layer Height from Met Data (NOT_SET)	meters	PBL Layer Height from Met Data	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_Total_CloudCov	REAL (UNLIMITED)	Total Cloud Cover (NOT_SET)	percent	Total Cloud Cover	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_atm_dem	REAL (UNLIMITED)	DEM value at current location from 1 km x 1 km grid (NOT_SET)	meters	Surface height value for current location from 1 km x 1 km grid	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_SolAng	REAL (UNLIMITED)	Solar Angle (NOT_SET)	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 one degree accuracy.	Rel 33 GLAS Binary Data	DS_UTCTime_1

Group: Data_1HZ/Geophysical

This group contains geophysical parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Surface_pres	REAL (UNLIMITED)	Surface Pressure (surface_air_pressure)	hPa	Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_Surface_relh	REAL (UNLIMITED)	Relative Humidity (relative_humidity)	percent	Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_Surface_temp	REAL (UNLIMITED)	Surface Temperature (surface_temperature)	degree Celsius	Atmospheric temperature at Earth's surface level measured in degrees Celsius and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_1

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Surface_wdir	REAL (UNLIMITED)	Surface Wind Direction Azimuth from North (NOT_SET)	degrees	Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_Surface_wind	REAL (UNLIMITED)	Surface Wind Speed (NOT_SET)	meters/second	Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_Spec_Humid	REAL (UNLIMITED)	Specific Humidity (NOT_SET)	gram/kilogram	Specific humidity 2m above ground.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_Temp2mAbvGrnd	REAL (UNLIMITED)	Temperature 2m Above Ground Level (NOT_SET)	degrees Celsius	Temperature 2m Above Ground Level	Rel 33 GLAS Binary Data	DS_UTCTime_1

Group: Data_1HZ/Quality

This group contains flags indicating the quality or suitability of data.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source					
orbit_pred_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Predicted or precision orbit;0=precision orbit used;1=predicted orbit used;2=on-board orbit used <table border="1" data-bbox="816 1087 1401 1304"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>precision_orbit_used predicted_orbit_used on-board_orbit_used</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	precision_orbit_used predicted_orbit_used on-board_orbit_used	Rel 33 GLAS Binary Data	
flag values	flag_meanings									
0, 1, 2	precision_orbit_used predicted_orbit_used on-board_orbit_used									
orbit_man_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Maneuvers;0=no maneuvers;1=maneuvers occurred during this record; orbit degraded <table border="1" data-bbox="816 1430 1401 1619"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_maneuvers maneuvers orbit_degraded</td> </tr> </table>	flag values	flag_meanings	0, 1	no_maneuvers maneuvers orbit_degraded	Rel 33 GLAS Binary Data	
flag values	flag_meanings									
0, 1	no_maneuvers maneuvers orbit_degraded									
orbit_model_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Model problems;0=no model problems;1=model problems; orbit RMS > 5 cm; required accuracy not met <table border="1" data-bbox="816 1738 1227 1875"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_problems problems</td> </tr> </table>	flag values	flag_meanings	0, 1	no_problems problems	Rel 33 GLAS Binary Data	
flag values	flag_meanings									
0, 1	no_problems problems									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
orbit_att_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Attitude;0=instrument attitude used for orbit;1=modeled attitude used, possible orbit degradation <table border="1" data-bbox="818 275 1401 491"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>instrument_attitude_used modeled_attitude_used possible_orbit_degradation</td> </tr> </table>	flag values	flag_meanings	0, 1	instrument_attitude_used modeled_attitude_used possible_orbit_degradation	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	instrument_attitude_used modeled_attitude_used possible_orbit_degradation								
orbit_array_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Solar ray orientation;0=solar ray orientation used from measurement;1=modeled solar ray orientation, possible orbit degradation <table border="1" data-bbox="818 642 1401 831"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>solar_ray_orientation_from_measurement modeled_solar_ray_orientation</td> </tr> </table>	flag values	flag_meanings	0, 1	solar_ray_orientation_from_measurement modeled_solar_ray_orientation	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	solar_ray_orientation_from_measurement modeled_solar_ray_orientation								
orbit_gps_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	GPS;0=no GPS data outage;1=GPS data missing from portion of this record, possible degradation <table border="1" data-bbox="818 953 1401 1115"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_GPS_data_outage GPS_data_missing</td> </tr> </table>	flag values	flag_meanings	0, 1	no_GPS_data_outage GPS_data_missing	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	no_GPS_data_outage GPS_data_missing								
att_offnadir_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Off-nadir angle; 0=off-nadir angle within limits;1=large off-nadir angle <table border="1" data-bbox="818 1241 1401 1423"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>off-nadir_angle_within_limits large_off-nadir_angle</td> </tr> </table>	flag values	flag_meanings	0, 1	off-nadir_angle_within_limits large_off-nadir_angle	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	off-nadir_angle_within_limits large_off-nadir_angle								
att_oceansw_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Ocean sweep;0=non-ocean sweep, 1=within time frame of ocean sweep <table border="1" data-bbox="818 1549 1308 1682"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>non-ocean_sweep ocean_sweep</td> </tr> </table>	flag values	flag_meanings	0, 1	non-ocean_sweep ocean_sweep	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	non-ocean_sweep ocean_sweep								
att_pointing_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Target of opportunity off-pointing;0=not within target of opportunity off-pointing 1=within time of target of opportunity off-pointing <table border="1" data-bbox="818 1803 1122 1936"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_TOO TOO</td> </tr> </table>	flag values	flag_meanings	0, 1	not_TOO TOO	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	not_TOO TOO								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
att_steering_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Steering to reference track;0=not within target of opportunity off-pointing 1=within time of target of opportunity off-pointing <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_TOO TOO</td> </tr> </table>	flag values	flag_meanings	0, 1	not_TOO TOO	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	not_TOO TOO								
att_actual_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	0=i_AttFlg_1 through i_AttFlg_3 have been set based on actual data 1=i_AttFlg_1 through i_AttFlg_3 have not been set - IGNORE these flags <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>actual ignore</td> </tr> </table>	flag values	flag_meanings	0, 1	actual ignore	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1	actual ignore								
att_ist_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	IST data;0 = IST data is good 1 = Missing IST for at least a portion of the time of this frame 2 = Noisy IST for at least a portion of the time of this frame 3 = Noisy and missing IST for at least a portion of the time of this frame <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2, 3</td> <td>IST_data_good IST_missing IST_noisy IST_noisy_and_missing</td> </tr> </table>	flag values	flag_meanings	0, 1, 2, 3	IST_data_good IST_missing IST_noisy IST_noisy_and_missing	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1, 2, 3	IST_data_good IST_missing IST_noisy IST_noisy_and_missing								
att_gyro_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	GYRO data;0 = GYRO data is good 1 = Missing GYRO for at least a portion of the time of this frame 2 = Noisy GYRO for at least a portion of the time of this frame 3 = Noisy and missing GYRO for at least a portion of the time of this frame <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2, 3</td> <td>GYRO_data_good GYRO_data_missing GYRO_data_noisy GYRO_data_noisy_and_missing</td> </tr> </table>	flag values	flag_meanings	0, 1, 2, 3	GYRO_data_good GYRO_data_missing GYRO_data_noisy GYRO_data_noisy_and_missing	Rel 33 GLAS Binary Data
flag values	flag_meanings								
0, 1, 2, 3	GYRO_data_good GYRO_data_missing GYRO_data_noisy GYRO_data_noisy_and_missing								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source																		
att_lrs_flg	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	<p>LRS Data;0 = LRS data good, consists of star, laser and CRS 1 = LRS data good, but no star data for at least a portion of this frame 2 = LRS data good, but no laser data for at least a portion of this frame 3 = LRS data good, but no CRS data for at least a portion of this frame 4 = LRS data good, but only CRS data for at least a portion of this frame 5 = LRS data good, but only laser data for at least a portion of this frame 6 = LRS data good, but only star data for at least a portion of this frame 7 = Missing LRS for at least a portion of the time of this frame</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1,</td> <td>LRS_data_good</td> </tr> <tr> <td>2, 3,</td> <td>LRS_data_good_but_no_star_data</td> </tr> <tr> <td>4, 5,</td> <td>LRS_data_good_but_no_laser_data</td> </tr> <tr> <td>6, 7</td> <td>LRS_data_good_but_no_CRS_data</td> </tr> <tr> <td></td> <td>LRS_data_good_but_only_some_CRS_data</td> </tr> <tr> <td></td> <td>LRS_data_good_but_only_some_laser_data</td> </tr> <tr> <td></td> <td>LRS_data_good_but_only_some_star_data</td> </tr> <tr> <td></td> <td>some_missing_LRS_data</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1,	LRS_data_good	2, 3,	LRS_data_good_but_no_star_data	4, 5,	LRS_data_good_but_no_laser_data	6, 7	LRS_data_good_but_no_CRS_data		LRS_data_good_but_only_some_CRS_data		LRS_data_good_but_only_some_laser_data		LRS_data_good_but_only_some_star_data		some_missing_LRS_data	Rel 33 GLAS Binary Data
flag values	flag_meanings																						
0, 1,	LRS_data_good																						
2, 3,	LRS_data_good_but_no_star_data																						
4, 5,	LRS_data_good_but_no_laser_data																						
6, 7	LRS_data_good_but_no_CRS_data																						
	LRS_data_good_but_only_some_CRS_data																						
	LRS_data_good_but_only_some_laser_data																						
	LRS_data_good_but_only_some_star_data																						
	some_missing_LRS_data																						
i_LidarQF	INTEGER_1 (UNLIMITED)	Lidar Frame quality flag (NOT_SET)	NOT_SET	<p>Lidar frame quality flag. 0=good data, 1=data unsuitable for L2 processing due to weak 532 laser energy or high background.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>good unsuitable</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	good unsuitable	Rel 33 GLAS Binary Data														
flag values	flag_meanings																						
0, 1	good unsuitable																						

Group: Data_1HZ/Flags

This group contains flags indicating the quality or suitability of data.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates																						
i_Aer_ir_layflg	INTEGER_1 (UNLIMITED)	Layer Flag for 1064 Aerosol (NOT_SET)	NOT_SET	<p>Number of 1064 layers of aerosol saved</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1,</td> <td>none_saved 1_saved</td> </tr> <tr> <td>2, 3,</td> <td>2_saved 3_saved 4_saved</td> </tr> <tr> <td>4, 5,</td> <td>5_saved 6_saved 7_saved</td> </tr> <tr> <td>6, 7,</td> <td>8_saved 9_saved 10_saved</td> </tr> <tr> <td>8, 9,</td> <td>11_saved 12_saved</td> </tr> <tr> <td>10,</td> <td>13_saved 14_saved</td> </tr> <tr> <td>11,</td> <td>15_saved</td> </tr> <tr> <td>12,</td> <td></td> </tr> <tr> <td>13,</td> <td></td> </tr> <tr> <td>14, 15</td> <td></td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1,	none_saved 1_saved	2, 3,	2_saved 3_saved 4_saved	4, 5,	5_saved 6_saved 7_saved	6, 7,	8_saved 9_saved 10_saved	8, 9,	11_saved 12_saved	10,	13_saved 14_saved	11,	15_saved	12,		13,		14, 15		Rel 33 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings																											
0, 1,	none_saved 1_saved																											
2, 3,	2_saved 3_saved 4_saved																											
4, 5,	5_saved 6_saved 7_saved																											
6, 7,	8_saved 9_saved 10_saved																											
8, 9,	11_saved 12_saved																											
10,	13_saved 14_saved																											
11,	15_saved																											
12,																												
13,																												
14, 15																												

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
surf_ld_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type;0=no Land;1=Land <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_land land</td> </tr> </table>	flag values	flag_meanings	0, 1	no_land land	Rel 33 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_land land									
surf_si_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type;0=no Sea Ice;1=Sea Ice <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_seaice seaice</td> </tr> </table>	flag values	flag_meanings	0, 1	no_seaice seaice	Rel 33 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_seaice seaice									
surf_oc_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type;0=no Ocean;1=Ocean <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_ocean ocean</td> </tr> </table>	flag values	flag_meanings	0, 1	no_ocean ocean	Rel 33 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_ocean ocean									
surf_is_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type;0=no Ice Sheet;1=Ice Sheet <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_icesheet icesheet</td> </tr> </table>	flag values	flag_meanings	0, 1	no_icesheet icesheet	Rel 33 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_icesheet icesheet									

Group: Data_1HZ/Angle

This group contains reflectivity information.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_beam_azimuth	REAL (UNLIMITED)	Azimuth (NOT_SET)	degrees	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.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_beam_coelev	REAL (UNLIMITED)	Co-elevation (NOT_SET)	degrees	Co-elevation (CE) is direction from vertical of the laser beam as seen by an observer located at the laser ground spot.	Rel 33 GLAS Binary Data	DS_UTCTime_1
r_pad_angle	REAL (UNLIMITED)	PAD Angle (NOT_SET)	degrees	Attitude angle calculated from PAD and POD.	Rel 33 GLAS Binary Data	DS_UTCTime_1

Group: /Data_5HZ/

This group contains data with a rate of 5HZ. 5Hz data may be indexed to the 1HZ data using the i_rec_ndx parameter in each respective time group.

Dimension Scales

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
DS_UTCTime_5	DOUBLE (UNLIMITED)	Transmit Time of First Shot in frame in J2000 (time)	seconds	The transmit time of five shots in the 1 second frame measured as 'UTC seconds' elapsed since Jan 1 2000 12:00:00 UTC. This time has been derived from the GPS time accounting for leap seconds.	Rel 33 GLAS Binary Data	NOT_SET

Group: Data_5HZ/Time

This group contains the 5HZ index and time-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
i_rec_ndx	INTEGER (UNLIMITED)	GLAS Record Index (NOT_SET)	NOT_SET	Unique index that relates this record to the corresponding record(s) in each GLAS data product.	Rel 33 GLAS Binary Data	DS_UTCTime_5
i_shot_count	INTEGER (UNLIMITED)	GLAS shot counter (NOT_SET)	NOT_SET	Identifies each laser shot within a record index. A combination of i_rec_ndx and i_shot_count can be used to uniquely identify each GLAS laser shot.	Rel 33 GLAS Binary Data	DS_UTCTime_5

Group: Data_5HZ/Geolocation

This group contains information relating to the GLAS campaign geolocation.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_lat	DOUBLE (UNLIMITED)	Profile Location, Latitude (at each time) (latitude)	degrees_north	Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and north latitude, at the 5 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_5
d_lon	DOUBLE (UNLIMITED)	Profile Location, Longitude(at each time) (longitude)	degrees_east	Profile coordinate in the IERS Terrestrial Reference Frame: east longitude and north latitude, at the 5 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_5

Group: Data_5HZ/PBL

This group contains the PBL-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Surface_wdir	REAL (UNLIMITED)	Surface Wind Direction Azimuth from North (NOT_SET)	degrees	Wind direction at Earth's surface level measured in degrees of azimuth from North and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_5
r_HRpbl_grd	REAL (UNLIMITED)	Ground Detection for High Res PBL (NOT_SET)	meters	The height above the reference ellipsoid of the ground used by the high res PBL processing algorithms.	Rel 33 GLAS Binary Data	DS_UTCTime_5

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Surface_wind	REAL (UNLIMITED)	Surface Wind Speed (NOT_SET)	meters/second	Wind speed at Earth's surface level measured in km/hour and derived from the meteorological data files.	Rel 33 GLAS Binary Data	DS_UTCTime_5
r_HRpbl_ht	REAL (UNLIMITED)	High Resolution PBL Height at 532 nm (NOT_SET)	meters	High resolution height of the planetary boundary layer, as derived from the aerosol structure; the high resolution data occurs at the rate of 5 per second.	Rel 33 GLAS Binary Data	DS_UTCTime_5

Group: Data_5HZ/Flags

This group contains flags at 5 per sec.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description				
i_HRpbl_qf	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>quality flag at 5Hz for 4 sec: value 0 = PBL was searched for, but not detected; values 1 to 14 increasing goodness; value 14 = bad; value 15 = PBL not searched for</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15</td> <td>HRpbl_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad HRpbl_not_searched</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	HRpbl_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad HRpbl_not_searched
flag values	flag_meanings							
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	HRpbl_not_detected good_1 good_2 good_3 good_4 good_5 good_6 good_7 good_8 good_9 good_10 good_11 good_12 good_13 bad HRpbl_not_searched							
i_HRpbl_uf	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>use flag at 5Hz for 4 sec: value 0 = no saturated bins present in layer; value 1 = saturated bins present in layer and replaced with 1064 data; value 2 = saturated bins present in layer and not replaced with 1064 data</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064data</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064data
flag values	flag_meanings							
0, 1, 2	no_saturated_bins_in_layer saturated_bins_present_in_layer_and_replaced_with_1064data saturated_bins_present_in_layer_and_not_replaced_with_1064data							
i_HRpbl_ccf	INTEGER_1 (UNLIMITED)	Layer Height Flag (NOT_SET)	NOT_SET	<p>clear/cloudy flag at 5Hz for 4 sec: value 0 = clear; value 1 = cloudy</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>clear cloudy</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	clear cloudy
flag values	flag_meanings							
0, 1	clear cloudy							

/ANCILLARY_DATA

/ANCILLARY_DATA

Attribute	Example Value
glas_osc_rate	1.000000023
glas_osc_rate_date	2003-10-30
glas_osc_rate_time	00:00:00

Attribute	Example Value
sc_osc_rate	0.9999998854809
sc_osc_rate_date	2003-10-30
sc_osc_rate_time	00:00:00
internal_time_delay	0.0000151100
internal_time_delay_date	2003-10-30
internal_time_delay_time	00:00:00
internal_range_delay	9.5560
internal_range_delay_date	2003-10-30
internal_range_delay_time	00:00:00
Additional_Attribute	SP_ICE_PATH_NO, SP_ICE_GLAS_StartBlock, SP_ICE_GLAS_EndBlock, ReferenceOrbit, Track, PercentGroundHit, PercentHighRate, PercentMediumRate, PercentLowRate, PercentFullRate, Cycle, Instance
internal_range_delay_desc	Internal range calibration bias determined during GLAS instrument integration testing and validated in-flight, meters.
internal_time_delay_desc	Internal time calibration bias determined during GLAS instrument integration testing and validated in-flight, seconds.

/METADATA

/METADATA

Attribute	Example Value
description	This group contains structured, computer-parseable ECHO-style collection and inventory-level metadata.
HDFVersion	HDF5 1.8.9
ControlFile	cf_name=gla08_test.ct1

/METADATA/COLLECTIONMETADATA

Attribute	Example Value
DLLName	libDsESDTG1GLASPoly.001Sh.so
GranuleTimeDuration	81280
SpatialSearchType	Orbit
DataFileFormat	HDF5
ScienceMimeType	application/x-hdfeos
BrowseMimeType	application/x-hdfeos
BrowseOnlineMimeType	image/jpeg

Attribute	Example Value
ShortName	GLAH08
LongName	GLAS/ICESat L2 Global Planetary Boundary Layer & Elevated Aerosol Layers (HDF5)
CollectionDescription	The level 2 planetary boundary layer and elevated aerosol layer height data will be provided at a minimum of once per 4 seconds. Data granules will contain approximately 23 hours (14 orbits) of data.
VersionID	33
CitationforExternalPublication	The data used in this study were produced by the GLAS Science Team at the ICESat Science Investigator-led Processing System (I-SIPS) at NASA/GSFC. The data archive site is the NSIDC DAAC.
CollectionState	In Work
MaintenanceandUpdateFrequency	Daily
AccessConstraints	Data may not be reproduced or distributed without including the CitationForExternalPublication for this product included in this Metadata. Data may not be distributed in an altered form without the written permission of the GLAS Science Team.
TemporalKeyword	Day
SpatialKeyword	Global

/METADATA/COLLECTIONMETADATA/AdditionalAttributes

Attribute	Example Value
PercentGroundHit	AdditionalAttributesContainer
PercentHighRate	AdditionalAttributesContainer
PercentMediumRate	AdditionalAttributesContainer
Track	AdditionalAttributesContainer
Instrument_State	AdditionalAttributesContainer
PercentLowRate	AdditionalAttributesContainer
PercentFullRate	AdditionalAttributesContainer
ReferenceOrbit	AdditionalAttributesContainer
SP_ICE_PATH_NO	AdditionalAttributesContainer
SP_ICE_GLAS_StartBlock	AdditionalAttributesContainer
SP_ICE_GLAS_EndBlock	AdditionalAttributesContainer
Cycle	AdditionalAttributesContainer
Instance	AdditionalAttributesContainer
Instrument_State_Date	AdditionalAttributesContainer

Attribute	Example Value
Instrument_State_Time	AdditionalAttributesContainer
Timing_Bias	AdditionalAttributesContainer
Timing_Bias_Date	AdditionalAttributesContainer
Timing_Bias_Time	AdditionalAttributesContainer
identifier_product_doi	AdditionalAttributesContainer
identifier_file_uuid	AdditionalAttributesContainer
identifier_product_doi_authority	AdditionalAttributesContainer

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Cycle

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	A count of the number of exact repeats of this reference orbit.
AdditionalAttributeName	Cycle
ParameterUnitsofMeasurement	counts
ParameterRangeBegin	0
ParameterRangeEnd	250

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Instance

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	The number of times that we have returned to a specific reference orbit.
AdditionalAttributeName	Instance
ParameterUnitsofMeasurement	counts
ParameterRangeBegin	1
ParameterRangeEnd	99

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Instrument_State

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	Flag word that indicates which redundant units (laser, detector, oscillator) of the GLAS instrument are in operation.
AdditionalAttributeName	Instrument_State

Attribute	Example Value
ParameterUnitsofMeasurement	Flag word
ParameterRangeBegin	0
ParameterRangeEnd	5

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Instrument_State_Date

Attribute	Example Value
AdditionalAttributeDatatype	date
AdditionalAttributeDescription	The date that corresponds to the first valid Instrument_State. There is a maximum of two per granule.
AdditionalAttributeName	Instrument_State_Date

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Instrument_State_Time

Attribute	Example Value
AdditionalAttributeDatatype	time
AdditionalAttributeDescription	The time that corresponds to the first valid Instrument_State. There is a maximum of two per granule.
AdditionalAttributeName	Instrument_State_Time

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/PercentFullRate

Attribute	Example Value
AdditionalAttributeDatatype	float
AdditionalAttributeDescription	Percent of data for this granule that atmospheric parameters are provided at 40 Hz data rate.
AdditionalAttributeName	PercentFullRate
ParameterUnitsofMeasurement	Percent
ParameterRangeBegin	0.0
ParameterRangeEnd	100.0
ParameterValueAccuracy	1
ParameterMeasurementResolution	1

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/PercentGroundHit

Attribute	Example Value
AdditionalAttributeDatatype	float
AdditionalAttributeDescription	Percent of data for this granule that had a detected ground return of the transmitted laser pulse.

Attribute	Example Value
AdditionalAttributeName	PercentGroundHit
ParameterUnitsofMeasurement	Percent
ParameterRangeBegin	0.0
ParameterRangeEnd	100.0
ParameterValueAccuracy	1
ParameterMeasurementResolution	1

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/PercentHighRate

Attribute	Example Value
AdditionalAttributeDatatype	float
AdditionalAttributeDescription	Percent of data for this granule that atmospheric parameters are provided at 5 Hz data rate.
AdditionalAttributeName	PercentHighRate
ParameterUnitsofMeasurement	Percent
ParameterRangeBegin	0.0
ParameterRangeEnd	100.0
ParameterValueAccuracy	1
ParameterMeasurementResolution	1

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/PercentLowRate

Attribute	Example Value
AdditionalAttributeDatatype	float
AdditionalAttributeDescription	Percent of data for this granule that atmospheric parameters are provided at 0.25 Hz data rate.
AdditionalAttributeName	PercentLowRate
ParameterUnitsofMeasurement	Percent
ParameterRangeBegin	0.0
ParameterRangeEnd	100.0
ParameterValueAccuracy	1
ParameterMeasurementResolution	1

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/PercentMediumRate

Attribute	Example Value
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Attribute	Example Value
AdditionalAttributeDatatype	float
AdditionalAttributeDescription	Percent of data for this granule that atmospheric parameters are provided at 1 Hz data rate.
AdditionalAttributeName	PercentMediumRate
ParameterUnitsofMeasurement	Percent
ParameterRangeBegin	0.0
ParameterRangeEnd	100.0
ParameterValueAccuracy	1
ParameterMeasurementResolution	1

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/ReferenceOrbit

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	Assigned number for which exact orbital elements describe the exact repeat orbit pattern.
AdditionalAttributeName	ReferenceOrbit
ParameterUnitsofMeasurement	Assigned number
ParameterRangeBegin	1
ParameterRangeEnd	30000

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/SP_ICE_GLAS_EndBlock

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	Integer number within GLAS coverage scheme in which granule data ends.
AdditionalAttributeName	SP_ICE_GLAS_EndBlock
ParameterRangeBegin	1
ParameterRangeEnd	360

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/SP_ICE_GLAS_StartBlock

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	Integer number within GLAS coverage scheme in which granule data starts.
AdditionalAttributeName	SP_ICE_GLAS_StartBlock

Attribute	Example Value
ParameterRangeBegin	1
ParameterRangeEnd	360

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/SP_ICE_PATH_NO

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	Number which represents the GLAS path number.
AdditionalAttributeName	SP_ICE_PATH_NO
ParameterRangeBegin	1
ParameterRangeEnd	32768

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Timing_Bias

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	The time tag error determined by the calibration team that was added to the time tags to compute the true time of data as provided on the granule.
AdditionalAttributeName	Timing_Bias
ParameterUnitsofMeasurement	Microseconds
ParameterRangeBegin	-1000000
ParameterRangeEnd	+1000000

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Timing_Bias_Date

Attribute	Example Value
AdditionalAttributeDatatype	date
AdditionalAttributeDescription	The date that corresponds to the first valid Timing_Bias. There are a maximum of two per granule.
AdditionalAttributeName	Timing_Bias_Date

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Timing_Bias_Time

Attribute	Example Value
AdditionalAttributeDatatype	time
AdditionalAttributeDescription	The time that corresponds to the first valid Timing_Bias. There are a maximum of two per granule.
AdditionalAttributeName	Timing_Bias_Time

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Track

Attribute	Example Value
AdditionalAttributeDatatype	int
AdditionalAttributeDescription	The unique number assigned for each repeat ground track (one orbit) of the reference orbit.
AdditionalAttributeName	Track
ParameterUnitsofMeasurement	counts
ParameterRangeBegin	0
ParameterRangeEnd	3000

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier_file_uuid

Attribute	Example Value
AdditionalAttributeDatatype	varchar
AdditionalAttributeDescription	Universally unique identifier for this data product's files
AdditionalAttributeName	identifier_file_uuid

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier_product_doi

Attribute	Example Value
AdditionalAttributeDatatype	varchar
AdditionalAttributeDescription	Digital object identifier that uniquely identifies this data product
AdditionalAttributeName	identifier_product_doi

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier_product_doi/InformationContent

Attribute	Example Value
ParameterValue	10.5067/ICESAT/GLAS/DATA201

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier_product_doi_authority

Attribute	Example Value
AdditionalAttributeDatatype	varchar
AdditionalAttributeDescription	URL of the digital object identifier resolving authority
AdditionalAttributeName	identifier_product_doi_authority

/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier_product_doi_authority/InformationContent

Attribute	Example Value

Attribute	Example Value
ParameterValue	http://dx.doi.org/10.5067/ICESAT/GLAS/DATA201

/METADATA/COLLECTIONMETADATA/CSDTDescription

Attribute	Example Value
PrimaryCSDT	n-Dim Array of Records
IndirectReference	tracks/orbits
Implementation	HDF
CSDTComments	Granule contains fourteen orbits of data; nominally 24-hour period.

/METADATA/COLLECTIONMETADATA/CollectionAssociation

Attribute	Example Value
GLA00	CollectionAssociationContainer
GLAH02	CollectionAssociationContainer
GLAH07	CollectionAssociationContainer
GLAH09	CollectionAssociationContainer
GLAH10	CollectionAssociationContainer
GLAH11	CollectionAssociationContainer

/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLA00

Attribute	Example Value
CollectionType	Science Associated
CollectionUse	The initial collection of GLAS instrument data downlinked from the spacecraft.
ShortName	GLA00
VersionID	1

/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH02

Attribute	Example Value
CollectionType	Science Associated
CollectionUse	Level 1A atmospheric data product file containing: normalized lidar signals.
ShortName	GLAH02
VersionID	33

/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH07

Attribute	Example Value
CollectionType	Input
CollectionUse	Level 1B file containing: calibrated backscatter profiles.
ShortName	GLAH07
VersionID	33

/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH09

Attribute	Example Value
CollectionType	Dependent
CollectionUse	Level 2 file containing: cloud layer top and bottom heights.
ShortName	GLAH09
VersionID	33

/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH10

Attribute	Example Value
CollectionType	Dependent
CollectionUse	Level 2 file containing: cloud- and aerosol- attenuation corrected backscatter and extinction profiles.
ShortName	GLAH10
VersionID	33

/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH11

Attribute	Example Value
CollectionType	Dependent
CollectionUse	Level 2 file containing: cloud and aerosol layer optical depths.
ShortName	GLAH11
VersionID	33

/METADATA/COLLECTIONMETADATA/ContactOrganization

Attribute	Example Value
Data_Originator	ContactOrganizationContainer
Archive	ContactOrganizationContainer

/METADATA/COLLECTIONMETADATA/ContactOrganization/Archive

Attribute	Example Value
Role	Archive
HoursofService	M-F, 8:00am to 5:00pm, Mountain Time
ContactInstructions	For inquiries, contact NSIDC User Services. Primary first level contact.
ContactOrganizationName	NSIDC User Services
StreetAddress	CIRES/NSIDC University of Colorado Campus, Box 449
City	Boulder
StateProvince	Colorado
PostalCode	80309-0449
Country	USA
TelephoneNumber	303-492-2468
TelephoneNumberType	Facsimile
ElectronicMailAddress	nsidc@nsidc.org

/METADATA/COLLECTIONMETADATA/ContactOrganization/Data_Originator

Attribute	Example Value
Role	Data Originator
HoursofService	M-F, 8:00am to 4:30pm Eastern Time
ContactInstructions	Contact by e-mail first
ContactOrganizationName	ICESat Science Investigator-led Processing System (I-SIPS)
StreetAddress	Building 33, NASA Goddard Space Flight Center
City	Greenbelt
StateProvince	Maryland
PostalCode	20771
Country	USA
TelephoneNumber	757-864-1238
TelephoneNumberType	Voice
ElectronicMailAddress	David.W.Hancock@nasa.gov

/METADATA/COLLECTIONMETADATA/ContactPerson

Attribute	Example Value

Attribute	Example Value
Hancock	ContactPersonContainer
Schutz	ContactPersonContainer
zwally	ContactPersonContainer
DiMarzio	ContactPersonContainer

/METADATA/COLLECTIONMETADATA/ContactPerson/DiMarzio

Attribute	Example Value
Role	Producer
HoursofService	M-F, 8:00am to 4:30pm Eastern Time
ContactInstructions	None
ContactJobPosition	Deputy Science Software Development Manager
ContactFirstName	John
ContactMiddleName	P
ContactLastName	DiMarzio
StreetAddress	Building 33, Rm. B-209D, NASA/GSFC
City	Greenbelt
StateProvince	Maryland
PostalCode	20771
Country	USA
TelephoneNumber	301-614-5893
TelephoneNumberType	Voice
ElectronicMailAddress	John.P.Dimarzio.1@nasa.gov

/METADATA/COLLECTIONMETADATA/ContactPerson/Hancock

Attribute	Example Value
Role	Data Originator
HoursofService	M-F, 8:00am to 4:30pm. Eastern Time.
ContactInstructions	None
ContactJobPosition	Science Software Development Manager.
ContactFirstName	David

Attribute	Example Value
ContactMiddleName	W.
ContactLastName	Hancock
StreetAddress	Building N-159, NASA/GSFC Wallops Flight Facility.
City	Wallops Island
StateProvince	Virginia
PostalCode	23337
Country	USA
TelephoneNumber	757-824-1238
TelephoneNumberType	Voice
ElectronicMailAddress	David.W.Hancock@nasa.gov

/METADATA/COLLECTIONMETADATA/ContactPerson/Schutz

Attribute	Example Value
Role	Investigator
HoursofService	M-F, 8:00am to 4:30pm Central Time
ContactInstructions	None
ContactJobPosition	GLAS Science Team Leader
ContactFirstName	Bob
ContactMiddleName	E
ContactLastName	Schutz
StreetAddress	3925 W. Braker Lane, Center for Space Research
City	Austin
StateProvince	Texas
PostalCode	78759-5321
Country	USA
TelephoneNumber	512-471-4267
TelephoneNumberType	Voice
ElectronicMailAddress	schutz@utcsr.ae.utexas.edu

/METADATA/COLLECTIONMETADATA/ContactPerson/Zwally

Attribute	Example Value
Role	Producer
HoursofService	M-F, 8:00am to 4:30pm Eastern Time
ContactInstructions	None.
ContactJobPosition	ICESat Project Scientist
ContactFirstName	Jay
ContactLastName	Zwally
StreetAddress	Building 33, Rm A-217
City	Greenbelt
StateProvince	Maryland
PostalCode	20771
Country	USA
TelephoneNumber	301-614-5643
TelephoneNumberType	Voice
ElectronicMailAddress	Jay.Zwally@nasa.gov

/METADATA/COLLECTIONMETADATA/DisciplineTopicParameters

Attribute	Example Value
Atmosphere	DisciplineTopicParametersContainer

/METADATA/COLLECTIONMETADATA/DisciplineTopicParameters/Atmosphere

Attribute	Example Value
ECSDisciplineKeyword	Earth Science
ECSTopicKeyword	Atmosphere
ECSTermKeyword	Aerosols
ECSVariableKeyword	Aerosol Particle Properties

/METADATA/COLLECTIONMETADATA/DisciplineTopicParameters/Atmosphere/ECSPParameter

Attribute	Example Value
ECSPParameterKeyword	Aerosol Layer Height

/METADATA/COLLECTIONMETADATA/ECSCollection

Attribute	Example Value
RevisionDate	2012-06-25
SuggestedUsage	GLAH08 contains the heights of planetary boundary layer (PBL) and aerosol layers for researchers. Elevated aerosol layer height data consist of top and bottom heights for up to 5 layers below 20 km and for up to 3 layers above 20 km. Each GLAH08 file was created from an equivalent GLA08 binary file. The data used to create the GLAH08 values are contained in the equivalent GLAHxx files for the GLAxx files. See the provenance metadata for the creation of the GLA08.
ProcessingCenter	GSFC I-SIPS
ArchiveCenter	NSIDC
VersionDescription	Initial Version
DatasetDisclaimerPointer	http://nsidc.org/data/icesat/disclaimer.html
ECSCollectionGuidePointer	https://nsidc.org/data/glah02-glah07-glah08-glah09-glah10-glah11/versions/33/documentation
ECSCollectionGuidePointerComment	Guide Document for this product at NSIDC
MiscellaneousInformationPointer	http://nsidc.org/data/icesat/
MiscellaneousInformationPointerComment	GLAS Product page at NSIDC

/METADATA/COLLECTIONMETADATA/Platform

Attribute	Example Value
ICESat	PlatformContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat

Attribute	Example Value
PlatformShortName	ICESat
PlatformLongName	Ice, Cloud, and Land Elevation Satellite
PlatformType	Spacecraft

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument

Attribute	Example Value
GLAS	InstrumentContainer
GPS	InstrumentContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS

Attribute	Example Value
InstrumentShortName	GLAS

Attribute	Example Value
InstrumentLongName	Geoscience Laser Altimeter System
InstrumentTechnique	Laser Altimetry and Light Detection and Radar
NumberofSensors	3

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/InstrumentCharacteristic

Attribute	Example Value
SwathWidth	InstrumentCharacteristicContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/InstrumentCharacteristic/SwathWidth

Attribute	Example Value
InstrumentCharacteristicName	SwathWidth
InstrumentCharacteristicDescription	The width of the sensor scan as the satellite moves along the ground track.
InstrumentCharacteristicDataType	int
InstrumentCharacteristicUnit	kilometers
InstrumentCharacteristicValue	2

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor

Attribute	Example Value
LA	SensorContainer
PC	SensorContainer
CD	SensorContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/CD

Attribute	Example Value
SensorShortName	CD
SensorLongName	Cloud LIDAR
SensorTechnique	Measure of 1064nm return energy in 75m bins from 20km to surface

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/CD/SensorCharacteristic

Attribute	Example Value
wavelength	SensorCharacteristicContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/CD/SensorCharacteristic/wavelength

Attribute	Example Value
SensorCharacteristicName	wavelength
SensorCharacteristicDescription	detector
SensorCharacteristicDataType	varchar
SensorCharacteristicUnit	nanometer
SensorCharacteristicValue	1064 nm

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/LA

Attribute	Example Value
SensorShortName	LA
SensorLongName	Laser Altimeter
SensorTechnique	Exact Measurement of Time between Transmit Pulse and receive ground return

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/LA/SensorCharacteristic

Attribute	Example Value
wavelength	SensorCharacteristicContainer
waveform	SensorCharacteristicContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/LA/SensorCharacteristic/waveform

Attribute	Example Value
SensorCharacteristicName	waveform
SensorCharacteristicDescription	digitizer
SensorCharacteristicDataType	varchar
SensorCharacteristicUnit	counts
SensorCharacteristicValue	0-255

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/LA/SensorCharacteristic/wavelength

Attribute	Example Value
SensorCharacteristicName	wavelength
SensorCharacteristicDescription	transmission
SensorCharacteristicDataType	varchar
SensorCharacteristicUnit	nanometer

Attribute	Example Value
SensorCharacteristicValue	1064 nm

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/PC

Attribute	Example Value
SensorShortName	PC
SensorLongName	Photon Counter for the 532 nm Aerosol Returns
SensorTechnique	Counting of 532nm photon return in 75m bins 40km to surface

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/PC/SensorCharacteristic

Attribute	Example Value
wavelength	SensorCharacteristicContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GLAS/Sensor/PC/SensorCharacteristic/wavelength

Attribute	Example Value
SensorCharacteristicName	wavelength
SensorCharacteristicDescription	detector
SensorCharacteristicDataType	varchar
SensorCharacteristicUnit	nanometer
SensorCharacteristicValue	532nm

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GPS

Attribute	Example Value
InstrumentShortName	GPS
InstrumentLongName	Global Positioning System Receiver
InstrumentTechnique	Radionavigation
NumberOfSensors	1

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GPS/Sensor

Attribute	Example Value
GPS_Receiver	SensorContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GPS/Sensor/GPS_Receiver

Attribute	Example Value

Attribute	Example Value
SensorShortName	GPS Receiver
SensorLongName	Dual frequency GPS receiver
SensorTechnique	Pseudorange and carrier phase

/METADATA/COLLECTIONMETADATA/Platform/ICESat/PlatformCharacteristic

Attribute	Example Value
OrbitInclination	PlatformCharacteristicContainer
OrbitalPeriod	PlatformCharacteristicContainer

/METADATA/COLLECTIONMETADATA/Platform/ICESat/PlatformCharacteristic/OrbitInclination

Attribute	Example Value
PlatformCharacteristicName	OrbitInclination
PlatformCharacteristicDescription	Angle between the orbit plane and the Earth's equatorial plane
PlatformCharacteristicDataType	float
PlatformCharacteristicUnit	Degrees
PlatformCharacteristicValue	94.0

/METADATA/COLLECTIONMETADATA/Platform/ICESat/PlatformCharacteristic/OrbitalPeriod

Attribute	Example Value
PlatformCharacteristicName	OrbitalPeriod
PlatformCharacteristicDescription	Orbital period in decimal minutes.
PlatformCharacteristicDataType	float
PlatformCharacteristicUnit	Minutes
PlatformCharacteristicValue	96.7

/METADATA/COLLECTIONMETADATA/ProcessingLevel

Attribute	Example Value
ProcessingLevelDescription	Geophysical Quantities at the sensor resolution or geolocated
ProcessingLevelID	2

/METADATA/COLLECTIONMETADATA/Review

Attribute	Example Value

Attribute	Example Value
ScienceReviewDate	2001-03-04
ScienceReviewStatus	QA at DAACs
FutureReviewDate	2001-09-04

/METADATA/COLLECTIONMETADATA/Spatial

Attribute	Example Value
SpatialCoverageType	Horizontal
WestBoundingCoordinate	-180.0
NorthBoundingCoordinate	90.0
EastBoundingCoordinate	180.0
SouthBoundingCoordinate	-90.0

/METADATA/COLLECTIONMETADATA/StorageMediumClass

Attribute	Example Value
StorageMedium	Online

/METADATA/COLLECTIONMETADATA/Temporal

Attribute	Example Value
TimeType	UTC
DateType	J2000
TemporalRangeType	Continuous Range
PrecisionofSeconds	2
EndsatPresentFlag	Y
RangeBeginningDate	2003-01-13
RangeBeginningTime	00:00:00
RangeEndingDate	2010-01-13
RangeEndingTime	00:00:00

/METADATA/INVENTORYMETADATA

Attribute	Example Value
PGEVersion	Version 1.1

Attribute	Example Value
ShortName	GLAH08
VersionID	33
RangeBeginningTime	01:51:38
RangeEndingTime	00:24:45
RangeBeginningDate	2003-11-18
RangeEndingDate	2003-11-19

/METADATA/INVENTORYMETADATA/ECSDDataGranule

Attribute	Example Value
ReprocessingPlanned	no further update anticipated
ReprocessingActual	reprocessed
LocalGranuleID	GLAH08_633_2103_002_0407_0_01_0001.H5
ProductionDateTime	2013-02-08T11:56:22
LocalVersionID	33

/METADATA/INVENTORYMETADATA/InputGranule

Attribute	Example Value
InputPointer	gla08_test.ctl, tai-utc.dat, GLA08_633_2103_002_0407_0_01_0001.P0310, DsESDTG1GLAH08.033.desc

/METADATA/INVENTORYMETADATA/MeasuredParameter

Attribute	Example Value
ParameterName	Aerosol_Layer_Heights, Planetary_Boundary_Layer

/METADATA/INVENTORYMETADATA/OrbitCalculatedSpatialDomain

Attribute	Example Value
OrbitNumber	4604, 4605, 4606, 4607, 4608, 4609, 4610, 4611, 4612, 4613, 4614, 4615, 4616, 4617, 4618
StartOrbitNumber	4604
StopOrbitNumber	4618
EquatorCrossingLongitude	-103.22287, -127.41792, -151.61336, -175.8089, 159.99582, 135.80128, 111.6064, 87.41001, 63.21418, 39.01927, 14.825027, -9.368591, -33.562866, -57.758118, -81.95212
EquatorCrossingTime	01:38:10, 03:14:50, 04:51:29, 06:28:07, 08:04:46, 09:41:25, 11:18:05, 12:54:44, 14:31:22, 16:08:02, 17:44:42, 19:21:21, 20:58:00, 22:34:38, 00:11:17

Attribute	Example Value
Name	glas_atm
Type	2
Version	6.0.1
Description	This process is an instantiation of the GLAS Science Algorithm Software (GSAS) 2 ATBDs.

/METADATA/PROVENANCE/STEP_1/ProcessInput

Attribute	Example Value
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Attribute	Example Value
Type	IN_CNTL, IN_ANC_TAIUTC, IN_GLA08, IN_ESDT
Version	0, 0, 1, 1

/METADATA/PROVENANCE/STEP_2/ProcessOutput

Attribute	Example Value
Name	out/GLAH08_633_2103_002_0407_0_01_0001.H5
Type	OUT_GLAH08
Version	1
UUID	599740C3-F062-4F49-A756-8A0DA37BC95B
DOI	10.5067/ICESAT/GLAS/DATA201

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