

GLAH09 Product Data Dictionary

File-Level (Global) Attributes

Attribute	Example Value
featureType	timeSeries
ShortName	GLAH09
title	GLAS/ICESat L2 Global Cloud Heights for Multi-layer Clouds (HDF5)
comment	The level 2 cloud layer height data with top and bottom heights, and ground heights are provided at a minimum of once per 4 seconds. Data granules will contain approximately 23 hours (14 orbits) of data.
summary	GLAH09 contains the cloud layer heights for researchers. Cloud layer height data consist of top and bottom heights for up to 10 layers below 20 km at 0.25 hz and 5 hz (40hz for below 4 km). Ground heights are provided at each resolution. Each GLAH09 file was created from an equivalent GLA09 binary file. The data used to create the GLAH09 values are contained in the equivalent GLAHxx files for the GLAxx files. See the provenance metadata for the creation of the GLA09.
license	http://nsidc.org/data/icesat/disclaimer.html
references	https://nsidc.org/data/glah02-glah07-glah08-glah09-glah10-glah11/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	2013-02-08T11:58:44

Attribute	Example Value
spatial_coverage_type	Horizontal
history	2011-06-20T15:27:20 glas_atm 6.0.1 GLA09_633_2103_002_0407_0_01_0001.DAT, 2013-02-08T11:58:44.000000Z GLA09_h5_convert Version 1.1 (February 2013) out/GLAH09_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 > Clouds > Cloud Height > Cloud Layer Heights, Earth Science > Atmosphere > Clouds > Cloud Vertical Distribution > Cloud Layer Heights
keywords_vocabulary	GCMD Science Keywords Version 6.0
standard_vocabulary_name	CF-1.6
naming_authority	http://dx.doi.org/10.5067/ICESAT/GLAS/DATA202
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/DATA202
identifier_product_type	GLAH09
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 0.25 HZ.

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_10	INTEGER (UNLIMITED)	Cloud Layer Index (NOT_SET)	NOT_SET	This array contains the cloud layer index, up to 10	Constants	NOT_SET

Group: Data_4s/Time

This group contains the 4s 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="782 1100 1224 1287"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>transmit_time ground_bounce_time</td> </tr> </tbody> </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="782 1440 1180 1575"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>not_applied applied</td> </tr> </tbody> </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									
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="782 1724 1180 1858"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>not_applied applied</td> </tr> </tbody> </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				
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="782 300 1180 436"> <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="782 583 1180 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									

Group: Data_4s/Geolocation

This group contains geolocation-related parameters.

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 0.25 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_4s
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 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	source	coordinates				
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="735 1570 1156 1707"> <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	Rel 33 GLAS Binary Data	DS_UTCTime_4s
flag values	flag_meanings									
0, 1	PAD_used PAD_not_used									

Group: Data_4s/LRCloudLayer

This group contains the(0.25HZ) Low resolution cloud layer parameters. (layers once per 4 seconds).

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
-------	-----------------------	---------------------------	-------	-------------	--------	------------

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
r_LRcld_bot	REAL (UNLIMITED, 10)	Low Resolution Cloud Bottom at 532 nm (NOT_SET)	meters	Low resolution height above the reference ellipsoid of the bottom of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The low resolution data occurs at the rate of once per 4 seconds.	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRcld_top	REAL (UNLIMITED, 10)	Low Resolution Cloud Top at 532 nm (NOT_SET)	meters	Low resolution height above the reference ellipsoid of the top of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The low resolution data occurs at the rate of once per 4 seconds.	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRcld_grd	REAL (UNLIMITED)	Low Resolution Ground Detection at 532 nm (NOT_SET)	meters	The height from the reference ellipsoid of the ground as detected by the low resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRg_cldbot_pres	REAL (UNLIMITED, 10)	Low Resolution 532 nm Cloud Bottom Pressure (NOT_SET)	hPa	Low Resolution 532 nm Cloud Bottom Pressure	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRg_cldbot_relh	REAL (UNLIMITED, 10)	Low Resolution 532 nm Cloud Bottom Relative Humidity (NOT_SET)	percent	Low Resolution 532 nm Cloud Bottom Relative Humidity	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRg_cldbot_temp	REAL (UNLIMITED, 10)	Low Resolution 532 nm Cloud Bottom Temperature (NOT_SET)	degree Celsius	Low Resolution 532 nm Cloud Bottom Temperature	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRg_cldtop_pres	REAL (UNLIMITED, 10)	Low Resolution 532 nm Cloud Top Pressure (NOT_SET)	hPa	Low Resolution 532 nm Cloud Top Pressure	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRg_cldtop_relh	REAL (UNLIMITED, 10)	Low Resolution 532 nm Cloud Top Relative Humidity (NOT_SET)	percent	Low Resolution 532 nm Cloud Top Relative Humidity	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRg_cldtop_temp	REAL (UNLIMITED, 10)	Low Resolution 532 nm Cloud Top Temperature (NOT_SET)	degree Celsius	Low Resolution 532 nm Cloud Top Temperature	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cld_bot	REAL (UNLIMITED, 10)	Elevation of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	meters	Elevation of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
r_LRir_cld_top	REAL (UNLIMITED, 10)	Elevation of Top of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	meters	Elevation of top of cloud layers detected in 1064 nm at low resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cldbot_pres	REAL (UNLIMITED, 10)	Pressure of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	hPa	Pressure of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cldbot_relh	REAL (UNLIMITED, 10)	Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm Low Resolution (NOT_SET)	percent	Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cldbot_temp	REAL (UNLIMITED, 10)	Temperature of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	degree Celsius	Temperature of Bottom of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cldtop_pres	REAL (UNLIMITED, 10)	Pressure of Top of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	hPa	Pressure of Top of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cldtop_relh	REAL (UNLIMITED, 10)	Relative Humidity of Top of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	percent	Relative Humidity of Top of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir
r_LRir_cldtop_temp	REAL (UNLIMITED, 10)	Temperature of Top of Cloud Layers Detected in 1064 nm at Low Resolution (NOT_SET)	degree Celsius	Temperature of Top of Cloud Layers Detected in 1064 nm at Low Resolution data rate (1 per 4 sec).	Rel 33 GLAS Binary Data	DS_UTCTir

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate				
i_LRC_af	INTEGER_1 (UNLIMITED)	Low Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>availability flag: Tells how many cloud layers were found at this resolution from the 532 nm channel. value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected</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>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 not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for									
i_LRC_qf	INTEGER_1 (UNLIMITED, 10)	Low Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>qf=quality flag: value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution; value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>1, 2, 3, 4, 14, 15</td> <td>low_chance moderate high no_doubt uncertain not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	1, 2, 3, 4, 14, 15	low_chance moderate high no_doubt uncertain not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
1, 2, 3, 4, 14, 15	low_chance moderate high no_doubt uncertain not_searched_for									
i_LRC_df	INTEGER_1 (UNLIMITED, 10)	Low Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>would_not_have_been_detected would_have_been_detected</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	would_not_have_been_detected would_have_been_detected	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 1	would_not_have_been_detected would_have_been_detected									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate				
i_LRCir_af	INTEGER_1 (UNLIMITED)	Low Resolution 1064 nm Cloud Layer QA Flag (NOT_SET)	NOT_SET	<p>availability flag: It provides the number of cloud layers determined from the 1064 nm data. value 0 = layers searched for but not detected; value 15 = cloud layers 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>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 not_searched_for</td> </tr> </tbody> </table>	flag values	flag meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for									
i_LRir_QAflag	INTEGER_1 (UNLIMITED, 10)	Low Resolution 1064 nm Cloud Layer QA Flag (NOT_SET)	NOT_SET	<p>quality flag: value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for but not detected; values 1-14 indicate increasing confidence of good cloud retrieval (value 1 = least confidence, value 14 = greatest confidence).</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>not_detected confidence_1 confidence_2 confidence_3 confidence_4 confidence_5 confidence_6 confidence_7 confidence_8 confidence_9 confidence_10 confidence_11 confidence_12 confidence_13 confidence_14 not_searched_for</td> </tr> </tbody> </table>	flag values	flag meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	not_detected confidence_1 confidence_2 confidence_3 confidence_4 confidence_5 confidence_6 confidence_7 confidence_8 confidence_9 confidence_10 confidence_11 confidence_12 confidence_13 confidence_14 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	not_detected confidence_1 confidence_2 confidence_3 confidence_4 confidence_5 confidence_6 confidence_7 confidence_8 confidence_9 confidence_10 confidence_11 confidence_12 confidence_13 confidence_14 not_searched_for									

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

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
DS_Cloud_Layer_10	INTEGER (UNLIMITED)	Cloud Layer Index (NOT_SET)	NOT_SET	This array contains the cloud layer index, up to 10	Constants	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 geolocation-related parameters.

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 Clouds.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_Total_CloudCov	REAL (UNLIMITED)	Total Cloud Cover (NOT_SET)	percent	Total Cloud Cover	Rel 33 GLAS Binary Data	DS_UTCTime_1
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_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

Group: Data_1HZ/Geophysical

This group contains geophysical parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_topo_elev	REAL (UNLIMITED)	Topographic elevation of surface above geoid (NOT_SET)	meters	Topographic elevation of surface above geoid based upon POD, PAD, and geoid	Rel 33 GLAS Binary Data	DS_UTCTime_1

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)	Surface 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
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)	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" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">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								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
orbit_man_flg	INTEGER_1 (UNLIMITED)	Orbit flag (NOT_SET)	NOT_SET	Maneuvers;0=no maneuvers;1=maneuvers occurred during this record; orbit degraded <table border="1"> <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)	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"> <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								
orbit_att_flg	INTEGER_1 (UNLIMITED)	Orbit flag (NOT_SET)	NOT_SET	Attitude;0=instrument attitude used for orbit;1=modelled attitude used, possible orbit degradation <table border="1"> <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)	Orbit flag (NOT_SET)	NOT_SET	Solar ray orientation;0=solar ray orientation used from measurement;1=modelled solar ray orientation, possible orbit degradation <table border="1"> <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)	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"> <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 (NOT_SET)	NOT_SET	Off-nadir angle; 0=off-nadir angle within limits;1=large off-nadir angle <table border="1"> <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								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
att_oceansw_flg	INTEGER_1 (UNLIMITED)	Attitude flag (NOT_SET)	NOT_SET	<p>Ocean sweep;0=non-ocean sweep, 1=within time frame of ocean sweep</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>non-ocean_sweep ocean_sweep</td> </tr> </tbody> </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 (NOT_SET)	NOT_SET	<p>Target of opportunity off-pointing;0=not within target of opportunity off-pointing 1=within time of target of opportunity off-pointing</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>not_TOO TOO</td> </tr> </tbody> </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_steering_flg	INTEGER_1 (UNLIMITED)	Attitude flag (NOT_SET)	NOT_SET	<p>Steering to reference track;0=not within target of opportunity off-pointing 1=within time of target of opportunity off-pointing</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>not_TOO TOO</td> </tr> </tbody> </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 (NOT_SET)	NOT_SET	<p>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</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>actual ignore</td> </tr> </tbody> </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 (NOT_SET)	NOT_SET	<p>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</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>IST_data_good IST_missing IST_noisy IST_noisy_and_missing</td> </tr> </tbody> </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 (NOT_SET)	NOT_SET	<p>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</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>GYRO_data_good GYRO_data_missing GYRO_data_noisy GYRO_data_noisy_and_missing</td> </tr> </tbody> </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	coordinates				
att_lrs_flg	INTEGER_1 (UNLIMITED)	Attitude flag (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, 2, 3, 4, 5, 6, 7</td> <td>LRS_data_good LRS_data_good_but_no_star_data LRS_data_good_but_no_laser_data 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</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7	LRS_data_good LRS_data_good_but_no_star_data LRS_data_good_but_no_laser_data 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, 2, 3, 4, 5, 6, 7	LRS_data_good LRS_data_good_but_no_star_data LRS_data_good_but_no_laser_data 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				
surf_ld_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	<p>Region type;0=no Land;1=Land</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>no_land land</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	no_land land	Rel 33 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1	no_land land									
surf_si_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	<p>Region type;0=no Sea Ice;1=Sea Ice</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>no_seaice seaice</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	no_seaice seaice	Rel 33 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1	no_seaice seaice									
surf_oc_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	<p>Region type;0=no Ocean;1=Ocean</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>no_ocean ocean</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	no_ocean ocean	Rel 33 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1	no_ocean ocean									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
surf_is_flg	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type;0=no Ice Sheet;1=Ice Sheet <table border="1" data-bbox="805 243 1214 380"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>no_icesheet icesheet</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	no_icesheet icesheet	Rel 33 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1	no_icesheet icesheet									
i_atm_char_conf	INTEGER_1 (UNLIMITED)	Atmosphere Characterization Flag Confidence (NOT_SET)	N/A	Confidence level ascribed to the atmosphere characterization flag. 0=not applicable (for contamination flag values of 9 or 10). 1: low confidence. 2: reasonable confidence. 3: high confidence. <table border="1" data-bbox="805 583 1271 829"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3</td> <td>not_applicable low_confidence reasonable_confidence high_confidence</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3	not_applicable low_confidence reasonable_confidence high_confidence	Rel 33 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2, 3	not_applicable low_confidence reasonable_confidence high_confidence									
i_atm_char_flag	INTEGER_1 (UNLIMITED)	Atmosphere Characterization Flag (NOT_SET)	NOT_SET	Flag to characterize cloud and blowing snow state of the atmosphere 0 clear 1 high cloud (> 5 km) low optical depth 2 high cloud (> 5 km), high optical depth 3 mid cloud (>2, <=5 km) low optical depth 4 mid cloud (>2, <=5 km) high optical depth 5 low cloud (> 500 m, <=2 km), low optical depth 6 low cloud (> 500 m, <=2 km), high optical depth 7 blowing snow or fog (< 500 m), low optical depth 8 blowing snow or fog (< 500 m), high optical depth 9 not tested 10 data quality insufficient to assign flag <table border="1" data-bbox="805 1285 1271 1696"> <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</td> <td>clear high_cloud_low_opt_depth high_cloud_high_opt_depth mid_cloud_low_opt_depth mid_cloud_high_opt_depth low_cloud_low_opt_depth low_cloud_high_opt_depth b_snow_or_fog_low_opt_depth b_snow_or_fog_high_opt_depth not_tested poor_quality</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	clear high_cloud_low_opt_depth high_cloud_high_opt_depth mid_cloud_low_opt_depth mid_cloud_high_opt_depth low_cloud_low_opt_depth low_cloud_high_opt_depth b_snow_or_fog_low_opt_depth b_snow_or_fog_high_opt_depth not_tested poor_quality	Rel 33 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	clear high_cloud_low_opt_depth high_cloud_high_opt_depth mid_cloud_low_opt_depth mid_cloud_high_opt_depth low_cloud_low_opt_depth low_cloud_high_opt_depth b_snow_or_fog_low_opt_depth b_snow_or_fog_high_opt_depth not_tested poor_quality									

Group: Data_1HZ/Angle

This group contains beam pointing angle information.

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

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_1HZ/Reflectivity

This group contains reflectivity information.

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

This group contains the (1HZ) medium resolution cloud layer parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
r_MRcld_bot	REAL (UNLIMITED, 10)	Medium Resolution Cloud Bottom at 532 nm (NOT_SET)	meters	Medium resolution height above the reference ellipsoid of the bottom of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The medium resolution data occurs at the rate of once per second.	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRcld_top	REAL (UNLIMITED, 10)	Medium Resolution Cloud Top at 532 nm (NOT_SET)	meters	Medium resolution height above the reference ellipsoid of the top of a cirrus, thin, or dense cloud layer in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The medium resolution data occurs at the rate of once per second.	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRg_cldbot_pres	REAL (UNLIMITED, 10)	Medium Resolution 532 nm Cloud Bottom Pressure (NOT_SET)	hPa	Medium Resolution 532 nm Cloud Bottom Pressure	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRg_cldbot_relh	REAL (UNLIMITED, 10)	Medium Resolution 532 nm Cloud Bottom Relative Humidity (NOT_SET)	percent	Medium Resolution 532 nm Cloud Bottom Relative Humidity	Rel 33 GLAS Binary Data	DS_UTCTir

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
r_MRg_cldbot_temp	REAL (UNLIMITED, 10)	Medium Resolution 532 nm Cloud Bottom Temperature (NOT_SET)	degree Celsius	Medium Resolution 532 nm Cloud Bottom Temperature	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRg_cldtop_pres	REAL (UNLIMITED, 10)	Medium Resolution 532 nm Cloud Top Pressure (NOT_SET)	hPa	Medium Resolution 532 nm Cloud Top Pressure	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRg_cldtop_relh	REAL (UNLIMITED, 10)	Medium Resolution 532 nm Cloud Top Relative Humidity (NOT_SET)	percent	Medium Resolution 532 nm Cloud Top Relative Humidity	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRg_cldtop_temp	REAL (UNLIMITED, 10)	Medium Resolution 532 nm Cloud Top Temperature (NOT_SET)	degree Celsius	Medium Resolution 532 nm Cloud Top Temperature	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRir_cld_bot	REAL (UNLIMITED, 10)	Elevation of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution (NOT_SET)	meters	Elevation of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRir_cld_top	REAL (UNLIMITED, 10)	Elevation of Top of Cloud Layers Detected in 1064 nm at Medium Resolution (NOT_SET)	meters	Elevation of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRir_cldbot_pres	REAL (UNLIMITED, 10)	Pressure of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution (NOT_SET)	hPa	Pressure of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRir_cldbot_relh	REAL (UNLIMITED, 10)	Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm at MR (NOT_SET)	percent	Relative Humidity of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir
r_MRir_cldbot_temp	REAL (UNLIMITED, 10)	Temperature of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution (NOT_SET)	degree Celsius	Temperature of Bottom of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate				
r_MRir_cldtop_pres	REAL (UNLIMITED, 10)	Pressure of Top of Cloud Layers Detected in 1064 nm at Medium Resolution (NOT_SET)	hPa	Pressure of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir				
r_MRir_cldtop_relh	REAL (UNLIMITED, 10)	Relative Humidity of Top of Cloud Layers in 1064 nm at Medium Resolution (NOT_SET)	percent	Relative Humidity of Top of Cloud Layers in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir				
r_MRir_cldtop_temp	REAL (UNLIMITED, 10)	Temperature of Top of Cloud Layers Detected in 1064 nm at Medium Resolution (NOT_SET)	degree Celsius	Temperature of Top of Cloud Layers Detected in 1064 nm at Medium Resolution data rate.	Rel 33 GLAS Binary Data	DS_UTCTir				
r_MRcld_grd	REAL (UNLIMITED)	Medium Resolution Ground Detection at 532 nm (NOT_SET)	meters	The height above the reference ellipsoid of the ground as detected by the medium resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.	Rel 33 GLAS Binary Data	DS_UTCTir				
i_MRC_af	INTEGER_1 (UNLIMITED)	Medium Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>Availability flag: Tells how many cloud layers were found at this resolution. The total number of layers found is the sum of those found using the 532 channel and the 1064 channel (thus, this number will generally be larger than the actual number of layers present). value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected</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>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 not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate				
i_MRC_qf	INTEGER_1 (UNLIMITED, 10)	Medium Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>Quality flag: value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for but not detected; value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4, 15</td> <td>not_detected low_chance moderate high no_doubt not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 15	not_detected low_chance moderate high no_doubt not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 1, 2, 3, 4, 15	not_detected low_chance moderate high no_doubt not_searched_for									
i_MRC_uf	INTEGER_1 (UNLIMITED, 10)	Medium Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>Use flag: Tells which channel was used to detect the layer; value 0 = cloud layer was derived from 532 channel data; value 2 = cloud layer was derived from the 1064 channel data</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 2</td> <td>532_channel_data 1064_channel_data</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 2	532_channel_data 1064_channel_data	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 2	532_channel_data 1064_channel_data									
i_MRC_df	INTEGER_1 (UNLIMITED, 10)	Medium Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>Diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>would_not_have_been_detected would_have_been_detected</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	would_not_have_been_detected would_have_been_detected	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 1	would_not_have_been_detected would_have_been_detected									
i_MRCir_af	INTEGER_1 (UNLIMITED)	Medium Resolution 1064 nm Cloud Layer QA Flag (NOT_SET)	NOT_SET	<p>Availability flag. It provides the number of cloud layers determined from the 1064 nm data. value 0 = layers searched for but not detected; value 15 = cloud layers 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>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 not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate																						
i_MRir_QAflag	INTEGER_1 (UNLIMITED, 10)	Medium Resolution 1064 nm Cloud Layer QA Flag (NOT_SET)	NOT_SET	Quality flag: value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for but not detected; values 1-14 indicate increasing confidence of good cloud retrieval (value 1 = least confidence, value 14 = greatest confidence). <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1,</td> <td>not_detected</td> </tr> <tr> <td>2, 3,</td> <td>confidence_1 confidence_2 confidence_3</td> </tr> <tr> <td>4, 5,</td> <td>confidence_4 confidence_5</td> </tr> <tr> <td>6, 7,</td> <td>confidence_6 confidence_7</td> </tr> <tr> <td>8, 9,</td> <td>confidence_8 confidence_9</td> </tr> <tr> <td>10,</td> <td>confidence_10 confidence_11</td> </tr> <tr> <td>11,</td> <td>confidence_12 confidence_13</td> </tr> <tr> <td>12,</td> <td>confidence_14</td> </tr> <tr> <td>13,</td> <td>not_searched_for</td> </tr> <tr> <td>14, 15</td> <td></td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1,	not_detected	2, 3,	confidence_1 confidence_2 confidence_3	4, 5,	confidence_4 confidence_5	6, 7,	confidence_6 confidence_7	8, 9,	confidence_8 confidence_9	10,	confidence_10 confidence_11	11,	confidence_12 confidence_13	12,	confidence_14	13,	not_searched_for	14, 15		Rel 33 GLAS Binary Data	DS_UTCTir
flag values	flag_meanings																											
0, 1,	not_detected																											
2, 3,	confidence_1 confidence_2 confidence_3																											
4, 5,	confidence_4 confidence_5																											
6, 7,	confidence_6 confidence_7																											
8, 9,	confidence_8 confidence_9																											
10,	confidence_10 confidence_11																											
11,	confidence_12 confidence_13																											
12,	confidence_14																											
13,	not_searched_for																											
14, 15																												
r_MRcld_pct	REAL (UNLIMITED, 10)	Percentage of Saturated Bins in Medium Resolution Cloud Layers at 532 nm (NOT_SET)	NOT_SET	Percentage of saturated bins in medium resolution cloud layers	Rel 33 GLAS Binary Data	DS_UTCTir																						

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
DS_Cloud_Layer_10	INTEGER (UNLIMITED)	Cloud Layer Index (NOT_SET)	NOT_SET	This array contains the cloud layer index, up to 10	Constants	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

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
i_shot_count	INTEGER (UNLIMITED)	GLAS shot counter (NOT_SET)	NOT_SET	Identifies each laser shot within a record index. A combination of <i>i_rec_ndx</i> and <i>i_shot_count</i> 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 geolocation-related parameters.

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/BlowingSnow5hz

This group contains the 5HZ blowing snow parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_blow_snow_erd	REAL (UNLIMITED)	Blowing Snow Range Delay (NOT_SET)	millimeters	An estimate of the range delay caused by blowing snow.	Rel 33 GLAS Binary Data	DS_UTCTime_5
r_blow_snow_ht	REAL (UNLIMITED)	Blowing Snow Height (NOT_SET)	meters	Represents the maximum height above the surface of the blowing snow layer.	Rel 33 GLAS Binary Data	DS_UTCTime_5
r_blow_snow_od	REAL (UNLIMITED)	Blowing Snow Optical Depth (NOT_SET)	NOT_SET	An estimate of the optical depth of the blowing snow layer.	Rel 33 GLAS Binary Data	DS_UTCTime_5

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates																						
i_blow_snow_conf	INTEGER_1 (UNLIMITED)	Blowing Snow Confidence (NOT_SET)	NOT_SET	<p>A number that indicates the degree of confidence that this is indeed blowing snow. Blowing snow confidence ranges from 0 - 15 and has the following meanings: 0: profile tested, but no blowing snow detected 1 - 5: Good blowing snow detection using the 1064 channel. 1 is lowest confidence that layer is blowing snow, 5 is highest confidence. 6: Layer suspected of being low cloud (such as fog), or seemingly too thick to be blowing snow (> 1.0 km thick) as determined from 1064 channel. 7 - 12: Good blowing snow detection using the 532 channel. 7 is lowest confidence that layer is blowing snow, 12 is highest confidence. 13: Layer suspected of being low cloud (such as fog), or seemingly too thick to be blowing snow (> 1.0 km thick) as determined from 532 channel. 14: Wind speed < 5 m/s or ground stroke not detected (the latter case indicating overlying thick cloud) 15: Signal not examined for blowing snow (could be because it is closer to the equator than plus or minus 60 degrees latitude, or not over sea ice or land)</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1,</td> <td>no_b_s good_b_s_1064_1</td> </tr> <tr> <td>2, 3,</td> <td>good_b_s_1064_2</td> </tr> <tr> <td>4, 5,</td> <td>good_b_s_1064_3</td> </tr> <tr> <td>6, 7,</td> <td>good_b_s_1064_4</td> </tr> <tr> <td>8, 9,</td> <td>good_b_s_1064_5</td> </tr> <tr> <td>10,</td> <td>suspctd_low_cl_1064</td> </tr> <tr> <td>11,</td> <td>good_b_s_532_7</td> </tr> <tr> <td>12,</td> <td>good_b_s_532_8</td> </tr> <tr> <td>13,</td> <td>good_b_s_532_9</td> </tr> <tr> <td>14, 15</td> <td>good_b_s_532_10 good_b_s_532_11 good_b_s_532_12 suspctd_low_cl_532 low_wind_sp_thick_cloud sig_not_exam</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1,	no_b_s good_b_s_1064_1	2, 3,	good_b_s_1064_2	4, 5,	good_b_s_1064_3	6, 7,	good_b_s_1064_4	8, 9,	good_b_s_1064_5	10,	suspctd_low_cl_1064	11,	good_b_s_532_7	12,	good_b_s_532_8	13,	good_b_s_532_9	14, 15	good_b_s_532_10 good_b_s_532_11 good_b_s_532_12 suspctd_low_cl_532 low_wind_sp_thick_cloud sig_not_exam	Rel 33 GLAS Binary Data	DS_UTCTime_5
flag values	flag_meanings																											
0, 1,	no_b_s good_b_s_1064_1																											
2, 3,	good_b_s_1064_2																											
4, 5,	good_b_s_1064_3																											
6, 7,	good_b_s_1064_4																											
8, 9,	good_b_s_1064_5																											
10,	suspctd_low_cl_1064																											
11,	good_b_s_532_7																											
12,	good_b_s_532_8																											
13,	good_b_s_532_9																											
14, 15	good_b_s_532_10 good_b_s_532_11 good_b_s_532_12 suspctd_low_cl_532 low_wind_sp_thick_cloud sig_not_exam																											

Group: Data_5HZ/HRCLOUDLayer

This group contains the 5HZ high resolution cloud layer parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_HRcld_grd	REAL (UNLIMITED)	High Resolution Ground Detection at 532 nm (NOT_SET)	meters	The height above the reference ellipsoid of the ground as detected by the high resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.	Rel 33 GLAS Binary Data	DS_UTCTime_5
r_HRcld_bot	REAL (UNLIMITED, 10)	High Resolution Cloud Bottom at 532 nm (NOT_SET)	meters	High resolution height above the reference ellipsoid of the bottom of a cirrus, thin, or dense cloud layer below 10KM in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The high resolution data occurs at the rate of 5 per second.	Rel 33 GLAS Binary Data	DS_UTCTime_5

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
r_HRcld_top	REAL (UNLIMITED, 10)	High Resolution Cloud Top at 532 nm (NOT_SET)	meters	High resolution height above the reference ellipsoid of the top of a cirrus, thin, or dense cloud layer below 10 KM in the atmosphere. There can be up to 10 cloud layers in an atmospheric profile. The high resolution data occurs at the rate of 5 per second.	Rel 33 GLAS Binary Data	DS_UTCTime_5				
i_HRC_af	INTEGER_1 (UNLIMITED)	High Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	availability flag: Tells how many cloud layers were found (from the 532 channel) at this resolution. value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected <table border="1" data-bbox="760 506 1240 919"> <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>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 not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTime_5
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for									
i_HRC_qf	INTEGER_1 (UNLIMITED, 10)	High Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	quality flag: value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution; value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected. <table border="1" data-bbox="760 1209 1240 1425"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>1, 2, 3, 4, 14, 15</td> <td>low_chance moderate high no_doubt uncertain not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	1, 2, 3, 4, 14, 15	low_chance moderate high no_doubt uncertain not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTime_5
flag values	flag_meanings									
1, 2, 3, 4, 14, 15	low_chance moderate high no_doubt uncertain not_searched_for									
i_HRC_df	INTEGER_1 (UNLIMITED, 10)	High Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight <table border="1" data-bbox="760 1631 1240 1818"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>would_not_have_been_detected would_have_been_detected</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	would_not_have_been_detected would_have_been_detected	Rel 33 GLAS Binary Data	DS_UTCTime_5
flag values	flag_meanings									
0, 1	would_not_have_been_detected would_have_been_detected									

Group: /Data_40HZ

This group contains the 40hz rate data.

Dimension Scales

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
DS_UTCTime_40	DOUBLE (UNLIMITED)	Transmit Time of First Shot in frame in J2000 (time)	seconds	The transmit time of each 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_40HZ/Time

This group contains the 40HZ 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_40
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_40

Group: Data_40HZ/Geolocation

This group contains geolocation-related parameters.

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 40 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_40
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 40 hertz rate.	Rel 33 GLAS Binary Data	DS_UTCTime_40

Group: Data_40HZ/FRCloudLayer

This group contains the (40HZ) full resolution cloud layer parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_FRg_grd_sig	REAL (UNLIMITED)	Full Resolution Ground Return Signal at 532 nm (NOT_SET)	1/(m-sr)	Ground return signal from the 532 nm backscatter profile at the height that the ground return is detected.	Rel 33 GLAS Binary Data	DS_UTCTime_40
r_FRir_grd_sig	REAL (UNLIMITED)	Full Resolution Ground Return Signal at 1064 nm (NOT_SET)	1/(m-sr)	Ground return signal from the 1064 nm backscatter profile at the height that the ground return is detected.	Rel 33 GLAS Binary Data	DS_UTCTime_40

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
i_FRir_qaFlag	INTEGER_1 (UNLIMITED)	Full Resolution 1064 Quality Flag (NOT_SET)	NOT_SET	<p>Full Resolution 1064 Quality Flag. Value 0 - 12 = Cloud detected by cloud search algorithm with higher numbers indicating a stronger average signal from the region starting at cloud top and extending 500 m below cloud top height. Value 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (<i>i_FRir_intsig</i>) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (<i>i_FRir_cldtop</i>) is set to a value of 10.0 km. Value 14 = Indicates the likely presence of low clouds (< 150 m) based on elevated signal from the two bins above the ground return bin that were not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (<i>i_FRir_cldtop</i>) is set to a value of 0.10 km. Value 15 = No clouds.</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>cloud_det_0 cloud_det_1 cloud_det_2 cloud_det_3 cloud_det_4 cloud_det_5 cloud_det_6 cloud_det_7 cloud_det_8 cloud_det_9 cloud_det_10 cloud_det_11 cloud_det_12 possible_clouds low_clouds no_clouds</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	cloud_det_0 cloud_det_1 cloud_det_2 cloud_det_3 cloud_det_4 cloud_det_5 cloud_det_6 cloud_det_7 cloud_det_8 cloud_det_9 cloud_det_10 cloud_det_11 cloud_det_12 possible_clouds low_clouds no_clouds	Rel 33 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	cloud_det_0 cloud_det_1 cloud_det_2 cloud_det_3 cloud_det_4 cloud_det_5 cloud_det_6 cloud_det_7 cloud_det_8 cloud_det_9 cloud_det_10 cloud_det_11 cloud_det_12 possible_clouds low_clouds no_clouds									
i_FRC_af	INTEGER_1 (UNLIMITED)	Full Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	<p>Availability flag: Tells how many cloud layers were found (from the 532 channel) at this resolution. value 15 = cloud layers were not searched for; value 0 = cloud layers were searched for, but not detected.</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>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 not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	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 not_searched_for									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
i_FRC_qf	INTEGER_1 (UNLIMITED)	Full Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	Quality flag: value 15 = cloud layers were not searched for - either bad data or cloud layers were not found at a coarser resolution; value 1 = low chance of being a cloud; value 2 = moderate; value 3 = high; value 4 = no doubt -- based upon noise-to-signal and geometric thickness evaluation; Value 14 = height of bottom of lowest detected layer in profile very uncertain because ground signal was not detected. <table border="1" data-bbox="792 436 1258 655"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>1, 2, 3, 4, 14, 15</td> <td>low_chance moderate high no_doubt uncertain not_searched_for</td> </tr> </tbody> </table>	flag values	flag_meanings	1, 2, 3, 4, 14, 15	low_chance moderate high no_doubt uncertain not_searched_for	Rel 33 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
1, 2, 3, 4, 14, 15	low_chance moderate high no_doubt uncertain not_searched_for									
i_FRC_df	INTEGER_1 (UNLIMITED)	Full Resolution Cloud Layers Flag for 532 nm (NOT_SET)	NOT_SET	Diurnal flag: This tells whether a given layer would be detected during normal daylight conditions. value 0 = layer would not have been detected in typical daytime background; value 1 = layer would have been detected in daylight. <table border="1" data-bbox="792 856 1258 1054"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>would_not_have_been_detected would_have_been_detected</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	would_not_have_been_detected would_have_been_detected	Rel 33 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	would_not_have_been_detected would_have_been_detected									
r_FRcld_bot	REAL (UNLIMITED)	Full Resolution Cloud Bottom at 532 nm (NOT_SET)	meters	The height above the reference ellipsoid to the bottom of the full resolution cloud layer (40 Hz). This resolution cloud search is independent of the lower resolution cloud search results and is done for each 40 Hz shot regardless of whether or not clouds were detected at the lower resolutions. Note that the 40 Hz data is available only below 10 km, and thus clouds existing above that level cannot be detected at the 40 Hz resolution.	Rel 33 GLAS Binary Data	DS_UTCTime_40				
r_FRcld_grd	REAL (UNLIMITED)	Full Resolution Cloud Ground Detection at 532 nm (NOT_SET)	meters	The height above the reference ellipsoid of the ground as detected by the full resolution cloud processing algorithms. A value of -127 indicates that the ground was searched for, but not detected.	Rel 33 GLAS Binary Data	DS_UTCTime_40				
r_FRcld_top	REAL (UNLIMITED)	Full Resolution Cloud Top at 532 nm (NOT_SET)	meters	The height above the reference ellipsoid to the top of the full resolution cloud layer (40 Hz). This resolution cloud search is independent of the lower resolution cloud search results and is done for each 40 Hz shot regardless of whether or not clouds were detected at the lower resolutions. Note that the 40 Hz data is available only below 10 km, and thus clouds existing above that level cannot be detected at the 40 Hz resolution.	Rel 33 GLAS Binary Data	DS_UTCTime_40				
r_FRir_cldtop	REAL (UNLIMITED)	Full Resolution 1064 Cloud Top (NOT_SET)	meters	Full resolution (40 Hz) cloud top height obtained from the 1064 atmospheric channel. This parameter is for a 4 second record. Also parameter is in GLA06, 12-15.	Rel 33 GLAS Binary Data	DS_UTCTime_40				

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
r_FRir_intsig	REAL (UNLIMITED)	Full Resolution 1064 Integrated Signal (NOT_SET)	1/(m-sr)	Though called 'integrated signal' this is actually an average of all bins in the above-ground portion of the 1064 40 Hz profile with values above the threshold of 1.0e-7 (1/(m-sr). This parameter is for a 4 second record. This parameter is also in GLA06, 12-15.	Rel 33 GLAS Binary Data	DS_UTCTime_4

/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
sc_osc_rate	0.99999998854809
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, 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=gla09_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
ShortName	GLAH09
LongName	GLAS/ICESat L2 Global Cloud Heights for Multi-layer Clouds (HDF5)
CollectionDescription	The level 2 cloud layer height data with top and bottom heights, and ground heights are 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
Track	AdditionalAttributesContainer
Instrument_State	AdditionalAttributesContainer
ReferenceOrbit	AdditionalAttributesContainer
SP_ICE_PATH_NO	AdditionalAttributesContainer
SP_ICE_GLAS_StartBlock	AdditionalAttributesContainer

Attribute	Example Value
SP_ICE_GLAS_EndBlock	AdditionalAttributesContainer
Cycle	AdditionalAttributesContainer
Instance	AdditionalAttributesContainer
Instrument_State_Date	AdditionalAttributesContainer
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
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/PercentGroundHit

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

Attribute	Example Value
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/DATA202

/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
ParameterValue	http://dx.doi.org/10.5067/ICESAT/GLAS/DATA202

/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

Attribute	Example Value
GLAH02	CollectionAssociationContainer
GLAH07	CollectionAssociationContainer
GLAH08	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/GLAH08

Attribute	Example Value
CollectionType	Dependent
CollectionUse	Level 2 file containing: planetary boundary layer heights and aerosol layer top and bottom.

Attribute	Example Value
ShortName	GLAH08
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

Attribute	Example Value
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
Hancock	ContactPersonContainer
Schutz	ContactPersonContainer
Zwally	ContactPersonContainer
DiMarzio	ContactPersonContainer

/METADATA/COLLECTIONMETADATA/ContactPerson/DiMarzio

Attribute	Example Value
Role	Producer

Attribute	Example Value
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
ContactMiddleName	W.
ContactLastName	Hancock
StreetAddress	Building N-159, NASA/GSFC Wallops Flight Facility.
City	Wallops Island
StateProvince	Virginia
PostalCode	23337
Country	USA

Attribute	Example Value
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

Attribute	Example Value
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	Clouds
ECSVariableKeyword	Cloud Vertical Distribution

/METADATA/COLLECTIONMETADATA/DisciplineTopicParameters/Atmosphere/ECSParameter

Attribute	Example Value
ECSParameterKeyword	Cloud Layer Heights

/METADATA/COLLECTIONMETADATA/ECSCollection

Attribute	Example Value
RevisionDate	2012-06-25
SuggestedUsage	GLAH09 contains the cloud layer heights for researchers. Cloud layer height data consist of top and bottom heights for up to 10 layers below 20 km at 0.25 hz and 5 hz (40hz for below 4 km). Ground heights are provided at each resolution. Each GLAH09 file was created from an equivalent GLA09 binary file. The data used to create the GLAH09 values are contained in the equivalent GLAHxx files for the GLAxx files. See the provenance metadata for the creation of the GLA09.
ProcessingCenter	GSFC I-SIPS
ArchiveCenter	NSIDC

Attribute	Example Value
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
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
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
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
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

Attribute	Example Value
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
ShortName	GLAH09
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

Attribute	Example Value
ReprocessingActual	reprocessed
LocalGranuleID	GLAH09_633_2103_002_0407_0_01_0001.H5
ProductionDateTime	2013-02-08T11:58:44
LocalVersionID	33

/METADATA/INVENTORYMETADATA/InputGranule

Attribute	Example Value
InputPointer	gla09_test.ctl, tai-utc.dat, GLAH09_633_2103_002_0407_0_01_0001.P0310, DsESDTG1GLAH09.033.desc

/METADATA/INVENTORYMETADATA/MeasuredParameter

Attribute	Example Value
ParameterName	532_Cloud_Layer_Heights, 1064_Cloud_Layer_Heights

/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
EquatorCrossingDate	2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-18, 2003-11-19

/METADATA/INVENTORYMETADATA/ProductSpecificMetadata

Attribute	Example Value
PercentGroundHit	0
Track	407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421
Instrument_State	373338
ReferenceOrbit	1
SP_ICE_PATH_NO	3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443
SP_ICE_GLAS_StartBlock	NOT SET

Attribute	Example Value
SP_ICE_GLAS_EndBlock	NOT SET
Cycle	2
Instance	3
Instrument_State_Date	2003-10-30
Instrument_State_Time	00:00:00
identifier_product_doi	10.5067/ICESAT/GLAS/DATA202
identifier_file_uuid	599740C3-F062-4F49-A756-8A0DA37BC95B
identifier_product_doi_authority	http://dx.doi.org/10.5067/ICESAT/GLAS/DATA202

/METADATA/PROVENANCE

/METADATA/PROVENANCE/STEP_1

Attribute	Example Value
ProcessDateTime	2011-06-20T15:27:20

/METADATA/PROVENANCE/STEP_1/ProcessAgent

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
-----------	---------------

Attribute	Example Value
Type	IN_CNTL, IN_ANC_TAIUTC, IN_GLA09, IN_ESDT
Version	0, 0, 1, 1

/METADATA/PROVENANCE/STEP_2/ProcessOutput

Attribute	Example Value
Name	out/GLAH09_633_2103_002_0407_0_01_0001.H5
Type	OUT_GLAH09
Version	1
UUID	599740C3-F062-4F49-A756-8A0DA37BC95B
DOI	10.5067/ICESAT/GLAS/DATA202

Page last updated: 02/21/2013

