

## GLAH15 Product Data Dictionary

## File-Level (Global) Attributes

Attribute	Example Value
<b>featureType</b>	timeSeries
<b>ShortName</b>	GLAH15
<b>title</b>	GLAS/ICESat L2 Ocean Altimetry Data (HDF5)
<b>comment</b>	GLAH15 contains the ocean elevation and small-scale roughness corrected for geodetic and atmospheric affects, calculated from algorithms fine-tuned for ocean returns. Data granules will contain 14 orbits of data over the oceans.
<b>summary</b>	GLAH15 contains ocean elevation and small-scale roughness data for researchers. Includes the geolocation, reflectance, and the geodetic, instrument, and atmospheric corrections. Parameters are at the full 40Hz resolution within the ICESat ocean mask. Each GLAH15 file was created from an equivalent GLA15 binary file. The data used to create the GLAH15 values are contained in the equivalent GLAHxx files for the GLAxx files. See the provenance metadata for the creation of the GLA15.
<b>license</b>	<a href="https://nsidc.org/data/icesat/disclaimer.html">https://nsidc.org/data/icesat/disclaimer.html</a>
<b>references</b>	<a href="https://nsidc.org/data/glah01-glah05-glah06-glah12-glah13-glah14-glah15/versions/34/documentation">https://nsidc.org/data/glah01-glah05-glah06-glah12-glah13-glah14-glah15/versions/34/documentation</a> (Guide Document for this product at NSIDC), <a href="https://nsidc.org/data/icesat/">https://nsidc.org/data/icesat/</a> (GLAS Product page at NSIDC)
<b>AccessConstraints</b>	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.
<b>CitationforExternalPublication</b>	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.
<b>contributor_role</b>	Data Originator, Investigator, Producer, Producer
<b>contributor_name</b>	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)
<b>creator_name</b>	ICESat Science Investigator-led Processing System (I-SIPS)
<b>creator_email</b>	David.W.Hancock@nasa.gov
<b>publisher_name</b>	NSIDC User Services
<b>publisher_email</b>	nsidc@nsidc.org
<b>publisher_url</b>	<a href="https://nsidc.org/data/icesat/">https://nsidc.org/data/icesat/</a>
<b>platform</b>	Ice, Cloud, and Land Elevation Satellite (ICESat)
<b>instrument</b>	Geoscience Laser Altimeter System (GLAS)
<b>processing_level</b>	2

Attribute	Example Value
<b>date_created</b>	2014-08-18T22:32:58
<b>spatial_coverage_type</b>	Horizontal
<b>history</b>	2014-05-24T04:16:41 glas_alt 6.1 GLA15_634_2103_002_0407_0_01_0001.DAT, 2014-08-18T22:32:58.000000Z GLA15_h5_convert Version 1.4 (July 2014) /GLAH15_634_2103_002_0407_0_01_0001.H5
<b>geospatial_lat_min</b>	-90.0
<b>geospatial_lat_max</b>	90.0
<b>geospatial_lon_min</b>	-180.0
<b>geospatial_lon_max</b>	180.0
<b>geospatial_lat_units</b>	degrees_north
<b>geospatial_lon_units</b>	degrees_east
<b>keywords</b>	Earth Science > Oceans > Sea Surface Topography > Sea Surface Height > Laser Reflectance, Earth Science > Oceans > Ocean Optics > Reflectance > Laser Reflectance, Earth Science > Oceans > Sea Surface Topography > Sea Surface Slope
<b>keywords_vocabulary</b>	GCMD Science Keywords Version 6.0
<b>standard_name_vocabulary</b>	not_set
<b>naming_authority</b>	<a href="http://dx.doi.org/10.5067/ICESAT/GLAS/DATA212">http://dx.doi.org/10.5067/ICESAT/GLAS/DATA212</a>
<b>project</b>	Ice, Cloud, and Land Elevation Satellite (GLAS_HDF)
<b>time_type</b>	UTC
<b>date_type</b>	J2000
<b>time_coverage_start</b>	2003-11-18T01:51:38
<b>time_coverage_end</b>	2003-11-19T00:24:44
<b>time_coverage_duration</b>	81280
<b>source</b>	Satellite Measurements
<b>HDFVersion</b>	HDF5 1.8.9
<b>identifier_file_uuid</b>	aab67684-df3a-4253-b01b-a3de6a5dc1eb
<b>identifier_product_doi</b>	10.5067/ICESAT/GLAS/DATA212
<b>identifier_product_type</b>	GLAH15
<b>identifier_product_format_version</b>	1.0
<b>Conventions</b>	CF-1.6

Attribute	Example Value
<b>institution</b>	National Aeronautics and Space Administration (NASA)

## Group: /Data\_1HZ

This group contain 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
<b>DS_UTCTime_1</b>	DOUBLE (UNLIMITED)	Transmit Time of First Shot in frame in J2000 (time)	seconds since 2000-01-01 12:00:00 UTC	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 34 GLAS Binary Data	NOT_SET

### Group: Data\_1HZ/Time

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

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>i_rec_ndx</b>	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 34 GLAS Binary Data	DS_UTCTime_1				
<b>i_shot_count</b>	INTEGER (UNLIMITED)	GLAS shot counter (NOT_SET)	NOT_SET	Identifies each laser shot within a record index. A combination of <code>i_rec_ndx</code> and <code>i_shot_count</code> can be used to uniquely identify each GLAS laser shot.	Rel 34 GLAS Binary Data	DS_UTCTime_1				
<b>d_transtime</b>	DOUBLE (UNLIMITED)	One way transit time (NOT_SET)	seconds	One way transit time calculated using the preliminary range offset. This is added to the UTC time tag to get the ground bounce times at which to calculate the orbit.	Rel 34 GLAS Binary Data	DS_UTCTime_1				
<b>d_deltagpstmcor</b>	DOUBLE (UNLIMITED)	Delta GPS time correction (NOT_SET)	seconds	The high frequency delta GPS time correction calculated during the precision orbit processing step.	Rel 34 GLAS Binary Data	DS_UTCTime_1				
<b>shot_time_flg</b>	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Shot time flag; Indicates what shot time is used. <table border="1" data-bbox="812 1675 1237 1864"> <tbody> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	transmit_time ground_bounce_time									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>gps_time_flg</b>	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	GPS time flag; Indicates if delta gps time correction is applied to shot time. <table border="1" data-bbox="812 273 1214 409"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_applied applied</td> </tr> </table>	flag values	flag_meanings	0, 1	not_applied applied	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	not_applied applied									
<b>pl_timing_flg</b>	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Post-launch timing; indicates if post-launch timing bias is applied. Data value is stored in the Metadata group. <table border="1" data-bbox="812 562 1214 699"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_applied applied</td> </tr> </table>	flag values	flag_meanings	0, 1	not_applied applied	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	not_applied applied									
<b>ddelay_flg</b>	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Digitizer turn-on delay flag; Indicates if digitizer turn-on delay is accounted for in shot time. Data value is stored in the Metadata group. <table border="1" data-bbox="812 852 1214 989"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>peaktp_flg</b>	INTEGER_1 (UNLIMITED)	time correction flag (NOT_SET)	NOT_SET	Peak of transmit pulse flag; Indicates if time to peak of transmit pulse is accounted for in shot time. <table border="1" data-bbox="812 1142 1214 1278"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									

**Group: Data\_1HZ/Geolocation**

This group contains geolocation-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_lat</b>	DOUBLE (UNLIMITED)	Spot 1 Coordinate Data, Latitude Corrected (latitude)	degrees_north	The geodetic latitude of the laser spot computed from the Precision orbit, precision attitude, and ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The values are in degrees north.	Rel 34 GLAS Binary Data	DS_UTCTime_1
<b>d_lon</b>	DOUBLE (UNLIMITED)	Spot 1 Coordinate Data, Longitude Corrected (longitude)	degrees_east	The longitude of the laser spot computed from the Precision orbit, precision attitude, and ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The values are in degrees east.	Rel 34 GLAS Binary Data	DS_UTCTime_1

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
i_track	INTEGER (UNLIMITED)	Track (NOT_SET)	NOT_SET	The track number.	Rel 34 GLAS Binary Data	DS_UTCTime_1

**Group: Data\_1HZ/Packet\_data**

This group contains flags indicating packet availability.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
apid_ADLg_1_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer large wf packet APID availability flag for 1st 10 shots <table border="1" data-bbox="812 646 1271 837"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_ADLg_2_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer large wf packet APID availability flag for 2nd 10 shots <table border="1" data-bbox="812 961 1271 1152"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_ADLg_3_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer large wf packet APID availability flag for 3rd 10 shots <table border="1" data-bbox="812 1276 1271 1467"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_ADLg_4_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer large wf packet APID availability flag for 4th 10 shots <table border="1" data-bbox="812 1591 1271 1782"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>apid_ADSm_1_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer small wf packet APID availability flag for 1st 10 shots <table border="1" data-bbox="812 273 1271 468"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ADSm_2_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer small wf packet APID availability flag for 2nd 10 shots <table border="1" data-bbox="812 594 1271 789"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ADSm_3_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer small wf packet APID availability flag for 3rd 10 shots <table border="1" data-bbox="812 915 1271 1110"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ADSm_4_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer small wf packet APID availability flag for 4th 10 shots <table border="1" data-bbox="812 1236 1271 1432"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_PC532_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	532 Photon counter packet APID availability flag <table border="1" data-bbox="812 1518 1271 1713"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_CD1064_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	1064 Cloud Digitizer packet APID availability flag <table border="1" data-bbox="812 1808 1271 2003"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>apid_ADSci_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Ancillary science packet APID availability flag <table border="1" data-bbox="812 247 1271 441"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ASAD_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Altimeter Digitizer telemetry data in Ancillary science packet APID availability flag <table border="1" data-bbox="812 562 1271 756"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ASPC_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Photon counter telemetry data in Ancillary science packet APID availability flag <table border="1" data-bbox="812 877 1271 1071"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ASCF_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Cloud Digitizer telemetry data in Ancillary science packet APID availability flag <table border="1" data-bbox="812 1192 1271 1386"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_ASCT_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	C&T board telem. data in Ancillary science packet APID availability flag <table border="1" data-bbox="812 1507 1271 1701"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
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Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
apid_CT20_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	CT HW telemetry packet #1 (APID 20) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_CT21_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	CT HW telemetry packet #2 (APID 21) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_CT22_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	CT HW telemetry packet #3 (APID 22) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_CT23_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	CT HW telemetry packet #4 (APID 23) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_CT50_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	CT HW telemetry packet #5 (APID 50) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
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0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									



Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>apid_SS24_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Small software telemetry packet #1 (APID 24) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_LS25_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Large software telemetry packet #1 (APID 25) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_LS55_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	Large software telemetry packet #2 (APID 55) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_GPS_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	GPS telemetry packet APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_PRAP_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	S/C position, rate, and attitude telemetry packet (PRAP) APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
<b>apid_LPA_1_flg</b>	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	LPA packet #1 APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
apid_LPA_2_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	LPA packet #2 APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_LPA_3_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	LPA packet #3 APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									
apid_LPA_4_flg	INTEGER_1 (UNLIMITED)	APID Data Availability Flag (NOT_SET)	NOT_SET	LPA packet #4 APID availability flag <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>present filled_at_EDOS never_received_ISIPS_filled</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2	present filled_at_EDOS never_received_ISIPS_filled									

**Group: Data\_1HZ/Quality**

This group contains quality-related parameters and flags.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
orbit_pred_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Predicted or precision orbit flag. <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>precision_orbit_used predicted_orbit_used onboard_orbit_used</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	precision_orbit_used predicted_orbit_used onboard_orbit_used	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1, 2	precision_orbit_used predicted_orbit_used onboard_orbit_used								
orbit_man_flg	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Maneuver flag. If maneuvers occurred orbit is considered degraded. <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_maneuvers maneuvers_occurred_during_this_record</td> </tr> </table>	flag values	flag_meanings	0, 1	no_maneuvers maneuvers_occurred_during_this_record	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	no_maneuvers maneuvers_occurred_during_this_record								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
<b>orbit_model_flg</b>	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Model problems flag. <code>model_problems</code> indicated when orbit RMS > 5 cm; indicates required accuracy not met. <table border="1" data-bbox="824 275 1377 411"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_model_problems model_problems</td> </tr> </table>	flag values	flag_meanings	0, 1	no_model_problems model_problems	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	no_model_problems model_problems								
<b>orbit_att_flg</b>	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Attitude flag; <code>modeled_attitude_used</code> indicates possible orbit degradation. <table border="1" data-bbox="824 537 1399 730"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>instrument_attitude_used_for_orbit modeled_attitude_used</td> </tr> </table>	flag values	flag_meanings	0, 1	instrument_attitude_used_for_orbit modeled_attitude_used	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	instrument_attitude_used_for_orbit modeled_attitude_used								
<b>orbit_array_flg</b>	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	Solar ray orientation flag; <code>modeled_solar_ray_orientation</code> indicates possible orbit degradation. <table border="1" data-bbox="824 856 1399 1075"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>solar_ray_orientation_used_from measurement modeled_solar_ray_orientation</td> </tr> </table>	flag values	flag_meanings	0, 1	solar_ray_orientation_used_from measurement modeled_solar_ray_orientation	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	solar_ray_orientation_used_from measurement modeled_solar_ray_orientation								
<b>orbit_gps_flg</b>	INTEGER_1 (UNLIMITED)	POD flag (Orbit Flag) (NOT_SET)	NOT_SET	GPS flag; <code>GPS_data_missing</code> indicates GPS data missing from portion of this record and possible degradation. <table border="1" data-bbox="824 1201 1399 1394"> <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 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	no_GPS_data_outage GPS_data_missing								
<b>att_offnadir_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Off-nadir angle flag; Indicates if off-nadir angle is within limits. <table border="1" data-bbox="824 1495 1318 1629"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>within_limit outside_limits</td> </tr> </table>	flag values	flag_meanings	0, 1	within_limit outside_limits	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	within_limit outside_limits								
<b>att_oceansw_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Ocean sweep flag; Indicates if an ocean sweep is within the time frame of this record. <table border="1" data-bbox="824 1755 1318 1885"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_ocean_sweep ocean_sweep</td> </tr> </table>	flag values	flag_meanings	0, 1	not_ocean_sweep ocean_sweep	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	not_ocean_sweep ocean_sweep								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
<b>att_pointing_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Target of opportunity off-pointing flag; Indicates if this record is within time of target of opportunity off-pointing. <table border="1" data-bbox="824 275 1248 411"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_pointing pointing</td> </tr> </table>	flag values	flag_meanings	0, 1	not_pointing pointing	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	not_pointing pointing								
<b>att_steering_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Steering to reference track flag; Indicates if this record is within target of opportunity off-pointing. <table border="1" data-bbox="824 537 1248 674"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>not_pointing pointing</td> </tr> </table>	flag values	flag_meanings	0, 1	not_pointing pointing	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	not_pointing pointing								
<b>att_actual_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	Actual data bits flag; Indicates if the first 3 Attitude Flags have been set based on actual data, if ignore, then IGNORE those bits. <table border="1" data-bbox="824 800 1156 936"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>actual ignore</td> </tr> </table>	flag values	flag_meanings	0, 1	actual ignore	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	actual ignore								
<b>att_ist_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	IST data flag; Indicates if IST data are good, missing for at least a portion of the time of this frame, noisy for at least a portion of the time of this frame or noisy and missing for at least a portion of the time of this frame. <table border="1" data-bbox="824 1115 1378 1251"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2, 3</td> <td>good missing noisy missing_noisy</td> </tr> </table>	flag values	flag_meanings	0, 1, 2, 3	good missing noisy missing_noisy	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1, 2, 3	good missing noisy missing_noisy								
<b>att_gyro_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	GYRO data flag; Indicates if GYRO data are good, missing for at least a portion of the time of this frame, noisy for at least a portion of the time of this frame or noisy and missing for at least a portion of the time of this frame. <table border="1" data-bbox="824 1430 1378 1566"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2, 3</td> <td>good missing noisy missing_noisy</td> </tr> </table>	flag values	flag_meanings	0, 1, 2, 3	good missing noisy missing_noisy	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1, 2, 3	good missing noisy missing_noisy								

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source				
<b>att_lrs_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Flag 1 (NOT_SET)	NOT_SET	<p>LRS Data flag; Indicates the following conditions: LRS data good, consists of star, laser and CRS; LRS data good, but no star data for at least a portion of this frame; LRS data good, but no laser data for at least a portion of this frame; LRS data good, but no CRS data for at least a portion of this frame; LRS data good, but only CRS data for at least a portion of this frame; LRS data good, but only laser data for at least a portion of this frame; LRS data good, but only star data for at least a portion of this frame; 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>good no_star no_laser no_crs only_crs only_laser only_star missing_lrs</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7	good no_star no_laser no_crs only_crs only_laser only_star missing_lrs	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1, 2, 3, 4, 5, 6, 7	good no_star no_laser no_crs only_crs only_laser only_star missing_lrs								
<b>altfrm_corr_flg</b>	INTEGER_1 (UNLIMITED)	Altimeter Frame Quality Flag (NOT_SET)	NOT_SET	<p>Corrections flag; Indicates if all data in frame are good with appropriate corrections applied; or if some of data are not corrected or have measurement problems.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>good uncorrected</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	good uncorrected	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	good uncorrected								
<b>altfrm_data_flg</b>	INTEGER_1 (UNLIMITED)	Altimeter Frame Quality Flag (NOT_SET)	NOT_SET	<p>Frame data flag; Indicates if there are at least some usable data in the frame; or if all elevations in the frame are bad due to problems with corrections.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>good not_good</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	good not_good	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	good not_good								
<b>altfrm_meas_flg</b>	INTEGER_1 (UNLIMITED)	Altimeter Frame Quality Flag (NOT_SET)	NOT_SET	<p>Measurements flag; Indicates if all GLAS measurements are good or if there is at least one unusable measurement in the frame.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>good not_good</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	good not_good	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	good not_good								
<b>altfrm_use_flg</b>	INTEGER_1 (UNLIMITED)	Altimeter Frame Quality Flag (NOT_SET)	NOT_SET	<p>Usable Measurements flag; Indicates if there is at least one usable measurement in the frame; or if all GLAS measurements are bad.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>usable not_usable</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	usable not_usable	Rel 34 GLAS Binary Data
flag values	flag_meanings								
0, 1	usable not_usable								

**Group: Data\_1HZ/Transmit\_Energy**

This group contains information relating to transmit energy.

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Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_tpazimuth_avg	DOUBLE (UNLIMITED)	Transmit Pulse azimuth - frame avg (NOT_SET)	degrees	Transmit pulse azimuth as measured by the LPA. Averaged over the 1-second frame. From ANC09.	Rel 34 GLAS Binary Data	DS_UTCTime_1
d_tpeccentricity_avg	DOUBLE (UNLIMITED)	Transmit Pulse eccentricity - frame avg (NOT_SET)	NOT_SET	Transmit pulse eccentricity as measured by the LPA. Averaged over the 1-second frame. From ANC09.	Rel 34 GLAS Binary Data	DS_UTCTime_1
d_tpmajoraxis_avg	DOUBLE (UNLIMITED)	Transmit Pulse major axis - frame avg (NOT_SET)	meters	Transmit pulse major axis as measured by the LPA. Averaged over the 1-second time frame. From ANC09.	Rel 34 GLAS Binary Data	DS_UTCTime_1
d_tpaintensity_avg	DOUBLE (UNLIMITED)	Transmit Pulse intensity - frame avg (NOT_SET)	count	Transmit pulse intensity as measured by the LPA. Averaged over the 1-second time frame. From ANC09.	Rel 34 GLAS Binary Data	DS_UTCTime_1

#### Group: Data\_1HZ/Elevation

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

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_OcMeanElev	DOUBLE (UNLIMITED)	Mean elevation over 1 sec (height_above_reference_ellipsoid)	meters	1 -sec mean elevation of the up to 40 GLA15 ocean elevations..	Rel 34 GLAS Binary Data	DS_UTCTime_1
d_OcRufRMS	DOUBLE (UNLIMITED)	RMS of elevations used for 1-sec mean elevation (NOT_SET)	meters	The standard deviation of the up to 40 GLA15 ocean elevations measurements.	Rel 34 GLAS Binary Data	DS_UTCTime_1
d_bathyElv	DOUBLE (UNLIMITED)	Bathymetry Elevation (NOT_SET)	meters	Bathymetry elevation.	Rel 34 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
d_localSolarTime	DOUBLE (UNLIMITED)	Local apparent solar time (NOT_SET)	seconds	Local apparent solar time.	Rel 34 GLAS Binary Data	DS_UTCTime_1
d_Azimuth	DOUBLE (UNLIMITED)	Local Azimuth (solar_azimuth_angle)	degrees	Mean azimuth measured clockwise from north based on latitude, longitude, and elevation of a 1 second interval of the trace of the ground footprint-center.	Rel 34 GLAS Binary Data	DS_UTCTime_1

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_SolAng</b>	DOUBLE (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 34 GLAS Binary Data	DS_UTCTime_1
<b>d_reflCor_atm</b>	DOUBLE (UNLIMITED)	Reflectivity Correction Factor For Atmospheric Effects (NOT_SET)	NOT_SET	This reflectance correction factor is calculated as $1 / e^{-(tc+ta+tp+tm)}$ , where tc is the cloud (column) integrated optical depth, ta is the aerosol (column) integrated optical depth, tp is the planetary boundary layer optical depth, and tm is the molecular optical depth. tm is a constant equal to $-\log(gd\_T\_RTatm)/2$ , where $gd\_T\_RTatm = 0.98$ is defined in <code>const_elev_mod.f90</code> or read from ANC07-03. The attenuation correction factor has been corrected for multiple scattering. The reflectance has been corrected for waveform saturation.	Rel 34 GLAS Binary Data	DS_UTCTime_1

#### Group: Data\_1HZ/Elevation\_Flags

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

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>surf_ld_flg</b>	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type flag; indicates presence of land. <table border="1" data-bbox="812 1155 1131 1293"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_land land</td> </tr> </table>	flag values	flag_meanings	0, 1	no_land land	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_land land									
<b>surf_si_flg</b>	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type Sea Ice flag; indicates the presence of sea ice. <table border="1" data-bbox="812 1417 1200 1556"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_sea_ice sea_ice</td> </tr> </table>	flag values	flag_meanings	0, 1	no_sea_ice sea_ice	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_sea_ice sea_ice									
<b>surf_oc_flg</b>	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type ocean flag; indicates the presence of ocean. <table border="1" data-bbox="812 1680 1154 1818"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_ocean ocean</td> </tr> </table>	flag values	flag_meanings	0, 1	no_ocean ocean	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_ocean ocean									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>surf_is_flg</b>	INTEGER_1 (UNLIMITED)	Region Type (NOT_SET)	NOT_SET	Region type Ice Sheet flag; indicates the presence of ice sheet. <table border="1" data-bbox="812 273 1234 462"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>no_ice_sheet ice_sheet</td> </tr> </table>	flag values	flag_meanings	0, 1	no_ice_sheet ice_sheet	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	no_ice_sheet ice_sheet									
<b>rng_ldtide_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	Load tides flag; Indicates if a correction for the dynamic effect of load tides has been applied to the range before the elevation was calculated. <table border="1" data-bbox="812 619 1209 756"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>rng_octide_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	Ocean tides flag; Indicates if a correction for the dynamic effect of ocean tides has been applied to the range before the elevation was calculated. <table border="1" data-bbox="812 913 1161 1039"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>rng_setide_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	Solid earth tides flag; Indicates if a correction for the dynamic effect of solid earth tides has been applied to the range before the elevation was calculated. <table border="1" data-bbox="812 1228 1209 1354"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>rng_drytrop_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	Dry troposphere flag; Indicates if a correction for propagation errors due to the dry troposphere was applied to the range before the elevation was calculated. <table border="1" data-bbox="812 1543 1209 1669"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>rng_wettrop_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	Wet troposphere flag Indicates if a correction for propagation errors due to the wet troposphere was applied to the range before the elevation was calculated. <table border="1" data-bbox="812 1858 1209 1984"> <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 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									



Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>rng_intbias_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	<p>Internal range bias flag; Indicates if the internal range bias was applied to the range before the elevation was calculated and if the value of d_refRng on the record has this correction applied.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>applied not_applied</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	applied not_applied	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>rng_plbias_flg</b>	INTEGER_1 (UNLIMITED)	Range Correction Flag (NOT_SET)	NOT_SET	<p>Post-launch range bias flag; Indicates if the post-launch range bias was applied to the range before the elevation was calculated and if the value of d_refRng on the record has this correction applied.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>applied not_applied</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	applied not_applied	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	applied not_applied									
<b>rng_model_flg</b>	INTEGER_1 (UNLIMITED)	Correction Status Flag (NOT_SET)	NOT_SET	<p>Geophysical corrections flag; Indicates if the load and ocean tides are from global model, regional model no. 1, regional model no. 2, or regional model no. 3.</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>global model_1 model_2 model_3</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3	global model_1 model_2 model_3	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2, 3	global model_1 model_2 model_3									
<b>rng_oldmet_flg</b>	INTEGER_1 (UNLIMITED)	Correction Status Flag (NOT_SET)	NOT_SET	<p>Geophysical corrections flag; Indicates if troposphere corrections are based on 6hr NCEP grids surrounding data, 6hr NCEP grids but at least one was &gt;6 but &lt;24 hrs away from data, standard atm, or reanalyzed met data.</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>6_hour over_6_hour standard_atm reanalyzed</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3	6_hour over_6_hour standard_atm reanalyzed	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2, 3	6_hour over_6_hour standard_atm reanalyzed									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>rng_atmcorr_flg</b>	INTEGER_1 (UNLIMITED)	Correction Status Flag (NOT_SET)	NOT_SET	<p>Geophysical corrections flag; Indicates values used to calculate corrected reflectivity - computed aerosol and cloud optical depths used, default-null aerosol and computed cloud optical depths, computed aerosol and default-null cloud optical depths, default-null values for aerosol and cloud optical depths, or if maximum bound set.</p> <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2, 3, 4</td> <td>computed only_od only_aerosol defaults max_bound_set</td> </tr> </table>	flag values	flag_meanings	0, 1, 2, 3, 4	computed only_od only_aerosol defaults max_bound_set	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1, 2, 3, 4	computed only_od only_aerosol defaults max_bound_set									

**Group: Data\_1HZ/Atmosphere**

This group contains the 1 hz information relating to the atmosphere.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>atm_gla11_flg</b>	INTEGER_1 (UNLIMITED)	Atmosphere Availability Flag (NOT_SET)	NOT_SET	<p>GLA11 data availability flag</p> <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>available not_available</td> </tr> </table>	flag values	flag_meanings	0, 1	available not_available	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	available not_available									
<b>atm_gla09_flg</b>	INTEGER_1 (UNLIMITED)	Atmosphere Availability Flag (NOT_SET)	NOT_SET	<p>GLA09 data availability flag</p> <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>available not_available</td> </tr> </table>	flag values	flag_meanings	0, 1	available not_available	Rel 34 GLAS Binary Data	DS_UTCTime_1
flag values	flag_meanings									
0, 1	available not_available									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>atm_char_flag</b>	INTEGER_1 (UNLIMITED)	Atmosphere Characterization Flag (NOT_SET)	NOT_SET	<p>Flag to characterize cloud and blowing snow state of the atmosphere based on combinations of <code>hi_cloud</code> (&gt; 5 km), <code>mid_cloud</code> (&gt;2, &lt;=5 km), <code>low_cloud</code> (&gt; 500 m, &lt;=2 km), blowing snow or fog and hi/lo optical depth.</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</td> <td>clear hi_cloud_low_od hi_cloud_high_od mid_cloud_low_od mid_cloud_hi_od low_cloud_low_od low_cloud_hi_od blowing_snow_low_od blowing_snow_hi_od</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8	clear hi_cloud_low_od hi_cloud_high_od mid_cloud_low_od mid_cloud_hi_od low_cloud_low_od low_cloud_hi_od blowing_snow_low_od blowing_snow_hi_od	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2, 3, 4, 5, 6, 7, 8	clear hi_cloud_low_od hi_cloud_high_od mid_cloud_low_od mid_cloud_hi_od low_cloud_low_od low_cloud_hi_od blowing_snow_low_od blowing_snow_hi_od									
<b>atm_char_conf</b>	INTEGER_1 (UNLIMITED)	Atmosphere Characterization Flag Confidence (NOT_SET)	NOT_SET	<p>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. 10: data quality insufficient to assign flag.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 10</td> <td>not_applicable low_confidence reasonable_confidence high_confidence quality_insufficient</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 10	not_applicable low_confidence reasonable_confidence high_confidence quality_insufficient	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings									
0, 1, 2, 3, 10	not_applicable low_confidence reasonable_confidence high_confidence quality_insufficient									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates																																
<b>clid1_mswf_flg</b>	INTEGER_1 (UNLIMITED)	Cloud Multiple Scattering Warning Flag (NOT_SET)	NOT_SET	<p>The multiple scattering warning flag (MSWF) is based on the total column optical depth (aerosol plus cloud) calculated in GLA11 using 532nm. It is intended as a way to quickly obtain information about the potential severity of multiple scattering with regards to the range-to-surface calculated by the altimetry processing software. The multiple scattering warning flag will have values ranging from 0-14, based on the total column optical depth. A warning flag value of 15 will signify invalid. An invalid will be encoded if an optical depth in any of the layers in the 1-second column could not be calculated. This usually occurs in a very optically thick cloud which extinguishes the signal. It could also occur if the extinction-to-backscatter ratio assignment is set too high, causing the transmission calculations in the lidar inversion to go out-of-range.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr><td>0, 1,</td><td>under_0.010</td></tr> <tr><td>2, 3,</td><td>0.010_0.030</td></tr> <tr><td>4, 5,</td><td>0.030_0.060</td></tr> <tr><td>6, 7,</td><td>0.060_0.100</td></tr> <tr><td>8, 9,</td><td>0.100_0.150</td></tr> <tr><td>10,</td><td>0.150_0.225</td></tr> <tr><td>11,</td><td>0.225_0.300</td></tr> <tr><td>12,</td><td>0.300_0.400</td></tr> <tr><td>13,</td><td>0.400_0.500</td></tr> <tr><td>14, 15</td><td>0.500_0.670</td></tr> <tr><td></td><td>0.670_0.900</td></tr> <tr><td></td><td>0.900_1.200</td></tr> <tr><td></td><td>1.200_1.600</td></tr> <tr><td></td><td>1.600_2.000</td></tr> <tr><td></td><td>over_2.000 invalid</td></tr> </tbody> </table>	flag values	flag_meanings	0, 1,	under_0.010	2, 3,	0.010_0.030	4, 5,	0.030_0.060	6, 7,	0.060_0.100	8, 9,	0.100_0.150	10,	0.150_0.225	11,	0.225_0.300	12,	0.300_0.400	13,	0.400_0.500	14, 15	0.500_0.670		0.670_0.900		0.900_1.200		1.200_1.600		1.600_2.000		over_2.000 invalid	Rel 34 GLAS Binary Data	DS_UTCTime_
flag values	flag_meanings																																					
0, 1,	under_0.010																																					
2, 3,	0.010_0.030																																					
4, 5,	0.030_0.060																																					
6, 7,	0.060_0.100																																					
8, 9,	0.100_0.150																																					
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11,	0.225_0.300																																					
12,	0.300_0.400																																					
13,	0.400_0.500																																					
14, 15	0.500_0.670																																					
	0.670_0.900																																					
	0.900_1.200																																					
	1.200_1.600																																					
	1.600_2.000																																					
	over_2.000 invalid																																					
<b>MRC_af_flg</b>	INTEGER_1 (UNLIMITED)	Medium Resolution Cloud Availability Flag (NOT_SET)	NOT_SET	<p>Indicates number of cloud layers at medium resolution from the 532 nm channel; not_searched = cloud layers were not searched for; not_detected = 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,</td><td>not_searched 1 2</td></tr> <tr><td>5, 6, 7, 8, 9,</td><td>3 4 5 6 7 8 9 10</td></tr> <tr><td>10, 11, 12,</td><td>11 12 13 14</td></tr> <tr><td>13, 14, 15</td><td>not_detected</td></tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4,	not_searched 1 2	5, 6, 7, 8, 9,	3 4 5 6 7 8 9 10	10, 11, 12,	11 12 13 14	13, 14, 15	not_detected	Rel 34 GLAS Binary Data	DS_UTCTime_																						
flag values	flag_meanings																																					
0, 1, 2, 3, 4,	not_searched 1 2																																					
5, 6, 7, 8, 9,	3 4 5 6 7 8 9 10																																					
10, 11, 12,	11 12 13 14																																					
13, 14, 15	not_detected																																					
<b>d_Surface_pres</b>	DOUBLE (UNLIMITED)	Surface Pressure (surface_temperature)	hPa	<p>Atmospheric pressure at Earth's surface level measured in hPa and derived from the meteorological data files. This surface pressure is computed in the atmospheric processing and is not the pressure used for the troposphere delay correction.</p>	Rel 34 GLAS Binary Data	DS_UTCTime_																																

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_Surface_relh</b>	DOUBLE (UNLIMITED)	Relative Humidity (surface_air_pressure)	percent	Atmospheric relative humidity at Earth's surface level measured as a percentage and derived from the meteorological data files.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_Surface_temp</b>	DOUBLE (UNLIMITED)	Surface Temperature (relative_humidity)	degree Celsius	Atmospheric temperature at Earth's surface level measured in degrees Celcius and derived from the meteorological data files.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_Surface_wdir</b>	DOUBLE (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 34 GLAS Binary Data	DS_UTCTime_40
<b>d_Surface_wind</b>	DOUBLE (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 34 GLAS Binary Data	DS_UTCTime_40
<b>d_gASP</b>	DOUBLE (UNLIMITED)	Global Mean Atmospheric Pressure (NOT_SET)	Pascal (Pa)	Global mean surface air pressure computed from NCEP 24-hour forecast. Included for computation of an Inverted Barometer (IB) correction.	Rel 34 GLAS Binary Data	DS_UTCTime_40

## Group: /Data\_40HZ/

This group contains data with a rate of 40HZ. 40Hz 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
<b>DS_UTCTime_40</b>	DOUBLE (UNLIMITED)	Transmit time of each shot in J2000 seconds (time)	seconds since 2000-01-01 12:00:00 UTC	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 34 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
<b>i_rec_ndx</b>	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 34 GLAS Binary Data	DS_UTCTime_40
<b>i_shot_count</b>	INTEGER (UNLIMITED)	GLAS shot counter (NOT_SET)	NOT_SET	Identifies each laser shot within a record index. A combination of <code>i_rec_ndx</code> and <code>i_shot_count</code> can be used to uniquely identify each GLAS laser shot.	Rel 34 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
<b>d_lat</b>	DOUBLE (UNLIMITED)	Coordinate Data, Latitude, specific to ocean range (latitude)	degrees_north	The geodetic latitude of the laser spot computed from the precision orbit, precision attitude, and ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The values are in degrees north.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_lon</b>	DOUBLE (UNLIMITED)	Coordinate Data, Longitude, specific to ocean range (longitude)	degrees_east	The longitude of the laser spot computed from the precision orbit, precision attitude, and ice-sheet specific range after instrument corrections, atmospheric delays and tides have been applied. The values are in degrees east.	Rel 34 GLAS Binary Data	DS_UTCTime_40

**Group: Data\_40HZ/Elevation\_Surfaces**

This group contains the surface-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_elev</b>	DOUBLE (UNLIMITED)	Ocean Surface Elevation (NOT_SET)	meters	Surface elevation with respect to the ellipsoid at the spot location determined by range using the fitting algorithm after instrument corrections, atmospheric delays and tides have been applied.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_highElev</b>	DOUBLE (UNLIMITED)	Highest Elevation (NOT_SET)	meters	Highest elevation in footprint, with all corrections applied (corresponds to signal begin) using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_lowElev</b>	DOUBLE (UNLIMITED)	Lowest Elevation (NOT_SET)	meters	Lowest elevation in footprint, with all corrections applied (corresponds to signal end) using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_MSS_e1v</b>	DOUBLE (UNLIMITED)	Mean Sea Surface Elevation (height_above_reference_ellipsoid)	meters	The mean sea surface elevation from GSFC's data file DNSC08MSS_1min.mss.gz This is in reference to the TOPEX/Poseidon ellipsoid.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_oceanVar</b>	DOUBLE (UNLIMITED)	Standard Deviation of the ocean Gaussian Fit (NOT_SET)	volts	The Standard deviation of the difference between the functional fit and the received echo using standard parameters. It is directly taken from GLA05 parameter d_wFitSDev_2 (standard).	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_refRng</b>	DOUBLE (UNLIMITED)	Reference Range (altimeter_range)	meters	Range in distance calculated from the time between the centroid of the transmit pulse and the farthest gate from the spacecraft of the received pulse. See the rngcorrflg to determine any corrections that have been applied.	Rel 34 GLAS Binary Data	DS_UTCTime_40

**Group: Data\_40HZ/Elevation\_Corrections**

This group contains elevation-related corrections.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_dTrop</b>	DOUBLE (UNLIMITED)	Range Correction, Dry Troposphere (altimeter_range_correction_due_to_dry_troposphere)	meters	The range correction due to the dry troposphere; one correction for each shot. Validity is based on results of finding a range with the standard fit.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_satElevCorr</b>	DOUBLE (UNLIMITED)	Saturation Elevation Correction (NOT_SET)	meters	Correction to elevation for saturated waveforms. This correction has NOT been applied to the data. To apply it, SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates. See also: <a href="#">Saturation Correction Guidance</a> .	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_ElevBiasCorr</b>	DOUBLE (UNLIMITED)	Elevation Bias Correction (NOT_SET)	meters	Correction to elevation based on post flight analysis for biases determined for each campaign. This bias correction has not been applied to the data. To apply it, SUBTRACT the correction from the range estimate. To apply the correction to the elevations it must be ADDED to the elevation estimates.	Rel 34 GLAS Binary Data	DS_UTCTime_40

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_GmC	DOUBLE (UNLIMITED)	Range correction in m calc from Trans pulse peak loc to centroid (NOT_SET)	m	The difference of the Gaussian fit to the transmit pulse and the centroid of it. This correction was applied to the range before the computation of elevation. It is an additive correction to an elevation relative to Tx centroid to make the elevation relative to the Tx Gaussian.	Rel 34 GLAS Binary Data	DS_UTCTime_40

#### Group: Data\_40HZ/Elevation\_Angles

This group contains pointing angle parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_beamAzimuth	DOUBLE (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 34 GLAS Binary Data	DS_UTCTime_40
d_beamCoelv	DOUBLE (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 34 GLAS Binary Data	DS_UTCTime_40

#### Group: Data\_40HZ/Elevation\_Offsets

The group contains elevation offsets. These offsets allow the elevation for the specific surface types to be derived.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
d_ocRngOff	DOUBLE (UNLIMITED)	Ocean Range Offset (NOT_SET)	meters	Range offset to be added to d_refRng to calculate the range using the algorithm deemed appropriate for oceans.	Rel 34 GLAS Binary Data	DS_UTCTime_40
d_cntRngOff	DOUBLE (UNLIMITED)	Centroid Range Offset (NOT_SET)	meters	Offset to be added to d_refRng to give the range in distance to the location of the centroid of the received echo from signal begin through signal end defined by the standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40
d_sigBegOff	DOUBLE (UNLIMITED)	Signal Begin Range Offset (NOT_SET)	meters	Offset to be added to d_refRng to give the range in distance to the location of the received echo calculated at the beginning of signal (closest to the spacecraft) using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40



Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_SigEndOff</b>	DOUBLE (UNLIMITED)	Signal End Range Offset (NOT_SET)	meters	Offset to be added to d_refRng to give the range in distance to the location of the received echo calculated at the end of signal (farthest from the spacecraft) using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_TrshRngOff</b>	DOUBLE (UNLIMITED)	Threshold Retracker Range Offset (NOT_SET)	meters	Offset to be added to d_refRng to give the range in distance to the threshold retracker location of the received echo using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40

**Group: Data\_40HZ/Quality**

This group contains flags related to the elevation estimates for each shot.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>rng_uqf_sigbeg1_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Signal begin range increment flag (standard). <table border="1" data-bbox="857 793 1214 932"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_sigend1_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Signal end range increment flag (standard). <table border="1" data-bbox="857 1058 1214 1197"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_thres1_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Threshold retracker range increment flag (standard). <table border="1" data-bbox="857 1323 1214 1461"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_cent1_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Centroid retracker range increment flag (standard). <table border="1" data-bbox="857 1587 1214 1726"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_sigbeg2_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Signal begin range increment flag (alternate). <table border="1" data-bbox="857 1852 1214 1990"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>rng_uqf_sigend2_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Signal end range increment flag (alternate). <table border="1" data-bbox="857 275 1214 411"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_thres2_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Threshold retracker range increment flag (alternate). <table border="1" data-bbox="857 537 1214 674"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_cent2_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Centroid retracker range increment flag (alternate). <table border="1" data-bbox="857 800 1214 936"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_is_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Ice sheet range increment flag. <table border="1" data-bbox="857 1031 1214 1167"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_si_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Sea ice range increment flag. <table border="1" data-bbox="857 1262 1214 1398"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_ld_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Land range increment flag. <table border="1" data-bbox="857 1493 1214 1629"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>rng_uqf_oc_flg</b>	INTEGER_1 (UNLIMITED)	Range Offset Quality/Use Flag (NOT_SET)	NOT_SET	Ocean range increment flag. <table border="1" data-bbox="857 1724 1214 1860"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>sat_corr_flg</b>	INTEGER_1 (UNLIMITED)	Saturation Correction Flag (NOT_SET)	NOT_SET	<p>Saturation Correction Flag; Indicates if the saturation is Not Saturated (<math>i\_satNdx &lt; 2</math>) or No Signal; Inconsequential (<math>i\_satNdx \geq 2</math> &amp; <math>i\_pctSat &lt; 2.0</math>); is Applicable (<math>i\_satNdx \geq 2</math> &amp; <math>i\_pctSat \geq 2.0</math> &amp; Full Width* &lt; 100ns); is Not Computable; is Not Applicable (<math>i\_satNdx \geq 2</math> &amp; <math>i\_pctSat \geq 2.0</math> &amp; Full Width* &gt;= 100ns).</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1, 2, 3, 4</td> <td>not_saturated; inconsequential; applicable; not_computed; not_applicable</td> </tr> </tbody> </table> <p>Note: the file-level metadata erroneously indicates six values are used: 0, 1, 2, 3, 4, 5. As described above, only five values are defined.</p> <p>See also: <a href="#">Saturation Correction Guidance</a>.</p>	flag values	flag_meanings	0, 1, 2, 3, 4	not_saturated; inconsequential; applicable; not_computed; not_applicable	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1, 2, 3, 4	not_saturated; inconsequential; applicable; not_computed; not_applicable									
<b>elev_use_flg</b>	INTEGER_1 (UNLIMITED)	Elevation use flag (NOT_SET)	NOT_SET	<p>Flag indicating whether the elevations on this record should be used.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>valid not_valid</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	valid not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	valid not_valid									
<b>att_pad_use_flg</b>	INTEGER_1 (UNLIMITED)	Pad Use Flag (NOT_SET)	NOT_SET	<p>PAD Use Flag; Indicates if PAD used to determine spot location.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>used not_used</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	used not_used	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	used not_used									
<b>att_calc_pad_flg</b>	INTEGER_1 (UNLIMITED)	Calc Pad Use Flag (NOT_SET)	NOT_SET	<p>Calc PAD Use Flag; Indicates if new PAD or pass-thru PAD was used to determine orbit.</p> <table border="1"> <thead> <tr> <th>flag values</th> <th>flag_meanings</th> </tr> </thead> <tbody> <tr> <td>0, 1</td> <td>new pass_thru</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1	new pass_thru	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	new pass_thru									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>att_lpa_flg</b>	INTEGER_1 (UNLIMITED)	LPA Problem Flag (NOT_SET)	NOT_SET	LPA Problem Flag; Indicates if LPA is good, missing or noisy. <table border="1" data-bbox="857 275 1224 468"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1, 2</td> <td>good missing noisy</td> </tr> </table>	flag values	flag_meanings	0, 1, 2	good missing noisy	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1, 2	good missing noisy									
<b>sigma_att_flg</b>	INTEGER_1 (UNLIMITED)	Attitude Quality Indicator (NOT_SET)	NOT_SET	Attitude quality indicator flag. <table border="1" data-bbox="857 564 1224 758"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 50, 100, 127</td> <td>good warning bad not_valid</td> </tr> </table>	flag values	flag_meanings	0, 50, 100, 127	good warning bad not_valid	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 50, 100, 127	good warning bad not_valid									
<b>i_satNdx</b>	INTEGER (UNLIMITED)	Saturation Index (NOT_SET)	ns	The count of the number of gates in a waveform which have an amplitude greater than or equal to <i>i_satNdxTh</i> (set in anc07_0004). The value 126 means 126 or more gates are above the saturation index threshold ( <i>i_satNdxth</i> ).	Rel 34 GLAS Binary Data	DS_UTCTime_40				
<b>d_pctSAT</b>	DOUBLE (UNLIMITED)	Percent Saturation (NOT_SET)	percent	Percent saturation ( <i>d_pctSAT</i> ) is calculated using the formula: $d\_pctSAT = 100 * (\text{saturation index}) / (\text{signal end} - \text{signal begin in nanoseconds})$ . The alternate signal end/begin are used for GLA14 <i>d_pctSAT</i> , while the standard fit values are used for GLA06, 12, 13, and 15. The Saturation elevation correction is not applied in the geolocation processing computation of lat, lon and elev. Because the saturation corrections are small and data is acquired within 5 deg off nadir, effects on lat and lon can be ignored. To apply the saturation elevation correction to the elevations on the products it must be ADDED to the elevation estimates. Reported elevations for returns with invalid <i>d_satElevCorr</i> values and <i>sat_corr_flg</i> values of 3 or 4 are likely to have large, uncorrectable errors and should be excluded from analyses. See also: <a href="#">Saturation Correction Guidance</a> .	Rel 34 GLAS Binary Data	DS_UTCTime_40				

**Group: Data\_40HZ/Elevation\_Flags**

This group contains flags related to the elevation estimates for each shot.

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

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>e1v_cnt_1_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Standard parameterization; true if centroid of received pulse between signal begin and signal end defined for standard parameterization used to calculate elevation.  <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									
<b>e1v_cnt_2_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Alternate parameterization; indicates if centroid of received pulse between signal begin and signal end defined for alternate parameterization used to calculate elevation.  <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									
<b>e1v_peak_1_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Standard parameterization; Indicates if location of last gaussian peak in received pulse for standard parameterization used to calculate elevation.  <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									
<b>e1v_peak_2_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Alternate parameterization; Indicates if location of last Gaussian peak in received pulse for alternate parameterization used to calculate elevation.  <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									
<b>e1v_thres_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Threshold retracker; Indicates if location of threshold retracker used to calculate elevation.  <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									
<b>e1v_gauss_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Gaussian; Indicates if location associated with gaussian with largest peak used to calculate elevation.  <table border="1"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
<b>elv_other_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Other algorithm; Indicates if other algorithm used to calculate elevation - see software release documentation for details. <table border="1" data-bbox="800 302 1105 441"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									
<b>elv_cloud_flg</b>	INTEGER_1 (UNLIMITED)	Elevation Definition Flag (NOT_SET)	NOT_SET	Cloud contamination; Indicates if Gain > flag value, indicating probable cloud contamination. <table border="1" data-bbox="800 562 1105 701"> <tr> <td>flag values</td> <td>flag_meanings</td> </tr> <tr> <td>0, 1</td> <td>false true</td> </tr> </table>	flag values	flag_meanings	0, 1	false true	Rel 34 GLAS Binary Data	DS_UTCTime_40
flag values	flag_meanings									
0, 1	false true									

**Group: Data\_40HZ/Transmit\_Energy**

This group contains transmit energy parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_TxNrg</b>	DOUBLE (UNLIMITED)	1064 nm Laser Transmit Energy (NOT_SET)	joules	The 1064 nm laser pulse transmitted energy in energy units, computed from the digitized outgoing pulse, and the transmit gain.	Rel 34 GLAS Binary Data	DS_UTCTime_40

**Group: Data\_40HZ/Geophysical**

This group contains geophysical parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
<b>d_d2refTrk</b>	DOUBLE (UNLIMITED)	Distance to the reference ground track (NOT_SET)	meters	Distance to the reference ground track.	Rel 34 GLAS Binary Data	DS_UTCTin
<b>d_ocElv</b>	DOUBLE (UNLIMITED)	Ocean Tide Elevation (sea_surface_height_amplitude_due_to_non_equilibrium_ocean_tide)	meters	The ocean tide elevation from the TPX07.1 tide model.	Rel 34 GLAS Binary Data	DS_UTCTin
<b>d_deltaEllip</b>	DOUBLE (UNLIMITED)	Delta Ellipsoid (NOT_SET)	meters	Surface elevation (T/P ellipsoid) minus surface elevation (WGS84 ellipsoid).	Rel 34 GLAS Binary Data	DS_UTCTin

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinate
<b>d_poTide</b>	DOUBLE (UNLIMITED)	Pole Tide (sea_surface_height_amplitude_due_to_pole_tide)	meters	Pole tide: an ocean tide which is the result of the Chandler wobble (a free nutation of the Earth caused by fluctuating pressure on the bottom of the ocean, caused by temperature and salinity changes and wind-driven changes in the circulation of the oceans).	Rel 34 GLAS Binary Data	DS_UTCTir
<b>d_gdHt</b>	DOUBLE (UNLIMITED)	Geoid (geoid_height_above_reference_ellipsoid)	meters	The height of the geoid above the ellipsoid. EGM2008 geoid height above the reference ellipsoid.	Rel 34 GLAS Binary Data	DS_UTCTir
<b>d_erElv</b>	DOUBLE (UNLIMITED)	Solid Earth Tide Elevation (at first & last shot) (NOT_SET)	meters	The solid earth tide elevation.	Rel 34 GLAS Binary Data	DS_UTCTir
<b>d_wTrop</b>	DOUBLE (UNLIMITED)	Range Correction_Wet Troposphere (altimeter_range_correction_due_to_wet_troposphere)	meters	The range correction due to the wet troposphere.	Rel 34 GLAS Binary Data	DS_UTCTir
<b>d_eqElv</b>	DOUBLE (UNLIMITED)	Equilibrium Tide Elevation (at first & last shot) (sea_surface_height_amplitude_due_to_equilibrium_ocean_tide)	meters	The equilibrium (long period) tide at last valid shot over the ocean.	Rel 34 GLAS Binary Data	DS_UTCTir
<b>d_ldElv</b>	DOUBLE (UNLIMITED)	Load Tide Elevation (NOT_SET)	meters	The load tide elevation applied to each shot.	Rel 34 GLAS Binary Data	DS_UTCTir

**Group: Data\_40HZ/Reflectivity**

This group contains reflectivity parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_reflctUC</b>	DOUBLE (UNLIMITED)	reflctUC (NOT_SET)	NOT_SET	Reflectivity, not corrected for atmospheric effects, is calculated as $Refl = R/T$ , where R is the received energy after it has been scaled for range, and T is the transmitted energy. <i>i_reflctUC</i> has also been calibrated for gain non-linearity (only for non-saturated waveforms), ground truth calibration and <a href="#">boresight shift shadowing</a> (BSS). It is not corrected for saturation effects. If the shot is saturated (satindex above 2) then to correct for saturation the reflectivity estimate needs to be multiplied by the ratio of the corrected energy to the uncorrected energy (sat corrected reflectivity = $d\_reflctUC * (d\_RecNrgAll + d\_satNrgCorr)/d\_RecNrgAll$ ). The atmospheric corrected reflectivity may be calculated from this uncorrected reflectivity by multiplying it by <i>d_reflCor_atm</i> . <i>d_reflctUC</i> is invalid where <i>d_satNrgCorr</i> is invalid.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_sDevNsOb1</b>	DOUBLE (UNLIMITED)	Standard deviation of 1064 nm Background noise, (alternate) (NOT_SET)	volts	The standard deviation of the background noise (alternate parameters).	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_satNrgCorr</b>	DOUBLE (UNLIMITED)	Saturation Energy Correction (NOT_SET)	Joules	Correction to energy for saturated waveforms. This correction has not been applied to the energy. It should be ADDED to any echo pulse energy calculated from the pulse area under the waveform. Also any reflectivity estimates need to be corrected for this error in energy measurement. See also: <a href="#">Saturation Correction Guidance</a> .	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_RecNrgAll</b>	DOUBLE (UNLIMITED)	Received Energy signal begin to signal end (NOT_SET)	Joules	This is calculated by taking the area under the received waveform (referenced to the observed noise) from all responses between the noise crossing before the first threshold crossing and the noise crossing after the last threshold crossing. It is a rescaled value from the GLA01 parameter <i>d_recNrgAll_EU</i> and is not recomputed.	Rel 34 GLAS Binary Data	DS_UTCTime_40

**Group: Data\_40HZ/Waveform**

This group contains waveform-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_skew2</b>	DOUBLE (UNLIMITED)	Skewness (NOT_SET)	NOT_SET	The skewness of the received echo from signal begin to signal end using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_kurt2</b>	DOUBLE (UNLIMITED)	Kurtosis of the Received Echo (standard) (NOT_SET)	NOT_SET	Kurtosis of the received echo from signal begin to signal end using standard parameters	Rel 34 GLAS Binary Data	DS_UTCTime_40



Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_maxRecAmp</b>	DOUBLE (UNLIMITED)	Max Amplitude of Received Echo (NOT_SET)	volts	Maximum amplitude of the received echo.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_maxSmAmp</b>	DOUBLE (UNLIMITED)	Peak Amplitude of Smoothed Received Echo (NOT_SET)	volts	The peak amplitude of the received echo after it has been smoothed to remove high frequency noise (see ATBD).	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>i_numPk</b>	INTEGER (UNLIMITED)	Number of Peaks found in the Return (NOT_SET)	count	The number of peaks in the return echo found by the gaussian fitting procedure, using standard parameters.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>i_gval_rcv</b>	INTEGER (UNLIMITED)	Gain Value used for Received Pulse (NOT_SET)	counts	Gain value used for received pulse - uncalibrated.	Rel 34 GLAS Binary Data	DS_UTCTime_40

**Group: Data\_40HZ/Atmosphere**

This group contains atmosphere-related parameters.

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates
<b>d_FRir_cldtop</b>	DOUBLE (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 in GLA09.	Rel 34 GLAS Binary Data	DS_UTCTime_40
<b>d_FRir_intsig</b>	DOUBLE (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) units). This parameter is extracted from the equivalent parameter on GLA09.	Rel 34 GLAS Binary Data	DS_UTCTime_40

Label	Datatype (Dimensions)	long_name (standard_name)	units	description	source	coordinates				
FRir_qa_flg	INTEGER_1 (UNLIMITED)	Full Resolution 1064 Quality Flag (NOT_SET)	NOT_SET	<p>Full resolution 1064 Quality Flag; 0 - 12 indicate 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; 13 = Indicates the possible presence of a cloud based on the value of the integrated signal parameter (i_FRir_intsig) that was not detected directly by the cloud search algorithm. When this occurs, the 40 Hz cloud top height (i_FRir_cldtop) is set to a value of 10.0 km; 14 = Indicates the likely presence of low clouds (&lt; 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_FRir_cldtop) is set to a value of 0.10; 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>0 1 2 3 4 5 6 7 8 9 10 11 12 possible likely</td> </tr> </tbody> </table>	flag values	flag_meanings	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	0 1 2 3 4 5 6 7 8 9 10 11 12 possible likely	Rel 34 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	0 1 2 3 4 5 6 7 8 9 10 11 12 possible likely									

## /ANCILLARY\_DATA

### /ANCILLARY\_DATA

Attribute	Example Value
Campaign	2A
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

Attribute	Example Value
<b>Additional_Attribute</b>	SP_ICE_PATH_NO, SP_ICE_GLAS_StartBlock, SP_ICE_GLAS_EndBlock, ReferenceOrbit, Track, Timing_Drift, PercentGroundHit, Cycle, OrbitQuality, Instance, Range_Bias, Range_Bias_Date, Range_Bias_Time, Timing_Bias, Timing_Bias_Date, Timing_Bias_Time
<b>globAvSrfPres1</b>	100964.3794153
<b>gASP_t1</b>	122385600.0000000
<b>globAvSrfPres2</b>	100965.0504048
<b>gASP_t2</b>	122407200.0000000
<b>globAvSrfPres3</b>	100971.5330532
<b>gASP_t3</b>	122428800.0000000
<b>globAvSrfPres4</b>	100976.6362863
<b>gASP_t4</b>	122450400.0000000
<b>globAvSrfPres5</b>	100979.7656113
<b>gASP_t5</b>	122472000.0000000
<b>internal_range_delay_desc</b>	Internal range calibration bias determined during GLAS instrument integration testing and validated in-flight, meters.
<b>internal_time_delay_desc</b>	Internal time calibration bias determined during GLAS instrument integration testing and validated in-flight, seconds.

## /METADATA

### /METADATA

Attribute	Example Value
<b>description</b>	This group contains structured, computer-parseable ECHO-style collection and inventory-level metadata.
<b>HDFVersion</b>	HDF5 1.8.9
<b>ControlFile</b>	cf_name=CTL00_000_20140818_2598071_01_gla15_h5_convert.ct1

### /METADATA/COLLECTIONMETADATA

Attribute	Example Value
<b>DLLName</b>	libDsESDTG1GLASPoly.001Sh.so
<b>GranuleTimeDuration</b>	81280
<b>SpatialSearchType</b>	Orbit
<b>DataFileFormat</b>	HDF5
<b>ScienceMimeType</b>	application/x-hdfeos

Attribute	Example Value
<b>BrowseMimeType</b>	application/x-hdfeos
<b>BrowseOnlineMimeType</b>	image/jpeg
<b>ShortName</b>	GLAH15
<b>LongName</b>	GLAS/ICESat L2 Ocean Altimetry Data (HDF5)
<b>CollectionDescription</b>	GLAH15 contains the ocean elevation and small-scale roughness corrected for geodetic and atmospheric affects, calculated from algorithms fine-tuned for ocean returns. Data granules will contain 14 orbits of data over the oceans.
<b>VersionID</b>	34
<b>CitationforExternalPublication</b>	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.
<b>CollectionState</b>	In Work
<b>MaintenanceandUpdateFrequency</b>	Daily
<b>AccessConstraints</b>	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.
<b>TemporalKeyword</b>	Day
<b>SpatialKeyword</b>	Global

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes**

Attribute	Example Value
<b>PercentGroundHit</b>	AdditionalAttributesContainer
<b>Track</b>	AdditionalAttributesContainer
<b>Instrument_State</b>	AdditionalAttributesContainer
<b>ReferenceOrbit</b>	AdditionalAttributesContainer
<b>Timing_Bias</b>	AdditionalAttributesContainer
<b>Timing_Drift</b>	AdditionalAttributesContainer
<b>OrbitQuality</b>	AdditionalAttributesContainer
<b>SP_ICE_PATH_NO</b>	AdditionalAttributesContainer
<b>SP_ICE_GLAS_StartBlock</b>	AdditionalAttributesContainer
<b>SP_ICE_GLAS_EndBlock</b>	AdditionalAttributesContainer
<b>Cycle</b>	AdditionalAttributesContainer
<b>Instance</b>	AdditionalAttributesContainer

Attribute	Example Value
Range_Bias	AdditionalAttributesContainer
Instrument_State_Date	AdditionalAttributesContainer
Instrument_State_Time	AdditionalAttributesContainer
Range_Bias_Date	AdditionalAttributesContainer
Range_Bias_Time	AdditionalAttributesContainer
Timing_Bias_Date	AdditionalAttributesContainer
Timing_Bias_Time	AdditionalAttributesContainer
Timing_Drift_Date	AdditionalAttributesContainer
Timing_Drift_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
<b>AdditionalAttributeDatatype</b>	int
<b>AdditionalAttributeDescription</b>	Flag word that indicates which redundant units (laser, detector, oscillator) of the GLAS instrument are in operation.
<b>AdditionalAttributeName</b>	Instrument_State
<b>ParameterUnitsofMeasurement</b>	Flag word
<b>ParameterRangeBegin</b>	0
<b>ParameterRangeEnd</b>	5

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Instrument\_State\_Date**

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

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Instrument\_State\_Time**

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

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/OrbitQuality**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	varchar
<b>AdditionalAttributeDescription</b>	Status word that states what type of orbit was used during processing of the data for the granule. It specifies the models used in the orbit determination program. This provides an indication of the quality of the orbits being applied to the data.
<b>AdditionalAttributeName</b>	OrbitQuality
<b>ParameterUnitsofMeasurement</b>	Flag

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/PercentGroundHit**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	float

Attribute	Example Value
<b>AdditionalAttributeDescription</b>	Percent of data for this granule that had a detected ground return of the transmitted laser pulse.
<b>AdditionalAttributeName</b>	PercentGroundHit
<b>ParameterUnitsofMeasurement</b>	Percent
<b>ParameterRangeBegin</b>	0.0
<b>ParameterRangeEnd</b>	100.0
<b>ParameterValueAccuracy</b>	1
<b>ParameterMeasurementResolution</b>	1

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Range\_Bias**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	int
<b>AdditionalAttributeDescription</b>	The additive calibration correction in millimeters to apply to range based on the science team cal/val activities.
<b>AdditionalAttributeName</b>	Range_Bias
<b>ParameterUnitsofMeasurement</b>	Millimeters
<b>ParameterRangeBegin</b>	-10000
<b>ParameterRangeEnd</b>	10000
<b>ParameterValueAccuracy</b>	1
<b>ParameterMeasurementResolution</b>	1

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Range\_Bias\_Date**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	date
<b>AdditionalAttributeDescription</b>	The date that corresponds to the first valid Range_Bias. There are a maximum of two per granule.
<b>AdditionalAttributeName</b>	Range_Bias_Date

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Range\_Bias\_Time**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	time
<b>AdditionalAttributeDescription</b>	The time that corresponds to the first valid Range_Bias. There are a maximum of two per granule.
<b>AdditionalAttributeName</b>	Range_Bias_Time

**/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/Timing\_Drift**

Attribute	Example Value
AdditionalAttributeDatatype	float
AdditionalAttributeDescription	This is the ratio of the true time for a one second oscillator tick to nominal one
AdditionalAttributeName	Timing_Drift
ParameterRangeBegin	-1.0
ParameterRangeEnd	+1.0

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Timing\_Drift\_Date**

Attribute	Example Value
AdditionalAttributeDatatype	date

Attribute	Example Value
<b>AdditionalAttributeDescription</b>	The date that corresponds to the first valid <code>Timing_Drift</code> . There are a maximum of two per granule.
<b>AdditionalAttributeName</b>	<code>Timing_Drift_Date</code>

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Timing\_Drift\_Time**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	time
<b>AdditionalAttributeDescription</b>	The time that corresponds to the first valid <code>Timing_Drift</code> . There are a maximum of two per granule.
<b>AdditionalAttributeName</b>	<code>Timing_Drift_Time</code>

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/Track**

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

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier\_file\_uuid**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	varchar
<b>AdditionalAttributeDescription</b>	Universally unique identifier for this data product's files
<b>AdditionalAttributeName</b>	<code>identifier_file_uuid</code>

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier\_product\_doi**

Attribute	Example Value
<b>AdditionalAttributeDatatype</b>	varchar
<b>AdditionalAttributeDescription</b>	Digital object identifier that uniquely identifies this data product
<b>AdditionalAttributeName</b>	<code>identifier_product_doi</code>

**/METADATA/COLLECTIONMETADATA/AdditionalAttributes/identifier\_product\_doi/InformationContent**

Attribute	Example Value
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Attribute	Example Value
ParameterValue	10.5067/ICESAT/GLAS/DATA212

**/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	<a href="http://dx.doi.org/10.5067/ICESAT/GLAS/DATA212">http://dx.doi.org/10.5067/ICESAT/GLAS/DATA212</a>

**/METADATA/COLLECTIONMETADATA/CSDTDescription**

Attribute	Example Value
PrimaryCSDT	n-Dim Array of Records
IndirectReference	tracks/orbits
Implementation	HDF
CSDTComments	Two dimensional arrays with six segments per track (orbit). The segments are: (1)the equator to +50 lat,(2)+50 lat across pole to +50 lat,(3)+50 deg lat to equator,(4)equator to -50 lat,(5)-50 deg lat across pole to -50 deg lat,(6)-50 deg lat to equator.

**/METADATA/COLLECTIONMETADATA/CollectionAssociation**

Attribute	Example Value
GLAH06	CollectionAssociationContainer
GLAH05	CollectionAssociationContainer
GLAH01	CollectionAssociationContainer
GLA00	CollectionAssociationContainer
GLAH12	CollectionAssociationContainer
GLAH13	CollectionAssociationContainer
GLAH14	CollectionAssociationContainer

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLA00**

Attribute	Example Value
CollectionType	Science Associated

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

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH01**

Attribute	Example Value
CollectionType	Science Associated
CollectionUse	Level 1A file containing altimeter height, waveform data, and other data required to produce the Level 1B waveform products
ShortName	GLAH01
VersionID	33

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH05**

Attribute	Example Value
CollectionType	Input
CollectionUse	Level 1B file containing: the range, corrections to the range from the waveform retracking algorithms, the surface roughness estimate, and the reflectance
ShortName	GLAH05
VersionID	34

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH06**

Attribute	Example Value
CollectionType	Input
CollectionUse	Level 1B file containing elevations, elevation corrections, surface roughness, reflectance, and associated timing and data quality information
ShortName	GLAH06
VersionID	34

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH12**

Attribute	Example Value
CollectionType	Science Associated
CollectionUse	Level 2 file containing: corrected ice sheet elevations above the reference ellipsoid, surface roughness, reflectance, and the corrections that were used. The product parameters are the result of product-specialized waveform fitting.
ShortName	GLAH12

Attribute	Example Value
VersionID	34

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH13**

Attribute	Example Value
CollectionType	Science Associated
CollectionUse	Level 2 file containing: Sea Ice Elevation, Reflectance, and Roughness, Ice Berg Elevations and Roughness. The product parameters are the result of product-specialized waveform fitting.
ShortName	GLAH13
VersionID	34

**/METADATA/COLLECTIONMETADATA/CollectionAssociation/GLAH14**

Attribute	Example Value
CollectionType	Science Associated
CollectionUse	Level 2 file containing: corrected surface elevations above the reference ellipsoid, surface roughness, reflectance, and the corrections that were used. The product parameters are the result of product-specialized waveform fitting.
ShortName	GLAH14
VersionID	34

**/METADATA/COLLECTIONMETADATA/ContactOrganization**

Attribute	Example Value
Data_Originator	ContactOrganizationContainer
Archive	ContactOrganizationContainer

**/METADATA/COLLECTIONMETADATA/ContactOrganization/Archive**

Attribute	Example Value
Role	Archive
HoursofService	M-F, 8:00am to 5:00pm, Mountain Time
ContactInstructions	For inquiries, contact NSIDC User Services. Primary first level contact.
ContactOrganizationName	NSIDC User Services
StreetAddress	CIRES/NSIDC University of Colorado Campus, Box 449
City	Boulder
StateProvince	Colorado
PostalCode	80309-0449

Attribute	Example Value
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
HoursofService	M-F, 8:00am to 4:30pm Eastern Time

Attribute	Example Value
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
TelephoneNumber	757-824-1238

Attribute	Example Value
TelephoneNumberType	Voice
ElectronicMailAddress	David.W.Hancock@nasa.gov

**/METADATA/COLLECTIONMETADATA/ContactPerson/Schutz**

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

**/METADATA/COLLECTIONMETADATA/ContactPerson/Zwally**

Attribute	Example Value
Role	Producer
HoursofService	M-F, 8:00am to 4:30pm Eastern Time
ContactInstructions	None.
ContactJobPosition	ICESat Project Scientist
ContactFirstName	Jay
ContactLastName	Zwally
StreetAddress	Building 33, Rm A-217



Attribute	Example Value
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
Oceans	DisciplineTopicParametersContainer

**/METADATA/COLLECTIONMETADATA/DisciplineTopicParameters/Oceans**

Attribute	Example Value
ECSDisciplineKeyword	Earth Science
ECSTopicKeyword	Oceans
ECSTermKeyword	Sea Surface Topography
ECSVariableKeyword	Sea Surface Slope

**/METADATA/COLLECTIONMETADATA/DisciplineTopicParameters/Oceans/ECSParameter**

Attribute	Example Value
ECSParameterKeyword	Laser Reflectance

**/METADATA/COLLECTIONMETADATA/ECSCollection**

Attribute	Example Value
RevisionDate	2013-11-07
SuggestedUsage	GLAH15 contains ocean elevation and small-scale roughness data for researchers. Includes the geolocation, reflectance, and the geodetic, instrument, and atmospheric corrections. Parameters are at the full 40Hz resolution within the ICESat ocean mask. Each GLAH15 file was created from an equivalent GLA15 binary file. The data used to create the GLAH15 values are contained in the equivalent GLAHxx files for the GLAxx files. See the provenance metadata for the creation of the GLA15.
ProcessingCenter	GSFC I-SIPS
ArchiveCenter	NSIDC

Attribute	Example Value
<b>VersionDescription</b>	GLASHDF V2.0-Elevations for all products except GLAH14 are now based on the range from the Gaussian fit to the transmit pulse to the Gaussian fit to the received echo. Range used for trop corrections was changed from threshold to centroid.(See Rel Notes)
<b>DatasetDisclaimerPointer</b>	<a href="https://nsidc.org/data/icesat/disclaimer.html">https://nsidc.org/data/icesat/disclaimer.html</a>
<b>ECSCollectionGuidePointer</b>	<a href="https://nsidc.org/data/glah01-glah05-glah06-glah12-glah13-glah14-glah15/versions/34/documentation">https://nsidc.org/data/glah01-glah05-glah06-glah12-glah13-glah14-glah15/versions/34/documentation</a>
<b>ECSCollectionGuidePointerComment</b>	Guide Document for this product at NSIDC
<b>MiscellaneousInformationPointer</b>	<a href="https://nsidc.org/data/icesat/">https://nsidc.org/data/icesat/</a>
<b>MiscellaneousInformationPointerComment</b>	GLAS Product page at NSIDC

#### /METADATA/COLLECTIONMETADATA/Platform

Attribute	Example Value
<b>ICESat</b>	PlatformContainer

#### /METADATA/COLLECTIONMETADATA/Platform/ICESat

Attribute	Example Value
<b>PlatformShortName</b>	ICESat
<b>PlatformLongName</b>	Ice, Cloud, and Land Elevation Satellite
<b>PlatformType</b>	Spacecraft

#### /METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument

Attribute	Example Value
<b>GLAS</b>	InstrumentContainer
<b>GPS</b>	InstrumentContainer

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

Attribute	Example Value
<b>InstrumentShortName</b>	GLAS
<b>InstrumentLongName</b>	Geoscience Laser Altimeter System
<b>InstrumentTechnique</b>	Laser Altimetry and Light Detection and Radar
<b>NumberofSensors</b>	3

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

Attribute	Example Value
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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

Attribute	Example Value
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

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

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

Attribute	Example Value
<b>wavelength</b>	SensorCharacteristicContainer

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

Attribute	Example Value
<b>SensorCharacteristicName</b>	wavelength
<b>SensorCharacteristicDescription</b>	detector
<b>SensorCharacteristicDataType</b>	varchar
<b>SensorCharacteristicUnit</b>	nanometer
<b>SensorCharacteristicValue</b>	532nm

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

Attribute	Example Value
<b>InstrumentShortName</b>	GPS
<b>InstrumentLongName</b>	Global Positioning System Receiver
<b>InstrumentTechnique</b>	Radionavigation
<b>NumberofSensors</b>	1

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

Attribute	Example Value
<b>GPS_Receiver</b>	SensorContainer

**/METADATA/COLLECTIONMETADATA/Platform/ICESat/Instrument/GPS/Sensor/GPS\_Receiver**

Attribute	Example Value
<b>SensorShortName</b>	GPS Receiver
<b>SensorLongName</b>	Dual frequency GPS receiver
<b>SensorTechnique</b>	Pseudorange and carrier phase

**/METADATA/COLLECTIONMETADATA/Platform/ICESat/PlatformCharacteristic**

Attribute	Example Value

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
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Attribute	Example Value
<b>SpatialCoverageType</b>	Horizontal
<b>WestBoundingCoordinate</b>	-180.0
<b>NorthBoundingCoordinate</b>	90.0
<b>EastBoundingCoordinate</b>	180.0
<b>SouthBoundingCoordinate</b>	-90.0

**/METADATA/COLLECTIONMETADATA/StorageMediumClass**

Attribute	Example Value
<b>StorageMedium</b>	Online

**/METADATA/COLLECTIONMETADATA/Temporal**

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

**/METADATA/INVENTORYMETADATA**

Attribute	Example Value
<b>PGEVersion</b>	Version 1.4
<b>ShortName</b>	GLAH15
<b>VersionID</b>	34
<b>RangeBeginningTime</b>	01:51:38
<b>RangeEndingTime</b>	00:24:44
<b>RangeBeginningDate</b>	2003-11-18
<b>RangeEndingDate</b>	2003-11-19





Attribute	Example Value
Timing_Bias	0
Timing_Drift	0
OrbitQuality	6
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
SP_ICE_GLAS_EndBlock	NOT SET
Cycle	2
Instance	3
Range_Bias	0
Instrument_State_Date	2003-10-30
Instrument_State_Time	00:00:00
Range_Bias_Date	2003-10-30
Range_Bias_Time	00:00:00
Timing_Bias_Date	2003-10-30
Timing_Bias_Time	00:00:00
identifier_product_doi	10.5067/ICESAT/GLAS/DATA212
identifier_file_uuid	aab67684-df3a-4253-b01b-a3de6a5dc1eb
identifier_product_doi_authority	<a href="http://dx.doi.org/10.5067/ICESAT/GLAS/DATA212">http://dx.doi.org/10.5067/ICESAT/GLAS/DATA212</a>

**/METADATA/PROVENANCE**

**/METADATA/PROVENANCE/STEP\_1**

Attribute	Example Value
ProcessDateTime	2014-05-24T04:16:41

**/METADATA/PROVENANCE/STEP\_1/ProcessAgent**

Attribute	Example Value
Name	glas_alt
Type	2
Version	6.1
Description	This process is an instantiation of the GLAS Science Algorithm Software (GSAS) 2 ATBDs.





Attribute	Example Value
<b>Name</b>	./CTL00_000_20140818_2598071_01_gla15_h5_convert.ct1, ./tai-utc.dat, ./GLA15_634_2103_002_0407_0_01_0001.DAT, ./DsESDTGLGLAH15.034.desc
<b>Type</b>	IN_CNTRL, IN_ANC_TAIUTC, IN_GLA15, IN_ESDT
<b>Version</b>	0, 0, 1, 1

**/METADATA/PROVENANCE/STEP\_2/ProcessOutput**

Attribute	Example Value
<b>Name</b>	./GLAH15_634_2103_002_0407_0_01_0001.H5
<b>Type</b>	OUT_GLAH15
<b>Version</b>	1
<b>UUID</b>	aab67684-df3a-4253-b01b-a3de6a5dc1eb
<b>DOI</b>	10.5067/ICESAT/GLAS/DATA212

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