

# GLA01 Records: Release 33

GLA01 data records consist of three types: main records, long records, and short records. All types have the same physical length of 4660 bytes so users can read the files with FORTRAN or other suitable program, using a direct-access format. The record type indicator is contained in bytes 11 and 12 of each record. Normally a main record is followed by either two short records or five long records, depending on the number of samples telemetered for that frame (1 sec) of data. When waveform information is missing, however, it is possible to have only a main record without any long or short records following it.

See the [GLAS Altimetry Data Dictionary](#) for details of each parameter, including units and scaling factors. The GLAS science team created this dictionary. Units and scaling factors with a "d" indicate double-precision constants; for example, a value of "1.0d5" is equivalent to 100,000. Nearly all integers are signed; exceptions are noted below.

When comparing data from different products, the record index is consistent as long as all products represent the same release of data. If you want to compare different products with different releases, you should update your oldest product to the latest release. For example, if you want to compare data from a GLA05 Release-12 file and GLA12 Release-18 file, you should order a new GLA05 Release-18 file to replace the older release. The [ICESat/GLAS Data Releases](#) page describes characteristics and temporal coverage of each version of data.

The following codes are used to denote data types throughout the remainder of this document.

i1b: 1-byte integer

i2b: 2-byte (short) integer

i4b: 4-byte (long) integer

r4b: 4-byte real

r8b: 8-byte real

Values in parentheses indicate the record size, for example:

i2b(39): 39 records of 2-byte integers

i1b(48,40): 48-record x 40-record array of 1-byte integers

Table 1. GLA01 Main Record

Name	Short Description	Byte Offset	Data Type	Total Bytes
i_rec_ndx	GLAS record index	0	i4b	4

Name	Short Description	Byte Offset	Data Type	Total Bytes
i_UTCTime	Transmit time of first shot in frame in J2000 (referenced from noon on 01 January 2000)	4	i4b(2)	8
i_gla01_rectype	GLA01 record type	12	i2b	2
i_spare1	Spares	14	i2b	2
i_dShotTime	Laser shot deltas (shots 2-40)	16	i4b(39)	156
i1_pred_lat	Predicted geodetic latitude of the laser footprint	172	i4b	4
i1_pred_lon	Predicted geodetic longitude of the laser footprint	176	i4b	4
i_RespEndTime	Ending address of range response	180	i4b(40)	160
i_LastThrXingT	Last threshold crossing location for selected filter	340	i4b(40)	160
i_NextThrXing	Next to last threshold crossing location for selected filter	500	i4b(40)	160
i_EchoPeakLoc	Echo peak location	660	i4b(40)	160
i_EchoPeakVal	Echo peak value	820	i2b(40)	80
i_wt_fact_filt	Filter weight factors	900	i4b(6,40)	960
i_filt_r_thresh	Selected filter threshold value	1860	i2b(40)	80
i_time_txWfPk	Transmit pulse peak location	1940	i4b(40)	160
i_TxWfStart	Starting address of transmit pulse sample	2100	i4b(40)	160
i_TxNrg_EU	1064 nm laser transmit energy	2260	i4b	4
i_RecNrgAll_EU	1064 nm laser received energy from all signals above threshold	2264	i4b(40)	160
i_RecNrgLast_EU	1064 nm laser received energy	2424	i4b(40)	160
i_txWfPk_Flag	Transmit waveform peak status flag	2584	i1b(40)	40
i_InstState	Instrument state	2624	i4b	4
i_APID_AvFlg	APID data availability flag	2628	i1b(8)	8
i_FiltNumMask	Filter selection mask	2636	i4b	4
i_HOff	DEM offset	2640	i4b(2)	8
i_ADBias	Altimeter digitizer bias	2648	i4b(2)	8
i_RminRmax	Range window start and stop	2656	i4b(2)	8
i_WMinMax	Window size	2664	i4b(2)	8
i_ObSCHt	Onboard height of spacecraft	2672	i4b	4
i_engineering	Engineering data	2676	i2b(12)	24
i_compRatio	Compression ratios	2700	i2b(2)	4

Name	Short Description	Byte Offset	Data Type	Total Bytes
i_N_val	Value of N	2704	i2b	2
i_r_val	Value of r	2706	i2b	2
i_ADdetOutGn	Transmitted gain	2708	i2b	2
i_DEMmin	DEM minimum	2710	i2b	2
i_DEMmax	DEM maximum	2712	i2b	2
i_tx_wf	Sampled transmit pulse waveform	2714	i1b(48,40) unsigned	1920
i_OrbFlg	Orbit flag	4634	i1b(2)	2
i_EchoLandType	Echo land type	4636	i1b	1
i_RngSrc_Flag	Range data source	4637	i1b	1
i_timecorflg	Time correction flag	4638	i2b	2
i_TxFlg	Transmit pulse flag	4640	i1b(5)	5
i_GainShiftFlg	Gain shift flag	4645	i1b(5)	5
i_spare2	Spares	4650	i1b(10)	10

Table 2. GLA01 Long Record

Name	Short Description	Byte Offset	Data Type	Total Bytes
i_rec_ndx	GLAS record index	0	i4b	4
i_UTCTime	Transmit time of first shot in frame in J2000	4	i4b(2)	8
i_gla01_rectype	GLA01 record type	12	i2b	2
i_spare1	Spares	14	i2b	2
i_filtnum	Filter number	16	i1b(8)	8
i_shot_ctr	Shot counter	24	i2b(8)	16
i_statflags	Range window status word	40	i4b(8)	32
i_gainSet1064	AD gain setting	72	i2b(8)	16
i_4nsPeakVal	4 ns filter peak value	88	i2b(8)	16
i_8nsPeakVal	8 ns filter peak value	104	i2b(8)	16
i_4nsBgMean	Background mean value	120	i2b(8) unsigned	16
i_4nsBgSDEV	Background standard deviation	136	i2b(8) unsigned	16
i_samp_pad	Echo sample padding	152	i2b(8)	16
i_comp_type	Echo compression type	168	i1b(8)	8
i_rng_wf	1064 nm range waveform	176	i1b(544,8) unsigned	4352
i_gainStatus	Gain status bits	4528	i1b(8)	8

Name	Short Description	Byte Offset	Data Type	Total Bytes
i_NumCoinc	Number of coincidences for selected filter	4536	i1b(8)	8
i_rawPkHt	Height of peak in raw waveform	4544	i1b(8)	8
i_spare2	Spares	4552	i1b(108)	108

Table 3. GLA01 Short Record

Name	Short Description	Byte Offset	Data Type	Total Bytes
i_rec_ndx	GLAS record index	0	i4b	4
i_UTCTime	Transmit time of first shot in frame in J2000	4	i4b(2)	8
i_gla01_rectype	GLA01 record type	12	i2b	2
i_spare1	Spares	14	i2b	2
i_filtnum	Filter number	16	i1b(20)	20
i_shot_ctr	Shot counter	36	i2b(20)	40
i_statflags	Range window status word	76	i4b(20)	80
i_gainSet1064	AD gain setting	156	i2b(20)	40
i_4nsPeakVal	4 ns filter peak value	196	i2b(20)	40
i_8nsPeakVal	8 ns filter peak value	236	i2b(20)	40
i_4nsBgMean	Background mean value	276	i2b(20) unsigned	40
i_4nsBgSDEV	Background standard deviation	316	i2b(20) unsigned	40
i_samp_pad	Echo sample padding	356	i2b(20)	40
i_comp_type	Echo compression type	396	i1b(20)	20
i_rng_wf	1064 nm range waveform	416	i1b(200,20) unsigned	4000
i_gainStatus	Gain status bits	4416	i1b(20)	20
i_NumCoinc	Number of coincidences for selected filter	4436	i1b(20)	20
i_rawPkHt	Height of peak in raw waveform	4456	i1b(20)	20
i_spare2	Spares	4476	i1b(184)	184

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