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EARTHNET ERS-1

ERS-1.ALT.WDR
CCT FORMAT

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ANNEX E

ERS-1 ALT.WDR PRODUCT

CCT FORMAT

EARTHNET PROGRAMME OFFICE

Altimeter Wave Foundation Product

Acronym: **ALT.WDR**

This product consists of the altimeter transcribed raw data with associated immediately available calibrations,corrections, geolocation and characterization. This product is routinely generated on receipt of altimeter data at UK-PAF.

1) General CCT structure

The CCT contains the following four files :

Volume Directory File

Leader File

Data Set file

Null Volume File

2) Files description

a) Volume Directory File:

volume descriptor record	360 bytes (mandatory)
leader file pointer record	360 bytes (mandatory)
data set file pointer record	360 bytes (mandatory)
text record	360 bytes (optional)

b) Leader File:

file descriptor record	512 bytes (mandatory)
data set summary record	1800 bytes (mandatory)
EODC product quality summary record	260 bytes (mandatory)
instrument characteristics record	768 bytes (mandatory)

c) Data Set File:

file descriptor record	(mandatory)
data records	(mandatory)

d) Null Volume File:

volume descriptor record	360 bytes (mandatory)

Notation conventions :

**$** - the use of the "$"' (dollar sign) in the documentation denotes a requirement for the blank character (ie. the ASCII or EBCDIC space character).

(n) - this expression is used to denote the contents of an integer binary field which will vary depending on the product type or data origin and will have to be supplied on the CCT by the facility generating the CCT.

<.....> - this expression is used to denote the contents of a field, which will vary depending on the product type or data origin and will have to be supplied on the CCT by the facility generating the CCT.

<$...$> - this expression is used to denote a blank field.

File Class	Class Code	Data Type
"8BITASCII$ONLY$$$$$$$$$$$$"	"ASCO"	ASCII only data
"EBCDIC$ONLY$$$$$$$$$$$$$$$$$"	"EBCO"	EBCDIC only
"BCD$ONLY$$$$$$$$$$$$$$$$$$$$"	"BCDO"	BCD only
"BINARY$ONLY$$$$$$$$$$$$$$$$$"	"BINO"	binary only data
"MIXED$BINARY$AND$ASCII$$$$$$"	"MBAA"	binary & ASCII
"MIXED$BINARY$AND$EBCDIC$$$$$"	"MBAE"	binary & EBCDIC
"MIXED$BINARY$AND$BCD$$$$$$$$"	"MBAB"	binary & BCD
"UNDEFINED,$ETC.$$$$$$$$$$$$$"	"UNDF"	undefined
"COMPLEX$$$$$$$$$$$$$$$$$$$$"	"COMP"	complex
"REAL$$$$$$$$$$$$$$$$$$$$$$"	"REAL"	floating point

Data Interpretation	Format	Length
"INTEGER*1$$$$$$$$$$$$$$$$$$"	"I*1$"	(1 byte wide)
"INTEGER*2$$$$$$$$$$$$$$$$$$"	"I*2$"	(2 byte wide)
"INTEGER*4$$$$$$$$$$$$$$$$$$"	"I*4$"	(4 byte wide)

- one, two and four byte two"s complement integer representation

"SIGNED$INTEGER*1$$$$$$$$$$$$"	"IS1$"	(1 byte wide)
"SIGNED$INTEGER*2$$$$$$$$$$$$"	"IS2$"	(2 byte wide)
"SIGNED$INTEGER*4$$$$$$$$$$$$"	"IS4$"	(4 byte wide)

- one, two and four byte signed integer with the most significant bit used to denote sign

"UNSIGNED$INTEGER*1$$$$$$$$$$" "IU1$" (1 byte wide)
"UNSIGNED$INTEGER*2$$$$$$$$$$" "IU2$" (2 byte wide)
"UNSIGNED$INTEGER*4$$$$$$$$$$" "IU4$" (4 byte wide)
- one, two and four byte un -signed integer with the most significant bit used as part of the pixel value, the pixel is always positive.

"REAL*2$$$$$$$$$$$$$$$$$$$$$$" "R*2$" (2 byte wide)
"REAL*4$$$$$$$$$$$$$$$$$$$$$$" "R*4$" (4 byte wide)
"REAL*8$$$$$$$$$$$$$$$$$$$$$$" "R*8$" (8 byte wide)
- two, four and eight byte two's complement floating point representation with the exponent denoted in two's complement binary.(note that the REAL*8 representation is the same as double precision.)

"REAL*2$HEXADECIMAL$$$$$$$$$$" "R*2H" (2 byte wide)
"REAL*4$HEXADECIMAL$$$$$$$$$$" "R*4H" (4 byte wide)
"REAL*8$HEXADECIMAL$$$$$$$$$$" "R*8H" (8 byte wide)
- two, four eight byte hexadecimal floating point representation with the exponent denoted as a hexadecimal exponent. (note that the REAL*8. representation is the same as double precision.)

"COMPLEX*4$$$$$$$$$$$$$$$$$$$$" "C*4$" (4 byte wide)
"COMPLEX*8$$$$$$$$$$$$$$$$$$$$" "C*8$" (8 byte wide)
- four byte field with the first half (two bytes) containing the two"s complement floating point representation value of the real component and the second half containing the imaginary component.Similarly for the eight byte type, with each half of the field containing the real and imaginary pairs.

"COMPLEX$INTEGER*2$$$$$$$$$$" "CI*2" (2 byte wide)
"COMPLEX$INTEGER*4$$$$$$$$$$" "CI*4" (4 byte wide)
"COMPLEX$INTEGER*8$$$$$$$$$$" "CI*8" (8 byte wide)
- similar to the complex floating point representation above except that each component is stored as a two"s complement integer.

"COMPLEX$SIGNED$INTEGER*2$$$$" "CIS2" (2 byte wide)
"COMPLEX$SIGNED$INTEGER*4$$$$" "CIS4" (4 byte wide)
"COMPLEX$SIGNED$INTEGER*8$$$$" "CIS8" (8 byte wide)
- similar to the complex floating point representation above except that each component is stored as a signed integer.

"COMPLEX*4$HEXADECIMAL$$$$$$" "C*4H" (4 byte wide)
"COMPLEX*8$HEXADECIMAL$$$$$$" "C*8H" (8 byte wide)
- same as the floating point complex notation above except that the representation follows the hexadecimal conventions.

Records in products	**CEOS Codes**
Volume Directory File	
- VOLUME DESCRIPTOR RECORD	(192,192,18,18)
- FILE POINTER RECORD	(219,192,18,18)
- TEXT RECORD	(18,63,18,18)
Leader File	
- FILE DESCRIPTOR RECORD	(63,192,18,18)
- ALT.WDR DATA SET SUMMARY RECORD	(10,20,36,50)
- EODC ALT.WDR PRODUCT QUALITY SUMMARY RECORD	(10,21,36,50)
- INSTRUMENT CHARACTERISTICS RECORD	(10,23,36,50)
ALT Data File	
- FILE DESCRIPTOR RECORD	(63,192,18,18)
- PROCESSED DATA RECORD	(70,20,36,50)
Null Volume	
- NULL VOLUME DESCRIPTOR RECORD	(192,192,63,18)

Note:

Fields not provided are filled with blanks or meaningless values as -9999999.9999999 in case, for instance, of fields whose format is F16.7.

TABLE 2.1 VOLUME DESCRIPTOR RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record sequence number	(1)
2	5	B1	1-st record subtype code	(192)
3	6	B1	Record type code	(192)
4	7	B1	2-nd subtype code	(18)
5	8	B1	3-rd subtype code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag	A$
8	15-16	A2	blanks	$$
9	17-28	A12	format control document	CCB-CCB-0002
10	29-30	A2	Superstructure format control document	A$
11	31-32	A2	Superstructure record format revision	A$
12	33-44	A12	Logical volume generating facility software release and revision level	<software.id.>
13	45-60	A16	ID of physical volume containing this volume descriptor	<physical.tape.id.>
14	61-76	A16	Logical volume identifier	<logical.set.id.>
15	77-92	A16	Volume set identifier (product generation date) (YYYYMMDDhhmmssdd, dd=deci-secs)	<volume.set.id.>
16	93-94	I2	Total number of physical volumes in the logical volume	$1
17	95-96	I2	Physical volume sequence number of the first tape within the logical volume	$1
18	97-98	I2	Physical volume sequence number of the last tape within the logical volume	$1
19	99-100	I2	Physical volume sequence number of the current tape within the logical volume	$1
20	101-101	I4	First referenced file number in this physical volume whithin the logical volume.	$$$1
21	105-108	I4	Logical volume within a volume set	$$$1
22	109-112	I4	Logical volume number within physical volume	$$$1
23	113-120	A8	Logical volume creation date (YYYYMMDD)	<YYYYMMDD>
24	121-128	A8	Logical volume creation time (hhmmssdd, dd=deci-seconds)	<hhmmssdd>
25	129-140	A12	Logical volume generation country	<country..>
26	141-148	A8	Logical volume generating agency	<agency..>
27	149-160	A12	Logical volume generating facility	<facility.>
28	161-164	I4	Number of file pointer records in volume directory	$$$2
29	165-168	I4	Number of records in volume directory	$$$4
30	169-260	A92	Volume descriptor spare segment (always blank filled)	(blanks)
31	261-360	A100	Local use segment	(blanks)

TABLE 2.2 LEADER FILE POINTER RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record number	(2)
2	5	B1	1-st record subtype code	(219)
3	6	B1	record type code	(192)
4	7	B1	2-nd subtype code	(18)
5	8	B1	3-rd subtype code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag for referenced file	A$
8	15-16	A2	blank	$$
9	17-20	I4	Referenced file number	$$$1
10	21-36	A16	Referenced file name	ERS1.ALT.WDRDTOP
11	37-64	A28	Referenced file class	ALTLEADER$FILE$$$$$$
12	65-68	A4	Referenced file class code	ALTL
13	69-96	A28	Referenced file data type	MIXED$BINARY$AND$ASC
14	97-100	A4	Referenced file data type code	MBAA
15	101-108	I8	Number of records in referenced file	<nnnnnnnn>
16	109-116	I8	Referenced file 1-st record length	<nnnnnnnn>
17	117-124	I8	Referenced file maximum record length	$$$$1800
18	125-136	A12	Referenced file record length type	VARIABLE$LEN
19	137-140	A4	Referenced file record length type code	VARE
20	141-142	I2	Referenced file physical volume start number	$1
21	143-144	I2	Referenced file physical volume end number	$1
22	145-152	I8	Referenced file portion start, 1-st record number for this physical volume	$$$$$$$1
23	153-160	I8	Referenced file portion end, last record number for this physical volume	$$$$$$$4
24	161-260	A100	File pointer spare segment	(blanks)
25	261-360	A100	Local use segment	(blanks)

TABLE 2.3 DATA FILE POINTER RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record number	(3)
2	5	B1	1-st record subtype code	(219)
3	6	B1	record type code	(192)
4	7	B1	2-nd subtype code	(18)
5	8	B1	3-rd subtype code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag for referenced file	A$
8	15-16	A2	blank	$$
9	17-20	I4	Referenced file number	$$$2
10	21-36	A16	Referenced file name	ERS1.ALT.WDRDTOP
11	37-64	A28	Referenced file class	DATA$TYPE$OPTIONS$FILE
12	65-68	A4	Referenced file class code	DTOP
13	69-96	A28	Referenced file data type	MIXED$BINARY$AND$ASCII
14	97-100	A4	Referenced file data type code	MBAA
15	101-108	I8	Number of records in referenced file	<nnnnnnnn>
16	109-116	I8	Referenced file 1-st record length	<nnnnnnnn>
17	117-124	I8	Referenced file maximum record length	$$$$9046
18	125-136	A12	Referenced file record length type	VARIABLE$LEN
19	137-140	A4	Referenced file record length type code	VARI
20	141-142	I2	Referenced file physical volume start number	$1
21	143-144	I2	Referenced file physical volume end number	$1
22	145-152	I8	Referenced file portion start, 1-st record number for this physical volume	<$$$$$$$1>
23	153-160	I8	Referenced file portion end, last record number for this physical volume	<nnnnnnnn>
24	161-260	A100	File pointer spare segment	(blanks)
25	261-360	A100	Local use segment	(blanks)

TABLE 2.4 TEXT RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	record number	
2	5	B1	1st record sub-type code	(18)
3	6	B1	record type code, always	(63)
4	7	B1	2nd record sub-type code	(18)
5	8	B1	3rd record sub-type code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag for this record, always='A$' for ASCII or 'E$' for EBCDIC	
8	15-16	A2	Continuation flag=$$	
9	17-48	A32	Product identifier	
10	49-106	A58	Location and date/time of product generation	
11	107-130	A24	physical tape identification	
12	131-160	A32	spare	
13	161-256	A96	spare	
14	257-360	A104	blanks	

TABLE 3.1 ALTLEADER FILE - FILE DESCRIPTOR RECORD (FIXED SEGMENT) DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION AND/OR CONTENT	CONTENT
1	1-4	B4	Record sequence number	(1)
2	5	B1	1-st record sub-type code	(63)
3	6	B1	Record type code	(192)
4	7	B1	2-nd record sub-type code	(18)
5	8	B1	3-rd record sub-type code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag	$A
8	15-16	A2	blanks	$$
9	17-28	A12	Format control document ID for this data file format	ERS1-ALT-CCT
10	29-30	A2	Format control document revision level	$A
11	31-32	A2	File design descriptor revision letter	$A
12	33-44	A12	Generating software release and revision level	<software.id.>
13	45-48	I4	File number	$$$1
14	49-64	A16	File name	ERS1.ALT.WDRLEAD
15	65-68	A4	Record sequence and location type flag	FSEQ
16	69-76	I8	Sequence number location	$$$$$$$1
17	77-80	I4	Sequence number field length	$$$4
18	81-84	A4	Record code and location type flag	FTYP
19	85-92	I8	Record code location	$$$$$$$5
20	93-96	I4	Record code field length	$$$4
21	97-100	A4	Record length and location type flag	FLGT
22	101-108	I8	Record length location	$$$$$$$9
23	109-112	I4	Record length field length	$$$4
24	113	A1	Reserved	blank
25	114	A1	Reserved	blank
26	115	A1	Reserved	blank
27	116	A1	Reserved	blank
28	117-180	A64	Reserved segment	blank

TABLE 3.1 ALT LEADER FILE - FILE DESCRIPTOR RECORD (Cont'd)
(VARIABLE SEGMENT) DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
29	181-186	I6	number of catalogue records	<$$$$$0>
30	187-192	I6	length of above records	
31	193-198	I6	reserved	
32	199-204	I6	reserved	
33	205-210	I6	number of platform pos. data records	<$$$$$0>
34	211-216	I6	length of above records	
35	217-222	I6	number of attitude data records	<$$$$$0>
36	223-228	I6	length of above records	
37	229-234	I6	reserved	
38	235-240	I6	reserved	
39	241-246	I6	number of OBOG Time correlation records	<$$$$$0>
40	247-252	I6	length of above records	
41	253-258	I6	reserved	
42	259-264	I6	reserved	
43	265-270	I6	number of sensor parameters data records	<$$$$$0>
44	271-276	I6	length of above records	
45	277-282	I6	number of calibration data records	<$$$$$0>
46	283-288	I6	length of above records	
47	289-360	A72	spare	
48	361-366	I6	Number of ALT Data Set Summary Records	<$$$$$1>
49	367-372	I6	ALT Data Set Summary Record Length	<$$1800>
50	373-390	I18	Reserved	
51	391-396	I6	reserved	
52	397-402	I6	reserved	
53	403-408	I6	reserved	
54	409-414	I6	reserved	
55	415-426	I12	Reserved	
56	427-438	I12	Reserved	
57	439-450	I12	Reserved	
58	451-462	I12	Reserved	
59	463-474	I12	Reserved	
60	475-480	I6	Number of EODC Product Quality Summary Records	<$$$$$1>
61	481-486	I6	EODC Product Quality Summary Record Length	<$$$260>
62	487-492	I6	Number of Instrument Characteristics Records	<$$$$$1>
63	493-498	I6	Instrument Characteristics Record Length	<$$$768>
64	499-512	A14	spare	

TABLE 3.2 WDR DATA SET SUMMARY RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Recorequence Number	(2)
2	5	B1	File Code	(10)
3	6	B1	Record Code	(20)
4	7	B1	Mission Code	(36)
5	8	B1	Origin Code	(50)
6	9-12	B4	Length of this record	(1800)
7	13-16	I4	Data Set Summary Record Sequence Number	
8	17-20	I4	ALT Channel Indicator	
9	21-36	A16	Pass Identification	
10	37-68	A32	Pass Designator	
11	69-100	A32	Pass Start Time <YYYYMMDDHHMMSSmmm+15blanks>	
12	101-132	A32	Pass End Time <YYYYMMDDHHMMSSmmm+15blanks>	
13	133-148	F16.7	Pass Start Latitude in degrees	
14	149-164	F16.7	Pass Start Longitude in degrees	
15	165-180	F16.7	Pass End Latitude in degrees	
16	181-196	F16.7	Pass End Longitude in degrees	
17	197-212	A16	Ellipsoid Designator	
18	213-228	F16.7	Ellipsoid Semi-Major Axis (Re)	
19	229-244	F16.7	Ellipsoid Semi-Minor Axis	
20	245-260	F16.7	Earth Mass (M)	
21	261-276	F16.7	Gravitational Constant (G)	
22	277-292	F16.7	Ellipsoid J2 Parameter	
23	293-308	F16.7	Ellipsoid J3 Parameter	
24	309-324	F16.7	Ellipsoid J4 Parameter	
25	325-332	A8	reserved	
26	333-348	F16.7	Pass Length (Km)	
27	349-372	A24	reserved	
28	373-376	I4	no. of ALT Channels	
29	377-392	A16	Sensor Platform Mission Identifier	
30	393-416	A24	Sensor and Mode of Operation for this Channel <AAAAAABBCC$$$$> with AAAAAA = Sensor ID (ERS-1 ALT) BB = ALT band CC = resolution mode code	
31	417-424	A8	orbit Number	
32	425-440	A16	spare	
33	441-456	F16.7	Radar Wavelength (metres)	
34	457-472	A16	reserved	
35	473-488	A16	Transmitted pulse code specifier (e.g. Linear FM modulated chirp, etc)	
36	489-504	F16.7	Transmitted Pulse Coefficient 1 (Chirp = range chirp constant term (offset from DC)(Hz)	
37	505-520	F16.7	Transmitted Pulse Coefficient 2 (Chirp = range chirp linear term (Hz/sec)	
38	521-536	F16.7	Sampling Rate in Hz	
39	537-552	F16.7	Transmitted Pulse Length (microseconds)	
40	553-560	I8	quantization in bits per channel	
41	561-572	A12	quaantizer descriptor	
42	573-576	A4	Echo Tracker on/off designator ($$ON/$OFF)	

TABLE 3.2 WDR DATA SET SUMMARY RECORD (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
43	577-592	F16.7	Nominal PRF (Hz)
44	593-608	F16.7	Antenna 3dB Beamwidth (degrees)
45	609-624	A16	processing Facility Identifier
46	625-632	A8	Processing System Identifier
47	633-640	A8	Processing Version Codes
48	641-656	A16	Processing Facility Process Code
49	657-672	A16	Product Level Code
50	673-704	A32	Product Type Specifier
51	705-736	A32	processing Algorithm Identifier
52	737-740	I4	Data Averaging Factor
53	741-772	A32	Retracking Pulse Model Designator
54	773-804	A32	Tracker Type
55	805-820	F16.7	Nominal Sampling Time Interval in nsec
56	821-828	I8	Number of Tracker Parameters
57	829-844	F16.7	First Tracker Parameter
58	845-1800	F16.7	Rest of the Tracker Parameters

TABLE 3.3 EODC ALT.WDR PRODUCT QUALITY SUMMARY RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record Sequence Number	(3)
2	5	B1	File Code	(21)
3	6	B1	Record Code	(36)
4	7	B1	Mission Code	(50)
5	8	B1	Origin Code	(260)
6	9-12	B4	Length of this record	
7	13-16	I4	Product Quality Summary Record Sequence Number	
8	17-20	B4	Orbit number	
9	21-22	B2	Source packet count	
10	23-24	B2	Missing previous source packet count	
11	25-26	B2	Non-zero data degraded word source packet coun	
12	27-28	B2	Dummy source packet count	
13	29-30	B2	Source packet tracking on ocean count	
14	31-32	B2	Source packet tracking on ice count	
15	33-34	B2	Source packet acquisition ocean mode count	
16	35-36	B2	Source packet acquisition ice mode count	
17	37-38	B2	Source packet BITE mode count	
18	39-40	B2	Source packet closed-loop calibration count	
19	41-42	B2	Source packet RSS state on count	
20	43-44	B2	Source packet ground calibration count	
21	45-46	B2	Source packet with open loop ocean cal. count	
22	47-48	B2	Source packet with open loop ice cal. count	
23	49-50	B2	Source packet mode change count	
24	51-52	B2	Source packet with LOT assertion count	
25	53-54	B2	Source packet with LOT alarm count	
26	55-56	B2	Source packet preset tracking count	
27	57-58	B2	PCD bytes error flag count	
28	59-60	B2	alpha HTL filter error flag count	
29	61-62	B2	beta HTL filter error flag count	
30	63-64	B2	alpha STL filter error flag count	
31	65-66	B2	beta STL filter error flag count	
32	67-68	B2	alpha AGC filter error flag count	
33	69-70	B2	beta AGC filter error flag count	
34	71-72	B2	Power reference error flag count	
35	73-74	B2	Preset tracking duration error flag count	
36	75-76	B2	Preset time delay error flag count	
37	77-78	B2	Preset first deriv. of time delay error flag count	
38	79-80	B2	Preset AGC error flag count	
39	81-82	B2	Preset slope error flag count	
40	83-84	B2	Rx offset error flag count	
41	85-86	B2	Internal range correction error flag count	
42	87-88	B2	External range correction error flag count	
43	89-90	B2	Doppler range correction error flag count	
44	91-92	B2	Internal slope correction error flag count	
45	93-94	B2	External Hs correction error flag count	

TABLE 3.3 EODC ALT.WDR PRODUCT QUALITY SUMMARY RECORD (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
46	95-96	B2	AGC Internal correction error flag count
47	97-98	B2	Sigma0 correction error flag count
48	99-100	B2	Range Sigma0 correction error flag count
49	101-104	B4	Time delay error flag count
50	105-108	B4	Range error flag count
51	109-112	B4	HTL discr. error flag count
52	113-116	B4	HTL beta branch error flag count
53	117-120	B4	Range blunder point flag count
54	121-124	B4	Slope error flag count
55	125-128	B4	Hs error flag count
56	129-132	B4	STL discr. error flag count
57	133-136	B4	Hs blunder point flag count
58	137-140	B4	AGC error flag count
59	141-144	B4	Sigma0 error flag count
60	145-148	B4	AGC discr. error flag count
61	149-152	B4	Sigma0 blunder point flag count
62	153-156	B4	Waveform samples error flag count
63	157-160	B4	Bin gains error flag count
64	161-164	B4	Waveform sum error flag count
65	165-168	B4	Mispointing error flag count
66	169-170	B4	Orbit degraded flag count
67	171-176	B4	Waveform UT error flag count
68	177-180	B4	Latitude error flag count
69	181-184	B4	Longitude error flag count
70	185-188	B4	Altitude error flag count
71	189-192	B4	Attitude error flag count
72	193-196	B4	Peakiness flag count
73	197-200	B4	Multi-peaked flag count
74	201-204	B4	Strange-shape flag count
75	205-208	B4	Tracking error flag count
76	209-212	B4	Orbit number
77	213	B1	Total summary flag
78	214	B1	Packet checksum error summary flag
79	215	B1	alpha HTL filter error summary flag
80	216	B1	b HTL filter error summary flag
81	217	B1	alpha STL filter error summary flag
82	218	B1	b STL filter error summary flag
83	219	B1	a AGC filter error summary flag
84	220	B1	b AGC filter error summary flag
85	221	B1	Power reference error summary flag
86	222	B1	Preset tracking duration error summary flag
87	223	B1	Preset time delay error summary flag
88	224	B1	Preset first deriv. of time delay error summary flag
89	225	B1	Preset AGC error summary flag
90	226	B1	Preset slope error summary flag
91	227	B1	Rx offset error summary flag
92	228	B1	Internal range correction error summary flag
93	229	B1	External range correction error summary flag

TABLE 3.3 EODC ALT.WDR PRODUCT QUALITY SUMMARY RECORD (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
94	230	B1	Doppler range correction error summary flag
95	231	B1	Internal slope correction error summary flag
96	232	B1	External Hs correction error summary flag
97	233	B1	AGC Internal correction error summary flag
98	234	B1	Sigma0 correction error summary flag
99	235	B1	Range Sigma0 correction error summary flag
100	236	B1	Time delay error summary flag
101	237	B1	Range error summary flag
102	238	B1	HTL discr. error summary flag
103	239	B1	HTL beta branch error summary flag
104	240	B1	Range blunder point summary flag
105	241	B1	Slope error summary flag
106	242	B1	Hs error summary flag
107	243	B1	STL discr. error summary flag
108	244	B1	Hs blunder point summary flag
109	245	B1	AGC error summary flag
110	246	B1	Sigma0 error summary flag
111	247	B1	AGC discr. error summary flag
112	248	B1	Sigma0 blunder point summary flag
113	249	B1	Waveform samples error summary flag
114	250	B1	Bin gains error summary flag
115	251	B1	Waveform sum error summary flag
116	252	B1	Mispointing error summary flag
117	253	B1	Orbit degraded summary flag
118	254	B1	Waveform UT error summary flag
119	255	B1	Latitude error summary flag
120	256	B1	Longitude error summary flag
121	257	B1	Altitude error summary flag
122	258	B1	Attitude error summary flag
123	259	B1	Attitude error summary flag
124	260	B1	Reserved

TABLE 3.4 INSTRUMENT CHARACTERISTICS RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record Sequence Number	(4)
2	5	B1	File Code	(10)
3	6	B1	Record Code	(23)
4	7	B1	Mission Code	(36)
5	8	B1	Origin Code	(50)
6	9-12	B4	Length of this record	(768)
7	13-16	I4	Instrument Characteristics Record Sequence Number	
8	17-20	B4	Speed of light (c) (dm/s)	
9	21-24	B4	Semi-major axis of Earth ellipse (a) (dm)	
10	25-28	B4	Earth radius (dm)	
11	29-32	B4	Flattening of the Earth ellipse (f) (X 106)	
12	33-56	B24	Reserved	
13	57-58	B2	Low retrack fraction (% X 10)	
14	59-60	B2	Medium retrack fraction (% X 10)	
15	61-62	B2	High retrack fraction (% X 10)	
16	63-64	B2	Ocean peakiness threshold (X 1000)	
17	65-66	B2	Ocean width threshold (X 100)	
18	67-86	B20	Reserved	
19	87-90	B4	80 Mhz clock period (P80) (nsec X 104)	
20	91-94	B4	Pulse repetition frequency (PRF) (Hz X 106)	
21	95-98	B4	Nominal Pulse rep. frequency (Hz X 106)	
22	99-102	B4	Altimeter frequency (fo) (GHz X 104)	
23	103-104	B2	Ground calibration correction (Dg) (cm)	
24	105-232	64B2	AGC to sigma0 ocean table (X 100)	
25	233-360	64B2	AGC to sigma0 ice table (X 100)	
26	361-364	B4	Significant waveheight constant K1 (cm)	
27	365-366	B2	Significant waveheight constant K2 (m2 X 1000)	
28	367-368	B2	Significant waveheight constant Tz (X 1000)	
29	369-372	B4	Significant waveheight constant sp (X 104)	
30	373-376	B4	Standard power reference value (Poref) (dB X 104)	
31	377-504	64B2	64 pre-launch bin-gain corrections (X 100)	
32	505-632	64B2	64 bin-gain corrections (X 100)	
33	633-636	B4	Reference satellite altitiude (m)	
34	637-640	B4	Chirp bandwidth ocean (mHz X 104)	
35	641-644	B4	Chirp bandwidth ice (mHz X 104)	
36	645-646	B2	Chirp duration ocean (μs X 100)	
37	647-648	B2	Chirp duration ice (μs X 100)	
38	649-650	B2	Nominal compressed pulse length ocean (tocean) (ns X 1000)	
39	651-652	B2	Nominal compressed pulse length ice (tice) (ns X 1000)	

TABLE 3.4 INSTRUMENT CHARACTERISTICS RECORD (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
40	653-656	B4	Bin to metres ocean (X 105)
41	657-660	B4	Bin to metres ice (X 105)
42	661-664	B4	Antenna beam width (millidegrees)
43	665-668	B4	Antenna aperture constant (X 107)
44	669-672	B4	Nominal Preset duration for calibration SPTR mode
45	673-674	I2	Range window alias lower limit ocean
46	675-676	I2	Range window alias upper limit ocean
47	677-678	I2	Range window alias lower limit ice
48	679-680	I2	Range window alias upper limit ice
49	681-682	I2	Window centre ocean
50	683-684	I2	Window centre ice 1/4
51	685-686	I2	Window centre ice 1/2
52	687-688	I2	Window centre ice 3/4
53	689-692	I4	RX init ocean
54	693-696	I4	RX init ice
55	697-700	I4	PTR nominal amplitude
56	701-702	I2	PTR window centre ocean
57	703-704	I2	PTR window centre ice
58	705-708	B4	Spacecraft Centre of Gravity Offset (m X 104)
59	709-712	B4	Antenna/platform roll offset (millidegrees)
60	713-716	B4	Antenna/platform pitch offset (millidegrees)
61	717-720	B4	Antenna/platform yaw offset (millidegrees)
62	721-724	B4	Datation bias (msec X 100)
63	725-728	B4	External calibration altitude correction (mm)
64	729-768	B40	Reserved

TABLE 4.1 DATA TYPE OPTION FILE - FILE DESCRIPTOR RECORD (FIXED SEGMENT) DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record sequence number	(1)
2	5	B1	1-st record sub-type code	(63)
3	6	B1	Record type code	(192)
4	7	B1	2-nd record sub-type code	(18)
5	8	B1	3-rd record sub-type code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag	A$
8	15-16	A2	blanks	$$
9	17-28	A12	Format control document ID for this data file format	ERS1-ALT-CCT
10	29-30	A2	Format control document revision level	$A
11	31-32	A2	File design descriptor revision letter	$A
12	33-44	A12	Generating software release and revision level	<software.id.>
13	45-48	I4	File number	$$$2
14	49-64	A16	File name	ERS1.ALT.WDRDTOP
15	65-68	A4	Record sequence and location type flag	FSEQ
16	69-76	I8	Sequence number location	$$$$$$$1
17	77-80	I4	Sequence number field length	$$$4
18	81-84	A4	Record code and location type flag	FTYP
19	85-92	I8	Record code location	$$$$$$$5
20	93-96	I4	Record code field length	$$$4
21	97-100	A4	Record length and location type flag	FLGT
22	101-108	I8	Record length location	$$$$$$$9
23	109-112	I4	Record length field length	$$$4
24	113	A1	Reserved	blank
25	114	A1	Reserved	blank
26	115	A1	Reserved	blank
27	116	A1	Reserved	blank
28	117-180	A64	Reserved segment	blank

TABLE 4.1 ALT DATA OPTIONS FILE - FILE DESCRIPTOR RECORD (Cont'd)
(VARIABLE SEGMENT) DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION
29	181-186	I6	Number of Data records in the DATA FILE
30	187-192	I6	Record Length
31	193-216	A24	spare
32	217-220	I4	Number of records in a product
33	221-228	I8	Length of a product
34	229-336	A8	spare
37	237-240	I4	Number of lines in a product
38	241-244	I4	Number of measures per line
39	245-248	I4	spare
40	249-254	I6	Length of a line
41	255-260	I6	Length of a measure
42	261-268	I8	spare
43	269-272	A4	Interleaved indicator
44	273-276	I4	Length of the Main Product Header
45	277-280	I4	Length of the Secondary Product Header
46	281-288	I8	spare
47	289-292	I4	reserved
48	293-296	I4	reserved
49	297-360	A64	spare
50	361-366	I6	Number of ALT Data Records
51	367-372	I6	ALT Data Record Length
52	373-378	I6	Number of Signal Data Records
53	379-384	I6	Signal data record length
54	385-388	I4	Number of Records in Product
55	389-394	I6	Length of Product
56	395-398	I4	Number of Bytes of Prefix Data per Record
57	399-406	I8	Number of Bytes of Data per Record
58	407-410	I4	Number of Bytes of Suffix Data per Record
59	411-414	A4	Prefix/Suffix Repeat Flag
60	415-EOR	A	reserved

TABLE 4.2 DATA OPTIONS FILE - ALT.WDR DATA RECORD DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record Sequence Number	(2)
2	5	B1	File Code	(70)
3	6	B1	Record Code	(20)
4	7	B1	Mission Code	(36)
5	8	B1	Origin Code	(50)
6	9-12	B4	Length of this record	
	13 32		Prefix Data	
7	13-16	B4	Source packet No within product (1-n)	
8	17-20	B4	Orbit Number	
9	21-24	B4	Source Packet UTC - 4 most sig bytes (No of days MJD)	
10	25-28	B4	Source Packet UTC - milliseconds of day	
11	29-32	B4	Source Packet UTC - microseconds remaining	
	33 5132		ALT Processed Data	
12	33-34	B2	Packet ID (status identifier)	
13	35-36	B2	Packet Sequence Control	
14	37-38	B2	Packet Length	
15	39-43	B5	S/C Binary Counter	
16	44-44	B1	Data Subset Counter	
17	45-48	B4	a HTL Filter (X 1010)	
18	49-52	B4	b HTL Filter (X 1010)	
19	53-60	2B4	a STL Filter (X 1010)	
20	61-64	B4	b STL Filter (X 1010)	
21	65-68	B4	a AGC Filter (X 1010)	
22	69-72	B4	b AGC Filter (X 1010)	
23	73-76	B4	Power Reference Value (FPDU X 100)	
24	77-82	B6	Spares	
25	83-86	B4	Preset Duration	
26	87-90	B4	Preset Time Delay (12.5ns X 1000)	
27	91-94	B4	Preset First Derivative of Time Delay (12.5ns/PRI X 106)	
28	95-98	B4	Preset AGC (dB X 100)	

TABLE 4.2 DATA OPTIONS FILE - ALT.WDR DATA RECORD DEFINITION (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
29	99-102	B4	Preset Slope (slope units X 100)
30	103-106	B4	RX Offset (12.5ns X 1000)
31	107-140	B34	Spares
			For each of 20 science blocks:
			First science block
32	141-142	B2	Mode ID
33	143-146	B4	Noise Floor Estimation (FPDU X 100)
34	147-150	B4	HTL Discriminator o/p (12.5NS X 10000)
35	151-154	B4	STL Discriminator o/p (slope units X 100)
36	155-158	B4	AGC Discriminator o/p (counts X 10)
37	159-162	B4	HTL Beta Branch (X 106)
38	163-290	64B2	64 Waveform Samples
39	291-294	B4	Time Delay (12.5ns X 1000)
40	295-298	B4	Slope (slope units X 100)
41	299-302	B4	AGC (dB X 100)
			42 to 231 - other 19 science blocks
			end of 20 science blocks
232	3381-3384	B4	PCD bytes
			The following (once per source packet):
233	3385-3388	B4	Science block valid word
234	3389-3390	B2	Spares
235	3391-3394	B4	Data degraded word
236	3395-3396	B2	Auxiliary Data Limit Flags Halfword
237	3397-3400	B4	Ocean/Ice Mode Flags Word
			The following repeated 20 times (once per science block):
238	3401-3402	B2	Frame number
239	3403-3406	B4	Range (mm)
240	3407-3410	B4	Hs (mm)
241	3411-3414	B4	Sigma0 (dB X 100)
			Waveform parameters:
242	3415-3418	B4	Waveform amplitude (counts X 100)
243	3419-3422	B4	Waveform width (mm)

TABLE 4.2 DATA OPTIONS FILE - ALT.WDR DATA RECORD DEFINITION (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
244	3423-3426	B4	Low retrack point (bins X 100)
245	3427-3430	B4	Medium retrack point (bins X 100)
246	3431-3434	B4	High retrack point (bins X 100)
247	3435-3438	B4	Waveform peakiness (X 1000)
248	3439-3442	B4	Waveform latitude
249	3443-3446	B4	Waveform longitude
250	3447-3450	B4	Altitude (mm)
251	3451-3451	B1	Range error flags byte
252	3452-3452	B1	Hs error flags byte
253	3453-3453	B1	Sigma0 error flags byte
254	3454-3454	B1	Waveform error flags byte
255	3455-3455	B1	Waveform shape flags byte
256	3456-3456	B1	Location error flags byte

257 to 617 - remaining 19 groups of waveform data

Then the following parameters, once per source packet:

618	4521-4524	B4	Range constant (mm)
619	4525-4528	B4	Range std. dev., RSD (mm)
620	4529-4532	B4	Range Gradient (ms-1 X 100)
621	4533-4536	B4	Spares
622	4537-4540	B4	Range values used, n
623	4541-4544	B4	Hs mean, Hmean (mm)
624	4545-4548	B4	Hs values used, nh
625	4549-4552	B4	Hs std. dev., HSD (mm)
626	4553-4556	B4	Sigma0 mean, Smean (dB X 10)
627	4557-4560	B4	Sigma0 std. dev., SSD (mm)
628	4561-4564	B4	Sigma0 values used, ns
629	4565-4566	B2	Range corrections error flags word
630	4567-4567	B1	Hs correction error flags byte
631	4568-4568	B1	Sigma0 corr.error flags byte
632	4569-4572	B4	Mispointing (microdegrees)
633	4573-4584	B12	Spares
634	4585-4588	B4	Yaw (microdegrees)
635	4589-4592	B4	Roll (microdegrees)
636	4593-4596	B4	Pitch (microdegrees)
637	4597-4608	B12	Spares

TABLE 4.2 DATA OPTIONS FILE - ALT.WDR DATA RECORD DEFINITION (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
The following corrections, once per source packet:			
638	4609-4612	B4	Internal Range Correction (mm)
639	4613-4616	B4	External Range Correction (mm)
640	4617-4624	2B4	Pulse Repetition Period (Hz X 108)
641	4625-4628	B4	Internal Slope Correction (FPDU/bin X 100)
642	4629-4632	B4	External Hs Correction (mm)
643	4633-4636	B4	AGC Correction (dB X 100)
644	4637-4640	B4	Sigma0 Correction (dB X 100)
645	4641-4896	64B4	64 Bin Gain Corrections (X 1000)
646	4897-4900	B4	Doppler Range Correction (mm)
647	4901-4904	B4	Range sigma0 Correction (dB X 100)
The followig 19 parameter locations contain zero as they are reserved for completion during altimeter update processing:			
648	4905-4908	B4	Ionospheric Delay Correction (mm)
649	4909-4912	B4	PRARE Data Correction (mm)
650	4913-4916	B4	Electron Content (electrons m-2 X 1016 X 10)
651	4917-4920	B4	Dry tropo range correction (mm)
652	4921-4924	B4	Surface pressure (mbars X 10)
653	4925-4928	B4	Wet tropospheric range correction.[GFA] (mm)
654	4929-4932	B4	Surface air temperature, T0 (K X 10)
655	4933-4936	B4	Total integrated water vapour, Q [GFA] (kg m-2 X 10)
656	4937-4940	B4	Wet tropospheric range correction.[ATSR-M] (mm)
657	4941-4944	B4	Wet tropospheric range correction .[SSM/I] (mm)
658	4945-4948	B4	Wet tropospheric range correction.[Rad Snd] (mm)
659	4949-4952	B4	Integral of function rw(h)/T(h) (kg m-2 K-1 X 1000)
660	4953-4956	B4	Total integrated water vapour, Q [ATSR-M] (kg m-2 X 10)
661	4957-4960	B4	Total integrated water vapour, Q [SSM/I] (kg m-2 X 10)
662	4961-4964	B4	Total integrated water vapour, Q [Rad Snd] (kg m-2 X 10)
663	4965-4968	B4	Liquid water range correction (mm)
664	4969-4972	B4	Liquid water attenuation correction (dB X 100)
665	4973-4976	B4	Total liquid water, L ((kg m-2 X 10)
666	4977-4980	B4	Atmos. Corrections Status Word
667	4981-4984	B4	Terrain type flag
668	4985-4988	B4	Land/sea flags word (20bits)
669	4989-4992	B4	Coastline flags word (20bits)
670	4993-4996	B4	Possible sea-ice word (20bits)
671	4997-5000	B4	Spacecraft health word
672	5001-5004	B4	Spacecraft C-of-G offset (mm)
673	5005-5008	B4	Geoid elevation (mm)
674	5009-5010	B2	Earth Tide
675	5011-5012	B2	Ocean Tide
676	5013-5014	B2	Ocean Loading Tide

TABLE 4.2 DATA OPTIONS FILE - ALT.WDR DATA RECORD DEFINITION (Cont'd)

FIELD	BYTES	FORMAT	DESCRIPTION
Corresponding FD product (if available, otherwise zero filled)			
677	5015-5018	B4	FD Data Record Number
678	5019-5042	A24	FD UTC Time
679	5043-5046	B4	FD Latitude
680	5047-5050	B4	FD Longitude
681	5051-5052	B2	FD wind speed, U10
682	5053-5054	B2	FD Windspeed Std. Dev.
683	5055-5056	B2	FD Significant Waveheight, Hs
684	5057-5058	B2	FD SWH Std. Dev
685	5059-5062	B4	FD Altitude, H
686	5063-5066	B4	FD Altitude Std. Dev.
687	5067-5068	B2	FD Number of Blocks Used for Averaging
688	5069-5069	B1	FD Product Confidence Data
689	5070-5071	B2	FD Average Peakiness
690	5072-5075	B4	FD Spares
691	5076-5076	B1	FD Open Loop Calibration Status
692	5077-5077	B1	FD Instrument Mode Byte
693	5078-5078	B1	FD Spare
694	5079-5082	B4	FD Attitude Correction - ionosphere
695	5083-5086	B4	FD Attitude Correction - dry tropospheric
696	5087-5090	B4	FD Attitude Correction - wet tropospheric
697	5091-5094	B4	FD Attitude Correction - cal. constant
698	5095-5098	B4	FD Open Loop HTL - cal. correction
699	5099-5102	B4	FD Open Loop AGC - cal. correction
700	5103-5106	A4	Orbit type corresponding to Source Packet Centre UTC
701	5107-5110	B4	Update Status Word
702	5111-5120	B10	Spares
703	5121-5124	B4	Source Packet Centre UTC - 4 most sig bytes (No of days MJD)
704	5125-5128	B4	Source Packet Centre UTC - milliseconds of day
705	5129-5132	B4	Source Packet Centre UTC - microseconds remaining
			Suffix Data
706	5133-5136	B4	Actual Number of Waveforms in this data record 20 M
			Quality Codes
707	5137-EOR		Processing Specific Details (Facility Specific Including Quality Information)

TABLE 5.1 NULL VOLUME DESCRIPTOR RECORD

FIELD	BYTES	FORMAT	DESCRIPTION	CONTENT
1	1-4	B4	Record sequence number	(1)
2	5	B1	1-st record subtype code	(192)
3	6	B1	Record type code	(192)
4	7	B1	2-nd subtype code	(63)
5	8	B1	3-rd subtype code	(18)
6	9-12	B4	Length of this record	(360)
7	13-14	A2	ASCII/EBCDIC flag	A$
8	15-16	A2	blanks	$$
9	17-28	A12	format control document	CCB-CCT-0002
10	29-30	A2	Superstructure format control document	A$
11	31-32	A2	Superstructure record format revision	A$
12	33-44	A12	Logical volume generating facility software release and revision level	<software.id.>
13	45-60	A16	ID of physical volume containing this volume descriptor	<physical.tape.id.>
14	61-76	A16	Logical volume identifier	<logical.set.id.>
15	77-92	A16	Volume set identifier	<volume.set.id.>
16	93-94	I2	Total number of physical volumes in the logical volume	$1
17	95-96	I2	Physical volume sequence number of the first tape within the logical volume	$1
18	97-98	I2	Physical volume sequence number of the last tape within the logical volume	$1
19	99-100	I2	Physical volume sequence number of the current tape within the logical volume	$1
20	101-101	I4	First referenced file number in this physical volume whithin the logical volume.	$$$1
21	105-108	I4	Logical volume within a volume set	$$$1
22	109-112	I4	Logical volume number within physical volume	$$$1
23	113-120	A8	Logical volume creation date (YYYYMMDD)	<YYYYMMDD>
24	121-128	A8	Logical volume creation time (hhmmssdd, dd=deci-seconds)	<hhmmssdd>
25	129-140	A12	Logical volume generation country	<country..>
26	141-148	A8	Logical volume generating agency	<agency..>
27	149-160	A12	Logical volume generating facility	<facility.>
28	161-164	I4	Number of file pointer records in volume directory	$$$0
29	165-168	I4	Number of records in volume directory	$$$1
30	169-260	A92	Volume descriptor spare segment (always blank filled)	(blanks)
31	261-360	A100	Local use segment	(blanks)