ANNEX B

ERS-1 ALT.FDC PRODUCT

CCT FORMAT

EARTHNET PROGRAMME OFFICE

Altimeter Fast Delivery Copy

Acronym: **ALT.FDC**

The product is a copy of the product generated in real time by the acquisition stations. It contains an averaged wind speed, wave height, and satellite altitude together with the standard deviations (one per quantity) for single cells along the satellite track. One cell is sampled every 6.725 km and there is a maximum of 20 measured values during one second. Seventy seven cells are combined in one product and represent an area of approximately 500 km.

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)

b) Leader File:

file descriptor record	360 bytes (mandatory)
FDC catalogue record(s)	1370 bytes (mandatory)

c) Data Set File:

file descriptor record	360 bytes (mandatory)
data records	7028 bytes (mandatory)

d) Null Volume File:

volume descriptor record	360 bytes (mandatory)

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	$$
9	17-28	A12	format control document	CCB-CCT-0002
10	29-30	A2	Superstructure format control document	A$
11	31-32	A2	Superstructure record format revision	A$
12	33-44	A12	Logical volume generating facility software release and revision level	<software.id.>
13	45-60	A16	ID of physical volume containing this volume descriptor	<physical.tape.id.>
14	61-76	A16	Logical volume identifier	<logical,set.id.>
15	77-92	A16	Volume set identifier (product generation date) (YYYYMMDDhhmmssdd, dd=deci-secs)	<volume.set.id.>
16	93-94	I2	Total number of physical volumes in the logical volume	$1
17	95-96	I2	Physical volume sequence number of the first tape within the logical volume	$1
18	97-98	I2	Physical volume sequence number of the last tape within the logical volume	$1
19	99-100	I2	Physical volume sequence number of the current tape within the logical volume	$1
20	101-101	I4	First referenced file number in this physical volume whithin the logical volume.	$$$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	$$$2
29	165-168	I4	Number of records in volume directory	$$$3
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.FDCLEAD
11	37-64	A28	Referenced file class	ALTLEADER$FILE$$$$$$
12	65-68	A4	Referenced file class code	ALTL
13	69-96	A28	Referenced file data type	MIXED$BINARY$AND$ASC
14	97-100	A4	Referenced file data type code	MBAA
15	101-108	I8	Number of records in referenced file	<nnnnnnnn>
16	109-116	I8	Referenced file 1-st record length	$$$$$360
17	117-124	I8	Referenced file maximum record length	$$$$1370
18	125-136	A12	Referenced file record length type	VARIABLE$LEN
19	137-140	A4	Referenced file record length type code	VARE
20	141-142	I2	Referenced file physical volume start number	$1
21	143-144	I2	Referenced file physical volume end number	$1
22	145-152	I8	Referenced file portion start, 1-st record number for this physical volume	$$$$$$$1
23	153-160	I8	Referenced file portion end, last record number for this physical volume	<nnnnnnnn>
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.FDCDTOP
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	$$$$$360
17	117-124	I8	Referenced file maximum record length	$$$$7028
18	125-136	A12	Referenced file record length type	VARIA$LENGTH
19	137-140	A4	Referenced file record length type code	VARI
20	141-142	I2	Referenced file physical volume start number	$1
21	143-144	I2	Referenced file physical volume end number	$1
22	145-152	I8	Referenced file portion start, 1-st record number for this physical volume	<$$$$$$$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 3.1 ALTLEADER FILE - FILE DESCRIPTOR RECORD (FIXED SEGMENT) DEFIN'TION

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.FDCLEAD
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 3.2 ALTLEADER FILE - FILE DESCRIPTOR RECORD (VARIABLE SEGMENT) DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION	
29	181-186	I6	number of catalogue records	<nnnnnn>
30	187-192	I6	length of above records	$$1370
31	193-198	I6	reserved	
32	199-204	I6	reserved	
33	205-210	I6	number of platform pos. data records	$$$$$0
34	211-216	I6	length of above records	$$$$$0
35	217-222	I6	number of attitude data records	$$$$$0
36	223-228	I6	length of above records	$$$$$0
37	229-234	I6	reserved	
38	235-240	I6	reserved	
39	241-246	I6	number of OBOG Time correlation records	$$$$$0
40	247-252	I6	length of above records	$$$$$0
41	253-258	I6	reserved	
42	259-264	I6	reserved	
43	265-270	I6	number of sensor parameters data records	$$$$$0
44	271-276	I6	length of above records	$$$$$0
45	277-282	I6	number of calibration data records	$$$$$0
46	283-288	I6	length of above records	$$$$$0
47	289-294	I6	reserved	
48	295-300	I6	reserved	
49	301-306	I6	reserved	
50	307-312	I6	reserved	
51	313-318	I6	reserved	
52	319-324	I6	reserved	
53	325-330	I6	reserved	
54	331-336	I6	reserved	
55	337-342	I6	reserved	
56	343-348	I6	reserved	
57	349-354	I6	reserved	
58	355-360	I6	reserved	

TABLE 3.3 ALTLEADER FILE CATALOGUE RECORD DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION	
1	1-4	B4	record sequence number	(n)
2	5	B	1-st record subtype code	(10)
3	6	B	record type code	(11)
4	7	B	2-nd subtype code	(36)
5	8	B	3-rd subtype code	(50)
6	9-12	B4	Record Length	(1370)
7	13-16	I4	Second Sequence Number incremented at each record, updated to 1 when the type changes	
8	17-20	I4	Number of catalogue sub-record per record (10 maximum)	
9	21-30	F10.4	Dataset Ident = revolution nb. frame nb.The revolution number corresponds to an absolute orbit number incremented at the ascending node. The frame number is varying from 0 at ascending node to 7199 each 0.05 deg of the sub-satellite track.	
10	31-47	A17	Station product identifier corresponds to the product id.present in the Main Product Header of the FDP.	
11	48	A1	Sensor mode : 0 = Ocean mode	
12	49-51	I3	Number of measures	
13	52-71	A20	Processing date	
14	72-75	F4.2	CERSAT software version number	
15	76	I1	FDP quality indicator from 0 to 9 (best to worst quality)	
16	77-82	F6.2	Start Latitude in degrees. A negative value denotes South latitude and a positive value denotes North latitude	
17	83-88	F6.2	Start Longitude in degrees (0.00 - 360.00 from Greenwich to East)	
18	89-94	F6.2	End Latitude	
19	95-100	F6.2	End Longitude	
20	101-103	I3	Orbital cycle number	
21	104	A1	Orbital sense : A = Ascending	
22	105-108	I4	Orbit number in the cycle varying from 1 to 43 for the 3 days repeat cycle	
23	109-113	I5	Revolution number	
24	114-133	A20	Start Date (DD/MON/YYYY-HH:MI:SS)	
25	134-153	A20	End Date (DD/MON/YYYY-HH:MI:SS)	
26	154-155	A2	Station identifier : GS = Gatineau Station KS = Kiruna Station FS = Fucino Station	
2nd catalogue sub-record				
27	156-165	F10.4	Dataset ident	

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.FDCDTOP
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 4.2 DATA TYPE OPTIONS FILE - FILE DESCRIPTOR RECORD (VARIABLE SEGMENT) DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION
29	181-186	I6	number of DATA records in the DATA FILE
30	187-192	I6	length of the above records
31	193-216	A24	spare
32	217-220	I4	number of records in a product2-nd record s
33	221-228	I8	length of a product
34	229-236	A8	spare
35	237-240	I4	number of lines in a product
36	241-244	I4	number of measures per line
37	245-248	I4	spare
38	249-254	I6	length of a line
39	255-260	I6	length of a measure
40	261-268	I8	spare
41	269-272	A4	interleaving indicator
42	273-276	I4	length of main product header
43	277-280	I4	length of secondary product header
44	281-288	I8	spare
45	289-292	I4	$$$0
46	293-296	I4	$$$0
47	297-360	A64	spare

Data File Record
Each DATA FILE record (one fast delivery product) has the same structure. This structure consists of three parts.

Main Product Header	(176 bytes)
Specific Product Header	(56 bytes)
Data Set Record	(77x88 bytes)

The MPH is 176 bytes long and contains information applicable the processing chain.The specific product header is 56 bytes long and contains information specific to the processed cell

TABLE 4.3 DATA FILE RECORD DEFINITION

FIELD	BYTES	FORMAT	DESCRIPTION	
1	1-4	B4	Record sequence number	(n)
2	5	B1	1-st record sub-type code	(70)
3	6	B1	Record type code	(11)
4	7	B1	2-nd record sub-type code	(36)
5	8	B1	3-rd record sub-type code	(50)
6	9-12	B4	Length of this record	(7028)
7	13-16	A4	blanks	
8	17-20	A4	blanks	
	MPH start			
9	21-37	A17	reserved	
10	38-38	B1	Type of Product: 9 = Radar Altimeter (URA) l9 = Radar Altimeter Instrument eaders (ERAI	
11	39-39	B1	Spacecraft (1 = ERS-1)	
12	40-63	A24	UTC time of subsatellite point at beginning of product.Format in ASCII: "dd-mmm-yyyy hh:mm:ss.ttt"	
13	64-64	B1	Station ID, where data were processed :1 = Kiruna Station (KIR) 2 = Fucino Station (FUC), 3 = Maspalomas Station (MAS) 4 = Gatineau Station (GAT), 5 = Frascati Station (internal use)	
14	65-66	A2	reserved	
15	67-90	A24	UTC time when MPH was generated;	
16	91-94	B4	size of Specific Product Header Record in Bytes	
17	95-98	B4	number of Product Data Set Records	
18	99-102	B4	size of each Product Data Set Record in Bytes	
19	103-103	A1	reserved	
20	104-104	A1	reserved	
21	105-128	A24	UTC reference time.Time relation used to convert from satellite to ground, used together with the next two fields.	

TABLE 4.3 DATA FILE RECORD DEFINITION (Cont'ed)

FIELD	BYTES	FORMAT		DESCRIPTION
22	129-132	B4		reference binary time of satellite clock (32-bit unsigned integer)
23	133-136	B4		step length of satellite clock in nanoseconds
24	137-144	A8		reserved
25	145-146	A2		Threshold table version number.
26	147-148	B2		Spare
28	149-172	A24		UTC time of ascending node state vector in earth-fixed reference system
29	173-176	B4		State vector; X 10^{-2}m
30	177-180	B4		State vector; Y 10^{-2}m
31	181-184	B4		State vector; Z 10^{-2}m
32	185-188	B4		State vector; X velocity 10^{-5}m/s
33	189-192	B4		State vector; Y velocity 10^{-5}m/s
34	193-196	B4		State vector; Z velocity 10^{-5}m/s
	SPH start			
35	197-198	B2		reserved
36	199-202	B4		Geodetic latitude of data set record 1 (10^{-3}deg) A negative value denotes South latitude positive value denotes North latitude.
37	203-206	B4		East longitude of data set record 1 (i.e. 0-360° in 10^{-3} deg) from Greenwich to east)
38	207-210	B4		Subsatellite Track Heading at data set record 1.
39	211-214	B4		USO offset frequency with 10 Hz respect to 5 MHz
				Identifier of external tables:
40	215-216	B2	1	Global Threshold Parameter Table ID
41	217-218	B2	2	Static Parameters Parameter Table ID
42	219-220	B2	2	Dynamic Parameter Parameter Table ID
43	221-222	B2	2	τ^{G}_{REF} Parameter Table ID
44	223-224	B2	2	$TAB_{\tau 1}$ Parameter Table ID
45	225-226	B2	2	$TAB_{\tau 2}$ Parameter Table ID
46	227-228	B2	3	Reserved
47	229-230	B2	3	σ^{G}_{S}
48	231-232	B2	3	TAB_{S} Parameter Table ID
49	233-234	B2	3	Reserved
50	235-236	B2	3	A^{G}_{REF} Parameter Table ID
51	237-238	B2	4	Reserved

TABLE 4.3 DATA FILE RECORD DEFINITION (Cont'ed)

FIELD	BYTES	FORMAT		DESCRIPTION
52	239-240	B2	4	TAB_{A2} Parameter Table ID
53	241-242	B2	4	TAB_{LOC} Parameter Table ID
54	243-244	B2	4	Spare
55	245-246	B2	4	Spare
56	247-248	B2	5	Spare
57	249-250	B2	5	Spare
58	251-252	B2	5	Pressure Field Table ID
59	253-256	B4		Data record number
60	257-280	A24		UTC Time at middle of the source packet
61	281-284	B4		Geodetic latitude. (10^{-3} deg). A negative value denotes South latitude and a positive value denotes North latitude
62	285-288	B4		East longitude (i.e. 0-360° 10^{-3} deg from Greenwich to east)
63	289-290	B2		Average Wind Speed (10^{-2} m/s)
64	291-292	B2		Standard Deviation of Wind Speed (10^{-4} m/s)
65	293-294	B2		Average Significant Wave Height (10^{-2} m)
66	295-296	B2		Standard Deviation of Significant Wave Height (10^{-4} m)
67	297-300	B4		Average Altitude (corrected) (10^{-2} m)
68	301-304	B4		Standard Deviation of Altitude (corrected) (10^{-2} m)
69	305-306	B2		Number of blocks used for averaging
70	307-307	A1		reserved
71	308-309	B2		Average Peakiness (10^{-2})
72	310-311	B2		Spare
73	312-313	B2		Spare
74	314-314	B1		Open Loop Calibration Status: bit 1 Height Error Correction : 0 = from open loop calibration 1 = default bit 2 STL discriminator output correction: 0 = from open loop calibration; 1 = default bit 3 AGC output correction : 0 = from open loop calibration 1 = default
75	315-315	B1		Instrument Mode : bit 1 Blank data record, bit 2 Test, bit 3 Calibration (closed loop), bit 4 BITE , bit 5 Acquisition on Ice bit 6 Acquisition on Ocean, bit 7 Tracking on Ice, bit 8 Tracking on Ocean
76	316-316	B1		Spare
77	317-320	B4		Altitude Correction ionosphere (10^{-3} m)
78	321-324	B4		Altitude Correction wet troposphere (10^{-3} m)
79	325-328	B4		Altitude Correction dry troposphere (10^{-3} m)
80	329-332	B4		Altitude Correction calibration constant (10^{-3} m)
81	333-336	B4		Smoothed Open Loop HTL calibration correction (10^{-3} m)
82	337-340	B4		Smoothed Open Loop AGC calibration correction (10^{-3} m)

fields 59 to 82 are repeated 77 times

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)