Consortium Members

ESA Sea Level CCI

D2.8 INPUT OUTPUT DATA DOCUMENT (IODD)

Reference:	CLS-DOS-NT-13-252
Nomenclature:	SLCCI-IODD-34
Issue:	1. 0
Date:	Nov. 20, 13

Chronology Issues:			
Issue:	Date:	Reason for change:	Author
1.0	20/11/13	Creation of IODD Issue 1.0	F Mertz

People involved in this issue:		
Written by (*):	F Mertz (CLS)	Date + Initials:(visa or ref)
Checked by (*):	G Timms (CGI)	Date + Initial:(visa ou ref)
Approved by (*):	G Larnicol (CLS)	Date + Initial:(visa ou ref)
Application authorized by (*):	ESA	Date + Initial:(visa ou ref)

**In the opposite box: Last and First name of the person + company if different from CLS*

Index Sheet:	
Context:	Baghera tool, project ACT-OCEAN
Keywords:	Oceanography, sea level
Hyperlink:	

Distribution:		
Company	Means of distribution	Names
ESA	Email	Jerôme Benveniste, Bruno Manuel Lucas, Salvatore Dinardo
CLS	Email	Michael Ablain, Yannice Faugere, Gilles Larnicol
CGI	Email	Gary Timms

Copyright CLS.

List of tables and figures

List of tables:

List of figures:

Applicable documents

AD 1 Sea level CCI project Management Plan
CLS-DOS-NT-10-013

Reference documents

RD 1 Manuel du processus Documentation
CLS-DOC

RD *2* PVSAR: Selection Meeting Report
CLS-DOC-NT-12-125

RD 3 Algorithm Theoretical Basis Document (ATBDv1)
CLS-DOC-NT-11-009

RD 4 ALGORITHM DEFINITION, ACCURACY AND SPECIFICATION - BIBLI_ALTI : ALTIMETER LEVEL 2 PROCESSING: **SALP-ST-BA-EA-15598-CN**

RD 5 ALGORITHM DEFINITION, ACCURACY AND SPECIFICATION – SSALTO-DUACS : ALTIMETER LEVEL 3 and 4 PROCESSING: **CLS-DOC-NT-10-128**

Copyright CLS.

List of Contents

Copyright CLS.

Copyright CLS.

1. Introduction

1.1. Purpose and scope

This document is the input output data document (IODD) for the Sea Level ECV project. It describes the sets of data, which are inputs to, or outputs from the components of the sea Level processing system for the ESA Climate Change Initiative (CCI). The Sea Level processing system will be used to generate and continuously update the Sea Level FCDR and ECV products.

Most of the data defined in this document have already been described in detail in the frame of SSALTO programme. Therefore most of the data sets named in this document are briefly described, with references to the original defining document. For input or output data sets not described elsewhere, a detailed description is given.

1.2. Document structure

After this formal introduction,

- section 2 provides an overview of the Sea Level CCI processing chain and the data required for input and produced as output
- section 3 lists and describes the Level 2 data used in the Sea Level CCI processing system
- section 4 lists and describes the Level 3 data used in the Sea Level CCI processing system
- section 5 lists and describes the Level 4 data used in the Sea Level CCI processing system
- section 6 lists and describes the Level 5 data used in the Sea Level CCI processing system
- section 6 lists and describes the auxiliary data used in the Sea Level CCI processing system

2. The sea level processing chain and its products

This chapter intends to present an overview of the different processing steps activated to produce the Sea-Level CCI ECV products.

The following figure gives an overview of Sea-Level CCI system based on the CNES SSALTO/DUACS ground segment, where processing sequences can be divided into 8 main steps:

- Acquire Data
- Pre process data
- Perform input checks and Quality Control
- Generate Products
- Performs output checks and Quality Control
- Do measures and built indicators
- Store the built product datasets
- Archive / Retrieve a “Product Dataset”

The product generation is divided into three sub-steps:

Copyright CLS

- Inter calibrate & Unify
- Generate along track product
- Generate merged product

Each step has its sequence of algorithms that can be activated to generate Sea-Level CCI ECV products.

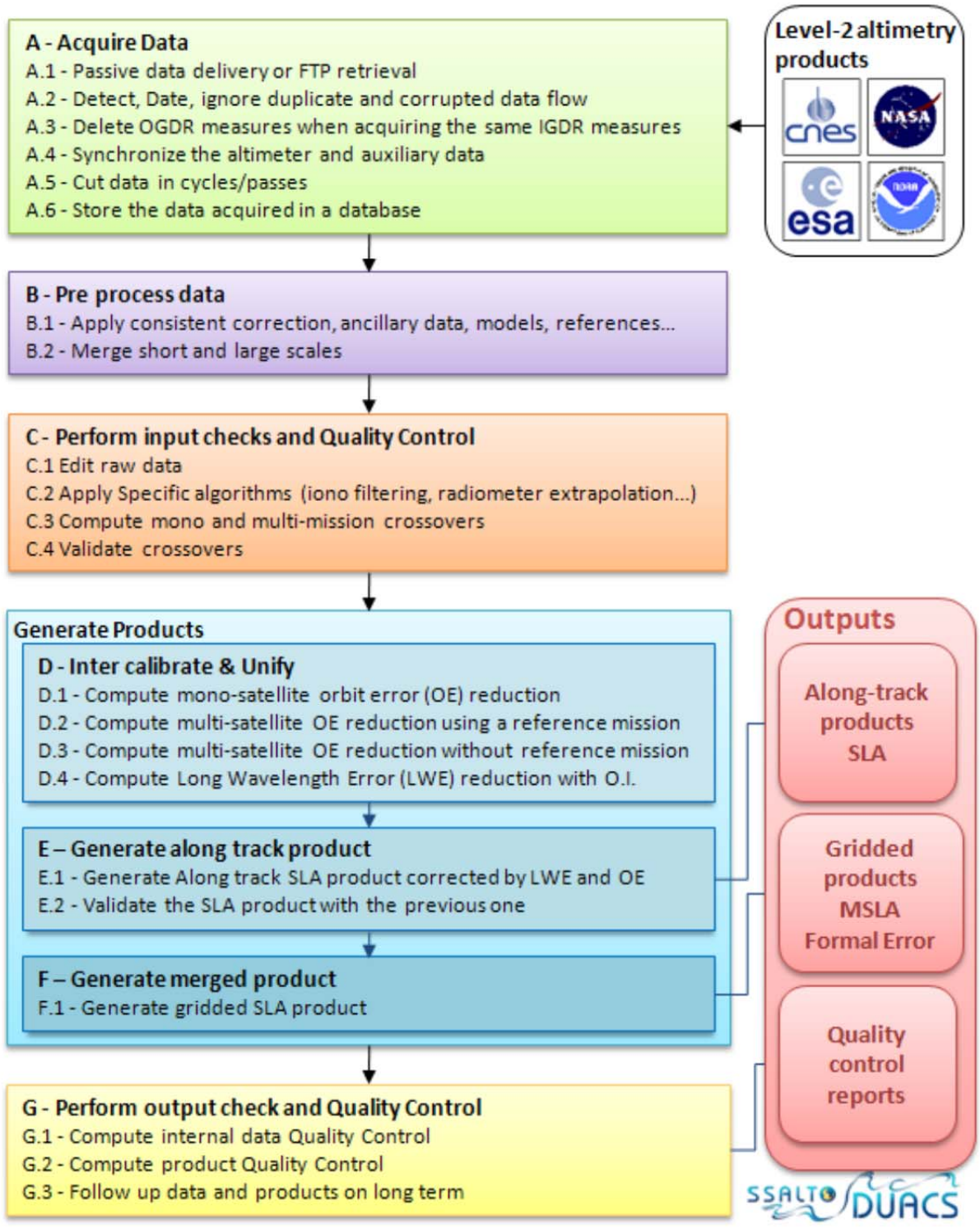

Figure 1: Main components of the Sea-Level CCI system, based on the CNES SSALTO/DUACS

Copyright CLS

3. **Level 2 data**

3.1. Topex-Poseidon data

3.1.1. Filenaming convention

The nomenclature of GDR-M CYCLE HEADER FILE is:

MGxccc.HDR

where:

- M is for the AVISO Merged product.
- G is for the GDR data type(1).
- x is the generation letter (A to Z) (1). [At the date of edition 3, x = C.]
- ccc is the cycle number(2) .
- HDR is for a header file.

The nomenclature of GDR-M PASS-FILES is:

MGxccc.ppp

where:

- M is for the AVISO merged product.
- G is for the GDR data type(1).
- x is the generation letter (A to Z)(1). [At the date of edition 3, x = C.]
- ccc is the cycle number(2).
- ppp is the pass-file number (001 to 254).

3.1.2. Product data format

3.1.2.1. MGDR_cycle_header

id	field name	Definition
0	EDU_label	**ascii string** *size*: 20 CCSDS EDU Label fixed value: "CCSD3ZF0000100000001" hidden: true
1	white_space_1	**ascii string** *size*: 58 white space fixed value: " "

Copyright CLS

		hidden: true
2	cr_newline_1	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
3	Header_label	**ascii string** *size*: 20 CCSDS Header Label fixed value: "CCSD3KS00006CYCLEHDR" hidden: true
4	white_space_2	**ascii string** *size*: 58 white space fixed value: " " hidden: true
5	cr_newline_2	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
6	Producer_Agency_Name_label	**ascii string** *size*: 23 Producer_Agency_Name = fixed value: "Producer_Agency_Name = " hidden: true
7	**Producer_Agency_Name**	**ascii string** *size*: 4 The name of the government agency in charge of this product
8	semicolon_mark_1	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true

Copyright CLS

9	white_space_3	**ascii string** *size*: 50 white space fixed value: " " hidden: true
10	cr_newline_3	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
11	Producer_Institution_Name_label	**ascii string** *size*: 28 Producer_Institution_Name = fixed value: "Producer_Institution_Name = " hidden: true
12	**Producer_Institution_Name**	**ascii string** *size*: 5 The name of the institution producing the file
13	semicolon_mark_2	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
14	white_space_4	**ascii string** *size*: 44 white space fixed value: " " hidden: true
15	cr_newline_4	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
16	source_label	**ascii string** *size*: 14 Source Name =

Copyright CLS

		fixed value: "Source_Name = " hidden: true
17	**source**	**ascii string** *size*: 14 Name of the project
18	semicolon_mark_3	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
19	white_space_5	**ascii string** *size*: 49 white space fixed value: " " hidden: true
20	cr_newline_5	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
21	Sensor_Name_label	**ascii string** *size*: 14 Sensor_Name = fixed value: "Sensor_Name = " hidden: true
22	**Sensor_Name**	**ascii string** *size*: 14 Main sensors used to acquire the data
23	semicolon_mark_4	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
24	white_space_6	**ascii string** *size*: 49

Copyright CLS

		white space fixed value: " " hidden: true
25	cr_newline_6	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
26	Data_Handbook_Reference_label	**ascii string** *size*: 26 Data_Handbook_Reference = fixed value: "Data_Handbook_Reference = " hidden: true
27	**Data_Handbook_Reference**	**ascii string** *size*: 21 Reference to the AVISO CD-ROM User Manual: Merged TOPEX/POSEIDON Products
28	semicolon_mark_5	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
29	white_space_7	**ascii string** *size*: 30 white space fixed value: " " hidden: true
30	cr_newline_7	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
31	Product_Create_Start_Time_label	**ascii string** *size*: 28 Product Create Start Time =

Copyright CLS

		fixed value: "Product_Create_Start_Time = " hidden: true
32	**Product_Create_Start_Time**	**ascii time** *size*: 17 Local time when the file started to be produced unit: "s since 2000-01-01" **ascii string** *size*: 17 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss".
33	semicolon_mark_6	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
34	white_space_8	**ascii string** *size*: 32 white space fixed value: " " hidden: true
35	cr_newline_8	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
36	Product_Create_End_Time_label	**ascii string** *size*: 26 Product_Create_End_Time = fixed value: "Product_Create_End_Time = " hidden: true
37	**creation_end_time**	**ascii time** *size*: 17 Local time of the end of the production of the file unit: "s since 2000-01-01" **ascii string** *size*: 17

Copyright CLS

		CCSDS ASCII datetime "YYYY-DDDThh:mm:ss".
38	semicolon_mark_7	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
39	white_space_9	**ascii string** *size*: 34 white space fixed value: " " hidden: true
40	cr_newline_9	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
41	Generating_Software_Name_label	**ascii string** *size*: 27 Generating_Software_Name = fixed value: "Generating_Software_Name = " hidden: true
42	**Generating_Software_Name**	**ascii string** *size*: 50 Name of the software generating the file. The format is "TS_XXX_PROD_PRINCIPAL", where XXX being a 3-character ASCII string indentifying the generating product. "XXX" = "GDM" for GDR-M files (cycle header file and passfiles), "XXX" = "CRO" for the crossover point file, "XXX" = "EPH" for the orbit files
43	semicolon_mark_8	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
44	cr_newline_10	**ascii string** *size*: 2 carriage return + newline

Copyright CLS

		fixed value: "\r\n" hidden: true
45	Build_Id_label	**ascii string** *size*: 11 Build_Id = fixed value: "Build_Id = " hidden: true
46	**Build_Id**	**ascii string** *size*: 21 Reference of the document describing the software used to product this file. The format is "AVI_XX_XXXXX_XXXX_XXX" which is an AVISO project document reference
47	semicolon_mark_9	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
48	white_space_11	**ascii string** *size*: 45 white space fixed value: " " hidden: true
49	cr_newline_11	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
50	Pass_File_Data_Type_label	**ascii string** *size*: 22 Pass_File_Data_Type = fixed value: "Pass_File_Data_Type = " hidden: true
51	**Pass_File_Data_Type**	**ascii string** *size*: 6 Type of data used to produce the file. Valid types are "IGDR-M" during the verification pahse, "GDR-M" during the

Copyright CLS

		operational phase
52	semicolon_mark_10	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
53	white_space_12	**ascii string** *size*: 49 white space fixed value: " " hidden: true
54	cr_newline_12	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
55	Cycle_Number_label	**ascii string** *size*: 15 Cycle_Number = fixed value: "Cycle_Number = " hidden: true
56	**Cycle_Number**	**ascii uint16** *size*: 3 The ten-day repeat cycle number associated to this file
57	semicolon_mark_11	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
58	white_space_13	**ascii string** *size*: 59 white space fixed value: " " hidden: true

Copyright CLS

59	cr_newline_13	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
60	Package_Data_Start_Time_label	**ascii string** *size*: 26 Package_Data_Start_Time = fixed value: "Package_Data_Start_Time = " hidden: true
61	**Package_Data_Start_Time**	**ascii time** *size*: 24 UTC date and time of the first data record unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
62	semicolon_mark_12	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
63	white_space_14	**ascii string** *size*: 27 white space fixed value: " " hidden: true
64	cr_newline_14	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
65	Package_Data_End_Time_label	**ascii string** *size*: 24 Package Data End Time =

Copyright CLS

		fixed value: "Package_Data_End_Time = " hidden: true
66	**Package_Data_End_Time**	**ascii time** *size*: 24 UTC date and time of the last data record unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
67	semicolon_mark_13	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
68	white_space_15	**ascii string** *size*: 29 white space fixed value: " " hidden: true
69	cr_newline_15	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
70	Start_Pass_Number_label	**ascii string** *size*: 20 Start_Pass_Number = fixed value: "Start_Pass_Number = " hidden: true
71	**Start_Pass_Number**	**ascii uint16** *size*: 3 Pass number of the first non empty pass-file within the current ten-day repeat cycle
72	semicolon_mark_14	**ascii char** *size*: 1

Copyright CLS

		semicolon fixed value: ";" hidden: true
73	white_space_16	**ascii string** *size*: 54 white space fixed value: " " hidden: true
74	cr_newline_16	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
75	End_Pass_Number_label	**ascii string** *size*: 18 End_Pass_Number = fixed value: "End_Pass_Number = " hidden: true
76	**End_Pass_Number**	**ascii uint16** *size*: 3 Pass number of the last non empty pass-file within the current ten-day repeat cycle
77	semicolon_mark_15	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
78	white_space_17	**ascii string** *size*: 56 white space fixed value: " " hidden: true
79	cr_newline_17	**ascii string** *size*: 2 carriage return + newline

Copyright CLS

		fixed value: "\r\n" hidden: true
80	Pass_Count_label	**ascii string** *size*: 13 Pass_Count = fixed value: "Pass_Count = " hidden: true
81	**Pass_Count**	**ascii uint16** *size*: 3 Total number of non empty pass-files within the current ten-day repeat cycle
82	semicolon_mark_16	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
83	white_space_18	**ascii string** *size*: 61 white space fixed value: " " hidden: true
84	cr_newline_18	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
85	CCSDS_marker_1	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERCYCLEHDR" hidden: true
86	white_space_19	**ascii string** *size*: 58 white space

Copyright CLS

		fixed value: " " hidden: true
87	cr_newline_19	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
88	References_label	**ascii string** *size*: 20 CCSDS References label fixed value: "CCSD3RF0000300000001" hidden: true
89	white_space_20	**ascii string** *size*: 58 white space fixed value: " " hidden: true
90	cr_newline_20	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
91	Pass_File_Protocol_label	**ascii string** *size*: 21 Pass_File_Protocol = fixed value: "Pass_File_Protocol = " hidden: true
92	**Pass_File_Protocol**	**ascii string** *size*: 4 The protocol of te pass-files. The value NONE indicates a non CCSDS protocol
93	semicolon_mark_17	**ascii char** *size*: 1 semicolon fixed value: ";"

FORM-NT-GB-7-1

Copyright CLS

		hidden: true
94	white_space_21	**ascii string** *size*: 52 white space fixed value: " " hidden: true
95	cr_newline_21	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
96	Pass_File_Delimiter_label	**ascii string** *size*: 22 Pass_File_Delimiter = fixed value: "Pass_File_Delimiter = " hidden: true
97	**Pass_File_Delimiter**	**ascii string** *size*: 3 File delimeter of the pass-files
98	semicolon_mark_18	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
99	white_space_22	**ascii string** *size*: 52 white space fixed value: " " hidden: true
100	cr_newline_22	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true

Copyright CLS

101	Type_label	**ascii string** *size*: 7 Type = fixed value: "Type = " hidden: true
102	**Type**	**ascii string** *size*: 50 Type of data used to generate the merged products. Valid types are "IGDR" for IGDR-M products (verification phase), or "GDR" for GDR-M products (operational and extended phase)
103	semicolon_mark_19	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
104	white_space_23	**ascii string** *size*: 20 white space fixed value: " " hidden: true
105	cr_newline_23	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
106	**Pass_file**	**ascii array[***dim_0***]** Pass-file names. dim_0: **int**(../Pass_Count) **ascii record** *size*: 80

id	field name	definition
0	name_label	**ascii string** *size*: 12 Reference = fixed value: "Reference = "

FORM-NT-GB-7-1

Copyright CLS

			hidden: true
	1	**name**	**ascii string** *size*: 10 Pass-file name. The name is an ASCII file name in accordance with VAX/VMS. The format for this element is "MXccc.ppp" where: X = the data type (G for GDR products), x = the generation letter, ccc = the cycle number, ppp = the pass number
	2	semicolon_mark	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
	3	white_space	**ascii string** *size*: 55 white space fixed value: " " hidden: true
	4	cr_newline	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true

3.1.2.2. MGDR_pass_file_header

ascii record "MGDR_pass_file_header" *size*: 7524

id	field name	definition
0	EDU_label	**ascii string** *size*: 20 CCSDS EDU Label fixed value: "CCSD3ZF0000100000001"

FORM-NT-GB-7-1

Copyright CLS

		hidden: true
1	white_space_1	**ascii string** *size*: 206 white space fixed value: " " hidden: true
2	cr_newline_1	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
3	Header_label	**ascii string** *size*: 20 CCSDS Header Label fixed value: "CCSD3KS00006PASSFILE" hidden: true
4	white_space_2	**ascii string** *size*: 206 white space fixed value: " " hidden: true
5	cr_newline_2	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
6	Producer_Agency_Name_label	**ascii string** *size*: 23 Producer_Agency_Name = fixed value: "Producer_Agency_Name = " hidden: true

Copyright CLS

7	**Producer_Agency_Name**	**ascii string** *size*: 4 The name of the government agency in charge of this product
8	semicolon_mark_1	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
9	white_space_3	**ascii string** *size*: 198 white space fixed value: " " hidden: true
10	cr_newline_3	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
11	Producer_Institution_Name_label	**ascii string** *size*: 28 Producer_Institution_Name = fixed value: "Producer_Institution_Name = " hidden: true
12	**Producer_Institution_Name**	**ascii string** *size*: 5 The name of the institution producing the file
13	semicolon_mark_2	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
14	white_space_4	**ascii string** *size*: 192 white space fixed value:

Copyright CLS

		" " hidden: true
15	cr_newline_4	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
16	Source_Name_label	**ascii string** *size*: 14 Source_Name = fixed value: "Source_Name = " hidden: true
17	**Source_Name**	**ascii string** *size*: 14 Name of the project
18	semicolon_mark_3	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
19	white_space_5	**ascii string** *size*: 197 white space fixed value: " " hidden: true
20	cr_newline_5	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
21	Sensor_Name_label	**ascii string** *size*: 14 Sensor Name =

Copyright CLS

		fixed value: "Sensor_Name = " hidden: true
22	**Sensor_Name**	**ascii string** *size*: 14 Main sensors used to acquire the data
23	semicolon_mark_4	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
24	white_space_6	**ascii string** *size*: 197 white space fixed value: " " hidden: true
25	cr_newline_6	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
26	Data_Handbook_Reference_label	**ascii string** *size*: 26 Data_Handbook_Reference = fixed value: "Data_Handbook_Reference = " hidden: true
27	**Data_Handbook_Reference**	**ascii string** *size*: 21 Reference to the AVISO CD-ROM User Manual: Merged TOPEX/POSEIDON Products
28	semicolon_mark_5	**ascii char** *size*: 1 semicolon fixed value: ";"

Copyright CLS

		hidden: true
29	white_space_7	**ascii string** *size*: 178 white space fixed value: " " hidden: true
30	cr_newline_7	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
31	Product_Create_Start_Time_label	**ascii string** *size*: 28 Product_Create_Start_Time = fixed value: "Product_Create_Start_Time = " hidden: true
32	**Product_Create_Start_Time**	**ascii time** *size*: 17 unit: "s since 2000-01-01" **ascii string** *size*: 17 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss".
33	semicolon_mark_6	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
34	white_space_8	**ascii string** *size*: 180 white space fixed value: " " hidden: true
35	cr_newline_8	**ascii string** *size*: 2

Copyright CLS

		carriage return + newline fixed value: "\r\n" hidden: true
36	Product_Create_End_Time_label	**ascii string** *size*: 26 Product_Create_End_Time = fixed value: "Product_Create_End_Time = " hidden: true
37	**Product_Create_End_Time**	**ascii time** *size*: 17 Local time of the end of the production of the file unit: "s since 2000-01-01" **ascii string** *size*: 17 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss".
38	semicolon_mark_7	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
39	white_space_9	**ascii string** *size*: 182 white space fixed value: " " hidden: true
40	cr_newline_9	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
41	Generating_Software_Name_label	**ascii string** *size*: 27 Generating_Software_Name = fixed value: "Generating_Software_Name = "

Copyright CLS

		hidden: true
42	**Generating_Software_Name**	**ascii string** *size*: 50 Name of the software generating the file. The format is "TS_XXX_PROD_PRINCIPAL", where XXX being a 3-character ASCII string indentifying the generating product. "XXX" = "GDM" for GDR-M files (cycle header file and passfiles), "XXX" = "CRO" for the crossover point file, "XXX" = "EPH" for the orbit files
43	semicolon_mark_8	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
44	white_space_10	**ascii string** *size*: 148 white space fixed value: " " hidden: true
45	cr_newline_10	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
46	Build_Id_label	**ascii string** *size*: 11 Build_Id = fixed value: "Build_Id = " hidden: true
47	**Build_Id**	**ascii string** *size*: 21 Reference of the document describing the software used to produce this file. The format is "AVI_XX_XXXXX_XXXX_XXX" which is an AVISO project document reference
48	semicolon_mark_9	**ascii char** *size*: 1 semicolon

Copyright CLS

		fixed value: ";" hidden: true
49	white_space_11	**ascii string** *size*: 193 white space fixed value: " " hidden: true
50	cr_newline_11	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
51	Pass_File_Data_Type_label	**ascii string** *size*: 22 Pass_File_Data_Type = fixed value: "Pass_File_Data_Type = " hidden: true
52	**Pass_File_Data_Type**	**ascii string** *size*: 6 Type of data used to produce the file. Valid types are "IGDR-M" during the verification pahse, "GDR-M" during the operational phase
53	semicolon_mark_10	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
54	white_space_12	**ascii string** *size*: 197 white space fixed value: " " hidden: true
55	cr_newline_12	**ascii string** *size*: 2

Copyright CLS

		carriage return + newline fixed value: "\r\n" hidden: true
56	Poseidon_Range_Bias_label	**ascii string** *size*: 22 Poseidon_Range_Bias = fixed value: "Poseidon_Range_Bias = " hidden: true
57	**Poseidon_Range_Bias**	**ascii float** *size*: 5
58	Poseidon_Range_Bias_unit	**ascii string** *size*: 3 cm fixed value: " cm" hidden: true
59	semicolon_mark_11	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
60	white_space_13	**ascii string** *size*: 195 white space fixed value: " " hidden: true
61	cr_newline_13	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
62	Topex_Range_Bias_label	**ascii string** *size*: 19 Topex_Range_Bias =

Copyright CLS

		fixed value: "Topex_Range_Bias = " hidden: true
63	**Topex_Range_Bias**	**ascii float** *size*: 5
64	Topex_Range_Bias_unit	**ascii string** *size*: 3 cm fixed value: " cm" hidden: true
65	semicolon_mark_12	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
66	white_space_14	**ascii string** *size*: 198 white space fixed value: " " hidden: true
67	cr_newline_14	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
68	TP_sigma0_offset_label	**ascii string** *size*: 20 T/P_sigma0_offset = fixed value: "T/P_sigma0_offset = " hidden: true
69	**TP_sigma0_offset**	**ascii float** *size*: 5
70	TP_sigma0_offset_unit	**ascii string** *size*: 3 dB

Copyright CLS

		fixed value: " dB" hidden: true
71	semicolon_mark_13	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
72	white_space_15	**ascii string** *size*: 197 white space fixed value: " " hidden: true
73	cr_newline_15	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
74	NASA_Orbit_Filename_label	**ascii string** *size*: 22 NASA_Orbit_Filename = fixed value: "NASA_Orbit_Filename = " hidden: true
75	**NASA_Orbit_Filename**	**ascii string** *size*: 38
76	semicolon_mark_14	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
77	white_space_16	**ascii string** *size*: 165 white space fixed value: "

Copyright CLS

		" hidden: true
78	cr_newline_16	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
79	Orbit_Qual_NASA_label	**ascii string** *size*: 18 Orbit_Qual_NASA = fixed value: "Orbit_Qual_NASA = " hidden: true
80	**Orbit_Qual_NASA**	**ascii string** *size*: 11
81	semicolon_mark_15	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
82	white_space_17	**ascii string** *size*: 196 white space fixed value: " " hidden: true
83	cr_newline_17	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
84	CNES_Orbit_Filename_label	**ascii string** *size*: 22 CNES_Orbit_Filename = fixed value: "CNES_Orbit_Filename = "

Copyright CLS

		hidden: true
85	**CNES_Orbit_Filename**	**ascii string** *size*: 38
86	semicolon_mark_16	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
87	white_space_18	**ascii string** *size*: 165 white space fixed value: " " hidden: true
88	cr_newline_18	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
89	Orbit_Qual_CNES_label	**ascii string** *size*: 18 Orbit_Qual_CNES = fixed value: "Orbit_Qual_CNES = " hidden: true
90	**Orbit_Qual_CNES**	**ascii string** *size*: 1
91	semicolon_mark_17	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
92	white_space_19	**ascii string** *size*: 206 white space fixed value:

Copyright CLS

		" " hidden: true
93	cr_newline_19	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
94	Topex_Pass_File_Id_label	**ascii string** *size*: 21 Topex_Pass_File_Id = fixed value: "Topex_Pass_File_Id = " hidden: true
95	**Topex_Pass_File_Id**	**ascii string** *size*: 38
96	semicolon_mark_18	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
97	white_space_20	**ascii string** *size*: 166 white space fixed value: " " hidden: true
98	cr_newline_20	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
99	Poseidon_Pass_File_Id_label	**ascii string** *size*: 24 Poseidon_Pass_File_Id =

Copyright CLS

		fixed value: "Poseidon_Pass_File_Id = " hidden: true
100	**Poseidon_Pass_File_Id**	**ascii string** *size*: 38
101	semicolon_mark_19	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
102	white_space_21	**ascii string** *size*: 163 white space fixed value: " " hidden: true
103	cr_newline_21	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
104	CORIOTROP_File_Id_label	**ascii string** *size*: 20 CORIOTROP_File_Id = fixed value: "CORIOTROP_File_Id = " hidden: true
105	**CORIOTROP_File_Id**	**ascii string** *size*: 38
106	semicolon_mark_20	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
107	white_space_22	**ascii string** *size*: 167 white space

Copyright CLS

		fixed value: " " hidden: true
108	cr_newline_22	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
109	Cycle_Number_label	**ascii string** *size*: 15 Cycle_Number = fixed value: "Cycle_Number = " hidden: true
110	**Cycle_Number**	**ascii uint16** *size*: 3 The ten-day repeat cycle number associated to this file
111	semicolon_mark_21	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
112	white_space_23	**ascii string** *size*: 207 white space fixed value: " " hidden: true
113	cr_newline_23	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
114	Pass_Number_label	**ascii string** *size*: 14

Copyright CLS

		Pass_Number = fixed value: "Pass_Number = " hidden: true
115	**Pass_Number**	**ascii uint16** *size*: 3
116	semicolon_mark_22	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
117	white_space_24	**ascii string** *size*: 208 white space fixed value: " " hidden: true
118	cr_newline_24	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
119	Pass_Data_Count_label	**ascii string** *size*: 18 Pass_Data_Count = fixed value: "Pass_Data_Count = " hidden: true
120	**Pass_Data_Count**	**ascii uint16** *size*: 4
121	semicolon_mark_23	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
122	white_space_25	**ascii string** *size*: 203

Copyright CLS

		white space fixed value: " " hidden: true
123	cr_newline_25	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
124	Rev_Number_label	**ascii string** *size*: 13 Rev_Number = fixed value: "Rev_Number = " hidden: true
125	**Rev_Number**	**ascii uint16** *size*: 5
126	semicolon_mark_24	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
127	white_space_26	**ascii string** *size*: 207 white space fixed value: " " hidden: true
128	cr_newline_26	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
129	Equator_Longitude_label	**ascii string** *size*: 20

Copyright CLS

		Equator_Longitude = fixed value: "Equator_Longitude = " hidden: true
130	**Equator_Longitude**	**ascii float** *size*: 10
131	semicolon_mark_25	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
132	white_space_27	**ascii string** *size*: 195 white space fixed value: " " hidden: true
133	cr_newline_27	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
134	Equator_Time_label	**ascii string** *size*: 15 Equator_Time = fixed value: "Equator_Time = " hidden: true
135	**Equator_Time**	**ascii time** *size*: 24 unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
136	semicolon_mark_26	**ascii char** *size*: 1 semicolon

Copyright CLS

		fixed value: ";" hidden: true
137	white_space_28	**ascii string** *size*: 186 white space fixed value: " " hidden: true
138	cr_newline_28	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
139	Time_First_Pt_label	**ascii string** *size*: 16 Time_First_Pt = fixed value: "Time_First_Pt = " hidden: true
140	**Time_First_Pt**	**ascii time** *size*: 24 unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
141	semicolon_mark_27	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
142	white_space_29	**ascii string** *size*: 185 white space fixed value: " " hidden: true

Copyright CLS

		hidden: true
143	cr_newline_29	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
144	Time_Last_Pt_label	**ascii string** *size*: 15 Time_Last_Pt = fixed value: "Time_Last_Pt = " hidden: true
145	**Time_Last_Pt**	**ascii time** *size*: 24 unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
146	semicolon_mark_28	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
147	white_space_30	**ascii string** *size*: 186 white space fixed value: " " hidden: true
148	cr_newline_30	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
149	Time_Epoch_label	**ascii string** *size*: 13 Time_Epoch =

Copyright CLS

		fixed value: "Time_Epoch = " hidden: true
150	**Time_Epoch**	**ascii time** *size*: 24 unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
151	semicolon_mark_29	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
152	white_space_31	**ascii string** *size*: 188 white space fixed value: " " hidden: true
153	cr_newline_31	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
154	CCSDS_marker_1	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERPASSFILE" hidden: true
155	white_space_32	**ascii string** *size*: 206 white space fixed value: " "

FORM-NT-GB-7-1

Copyright CLS

		hidden: true
156	cr_newline_32	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
157	Data_label	**ascii string** *size*: 20 CCSDS Data label fixed value: "NJPL3IF0004700000001" hidden: true
158	white_space_33	**ascii string** *size*: 206 white space fixed value: " " hidden: true
159	cr_newline_33	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true

3.1.2.3. MGDR_pass_file_data_record

binary record "MGDR_pass_file_data_record" *size*: 228

id	field name	definition
0	**Tim_Moy_1**	**binary int16** *size*: 2 Time, day part unit: "days since 1958-01-01" endianness: little endian
1	**Tim_Moy_2**	**binary int32** *size*: 4

Copyright CLS

		Time, millisecond part unit: "1e-3 s" endianness: little endian
2	**Tim_Moy_3**	**binary int16** *size*: 2 Time, microsecond part unit: "1e-6 s" endianness: little endian
3	**Dtim_Mil**	**binary int32** *size*: 4 Time shift midframe unit: "1e-6 s" endianness: little endian
4	**Dtim_Bias**	**binary int32** *size*: 4 Net time tag correction unit: "1e-6 s" endianness: little endian
5	**Dtim_Pac**	**binary int32** *size*: 4 10 per second timing unit: "1e-6 s" endianness: little endian
6	**Lat_Tra**	**binary int32 (double)** *size*: 4 Latitude unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006) endianness: little endian
7	**Lon_Tra**	**binary int32 (double)** *size*: 4 Longitude unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006) endianness: little endian

Copyright CLS

8	**Sat_Alt**	**binary int32** *size*: 4 Altitude above the reference elipsoid (NASA) unit: "1e-3 m" endianness: little endian
9	**HP_Sat**	**binary int32** *size*: 4 Altitude above the reference elipsoid (CNES) unit: "1e-3 m" endianness: little endian
10	**Sat_Alt_Hi_Rate**	**binary array[10]** *size*: 20 Differences of satellite altitudes from sat_alt **binary int16** *size*: 2 unit: "1e-3 m" endianness: little endian
11	**HP_Sat_Hi_Rate**	**binary array[10]** *size*: 20 Differences of satellite altitudes from hp_alt **binary int16** *size*: 2 unit: "1e-3 m" endianness: little endian
12	**Att_Wvf**	**binary uint8** *size*: 1 Waveform attitude unit: "1e-2 degrees" endianness: little endian
13	**Att_Ptf**	**binary uint8** *size*: 1 Platform attitude unit: "1e-2 degrees" endianness: little endian
14	**H_Alt**	**binary int32** *size*: 4 One per second altimeter range unit: "1e-3 m"

Copyright CLS

		endianness: little endian
15	**H_Alt_SME**	**binary array[10]** *size*: 20 Differences of altimeter range from h_alt **binary int16** *size*: 2 unit: "1e-3 m" endianness: little endian
16	**Nval_H_Alt**	**binary int8** *size*: 1 Number of valid points for 1 second altitude endianness: little endian
17	**RMS_H_Alt**	**binary int16** *size*: 2 Root mean square of range unit: "1e-3 m" endianness: little endian
18	**Net_Instr_R_Corr_K**	**binary int16** *size*: 2 Net instrument correction to range (Ku) unit: "1e-3 m" endianness: little endian
19	**Net_Instr_R_Corr_C**	**binary int16** *size*: 2 Net instrument correction to range (C) unit: "1e-3 m" endianness: little endian
20	**CG_Range_Corr**	**binary int8** *size*: 1 Center of gravity movement correction to range unit: "1e-3 m" endianness: little endian
21	**Range_Deriv**	**binary int16** *size*: 2 Range derivative unit: "1e-2 m/s" endianness: little endian

Copyright CLS

22	**RMS_Range_Deriv**	**binary int16** *size*: 2 RMS of high-rate values of range_deriv unit: "1e-2 m/s" endianness: little endian
23	**Dry_Corr**	**binary int16** *size*: 2 Dry tropospheric correction at measurement time unit: "1e-3 m" endianness: little endian
24	**Dry1_Corr**	**binary int16** *size*: 2 Dry tropospheric correction before measurement unit: "1e-3 m" endianness: little endian
25	**Dry2_Corr**	**binary int16** *size*: 2 Dry tropospheric correction after measurement unit: "1e-3 m" endianness: little endian
26	**Inv_Bar**	**binary int16** *size*: 2 Inverser barometer correction at mesaurement time unit: "1e-3 m" endianness: little endian
27	**Wet_Corr**	**binary int16** *size*: 2 Wet tropospheric correction at measurement time unit: "1e-3 m" endianness: little endian
28	**Wet1_Corr**	**binary int16** *size*: 2 Wet tropospheric correction before measurement unit: "1e-3 m" endianness: little endian
29	**Wet2_Corr**	**binary int16** *size*: 2

Copyright CLS

		Wet tropospheric correction after measurement unit: "1e-3 m" endianness: little endian
30	**Wet_H_Rad**	**binary int16** *size*: 2 Radiometer wet tropospheric correction unit: "1e-3 m" endianness: little endian
31	**Iono_Cor**	**binary int16** *size*: 2 Topex dual-frequency ionospheric correction unit: "1e-3 m" endianness: little endian
32	**Iono_Dor**	**binary int16** *size*: 2 Ionospheric correction from DORIS unit: "1e-3 m" endianness: little endian
33	**Iono_Ben**	**binary int16** *size*: 2 Ionospheric correction from Bent model unit: "1e-3 m" endianness: little endian
34	**SWH_K**	**binary uint16** *size*: 2 Significant wave height (Ku) unit: "1e-2 m" endianness: little endian
35	**SWH_C**	**binary uint16** *size*: 2 Significant wave height (C) unit: "1e-2 m" endianness: little endian
36	**SWH_RMS_K**	**binary uint8** *size*: 1 RMS of significant wave height (Ku)

Copyright CLS

		unit: "1e-2 m" endianness: little endian
37	**SWH_RMS_S**	**binary uint8** *size*: 1 RMS of significant wave height (C) unit: "1e-2 m" endianness: little endian
38	**SWH_Pts_Avg**	**binary int8** *size*: 1 Number of valid points used to compute SWH endianness: little endian
39	**Net_Instr_SWH_Corr_K**	**binary int8** *size*: 1 Net instrument correction to SWH (Ku) unit: "1e-1 m" endianness: little endian
40	**Net_Instr_SWH_Corr_C**	**binary int8** *size*: 1 Net instrument correction to SWH (C) unit: "1e-1 m" endianness: little endian
41	**DR_SWH_Att_K**	**binary int16** *size*: 2 SWH/Attitude correction (Ku) unit: "1e-3 m" endianness: little endian
42	**DR_SWH_Att_C**	**binary int16** *size*: 2 SWH/Attitude correction (C) unit: "1e-3 m" endianness: little endian
43	**SSB_Corr_K1**	**binary int16** *size*: 2 Sea State Bias correction (Ku) (BM4) unit: "1e-3 m" endianness: little endian

Copyright CLS

44	**SSB_Corr_K2**	**binary int16** *size*: 2 Sea State Bias correction (Ku) (TGS) unit: "1e-3 m" endianness: little endian
45	**Sigma0_K**	**binary uint16 (double)** *size*: 2 Backscatter coefficient (Ku) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
46	**Sigma0_C**	**binary uint16 (double)** *size*: 2 Backscatter coefficient (C) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
47	**AGC_K**	**binary uint16 (double)** *size*: 2 Automatic gain control (Ku) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
48	**AGC_C**	**binary uint16 (double)** *size*: 2 Automatic gain control (C) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
49	**AGC_RMS_K**	**binary int16 (double)** *size*: 2 RMS of automatic gain control (Ku) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian

Copyright CLS

50	**AGC_RMS_C**	**binary uint8 (double)** *size*: 1 RMS of automatic gain control (C) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
51	**Atm_Att_Sig0_Corr**	**binary uint8 (double)** *size*: 1 Atmospheric attenuation correction to sigma0 unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
52	**Net_Instr_Sig0_Corr**	**binary int16 (double)** *size*: 2 Net instrument correction to sigma0 unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
53	**Net_Instr_AGC_Corr_K**	**binary int16 (double)** *size*: 2 Net instrument correction to AGC (Ku) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
54	**Net_Instr_AGC_Corr_C**	**binary int16 (double)** *size*: 2 Net instrument correction to AGC (C) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100) endianness: little endian
55	**AGC_Pts_Avg**	**binary int8** *size*: 1 Number of valid points used to compute AGC endianness: little endian
56	**H_MSS**	**binary int32** *size*: 4

Copyright CLS

		Mean sea surface height unit: "1e-3 m" endianness: little endian
57	**H_Geo**	**binary int32** *size*: 4 Geoid height unit: "1e-3 m" endianness: little endian
58	**H_Eot_CSR**	**binary int16** *size*: 2 Elastic ocean tide (CSR 3.0) unit: "1e-3 m" endianness: little endian
59	**H_Eot_FES**	**binary int16** *size*: 2 Elastic ocean tide (FES 95.2) unit: "1e-3 m" endianness: little endian
60	**H_Lt_CSR**	**binary int16** *size*: 2 Tidal loading effect (CSR 3.0) unit: "1e-3 m" endianness: little endian
61	**H_Set**	**binary int16** *size*: 2 Solid earth tide unit: "1e-3 m" endianness: little endian
62	**H_Pol**	**binary int8** *size*: 1 Geocentric pole tide unit: "1e-3 m" endianness: little endian
63	**Wind_Sp**	**binary uint8** *size*: 1 Wind intensity (from altimeter data)

Copyright CLS

		unit: "1e-1 m/s" endianness: little endian
64	**H_Ocs**	**binary int16** *size*: 2 Ocean depth unit: "m" endianness: little endian
65	**Tb_18**	**binary int16 (double)** *size*: 2 Brightness temperature 18 GHz unit: "1e-2 K" converted unit: "K" (multiply by 1/100) endianness: little endian
66	**Tb_21**	**binary int16 (double)** *size*: 2 Brightness temperature 21 GHz unit: "1e-2 K" converted unit: "K" (multiply by 1/100) endianness: little endian
67	**Tb_37**	**binary uint16 (double)** *size*: 2 Brightness temperature 37 GHz unit: "1e-2 K" converted unit: "K" (multiply by 1/100) endianness: little endian
68	**ALTON**	**binary int8** *size*: 1 Altimeter Indicator. This element is computed for TOPEX and POSEIDON data. It indicates which altimeter is on at the time of the measurement. Value Definition: 0 = POSEIDON on, 1 = TOPEX on endianness: little endian
69	**Instr_State_TOPEX**	**binary record** *size*: 1 States of Topex Altimeter. This element exists only for TOPEX measurements. A default value is given when POSEIDON is on

id	field name	definition

Copyright CLS

		0 spare: **binary bytes** *size*: 0:4 spare hidden: true 1 **altimeter_operating**: **binary uint8** *size*: 0:1 0 = A, 1 = B 2 **ku_band_status**: **binary uint8** *size*: 0:1 0 = on, 1 = off 3 **c_bandwidth**: **binary uint8** *size*: 0:1 0 = 320 MHz, 1 = 100 MHz 4 **c_band_status**: **binary uint8** *size*: 0:1 0 = on, 1 = off
70	**Instr_State_TMR**	**binary record** *size*: 1 States of the TMR. This element exists for TOPEX and POSEIDON data 0 spare_1: **binary bytes** *size*: 0:1 spare hidden: true 1 **TMR_21B_status**: **binary uint8** *size*: 0:1 0 = Off, 1 = On 2 **TMR_21A_status**: **binary uint8** *size*: 0:1 0 = On, 1 = Off 3 spare_2: **binary bytes** *size*: 0:5 spare hidden: true
71	**Instr_State_DORIS**	**binary int8** *size*: 1 States of Doris instrument. A default value is given when the field (i.e. CORIOTROP) is not available. Value Definition: 0 = No ionospheric correction available (DORIS or BENT), 1 = BENT correction available, 2 = BENT and DORIS correction available

Copyright CLS

		endianness: little endian
72	**IMANV**	**binary int8** *size*: 1 Maneuver indicator. This element exists only for POSEIDON measurements. A default value is given when TOPEX is on. Value Definition: 0 = A maneuver is occuring, 1 = Adjusted when no maneuver orbit, 2 = Extrapolated when no maneuver, 3 = Accuracy better than 2 cm rms, 4 = Accuracy below 7.5 cm rms, 5 = Accuracy below 13 cm rms, 6 = Accuracy below 20 cm rmsorbit, 7 = Accuracy worst than 20 cm rms, 8 = No Doris data available endianness: little endian
73	**Lat_Err**	**binary int8** *size*: 1 Quality index of the latitude. This element is computed for TOPEX and POSEIDON data. A default value is given when one of the two latitudes is not available. Value Definition: 0 = Difference below ten microdegrees, 1 = Difference over ten microdegrees endianness: little endian
74	**Lon_Err**	**binary int8** *size*: 1 Quality index of the longitude. This element is computed for TOPEX and POSEIDON data. A default value is given when one of the two longitudes is not available. Value Definition: 0 = Difference below ten microdegrees, 1 = Difference over ten microdegrees endianness: little endian
75	**Val_Att_Ptf**	**binary int8** *size*: 1 Platform attitude validity. This flag exists only for POSEIDON measurements. A default value is given when TOPEX is on. It indicates if the platform attitude is believed to be valid or not. Value Definition: 0 = OK, 1 = Possible error, 2 = Bad data endianness: little endian
76	**Current_Mode_1**	**binary record** *size*: 1 Altimeter current mode (Topex' first frame)

id	field name	definition
0	**high_low_rate_waveform_channel_assignment**	**binary uint8** *size*: 0: 1 0 = Ku / C, 1 = C / Ku
1	**high_variability**	**binary uint8** *size*: 0: 1

Copyright CLS

				0 = low, 1 = high
		2	**gate**	**binary uint** *size*: 0: **8** 1 0 = AGC gate, 1 = Primary Max / 3
		3	**track**	**binary uint** *size*: 0: **8** 1 0 = EML, 1 = Threshold
		4	**mode**	**binary uint** *size*: 0: **8** 4 3 = Standby, 6 = Cal I, 12 = Cal II, 9 = Coarse acquisition, 10 = Coarse track, 5 = Fine acquisition, 15 = Fine track
77	**Current_Mode_2**	**binary record** *size*: 1 Altimeter current mode (Topex or Poseidon' second frame)		
		id	**field name**	**definition**
		0	**high_low_rate_waveform_channel_assignment**	**binary uint** *size*: 0: **8** 1 This flag exists only for TOPEX measurements. A default value of 0 is given when POSEIDON is on. Value definition: 0 = Ku / C, 1 = C / Ku
		1	**high_variability**	**binary uint** *size*: 0: **8** 1 This flag exists only for TOPEX measurements. A default value of 0 is given when POSEIDON is on. Value definition: 0 = low, 1 = high
		2	**gate**	**binary uint** *size*: 0:

Copyright CLS

				8 1 This flag exists only for TOPEX measurements. A default value of 0 is given when POSEIDON is on. Value definition: 0 = AGC gate, 1 = Primary Max / 3
		3	**track**	**binary uint** *size*: 0: **8** 1 This flag exists only for TOPEX measurements. A default value of 0 is given when POSEIDON is on. Value definition: 0 = EML, 1 = Threshold
		4	**mode**	**binary uint** *size*: 0: **8** 4 This element exists and is different for TOPEX and POSEIDON. Value definition for TOPEX: 3 = Standby, 6 = Cal I, 12 = Cal II, 9 = Coarse acquisition, 10 = Coarse track, 5 = Fine acquisition, 15 = Fine track. Value definition for POSEIDON: 1 = Acquisition mode, 2 = Low-rate tracking, 3 = High-rate tracking

78	**Gate_Index**	**binary record** *size*: 1 Topex gate index. This element exists only for TOPEX measurements. A default value is given when POSEIDON is on.		
		id	**field name**	**definition**
		0	**secondary_channel**	**binary uint8** *size*: 0:4 binary representation of the gate index for the

Copyright CLS

		secondary channel. The value ranges from 1 to 5
1	**primary_channel**	**binary uint8** *size*: 0:4 binary representation of the gate index for the primary channel. The value ranges from 1 to 5

79	**Ind_Pha**	**binary int8** *size*: 1 Poseidon indicator on tracker processing. This element exists only for POSEIDON measurements. A default value is given when TOPEX is on. Value Definition: 0 = OK, 1 = Tracking lost, 2 = Computation time too long endianness: little endian
80	**Rang_SME**	**binary record** *size*: 2 State of 1/10 second values. This element is computed for TOPEX and POSEIDON data

id	field name	definition
0	**flag_7**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
1	**flag_6**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
2	**flag_5**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
3	**flag_4**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
4	**flag_3**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
5	**flag_2**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
6	**flag_1**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
7	**flag_0**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data

Copyright CLS

		8	spare	**binary bytes** *size*: 0:6 spare hidden: true
		9	**flag_9**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
		10	**flag_8**	**binary uint8** *size*: 0:1 0 = OK , 1 = Bad data
81	**Alt_Bad_1**	**binary record** *size*: 1 Topex and Poseidon measurement conditions no 1. This set of flags exists and is different for TOPEX and POSEIDON data. When TOPEX is on, it indicates if a problem was detected with the altimeter sensor corrections, dual frequency ionospheric correction or in compressing high-rate measurements. When POSEIDON is on, it indicates if the one per second ranges, significant wave heights or backscatter coefficients are believed to be valid or not. Only the definition for TOPEX is used here. For POSEIDON the bits are: spare (2 bits), Backscatter coefficient: 0 = Ok, 1 = Possible error, 2 = Bad data (2 bits), Significant Wave Height: 0 = Ok, 1 = Possible error, 2 = Bad data (2 bits), Altimeter Range: 0 = Ok, 1 = Possible error, 2 = Bad data (2 bits)			
		id	**field name**	**definition**
		0	**total_altimeter_range_correction**	**binary uint8** *size*: 0:1 0 = Ku and C values OK , 1 = Problem detected in Ku or (and) C value(s)
		1	**dual_frequency_ionospheric_correction**	**binary uint8** *size*: 0:1 0 = OK , 1 = Too many errors reported
		2	**one_per_second_altimeter_range_quality**	**binary uint8** *size*: 0:1 0 = OK , 1 = RMS > 15cm
		3	**slope_of_fit**	**binary uint8** *size*: 0:1 0 = OK , 1 = Too steep
		4	**tflag**	**binary uint8** *size*: 0:1 fine tracks, EML, AGC gate

Copyright CLS

		5	**high_rate_waveforms**	**binary uint8** *size*: 0:1 0 = OK , 1 = Too many flaged
		6	**valid_points_from_fit**	**binary uint8** *size*: 0:1 0 = OK , 1 = Too many invalid
		7	**compression_used**	**binary uint8** *size*: 0:1 0 = Fit , 1 = Median
82	**Alt_Bad_2**	**binary record** *size*: 1 Topex and Poseidon measurement conditions no 2. This set of flags exists and is different for TOPEX and POSEIDON data. When TOPEX is on, it indicates if any of the pointing/sea-state conditions were invalid or sigma0 was out of limits. When POSEIDON is on, it indicates if the net (summed) instrument correction to ranges, significant wave heights or backscatter coefficients are believed to be valid or not. For POSEIDON the bits are: spare (2 bits), Backscatter coefficient: 0 = Ok, 1 = Possible error, 2 = Bad data (2 bits), Significant Wave Height: 0 = Ok, 1 = Possible error, 2 = Bad data (2 bits), Altimeter Range: 0 = Ok, 1 = Possible error, 2 = Bad data (2 bits)			
		id	**field name**	**definition**
		0	spare_1	**binary bytes** *size*: 0:1 spare hidden: true
		1	**ku_band_agc_correction_or_sigma0**	**binary uint8** *size*: 0:1 0 = Good values, 1 = AGC correction not done or sigma0 out of limit
		2	**c_band_agc_correction_or_sigma0**	**binary uint8** *size*: 0:1 0 = Good values, 1 = AGC correction not done or sigma0 out of limit
		3	**ku_swh_correction**	**binary uint8** *size*: 0:1 0 = Done , 1 = Not done
		4	**c_swh_correction**	**binary uint8** *size*: 0:1 0 = Done , 1 = Not done

Copyright CLS

		5 **c_range_correction**	**binary uint8** *size*: 0:1 0 = Done , 1 = Not done
		6 **ku_range_correction**	**binary uint8** *size*: 0:1 0 = Done , 1 = Not done
		7 spare_2	**binary bytes** *size*: 0:1 spare hidden: true
83	**Fl_Att**	**binary int8** *size*: 1 Attitude indicator. This element is computed for TOPEX and POSEIDON data. Value Definition: 0 = Att_Ptf used, 1 = Att_Wvf used. Note that for TOPEX data, the waveform estimate is always used to compute altimeter corrections involving attitude endianness: little endian	
84	**Dry_Err**	**binary int8** *size*: 1 Quality index on dry_corr. This element is computed for TOPEX and POSEIDON data. A default value is given when the field (i.e. CORIOTROP) is not available. Its value ranges from 0 to 9 with lower ranges when this element is valuable and higher ranges when it is not valuable endianness: little endian	
85	**Dry1_Err**	**binary int8** *size*: 1 Quality index on dry1_corr. This element is computed for TOPEX and POSEIDON data. A default value is given when the field (i.e. CORIOTROP) is not available. Its value ranges from 0 to 9 with lower ranges when this element is valuable and higher ranges when it is not valuable endianness: little endian	
86	**Dry2_Err**	**binary int8** *size*: 1 Quality index on dry2_corr. This element is computed for TOPEX and POSEIDON data. A default value is given when the field (i.e. CORIOTROP) is not available. Its value ranges from 0 to 9 with lower ranges when this element is valuable and higher ranges when it is not valuable endianness: little endian	
87	**Wet_Flag**	**binary int8** *size*: 1 Interpolation indicator on wet corr, wet1 corr, and wet2 corr. This	

Copyright CLS

		element is computed for TOPEX and POSEIDON data. A default value is given when CORIOTROP data are not available. Value Definition: 0 = No point over land, 1 = One point at least over land endianness: little endian
88	**Wet_H_Err**	**binary int8** *size*: 1 Quality index on wet_corr, wet1_corr, and wet2_corr. This element is computed for TOPEX and POSEIDON data. A default value is given when CORIOTROP data are not available. Its value ranges from 0 to 9 with lower ranges when this element is valuable and higher ranghes when it is not valuable endianness: little endian
89	**Iono_Bad**	**binary record** *size*: 2 Quality index on iono_cor. This element exists only for TOPEX measurements. A default value is given when POSEIDON is on. It represents a set of flags which indicates that the computed dual-frequency ionospheric correction is out of range or not computed because only one band was operating

id	field name	definition
0	**flag_7**	**binary uint8** *size*: 0: 1 0 = OK , 1 = Bad data
1	**flag_6**	**binary uint8** *size*: 0: 1 0 = OK , 1 = Bad data
2	**flag_5**	**binary uint8** *size*: 0: 1 0 = OK , 1 = Bad data
3	**flag_4**	**binary uint8** *size*: 0: 1 0 = OK , 1 = Bad data
4	**flag_3**	**binary uint8** *size*: 0: 1 0 = OK , 1 = Bad data
5	**flag_2**	**binary uint8** *size*: 0: 1 0 = OK , 1 = Bad data
6	**flag_1**	**binary uint** *size*: 0:

Copyright CLS

				8 1 0 = OK , 1 = Bad data
		7	**flag_0**	**binary uint 8** *size*: 0: 1 0 = OK , 1 = Bad data
		8	spare_1	**binary bytes** *size*: 0: 1 spare hidden: true
		9	**flag_fine_ht_c**	**binary uint 8** *size*: 0: 1 SDR Flag_Fine_Ht_C (C band)
		10	**flag_fine_ht_k**	**binary uint 8** *size*: 0: 1 SDR Flag_Fine_Ht_K (Ku band)
		11	**altimeter_science_preliminary_flags_set**	**binary uint 8** *size*: 0: 1 0 = No, 1 = Yes
		12	**altimeter_engineering_preliminary_flags_set**	**binary uint 8** *size*: 0: 1 0 = No, 1 = Yes
		13	spare_2	**binary bytes** *size*: 0: 1 spare hidden: true
		14	**flag_9**	**binary uint 8** *size*: 0: 1 0 = OK , 1 = Bad data
		15	**flag_8**	**binary uint 8** *size*: 0: 1 0 = OK , 1 = Bad data

Copyright CLS

90	**Iono_Dor_Bad**	**binary int8** *size*: 1 Quality index on iono_dor endianness: little endian
91	**Geo_Bad_1**	**binary record** *size*: 1 Ocean/land/ice indicator. This element is computed for TOPEX and POSEIDON data

id	field name	definition
0	spare	**binary bytes** *size*: 0:4 spare hidden: true
1	**ice_distribution**	**binary uint8** *size*: 0:1 0 = No ice , 1 = Ice
2	**sea_surface_state**	**binary uint8** *size*: 0:1 Sea Surface State as observed by the radiomater. 0 = Water , 1 = Land
3	**water_land_distribution**	**binary uint8** *size*: 0:1 0 = Water , 1 = Land
4	**deep_water_state**	**binary uint8** *size*: 0:1 (/ 1000m). 0 = Deep Water , 1 = Shallow Water

92	**Geo_Bad_2**	**binary record** *size*: 1 Rain/tide conditions. This element is computed for TOPEX and POSEIDON data

id	field name	definition
0	spare	**binary bytes** *size*: 0:3 spare hidden: true
1	**fes_95_2_ocean_tide**	**binary uint8** *size*: 0:2 0 = 4 valid points, 1 = 3 valid points, 2 = 2 valid points, 3 = less than 2 valid points

Copyright CLS

		2 **csr_3_0_ocean_tide** — **binary uint8** *size*: 0:2 0 = 4 valid points, 1 = 3 valid points, 2 = 2 valid points, 3 = less than 2 valid points 3 **rain_excess_liquid** — **binary uint8** *size*: 0:1 0 = Normal , 1 = Rain / Excess liquid detected
93	**TMR_Bad**	**binary record** *size*: 1 Flag for brightness temperatures. This element is computed for TOPEX and POSEIDON data 0 spare — **binary bytes** *size*: 0:6 spare hidden: true 1 **brightness_temperature_flag** — **binary uint8** *size*: 0:2 0 = All channels good, 1 = One or more channels fair, 2 = One or more channels poor, 3 = One or more channels with interpolation failure (bad)
94	**Ind_RTK**	**binary uint8** *size*: 1 POSEIDON ground retracking indicator. This element exists only for POSEIDON measurements. A default value is given when TOPEX is on endianness: little endian
95	spare	**binary bytes** *size*: 1 spare hidden: true

3.2. ERS-1/2 data

3.2.1. Filenaming convention

The nomenclature is:

OPR2-DIF-DIF-ssssssseeeeee.E2

OPR2-DIF-DIF-*.E2

Copyright CLS

Where:

- ssssss: Pass_Start_Date
- eeeeeee: Pass_End_Date

3.2.2. Product data format

3.2.2.1. OPR_pass_file_header

ascii record "OPR_pass_file_header" *size*: 3960

id	field name	definition
0	edu_label	**ascii string** *size*: 20 CCSDS EDU Label fixed value: "CCSD3ZF0000100000001" hidden: true
1	volume_label	**ascii string** *size*: 20 CCSDS Volume Label fixed value: "CCSD3KS00006PASSFILE" hidden: true
2	white_space_1	**ascii string** *size*: 138 white space fixed value: " " hidden: true
3	cr_newline_1	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
4	Pass_File_Name_label	**ascii string** *size*: 17 Pass_File_Name = fixed value: "Pass_File_Name = "

Copyright CLS

		hidden: true
5	**Pass_File_Name**	**ascii string** *size*: 12 Name of the pass-file, built from the following indicators: satellite, product type, orbit revolution number (absolute and relative number in the cycle), and pass direction (ascending or descending pass)
6	semicolon_mark_1	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
7	white_space_2	**ascii string** *size*: 148 white space fixed value: " " hidden: true
8	cr_newline_2	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
9	Pass_Station_label	**ascii string** *size*: 15 Pass_Station = fixed value: "Pass_Station = " hidden: true
10	**Pass_Station**	**ascii string** *size*: 2 Telemetry transcription station
11	semicolon_mark_2	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true

Copyright CLS

12	white_space_3	**ascii string** *size*: 160 white space fixed value: " " hidden: true
13	cr_newline_3	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
14	Pass_Start_Date_label	**ascii string** *size*: 18 Pass_Start_Date = fixed value: "Pass_Start_Date = " hidden: true
15	**Pass_Start_Date**	**ascii time** *size*: 24 Time of the first data record in the pass-file. BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" **ascii string** *size*: 24 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss.uuuuuu". Microseconds can be written using less digits (1-6 digits): e.g.: "YYYY-DDDThh:mm:ss.u "
16	semicolon_mark_3	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
17	white_space_4	**ascii string** *size*: 135 white space fixed value: " " hidden: true

Copyright CLS

18	cr_newline_4	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
19	Pass_Generation_Date_label	**ascii string** *size*: 23 Pass_Generation_Date = fixed value: "Pass_Generation_Date = " hidden: true
20	**Pass_Generation_Date**	**ascii time** *size*: 17 Local time when the pass-file was produced. BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" **ascii string** *size*: 17 CCSDS ASCII datetime "YYYY-DDDThh:mm:ss".
21	semicolon_mark_4	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
22	white_space_5	**ascii string** *size*: 137 white space fixed value: " " hidden: true
23	cr_newline_5	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
24	Pass_Nbmes_label	**ascii string** *size*: 13

Copyright CLS

		Pass_Nbmes = fixed value: "Pass_Nbmes = " hidden: true
25	**Pass_Nbmes**	**ascii uint16** *size*: 4 Number of data records in the pass-file
26	semicolon_mark_5	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
27	white_space_6	**ascii string** *size*: 160 white space fixed value: " " hidden: true
28	cr_newline_6	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
29	Pass_Start_End_Latitude_label	**ascii string** *size*: 26 Pass_Start_End_Latitude = fixed value: "Pass_Start_End_Latitude = " hidden: true
30	**Pass_Start_Latitude**	**ascii int32 (double)** *size*: 9 Latitude of the first data record in the pass-file unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006)
31	underscore_mark_1	**ascii char** *size*: 1 underscore

Copyright CLS

		fixed value: "_" hidden: true
32	**Pass_End_Latitude**	**ascii int32 (double)** *size*: 9 Latitude of the last data record in the pass-file unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006)
33	semicolon_mark_6	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
34	white_space_7	**ascii string** *size*: 132 white space fixed value: " " hidden: true
35	cr_newline_7	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
36	Pass_Start_End_Longitude_label	**ascii string** *size*: 27 Pass_Start_End_Longitude = fixed value: "Pass_Start_End_Longitude = " hidden: true
37	**Pass_Start_Longitude**	**ascii uint32 (double)** *size*: 9 Longitude of the first data record in the pass-file unit: "1e-6 degrees_east" converted unit: "degrees_east" (multiply by 1/1e+006)

Copyright CLS

38	underscore_mark_2	**ascii char** *size*: 1 underscore fixed value: "_" hidden: true
39	**Pass_End_Longitude**	**ascii uint32 (double)** *size*: 9 Longitude of the last data record in the pass-file unit: "1e-6 degrees_east" converted unit: "degrees_east" (multiply by 1/1e+006)
40	semicolon_mark_7	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
41	white_space_8	**ascii string** *size*: 131 white space fixed value: " " hidden: true
42	cr_newline_8	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
43	Pass_Version_label	**ascii string** *size*: 15 Pass_Version = fixed value: "Pass_Version = " hidden: true
44	**OPR_Version**	**ascii string** *size*: 4 Version of OPR software used to build the pass-file

FORM-NT-GB-7-1

Copyright CLS

45	underscore_mark_3	**ascii char** *size*: 1 underscore fixed value: "_" hidden: true
46	**OIP_Version**	**ascii string** *size*: 4 Version of OIP software used to build the pass-file
47	underscore_mark_4	**ascii char** *size*: 1 underscore fixed value: "_" hidden: true
48	**MBT_Version**	**ascii string** *size*: 4 Version of MBT software used to build the pass-file
49	underscore_mark_5	**ascii char** *size*: 1 underscore fixed value: "_" hidden: true
50	**Orbit_Version**	**ascii string** *size*: 4 Version of orbit software used to build the pass-file
51	semicolon_mark_8	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
52	white_space_9	**ascii string** *size*: 143 white space fixed value: " " hidden: true

FORM-NT-GB-7-1

Copyright CLS

53	cr_newline_9	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
54	Nbmes_Sea_Land_MBT_label	**ascii string** *size*: 21 Nbmes_Sea_Land_MBT = fixed value: "Nbmes_Sea_Land_MBT = " hidden: true
55	**Nbmes_Sea_MBT**	**ascii uint16** *size*: 4 Number of valid radiometer measurements over the sea
56	underscore_mark_6	**ascii char** *size*: 1 underscore fixed value: "_" hidden: true
57	**Nbmes_Land_MBT**	**ascii uint16** *size*: 4 Number of valid radiometer measurements over the land
58	semicolon_mark_9	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
59	white_space_10	**ascii string** *size*: 147 white space fixed value: " " hidden: true
60	cr_newline_10	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n"

Copyright CLS

		hidden: true
61	Nbmes_Valid_label	**ascii string** *size*: 14 Nbmes_Valid = fixed value: "Nbmes_Valid = " hidden: true
62	**Nbmes_Valid**	**ascii uint16** *size*: 4 Number of valid 1-Hz altimeter measurements in the pass-file
63	semicolon_mark_10	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
64	white_space_11	**ascii string** *size*: 159 white space fixed value: " " hidden: true
65	cr_newline_11	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
66	Nbmes_Valid_OIP_MBT_label	**ascii string** *size*: 22 Nbmes_Valid_OIP_MBT = fixed value: "Nbmes_Valid_OIP_MBT = " hidden: true
67	**Nbmes_Valid_OIP_MBT**	**ascii uint16** *size*: 4 Number of simultaneous altimeter and radiometer valid measurements in the pass-file
68	semicolon_mark_11	**ascii char** *size*: 1

Copyright CLS

		semicolon fixed value: ";" hidden: true
69	white_space_12	**ascii string** *size*: 151 white space fixed value: " " hidden: true
70	cr_newline_12	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
71	Type_Orbit_Height_Geo_label	**ascii string** *size*: 24 Type_Orbit_Height_Geo = fixed value: "Type_Orbit_Height_Geo = " hidden: true
72	**Type_Orbit_Height**	**ascii string** *size*: 5 Type of orbit data used to compute the altitude of the satellite above the reference ellipsoid (DPAFL or DPAFP)
73	underscore_mark_7	**ascii char** *size*: 1 underscore fixed value: "_" hidden: true
74	**Type_Orbit_Geo**	**ascii string** *size*: 5 Type of orbit data used to locate measurements (MMCC, DPAFL or DPAFP)
75	semicolon_mark_12	**ascii char** *size*: 1 semicolon

Copyright CLS

		fixed value: ";" hidden: true
76	white_space_13	**ascii string** *size*: 142 white space fixed value: " " hidden: true
77	cr_newline_13	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
78	Min_Max_Wind_Speed_label	**ascii string** *size*: 21 Min_Max_Wind_Speed = fixed value: "Min_Max_Wind_Speed = " hidden: true
79	**Min_Wind_Speed**	**ascii int16 (double)** *size*: 5 Minimal value of wind speed estimates (Wind_Sp) in the pass-file unit: "1e-2 m/s" converted unit: "m/s" (multiply by 1/100)
80	slash_mark_1	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
81	**Max_Wind_Speed**	**ascii int16 (double)** *size*: 5 Maximal value of wind speed estimates (Wind_Sp) in the pass-file unit: "1e-2 m/s" converted unit: "m/s" (multiply by 1/100)

Copyright CLS

82	semicolon_mark_13	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
83	white_space_14	**ascii string** *size*: 145 white space fixed value: " " hidden: true
84	cr_newline_14	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
85	Min_Max_Vapour_Content_label	**ascii string** *size*: 25 Min_Max_Vapour_Content = fixed value: "Min_Max_Vapour_Content = " hidden: true
86	**Min_Vapour_Content**	**ascii int16 (double)** *size*: 5 Minimal value of water vapour content estimates (WV_Cont) in the pass-file unit: "1e-2 g/cm2" converted unit: "g/cm2" (multiply by 1/100)
87	slash_mark_2	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
88	**Max_Vapour_Content**	**ascii int16 (double)** *size*: 5 Maximal value of water vapour content estimates (WV_Cont) in the pass-file

Copyright CLS

		unit: "1e-2 g/cm2" converted unit: "g/cm2" (multiply by 1/100)
89	semicolon_mark_14	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
90	white_space_15	**ascii string** *size*: 141 white space fixed value: " " hidden: true
91	cr_newline_15	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
92	Min_Max_Liquid_Content_label	**ascii string** *size*: 25 Min_Max_Liquid_Content = fixed value: "Min_Max_Liquid_Content = " hidden: true
93	**Min_Liquid_Content**	**ascii int16 (double)** *size*: 5 Minimal value of liquid water content estimates (LW_Cont) in the pass-file unit: "1e-2 kg/cm2" converted unit: "kg/cm2" (multiply by 1/100)
94	slash_mark_3	**ascii char** *size*: 1 slash fixed value: "/"

Copyright CLS

		hidden: true
95	**Max_Liquid_Content**	**ascii int16 (double)** *size*: 5 Maximal value of liquid water content estimates (LW_Cont) in the pass-file unit: "1e-2 kg/cm2" converted unit: "kg/cm2" (multiply by 1/100)
96	semicolon_mark_15	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
97	white_space_16	**ascii string** *size*: 141 white space fixed value: " " hidden: true
98	cr_newline_16	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
99	Min_Max_Altitude_label	**ascii string** *size*: 19 Min_Max_Altitude = fixed value: "Min_Max_Altitude = " hidden: true
100	**Min_Altitude**	**ascii int32 (double)** *size*: 10 Minimal value of altimeter range estimates (H_Alt) in the pass-file unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
101	slash_mark_4	**ascii char** *size*: 1 slash

Copyright CLS

		fixed value: "/" hidden: true
102	**Max_Altitude**	**ascii int32 (double)** *size*: 10 Maximal value of altimeter range estimates (H_Alt) in the pass-file unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
103	semicolon_mark_16	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
104	white_space_17	**ascii string** *size*: 137 white space fixed value: " " hidden: true
105	cr_newline_17	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
106	Min_Max_Wave_Height_label	**ascii string** *size*: 22 Min_Max_Wave_Height = fixed value: "Min_Max_Wave_Height = " hidden: true
107	**Min_Wave_Height**	**ascii int16 (double)** *size*: 5 Minimal value of significant wave height estimates (SWH) in the pass-file unit: "1e-2 m" converted unit: "m" (multiply by 1/100)

Copyright CLS

108	slash_mark_5	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
109	**Max_Wave_Height**	**ascii int16 (double)** *size*: 5 Maximal value of significant wave height estimates (SWH) in the pass-file unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
110	semicolon_mark_17	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
111	white_space_18	**ascii string** *size*: 144 white space fixed value: " " hidden: true
112	cr_newline_18	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
113	Min_Max_Sigma_Naught_label	**ascii string** *size*: 23 Min_Max_Sigma_Naught = fixed value: "Min_Max_Sigma_Naught = " hidden: true
114	**Min_Sigma_Naught**	**ascii int16 (double)** *size*: 5 Minimal value of backscatter coefficient estimates (Sigma0) in the pass-file

Copyright CLS

		unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
115	slash_mark_6	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
116	**Max_Sigma_Naught**	**ascii int16 (double)** *size*: 5 Maximal value of backscatter coefficient estimates (Sigma0) in the pass-file unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
117	semicolon_mark_18	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
118	white_space_19	**ascii string** *size*: 143 white space fixed value: " " hidden: true
119	cr_newline_19	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
120	Parameters_label	**ascii string** *size*: 13 Parameters = fixed value: "Parameters = " hidden: true

Copyright CLS

121	**R12**	**ascii uint8** *size*: 3 R12 sunspot number - used to compute the ionospheric correction
122	slash_mark_7	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
123	**USO_Drift**	**ascii int16 (double)** *size*: 5 USO drift - the difference between the nominal 5 MHz USO frequency and the in-flight measured USO frequency (nominal - measured). It is taken into account in the computation of altimeter range (see H_Alt_Raw) unit: "1e-3 Hz" converted unit: "Hz" (multiply by 1/1000)
124	slash_mark_8	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
125	**H_Alt_COG_Cor**	**ascii int16 (double)** *size*: 5 Distance antenna / centre of gravity is one of the corrections added to the raw value of altimeter range to get the altimeter range corrected for instrumental effects (see H_Alt). unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
126	semicolon_mark_19	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
127	white_space_20	**ascii string** *size*: 149 white space fixed value: "

Copyright CLS

		" hidden: true
128	cr_newline_20	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
129	Calibration_Corrections_label	**ascii string** *size*: 26 Calibration_Corrections = fixed value: "Calibration_Corrections = " hidden: true
130	**H_Alt_Bias**	**ascii int32 (double)** *size*: 10 Engineering calibration correction (bias) related to altimeter range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
131	slash_mark_9	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
132	**SWH_Bias**	**ascii int16 (double)** *size*: 5 Engineering calibration correction (bias) related to significant wave height unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
133	slash_mark_10	**ascii char** *size*: 1 slash fixed value: "/" hidden: true
134	**Sigma0_Bias**	**ascii int16 (double)** *size*: 5

Copyright CLS

		Engineering calibration correction (bias) related to backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
135	semicolon_mark_20	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
136	white_space_21	**ascii string** *size*: 129 white space fixed value: " " hidden: true
137	cr_newline_21	**ascii string** *size*: 2 carriage return + newline fixed value: "\r\n" hidden: true
138	white_space_22	**ascii string** *size*: 140 white space fixed value: " " hidden: true
139	ccsds_marker	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERPASSFILE" hidden: true
140	data_label	**ascii string** *size*: 20 CCSDS Data label

Copyright CLS

		fixed value: "FCST3IF0010300000001" hidden: true

3.2.2.2. OPR_pass_file_data_record

binary record "OPR_pass_file_data_record" *size*: 180

id	field name	definition
0	**Nb**	**binary int32** *size*: 4 Measurement number in the pass-file
1	**MCD**	**binary record** *size*: 4 This element is the Measurement Confidence Data, which regroups all the flags related to the 1-Hz altimeter measurement. 1-Hz altimeter quality flags are derived from the quality of 20-Hz ocean elementary measurements. A 1-Hz altimeter quality flag is set to "bad" if at least one of the corresponding elementary estimates is "bad" (i.e. out-of-range); otherwise it is set to "good". These engineering level flags may be considered as useful information for software validation, but their systematic use for editing data is to consider with care.

id	field name	definition
0	**Valid**	**binary uint8** *size*: 0:1 Measurement validity (0 = Valid, 1 = Invalid). A 1-Hz measurement is valid if it contains at least one 20-Hz elementary measurement declared "ocean" in the processing; it is invalid otherwise.
1	**Causes**	**binary uint8** *size*: 0:3 Cause of invalidity for invalid measurements (1 = Acquisition mode, 2 = Not acquisition mode but over land (measurements over land are provided in OPR as invalid measurements), 3 = Not acquisition mode, not over land, but not "ocean" measurement, 4 = Other operating mode (generally ice tracking mode)
2	**Qua_Raw**	**binary uint8** *size*: 0:1 Quality of range estimate (0 = Good , 1 = Bad)

Copyright CLS

		3	**Qua_Tele_Param**	**binary uint8** *size*: 0:1 Quality of telemetry parameters for range computation (0 = Good , 1 = Bad)
		4	**Qua_Cal_Cor**	**binary uint8** *size*: 0:1 Quality of internal calibration correction to range (0 = Good , 1 = Bad)
		5	**Qua_SWH**	**binary uint8** *size*: 0:1 Quality of significant wave height estimate (0 = Good , 1 = Bad)
		6	**Qua_Sigma0**	**binary uint8** *size*: 0:1 Quality of backscatter coefficient estimate (0 = Good , 1 = Bad)
		7	**Qua_Tele_Sigma0**	**binary uint8** *size*: 0:1 Quality of telemetry parameters for backscatter coefficient computation (0 = Good , 1 = Bad)
		8	**Qua_Sigma0_Cal_Cor**	**binary uint8** *size*: 0:1 Quality of internal calibration correction to backscatter coefficient (0 = Good , 1 = Bad)
		9	**Qua_Deriv**	**binary uint8** *size*: 0:1 Quality of range derivative estimate (0 = Good , 1 = Bad)
		10	**Typ_Alt_Cal_Cor**	**binary uint8** *size*: 0:1 Type of internal calibration for range correction (0 = Single Point Target Response, 1 = Invalid)
		11	**Typ_Sigma0_Cal_Cor**	**binary uint8** *size*: 0:1 Type of internal calibration for backscatter coefficient correction (0 = Single Point Target Response, 1 = Invalid)
		12	**Typ_Ocean_T**	**binary uint8** *size*: 0:1 Type of ocean tracking (0 = Nominal, 1 = Preset)

Copyright CLS

		13	**Sig_Wind_Sp**	**binary uint8** *size*: 0:1 Backscatter coefficient value for wind speed computation (0 = Nominal, 1 = Out-of-range)
		14	**Corr_Tide**	**binary uint8** *size*: 0:1 Presence / Absence of tide corrections (0 = Presence, 1 = Absence)
		15	**Sim_Radio**	**binary uint8** *size*: 0:1 Presence / Absence of a simultaneous radiometer data (0 = Presence, 1 = Absence)
		16	**Corr_TB_23**	**binary uint8** *size*: 0:1 23.8 GHz brightness temperature value (TB_23) for altimetric correction (0 = Nominal, 1 = Out-of-range)
		17	**Corr_TB_36**	**binary uint8** *size*: 0:1 36.5 GHz brightness temperature value (TB_36) for altimetric correction (0 = Nominal, 1 = Out-of-range)
		18	**OL_Flag**	**binary uint8** *size*: 0:1 Ocean / Land flag for the radiometer (0 = ocean, 1 = land)
		19	**Corr_Tropos**	**binary uint8** *size*: 0:1 Presence / Absence of meteorological wet tropospheric correction (0 = Presence, 1 = Absence)
		20	**MSS_DPAF**	**binary uint8** *size*: 0:1 Presence / Absence of DPAF mean sea surface (0 = Presence, 1 = Absence (the four MSS nearby grid points over land))
		21	**Manoeuvre**	**binary uint8** *size*: 0:1 Orbit quality - manoeuvre (0 = Nominal, 1 = Manoeuvre). Set to 1 when the orbit quality is affected by a satellite manoeuvre. The corresponding orbit altitude H_Sat is computed, but is wrong.

Copyright CLS

		22	**MSS_OSU**	**binary uint8** *size*: 0:1 Presence / Absence of OSU mean sea surface (0 = Presence, 1 = Absence (the four MSS nearby grid points over land))
		23	**Inv_Rad_Orb**	**binary uint8** *size*: 0:2 Cause of invalidity of radial orbit correction (1 = radial orbit correction exceeds 60 cm, 2 = altimeter data on land, 3 = no OPR1 altimeter data available)
		24	Unused	**binary bytes** *size*: 0:5 Spare hidden: true
2	**Tim_1**			**binary int32** *size*: 4 time stamp 1 (UTC time, in seconds, elapsed between the reference epoch (January 01, 1990 0 h.) and the time of the 1-Hz altimeter measurement, corresponding to the centre of the footprint). unit: "s since 1990-01-01"
3	**Tim_2**			**binary int32** *size*: 4 time stamp 2 (number of microseconds elapsed since the rounded second given in tim_1). unit: "1e-6 s"
4	**Lat**			**binary int32 (double)** *size*: 4 latitude unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006)
5	**Lon**			**binary int32 (double)** *size*: 4 longitude unit: "1e-6 degrees_east" converted unit: "degrees_east" (multiply by 1/1e+006)
6	**Nval**			**binary int32** *size*: 4 number of averaged 20-Hz measurements

Copyright CLS

7	**H_Alt_Raw**	**binary int32 (double)** *size*: 4 Range: raw value unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
8	**Std_H_Alt**	**binary int32 (double)** *size*: 4 Standard deviation on range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
9	**H_Alt_SME**	**binary array[10]** *size*: 20 Difference of the i-th 10-Hz range from H_Alt_Raw (i=1,10) **binary int16 (double)** *size*: 2 unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
10	**Tim_SME**	**binary array[10]** *size*: 20 Difference of the i-th 10-Hz time from Tim_1, Tim_2 **binary int16 (double)** *size*: 2 unit: "1e-4 s" converted unit: "s" (multiply by 1/10000)
11	**H_Alt**	**binary int32 (double)** *size*: 4 Range corrected fro instrumental effects unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
12	**H_Alt_LUT_Cor**	**binary int16 (double)** *size*: 2 Look-up table correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
13	**H_Alt_Dop_Cor**	**binary int16 (double)** *size*: 2 Doppler correction to range unit: "1e-3 m"

Copyright CLS

		converted unit: "m" (multiply by 1/1000)
14	**H_Alt_Cal_Cor_1**	**binary int32 (double)** *size*: 4 Internal calibration correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
15	**H_Alt_Cal_Cor_2**	**binary int32 (double)** *size*: 4 Initial setting for internal calibration correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
16	**Range_Deriv**	**binary int16 (double)** *size*: 2 Range first derivative unit: "1e-2 m/s" converted unit: "m/s" (multiply by 1/100)
17	**Dry_Cor**	**binary int16 (double)** *size*: 2 Dry tropospheric correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
18	**Wet_Cor**	**binary int16 (double)** *size*: 2 Meteorological wet tropospheric correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
19	**Pres_Err**	**binary int16 (double)** *size*: 2 Pressure field error unit: "1e2 Pa" converted unit: "Pa" (multiply by 100/1)
20	**Wet_H_Rad**	**binary int16 (double)** *size*: 2 Radiometer wet tropospheric correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)

Copyright CLS

21	**Iono_Cor**	**binary int16 (double)** *size*: 2 Ionospheric correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
22	**SSB_Cor**	**binary int16 (double)** *size*: 2 Sea state bias correction to range unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
23	**H_Eot**	**binary int16 (double)** *size*: 2 Elastic ocean tide unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
24	**H_Lt**	**binary int16 (double)** *size*: 2 Tidal loading effect unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
25	**H_Set**	**binary int16 (double)** *size*: 2 Solid earth tide unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
26	**H_Geo**	**binary int32 (double)** *size*: 4 Geoid height unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
27	**H_MSS_DPAF**	**binary int32 (double)** *size*: 4 Mean sea surface height unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
28	**H_Sat**	**binary int32 (double)** *size*: 4

Copyright CLS

		Altitude above the reference ellipsoid unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
29	**Orb_Err**	**binary int32 (double)** *size*: 4 Orbit error unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
30	**SWH_Raw**	**binary int16 (double)** *size*: 2 Significant wave height - raw value unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
31	**Std_SWH**	**binary int16 (double)** *size*: 2 Standard deviation on significant wave height unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
32	**SWH**	**binary int16 (double)** *size*: 2 Significant wave height corrected for instrumental effects unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
33	**SWH_Lut_Cor**	**binary int16 (double)** *size*: 2 Look-up table correction to significant wave height unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
34	**Sigma0_Raw**	**binary int16 (double)** *size*: 2 Backscatter coefficient - raw value unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
35	**Std_Sigma0**	**binary int16 (double)** *size*: 2 Standard deviation on backscatter coefficient

Copyright CLS

		unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
36	**Sigma0**	**binary int16 (double)** *size*: 2 Backscatter coefficient corrected for instrumental effects unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
37	**Sigma0_LUT_Cor**	**binary int16 (double)** *size*: 2 Look-up table correction to backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
38	**Sigma0_Cal_Cor**	**binary int16 (double)** *size*: 2 Internal calibration correction to backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
39	**Sigma0_LW**	**binary int16 (double)** *size*: 2 Sigma0 corrected for cloud liquid water path attenuation unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
40	**Wind_Sp**	**binary int16 (double)** *size*: 2 Wind speed unit: "1e-2 m/s" converted unit: "m/s" (multiply by 1/100)
41	**Wind_Sp_LW**	**binary int16 (double)** *size*: 2 Wind speed corrected for cloud liquid water path attenuation unit: "1e-2 m/s" converted unit: "m/s" (multiply by 1/100)
42	**TB_23**	**binary int16 (double)** *size*: 2 23.8 GHz brightness temperature unit: "1e-1 K"

Copyright CLS

		converted unit: "K" (multiply by 1/10)
43	**TB_36**	**binary int16 (double)** *size*: 2 36.5 GHz brightness temperature unit: "1e-1 K" converted unit: "K" (multiply by 1/10)
44	**WV_Cont**	**binary int16 (double)** *size*: 2 Water vapour content unit: "1e-2 g/cm2" converted unit: "g/cm2" (multiply by 1/100)
45	**WV_Cont_WS**	**binary int16 (double)** *size*: 2 Precise water vapour content (wind speed included) unit: "1e-2 g/cm2" converted unit: "g/cm2" (multiply by 1/100)
46	**LW_Cont**	**binary int16 (double)** *size*: 2 Liquid water content unit: "1e-2 kg/cm2" converted unit: "kg/cm2" (multiply by 1/100)
47	**LW_Cont_WS**	**binary int16 (double)** *size*: 2 Precise liquid water content (wind speed included) unit: "1e-2 kg/cm2" converted unit: "kg/cm2" (multiply by 1/100)
48	**H_MSS_OSU**	**binary int32 (double)** *size*: 4 OSU Mean sea surface height unit: "1e-3 m" converted unit: "m" (multiply by 1/1000)
49	**Square_Off_Nad**	**binary int32 (double)** *size*: 4 Waveform-derived square of the off-nadir angle (1-Hz estimate) unit: "1e-6 degrees2" converted unit: "degrees2" (multiply by 1/1e+006)

Copyright CLS

50	**Square_Off_Nad_Smoothed**	**binary int32 (double)** *size*: 4 Waveform-derived square of the off-nadir angle (smoothed estimate) unit: "1e-6 degrees2" converted unit: "degrees2" (multiply by 1/1e+006)
51	Spare	**binary bytes** *size*: 4 Spare hidden: true

3.3. GFO data

3.3.1. Filenaming convention

The nomenclature is:

gfo_cCCC_pPPP.gdr

where:

- "CCC" identifies the 17-day repeat cycle number
- "PPP" identifies the pass (half-revolution) number of the GDR

3.3.2. Product data format

3.3.2.1. GDR_HEADER

ascii record "GDR_HEADER"

id	field name	definition
0	PASS_BEGIN_TIME_label	**ascii string** *size*: 18 PASS_BEGIN_TIME = fixed value: "PASS_BEGIN_TIME = " hidden: true
1	**PASS_BEGIN_TIME**	**ascii double** UTC time, in seconds since 1/1/1985, of the first data record in the file. This time corresponds to the midframe time of the 1-Hz average of the first record

Copyright CLS

		unit: "s since 1985-01-01"
2	semicolon_1	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
3	newline_1	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
4	EQ_CROSSING_TIME_LON_label	**ascii string** *size*: 23 EQ_CROSSING_TIME_LON = fixed value: "EQ_CROSSING_TIME_LON = " hidden: true
5	**EQ_CROSSING_TIME**	**ascii double** time of the equator crossing point for this pass. The value is generated from the once per minute ephemeris data, interpolated to the equator crossing unit: "s since 1985-01-01"
6	**EQ_CROSSING_LON**	**ascii double** longitude of the equator crossing point for this pass. The value is generated from the once per minute ephemeris data, interpolated to the equator crossing unit: "degrees_east"
7	semicolon_2	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
8	newline_2	**ascii string** *size*: 1

Copyright CLS

		newline fixed value: "\n" hidden: true
9	CYCLE_NUMBER_label	**ascii string** *size*: 15 CYCLE_NUMBER = fixed value: "CYCLE_NUMBER = " hidden: true
10	**CYCLE_NUMBER**	**ascii uint32** determined from the equator crossing table, with cycle "zero" defined as the first (partial) 17-day cycle after the satellite attained its exact repeat orbit on 4/20/1998. With this definition, cycle number one, pass number one, has an equator crossing time of ~ 22:11 UTC on 5/3/1998. The first SDR data were generated during cycle one, beginning on 5/10/1998
11	semicolon_3	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
12	newline_3	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
13	PASS_NUMBER_label	**ascii string** *size*: 14 PASS_NUMBER = fixed value: "PASS_NUMBER = " hidden: true
14	**PASS_NUMBER**	**ascii uint16** the number of half revolutions since the beginning of the current cycle, ranging from 1 to 488. These are in order of increasing equator crossing time, with all ascending passes odd-numbered, and all

Copyright CLS

		descending passes even-numbered. Pass number one is defined as the pass whose equator crossing longitude is the smallest east longitude in the range 0-360 degrees. This pass had an average equator crossing longitude of approximately 1.01 E. Subsequent pass numbers have equator crossing times roughly 50 minutes later than the previous pass
15	semicolon_4	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
16	newline_4	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
17	PROCESSING_TIME_label	**ascii string** *size*: 18 PROCESSING_TIME = fixed value: "PROCESSING_TIME = " hidden: true
18	**PROCESSING_TIME**	**ascii string** *size*: 24 the time at which the GDR was created from the input SDRs. It is comprised of a 24-byte UNIX date and time stamp, e.g. "Mon Jun 10 14:30:00 2002"
19	semicolon_5	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
20	newline_5	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true

Copyright CLS

21	PROCESSING_CENTER_label	**ascii string** *size*: 20 PROCESSING_CENTER = fixed value: "PROCESSING_CENTER = " hidden: true
22	**PROCESSING_CENTER**	**ascii string [line]** processing center where the GDR was created, e.g. "NOAA LSA"
23	newline_6	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
24	SOFTWARE_VERSION_label	**ascii string** *size*: 19 SOFTWARE_VERSION = fixed value: "SOFTWARE_VERSION = " hidden: true
25	**SOFTWARE_VERSION**	**ascii string [line]** current version of the GDR processing software
26	newline_7	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
27	SATELLITE_ID_label	**ascii string** *size*: 15 SATELLITE_ID = fixed value: "SATELLITE_ID = " hidden: true
28	**SATELLITE_ID**	**ascii string [line]** satellite that was processed, e.g. "GFO"
29	newline_8	**ascii string** *size*: 1

Copyright CLS

		newline fixed value: "\n" hidden: true
30	DATA_RECORD_LENGTH_label	**ascii string** *size*: 21 DATA_RECORD_LENGTH = fixed value: "DATA_RECORD_LENGTH = " hidden: true
31	**DATA_RECORD_LENGTH**	**ascii uint16** length in bytes of the total GDR Data Record. This is currently 184 bytes for the GFO GDRs
32	semicolon_9	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
33	newline_9	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
34	BASIC_GDR_LENGTH_label	**ascii string** *size*: 19 BASIC_GDR_LENGTH = fixed value: "BASIC_GDR_LENGTH = " hidden: true
35	**BASIC_GDR_LENGTH**	**ascii uint16** length in bytes of the portion of the GDR Data Record which is common between all GDR files for different satellites. This is currently 98 bytes, as defined by NAVO data processing conventions
36	semicolon_10	**ascii string** *size*: 1 semicolon

Copyright CLS

		fixed value: ";" hidden: true
37	newline_10	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
38	HEIGHT_CALIBRATION_BIAS_label	**ascii string** *size*: 26 HEIGHT_CALIBRATION_BIAS = fixed value: "HEIGHT_CALIBRATION_BIAS = " hidden: true
39	**HEIGHT_CALIBRATION_BIAS**	**ascii double** equal to the "Height Calibration Bias" in the SDR Header unit: "mm"
40	semicolon_11	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
41	newline_11	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
42	ALTITUDE_BIAS_INITIAL_label	**ascii string** *size*: 24 ALTITUDE_BIAS_INITIAL = fixed value: "ALTITUDE_BIAS_INITIAL = " hidden: true
43	**ALTITUDE_BIAS_INITIAL**	**ascii double** equal to the "Altitude Bias (Initial)" in the SDR

Copyright CLS

		Header unit: "km"
44	semicolon_12	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
45	newline_12	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
46	ALTITUDE_BIAS_CENTER_OF_GRAVITY_label	**ascii string** *size*: 34 ALTITUDE_BIAS_CENTER_OF_GRAVITY = fixed value: "ALTITUDE_BIAS_CENTER_OF_GRAVITY = " hidden: true
47	**ALTITUDE_BIAS_CENTER_OF_GRAVITY**	**ascii double** equal to the "Altitude Bias based on S/C CG" in the SDR Header unit: "mm"
48	semicolon_13	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
49	newline_13	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
50	TIMING_BIAS_INITIAL_label	**ascii string** *size*: 22 TIMING_BIAS_INITIAL =

Copyright CLS

		fixed value: "TIMING_BIAS_INITIAL = " hidden: true
51	**TIMING_BIAS_INITIAL**	**ascii double** equal to "Timing Bias (Initial)" in the SDR Header. All times in the GDRs have been computed by subtracting this quantity from the corresponding times in the SDRs unit: "ms"
52	semicolon_14	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
53	newline_14	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
54	AGC_CALIBRATION_BIAS_label	**ascii string** *size*: 23 AGC_CALIBRATION_BIAS = fixed value: "AGC_CALIBRATION_BIAS = " hidden: true
55	**AGC_CALIBRATION_BIAS**	**ascii double** equal to "AGC Calibration Bias" in the SDR Header unit: "dB"
56	semicolon_15	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
57	newline_15	**ascii string** *size*: 1 newline

Copyright CLS

		fixed value: "\n" hidden: true
58	AGC_BIAS_INITIAL_label	**ascii string** *size*: 19 AGC_BIAS_INITIAL = fixed value: "AGC_BIAS_INITIAL = " hidden: true
59	**AGC_BIAS_INITIAL**	**ascii double** equal to "AGC Bias (Initial)" in the SDR Header unit: "dB"
60	semicolon_16	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
61	newline_16	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
62	ORBIT_label	**ascii string** *size*: 8 ORBIT = fixed value: "ORBIT = " hidden: true
63	**ORBIT**	**ascii string** *size*: 10 specifies the type of laser orbit ephemeris file ("moe" = medium orbit ephemeris; "poe" = precise orbit ephemeris) and the arc date string. The arc date is of the form "ZYMMDD" where Z indicates the decade ("n" for 1990; "z" for 2000); Y indicates the year within the decade (0-9); MM is the month (01-12) and DD is the day of the month (01-31)
64	semicolon_17	**ascii string** *size*: 1

Copyright CLS

		semicolon fixed value: ";" hidden: true
65	newline_17	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
66	PASS_END_TIME_label	**ascii string** *size*: 16 PASS_END_TIME = fixed value: "PASS_END_TIME = " hidden: true
67	**PASS_END_TIME**	**ascii double** et to the UTC time, in seconds since 1/1/1985, of the last data record in the file. This time corresponds to the midframe time of the 1-Hz average of the final record unit: "s since 1985-01-01"
68	semicolon_18	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
69	newline_18	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
70	NUMBER_GDR_RECORDS_label	**ascii string** *size*: 21 NUMBER_GDR_RECORDS = fixed value: "NUMBER_GDR_RECORDS = " hidden: true

Copyright CLS

71	**NUMBER_GDR_RECORDS**	**ascii uint32** count of one-second average records within the GDR
72	semicolon_19	**ascii string** *size*: 1 semicolon fixed value: ";" hidden: true
73	newline_19	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true
74	END_OF_HEADER	**ascii string** *size*: 13 END_OF_HEADER fixed value: "END_OF_HEADER" hidden: true
75	newline_20	**ascii string** *size*: 1 newline fixed value: "\n" hidden: true

3.3.2.2. GDR_DATA_RECORD

binary record "GDR_DATA_RECORD" *size*: 184

id	field name	definition
0	**Time_Past_Epoch**	**binary uint32** *size*: 4 time at the midframe expressed as the number of integer seconds since January 1, 1985, 0.0 hours UTC. Compute the actual midframe time as follows: Time_Midframe [sec] = Time_Past_Epoch [sec] + Time_Past_Epoch_Continued [microsec] * 1E-6 unit: "s since 1985-01-01"

Copyright CLS

1	**Time_Past_Epoch_Continued**	**binary uint32** *size*: 4 the fractional contribution to the total Time Past Epoch unit: "1e-6 s"
2	**Latitude**	**binary int32 (double)** *size*: 4 geodetic latitude calculated at the midframe, where north is positive and south is negative. This quantity is derived from an ephemeris or Keplerian elements unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006)
3	**Longitude**	**binary int32 (double)** *size*: 4 east geodetic longitude calculated at the midframe, where 0<=longitude<360. This quantity is derived from an ephemeris or Keplerian elements unit: "1e-6 degrees_east" converted unit: "degrees_east" (multiply by 1/1e+006)
4	**SSHU**	**binary int32** *size*: 4 SSH Uncorrected (SSHU) is the 1-Hz Sea Surface Height (SSH) relative to the ellipsoid, without any environmental corrections. The 1-Hz value is calculated at the midframe using the 10-Hz SSHU values. The 1-Hz value is obtained from a linear fit with iterative outlier rejection applied to the 10-Hz values. SSHU [mm] = Satellite_Altitude - (Satellite_Range + Net_Height_Correction), where Satellite_Range is the uncorrected height of the satellite above the sea surface, obtained from the SDR parameters H(1) through H(10) unit: "mm"
5	**SSHC**	**binary int32** *size*: 4 SSH Corrected (SSHC) is the 1-Hz Sea Surface Height (SSH) relative to the ellipsoid, with environmental corrections. The 1-Hz value is calculated at the midframe using the 10-Hz SSHC values. The 1-Hz value is obtained from a linear fit with iterative outlier rejection applied to the 10-Hz values. SSHC is calculated from SSHU. SSHC [mm] = SSHU - Environmental_Corrections, where Environmental_Corrections = Ionosphere + Dry_Troposphere + Wet_Troposphere_MWR + Inverse_Barometer + Ocean_Water_Tide + Ocean_Load_Tide + Solid_Earth_Tide + Pole_Tide + Sea_State_Bias unit: "mm"
6	**Altitude**	**binary uint32** *size*: 4 the geodetic height of the satellite above the reference

Copyright CLS

		ellipsoid, calculated at the midframe. This quantity is derived from an ephemeris or Keplerian elements unit: "mm"
7	**Time_Shift_Midframe**	**binary int32** *size*: 4 time offset between the first high-rate (10-Hz) sample in the GDR record, and the time of the 1-Hz record (Time_Past_Epoch + 1E-6 * Time_Past_Epoch_Continued). Times of SDR Data Records pertain to the first RA data sample of the high-rate data, while times of GDR Data Records pertain to the midframe, located halfway between high-rate samples five and six. All GDR times have been corrected by subtracting TIMING_BIAS_INITIAL from the SDR times. Time Shift Midframe is calculated from the "Ratio" parameter in the SDR Header as follows: Time_Shift_Midframe [microsec] = (4.5 * 0.098 * 1E6 * Ratio_SDR) unit: "1e-6 s"
8	**SWH**	**binary uint16 (double)** *size*: 2 1-Hz Significant Wave Height calculated at the midframe using the 10-Hz SWH's from the SDR. The 1-Hz value is obtained from a linear fit with iterative outlier rejection. SWH [cm] = SWH_SDR[m] * 100 unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
9	**Sigma0**	**binary uint16 (double)** *size*: 2 equal to the "Backscatter Coefficient" from the SDR Data Record unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
10	**Wind_Speed**	**binary uint16 (double)** *size*: 2 Wind Speed [cm/sec] is calculated from Sigma0 using a modified Chelton-Wentz algorithm: Wind_Speed [cm/sec] = 100 * SUM{ a(coeff_index,i) * Sigma0**i }i=0,1,2,3,4 where coeff_index = 0 for Sigma0 < 11.4, coeff_index = 1 for 11.4 <= Sigma0 < 20.2, coeff_index = 2 for Sigma0 >= 20.2, and a(coeff_index,i) is a 3x5 array with the following values: { {58.7614523 , -13.58500361, 2.239083411, -0.188532055, 0.005438225}, {366.3919346, -81.88668532, 6.890552953, -0.257760189, 0.003607894}, {0.0 , 0.0 , 0.0 , 0.0 , 0.0 } }. Reference: Witter, D.L., and D.B. Chelton, A Geosat wind speed algorithm and a method for altimeter wind speed algorithm development. J. Geophys. Res., 96, 8853-8860, 1991

Copyright CLS

		unit: "1e-2 m/s" converted unit: "m/s" (multiply by 1/100)
11	**AGC**	**binary uint16** **(double)** *size*: 2 1-Hz Automatic Gain Control calculated at the midframe using the 10-Hz AGC's from the SDR. The 1-Hz value is obtained from a linear fit with iterative outlier rejection. AGC [0.01 dB] = AGC_SDR[dB] * 100 + Net_AGC_Correction [0.01 dB] unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
12	**Dry_Troposphere**	**binary int16** *size*: 2 Dry Troposphere [mm] is derived from the NOAA NCEP Reanalysis Project sea level pressure data set. The value is determined by bilinear interpolation in space, and linear interpolation in time, from the 6-hourly, 2.5 degree spatial grids. Dry_Troposphere [mm] = -2.273 * (1 + 0.0026 * cos (2 * Latitude[radians])) * Sea_Level_Pressure[mbar] unit: "mm"
13	**Wet_Troposphere**	**binary int16** *size*: 2 Wet Troposphere (MWR) [mm] is the wet correction measured by the onboard microwave radiometer. It is obtained from the "Path Delay" variable in SDR Data Record as follows: Wet_Troposphere_MWR [mm] = -10 * Path_Delay_SDR [cm] unit: "mm"
14	**Ionosphere**	**binary int16** *size*: 2 Ionosphere [mm] is the altimeter range correction derived from the total electron content (TEC) in the atmosphere. Ionosphere is obtained from the University of Bern (Switzerland) "CODE" Global Ionosphere Maps (GIM). Two-hourly GIM maps are bilinearly interpolated, after rotation in solar/magnetic coordinates, to provide a precise value based on GPS measurements. The TEC measurements are converted to a range correction using the square of the GFO Ku-band frequency: Ionosphere [mm] = -402.5 * TEC[1016 electrons/m2] / f2 where f = 13.495 is the radar frequency, in GHz, and "1016 electrons/m2" is commonly referred to as a "TEC unit" unit: "mm"
15	**Inverse_Barometer**	**binary int16** *size*: 2 Inverse Barometer [mm] is calculated from the NOAA NCEP Reanalysis Project sea level pressure data set as follows: Inverse Barometer [mm] = -9.948* (Sea Level Pressure[mbar] -

Copyright CLS

		Mean_Ocean_Pressure[mbar]), Surface_Pressure values are "local" measurements at the sub-satellite nadir location (lat/lon), determined from bilinear spatial and linear temporal interpolation ofthe 6-hourly, 2.5 degree grids. The Mean_Ocean_Pressure values are calculated for each 6-hourly grid by averaging all Sea_Level_Pressure values that are over ocean (and not land) gridpoints. The 6-hourly time series is then smoothed with a 2-day filter, and the resulting time series of Mean_Ocean_Pressure is linearly interpolated in time to the measurement time of the data record unit: "mm"
16	**Sea_State_Bias**	**binary int16** *size*: 2 Sea State Bias [mm] (SSB) is calculated as 4.5% of SWH: Sea_State_Bias [mm] = -0.045 * (SWH[cm] * 10) unit: "mm"
17	**Solid_Earth_Tide**	**binary int16** *size*: 2 Solid Earth Tide [mm] is calculated as follows: Solid_Earth_Tide [mm] = 1000 * (RH2*V2 + RH3*V3)/GRAVITY, where RH2 = 0.609, RH3 = 0.291, and GRAVITY = 9.80. V2 and V3 are the second and third degree potential values (in the MKS system) from the tide-generating potential as given by Cartwright and Tayler (1971) and corrected by Cartwright and Edden (1973). Reference: Cartwright, D.E., and A.C. Edden, Corrected tables of tidal harmonics. Geophys. J. Roy. Soc., 23, 253-264, 1973 unit: "mm"
18	**Ocean_Water_Tide**	**binary int16** *size*: 2 Ocean Water Tide [mm] is calculated from the NASA Goddard Space Flight Center GOT00.2 tide model unit: "mm"
19	**Ocean_Load_Tide**	**binary int16** *size*: 2 Ocean Load Tide [mm] is calculated from the NASA Goddard Space Flight Center GOT00.2 tide model unit: "mm"
20	**Pole_Tide**	**binary int16** *size*: 2 Pole Tide [mm] is calculated as follows: Pole_Tide [mm] = A * sin(2 * Latitude[radians]) * ((Polar_location_X - X_pole_avg) * cos(Longitude[radians]) - (Polar_location_Y - Y_pole_avg) * sin(Longitude[radians])), where A = -69.435, X_pole_avg = 0.042, and Y_pole_avg = 0.293. The "Polar_location_X" and "Polar_location_Y" values are the polar motion angles (in arcsec) obtained from data in the orbit ephemeris files

Copyright CLS

		unit: "mm"
21	**Water_Depth**	**binary int16** *size*: 2 Water Depth [m] is obtained from the NOAA/NGDC ETOPO2 two-minute topography/bathymetry data base, which is largely based on predicted bathymetry from satellite altimetry unit: "m"
22	**Geoid_Depth**	**binary int32** *size*: 4 Geoid Height [mm] is obtained from the joint NASA/NIMA EGM96 database unit: "mm"
23	**Mean_Sea_Surface_I**	**binary int32** *size*: 4 Mean Sea Surface I [mm] is obtained from the NASA Goddard Space Flight Center GSFC00.1 two-minute mean sea surface database unit: "mm"
24	**Mean_Sea_Surface_II**	**binary int32** *size*: 4 Mean Sea Surface II [mm] is obtained from the OSUMSS95 one-sixteenth degree database unit: "mm"
25	**SSHU_STD**	**binary uint16** *size*: 2 SSHU STD [mm] is the standard deviation from the fit applied to the 10-Hz SSHU values unit: "mm"
26	**SWH_STD**	**binary uint16 (double)** *size*: 2 SWH STD [cm] is the standard deviation from the fit applied to the 10-Hz SWH values unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
27	**AGC_STD**	**binary uint16 (double)** *size*: 2 AGC STD [0.01 dB] is the standard deviation from the fit applied to the 10-Hz AGC values unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)

Copyright CLS

28	**Net_Height_Correction**	**binary int16** *size*: 2 Net Height Correction [mm] is calculated from fields in the SDR Header and Data Record as follows: Net_Height_Correction [mm] = Attitude_Wave_Height_Bias_SDR - Height_Calibration_Bias_SDR + Altitude_Bias_Center_of_Gravity_SDR - (1E6 * Altitude_Bias_Initial_SDR) - FM_Crosstalk_SDR unit: "mm"
29	**Net_SWH_Correction**	**binary int16** *size*: 2 Net SWH Correction [mm] is calculated from the "SWH Bias" in the SDR Data Record as follows: Net_SWH_Correction [mm] = SWH_Bias_SDR[m] * 1000 unit: "mm"
30	**Net_AGC_Correction**	**binary int16 (double)** *size*: 2 Net AGC Correction is calculated from fields in the SDR Header and Data Record as follows: Net_AGC_Correction [0.01 dB] = AGC_Temperature_Correction_SDR + Delta_AGC_Height_SDR + AGC_Correction_for_Attitude_SDR - AGC_Calibration_Bias_SDR unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
31	**Time_Tag_Deviation_1_Hz**	**binary int32 (double)** *size*: 4 The 1-Hz Time-tag Deviation is the difference between the actual and nominal inter-record spacing. This quantity is a function of the SDR Header variable "Ratio", which can change within a pass, and therefore it is carried as a data variable within the GDR. The nominal value of Ratio is 0.99992E-6. The 1-Hz inter-record spacing, in seconds, is 0.98*ratio*1E6. Hence the nominal value of the 1-Hz time-tag is 0.98*0.99992 = 0.9799216 seconds. The actual 1-Hz time-tag spacing is computed from the current value of Ratio in the SDR header, and the difference between the actual and nominal values is stored as the time-tag deviation, in units of femtoseconds. This high-precision value allows the SDR "Ratio" parameter to be reconstructed for time-tagging adjustments and calculation of the Ultra-Stable-Oscillator (USO) height correction. The USO height correction is implicitly applied during SDR generation, and is defined as: Delta-h_USO[mm] = h_0[mm] * Delta-dt[sec] / dt[sec], where "dt" is the 1-Hz time-tag spacing, and "Delta-dt" is the 1-Hz Time-tag Deviation. The order of magnitude of Delta-dt/dt is 10-7; with height values h_0 around 800 km, the Delta-h_USO term is on the order of 8 cm unit: "1e-15 s" converted unit: "s" (multiply by 1/1e+015)

Copyright CLS

32	**Attitude_Squared**	**binary int16 (double)** *size*: 2 Attitude Squared [10-4 deg2] is computed from the SDR variable Fitted_VATT, which is directly proportional to the square of attitude: Attitude_Squared [10-4 deg2] = b1*b1*(Fitted_VATT_SDR - b0) * 1E4, where b0 = 1.11, b1 = .8747. This waveform-derived estimate of spacecraft attitude2 has a near-Gaussian distribution around the actual platform attitude, and hence can be negative when the true attitude is nearly zero (perfect nadir pointing). Hence it is desirable to store the square of attitude as a signed quantity, rather than truncating attitude estimates when a "negative square root" error would otherwise occur unit: "1e-4 degrees2" converted unit: "degrees2" (multiply by 1/10000)
33	**NOAA_FLAGS**	**binary record** *size*: 2

id	field name	definition
0	Spare	**binary bytes** *size*: 1:6 Unused hidden: true
1	**Land_Ocean**	**binary uint8** *size*: 0:2 2-minute landmask grid, generated from the Generic Mapping Tools (GMT) shoreline database. The four possible states are: 0 = Ocean, 1 = N/A ("dry ocean"), 2 = Lake or Inland Sea, 3 = Land

34	**Wet_Troposphere_Model**	**binary int16** *size*: 2 Wet Troposphere (Model) is derived from the NOAA NCEP Reanalysis Project total precipitable water data set. The value is determined by bilinear interpolation in space, and linear interpolation in time, from the 6-hourly, 2.5 degree spatial grids: Wet_Troposphere_Model [mm] = -6.36 * Total_Precipitable_Water [kg/m2] unit: "mm"
35	Instrument_State_Flags	**binary uint8** *size*: 1 Not used at this time. It will be used to verify that the instrument state has not changed hidden: true
36	**NVals_SSHU**	**binary int8** *size*: 1

Copyright CLS

		number of high-rate values used in the calculation of the 1-Hz SSHU
37	**NVals_SWH**	**binary int8** *size*: 1 number of high-rate values used in the calculation of the 1-Hz SWH
38	**NVals_AGC**	**binary int8** *size*: 1 number of high-rate values used in the calculation of the 1-Hz AGC
39	**SWH_High_Rate**	**binary array[10]** *size*: 20 SWH High-Rate is calculated from the "SWH" high-rate values in the SDR Data Record (fields 20 through 29) as follows: SWH_High_Rate(i) [cm] = SWHSDR(i) [m] * 100 + Net_SWH_Correction , i=1,...,10 **binary uint16 (double)** *size*: 2 unit: "1e-2 m" converted unit: "m" (multiply by 1/100)
40	**SSHU_High_Rate**	**binary array[10]** *size*: 20 SSHU High-Rate Differences [mm] are the differences of the high-rate SSHU values from the 1-Hz SSHU value. The original high-rate SSHU values can be reconstructed by adding them to the 1-Hz SSHU value **binary int16** *size*: 2 unit: "mm"
41	**Altitude_High_Rate**	**binary array[10]** *size*: 20 Altitude High-Rate Differences [mm] are the differences of the high-rate Altitude values from the 1-Hz Altitude value. The original high-rate Altitude values can be reconstructed by adding them to the 1-Hz Altitude value **binary int16** *size*: 2 unit: "mm"
42	**Brightness_Temp_22GHz**	**binary uint16 (double)** *size*: 2 22 GHz Brightness Temp is calculated from the "22 GHz Brightness Temp" in the SDR Data Record as follows: 22 GHz Brightness Temp [0.01 deg K] = 22 GHz Brightness Temp_SDR[deg K] * 100 unit: "1e-2 K"

Copyright CLS

		converted unit: "K" (multiply by 1/100)
43	**Brightness_Temp_37GHz**	**binary uint16 (double)** *size*: 2 37 GHz Brightness Temp is calculated from the "37 GHz Brightness Temp" in the SDR Data Record as follows: 37 GHz Brightness Temp [0.01 deg K] = 37 GHz Brightness Temp_SDR[deg K] * 100 unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
44	**RA_Status_Mode_I**	**binary uint16** *size*: 2 RA Status Mode I is set equal to the "RA Status Mode I" from the SDR Data Record. This is a bit field
45	**RA_Status_Mode_II**	**binary uint16** *size*: 2 RA Status Mode II is set equal to the "RA Status Mode I" from the SDR Data Record. This is a bit field
46	**Receiver_Temperature**	**binary int16 (double)** *size*: 2 Receiver Temperature is calculated from the "Receiver Temperature" in the SDR Data Record as follows: Receiver Temperature [0.01 deg C] = Receiver TemperatureSDR[deg C] * 100 unit: "1e-2 degC" converted unit: "degC" (multiply by 1/100)
47	**Quality_Word_I**	**binary uint32** *size*: 4 Quality Word I is set equal to the "RA Quality Test Results" from the SDR Data Record. This is a bit field
48	**Quality_Word_II**	**binary uint32** *size*: 4 Quality Word II is set equal to the "WVR Quality Test Results" from the SDR Data Record. This is a bit field
49	**Average_VATT**	**binary int32 (double)** *size*: 4 Average VATT is calculated from the "Average VATT" in the SDR Data Record as follows: Average VATT [microvolt] = Average VATT_SDR[volt] * 1E6 unit: "1e-6 V" converted unit: "V" (multiply by 1/1e+006)
50	**Fitted_VATT**	**binary int32 (double)** *size*: 4

Copyright CLS

		Fitted VATT is calculated from the "Fitted VATT" in the SDR Data Record as follows: Fitted VATT [microvolt] = Fitted VATT_SDR[volt] * 1E6 unit: "1e-6 V" converted unit: "V" (multiply by 1/1e+006)

3.4. Envisat data

3.4.1. Filenaming convention

The naming convention for products is:

filename = RA2_GDR_2P<processing_stage_flag><originator_ID><start_day> <"_">

<start_time> <"_"> <duration> <phase> <cycle> <"_"> <relative_orbit> <"_"> <absolute_orbit> <"_"><counter><"."> <satellite_ID> <.extension>

3.4.2. Product data format

3.4.2.1. RA2_OCEAN_DATA_FOR_LEVEL_2

binary record "RA2_OCEAN_DATA_FOR_LEVEL_2" *size*: 356

Ra2 - MDS

id	field name	definition
0	**dsr_time**	**binary time** *size*: 12 MDSR Time stamp. Time fields based on UTC are computed for each record and referred to the center of the averaged waveform unit: "s since 2000-01-01" **binary record** *size*: 12 ENVISAT binary datetime

id	field name	definition
0	**days**	**binary int32** *size*: 4 days since January 1st, 2000 (may be negative) unit: "days since 2000-01-01"
1	**seconds**	**binary uint32** *size*: 4

Copyright CLS

		seconds since start of day unit: "s"
2	**microseconds**	**binary uint32** *size*: 4 microseconds since start of second unit: "1e-6 s"
1	**quality_flag**	**binary int8** *size*: 1 Quality Indicator (-1 for blank MDSR, 0 otherwise)
2	spare_1	**binary bytes** *size*: 3 Spare hidden: true
3	**lat**	**binary int32 (double)** *size*: 4 Geodetic Latitude (positive N, negative S) unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006)
4	**lon**	**binary int32 (double)** *size*: 4 Longitude (positive E, 0 at Greenwich, negative W) unit: "1e-6 degrees_east" converted unit: "degrees_east" (multiply by 1/1e+006)
5	**src_pack_cnt**	**binary uint32** *size*: 4 Source Packet Counter
6	**instr_mode_id_flags**	**binary uint32** *size*: 4 Instrument Mode ID
7	**meas_conf_data_flags**	**binary uint32** *size*: 4 Measurement Confidence Data
8	**alt_cog_ellip**	**binary uint32** *size*: 4 Altitude of CoG above reference ellipsoid unit: "mm"
9	**instant_alt_rate**	**binary int16** *size*: 2

Copyright CLS

		Instantaneous altitude rate unit: "mm"
10	spare_2	**binary bytes** *size*: 6 Spare hidden: true
11	**ku_band_ocean_range**	**binary uint32** *size*: 4 Ku-band ocean range unit: "mm"
12	**s_band_ocean_range**	**binary uint32** *size*: 4 S-band ocean range unit: "mm"
13	**sd_18hz_ku_ocean**	**binary uint16** *size*: 2 Standard deviation of 18 Hz Ku-band ocean range unit: "mm"
14	**sd_18hz_s_ocean**	**binary uint16** *size*: 2 Standard deviation of 18 Hz S-band ocean range unit: "mm"
15	**num_18hz_ku_ocean**	**binary uint16** *size*: 2 Number of 18 Hz valid points for Ku-band ocean range
16	**num_18hz_s_ocean**	**binary uint16** *size*: 2 Number of 18 Hz valid points for S-band ocean range
17	spare_3	**binary bytes** *size*: 8 Spare hidden: true
18	**mod_dry_tropo_corr**	**binary int16** *size*: 2 Model dry tropospheric correction unit: "mm"
19	**inv_barom_corr**	**binary int16** *size*: 2 Inverted barometer correction

Copyright CLS

		unit: "mm"
20	**mod_wet_tropo_corr**	**binary int16** *size*: 2 Model wet tropospheric correction unit: "mm"
21	**mwr_wet_tropo_corr**	**binary int16** *size*: 2 MWR derived wet tropospheric correction unit: "mm"
22	**ra2_ion_corr_ku**	**binary int16** *size*: 2 RA2 ionospheric correction on Ku-band unit: "mm"
23	**ra2_ion_corr_s**	**binary int16** *size*: 2 RA2 ionospheric correction on S-band unit: "mm"
24	**ion_corr_doris_ku**	**binary int16** *size*: 2 Ionospheric correction from DORIS on Ku-band unit: "mm"
25	**ion_corr_doris_s**	**binary int16** *size*: 2 Ionospheric correction from DORIS on S-band unit: "mm"
26	**ion_corr_mod_ku**	**binary int16** *size*: 2 Ionospheric correction from model on Ku-band unit: "mm"
27	**ion_corr_mod_s**	**binary int16** *size*: 2 Ionospheric correction from model on S-band unit: "mm"
28	**sea_bias_ku**	**binary int16** *size*: 2 Sea state bias on Ku-band unit: "mm"

Copyright CLS

29	**sea_bias_s**	**binary int16** *size*: 2 Sea state bias on S-band unit: "mm"
30	spare_4	**binary bytes** *size*: 12 Spare hidden: true
31	**square_ku_sig_wv_ht**	**binary int32** *size*: 4 Square of Ku-band Significant wave height unit: "mm2"
32	**square_s_sig_wv_ht**	**binary int32** *size*: 4 Square of S-band Significant wave height unit: "mm2"
33	**ku_sig_wv_ht**	**binary int16** *size*: 2 Ku-band Significant wave height unit: "mm"
34	**s_sig_wv_ht**	**binary int16** *size*: 2 S-band Significant wave height unit: "mm"
35	**sd_18hz_ku_swh**	**binary int16** *size*: 2 Standard deviation of 18 Hz Ku-band SWH unit: "mm"
36	**sd_18hz_s_swh**	**binary int16** *size*: 2 Standard deviation of 18 Hz S-band SWH unit: "mm"
37	**num_18hz_ku_ocean_swh**	**binary uint16** *size*: 2 Number of 18 Hz valid points for Ku-band ocean SWH
38	**num_18hz_s_ocean_swh**	**binary uint16** *size*: 2 Number of 18 Hz valid points for S-band ocean SWH
39	**ku_ocean_bscat_coeff**	**binary int16 (double)** *size*: 2

Copyright CLS

		Ku-band corrected Ocean backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
40	**s_ocean_bscat_coeff**	**binary int16 (double)** *size*: 2 S-band corrected Ocean backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
41	**sd_18hz_ku_ocean_bscat**	**binary int16 (double)** *size*: 2 Standard deviation of 18 Hz Ku-band ocean backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
42	**sd_18hz_s_ocean_bscat**	**binary int16 (double)** *size*: 2 Standard deviation of 18 Hz S-band ocean backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
43	**num_18hz_ku_ocean_bscat**	**binary uint16** *size*: 2 Number of 18 Hz valid points for Ku-band ocean backscatter coefficient
44	**num_18hz_s_ocean_bscat**	**binary uint16** *size*: 2 Number of 18 Hz valid points for S-band ocean backscatter coefficient
45	spare_5	**binary bytes** *size*: 40 Spare hidden: true
46	**ku_net_instr_corr_agc**	**binary int16 (double)** *size*: 2 Ku-band net instrument correction for AGC unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)

Copyright CLS

47	**s_net_instr_corr_agc**	**binary int16 (double)** *size*: 2 S-band net instrument correction for AGC unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
48	**ku_atm_atten_corr**	**binary int16 (double)** *size*: 2 Ku-band atmospheric attenuation correction unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
49	**s_atm_atten_corr**	**binary int16 (double)** *size*: 2 S-band atmospheric attenuation correction unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
50	**ku_rain_atten**	**binary int32 (double)** *size*: 4 Ku-band rain attenuation unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
51	**off_nad_ang_platf**	**binary int16 (double)** *size*: 2 Square of the satellite off-nadir angle from platform data unit: "1e-4 degrees2" converted unit: "degrees2" (multiply by 1/10000)
52	**off_nad_ang_wvform**	**binary int16 (double)** *size*: 2 Square of the satellite off-nadir angle from waveform data unit: "1e-4 degrees2" converted unit: "degrees2" (multiply by 1/10000)
53	**m_sea_surf_ht**	**binary int32** *size*: 4 Mean sea-surface height unit: "mm"
54	**geoid_ht**	**binary int32** *size*: 4 Geoid height

Copyright CLS

		unit: "mm"
55	**ocean_depland_elev**	**binary int32** *size*: 4 Ocean depth/land elevation unit: "mm"
56	**tot_geocen_ocn_tide_ht_sol1**	**binary int16** *size*: 2 Total geocentric ocean tide height (solution 1) unit: "mm"
57	**tot_geocen_ocn_tide_ht_sol2**	**binary int16** *size*: 2 Total geocentric ocean tide height (solution 2) unit: "mm"
58	**long_period_ocn_tide_ht**	**binary int16** *size*: 2 Long period Tide height unit: "mm"
59	**tidal_load_ht_sol2**	**binary int16** *size*: 2 Tidal loading height (solution 2) unit: "mm"
60	**solid_earth_tide_ht**	**binary int16** *size*: 2 Solid earth tide height unit: "mm"
61	**geocen_pole_tide_ht**	**binary int16** *size*: 2 Geocentric pole tide height unit: "mm"
62	**mod_surf_atm_pres**	**binary int16 (double)** *size*: 2 Model surface atmospheric pressure unit: "10 Pa" converted unit: "Pa" (multiply by 10/1)
63	**mwr_wvapour_cont**	**binary int16 (double)** *size*: 2 MWR water vapour content unit: "1e-2 g/cm2"

Copyright CLS

		converted unit: "g/cm2" (multiply by 1/100)
64	**mwr_liq_water_cont**	**binary int16 (double)** *size*: 2 MWR liquid water content unit: "1e-2 g/cm2" converted unit: "g/cm2" (multiply by 1/100)
65	**ra2_elec_cont**	**binary int16 (double)** *size*: 2 RA2 Total electron content (1 TECU = 1e16 electrons / m^2) unit: "1e15/m2" converted unit: "1e16/m2" (multiply by 1/10)
66	**ra2_wind_sp**	**binary int16** *size*: 2 RA2 wind speed unit: "mm/s"
67	**mod_wind_sp_u**	**binary int16** *size*: 2 u component of the model wind vector unit: "mm/s"
68	**mod_wind_sp_v**	**binary int16** *size*: 2 v component of the model wind vector unit: "mm/s"
69	**tidal_load_ht_sol1**	**binary int16** *size*: 2 Tidal loading height (solution 1) unit: "mm"
70	spare_6	**binary bytes** *size*: 8 Spare hidden: true
71	**interpole_238_temp_mwr**	**binary int16 (double)** *size*: 2 Interpolated 23.8 GHz brightness temperature from MWR unit: "1e-2 K" converted unit: "K" (multiply by 1/100)

Copyright CLS

72	**interpole_365_temp_mwr**	**binary int16 (double)** *size*: 2 Interpolated 36.5 GHz brightness temperature from MWR unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
73	**interpole_sd_238_temp_mwr**	**binary int16 (double)** *size*: 2 Interpolated standard deviation of MWR 23.8 GHz brightness temperature unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
74	**interpole_sd_365_temp_mwr**	**binary int16 (double)** *size*: 2 Interpolated standard deviation of MWR 36.5 GHz brightness temperature unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
75	spare_7	**binary bytes** *size*: 2 Spare hidden: true
76	**ave_ku_chirp**	**binary uint16** *size*: 2 Average Ku chirp band. Ku chirp band value is associated with the minimum of the 20 elementary chirp band indexes in the source packet. Possible values: 0 = there is at least one record at 320 MHz, 1 = there is at least one record at 80 MHz (and the others are at 20 MHz), 2 = all input records are at 20 MHz
77	unused_bits_1	**binary bytes** *size*: 3 Unused ku_chirp_id_flags bits hidden: true
78	**ku_chirp_id_flags**	**binary array[20]** *size*: 5 Ku chirp band identifiers. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:2 Possible values: 0 = 320 MHz (Ku), 1 = 80 MHz (Ku), 2 = 20 MHz (Ku). Default values (bits set to 1) are output in the event of non tracking records (records not in Tracking, Preset Tracking or Preset Loop Output), wherever the sum of all Ku

Copyright CLS

		and S waveforms samples are set to 0, or if Ku AGC or Ku onboard Rx delay are out of bounds
79	unused_bits_2	**binary bytes** *size*: 1:4 Unused error_flag_chirp_id_flags bits hidden: true
80	**error_flag_chirp_id_flags**	**binary array[20]** *size*: 2:4 Error flag for chirp band id. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:1 0 = valid measurement, 1 = invalid
81	**instr_flags**	**binary record** *size*: 4 Instrument flag

id	field name	definition
0	spare	**binary bytes** *size*: 3 spare hidden: true
1	**s_band_anomaly**	**binary uint32** *size*: 0:1 Flag for S-band anomaly
2	**flight_cal_corr_s**	**binary uint32** *size*: 0:1 Flag for availability of S flight calibration correction
3	**flight_cal_corr_ku**	**binary uint32** *size*: 0:1 Flag for availability of Ku flight calibration correction
4	**ptr_cal_band**	**binary uint32** *size*: 0:3 PTR calibration band identifier field
5	**decoded_redundancy_error**	**binary uint32** *size*: 0:2 Error flag for decoded redundancy flags

82	unused_bits_3	**binary bytes** *size*: 3

Copyright CLS

		Unused fault_id_flags bits hidden: true
83	**fault_id_flags**	**binary array[20]** *size*: 5 Fault indentifiers. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:2 0 = valid measurement, 1 = invalid. Unused bits are set to 1
84	spare_8	**binary bytes** *size*: 8 Spare hidden: true
85	unused_bits_4	**binary bytes** *size*: 3 Unused wvfrom_fault_id_flags bits hidden: true
86	**wvfrom_fault_id_flags**	**binary array[20]** *size*: 5 Waveforms samples fault indentifiers. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:2
87	unused_bits_5	**binary bytes** *size*: 2 Unused instr_id_data_level_flags bits hidden: true
88	**instr_id_data_level_flags**	**binary array[20]** *size*: 10 Instrument mode ID at data block level. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:4 0 = spare, 1 = acquisition, 2 = Tracking, 3 = IF Cal, 4 = BITE RF, 5 = BITE DGT, 6 = Preset Tracking, 7 = Preset Loop Output, 8 = Alignment failed. Default values (bits set to 1) are output in the event of non tracking records (records not in Tracking, Preset Tracking or Preset Loop Output), wherever the sum of all Ku and S waveform samples are set to 0, or if Ku AGC or Ku onboard Rx delay are out of bounds
89	**num_meas_ku_calibr**	**binary uint16** *size*: 2

Copyright CLS

		No. of measures for Ku flight calibration factor evaluation
90	**num_meas_s_calibr**	**binary uint16** *size*: 2 No. of measures for S flight calibration factor evaluation
91	**mwr_instr_flags**	**binary record** *size*: 2 MWR instrument flag

id	field name	definition
0	**tmp_flg**	**binary uint8** *size*: 0:1 Indicates uniformity of CEU temperature: 0 = temperature consistency, 1 = temperature inconsistency
1	**obdh_flg**	**binary uint8** *size*: 0:1 flag to indicate data is missing: 0 = no error, 1 = error
2	**red_flg**	**binary uint8** *size*: 0:1 Redundancy indicator ICU channel: 0 = normal channel, 1 = redundant channel
3	**pbp_flg**	**binary uint8** *size*: 0:1 Power Bus Protection indicator: 0 = no protection, 1 = protection
4	**oop_flg**	**binary uint8** *size*: 0:1 Overvoltage/Overload protection indicator: 0 = no protection, 1 = protection
5	spare	**binary bytes** *size*: 1:3 spare hidden: true

92	spare_9	**binary bytes** *size*: 6 Spare hidden: true
93	**ku_peak**	**binary uint16 (double)** *size*: 2 1 Hz Ku-band peakiness unit: "1e-3"

Copyright CLS

		converted unit: "" (multiply by 1/1000)
94	**s_peak**	**binary uint16 (double)** *size*: 2 1 Hz S-band peakiness unit: "1e-3" converted unit: "" (multiply by 1/1000)
95	spare_11	**binary bytes** *size*: 12 Spare hidden: true
96	unused_bits_6	**binary bytes** *size*: 1:4 Unused ku_ocean_retrk_qua_flags bits hidden: true
97	**ku_ocean_retrk_qua_flags**	**binary array[20]** *size*: 2:4 Ku-band ocean retracking quality. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:1 0 = valid, 1 = invalid
98	unused_bits_7	**binary bytes** *size*: 1:4 Unused s_ocean_retrk_qua_flags bits hidden: true
99	**s_ocean_retrk_qua_flags**	**binary array[20]** *size*: 2:4 S-band ocean retracking quality. Elements are in reverse order: the last array element refers to the first data block **binary uint8** *size*: 0:1 0 = valid, 1 = invalid
100	**altim_landocean_flag**	**binary uint16** *size*: 2 Altimeter surface type flag. The flag is based on a land/sea mask file and has the following four meanings: 0 = oceans or semi-enclosed seas, 1 = enclosed seas or lakes, 2 = continental ice, 3 = land
101	**radio_landocean_flag**	**binary uint16** *size*: 2 Radiometer land/ocean type flag. This flag has two states: 0 = Ocean, 1 = Land. In NRT, when MWR data are not available,

Copyright CLS

		this flag is set to its maximum value. In OFL, when MWR data are not available, this flag is set to its default value which is 1 (land)
102	**mwr_qua_interp_flag**	**binary uint16** *size*: 2 MWR Quality interpolation flag. 0 = interpolation was OK with no gap between the two MWR measurements around the RA-2 time, 1 = interpolation was OK but there was a gap between the two selected MWR measurements, 2 = extrapolation was used, 3 = neither interpolation nor extrapolation could be used. The default value (3 in NRT, and 0 in OFL) is output when no MWR data is available
103	**rain_flag**	**binary uint16** *size*: 2 Altimeter rain flag. 1 = rain (the expected Ku/S-band rain-free relationship minus the uncorrected Ku ocean backscattering coefficient, and if the MWR liquid water content, interpolated to RA-2 time, are bigger than certain thresholds), 0 = no rain (otherwise)
104	**interpole_flag**	**binary record** *size*: 2 interpolation flag

id	field name	definition
0	spare	**binary bytes** *size*: 1:4 spare hidden: true
1	**meteo_interp**	**binary uint8** *size*: 0:1 meteorological data interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
2	**ocean_tide_sol2**	**binary uint8** *size*: 0:1 ocean tide solution 2 interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
3	**ocean_tide_sol1**	**binary uint8** *size*: 0:1 ocean tide solution 1 interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
4	**mss**	**binary uint8** *size*: 0:1 MSS interpolation flag (0 = good, 1 = bad)

Copyright CLS

105	spare_12	**binary bytes** *size*: 2 Spare hidden: true

3.5. Jason-1

3.5.1. Filenaming convention

The product names are based on the following convention:

- JA1_GDR_2P<v><ccc>_<ppp>.CNES

With:

- <v> : product version (set to ‘c’, the current Jason-1 data standards)
- <ccc>: cycle number of 1st product record
- <ppp> : pass number of 1st product record (1-254)

3.5.2. Product data format

3.5.2.1. GDR_HEADER

ascii record "GDR_HEADER" *size*: 3520

id	field name	definition
0	edu_label	**ascii string** *size*: 20 CCSDS EDU Label fixed value: "CCSD3ZF0000100000001" hidden: true
1	volume_label	**ascii string** *size*: 20 CCSDS Volume Label fixed value: "CCSD3VS00006PRODUCER" hidden: true
2	newline_char_1	**ascii char** *size*: 1 newline fixed value: "\n"

FORM-NT-GB-7-1

Copyright CLS

		hidden: true
3	product_file_name_label	**ascii string** *size*: 20 Product_File_Name = fixed value: "Product_File_Name = " hidden: true
4	**product_file_name**	**ascii string** *size*: 40 Name of the product (i.e. JA1_xxx_2PaPccc_ppp.CNES or JA1_xxx_2PaPccc_ppp.NASA)
5	semicolon_mark_1	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
6	newline_char_2	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
7	agency_name_label	**ascii string** *size*: 23 Producer_Agency_Name = fixed value: "Producer_Agency_Name = " hidden: true
8	**agency_name**	**ascii string** *size*: 4 Agency Name (CNES or NASA)
9	semicolon_mark_2	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
10	newline_char_3	**ascii char** *size*: 1 newline

Copyright CLS

		fixed value: "\n" hidden: true
11	center_label	**ascii string** *size*: 20 Processing_Center = fixed value: "Processing_Center = " hidden: true
12	**center**	**ascii string** *size*: 6 Center (SSALTO or JSDS)
13	semicolon_mark_3	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
14	newline_char_4	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
15	data_type_label	**ascii string** *size*: 17 File_Data_Type = fixed value: "File_Data_Type = " hidden: true
16	**data_type**	**ascii string** *size*: 4 Type of data (IGDR or GDR or SGDR)
17	semicolon_mark_4	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
18	newline_char_5	**ascii char** *size*: 1

Copyright CLS

		newline fixed value: "\n" hidden: true
19	document_label	**ascii string** *size*: 21 Reference_Document = fixed value: "Reference_Document = " hidden: true
20	**document**	**ascii string** *size*: 50 ID of the document describing the product (i.e. SMM-ST-M-EA-10879-CN)
21	semicolon_mark_5	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
22	newline_char_6	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
23	software_label	**ascii string** *size*: 21 Reference_Software = fixed value: "Reference_Software = " hidden: true
24	**software**	**ascii string** *size*: 20 ID of the software used to create the product (i.e. CMA CNES Vx.x)

Copyright CLS

25	semicolon_mark_6	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
26	newline_char_7	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
27	operating_system_label	**ascii string** *size*: 19 Operating_System = fixed value: "Operating_System = " hidden: true
28	**operating_system**	**ascii string** *size*: 20 ID of the operating system (i.e. SUN/Solaris 7)
29	semicolon_mark_7	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
30	newline_char_8	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
31	creation_time_label	**ascii string** *size*: 24 Product_Creation_Time = fixed value: "Product_Creation_Time = " hidden: true
32	**creation_time**	**ascii time** *size*: 26 UTC date & time of product generation (CCSDS

Copyright CLS

		format) i.e. 2000-06-21T04:20:00.000000. BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" mapping: "0000-00-00T00:00:00.000000" -> 1.#QNAN0 **ascii string** *size*: 26 CCSDS ASCII datetime "YYYY-MM-DDThh:mm:ss.uuuuuu".
33	semicolon_mark_8	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
34	newline_char_9	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
35	ccsds_marker_1	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERPRODUCER" hidden: true
36	catalog_label	**ascii string** *size*: 20 CCSDS Catalog label fixed value: "CCSD3KS00006PASSFILE" hidden: true
37	newline_char_10	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
38	mission_label	**ascii string** *size*: 15

Copyright CLS

		Mission_Name = fixed value: "Mission_Name = " hidden: true
39	**mission**	**ascii string** *size*: 7 Name of the mission (Jason-1) fixed value: "Jason-1"
40	semicolon_mark_9	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
41	newline_char_11	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
42	altimeter_sensor_label	**ascii string** *size*: 24 Altimeter_Sensor_Name = fixed value: "Altimeter_Sensor_Name = " hidden: true
43	**altimeter_sensor**	**ascii string** *size*: 10 Name of the altimeter sensor (POSEIDON-2) fixed value: "POSEIDON-2"
44	semicolon_mark_10	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
45	newline_char_12	**ascii char** *size*: 1 newline

Copyright CLS

		fixed value: "\n" hidden: true
46	radiometer_sensor_label	**ascii string** *size*: 25 Radiometer_Sensor_Name = fixed value: "Radiometer_Sensor_Name = " hidden: true
47	**radiometer_sensor**	**ascii string** *size*: 3 Name of the radiometer sensor (JMR) fixed value: "JMR"
48	semicolon_mark_11	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
49	newline_char_13	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
50	doris_sensor_label	**ascii string** *size*: 20 DORIS_Sensor_Name = fixed value: "DORIS_Sensor_Name = " hidden: true
51	**doris_sensor**	**ascii string** *size*: 10 Name of the DORIS sensor (DORIS-2 GM) fixed value: "DORIS-2 GM"

Copyright CLS

52	semicolon_mark_12	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
53	newline_char_14	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
54	acquisition_station_label	**ascii string** *size*: 27 Acquisition_Station_Name = fixed value: "Acquisition_Station_Name = " hidden: true
55	**acquisition_station**	**ascii string** *size*: 20 Name of the station where the raw data have been acquired (directly derived from Level1.0 product)
56	semicolon_mark_13	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
57	newline_char_15	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
58	cycle_label	**ascii string** *size*: 15 Cycle_Number = fixed value: "Cycle_Number = " hidden: true
59	**cycle**	**ascii uint32** *size*: 5

Copyright CLS

		Cycle
60	semicolon_mark_14	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
61	newline_char_16	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
62	start_abs_orbit_label	**ascii string** *size*: 29 Absolute_Revolution_Number = fixed value: "Absolute_Revolution_Number = " hidden: true
63	**start_abs_orbit**	**ascii uint32** *size*: 5 Start absolute orbit number
64	semicolon_mark_15	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
65	newline_char_17	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
66	pass_number_label	**ascii string** *size*: 14 Pass_Number = fixed value: "Pass_Number = " hidden: true

Copyright CLS

67	**pass_number**	**ascii uint32** *size*: 3 Pass number within the cycle
68	semicolon_mark_16	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
69	newline_char_18	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
70	absolute_pass_number_label	**ascii string** *size*: 23 Absolute_Pass_Number = fixed value: "Absolute_Pass_Number = " hidden: true
71	**absolute_pass_number**	**ascii uint32** *size*: 5 Start absolute pass number
72	semicolon_mark_17	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
73	newline_char_19	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true

Copyright CLS

74	equator_time_label	**ascii string** *size*: 15 Equator_Time = fixed value: "Equator_Time = " hidden: true
75	**equator_time**	**ascii time** *size*: 26 UTC date & time of equator crossing (CCSDS format) for the half revolution containing the first point of the file. BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" mapping: "0000-00-00T00:00:00.000000" -> 1.#QNAN0 **ascii string** *size*: 26 CCSDS ASCII datetime "YYYY-MM-DDThh:mm:ss.uuuuuu".
76	semicolon_mark_18	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
77	newline_char_20	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
78	equator_longitude_label	**ascii string** *size*: 20 Equator_Longitude = fixed value: "Equator_Longitude = " hidden: true
79	**equator_longitude**	**ascii float** *size*: 7 Longitude in degrees of equator crossing (format +xxx.xx) unit: "degrees_east"

Copyright CLS

80	equator_longitude_units	**ascii string** *size*: 5 <deg> fixed value: "<deg>" hidden: true
81	semicolon_mark_19	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
82	newline_char_21	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
83	first_measurement_time_label	**ascii string** *size*: 25 First_Measurement_Time = fixed value: "First_Measurement_Time = " hidden: true
84	**first_measurement_time**	**ascii time** *size*: 26 UTC date & time of first measurement in the product (CCSDS format). BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" mapping: "0000-00-00T00:00:00.000000" -> 1.#QNAN0 **ascii string** *size*: 26 CCSDS ASCII datetime "YYYY-MM-DDThh:mm:ss.uuuuuu".
85	semicolon_mark_20	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true

FORM-NT-GB-7-1

Copyright CLS

86	newline_char_22	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
87	last_measurement_time_label	**ascii string** *size*: 24 Last_Measurement_Time = fixed value: "Last_Measurement_Time = " hidden: true
88	**last_measurement_time**	**ascii time** *size*: 26 UTC date & time of last measurement in the product (CCSDS format). BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" mapping: "0000-00-00T00:00:00.000000" -> 1.#QNAN0 **ascii string** *size*: 26 CCSDS ASCII datetime "YYYY-MM-DDThh:mm:ss.uuuuuu".
89	semicolon_mark_21	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
90	newline_char_23	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
91	first_measurement_latitude_label	**ascii string** *size*: 29 First_Measurement_Latitude = fixed value: "First_Measurement_Latitude = " hidden: true

Copyright CLS

92	**first_measurement_latitude**	**ascii float** *size*: 6 Latitude in degrees of first measurement in the product (format sxx.xx) unit: "degrees_north"
93	first_measurement_latitude_units	**ascii string** *size*: 5 <deg> fixed value: "<deg>" hidden: true
94	semicolon_mark_22	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
95	newline_char_24	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
96	last_measurement_latitude_label	**ascii string** *size*: 28 Last_Measurement_Latitude = fixed value: "Last_Measurement_Latitude = " hidden: true
97	**last_measurement_latitude**	**ascii float** *size*: 6 Latitude in degrees of last measurement in the product (format sxx.xx) unit: "degrees_north"
98	last_measurement_latitude_units	**ascii string** *size*: 5 <deg> fixed value: "<deg>" hidden: true

Copyright CLS

99	semicolon_mark_23	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
100	newline_char_25	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
101	first_measurement_longitude_label	**ascii string** *size*: 30 First_Measurement_Longitude = fixed value: "First_Measurement_Longitude = " hidden: true
102	**first_measurement_longitude**	**ascii float** *size*: 7 Longitude in degrees of first measurement in the product (format +xxx.xx) unit: "degrees_east"
103	first_measurement_longitude_units	**ascii string** *size*: 5 <deg> fixed value: "<deg>" hidden: true
104	semicolon_mark_24	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
105	newline_char_26	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true

Copyright CLS

106	last_measurement_longitude_label	**ascii string** *size*: 29 Last_Measurement_Longitude = fixed value: "Last_Measurement_Longitude = " hidden: true
107	**last_measurement_longitude**	**ascii float** *size*: 7 Longitude in degrees of last measurement in the product (format +xxx.xx) unit: "degrees_east"
108	last_measurement_longitude_units	**ascii string** *size*: 5 <deg> fixed value: "<deg>" hidden: true
109	semicolon_mark_25	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
110	newline_char_27	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
111	pass_data_count_label	**ascii string** *size*: 18 Pass_Data_Count = fixed value: "Pass_Data_Count = " hidden: true
112	**pass_data_count**	**ascii int16** *size*: 5 Number of 1 Hz measurements in the product
113	semicolon_mark_26	**ascii char** *size*: 1 semicolon

Copyright CLS

		fixed value: ";" hidden: true
114	newline_char_28	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
115	ocean_pass_data_count_label	**ascii string** *size*: 24 Ocean_Pass_Data_Count = fixed value: "Ocean_Pass_Data_Count = " hidden: true
116	**ocean_pass_data_count**	**ascii int16** *size*: 5 Number of 1 Hz measurements over ocean in the product
117	semicolon_mark_27	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
118	newline_char_29	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
119	ocean_pcd_label	**ascii string** *size*: 12 Ocean_PCD = fixed value: "Ocean_PCD = " hidden: true
120	**ocean_pcd**	**ascii int16** *size*: 3 Product confidence data in percentage (ratio of the altimeter data declared OK to the total number of ocean measurements where data

Copyright CLS

		integrity is determined using the quality flag for the 1 Hz altimeter data unit: "%"
121	ocean_pcd_unit	**ascii string** *size*: 3 <%> fixed value: "<%>" hidden: true
122	semicolon_mark_28	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
123	newline_char_30	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
124	time_epoch_label	**ascii string** *size*: 13 Time_Epoch = fixed value: "Time_Epoch = " hidden: true
125	**time_epoch**	**ascii time** *size*: 26 Reference used for measurement datation in the product (UTC value=1958-01-01T00:00:00.000000). BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" mapping: "0000-00-00T00:00:00.000000" -> 1.#QNAN0 **ascii string** *size*: 26 CCSDS ASCII datetime "YYYY-MM-DDThh:mm:ss.uuuuuu".
126	semicolon_mark_29	**ascii char** *size*: 1

Copyright CLS

		semicolon fixed value: ";" hidden: true
127	newline_char_31	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
128	tai_utc_difference_label	**ascii string** *size*: 21 TAI_UTC_Difference = fixed value: "TAI_UTC_Difference = " hidden: true
129	**tai_utc_difference**	**ascii int16** *size*: 4 Increment to be applied to UTC to give TAI (dt=TAI-UTC) unit: "s"
130	semicolon_mark_30	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
131	newline_char_32	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
132	time_leap_second_label	**ascii string** *size*: 22 Time_Of_Leap_Second = fixed value: "Time_Of_Leap_Second = " hidden: true
133	**time_leap_second**	**ascii time** *size*: 26

Copyright CLS

		UTC Time at which a leap second occured in the product. Set to 0000-00-00T00:00:00.000000 if not usefull. BEAT time value is given in seconds since 01-JAN-2000 unit: "s since 2000-01-01" mapping: "0000-00-00T00:00:00.000000" -> 1.#QNAN0 **ascii string** *size*: 26 CCSDS ASCII datetime "YYYY-MM-DDThh:mm:ss.uuuuuu".
134	semicolon_mark_31	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
135	newline_char_33	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
136	time_shift_mid_frame_label	**ascii string** *size*: 23 Time_Shift_Mid_Frame = fixed value: "Time_Shift_Mid_Frame = " hidden: true
137	**time_shift_mid_frame**	**ascii uint32 (double)** *size*: 10 Offset to apply to time to derive the time tag of the first 20 Hz waveform unit: "1e-6 s" converted unit: "s" (multiply by 1/1e+006)
138	time_shift_mid_frame_unit	**ascii string** *size*: 4 <us> fixed value: "<us>" hidden: true

Copyright CLS

139	semicolon_mark_32	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
140	newline_char_34	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
141	time_shift_interval_label	**ascii string** *size*: 22 Time_Shift_Interval = fixed value: "Time_Shift_Interval = " hidden: true
142	**time_shift_interval**	**ascii uint32 (double)** *size*: 10 Time interval between two 20 Hz waveforms unit: "1e-6 s" converted unit: "s" (multiply by 1/1e+006)
143	time_shift_interval_unit	**ascii string** *size*: 4 <us> fixed value: "<us>" hidden: true
144	semicolon_mark_33	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
145	newline_char_35	**ascii char** *size*: 1 newline fixed value: "\n"

Copyright CLS

		hidden: true
146	range_offset_label	**ascii string** *size*: 15 Range_Offset = fixed value: "Range_Offset = " hidden: true
147	**range_offset**	**ascii uint16** *size*: 4 Offset to be added to the altitude and to the range to retrieve the absolute values of these parameters (i.e. 1300 km) unit: "km"
148	range_offset_unit	**ascii string** *size*: 4 <km> fixed value: "<km>" hidden: true
149	semicolon_mark_34	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
150	newline_char_36	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
151	average_pressure_label	**ascii string** *size*: 19 Average_Pressure = fixed value: "Average_Pressure = " hidden: true
152	**average_pressure**	**ascii uint32 (double)** *size*: 5 Average global pressure from meteo fields over oceans. The nearest meteorological field to the

Copyright CLS

		first measurement of the pass is used to compute this average pressure unit: "10 Pa" converted unit: "Pa" (multiply by 10/1)
153	average_pressure_unit	**ascii string** *size*: 6 <daPa> fixed value: "<daPa>" hidden: true
154	semicolon_mark_35	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
155	newline_char_37	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
156	header_padding_label	**ascii string** *size*: 17 Header_Padding = fixed value: "Header_Padding = " hidden: true
157	header_padding	**ascii string** *size*: 186 hidden: true
158	semicolon_mark_36	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
159	newline_char_38	**ascii char** *size*: 1 newline

Copyright CLS

		fixed value: "\n" hidden: true
160	ccsds_marker_2	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERPASSFILE" hidden: true
161	supplementary_data_label_1	**ascii string** *size*: 20 CCSDS Supplementary data label fixed value: "CCSD3SS00006MEASFILE" hidden: true
162	newline_char_39	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
163	altimeter_level1_label	**ascii string** *size*: 19 Altimeter_Level1 = fixed value: "Altimeter_Level1 = " hidden: true
164	**altimeter_level1**	**ascii string** *size*: 40 Name of the altimeter Level 1.0 input file
165	semicolon_mark_37	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
166	newline_char_40	**ascii char** *size*: 1 newline fixed value: "\n"

Copyright CLS

		hidden: true
167	radiometer_level1_label	**ascii string** *size*: 20 Radiometer_Level1 = fixed value: "Radiometer_Level1 = " hidden: true
168	**radiometer_level1**	**ascii string** *size*: 40 Name of the radiometer Level 1.0 input file
169	semicolon_mark_38	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
170	newline_char_41	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
171	ccsds_marker_3	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERMEASFILE" hidden: true
172	supplementary_data_label_2	**ascii string** *size*: 20 CCSDS Supplementary data label fixed value: "CCSD3SS00006AUXFILES" hidden: true
173	newline_char_42	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true

Copyright CLS

174	poseidon2_characterization_label	**ascii string** *size*: 30 POSEIDON-2_Characterization = fixed value: "POSEIDON-2_Characterization = " hidden: true
175	**poseidon2_characterization**	**ascii string** *size*: 61 Name of the file containing the characterization data for the POSEIDON-2 altimeter
176	semicolon_mark_39	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
177	newline_char_43	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
178	poseidon2_ltm_label	**ascii string** *size*: 17 POSEIDON-2_LTM = fixed value: "POSEIDON-2_LTM = " hidden: true
179	**poseidon2_ltm**	**ascii string** *size*: 61 Name of the file containing the Long Term Monitoring values for the POSEIDON-2 altimeter
180	semicolon_mark_40	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
181	newline_char_44	**ascii char** *size*: 1 newline fixed value: "\n"

Copyright CLS

		hidden: true
182	jmr_main_beam_label	**ascii string** *size*: 16 JMR_Main_Beam = fixed value: "JMR_Main_Beam = " hidden: true
183	**jmr_main_beam**	**ascii string** *size*: 61 Name of the file containing the main beam brightness temperature coefficients for the antenna pattern correction
184	semicolon_mark_41	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
185	newline_char_45	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
186	jmr_bt_averaging_label	**ascii string** *size*: 19 JMR_BT_Averaging = fixed value: "JMR_BT_Averaging = " hidden: true
187	**jmr_bt_averaging**	**ascii string** *size*: 61 Name of the file containing the main beam brightness temperature coefficients for the antenna pattern correction
188	semicolon_mark_42	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true

Copyright CLS

189	newline_char_46	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
190	doris_tec_map_label	**ascii string** *size*: 16 DORIS_TEC_Map = fixed value: "DORIS_TEC_Map = " hidden: true
191	**doris_tec_map**	**ascii string** *size*: 61 Name of the file containing the Total Electronic Content calculated from DORIS measurements. (Set to 61 blank characters if the file was not available for the processing)
192	semicolon_mark_43	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
193	newline_char_47	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
194	doris_uso_label	**ascii string** *size*: 12 DORIS_USO = fixed value: "DORIS_USO = " hidden: true
195	**doris_uso**	**ascii string** *size*: 61 Name of the file containing the on-board Doris frequency shift
196	semicolon_mark_44	**ascii char** *size*: 1 semicolon

Copyright CLS

		fixed value: ";" hidden: true
197	newline_char_48	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
198	orbit_data_label	**ascii string** *size*: 13 Orbit_Data = fixed value: "Orbit_Data = " hidden: true
199	**orbit_data**	**ascii string** *size*: 61 Name of the file containing the orbit ephemeris (MOE for IGDR, POE for GDR)
200	semicolon_mark_45	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
201	newline_char_49	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
202	pf_corrections_label	**ascii string** *size*: 17 PF_Corrections = fixed value: "PF_Corrections = " hidden: true
203	**pf_corrections**	**ascii string** *size*: 61 Name of the file containing the platfrom corrections (mispointing relative to the

Copyright CLS

		subsatellite point distance between antenna center of phase and center of gravity)
204	semicolon_mark_46	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
205	newline_char_50	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
206	pole_location_label	**ascii string** *size*: 16 Pole_Location = fixed value: "Pole_Location = " hidden: true
207	**pole_location**	**ascii string** *size*: 61 Name of the file containing the precise pole location data
208	semicolon_mark_47	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
209	newline_char_51	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
210	mto_fields_label	**ascii string** *size*: 13 MTO_Fields = fixed value: "MTO_Fields = "

Copyright CLS

		hidden: true
211	**mto_fields**	**ascii string** *size*: 20 Name of the MTO model from which the meteorological parameters have been derived (Currently ECMWF_T511)
212	semicolon_mark_48	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
213	newline_char_52	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
214	orf_data_label	**ascii string** *size*: 11 ORF_Data = fixed value: "ORF_Data = " hidden: true
215	**orf_data**	**ascii string** *size*: 61 Orbit Revolution File used to create the pass file
216	semicolon_mark_49	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
217	newline_char_53	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
218	poseidon2_ob_ret_correction_tables_label	**ascii string** *size*: 38 POSEIDON-2 OB RET Correction Tables =

Copyright CLS

		fixed value: "POSEIDON-2_OB_RET_Correction_Tables = " hidden: true
219	**poseidon2_ob_ret_correction_tables**	**ascii string** *size*: 61 Name of the file containing the on-board retracking coefficient corrections
220	semicolon_mark_50	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
221	newline_char_54	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
222	poseidon2_ssb_label	**ascii string** *size*: 17 POSEIDON-2_SSB = fixed value: "POSEIDON-2_SSB = " hidden: true
223	**poseidon2_ssb**	**ascii string** *size*: 61 Name of the file containing the Sea state bias coefficient for Poseidon-2
224	semicolon_mark_51	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
225	newline_char_55	**ascii char** *size*: 1 newline fixed value: "\n"

Copyright CLS

		hidden: true
226	poseidon2_composite_ssb_label	**ascii string** *size*: 27 POSEIDON-2_Composite_SSB = fixed value: "POSEIDON-2_Composite_SSB = " hidden: true
227	**poseidon2_composite_ssb**	**ascii string** *size*: 61 Name of the file containing the composite Sea state bias coefficient for Poseidon-2
228	semicolon_mark_52	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
229	newline_char_56	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
230	jmr_retrieval_coefficients_label	**ascii string** *size*: 29 JMR_Retrieval_Coefficients = fixed value: "JMR_Retrieval_Coefficients = " hidden: true
231	**jmr_retrieval_coefficients**	**ascii string** *size*: 61 Name of the file containing the geophysical coefficients for the JMR
232	semicolon_mark_53	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
233	newline_char_57	**ascii char** *size*: 1 newline

Copyright CLS

		fixed value: "\n" hidden: true
234	land_sea_mask_map_label	**ascii string** *size*: 20 LAND_SEA_Mask_Map = fixed value: "LAND_SEA_Mask_Map = " hidden: true
235	**land_sea_mask_map**	**ascii string** *size*: 61 Name of the file containing the Land/Sea mask map
236	semicolon_mark_54	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
237	newline_char_58	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
238	ocean_tide_sol_1_label	**ascii string** *size*: 19 Ocean_Tide_Sol_1 = fixed value: "Ocean_Tide_Sol_1 = " hidden: true
239	**ocean_tide_sol_1**	**ascii string** *size*: 20 Name of the ocean tide model #1 (currently GOT99)
240	semicolon_mark_55	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true

Copyright CLS

241	newline_char_59	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
242	ocean_tide_sol_2_label	**ascii string** *size*: 19 Ocean_Tide_Sol_2 = fixed value: "Ocean_Tide_Sol_2 = " hidden: true
243	**ocean_tide_sol_2**	**ascii string** *size*: 20 Name of the ocean tide model #2 (currently FES99)
244	semicolon_mark_56	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
245	newline_char_60	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
246	tidal_loading_sol_1_label	**ascii string** *size*: 22 Tidal_Loading_Sol_1 = fixed value: "Tidal_Loading_Sol_1 = " hidden: true
247	**tidal_loading_sol_1**	**ascii string** *size*: 20 Name of loading tide model #1 (currently GOT99)
248	semicolon_mark_57	**ascii char** *size*: 1 semicolon fixed value: ";"

Copyright CLS

		hidden: true
249	newline_char_61	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
250	tidal_loading_sol_2_label	**ascii string** *size*: 22 Tidal_Loading_Sol_2 = fixed value: "Tidal_Loading_Sol_2 = " hidden: true
251	**tidal_loading_sol_2**	**ascii string** *size*: 20 Name of loading tide model #2 (currently FES99)
252	semicolon_mark_58	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
253	newline_char_62	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
254	solid_earth_tide_label	**ascii string** *size*: 19 Solid_Earth_Tide = fixed value: "Solid_Earth_Tide = " hidden: true
255	**solid_earth_tide**	**ascii string** *size*: 61 Name of the file containing the Cartwright and Edden tide potential amplitudes for the solid earth tide and the Equilibrium long period ocean tide height calculation
256	semicolon_mark_59	**ascii char** *size*: 1

Copyright CLS

		semicolon fixed value: ";" hidden: true
257	newline_char_63	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
258	neq_tide_label	**ascii string** *size*: 11 NEQ_Tide = fixed value: "NEQ_Tide = " hidden: true
259	**neq_tide**	**ascii string** *size*: 20 Name of the dynamic model fro long period tides (Currently NONE)
260	semicolon_mark_60	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
261	newline_char_64	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
262	geoid_map_label	**ascii string** *size*: 12 Geoid_Map = fixed value: "Geoid_Map = " hidden: true
263	**geoid_map**	**ascii string** *size*: 20 Name of the geoid model (currently EGM96)

Copyright CLS

264	semicolon_mark_61	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
265	newline_char_65	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
266	mss_map_label	**ascii string** *size*: 10 MSS_Map = fixed value: "MSS_Map = " hidden: true
267	**mss_map**	**ascii string** *size*: 20 Name of the Mean Sea Surface model (Currently GSF00.1)
268	semicolon_mark_62	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
269	newline_char_66	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
270	bathymetry_topography_map_label	**ascii string** *size*: 28 Bathymetry_Topography_Map = fixed value: "Bathymetry_Topography_Map = " hidden: true
271	**bathymetry_topography_map**	**ascii string** *size*: 20

Copyright CLS

		Name of the bathymetry/topography model (Currently DTM2000.1)
272	semicolon_mark_63	**ascii char** *size*: 1 semicolon fixed value: ";" hidden: true
273	newline_char_67	**ascii char** *size*: 1 newline fixed value: "\n" hidden: true
274	ccsds_marker_4	**ascii string** *size*: 20 CCSDS marker fixed value: "CCSD$$MARKERAUXFILES" hidden: true
275	data_label	**ascii string** *size*: 20 fixed value: "FCST3IF0011400000001" hidden: true

3.5.2.2. GDR_DATA_RECORD

binary record "GDR_DATA_RECORD" *size*: 440

id	field name	definition
0	**time_day**	**binary uint32** *size*: 4 time stamp 1 (number of days from reference data) unit: "days since 1958-01-01"
1	**time_sec**	**binary uint32** *size*: 4 time stamp 2 (number of seconds within the day) unit: "s"
2	**time_microsec**	**binary uint32** *size*: 4

Copyright CLS

		time stamp 3 (number of microseconds within the second) unit: "1e-6 s"
3	**latitude**	**binary int32 (double)** *size*: 4 latitude unit: "1e-6 degrees_north" converted unit: "degrees_north" (multiply by 1/1e+006)
4	**longitude**	**binary uint32 (double)** *size*: 4 longitude unit: "1e-6 degrees_east" converted unit: "degrees_east" (multiply by 1/1e+006)
5	**surface_type**	**binary uint8** *size*: 1 surface type (0 = open oceans or semi-enclosed seas, 1 = enclosed seas or lakes, 2 = continental ice, 3 = land)
6	**alt_echo_type**	**binary uint8** *size*: 1 altimeter echo type (0 = ocean-like, 1 = non ocean-like)
7	**rad_surf_type**	**binary uint8** *size*: 1 radiometer surface type (0 = ocean, 1 = land)
8	**qual_1hz_alt_data**	**binary record** *size*: 1 quality flag for 1 Hz altimeter data

id	field name	definition
0	**off_nadir_angle_ptf**	**binary uint8** *size*: 0:1 off nadir angle from platfrom (0 = good, 1 = bad)
1	**off_nadir_angle_ku_wvf**	**binary uint8** *size*: 0:1 off nadir angle from Ku band waveform parameters (0 = good, 1 = bad)
2	**sig0_c**	**binary uint8** *size*: 0:1 C band backscatter coefficient (0 = good, 1 = bad)
3	**sig0_ku**	**binary uint8** *size*: 0:1

Copyright CLS

				Ku band backscatter coefficient (0 = good, 1 = bad)
		4	**swh_c**	**binary uint8** *size*: 0:1 C band SWH (0 = good, 1 = bad)
		5	**swh_ku**	**binary uint8** *size*: 0:1 Ku band SWH (0 = good, 1 = bad)
		6	**range_c**	**binary uint8** *size*: 0:1 C band range (0 = good, 1 = bad)
		7	**range_ku**	**binary uint8** *size*: 0:1 Ku band range (0 = good, 1 = bad)
9	**qual_1hz_alt_instr_corr**	**binary record** *size*: 1 quality flag for 1 Hz altimeter data		
		id	**field name**	**definition**
		0	spare	**binary bytes** *size*: 0:2 spare hidden: true
		1	**sig0_c**	**binary uint8** *size*: 0:1 C band backscatter coefficient instrumental correction (0 = good, 1 = bad)
		2	**sig0_ku**	**binary uint8** *size*: 0:1 Ku band backscatter coefficient instrumental correction (0 = good, 1 = bad)
		3	**swh_c**	**binary uint8** *size*: 0:1 C band SWH instrumental correction (0 = good, 1 = bad)
		4	**swh_ku**	**binary uint8** *size*: 0:1 Ku band SWH instrumental correction (0 = good, 1 = bad)
		5	**range_c**	**binary uint8** *size*: 0:1

Copyright CLS

		C band range instrumental correction (0 = good, 1 = bad)
6	**range_ku**	**binary uint8** *size*: 0:1 Ku band range instrumental correction (0 = good, 1 = bad)

10	**qual_1hz_rad_data**	**binary record** *size*: 1 quality flag for 1 Hz radiometer data

id	field name	definition
0	spare	**binary bytes** *size*: 0:5 spare hidden: true
1	**tb_340**	**binary uint8** *size*: 0:1 34 GHz brightness temperature (0 = good, 1 = bad)
2	**tb_238**	**binary uint8** *size*: 0:1 23.8 GHz brightness temperature (0 = good, 1 = bad)
3	**tb_187**	**binary uint8** *size*: 0:1 18.7 GHz brightness temperature (0 = good, 1 = bad)

11	**alt_state_flag**	**binary record** *size*: 1 altimeter state flag

id	field name	definition
0	**status_c**	**binary uint8** *size*: 0:1 C band status (0 = on, 1 = off)
1	**status_ku**	**binary uint8** *size*: 0:1 Ku band status (0 = on, 1 = off)
2	**band_seq**	**binary uint8** *size*: 0:1 Ku/C band sequencing (0 = 3Ku-1C-3Ku, 1 = 2Ku-1C-2Ku)
3	**bandwidth_c**	**binary uint8** *size*: 0:1

Copyright CLS

				C bandwidth (0 = 320 MHz, 1 = 100 MHz)
		4	**spectrum_coding**	**binary uint8** *size*: 0:1 Spectrum coding (0 = I and Q, 1 = I^2 + Q^2)
		5	**bandwidth_inv**	**binary uint8** *size*: 0:1 reception bandwith inversion (0 = Not reversed, 1 = reversed)
		6	**altimeter**	**binary uint8** *size*: 0:1 Altimeter operating (0 = side A (nominal POSEIDON-2 altimeter), 1 = side B (redundancy))
		7	spare	**binary bytes** *size*: 0:1 spare hidden: true
12	**rad_state_flag**	**binary record** *size*: 1 radiometer state flag		
		id	**field name**	**definition**
		0	spare	**binary bytes** *size*: 0:4 spare hidden: true
		1	**channel_3**	**binary uint8** *size*: 0:1 23.8 GHz Channel 3 (0 = On, 1 = Off); if channel 2 and 3 are both on, the 23.8 GHz brightness temperature that is provided in the OSDR is taken from the nominal channel (channel 3) and the corresponding geophysical parameters are derived from the channel 3 brightness temperature
		2	**channel_2**	**binary uint8** *size*: 0:1 23.8 GHz Channel 2 (0 = On, 1 = Off)
		3	**mode1_cal_sequence**	**binary uint8** *size*: 0:1

Copyright CLS

		<table><tr><td></td><td></td><td>Mode 1 Cal Sequence (0 = Normal data taking Mode 1 or 2, 1 = Mode 1 Cal Sequence)</td></tr><tr><td>4</td><td>**mode**</td><td>**binary uint8** *size*: 0:1 Mode (0 = Mode 2 (nominal), 1 = Mode 1)</td></tr></table>
13	**orb_state_flag**	**binary uint8** *size*: 1 orbit state flag. The orbit stat may range from 0 to 9: 0 = mission operations orbit that is computer during a maneuver period, 1 = adjusted mission operations orbit, 2 = extrapolated mission operations orbit, 3 = adjusted (preliminary/precise) orbit, 4 = the (preliminary/precise) orbit is estimated during a maneuver period, 5 = the (preliminary/precise) orbit is interpolated over a tracking data gap, 6 = the (preliminary/precise) orbit extrapolated for a duration less than 1 day, 7 = the (preliminary/precise) orbit is extrapolated for a duration that ranges from 1 day to 2 days, 8 = the (preliminary/precise) orbit is extrapolated for a duration larger than 2 days, or the orbit is extrapolated just after a maneuver, 9 = the DORIS DIODE navigator orbit
14	qual_spare	**binary bytes** *size*: 3 spare (to be aligned) hidden: true
15	**altitude**	**binary uint32** *size*: 4 1 Hz altitude of satellite (a reference offset is subtracted from the altitude. The reference offset can be found in the header) unit: "1e-4 m"
16	**alt_hi_rate**	**binary array[20]** *size*: 80 differences between altitudes corresponding to the elementary measurements to that of the averaged measurements **binary int32** *size*: 4 unit: "1e-4 m"
17	**orb_alt_rate**	**binary int16** *size*: 2 orbital altitude rate unit: "cm/s"
18	orb_spare	**binary bytes** *size*: 2

Copyright CLS

		spare (to be aligned) hidden: true
19	**range_ku**	**binary uint32** *size*: 4 1 Hz Ku band range (a reference offset is subtracted from the range. The reference offset can be found in the header) unit: "1e-4 m"
20	**range_hi_rate_ku**	**binary array[20]** *size*: 80 20 Hz Ku band ranges (a reference offset is subtracted from the ranges. The reference offset can be found in the header) **binary int32** *size*: 4 unit: "1e-4 m"
21	**range_c**	**binary uint32** *size*: 4 1 Hz C band range (a reference offset is subtracted from the range. The reference offset can be found in the header) unit: "1e-4 m"
22	**range_hi_rate_c**	**binary array[20]** *size*: 80 20 Hz C band ranges (a reference offset is subtracted from the ranges. The reference offset can be found in the header) **binary int32** *size*: 4 unit: "1e-4 m"
23	**range_rms_ku**	**binary uint16** *size*: 2 RMS of the Ku band range unit: "1e-4 m"
24	**range_rms_c**	**binary uint16** *size*: 2 RMS of the C band range unit: "1e-4 m"
25	**range_numval_ku**	**binary uint8** *size*: 1 Number of valid points for Ku band range
26	**range_numval_c**	**binary uint8** *size*: 1 Number of valid points for C band range
27	**pseudo_datation_bias_corr_ku**	**binary int16** *size*: 2

Copyright CLS

		Pseudo altimeter datation bias correction (available only for version C and higher) unit: "1e-4 m"
28	range_mapvalpts_ku_spare	**binary bytes** *size*: 1:4 spare hidden: true
29	**range_mapvalpts_ku**	**binary array[20]** *size*: 2:4 map of valid points for Ku band range **binary uint8** *size*: 0:1 1 = bad, 0 = good
30	range_mapvalpts_c_spare	**binary bytes** *size*: 1:4 spare hidden: true
31	**range_mapvalpts_c**	**binary array[20]** *size*: 2:4 map of valid points for C band range **binary uint8** *size*: 0:1 1 = bad, 0 = good
32	**net_instr_corr_ku**	**binary int32** *size*: 4 net instrumental correction on Ku band range unit: "1e-4 m"
33	**net_instr_corr_c**	**binary int32** *size*: 4 net instrumental correction on C band range unit: "1e-4 m"
34	**model_dry_tropo_corr**	**binary int16** *size*: 2 model dry tropospheric correction unit: "1e-4 m"
35	**model_wet_tropo_corr**	**binary int16** *size*: 2 model wet tropospheric correction unit: "1e-4 m"

Copyright CLS

36	**rad_wet_tropo_corr**	**binary int16** *size*: 2 radiometer wet tropospheric correction unit: "1e-4 m"
37	**iono_corr_alt_ku**	**binary int16** *size*: 2 altimeter ionospheric correction on Ku band unit: "1e-4 m"
38	**iono_corr_doris_ku**	**binary int16** *size*: 2 DORIS iono correction on Ku band unit: "1e-4 m"
39	**sea_state_bias_ku**	**binary int16** *size*: 2 sea state bias correction in Ku-band unit: "1e-4 m"
40	**sea_state_bias_c**	**binary int16** *size*: 2 sea state bias correction in C-band unit: "1e-4 m"
41	**sea_state_bias_comp**	**binary int16** *size*: 2 composite sea state bias correction unit: "1e-4 m"
42	**swh_ku**	**binary uint16** *size*: 2 Ku band significant waveheight unit: "1e-3 m"
43	**swh_c**	**binary uint16** *size*: 2 C band significant waveheight unit: "1e-3 m"
44	**swh_rms_ku**	**binary uint16** *size*: 2 RMS of the Ku band sigmaC unit: "1e-3 m"
45	**swh_rms_c**	**binary uint16** *size*: 2 RMS of the C band sigmaC

Copyright CLS

		unit: "1e-3 m"
46	**swh_numval_ku**	**binary uint8** *size*: 1 number of valid points used to compute Ku-band significant waveheight
47	**swh_numval_c**	**binary uint8** *size*: 1 number of valid points used to compute C-band significant waveheight
48	**net_instr_corr_swh_ku**	**binary int16** *size*: 2 net instrumental correction on Ku band significant waveheight unit: "1e-3 m"
49	**net_instr_corr_swh_c**	**binary int16** *size*: 2 net instrumental correction on C band significant waveheight unit: "1e-3 m"
50	**sig0_ku**	**binary uint16 (double)** *size*: 2 Ku band backscatter coefficient (corrected for atmospheric attenuations) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
51	**sig0_c**	**binary uint16 (double)** *size*: 2 C band backscatter coefficient (corrected for atmospheric attenuations) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
52	**sig0_rms_ku**	**binary uint16 (double)** *size*: 2 RMS of the Ku band backscatter coefficient (corrected for atmospheric attenuations) unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
53	**sig0_rms_c**	**binary uint16 (double)** *size*: 2 RMS of the C band backscatter coefficient (corrected for atmospheric attenuations) unit: "1e-2 dB"

Copyright CLS

		converted unit: "dB" (multiply by 1/100)
54	**sig0_num_val_ku**	**binary uint8** *size*: 1 number of valid points used to compute Ku backscatter coefficient
55	**sig0_num_val_c**	**binary uint8** *size*: 1 number of valid points used to compute C backscatter coefficient
56	**agc_ku**	**binary uint16 (double)** *size*: 2 Ku band AGC unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
57	**agc_c**	**binary uint16 (double)** *size*: 2 C band AGC unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
58	**agc_rms_ku**	**binary uint16 (double)** *size*: 2 RMS of the Ku band AGC unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
59	**agc_rms_c**	**binary uint16 (double)** *size*: 2 RMS of the C band AGC unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
60	**agc_numval_ku**	**binary uint8** *size*: 1 number of valid points used to compute Ku band AGC
61	**agc_numval_c**	**binary uint8** *size*: 1 number of valid points used to compute C band AGC
62	**net_instr_sig0_corr_ku**	**binary int16 (double)** *size*: 2 net instrumental correction on Ku band backscatter coefficient unit: "1e-2 dB"

Copyright CLS

		converted unit: "dB" (multiply by 1/100)
63	**net_instr_sig0_corr_c**	**binary int16 (double)** *size*: 2 net instrumental correction on C band backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
64	**atmos_sig0_corr_ku**	**binary int16 (double)** *size*: 2 atmospheric attenuation correction on Ku band backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
65	**atmos_sig0_corr_c**	**binary int16 (double)** *size*: 2 atmospheric attenuation correction on C band backscatter coefficient unit: "1e-2 dB" converted unit: "dB" (multiply by 1/100)
66	**off_nadir_angle_ku_wvf**	**binary int16 (double)** *size*: 2 Square of the off nadir angle computed from Ku waveforms unit: "1e-4 degrees2" converted unit: "degrees2" (multiply by 1/1000)
67	**off_nadir_angle_ptf**	**binary int16 (double)** *size*: 2 Square of the off nadir angle computed from platform data unit: "1e-4 degrees2" converted unit: "degrees2" (multiply by 1/1000)
68	**tb_187**	**binary uint16 (double)** *size*: 2 18.7 GHz brightness temperature (along track averaging has not been performed) unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
69	**tb_238**	**binary uint16 (double)** *size*: 2 23.8 GHz brightness temperature (along track averaging has not been performed)

Copyright CLS

		unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
70	**tb_340**	**binary uint16 (double)** *size*: 2 34 GHz brightness temperature (along track averaging has not been performed) unit: "1e-2 K" converted unit: "K" (multiply by 1/100)
71	**mss**	**binary int32** *size*: 4 mean sea surface height unit: "1e-4 m"
72	**mss_tp_along_trk**	**binary int32** *size*: 4 TP along-track mean sea surface unit: "1e-4 m"
73	**geoid**	**binary int32** *size*: 4 geoid height unit: "1e-4 m"
74	**bathymetry**	**binary int16** *size*: 2 ocean depth/land elevation unit: "m"
75	**inv_bar_corr**	**binary int16** *size*: 2 inverted barometer height correction unit: "1e-4 m"
76	**hf_fluctuations_corr**	**binary int16** *size*: 2 High frequency fluctuations of the sea surface topography unit: "1e-4 m"
77	**mdt**	**binary int16** *size*: 2 mean dynamic topography (available only for version C and higher) unit: "1e-4 m"

Copyright CLS

78	**ocean_tide_sol1**	**binary int32** *size*: 4 geocentric ocean tide height (solution 1) unit: "1e-4 m"
79	**ocean_tide_sol2**	**binary int32** *size*: 4 geocentric ocean tide height (solution 2) unit: "1e-4 m"
80	**ocean_tide_equil**	**binary int16** *size*: 2 equilibrium long-period ocean tide height unit: "1e-4 m"
81	**ocean_tide_non_equil**	**binary int16** *size*: 2 non-equilibrium long-period ocean tide height unit: "1e-4 m"
82	**load_tide_sol1**	**binary int16** *size*: 2 loading tide height for geocentric ocean tide solution 1 unit: "1e-4 m"
83	**load_tide_sol2**	**binary int16** *size*: 2 loading tide height for geocentric ocean tide solution 2 unit: "1e-4 m"
84	**solid_earth_tide**	**binary int16** *size*: 2 solid earth tide height unit: "1e-4 m"
85	**pole_tide**	**binary int16** *size*: 2 geocentric pole tide height unit: "1e-4 m"
86	**wind_speed_model_u**	**binary int16** *size*: 2 U component of the model wind vector unit: "cm/s"
87	**wind_speed_model_v**	**binary int16** *size*: 2 V component of the model wind vector

Copyright CLS

		unit: "cm/s"
88	**wind_speed_alt**	**binary uint16** *size*: 2 altimeter wind speed unit: "cm/s"
89	**wind_speed_rad**	**binary uint16** *size*: 2 radiometer wind speed unit: "cm/s"
90	**rad_water_vapour**	**binary int16** *size*: 2 radiometer water vapour content unit: "1e-2 g/cm2"
91	**rad_liquid_water**	**binary int16** *size*: 2 radiometer liquid water unit: "1e-2 kg/cm2"
92	**ecmwf_meteo_map_avail**	**binary uint8** *size*: 1 ECMWF meteorological map availability (0 = 2 maps nominal, 1 = 2 maps degraded, 2 = 1 map, 3 = no map). Given the latest definition of the meteorological field processing algorithms, this flag will in fact always be set to 0. Consequently, it does not bring any useful information; the falg may thus be removed from the product once the verification phase is completed
93	**tb_interp_flag**	**binary uint8** *size*: 1 radiometer brightness temperatures interpolation flag (0 = good (no gap between JMR data), 1 = interp (gap between JMR data), 2 = extrap (extrapolation used), 3 = fail (extrapolation and interpolation failed)
94	**rain_flag**	**binary uint8** *size*: 1 rain flag (0 = OK, 1 = rain)
95	**ice_flag**	**binary uint8** *size*: 1 ice flag (0 = OK, 1 = ice)
96	**interp_flag**	**binary record** *size*: 1 interpolation flag

id	field name	definition

Copyright CLS

		0	spare	**binary bytes** *size*: 0:4 spare hidden: true
		1	**meteo_interp**	**binary uint8** *size*: 0:1 meteorological data interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
		2	**ocean_tide_sol2**	**binary uint8** *size*: 0:1 ocean tide solution 2 interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
		3	**ocean_tide_sol1**	**binary uint8** *size*: 0:1 ocean tide solution 1 interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
		4	**mss**	**binary uint8** *size*: 0:1 MSS interpolation flag (0 = good, 1 = bad)
97	flag_spare			**binary bytes** *size*: 3 spare (to be aligned) hidden: true

3.6. Jason-2 data

3.6.1. Filenaming convention

The product names are based on the following convention:

- JA2_<O/I/G>P<N/R/S>_2P<v><S/P><ccc>_<ppp>_<yyyymmdd_hhnnss>_<yyyymmdd_hhnnss>.nc

With:

- <O/I/G> : product family (O : OGDR, I : IGDR, G: GDR)
- <N/R/S> : product type (N : native, R: reduced, S : sensor)
- <v> : product version (set to 'T' during CalVal phases, set to 'c', the current Jason-1 data standards, for the first delivery of OSTM/Jason-2 products to users, set to 'd' for the reprocessed delivery)
- <S/P> : product duration (S : segment for OGDR, P : pass for I/GDR)
- <ccc>: cycle number of 1st product record

Copyright CLS

- <ppp> : pass number of 1st product record (1-254)
- <yyyymmdd_hhnnss> : date of 1st product record
- <yyyymmdd_hhnnss> : date of last product record

3.6.2. Product data format

netcdf JA2_GPR_2PdP007_002_20080909_140728_20080909_150340 {
dimensions:
time = 3307 ;
variables:
double time(time) ;
time:long_name = "time (sec. since 2000-01-01)" ;
time:standard_name = "time" ;
time:calendar = "gregorian" ;
time:tai_utc_difference = -33. ;
time:leap_second = "0000-00-00 00:00:00" ;
time:units = "seconds since 2000-01-01 00:00:00.0" ;
time:comment = "[tai_utc_difference] is the difference between T
AI and UTC reference time (seconds) for the first measurement of the data set. [
leap_second] is the UTC time at which a leap second occurs in the data set, if a
ny. After this UTC time, the [tai_utc_difference] is increased by 1 second" ;
int lat(time) ;
lat:long_name = "latitude" ;
lat:standard_name = "latitude" ;
lat:units = "degrees_north" ;
lat:scale_factor = 1.e-06 ;
lat:comment = "Positive latitude is North latitude, negative lat
itude is South latitude. See Jason-2 User Handbook. Associated quality flag is o
rb_state_flag_diode for the OGDR products, orb_state_flag_rest for the IGDR and and
GDR products" ;
int lon(time) ;
lon:long_name = "longitude" ;
lon:standard_name = "longitude" ;
lon:units = "degrees_east" ;
lon:scale_factor = 1.e-06 ;
lon:comment = "East longitude relative to Greenwich meridian. Se
e Jason-2 User Handbook. Associated quality flag is orb_state_flag_diode for the

Copyright CLS

OGDR products, orb_state_flag_rest for the IGDR and GDR products" ;

byte surface_type(time) ;

surface_type:_FillValue = 127b ;

surface_type:long_name = "surface type" ;

surface_type:flag_values = 0b, 1b, 2b, 3b ;

surface_type:flag_meanings = "ocean lake_enclosed_sea ice land"
;

surface_type:coordinates = "lon lat" ;

surface_type:comment = "Computed using a DTM2000 file: 0 = open
oceans or semi-enclosed seas; 1 = enclosed seas or lakes; 2 = continental ice; 3
= land. See Jason-2 User Handbook" ;

byte alt_echo_type(time) ;

alt_echo_type:_FillValue = 127b ;

alt_echo_type:long_name = "altimeter echo type" ;

alt_echo_type:flag_values = 0b, 1b ;

alt_echo_type:flag_meanings = "ocean_like non_ocean_like" ;

alt_echo_type:coordinates = "lon lat" ;

alt_echo_type:comment = "The altimeter echo type is determined b
y testing the rms of the high rate range measurements against a threshold as wel
l as the number of valid high rate range measurements against a minimum value" ;

byte rad_surf_type(time) ;

rad_surf_type:_FillValue = 127b ;

rad_surf_type:long_name = "radiometer surface type" ;

rad_surf_type:flag_values = 0b, 1b, 2b ;

rad_surf_type:flag_meanings = "open_ocean near_coast land" ;

rad_surf_type:coordinates = "lon lat" ;

rad_surf_type:comment = "The radiometer surface type flag is app
licable to the radiometer wet troposphere path delays provided by rad_wet_tropo_
corr. A value of 0 indicates that open ocean processing is used to compute the p
ath delay, 1 indicates coastal processing is used, and 2 indicates the path dela
y is invalid due to land" ;

byte alt_quality_flag(time) ;

alt_quality_flag:_FillValue = 127b ;

alt_quality_flag:long_name = "altimeter quality flag" ;

alt_quality_flag:flag_values = 0b, 1b ;

alt_quality_flag:flag_meanings = "good bad" ;

alt_quality_flag:coordinates = "lon lat" ;

alt_quality_flag:comment = "Compilation of all altimeter flags e

Copyright CLS

xcept altimeter echo type : Set to default in the current issue" ;
byte rad_quality_flag(time) ;
rad_quality_flag:_FillValue = 127b ;
rad_quality_flag:long_name = "radiometer quality flag" ;
rad_quality_flag:flag_values = 0b, 1b ;
rad_quality_flag:flag_meanings = "good bad" ;
rad_quality_flag:coordinates = "lon lat" ;
rad_quality_flag:comment = "Compilation of all radiometer flags
except radiometer surface type : Set to default in the current issue" ;
byte geophysical_quality_flag(time) ;
geophysical_quality_flag:_FillValue = 127b ;
geophysical_quality_flag:long_name = "geophysical quality flag"
;
geophysical_quality_flag:flag_values = 0b, 1b ;
geophysical_quality_flag:flag_meanings = "good bad" ;
geophysical_quality_flag:coordinates = "lon lat" ;
geophysical_quality_flag:comment = "Check on validity of all geo
physical fields : Set to default in the current issue" ;
byte ecmwf_meteo_map_avail(time) ;
ecmwf_meteo_map_avail:_FillValue = 127b ;
ecmwf_meteo_map_avail:long_name = "ECMWF meteorological map availability" ;
ecmwf_meteo_map_avail:flag_values = 0b, 1b, 2b, 3b ;
ecmwf_meteo_map_avail:flag_meanings = "2_maps_nominal 2_maps_deg
raded 1_map_extropolated no_map" ;
ecmwf_meteo_map_avail:coordinates = "lon lat" ;
ecmwf_meteo_map_avail:comment = "Possible values are: 0 meaning
\'2 maps, nominal\' (six hours apart), 1 meaning \'2 maps, degraded\' (more than
six hours apart), 2 meaning \'1 map, extrapolation used\', 3 meaning \'no map\'
" ;
byte rain_flag(time) ;
rain_flag:_FillValue = 127b ;
rain_flag:long_name = "rain flag" ;
rain_flag:flag_values = 0b, 1b ;
rain_flag:flag_meanings = "no_rain rain" ;
rain_flag:coordinates = "lon lat" ;
rain_flag:comment = "See Jason-2 User Handbook" ;
byte rad_rain_flag(time) ;
rad_rain_flag:_FillValue = 127b ;

Copyright CLS

rad_rain_flag:long_name = "radiometer rain flag" ;
rad_rain_flag:flag_values = 0b, 1b ;
rad_rain_flag:flag_meanings = "no_rain rain" ;
rad_rain_flag:coordinates = "lon lat" ;
rad_rain_flag:comment = "See Jason-2 User Handbook. The radiomet
er rain flag indicates where the radiometer wet troposphere path delay (rad_wet_
tropo_corr) is invalid due to rain contamination" ;
byte ice_flag(time) ;
ice_flag:_FillValue = 127b ;
ice_flag:long_name = "ice flag" ;
ice_flag:flag_values = 0b, 1b ;
ice_flag:flag_meanings = "no_ice ice" ;
ice_flag:coordinates = "lon lat" ;
ice_flag:comment = "See Jason-2 User Handbook" ;
byte rad_sea_ice_flag(time) ;
rad_sea_ice_flag:_FillValue = 127b ;
rad_sea_ice_flag:long_name = "radiometer sea-ice flag" ;
rad_sea_ice_flag:flag_values = 0b, 1b ;
rad_sea_ice_flag:flag_meanings = "no_sea_ice sea_ice" ;
rad_sea_ice_flag:coordinates = "lon lat" ;
rad_sea_ice_flag:comment = "See Jason-2 User Handbook. The radio
meter sea ice flag indicates where the radiometer wet troposphere path delay (ra
d_wet_tropo_corr) is invalid due to sea ice contamination" ;
int alt(time) ;
alt:_FillValue = 2147483647 ;
alt:long_name = "1 Hz altitude of satellite" ;
alt:standard_name = "height_above_reference_ellipsoid" ;
alt:units = "m" ;
alt:add_offset = 1300000. ;
alt:scale_factor = 0.0001 ;
alt:coordinates = "lon lat" ;
alt:comment = "Altitude of satellite above the reference ellipso
id. Associated quality flag is orb_state_flag_diode for the OGDR products, orb_s
tate_flag_rest for the IGDR and GDR products" ;
int range_ku(time) ;
range_ku:_FillValue = 2147483647 ;
range_ku:long_name = "1 Hz Ku band corrected altimeter range" ;
range_ku:standard_name = "altimeter_range" ;

Copyright CLS

range_ku:units = "m" ;
range_ku:add_offset = 1300000. ;
range_ku:scale_factor = 0.0001 ;
range_ku:coordinates = "lon lat" ;
range_ku:comment = "All instrumental corrections included, i.e. distance antenna-COG (cog_corr), USO drift correction (uso_corr), internal path correction (internal_path_delay_corr_ku), Doppler correction (doppler_corr_ku), modeled instrumental errors correction (modeled_instr_corr_range_ku) and system bias" ;
int range_ku_mle3(time) ;
range_ku_mle3:_FillValue = 2147483647 ;
range_ku_mle3:long_name = "1 Hz Ku band corrected altimeter range (MLE3 retracking)" ;
range_ku_mle3:standard_name = "altimeter_range" ;
range_ku_mle3:units = "m" ;
range_ku_mle3:add_offset = 1300000. ;
range_ku_mle3:scale_factor = 0.0001 ;
range_ku_mle3:coordinates = "lon lat" ;
range_ku_mle3:comment = "All instrumental corrections included, i.e. distance antenna-COG (cog_corr), USO drift correction (uso_corr), internal path correction (internal_path_delay_corr_ku), Doppler correction (doppler_corr_ku), modeled instrumental errors correction (modeled_instr_corr_range_ku_mle3) and system bias" ;
short model_dry_tropo_corr(time) ;
model_dry_tropo_corr:_FillValue = 32767s ;
model_dry_tropo_corr:long_name = "model dry tropospheric correction" ;
model_dry_tropo_corr:standard_name = "altimeter_range_correction_due_to_dry_troposphere" ;
model_dry_tropo_corr:source = "European Center for Medium Range Weather Forecasting" ;
model_dry_tropo_corr:institution = "ECMWF" ;
model_dry_tropo_corr:units = "m" ;
model_dry_tropo_corr:scale_factor = 0.0001 ;
model_dry_tropo_corr:coordinates = "lon lat" ;
model_dry_tropo_corr:comment = "Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag. A dry tropospheric correction must be added (negative value) to the i

Copyright CLS

nstrument range to correct this range measurement for dry tropospheric range del
ays of the radar pulse. See Jason-2 User Handbook" ;

short rad_wet_tropo_corr(time) ;

rad_wet_tropo_corr:_FillValue = 32767s ;

rad_wet_tropo_corr:long_name = "radiometer wet tropospheric corr
ection" ;

rad_wet_tropo_corr:standard_name = "altimeter_range_correction_d
ue_to_wet_troposphere" ;

rad_wet_tropo_corr:source = "AMR" ;

rad_wet_tropo_corr:institution = "NASA/JPL" ;

rad_wet_tropo_corr:units = "m" ;

rad_wet_tropo_corr:scale_factor = 0.0001 ;

rad_wet_tropo_corr:coordinates = "lon lat" ;

rad_wet_tropo_corr:comment = "A wet tropospheric correction must
be added (negative value) to the instrument range to correct this range measure
ment for wet tropospheric range delays of the radar pulse" ;

short iono_corr_alt_ku(time) ;

iono_corr_alt_ku:_FillValue = 32767s ;

iono_corr_alt_ku:long_name = "altimeter ionospheric correction o
n Ku band" ;

iono_corr_alt_ku:standard_name = "altimeter_range_correction_due
_to_ionosphere" ;

iono_corr_alt_ku:source = "Poseidon-3" ;

iono_corr_alt_ku:institution = "CNES" ;

iono_corr_alt_ku:units = "m" ;

iono_corr_alt_ku:scale_factor = 0.0001 ;

iono_corr_alt_ku:coordinates = "lon lat" ;

iono_corr_alt_ku:comment = "An ionospheric correction must be ad
ded (negative value) to the instrument range to correct this range measurement f
or ionospheric range delays of the radar pulse. See Jason-2 User Handbook" ;

short iono_corr_alt_ku_mle3(time) ;

iono_corr_alt_ku_mle3:_FillValue = 32767s ;

iono_corr_alt_ku_mle3:long_name = "altimeter ionospheric correct
ion on Ku band (MLE3 retracking)" ;

iono_corr_alt_ku_mle3:standard_name = "altimeter_range_correctio
n_due_to_ionosphere" ;

iono_corr_alt_ku_mle3:source = "Poseidon-3" ;

iono_corr_alt_ku_mle3:institution = "CNES" ;

Copyright CLS

iono_corr_alt_ku_mle3:units = "m" ;
iono_corr_alt_ku_mle3:scale_factor = 0.0001 ;
iono_corr_alt_ku_mle3:coordinates = "lon lat" ;
iono_corr_alt_ku_mle3:comment = "An ionospheric correction must be added (negative value) to the instrument range to correct this range measurement for ionospheric range delays of the radar pulse. See Jason-2 User Handbook" ;
short sea_state_bias_ku(time) ;
sea_state_bias_ku:_FillValue = 32767s ;
sea_state_bias_ku:long_name = "sea state bias correction in Ku band" ;
sea_state_bias_ku:standard_name = "sea_surface_height_bias_due_to_sea_surface_roughness" ;
sea_state_bias_ku:source = "Empirical solution fitted on Jason-2 GDR_C data" ;
sea_state_bias_ku:institution = "CNES" ;
sea_state_bias_ku:units = "m" ;
sea_state_bias_ku:scale_factor = 0.0001 ;
sea_state_bias_ku:coordinates = "lon lat" ;
sea_state_bias_ku:comment = "A sea state bias correction must be added (negative value) to the instrument range to correct this range measurement for sea state delays of the radar pulse. This element should not be used over land. See Jason-2 User Handbook" ;
short sea_state_bias_ku_mle3(time) ;
sea_state_bias_ku_mle3:_FillValue = 32767s ;
sea_state_bias_ku_mle3:long_name = "sea state bias correction in Ku band (MLE3 retracking)" ;
sea_state_bias_ku_mle3:standard_name = "sea_surface_height_bias_due_to_sea_surface_roughness" ;
sea_state_bias_ku_mle3:source = "Empirical solution fitted on Jason-2 GDR_C data" ;
sea_state_bias_ku_mle3:institution = "CNES" ;
sea_state_bias_ku_mle3:units = "m" ;
sea_state_bias_ku_mle3:scale_factor = 0.0001 ;
sea_state_bias_ku_mle3:coordinates = "lon lat" ;
sea_state_bias_ku_mle3:comment = "A sea state bias correction must be added (negative value) to the instrument range to correct this range measurement for sea state delays of the radar pulse. This element should not be used

Copyright CLS

over land. See Jason-2 User Handbook" ;
short swh_ku(time) ;
swh_ku:_FillValue = 32767s ;
swh_ku:long_name = "Ku band corrected significant waveheight" ;
swh_ku:standard_name = "sea_surface_wave_significant_height" ;
swh_ku:units = "m" ;
swh_ku:scale_factor = 0.001 ;
swh_ku:coordinates = "lon lat" ;
swh_ku:comment = "All instrumental corrections included, i.e. mo
deled instrumental errors correction (modeled_instr_corr_swh_ku) and system bias
" ;
short swh_ku_mle3(time) ;
swh_ku_mle3:_FillValue = 32767s ;
swh_ku_mle3:long_name = "Ku band corrected significant waveheigh
t (MLE3 retracking)" ;
swh_ku_mle3:standard_name = "sea_surface_wave_significant_height
" ;
swh_ku_mle3:units = "m" ;
swh_ku_mle3:scale_factor = 0.001 ;
swh_ku_mle3:coordinates = "lon lat" ;
swh_ku_mle3:comment = "All instrumental corrections included, i.
e. modeled instrumental errors correction (modeled_instr_corr_swh_ku_mle3) and s
ystem bias" ;
short sig0_ku(time) ;
sig0_ku:_FillValue = 32767s ;
sig0_ku:long_name = "Ku band corrected backscatter coefficient"
;
sig0_ku:standard_name = "surface_backwards_scattering_coefficien
t_of_radar_wave" ;
sig0_ku:units = "dB" ;
sig0_ku:scale_factor = 0.01 ;
sig0_ku:coordinates = "lon lat" ;
sig0_ku:comment = "All instrumental corrections included, except
ed the system bias, i.e. AGC instrumental errors correction, internal calibratio
n correction (internal_corr_sig0_ku), modeled instrumental errors correction (mo
deled_instr_corr_sig0_ku) and atmospheric attenuation (atmos_corr_sig0_ku)" ;
short sig0_ku_mle3(time) ;
sig0_ku_mle3:_FillValue = 32767s ;

Copyright CLS

sig0_ku_mle3:long_name = "Ku band corrected backscatter coeffici
ent (MLE3 retracking)" ;

sig0_ku_mle3:standard_name = "surface_backwards_scattering_coeff
icient_of_radar_wave" ;

sig0_ku_mle3:units = "dB" ;

sig0_ku_mle3:scale_factor = 0.01 ;

sig0_ku_mle3:coordinates = "lon lat" ;

sig0_ku_mle3:comment = "All instrumental corrections included, e
xcepted the system bias, i.e. AGC instrumental errors correction, internal calib
ration correction (internal_corr_sig0_ku), modeled instrumental errors correction (modeled_instr_corr_sig0_ku_mle3) and atmospheric attenuation (atmos_corr_sig0
_ku)" ;

int mean_sea_surface(time) ;

mean_sea_surface:_FillValue = 2147483647 ;

mean_sea_surface:long_name = "mean sea surface height above refe
rence ellipsoid" ;

mean_sea_surface:source = "MSS_CNES_CLS-2011" ;

mean_sea_surface:institution = "CLS/CNES" ;

mean_sea_surface:units = "m" ;

mean_sea_surface:scale_factor = 0.0001 ;

mean_sea_surface:coordinates = "lon lat" ;

mean_sea_surface:comment = "See Jason-2 User Handbook" ;

int mean_topography(time) ;

mean_topography:_FillValue = 2147483647 ;

mean_topography:long_name = "mean dynamic topography above geoid
" ;

mean_topography:source = "MDT_CNES_CLS-2009" ;

mean_topography:institution = "CLS/CNES" ;

mean_topography:units = "m" ;

mean_topography:scale_factor = 0.0001 ;

mean_topography:coordinates = "lon lat" ;

mean_topography:comment = "See Jason-2 User Handbook" ;

int bathymetry(time) ;

bathymetry:_FillValue = 2147483647 ;

bathymetry:long_name = "ocean depth/land elevation" ;

bathymetry:source = "DTM2000.1" ;

bathymetry:institution = "GSFC" ;

bathymetry:units = "m" ;

bathymetry:coordinates = "lon lat" ;

Copyright CLS

short inv_bar_corr(time) ;

inv_bar_corr:_FillValue = 32767s ;

inv_bar_corr:long_name = "inverted barometer height correction"
;

inv_bar_corr:standard_name = "sea_surface_height_correction_due_
to_air_pressure_at_low_frequency" ;

inv_bar_corr:source = "European Center for Medium Range Weather
Forecasting" ;

inv_bar_corr:institution = "ECMWF" ;

inv_bar_corr:units = "m" ;

inv_bar_corr:scale_factor = 0.0001 ;

inv_bar_corr:coordinates = "lon lat" ;

inv_bar_corr:comment = "Computed at the altimeter time-tag from
the interpolation of 2 meteorological fields that surround the altimeter time-ta
g. See Jason-2 User Handbook" ;

short hf_fluctuations_corr(time) ;

hf_fluctuations_corr:_FillValue = 32767s ;

hf_fluctuations_corr:long_name = "high frequency fluctuations of
the sea surface topography" ;

hf_fluctuations_corr:standard_name = "sea_surface_height_correct
ion_due_to_air_pressure_and_wind_at_high_frequency" ;

hf_fluctuations_corr:institution = "LEGOS/CLS/CNES" ;

hf_fluctuations_corr:units = "m" ;

hf_fluctuations_corr:scale_factor = 0.0001 ;

hf_fluctuations_corr:coordinates = "lon lat" ;

hf_fluctuations_corr:comment = "Provided as a correction to the
inverted barometer correction (inv_bar_corr)" ;

int ocean_tide_sol1(time) ;

ocean_tide_sol1:_FillValue = 2147483647 ;

ocean_tide_sol1:long_name = "geocentric ocean tide height (solut
ion 1)" ;

ocean_tide_sol1:standard_name = "sea_surface_height_amplitude_du
e_to_geocentric_ocean_tide" ;

ocean_tide_sol1:source = "GOT4.8" ;

ocean_tide_sol1:institution = "GSFC" ;

ocean_tide_sol1:units = "m" ;

ocean_tide_sol1:scale_factor = 0.0001 ;

ocean_tide_sol1:coordinates = "lon lat" ;

Copyright CLS

ocean_tide_sol1:comment = "Solution 1 corresponds to GOT4.8 mode
l. Includes the corresponding loading tide (load_tide_sol1) and equilibrium long
-period ocean tide height (ocean_tide_equil). The permanent tide (zero frequency
) is not included in this parameter because it is included in the geoid and mean
sea surface (geoid, mean_sea_surface). See Jason-2 User Handbook" ;
short solid_earth_tide(time) ;
solid_earth_tide:_FillValue = 32767s ;
solid_earth_tide:long_name = "solid earth tide height" ;
solid_earth_tide:standard_name = "sea_surface_height_amplitude_d
ue_to_earth_tide" ;
solid_earth_tide:source = "Cartwright and Edden [1973] Corrected
tables of tidal harmonics - J. Geophys. J. R. Astr. Soc., 33, 253-264." ;
solid_earth_tide:units = "m" ;
solid_earth_tide:scale_factor = 0.0001 ;
solid_earth_tide:coordinates = "lon lat" ;
solid_earth_tide:comment = "Calculated using Cartwright and Tayl
er tables and consisting of the second and third degree constituents. The perman
ent tide (zero frequency) is not included. See Jason-2 User Handbook" ;
short pole_tide(time) ;
pole_tide:_FillValue = 32767s ;
pole_tide:long_name = "geocentric pole tide height" ;
pole_tide:standard_name = "sea_surface_height_amplitude_due_to_p
ole_tide" ;
pole_tide:source = "Wahr [1985] Deformation of the Earth induced
by polar motion - J. Geophys. Res. (Solid Earth), 90, 9363-9368." ;
pole_tide:units = "m" ;
pole_tide:scale_factor = 0.0001 ;
pole_tide:coordinates = "lon lat" ;
pole_tide:comment = "See Jason-2 User Handbook" ;
short wind_speed_alt(time) ;
wind_speed_alt:_FillValue = 32767s ;
wind_speed_alt:long_name = "altimeter wind speed" ;
wind_speed_alt:standard_name = "wind_speed" ;
wind_speed_alt:units = "m/s" ;
wind_speed_alt:scale_factor = 0.01 ;
wind_speed_alt:coordinates = "lon lat" ;
wind_speed_alt:comment = "Should not be used over land. See Jaso
n-2 User Handbook. A calibration bias of 0.32 dB has been added to the Ku-band b

Copyright CLS

ackscatter coefficient (sig0_ku) before computing the wind speed" ;
short wind_speed_alt_mle3(time) ;
wind_speed_alt_mle3:_FillValue = 32767s ;
wind_speed_alt_mle3:long_name = "altimeter wind speed (MLE3 retr
acking)" ;
wind_speed_alt_mle3:standard_name = "wind_speed" ;
wind_speed_alt_mle3:units = "m/s" ;
wind_speed_alt_mle3:scale_factor = 0.01 ;
wind_speed_alt_mle3:coordinates = "lon lat" ;
wind_speed_alt_mle3:comment = "Should not be used over land. See
Jason-2 User Handbook. A calibration bias of 0.34 dB has been added to the Ku-b
and backscatter coefficient (sig0_ku_mle3) before computing the wind speed" ;
short rad_water_vapor(time) ;
rad_water_vapor:_FillValue = 32767s ;
rad_water_vapor:long_name = "radiometer water vapor content" ;
rad_water_vapor:standard_name = "atmosphere_water_vapor_content"
;
rad_water_vapor:source = "AMR" ;
rad_water_vapor:institution = "NASA/JPL" ;
rad_water_vapor:units = "kg/m^2" ;
rad_water_vapor:scale_factor = 0.1 ;
rad_water_vapor:coordinates = "lon lat" ;
rad_water_vapor:comment = "Should not be used over land" ;
short rad_liquid_water(time) ;
rad_liquid_water:_FillValue = 32767s ;
rad_liquid_water:long_name = "radiometer liquid water content" ;
rad_liquid_water:standard_name = "atmosphere_cloud_liquid_water_content" ;
rad_liquid_water:source = "AMR" ;
rad_liquid_water:institution = "NASA/JPL" ;
rad_liquid_water:units = "kg/m^2" ;
rad_liquid_water:scale_factor = 0.01 ;
rad_liquid_water:coordinates = "lon lat" ;
rad_liquid_water:comment = "Should not be used over land" ;
short ssha(time) ;
ssha:_FillValue = 32767s ;
ssha:long_name = "sea surface height anomaly" ;
ssha:standard_name = "sea_surface_height_above_sea_level" ;
ssha:source = "Poseidon-3" ;

Copyright CLS

ssha:institution = "CNES" ;
ssha:units = "m" ;
ssha:scale_factor = 0.001 ;
ssha:coordinates = "lon lat" ;
ssha:comment = "= altitude of satellite (alt) - Ku band correcte
d altimeter range (range_ku) - altimeter ionospheric correction on Ku band (iono
_corr_alt_ku) - model dry tropospheric correction (model_dry_tropo_corr) - radio
meter wet tropospheric correction (rad_wet_tropo_corr) - sea state bias correcti
on in Ku band (sea_state_bias_ku) - solid earth tide height (solid_earth_tide) -
geocentric ocean tide height solution 1 (ocean_tide_sol1) - geocentric pole tid
e height (pole_tide) - inverted barometer height correction (inv_bar_corr) - hig
h frequency fluctuations of the sea surface topography (hf_fluctuations_corr for
I/GDR off line products only) - mean sea surface (mean_sea_surface). Set to def
ault if the altimeter echo type (alt_echo_type) is set to 1 = non ocean like, th
e radiometer surface type (rad_surf_type) set to 2 = land, or the rain flag (rai
n_flag) set to 1 = rain" ;
short ssha_mle3(time) ;
ssha_mle3:_FillValue = 32767s ;
ssha_mle3:long_name = "sea surface height anomaly (MLE3 retracki
ng)" ;
ssha_mle3:standard_name = "sea_surface_height_above_sea_level" ;
ssha_mle3:source = "Poseidon-3" ;
ssha_mle3:institution = "CNES" ;
ssha_mle3:units = "m" ;
ssha_mle3:scale_factor = 0.001 ;
ssha_mle3:coordinates = "lon lat" ;
ssha_mle3:comment = "= altitude of satellite (alt) - Ku band cor
rected altimeter range (range_ku_mle3) - altimeter ionospheric correction on Ku
band (iono_corr_alt_ku_mle3) - model dry tropospheric correction (model_dry_trop
o_corr) - radiometer wet tropospheric correction (rad_wet_tropo_corr) - sea stat
e bias correction in Ku band (sea_state_bias_ku_mle3) - solid earth tide height
(solid_earth_tide) - geocentric ocean tide height solution 1 (ocean_tide_sol1) - geocentric pole tide height (pole_tide) - inverted barometer height correction
(inv_bar_corr) - high frequency fluctuations of the sea surface topography (hf_f
luctuations_corr for I/GDR off line products only) - mean sea surface (mean_sea_
surface). Set to default if the altimeter echo type (alt_echo_type) is set to 1
= non ocean like, the radiometer surface type (rad_surf_type) set to 2 = land, o
r the rain flag (rain_flag) set to 1 = rain" ;

Copyright CLS

// global attributes:

:Conventions = "CF-1.1" ;

:title = "GDR - Reduced dataset" ;

:institution = "CNES" ;

:source = "radar altimeter" ;

:history = "2012-04-23 17:11:19 : Creation" ;

:contact = "CNES aviso@oceanobs.com, EUMETSAT ops@eumetsat.int, NOAA ESPCOperations@noaa.gov" ;

:references = "L1 library=V3.1, L2 library=V4.2p1, Processing Pi lot=V3-4-1p2" ;

:processing_center = "SALP" ;

:reference_document = "OSTM/Jason-2 Products Handbook, SALP-MU-M -OP-15815-CN" ;

:mission_name = "OSTM/Jason-2" ;

:altimeter_sensor_name = "Poseidon-3" ;

:radiometer_sensor_name = "AMR" ;

:doris_sensor_name = "DGXX" ;

:gpsr_sensor_name = "GPSP" ;

:acq_station_name = "CNES" ;

:cycle_number = 7 ;

:absolute_rev_number = 864 ;

:pass_number = 2 ;

:absolute_pass_number = 1526 ;

:equator_time = "2008-09-09 14:35:34.445000" ;

:equator_longitude = 265.76 ;

:first_meas_time = "2008-09-09 14:07:28.268669" ;

:last_meas_time = "2008-09-09 15:03:40.896897" ;

:xref_altimeter_characterisation = "PJ2_CH1_AXVCNE20100528_18000 0_20080703_000000_20301231_235959" ;

:xref_altimeter_ltm = "PJ2_CA1_AXXCNE20120322_110037_20080615_11 5927_20120321_120000" ;

:xref_radiometer_temp = "AJ2_ANT_AXXJPL20110729_001740_20080704_ 055700_20301231_235959" ;

:xref_doris_uso = "JA2_OS1_AXXCNE20120323_074400_20080622_145801 _20120322_181600" ;

:xref_orbit_data = "JA2_VOR_AXVCNE20120406_092100_20080908_21552 7_20080910_002327" ; :xref_pf_data = "JA2_VPF_AXVCNE20120406_092600_20080908_215527_2 0080910_002327" ;

Copyright CLS

:xref_pole_location = "SMM_POL_AXXCNE20120323_070000_19870101_000000_20120421_000000" ;

:xref_orf_data = "JA2_ORF_AXXCNE20120323_074600_20080704_055707_20120331_081315" ;

:xref_meteorological_files = "SMM_APA_AXVCNE20080909_171853_20080909_120000_20080909_120000, SMM_APA_AXVCNE20080910_050453_20080909_180000_20080909_180000, SMM_PRA_AXVCNE20080909_171853_20080909_120000_20080909_120000, SMM_PRA_AXVCNE20080910_050453_20080909_180000_20080909_180000, SMM_UWA_AXVCNE20080909_171853_20080909_120000_20080909_120000, SMM_UWA_AXVCNE20080910_050453_20080909_180000_20080909_180000, SMM_VWA_AXVCNE20080909_171853_20080909_120000_20080909_120000, SMM_VWA_AXVCNE20080910_050453_20080909_180000_20080909_180000, SMM_WEA_AXVCNE20080909_171853_20080909_120000_20080909_120000, SMM_WEA_AXVCNE20080910_050453_20080909_180000_20080909_180000" ;

:xref_utc_tai_data = "SMM_TUC_AXVCNE20081201_150235_19900101_000000_20380118_191407" ;

:xref_radiometer_calibration = "AJ2_AL1_AXVJPL20080620_074625_20080620_074625_20301231_235959" ;

:xref_gim_data = "JA2_ION_AXPCNE20080910_073503_20080909_000000_20080909_235959" ;

:xref_mog2d_data = "SMM_MOG_AXVCNE20080930_184503_20080909_120000_20080909_120000, SMM_MOG_AXVCNE20081001_070005_20080909_180000_20080909_180000" ;

:ellipsoid_axis = 6378136.3 ;

:ellipsoid_flattening = 0.0033528131778969 ;

}

4. **Level 3 data**

4.1. Filenaming convention

The nomenclature used for the along-track FCDR is:

*VariableProject_Data_Mission_Cycle_Version***.nc**

Example: SLCCI_ALTDB_J2_Cycle094_V1.nc

VariableProject	**SLCCI**	Sea Level Climate Change Initiative
Data	**ALTDB**	Altimeter Database
Mission	**E1**	ERS-1
	E2	ERS-2

Copyright CLS

	EN	Envisat
	TP	Topex/Poseidon
	J1	Jason-1
	J2	Jason-2
	G2	Geosat Follow On
Cycle	**xxx**	Cycle number of the given altimeter mission
Version	**Vx**	version number

Table 1: Nomenclature of the FCDR product

4.2. Product data format

The FCDR products are stored using the NetCDF (Network Common Data Form) using CF (Climate and Forecast) Metadata convention.

4.2.1. Data Handling Variables

One dimension is defined:

- time: number of data per parameter in current file

Type	Name	Content	Unit	Scale Factor
double	time(time)	Time of measurement	days since 1950-01-01 00:00:00 UTC	none
int	latitude(time)	Latitude of measurement	degrees_north	10^{-6}
int	longitude(time)	Longitude of measurement	degrees_east	10^{-6}
short	cycle(time)	Cycle the measurement belongs to	1	none
short	track(time)	Track in cycle the measurement belongs to	1	none
short	TimeDay(time)	Number of days from reference date	days since 1950-01-01 00:00:00 UTC	none
short	TimeSec(time)	Number of seconds within the day	sec	none
short	TimeMicroSec(time)	Microseconds	1e-6 sec	none
int	corssh(time)	Corrected see surface height above the reference	meters	10^{-4}
int	alt(time)	1 Hz altitude of satellite	meters	10^{-4}
int	range(time)	1 Hz Ku band corrected altimeter range	meters	10^{-4}

Copyright CLS

short	dry_tropo_corr(time)	Model dry tropospheric correction	meters	10^{-4}
short	sea_state_bias(time)	Non parametric sea state bias	meters	10^{-4}
short	iono_corr(time)	Ionospheric correction	meters	10^{-4}
short	rad_wet_tropo_corr(time	Radiometer wet tropospheric correction	meters	10^{-4}
short	model_wet_tropo_corr(time)	ECMWF model wet tropospheric correction	meters	10^{-4}
short	comp_wet_tropo_corr(time)	Composite wet tropospheric correction	meters	10^{-4}
short	dyn_atmosph_corr(time)	Combined atmospheric correction[1]	meters	10^{-4}
short	off_nadir_angle(time)	Square of the off nadir angle computed from Ku waveforms	degrees²	10^{-4}
short	wind_speed_alt(time)	Altimeter wind speed	meters/seconde	10^{-3}
byte	alt_flag_oper(time)	Altimeter state flag	none	1
byte	rad_qual_interp_flag(time)	Radiometer quality interpolation flag	none	1
int	bathymetry(time)	Bathymetry	meters	10^{-3}
int	mean_sea_surface(time)	Mean sea surface height	meters	10^{-4}
int	ocean_tide(time)	Ocean tide height	meters	10^{-4}
short	pole_tide(time)	Pole tide height	meters	10^{-4}
short	sigma0(time)	Backscatter coefficient	db	10^{-3}
short	solid_earth_tide(time)	Solid earth tide height	meters	10^{-4}
short	swh(time)	Significant wave height	meters	10^{-4}
byte	range_numval(time)	Number of valid points for Ku band range	count	1
short	range_rms(time)	RMS of the Ku band range	meters	10^{-4}
byte	sigma0_numval(time)	Number of valid points for Ku band range	count	1
short	sigma0_rms(time)	RMS of the Ku band backscattering coefficient	dB	10^{-4}
byte	validation_flag(time)	Validity flag (0=valid, 1=non valid)	1	none
byte	rad_surf_type(time)	Radiometer surface type	none	1

[1] *Combined atmospheric correction : high frequency fluctuations of the sea surface topography and inverted barometer height correction computed from rectangular grids*

Copyright CLS

byte	alt_surf_type(time)	Altimeter surface type	none	1
byte	ice_flag(time)	Ice flag	none	1
short	global_bias	Global relative SSH Bias between all the missions	meters	10^{-4}
short	regional_bias	Regional relative SSH Bias between all the missions	meters	10^{-4}

Copyright CLS

4.2.2. NetCDF Header

4.2.2.1. Global attributes

Additional global attributes are available. They are providing information about the type of product or the processing and parameters used.

Attribute	Format	Description
title	string	A succinct description of what is in the dataset.
OriginalName		
CreatedBy		
CreatedOn		Date of file creation
Mission		Name (abbreviation) of the altimeter mission the data come from
MeanProfile		Cycle number
Version	string	Version of the product
Conventions	string	Convention used for format of the file
history	string	Provides an audit trail for modifications to the original data.

4.2.2.2. Variable attributes

The different variables can be described with different attributes as listed in the following table:

Attribute	Description
_FillValue	A value used to represent missing or undefined data
add_offset	If present, this number is to be added to the date after it is read by an application. If both *scale_factor* and *add_offset* attributes are present, the date are first scaled before the offset is added.
coordinates	Identified auxiliary coordinates variables.
long_name	A descriptive name that indicates a variable's content. This name is not standardized.
scale_factor	If present, the data are to be multiplied by this factor after the data are read by an application. See also *add_offset* attribute.
units	Unit of a variable's content. The value of this attribute must be a string that can be recognized by the UNIDATA's Udunits package.
Valid_range	Smallest and largest theoretical valid value of a variable

4.2.2.3. Example

```
netcdf SLCCI_ALTDB_EN_Cycle033_V1 {
dimensions:
        time = UNLIMITED ; // (1651486 currently)
variables:
        double time(time) ;
                time:_FillValue = 1.84467440737096e+19 ;
                time:long_name = "Time of measurement" ;
                time:units = "days since 1950-01-01 00:00:00 UTC" ;
                time:standard_name = "time" ;
                time:axis = "T" ;
                time:first_time = "2004-12-13 21:39:39.936071" ;
```


Copyright CLS

```
int latitude(time) ;
        latitude:_FillValue = 2147483647 ;
        latitude:long_name = "Latitude of measurement" ;
        latitude:units = "degrees_north" ;
        latitude:standard_name = "latitude" ;
        latitude:scale_factor = 1.e-06 ;
        latitude:add_offset = 0. ;
int longitude(time) ;
        longitude:_FillValue = 2147483647 ;
        longitude:long_name = "Longitude of measurement" ;
        longitude:units = "degrees_east" ;
        longitude:standard_name = "longitude" ;
        longitude:scale_factor = 1.e-06 ;
        longitude:add_offset = 0. ;
short cycle(time) ;
        cycle:_FillValue = 32767s ;
        cycle:long_name = "Cycle the measurement belongs to" ;
        cycle:units = "1" ;
short track(time) ;
        track:_FillValue = 32767s ;
        track:long_name = "Track in cycle the measurement belongs to" ;
        track:units = "1" ;
short TimeDay(time) ;
        TimeDay:_FillValue = 32767s ;
        TimeDay:long_name = "Number of days from reference date" ;
        TimeDay:units = "days since 1950-01-01 00:00:00.000 UTC" ;
        TimeDay:coordinates = "longitude latitude" ;
int TimeSec(time) ;
        TimeSec:_FillValue = 2147483647 ;
        TimeSec:long_name = "Number of seconds within the day" ;
        TimeSec:units = "sec" ;
        TimeSec:valid_range = 0, 86400 ;
        TimeSec:coordinates = "longitude latitude" ;
int TimeMicroSec(time) ;
        TimeMicroSec:_FillValue = 2147483647 ;
        TimeMicroSec:long_name = "Microseconds" ;
        TimeMicroSec:units = "1e-6 sec" ;
        TimeMicroSec:valid_range = 0, 999999 ;
        TimeMicroSec:coordinates = "longitude latitude" ;
int corssh(time) ;
        corssh:_FillValue = 2147483647 ;
        corssh:long_name = "Corrected sea surface height above the reference" ;
        corssh:units = "m" ;
        corssh:scale_factor = 0.0001 ;
        corssh:coordinates = "longitude latitude" ;
int alt(time) ;
        alt:_FillValue = 2147483647 ;
        alt:long_name = "1 Hz altitude of satellite" ;
        alt:units = "m" ;
        alt:scale_factor = 0.0001 ;
        alt:add_offset = 700000. ;
        alt:coordinates = "longitude latitude" ;
int range(time) ;
        range:_FillValue = 2147483647 ;
        range:long_name = "1 Hz Ku band corrected altimeter range" ;
        range:units = "m" ;
        range:scale_factor = 0.0001 ;
        range:add_offset = 700000. ;
        range:coordinates = "longitude latitude" ;
short dry_tropo_corr(time) ;
        dry_tropo_corr:_FillValue = 32767s ;
        dry_tropo_corr:long_name = "Model dry tropospheric correction" ;
        dry_tropo_corr:units = "m" ;
        dry_tropo_corr:scale_factor = 0.0001 ;
        dry_tropo_corr:coordinates = "longitude latitude" ;
short sea_state_bias(time) ;
        sea_state_bias:_FillValue = 32767s ;
        sea_state_bias:long_name = "Non parametric sea state bias correction" ;
        sea_state_bias:units = "m" ;
        sea_state_bias:scale_factor = 0.0001 ;
        sea_state_bias:coordinates = "longitude latitude" ;
short iono_corr(time) ;
        iono_corr:_FillValue = 32767s ;
```


Copyright CLS

```
                iono_corr:long_name = "altimeter ionospheric correction on Ku band (filtered), after cycle 64 GIM
ionospheric correction" ;
                iono_corr:units = "m" ;
                iono_corr:scale_factor = 0.0001 ;
                iono_corr:coordinates = "longitude latitude" ;
        short rad_wet_tropo_corr(time) ;
                rad_wet_tropo_corr:_FillValue = 32767s ;
                rad_wet_tropo_corr:long_name = "Radiometer wet tropospheric correction" ;
                rad_wet_tropo_corr:units = "m" ;
                rad_wet_tropo_corr:scale_factor = 0.0001 ;
                rad_wet_tropo_corr:coordinates = "longitude latitude" ;
        short model_wet_tropo_corr(time) ;
                model_wet_tropo_corr:_FillValue = 32767s ;
                model_wet_tropo_corr:long_name = "ECMWF model wet tropospheric correction" ;
                model_wet_tropo_corr:units = "m" ;
                model_wet_tropo_corr:scale_factor = 0.0001 ;
                model_wet_tropo_corr:coordinates = "longitude latitude" ;
        short comp_wet_tropo_corr(time) ;
                comp_wet_tropo_corr:_FillValue = 32767s ;
                comp_wet_tropo_corr:long_name = "Composite wet tropospheric correction" ;
                comp_wet_tropo_corr:units = "m" ;
                comp_wet_tropo_corr:scale_factor = 0.0001 ;
                comp_wet_tropo_corr:coordinates = "longitude latitude" ;
        short off_nadir_angle(time) ;
                off_nadir_angle:_FillValue = 32767s ;
                off_nadir_angle:long_name = "square of the off nadir angle computed from Ku waveforms" ;
                off_nadir_angle:units = "degrees2" ;
                off_nadir_angle:scale_factor = 0.0001 ;
                off_nadir_angle:coordinates = "longitude latitude" ;
        short wind_speed_alt(time) ;
                wind_speed_alt:_FillValue = 32767s ;
                wind_speed_alt:long_name = "altimeter wind speed" ;
                wind_speed_alt:units = "m/s" ;
                wind_speed_alt:scale_factor = 0.001 ;
                wind_speed_alt:coordinates = "longitude latitude" ;
        byte alt_flag_oper(time) ;
                alt_flag_oper:_FillValue = 127b ;
                alt_flag_oper:long_name = "altimeter state flag: altimeter operating: 0=SideA  1=SideB" ;
                alt_flag_oper:units = "1" ;
                alt_flag_oper:scale_factor = 1. ;
                alt_flag_oper:coordinates = "longitude latitude" ;
        byte rad_qual_interp_flag(time) ;
                rad_qual_interp_flag:_FillValue = 127b ;
                rad_qual_interp_flag:long_name = "MWR Quality interpolation flag: 0=good 1=interpolation with gap
2=extrapolation 3=fail" ;
                rad_qual_interp_flag:units = "1" ;
                rad_qual_interp_flag:scale_factor = 1. ;
                rad_qual_interp_flag:coordinates = "longitude latitude" ;
        byte alt_surf_type(time) ;
                alt_surf_type:_FillValue = 127b ;
                alt_surf_type:long_name = "altimeter surface type: 0=water, 1=land" ;
                alt_surf_type:units = "1" ;
                alt_surf_type:scale_factor = 1. ;
                alt_surf_type:coordinates = "longitude latitude" ;
        int bathymetry(time) ;
                bathymetry:_FillValue = 2147483647 ;
                bathymetry:long_name = "Bathymetry" ;
                bathymetry:units = "m" ;
                bathymetry:scale_factor = 0.001 ;
                bathymetry:coordinates = "longitude latitude" ;
        short dyn_atmosph_corr(time) ;
                dyn_atmosph_corr:_FillValue = 32767s ;
                dyn_atmosph_corr:long_name = "Combined atmospheric correction : high frequency fluctuations of the
sea surface topography and inverted barometer height correction computed from rectangular grids" ;
                dyn_atmosph_corr:units = "m" ;
                dyn_atmosph_corr:scale_factor = 0.0001 ;
                dyn_atmosph_corr:coordinates = "longitude latitude" ;
        int mean_sea_surface(time) ;
                mean_sea_surface:_FillValue = 2147483647 ;
                mean_sea_surface:long_name = "Mean sea surface height" ;
                mean_sea_surface:units = "m" ;
                mean_sea_surface:scale_factor = 0.0001 ;
                mean_sea_surface:coordinates = "longitude latitude" ;
```


Copyright CLS

```
int ocean_tide(time) ;
        ocean_tide:_FillValue = 2147483647 ;
        ocean_tide:long_name = "Geocentric ocean tide height" ;
        ocean_tide:units = "m" ;
        ocean_tide:scale_factor = 0.0001 ;
        ocean_tide:coordinates = "longitude latitude" ;
short pole_tide(time) ;
        pole_tide:_FillValue = 32767s ;
        pole_tide:long_name = "Geocentric pole tide height" ;
        pole_tide:units = "m" ;
        pole_tide:scale_factor = 0.0001 ;
        pole_tide:coordinates = "longitude latitude" ;
short sigma0(time) ;
        sigma0:_FillValue = 32767s ;
        sigma0:long_name = "Ku-band Backscatter coefficient" ;
        sigma0:units = "dB" ;
        sigma0:scale_factor = 0.001 ;
        sigma0:coordinates = "longitude latitude" ;
short solid_earth_tide(time) ;
        solid_earth_tide:_FillValue = 32767s ;
        solid_earth_tide:long_name = "Solid earth tide height" ;
        solid_earth_tide:units = "m" ;
        solid_earth_tide:scale_factor = 0.0001 ;
        solid_earth_tide:coordinates = "longitude latitude" ;
short swh(time) ;
        swh:_FillValue = 32767s ;
        swh:long_name = "Ku-band Significant wave height" ;
        swh:units = "m" ;
        swh:scale_factor = 0.001 ;
        swh:coordinates = "longitude latitude" ;
byte range_numval(time) ;
        range_numval:_FillValue = 127b ;
        range_numval:long_name = "number of valid points for Ku band range" ;
        range_numval:units = "count" ;
        range_numval:scale_factor = 1. ;
        range_numval:coordinates = "longitude latitude" ;
short range_rms(time) ;
        range_rms:_FillValue = 32767s ;
        range_rms:long_name = "RMS of the Ku band range" ;
        range_rms:units = "m" ;
        range_rms:scale_factor = 0.0001 ;
        range_rms:coordinates = "longitude latitude" ;
byte sigma0_numval(time) ;
        sigma0_numval:_FillValue = 127b ;
        sigma0_numval:long_name = "number of valid points for Ku band range" ;
        sigma0_numval:units = "count" ;
        sigma0_numval:scale_factor = 1. ;
        sigma0_numval:coordinates = "longitude latitude" ;
short sigma0_rms(time) ;
        sigma0_rms:_FillValue = 32767s ;
        sigma0_rms:long_name = "RMS of the Ku band backscattering coefficient" ;
        sigma0_rms:units = "dB" ;
        sigma0_rms:scale_factor = 0.001 ;
        sigma0_rms:coordinates = "longitude latitude" ;
byte validation_flag(time) ;
        validation_flag:_FillValue = 127b ;
        validation_flag:long_name = "validation flag: 0=valid, 1=non valid" ;
        validation_flag:units = "1" ;
        validation_flag:scale_factor = 1. ;
        validation_flag:coordinates = "longitude latitude" ;
byte rad_surf_type(time) ;
        rad_surf_type:_FillValue = 127b ;
        rad_surf_type:long_name = "radiometer surface type: 0=ocean, 1=land" ;
        rad_surf_type:units = "1" ;
        rad_surf_type:scale_factor = 1. ;
        rad_surf_type:coordinates = "longitude latitude" ;
int regional_bias(time) ;
        regional_bias:_FillValue = 2147483647 ;
        regional_bias:long_name = "regional bias" ;
        regional_bias:units = "m" ;
        regional_bias:scale_factor = 0.0001 ;
        regional_bias:coordinates = "longitude latitude" ;
int global_bias(time) ;
```


Copyright CLS

```
                    global_bias:_FillValue = 2147483647 ;
                    global_bias:long_name = "global bias" ;
                    global_bias:units = "m" ;
                    global_bias:scale_factor = 0.0001 ;
                    global_bias:coordinates = "longitude latitude" ;
          byte ice_flag(time) ;
                    ice_flag:_FillValue = 127b ;
                    ice_flag:long_name = "ice flag: 0=no ice, 1=ice" ;
                    ice_flag:units = "1" ;
                    ice_flag:scale_factor = 1. ;
                    ice_flag:coordinates = "longitude latitude" ;

// global attributes:
                    :title = "SLCCI Altimeter database V1 for  Cycle 033" ;
                    :OriginalName = "SLCCI_ALTDB_EN_Cycle033_V1.nc" ;
                    :CreatedBy = "slcci" ;
                    :CreatedOn = "15-JUN-2012 17:39:00:000000" ;
                    :Mission = "EN" ;
                    :MeanProfile = "033" ;
                    :Version = "0" ;
                    :Conventions = "CF-1.4" ;
                    :history = "2012/06/15 17:54:11 slcci@px-132.cls.fr ConvertATPInternalToCF: Converted to CF" ;
}
```

5. Level 4 data

5.1. Filenaming convention

DATE_PROJECT_LEVEL_ECV_VARIABLE_MISSION_VERSION.nc

Example: 20101215000000-ESACCI-L4_SEALEVEL-MSLA-MERGED-fv01.nc

DATE	*YYYYMMDDHHMMSS*	averaged month date
PROJECT	*ESACCI*	Project name
LEVEL	*L4*	Level of the product
ECV	*SEALEVEL*	Essential Climate Variable name
VARIABLE	*MSLA*	Variable maps of sea level anomalies
MISSION	*MERGED*	Combined data
VERSION	*fvxx*	version number

Table 2: Nomenclature of the ECV Monthly averaged sea level anomalies

5.2. Product data format

ECV products are stored using the NetCDF (Network Common Data Form) format and CF (Climate and Forecast) metadata conventions.

5.2.1. Data Handling Variables

4 dimensions are defined:

- Time
- Latitude : number of latitude boxes between -90° and 90°

Copyright CLS

- Longitude : number of longitudes boxes between 0° and 360°
- n: bounds associated to the time period

5.2.2. NetCDF header

5.2.2.1. Global attributes

Attribute	Format	Description
history	string	Provides an audit trail for modifications to the original data. Date and [product_create_time]
tracking_id		
comment	string	Miscellaneous information about the data or methods used to produce it.
institution	string	Specifies where the original data was produced.
references	string	Published or web-based references that describe the data or methods used to produce it.
Method	string	The source of production of the original data.
summary		
keywords		
id		
naming_authority		
keywords_vocabulary		
cdm_data_type		
comment		
date_created		
project	string	Climate Change Initiative --- European Space Agency
geospatial_lat_min		
geospatial_lat_max		
geospatial_lon_min		
geospatial_lon_max		
geospatial_vertical_min		
geospatial_vertical_max		
time_coverage_start		
time_coverage_end		
time_coverage_duration		
time_coverage_resolution		
standard_name_vocabulary		
license		
title	string	A succinct description of what is in the dataset.
Conventions	string	Convention used for format of the file
source	string	The method of production of original data (='Satellite altimetry')
contact	string	Primary contact for information about the data set
product_version	string	

Copyright CLS

5.2.2.2. Variable attributes

Type	Name	CF standard name attribute	Content	Unit
double	lat(latitude)	latitude	Latitude value of each point of the grid	degree_north
double	lon (longitude)	longitude	Longitude value of each point of the grid	degree_east
float	SLA(latitude, longitude)	sea_surface_height_above_sea_level	Sea level anomalies	(10^{-3})m
float	date(time)	time	Date of each SLA average	
float	date_bounds(n)		Date bounds	

6. Indicators

6.1. ECV Mean Sea Level changes indicators: Mean Sea Level temporal variations

6.1.1. Filenaming convention

DATE_PROJECT_INDICATEUR_ECV_VARIABLE_MISSION_VERSION.nc

Example: 20120830000000-ESACCI-IND_SEALEVEL-MSL-MERGED-fv01.nc

DATE	*YYYYMMDDHHMMSS*	production date of the file
PROJECT	*ESACCI*	Project name
INDICATEUR	*IND*	Type of the product
ECV	*SEALEVEL*	Essential Climate Variable name
VARIABLE	*MSL*	Mean Sea Level
MISSION	*MERGED*	Combined data
VERSION	*fvxx*	version number

Table 3: Nomenclature of the ECV Mean Sea Level temporal variations

6.1.2. Product data format

ECV products are stored using the NetCDF (Network Common Data Form) format and CF (Climate and Forecast) metadata conventions.

6.1.2.1. Data Handling Variables

For ECV Mean Sea Level changes indicators (temporal variations, geographic distribution), 3 dimensions are defined:

Copyright CLS

- Time
- Latitude : number of latitude boxes between -90° and 90°
- Longitude : number of longitudes boxes between 0° and 360°

6.1.2.2. NetCDF header

6.1.2.2.1. Global attributes

Attribute	Format	Description
history	string	Provides an audit trail for modifications to the original data. Date and [product_create_time]
tracking_id		
comment	string	Miscellaneous information about the data or methods used to produce it.
institution	string	Specifies where the original data was produced.
references	string	Published or web-based references that describe the data or methods used to produce it.
Method	string	The source of production of the original data.
summary		
keywords		
id		
naming_authority		
keywords_vocabulary		
cdm_data_type		
comment		
date_created		
project	string	Climate Change Initiative --- European Space Agency
geospatial_lat_min		
geospatial_lat_max		
geospatial_lon_min		
geospatial_lon_max		
geospatial_vertical_min		
geospatial_vertical_max		
time_coverage_start		
time_coverage_end		
time_coverage_duration		
time_coverage_resolution		
standard_name_vocabulary		
license		
title	string	A succinct description of what is in the dataset.
Conventions	string	Convention used for format of the file
source	string	The method of production of original data (='Satellite altimetry')
contact	string	Primary contact for information about the data set
product_version	string	

Copyright CLS

6.1.2.2.2. Variable attributes

Type	Name	CF standard name attribute	Content	Unit
double	lat(latitude)	latitude	Latitude value of each point of the grid	degree_north
double	lon(longitude)	longitude	Longitude value of each point of the grid	degree_east
float	date(time)	time	Date of each SLA average	
float	global_msl(time)	global_average_sea_level_change	Global mean sea level	(10^{-3})m
float	global_msl_trend	tendency_of_global_average_sea_level_change	Global mean sea level estimated trend	mm/yr
float	global_msl_trend_error		Error of global mean sea level trend	mm/yr

6.2. ECV Mean Sea Level changes indicators: Mean Sea Level changes geographic distribution

6.2.1. Filenaming convention

DATE_PROJECT_INDICATEUR_ECV_VARIABLE_MISSION_VERSION.nc

Example: 20120830000000-ESACCI-IND_SEALEVEL-MSL-MERGED-fv01.nc

DATE	*YYYYMMDDHHMMSS*	production date of the file
PROJECT	*ESACCI*	Project name
INDICATEUR	*IND*	Type of the product
ECV	*SEALEVEL*	Essential Climate Variable name
VARIABLE	*MSL*	Mean Sea Level
MISSION	*MERGED*	Combined data
VERSION	*fvxx*	version number

Table 4: Nomenclature of the ECV Mean Sea Level temporal variations

6.2.2. Product data format

ECV products are stored using the NetCDF (Network Common Data Form) format and CF (Climate and Forecast) metadata conventions.

6.2.2.1. Data Handling Variables

For ECV Mean Sea Level changes indicators (temporal variations, geographic distribution), 3 dimensions are defined:

- Time

Copyright CLS

- Latitude: number of latitude boxes between -90° and 90°
- Longitude: number of longitudes boxes between 0° and 360°

6.2.2.2. NetCDF header

6.2.2.2.1. Global attributes

Attribute	Format	Description
history	string	Provides an audit trail for modifications to the original data. Date and [product_create_time]
tracking_id		
comment	string	Miscellaneous information about the data or methods used to produce it.
institution	string	Specifies where the original data was produced.
references	string	Published or web-based references that describe the data or methods used to produce it.
Method	string	The source of production of the original data.
summary		
keywords		
id		
naming_authority		
keywords_vocabulary		
cdm_data_type		
comment		
date_created		
project	string	Climate Change Initiative --- European Space Agency
geospatial_lat_min		
geospatial_lat_max		
geospatial_lon_min		
geospatial_lon_max		
geospatial_vertical_min		
geospatial_vertical_max		
time_coverage_start		
time_coverage_end		
time_coverage_duration		
time_coverage_resolution		
standard_name_vocabulary		
license		
title	string	A succinct description of what is in the dataset.
Conventions	string	Convention used for format of the file
source	string	The method of production of original data (='Satellite altimetry')
contact	string	Primary contact for information about the data set
product_version	string	

Copyright CLS

6.2.2.2.2. Variable attributes

Type	Name	CF standard name attribute	Content	Unit
double	lat(latitude)	latitude	Latitude value of each point of the grid	degree_north
double	lon(longitude)	longitude	Longitude value of each point of the grid	degree_east
float	date(time)	time	Date of each SLA average	
float	local_msl_trend (latitude, longitude)	tendency_of_sea_surface_height_above_sea_level	Geographical distribution of mean sea level trends	mm/yr
float	local_msl_trend_error(latitude, longitude)	-	Geographical distribution of mean sea level trends errors	mm/yr

6.3. ECV Mean Sea Level changes indicators: Mean Sea Level changes amplitude and phases

6.3.1. Filenaming convention

DATE_PROJECT_INDICATEUR_ECV_VARIABLE_MISSION_VERSION.nc

Example: 20120830000000-ESACCI-IND_SEALEVEL-MSLAMPH-MERGED-fv01.nc

DATE	*YYYYMMDDHHMMSS*	production date of the file
PROJECT	*ESACCI*	Project name
INDICATEUR	*IND*	Type of the product
ECV	*SEALEVEL*	Essential Climate Variable name
VARIABLE	*MSLAMPH*	Mean Sea Level amplitude and phase
MISSION	*MERGED*	Combined data
VERSION	*fvxx*	version number

Table 5: Nomenclature of the ECV Mean Sea Level changes amplitude and phases

6.3.2. Product data format

ECV products are stored using the NetCDF (Network Common Data Form) format and CF (Climate and Forecast) metadata conventions.

6.3.2.1. Data Handling Variables

For ECV Mean Sea Level changes indicators amplitude and phases, 4 dimensions are defined:

- Time

Copyright CLS

- Latitude: number of latitude boxes between -90° and 90°
- Longitude: number of longitudes boxes between 0° and 360°
- Period: harmonic period

6.3.2.2. NetCDF header

6.3.2.2.1. Global attributes

Attribute	Format	Description
history	string	Provides an audit trail for modifications to the original data. Date and [product_create_time]
tracking_id		
comment	string	Miscellaneous information about the data or methods used to produce it.
institution	string	Specifies where the original data was produced.
references	string	Published or web-based references that describe the data or methods used to produce it.
Method	string	The source of production of the original data.
summary		
keywords		
id		
naming_authority		
keywords_vocabulary		
cdm_data_type		
comment		
date_created		
project	string	Climate Change Initiative --- European Space Agency
geospatial_lat_min		
geospatial_lat_max		
geospatial_lon_min		
geospatial_lon_max		
geospatial_vertical_min		
geospatial_vertical_max		
time_coverage_start		
time_coverage_end		
time_coverage_duration		
time_coverage_resolution		
standard_name_vocabulary		
license		
title	string	A succinct description of what is in the dataset.
Conventions	string	Convention used for format of the file
source	string	The method of production of original data (='Satellite altimetry')
contact	string	Primary contact for information about the data set
product_version	string	

Copyright CLS

6.3.2.2.2. Variable attributes

Type	Name	CF standard name attribute	Content	Unit
double	lat(latitude)	latitude	Latitude value of each point of the grid	degree_north
double	lon(longitude)	longitude	Longitude value of each point of the grid	degree_east
float	date(time)	time	Date of each SLA average	
float	ampl (latitude, longitude, period)	amplitude_of_global_average_sea_level_change	Geographical distribution of mean sea level amplitude	m
float	phase(latitude, longitude, period)	phase_of_global_average_sea_level_change	Geographical distribution of mean sea level phase	deg
	period	harmonic_period	'1 year' or '1/2 year'	

Copyright CLS