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TITLE: **ENVISAT-1 PRODUCTS SPECIFICATIONS**

VOLUME 14: **RA2 PRODUCTS SPECIFICATIONS LEVEL 2**

Abstract : **This document contains the RA2 Level 2 Product Specifications for Altimeter reprocessing baseline v3.0 (Phase F reprocessing).**

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ISSUE	REVISION	DATE	CHANGE STATUS	ORIGIN
5	F	11/05/2017	Document splitted in two parts: one applicable to Level 1 products and one for Level 2 products. All sections were re-numbered, Previous change log removed as the Sections does not have anymore the same meaning. Changes in Level 2 product specifications: Minor update of the format of the Level 2 NetCDF products Update of the computation of the fields ssha_01_ku and ssha_20_ku. uso_cor_01 and uso_cor_20 are provided d both in standard and enhanced datasets. Definition of new variables: lon_ref_track_20 and lat_ref_track_20, flag_loss_01_s, flag_cal_selection_20, flag_uso_anomaly_01, flag_uso_qual_01 Scale factor for agc_2k and scale_factor_2k set to 0.01	RA-0005-CLS-v7rev6
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5	I	13/04/2018	gpd_wet_tropo_cor_01 comment and institution have been modified. Some typos correction	Email from CNES (F. Baily-Poirot) on 18/01/2018

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REFERENCE DOCUMENTS

[RD 1] ENVISAT-1 PRODUCTS SPECIFICATIONS - VOLUME 14: RA2 PRODUCTS SPECIFICATIONS LEVEL 1 - PO-RS-MDA-GS-2009 - IDEAS+-SER-IPF-SPE-2766

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14 RA-2 PRODUCTS SPECIFICATIONS

14.9 INSTRUMENT OVERVIEW

The Radar Altimeter-2 measures with high precision the distance from the satellite to the closest point on the Earth's surface directly beneath it. If the orbit of the satellite is determined by independent means (such as by DORIS) the RA-2 data can be used to accurately map the Earth's topography. In addition, signal analysis of the returning radar echo can be used to provide insight into ground characteristics.

The RA-2 is a nadir looking pulse limited radar operating at a nominal frequency of 13.575 GHz (Ku-band). A second channel, operating at a nominal frequency of 3.2 GHz (S-band) is also used, primarily to estimate the effects of the ionosphere on the Ku-band channel.

Table 14.9.1 RA-2 Characteristics

GEOMETRIC:	Approx. 19 km footprint. Spatial sampling approx. 390 meters along track. 47 cm height resolution at 320 MHz max chirp bandwidth.
RADIOMETRIC:	Nadir looking pulse: Main Nominal frequency = 13.575 GHz (Ku-band) Error Nominal frequency = 3.2 GHz (S-band)

The RA-2 Instrument operates in three modes. These consist of Measurement Mode, RF and Digital Built-In Test Equipment (BITE) Mode, and IF Calibration Mode. Science data is gathered within the Measurement Mode, while the other modes are used for testing and calibration of the instrument.

1. Measurement Mode

The Measurement Mode consists of two primary phases. The first is Acquisition Phase, when the instrument attempts to locate the initial ground height. To do this, the instrument first initiates a Noise Power Estimation cycle to establish a noise power estimate, then proceeds with a Detection cycle in which the location of the leading edge of the return echo is established. The final step in the Acquisition Phase is the Automatic Gain Control (AGC) Setting cycle in which attempts to estimate the received signal power in order to set the appropriate gain settings to keep the return signal amplitude

within the proper dynamic range of the receiving equipment.

The second step of Measurement Mode is the Tracking Phase, in which the instrument acquires the science data. The transition from Acquisition to Tracking phases is performed automatically or started directly by macrocommand. During tracking it is possible to change tracking parameters without interruption of measurements. Periodic calibration is also performed while in the Tracking Phase of Measurement Mode. Operational products are constructed from the data obtained when the instrument is in the Tracking Phase of Measurement mode.

2. RF and Digital BITE Mode

The aim of these two modes is to test the RF Tx/Rx channel and the digital signal processing modules. BITE is executed from Measurement Mode by macrocommand. During BITE the tracking is interrupted. RF and Digital BITE are executed cyclically until a mode change request is received. Data generated while in this mode is included in Level 0 Products only.

3. IF Calibration Mode

The purpose of this mode is to measure the IF filter shape. This is done by measuring the spectra of averaged noise samples. Data generated while in this mode is included in Level 0 Products only.

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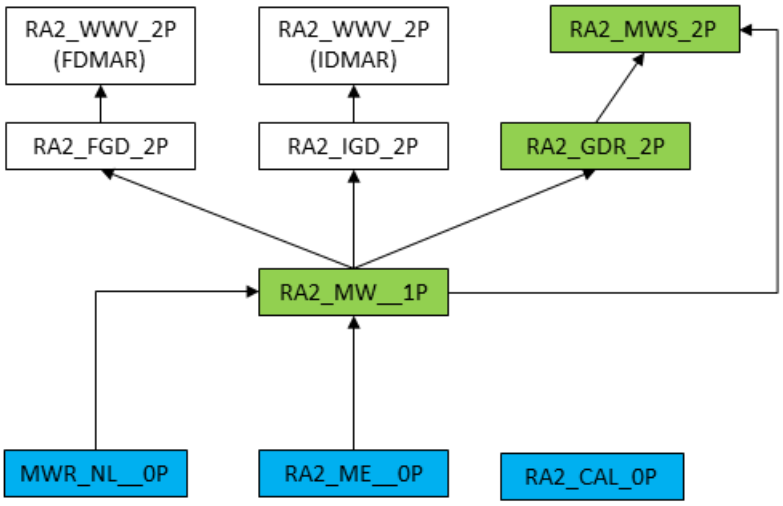
14.10 PRODUCTS OVERVIEW

The RA-2 products are summarized in Table 14.2.1, and the product tree of Figure 14.2.1. To be noted that som level 2 products are not generated anymore since ENVISAT satellite entered in Phase F, after the satellite link was lost.

Table 14.10.1 RA-2 Products

Instrument / mode	Product ID	Description
RA-2	RA2_CAL_0P	RA2 Calibration and BITE Mode Level 0
	RA2_ME__0P	RA2 Measurement Mode Level 0
	RA2_MW__1P	Geolocated and calibrated Altimeter Waveforms with TOA Microwave Brightness Temperatures
	RA2_FGD_2P	FDGDR: Fast delivery Geophysical Data record from RA-2 and Water Vapour/Liquid Content from MWR. Available 3 hours after data acquisition (**Not generated in Envisat Phase F – Description removed from present document**)
	RA2_IGD_2P	IGDR: Intermediate Geophysical Data record from RA2 and Water Vapour/Liquid Content from MWR. Processed off-line and available 3-5 days after acquisition (**Not generated in Envisat Phase F – Description removed from present document**)
	RA2_GDR_2P	GDR: Geophysical Data Record from RA-2 and Water Vapour/Liquid Content from MWR. Processed off-line and available 50 days after acquisition or in reprocessed dataset
	RA2_WWV_2P	FDMAR/IMAR: Wind/Wave product with height and MWR information for NRT dissemination to Meteocean users (2 products released at different levels of consolidation: FDMAR built from RA2_FGD_2P or IMAR built from RA2_IGD_2P) - (**Not generated in Envisat Phase F – Description removed from present document**)
	RA2_MWS_2P	SGDR: Sensor Geophysical Data Record from RA-2, Water Vapour/Liquid content from MWR and Individual Uncalibrated Waveforms from RA-2. Available after 50 days from data take or in reprocessed dataset.

Figure 14.10.1 RA-2 Product Tree. In green the products generated for Phase F (Reprocessing v3.0), in cyan the Level 0 product used for the reprocessing v3.0.



In this volume the Level 2 product specifications (for RA2_MWS_2P –or enhanced product – and RA2_GDR_2P – or standard product) are described in detail.

Level 1 product specifications (RA2_MW__1P) are specified in [RD-1]

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14.11 FILE NAMING CONVENTION

With the Phase-F reprocessing (baseline v3.0) the ENVISAT RA2/MWR Level 2 product file name follows the Sentinel-3 file name convention (see web page at https://earth.esa.int/web/sentinel/user-guides/sentinel-3-altimetry/naming-conventions) adapted to ENVISAT RA2/MWR products.

It is defined according to the following convention (96 characters):

MMM_SS_L_TTTTTT_yyyymmddThhmmss_YYYYMMDDTHHMMSS_YYYYMMDDTHHMMSS_<instance ID>_GGG_<class id>.<extension>

Where:

MMM: mission ID (e.g. ENV for ENVISAT)
SS: data source for the instrument data (e.g. RA for RA2)
L: processing level: one digit or one underscore "_" (e.g.: "2" for Level-2 products or underscore "_" if processing level is not applicable.).
TTTTTT: data type ID (e.g. GDR___ for “standard” products, MWS___ for “enhanced” products)
yyyymmddThhmmss: Data Start time (15 characters).
YYYYMMDDTHHMMSS: Data Stop time (15 characters).
YYYYMMDDTHHMMSS: creation date of the product (15 characters)
<instance ID>: DDDD_CCC_LLLL___, 16 characters, either upper-case letters or digits or underscores "_".
DDDD: orbit duration Sensing data time interval in seconds
CCC: cycle number at the start sensing time of the product
LLLL: relative track number within the cycle at the start sensing time of the product (one track = half orbit)
3 underscores "_"
GGG: product generating centre, three characters (e.g. PAC for F-PAC processing center)
<class id>: platform, eight characters, either upper-case letters or digits or underscores: **P_XX_NNN**, where:
P : one upper-case letter indicating the platform (e.g. R for reprocessing or one underscore"_" if not relevant).
XX : two upper-case letters/digits indicating the timeliness of the processing workflow (e.g. NT for Non-Time Critical – i.e. consolidated products- or two underscores"__" if not relevant).
NNN: three letters/digits. Free text for indicating the baseline collection (e.g. 003 for reprocessing baseline v3.0) or data usage (e.g. test, GSV, etc) or three underscores "___" if not relevant.
<extension>: 2 characters, the filename extension (e.g. nc for netCDF).

Example of the “standard” product filename (96 characters):

ENV_RA_2_GDR____20150101T102500_20150101T114000_20150101T115000_6101

_003_1001____PAC_R_NT_003.nc

Example of the “enhanced” product filename (96 characters):

ENV_RA_2_MWS____20150101T102500_20150101T114000_20150101T115000_610
1003_1001____PAC_R_NT_003.nc

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14.12 netCDF FILES REPRESENTATION CONVENTION

A NetCDF file contains *groups*, *dimensions*, *variables* and *attributes*, which all have both a name by which they are identified. These components can be used together to capture the meaning of data and relations among data fields in an array-oriented data set:

- **Groups:** group act as an entire NetCDF file and then may have attributes, dimensions, and variables.
- **Dimensions:** dimension is used to define the size of one or more of the multidimensional variables. A dimension has a length and a name. A dimension defined at top-level outside any group is available in all the groups.
- **Variables:** variable represents a multidimensional array of values of the same type. A variable has a name, a data type, and a size described by its list of dimensions.
- **Attributes:** attribute contains information about a variable (variable attribute) or about the whole NetCDF file (global attribute). Attributes may be used to specify properties as units, special values, maximum and minimum threshold values, and packing parameters. Attribute information is represented by single values or one-dimensional arrays of values.

The following convention should be used in documentations to represent all files in the NetCDF format using tables.

Same S3 netCDF file representation convention is used (Product Data Format Specification – Product Structures - S3IPF.PDS.002):

Table 14.12.1 netCDF files representation convention

Element name	Description	Range or value	T	D
<global common attributes>				
group_name				
dimension_name				
variable_name				
attribute_name				

Only background colours are used to differentiate NetCDF objects (groups, dimensions, variable and attributes): groups are in orange, dimensions in light blue, variables in light yellow and attributes in white with name right-aligned.

The table contains 5 columns:

- **Element name**: the name of NetCDF group, dimension, variable or attribute. For groups this is the only column filled, the others are empty.

- **Description**: description of the element; for a variable the description must be used to fill its “long_name” attribute (this attribute is then implicit and not described in the variable attributes list)

- **Range or value**: range or value of variables, or value of dimensions or attributes. The variable range is given in its geophysical unit, which could be different than the storage range defined by the standard “valid_min” and “valid_max” attributes (in case of NetCDF “packed” storage using the standard “scale_factor” and “add_offset” attributes).

- **T**: type of variables or attributes, not used for groups and dimensions

- **D**: dimensions of the variables or attributes, in the same order than storage and with one dimension per line

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14.13 LEVEL 2 PRODUCTS

Since the end of the ENVISAT mission, i.e. in Mission Phase F, which correspond to the altimeter reprocessing baseline v3.0, only the GDR (standard dataset) and SGDR products (enhanced dataset) are generated using DORIS Precise Orbit determination.

14.13.1 RA-2 Geophysical Data Record (GDR – standard product) and Sensor Data Record (SGDR – enhanced product)

These two products will consist of a series of records, each representing 1.114 seconds of data (1 Hz) and at 55.7 ms (18 Hz). There are sufficient records to cover a pass (i.e., approximately 3000s) formatted from pole to pole. Records are provided independently of the surface type at the sub-satellite point.

The Sensor Data Record is a combination of the fully consolidated Geophysical Data Record product (standard dataset) and the fully consolidated Geolocated and Calibrated Altimeter Waveforms with TOA Microwave Brightness Temperature (Level 1B) product. It is thus the most accurate and complete record of RA-2 performance available. The differences between the two products are listed in Section 14.13.1.5.2.

Parameters in the product include, among others, estimated range, wave height, and windspeed.

14.13.1.1 Input Data

Level 1B product plus auxiliary data.

14.13.1.2 Auxiliary Data Used

Auxiliary data required for Level 2 processing may include files used in Level 1B processing, plus the following auxiliary data files:

Description	Auxiliary File ID
Pole location data file	RA2_POL_AX
Platform data file	RA2_PLA_AX => EN1_VPF_AX
Ionospheric coefficients file	RA2_IOC_AX
Mean sea surface height map (solution 1)	RA2_MS1_AX
Mean sea surface height map (solution 2)	RA2_MS2_AX

Description	Auxiliary File ID
Altitude of Meteo grid points file	RA2_MET_AX => SMM_ALT
Ocean/Ice2 configuration (system) file	RA2_SOI_AX
Ice1 / Sea Ice configuration (system) file	RA2_ICT_AX
Modified dip map file	RA2_DIP_AX
Cartwright amplitudes file	RA2_SET_AX
Ocean tide solution 1 map file	RA2_OT1_AX
Ocean tide solution 2 map file	RA2_OT2_AX
Tidal loading coefficients map file (Solution 1)	RA2_TLG_AX
Long period tide file	RA2_LPT_AX
Geoid height map file	RA2_GEO_AX
Ocean depth / land elevation map file	AUX_DEM_AX
RA2 characterisation data file	RA2_CHD_AX
RA2 constants file	RA2_CST_AX
ENVISAT-1 Attitude data file	AUX_ATT_AX
ECMWF Re-analysis data file (ERA-Interim) (surface pression, mean sea level pressure, 10m wind U component, 10m wind V component, orography, specific humidity, and temperature)	Files in GRIB format
Orbit state vectors file	DOR_VOR_AX DOR_POR_AX
MWR land sea flag data	MWR_LSF_AX
Lapse Rate Climatology	RA2_LRC_AX
Modelled instrumental correction table	RA2_MI1_AX
Rain rate table	RA2_RRC_AX
S1 amplitude monthly grid	RA2_S1A_AX
S1 phase monthly grid	RA2_S1P_AX
S2 amplitude monthly grid	RA2_S2A_AX
S2 phase monthly grid	RA2_S2P_AX
Surface classification map	RA2_SCF_AX
Seasonal freezing level table	RA2_SFL_AX
Freezing level table	RA2_SFT_AX
Distance to shore map	RA2_SHD_AX

Description	Auxiliary File ID
Sea state bias file	RA2_SSB_AX
Sea Surface Temperature Seasonal table	RA2_SST_AX => SMM_SST_AX
Ice-2 Echo Geo Correction table	RA2_LEG_AX
Slope model for Greenland map file	RA2_SL1_AX
Slope model for Antarctica map file	RA2_SL2_AX

Table 14.13.1 Auxiliary Data Files for RA-2 Level 2 Processing

14.13.1.3 Processing Performed

This document is not the applicable document regarding RA-2 and MWR processing. The information included here is intended only as a high-level overview. The Level 2 processing for RA-2 consists of:

- the calibrated Level 1B waveforms are processed by 4 different retrackers in parallel;
- the 4 range estimates are placed in the product;
- the estimated range measurements are not corrected for the various geophysical effects, but the corrections are calculated and supplied in the product;
- estimates of significant wave height, backscatter coefficient and other parameters are performed.

14.13.1.4 Product Characteristics

The format of ENVISAT Level 2 User Products is the NetCdf-4 Classic (see Section 14.12 for representation convention).

14.13.1.4.1 Dimensions

A dimension may be used to represent a real physical dimension, for example, time, latitude, longitude, or height. A dimension might also be used to index other quantities (waveforms index for example).

The following dimensions are used in the ENVISAT Level 2 User Products files:

Table 14.13.2 Definition of Dimension in Level 2 products

		Product Type	
Dimension name	**Value**	**GDR (standard)**	**SGDR (enhanced)**
time_01	number of 1-Hz measurements	X	X
time_20	number of 18-Hz measurements	X	X
fft_sample_ind_ku	128 (indexes of samples in Ku-band waveforms)		X
dft_sample_ind_ku	2 (indexes of additional dft samples in Ku-band waveforms)		X
fft_sample_ind_s	64 (indexes of samples in S-band waveforms)		X
time_2k	number of 2-kHz measurements		X

14.13.1.4.2 Variables

Variables are used to store the bulk of the data in a netCDF file. A variable represents an array of values of the same type. A scalar value is treated as a 0-dimensional array. A variable has a name, a data type, and a shape described by its list of dimensions specified when the variable is created. A variable may also have associated attributes, which may be added, deleted or changed after the variable is created.

The list of variables present in the GDR product (standard dataset) and in the SGDR product (enhanced dataset) is provided in Section 14.13.1.5.2, while all the variables types are fully described in Section 14.13.1.5.3.

The **variable data types** used in the Level 2 products are a small set of netCDF types.

Table 14.13.3 Definition of Variable Types in Level 2 products

Variable type	Description
char	characters
byte	8-bit data signed
ubyte	8-bit data unsigned
short	16-bit signed integer
ushort	16-bit unsigned integer
int	32-bit signed integer
uint	32-bit unsigned integer
float	IEEE single precision floating point (32 bits)
double	IEEE double precision floating point (64 bits)

14.13.1.4.3 Attributes

NetCDF attributes are used to store data about the data (ancillary data or metadata), similar in many ways to the information stored in data dictionaries and schema in conventional database systems. Most attributes provide information about a specific variable. These are identified by the name of that variable, together with the name of the attribute.

Some attributes provide information about the data set as a whole. They are called **global attributes**. The list of the **global attributes** provided in standard and enhanced datasets is provided in Section **Error! Reference source not found.**.

The following table shows the **variable attributes** used in the ENVISAT Level 2 User Products. There are no mandatory attributes.

Table 14.13.4 Definition of Attributes in Level 2 products

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.
Calendar	Reference time calendar
Comment	Miscellaneous information about the data or the methods used to produce it
Coordinates	Identified auxiliary coordinates variables.
Flag_meanings	Use in conjunction with flag_values to provide descriptive words or phrase for each flag value.
Flag_values	Provide a list of the flag values. Use in conjunction with flag_meanings.
Long_name	A descriptive name that indicates a variable's content. This name is not standardized.
Scale_factor	If present, the date are to be multiplied by this factor after the data are read by an

Table 14.13.4 Definition of Attributes in Level 2 products

Attribute	Description
	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_max	Largest theoretical valid value of a variable (this is not the maximum of actual data).
Valid_min	Smallest theoretical valid value of a variable (this is not the minimum of actual data).

14.13.1.5 Product structure

The standard (GDR) and enhanced (SGDR) Level 2 netCDF products *global attributes* and *variables* are defined in the following sections.

14.13.1.5.1 Global attributes layout

Global attributes for the RA2 GDR and SGDR data files are defined in the following table.

Table 14.13.5 Definition of Global Attributes in Level 2 products

Attribute name	Description	Format
Conventions	netCDF convention	string
netcdf_version	netCDF version	string
title	Product title	string
institution	institution	string
contact	Web site for contact	string
references	Product specification document reference	string
altimeter_sensor_name	Name of the altimeter sensor	string
radiometer_sensor_name	Name of the radiometer sensor	string
product_name	Prodcut filename	string
proc_stage	Processing stage	string
acq_station_name	Identification of the acquisition station	string
proc_center	Processing center	string
software_version	Software version	string
creation_time	creation_time in YYYY-MM-DD HH:MM:SS.ttttt	string
sensing_start	sensing_start in YYYY-MM-DD HH:MM:SS.ttttt	string
sensing_stop	sensing_stop in YYYY-MM-DD HH:MM:SS.ttttt	string
phase	Satellite phase	string
cycle_number	Cycle number	int
orbit_number	Orbit number	int
pass_number	Pass number	int
absolute_orbit_number	Absolute orbit number	int

delta_ut1	Delta ut1	double
utc_sbt_time	utc_sbt_time in YYYY-MM-DD HH:MM:SS.tttttt	string
sat_binary_time	Satellite binary time	int
clock_step	clock_step	double
leap_utc	leap_utc in YYYY-MM-DD HH:MM:SS.tttttt	string
leap_sign	leap_sign	string
leap_err	leap_err	byte
flag_manoeuver	flag_manoeuver	string
manoeuver_start_utc	manoeuver_start_utc in YYYY-MM-DD HH:MM:SS.tttttt	string
manoeuver_stop_utc	manoeuver_stop_utc in YYYY-MM-DD HH:MM:SS.tttttt	string
ra2_first_meas_time	ra2_first_meas_time in YYYY-MM-DD HH:MM:SS.tttttt	string
ra2_last_meas_time	ra2_last_meas_time in YYYY-MM-DD HH:MM:SS.tttttt	string
ra2_first_meas_lat	ra2_first_meas_lat	double
ra2_last_meas_lat	ra2_last_meas_lat	double
ra2_first_meas_lon	ra2_first_meas_lon	double
ra2_last_meas_lon	ra2_last_meas_lon	double
ra2_l2_proc_flag	ra2_l2_proc_flag	byte
ra2_l2_processing_quality	ra2_l2_processing_quality	double
ra2_l2_processing_thresh	ra2_l2_processing_thresh	double
ra2_rv_rfss_def	ra2_rv_rfss_def	byte
ra2_rv_hpa_def	ra2_rv_hpa_def	byte
ra2_measurement_percent	ra2_measurement_percent	double
ra2_320_band_percent	ra2_320_band_percent	double
ra2_80_band_percent	ra2_80_band_percent	double
ra2_20_band_percent	ra2_20_band_percent	double
ra2_ocean_ku_retrack_percent	ra2_ocean_ku_retrack_percent	double
ra2_ocean_s_retrack_percent	ra2_ocean_s_retrack_percent	double
ra2_ice1_ku_retrack_percent	ra2_ice1_ku_retrack_percent	double
ra2_ice1_s_retrack_percent	ra2_ice1_s_retrack_percent	double
ra2_ice2_ku_retrack_percent	ra2_ice2_ku_retrack_percent	double
ra2_ice2_s_retrack_percent	ra2_ice2_s_retrack_percent	double
ra2_seaice_ku_retrack_percent	ra2_seaice_ku_retrack_percent	double
ra2_peakiness_low_percent	ra2_peakiness_low_percent	double
ra2_peakiness_high_percent	ra2_peakiness_high_percent	double
ra2_bt_optimal_interpolation_percent	ra2_bt_optimal_interpolation_percent	double
ra2_time_shift_midframe	ra2_time_shift_midframe	double

ra2_time_interval	ra2_time_interval	double
ra2_if_mask_sel	ra2_if_mask_sel	byte
ra2_if_mask_proc	ra2_if_mask_proc	byte
ra2_uso_sel	ra2_uso_sel	byte
ra2_uso_proc	ra2_uso_proc	byte
mwr_first_meas_time	mwr_first_meas_time in YYYY-MM-DD HH:MM:SS.tttttt	string
mwr_last_meas_time	mwr_last_meas_time in YYYY-MM-DD HH:MM:SS.tttttt	string
mwr_first_meas_lat	mwr_first_meas_lat	double
mwr_last_meas_lat	mwr_last_meas_lat	double
mwr_first_meas_lon	mwr_first_meas_lon	double
mwr_last_meas_lon	mwr_last_meas_lon	double
mwr_l2_proc_flag	mwr_l2_proc_flag	byte
mwr_l2_processing_quality	mwr_l2_processing_quality	double
mwr_l2_processing_thresh	mwr_l2_processing_thresh	double
xref_ra2_mwr_l1b	xref_ra2_mwr_l1b	string
xref_ra2_if_mask	xref_ra2_if_mask	string
xref_ra2_uso	xref_ra2_uso	string
xref_ra2_ptr	xref_ra2_ptr	string
xref_mwr_slt	xref_mwr_slt	string
xref_orbit	xref_orbit	string
xref_platform	xref_platform	string
xref_ra2_characterisation	xref_ra2_characterisation	string
xref_ra2_l1b_configuration	xref_ra2_l1b_configuration	string
xref_ra2_l1b_individual_echoes	xref_ra2_l1b_individual_echoes	string
xref_mwr_characterisation	xref_mwr_characterisation	string
xref_mwr_l1b_configuration	xref_mwr_l1b_configuration	string
xref_landsea	xref_landsea	string
xref_constants	xref_constants	string
xref_ocean_ice2_system	xref_ocean_ice2_system	string
xref_sea_ice_system	xref_sea_ice_system	string
xref_sea_state_bias	xref_sea_state_bias	string
xref_set_harmonic_coeff	xref_set_harmonic_coeff	string
xref_ocean_tide_sol1	xref_ocean_tide_sol1	string
xref_loading_tide_sol1	xref_loading_tide_sol1	string
xref_ocean_tide_sol2	xref_ocean_tide_sol2	string
xref_loading_tide_sol2	xref_loading_tide_sol2	string
xref_geoid	xref_geoid	string

xref_mss_sol1	xref_mss_sol1	string
xref_mss_sol2	xref_mss_sol2	string
xref_bathymetry	xref_bathymetry	string
xref_slope_model_1	xref_slope_model_1	string
xref_slope_model_2	xref_slope_model_2	string
xref_long_period_tide	xref_long_period_tide	string
xref_mdt	xref_mdt	string
xref_surf_class	xref_surf_class	string
xref_dist_shore	xref_dist_shore	string
xref_season_freezing	xref_season_freezing	string
xref_freezing	xref_freezing	string
xref_rain_rate	xref_rain_rate	string
xref_ sst	xref_sst	string
xref_lapse_rate	xref_lapse_rate	string
xref_meteo_analysis	xref_meteo_analysis	string
xref_meteo_reanalysis	xref_meteo_reanalysis	string
xref_pole_location	xref_pole_location	string
xref_gim	xref_gim	string
xref_mog2d_analysis	xref_mog2d_analysis	string
xref_mog2d_reanalysis	xref_mog2d_reanalysis	string
xref_echo_geo	xref_echo_geo	string
xref_gpd_wtc	xref_gpd_wtc	string

14.13.1.5.2 Variables in Level 2 standard (GDR) and enhanced (SGDR) data files

The variables for the RA2 Level 2 standard (GDR) and enhanced (SGDR) data files are defined in the following table. In grey it is defined the product type where the variable is present.

Data Set Variable	Parameter name	std	enh
Time-tags, locations and surface types			
Time-tags			
1 Hz Time tag	time_01 UTC_day_01 UTC_sec_01		
18 Hz Time tag	time_20		

Data Set Variable	Parameter name	std	enh
	UTC_day_20 UTC_sec_20		
Index of the 1 Hz measurement	ind_meas_1hz_20		
Index of the first 20 measurements	ind_first_meas_18hz_01		
Ku band waveform index	fft_sample_ind_ku		
Ku band DFT waveform index	dft_sample_ind_ku		
S band waveform index	fft_sample_ind_s		
Locations			
Latitude	lat_01		
18 Hz Latitude	lat_20		
Reference track latitude: 18 Hz	lat_ref_track_20		
Longitude	lon_01		
18 Hz Longitude	lon_20		
Reference track longitude: 18 Hz	lon_ref_track_20		
Slope corrected latitude	lat_cor_20		
Slope corrected longitude	lon_cor_20		
Surface types			
Surface type	surf_type_01		
18 Hz Surface type	surf_type_20		
Surface classification	surf_class_01		
18 Hz Surface classification	surf_class_20		
Distance to the coast	dist_coast_01		
18 Hz Distance to the coast	dist_coast_20		
Radiometer-derived surface type	rad_surf_type_01		
Source packet and MCD			
Counter			

Data Set Variable	Parameter name	std	enh
Source Packet Counter	seq_count_01		
Instrument mode id at source packet level	instr_mode_id_sp_01		
Nominal tracking data identifier	nominal_tracking _01		
18 Hz Nominal tracking data identifier	nominal_tracking _20		
Measurement Confidence Data			
MCD flag orbital processing status	mcd_flag_orb_state_rest_01		
MCD flag meteo data state	mcd_flag_meteo_map_avail_01		
MCD flag processing error	mcd_flag_proc_error_01		
MCD flag Ku band ocean retracking	mcd_flag_retracking_ocean_01_ku		
MCD flag S band ocean retracking	mcd_flag_retracking_ocean_01_s		
MCD flag Ku band ice-1 retracking	mcd_flag_retracking_ice1_01_ku		
MCD flag S band ice-1 retracking	mcd_flag_retracking_ice1_01_s		
MCD flag Ku band ice-2 retracking	mcd_flag_retracking_ice2_01_ku		
MCD flag S band ice-2 retracking	mcd_flag_retracking_ice2_01_s		
MCD flag Ku band sea-ice retracking	mcd_flag_retracking_seaice_01_ku		
MCD flag brightness temperature range check (channel 1)	mcd_flag_tb_238_01		
MCD flag brightness temperature range check (channel 2)	mcd_flag_tb_365_01		
MCD flag radiometer validity	mcd_flag_rad_validity_01		
MCD flag S band anomaly	mcd_flag_anomaly_01_s		

Data Set Variable	Parameter name	std	enh
MCD flag waveform sample fault id	mcd_flag_waveform_fault_id_01		
MCD flag rx delay fault id	mcd_flag_rx_delay_fault_id_01		
MCD flag agc fault id	mcd_flag_agc_fault_id_01		
MCD flag fault id	mcd_flag_fault_id_01		
MCD flag uso	mcd_flag_uso_01		
MCD flag obdh	mcd_flag_obdh_01		
MCD flag packet length	mcd_flag_packet_length_01		
Orbit parameters			
Altitude	alt_01		
18 Hz Altitude	alt_20		
Orbital altitude rate	orb_alt_rate_01		
18 Hz Orbital altitude rate	orb_alt_rate_20		
Tracker estimates (Ku and C bands)			
Tracker ranges			
18 Hz Ku band corrected tracker range	tracker_range_20_ku		
18 Hz S band corrected tracker range	tracker_range_20_s		
18 Hz tracker range validity flag	tracker_range_qual_20_ku		
18 Hz Ku band rx coarse delay	rx_delay_coarse_20_ku		
18 Hz Ku band rx fine delay	rx_delay_fine_20_ku		
18 Hz USO clock smoothed	uso_clock_smoothed_20		
Tracker AGCs			
18 Hz Ku band Corrected AGC	agc_20_ku		
18 Hz Ku band Corrected AGC	agc_20_s		
18 Hz Ku band Corrected AGC	scale_factor_20_ku		

Data Set Variable	Parameter name	std	enh
18 Hz Ku band Corrected AGC	scale_factor_20_s		
Ocean retracking estimates			
18 Hz Ku band retracking quality flag	retracking_ocean_qual_20_ku		
18 Hz S band retracking quality flag	retracking_ocean_qual_20_s		
Altimeter ranges			
Ku band Corrected altimeter range	range_ocean_01_ku		
S band Corrected altimeter range	range_ocean_01_s		
18 Hz Ku band Corrected altimeter range	range_ocean_20_ku		
18 Hz S band Corrected altimeter range	range_ocean_20_s		
Ku band Altimeter range validity flag	range_ocean_qual_01_ku		
S band Altimeter range validity flag	range_ocean_qual_01_s		
18 Hz Ku band Altimeter range validity flag	range_ocean_qual_20_ku		
18 Hz S band Altimeter range validity flag	range_ocean_qual_20_s		
Ku band RMS of the altimeter range	range_ocean_rms_01_ku		
S band RMS of the altimeter range	range_ocean_rms_01_s		
Ku band Number of valid points for the altimeter range	range_ocean_numval_01_ku		
S band Number of valid points for the altimeter range	range_ocean_numval_01_s		
Backscatter coefficients			
Ku band Corrected backscatter coefficient	sig0_ocean_01_ku		
S band Corrected backscatter	sig0_ocean_01_s		

Data Set Variable	Parameter name	std	enh
coefficient			
18 Hz Ku band Corrected backscatter coefficient	sig0_ocean_20_ku		
18 Hz S band Corrected backscatter coefficient	sig0_ocean_20_s		
Ku band Backscatter coefficient validity flag	sig0_ocean_qual_01_ku		
S band Backscatter coefficient validity flag	sig0_ocean_qual_01_s		
18 Hz Ku band Backscatter coefficient validity flag	sig0_ocean_qual_20_ku		
18 Hz S band Backscatter coefficient validity flag	sig0_ocean_qual_20_s		
Ku band RMS of the backscatter coefficient	sig0_ocean_rms_01_ku		
S band RMS of the backscatter coefficient	sig0_ocean_rms_01_s		
Ku band Number of valid points for the backscatter coefficient	sig0_ocean_numval_01_ku		
S band Number of valid points for the backscatter coefficient	sig0_ocean_numval_01_s		
Significant waveheights			
Ku band Corrected square of significant waveheight	square_swh_ocean_01_ku		
S band Corrected square of significant waveheight	square_swh_ocean_01_s		
Ku band Corrected significant waveheight	swh_ocean_01_ku		
S band Corrected significant waveheight	swh_ocean_01_s		
18 Hz Ku band Corrected significant waveheight	swh_ocean_20_ku		

Data Set Variable	Parameter name	std	enh
18 Hz S band Corrected significant waveheight	swh_ocean_20_s		
Ku band Significant waveheight validity flag	swh_ocean_qual_01_ku		
S band Significant waveheight validity flag	swh_ocean_qual_01_s		
18 Hz Ku band Significant waveheight validity flag	swh_ocean_qual_20_ku		
18 Hz S band Significant waveheight validity flag	swh_ocean_qual_20_s		
Ku band RMS of the significant waveheight	swh_ocean_rms_01_ku		
S band RMS of the significant waveheight	swh_ocean_rms_01_s		
Ku band Number of valid points for the significant waveheight	swh_ocean_numval_01_ku		
S band Number of valid points for the significant waveheight	swh_ocean_numval_01_s		
Ocean retracking outputs			
18 Hz Ku band Epoch	epoch_ocean_20_ku		
18 Hz S band Epoch	epoch_ocean_20_s		
18 Hz Ku band Composite sigma	sigmac_ocean_20_ku		
18 Hz S band Composite sigma	sigmac_ocean_20_s		
18 Hz Ku band Amplitude	amplitude_ocean_20_ku		
18 Hz S band Amplitude	amplitude_ocean_20_s		
18 Hz Ku band Thermal noise	thermal_noise_ocean_20_ku		
18 Hz S band Thermal noise	thermal_noise_ocean_20_s		
18 Hz Ku band Number of iterations of the ocean retracking	number_of_iterations_ocean_20_ku		

Data Set Variable	Parameter name	std	enh
18 Hz S band Number of iterations of the ocean retracking	number_of_iterations_ocean_20_s		
18 Hz Ku band MQE between waveform and ocean model	mqe_ocean_20_ku		
18 Hz S band MQE between waveform and ocean model	mqe_ocean_20_s		
Sea surface height			
Ku band Sea surface height anomaly (computed from the radiometer wet tropospheric correction) sea surface height anomaly= Orb_Alt _Ocean_Alt_Range_Ku - Filt_Iono_Cor_Ku - Model_Dry_Tropo_Cor - Rad_Wet_Tropo_Cor - SSB_Ku – MSS-1 - Solid_Earth_Tide - Geo_Ocean_Tide_1 - Geo_Pole_Tide - Inv_Baro – HF_Fluct	ssha_01_ku		
18 Hz Ku band Sea surface height anomaly (computed from the radiometer wet tropospheric correction) sea surface height anomaly = Orb_Alt_20 – Ocean_Alt_Range_Ku_20 - Filt_Iono_Cor_Ku	ssha_20_ku		

Data Set Variable	Parameter name	std	enh
- Model_Dry_Tropo_Cor - Rad_Wet_Tropo_Cor - SSB_Ku – MSS_1_20 - Solid_Earth_Tide - Geo_Ocean_Tide_1 - Geo_Pole_Tide - Inv_Baro – HF_Fluct			
OCOG retracking estimates			
18 Hz Ku band retracking quality flag	retracking_ice1_qual_20_ku		
18 Hz S band retracking quality flag	retracking_ice1_qual_20_s		
18 Hz slope model quality flag	slope_ice1_qual_20		
Altimeter ranges			
18 Hz Ku band Corrected altimeter range	range_ice1_20_ku		
18 Hz S band Corrected altimeter range	range_ice1_20_s		
Backscatter coefficients			
18 Hz Ku band Corrected backscatter coefficient	sig0_ice1_20_ku		
18 Hz S band Corrected backscatter coefficient	sig0_ice1_20_s		
Elevation			
Ku band Elevation of echoing points	elevation_ice1_01_ku		
18 Hz Ku band Elevation of echoing points	elevation_ice1_20_ku		
Ice-2 retracking estimates			

Data Set Variable	Parameter name	std	enh
18 Hz Ku band retracking quality flag	retracking_ice2_qual_20_ku		
18 Hz S band retracking quality flag	retracking_ice2_qual_20_s		
Altimeter ranges			
18 Hz Ku band Corrected altimeter range	range_ice2_20_ku		
18 Hz S band Corrected altimeter range	range_ice2_20_s		
Backscatter coefficients			
18 Hz Ku band Corrected backscatter coefficient	sig0_ice2_20_ku		
18 Hz S band Corrected backscatter coefficient	sig0_ice2_20_s		
18 Hz Ku band Corrected leading edge backscatter coefficient	sig0_leading_edge_ice2_20_ku		
18 Hz S band Corrected leading edge backscatter coefficient	sig0_leading_edge_ice2_20_s		
Width of the leading edge			
18 Hz Ku band Width of the leading edge	width_leading_edge_ice2_20_ku		
18 Hz S band Width of the leading edge	width_leading_edge_ice2_20_s		
Slope of the trailing edge			
18 Hz Ku band Slope of the first part of the trailing edge	slope_first_trailing_edge_ice2_20_ku		
18 Hz S band Slope of the first part of the trailing edge	slope_first_trailing_edge_ice2_20_s		
18 Hz Ku band Slope of the second part of the trailing edge	slope_second_trailing_edge_ice2_20_ku		

Data Set Variable	Parameter name	std	enh
18 Hz S band Slope of the second part of the trailing edge	slope_second_trailing_edge_ice2_20_s		
Sea-Ice retracking estimates			
18 Hz Ku band retracking quality flag	retracking_sea_ice_qual_20_ku		
Altimeter ranges			
18 Hz Ku band Corrected altimeter range	range_sea_ice_20_ku		
Backscatter coefficients			
18 Hz Ku band Corrected backscatter coefficient	sig0_sea_ice_20_ku		
Instrumental corrections (Ku and C bands)			
Altimeter range			
18 Hz reference tracking point offset	offset_tracking_20		
USO frequency drift correction	uso_cor_01		
18 Hz USO frequency drift correction	uso_cor_20		
18 Hz Ku band Internal path delay (calibration) correction	int_path_cor_20_ku		
18 Hz S band Internal path delay (calibration) correction	int_path_cor_20_s		
18 Hz Ku band Level 1b Doppler correction (nadir)	dop_cor_l1b_20_ku		
18 Hz S band Level 1b Doppler correction (nadir)	dop_cor_l1b_20_s		
18 Hz Ku band Doppler correction (nadir)	dop_cor_20_ku		
18 Hz S band Doppler correction (nadir)	dop_cor_20_s		

Data Set Variable	Parameter name	std	enh
18 Hz Ku band Doppler correction (slope corrected)	dop_slope_cor_20_ku		
18 Hz S band Doppler correction (slope corrected)	dop_slope_cor_20_s		
Distance antenna / COG	cog_cor_01		
Ku band Modeled instrumental correction	mod_instr_cor_range_01_ku		
18 Hz Ku band Net instrumental correction	net_instr_cor_range_20_ku		
18 Hz S band Net instrumental correction	net_instr_cor_range_20_s		
18 Hz Ku band Echo correction	echo_cor_range_20_ku		
18 Hz Ku band Geo correction	geo_cor_range_20_ku		
Backscatter coefficient			
18 Hz Ku band AGC correction	agc_cor_20_ku		
18 Hz S band AGC correction	agc_cor_20_s		
18 Hz Ku band Internal calibration correction	internal_cor_sig0_20_ku		
18 Hz S band Internal calibration correction	internal_cor_sig0_20_s		
18 Hz Ku band Net instrumental correction	net_instr_cor_sig0_20_ku		
18 Hz S band Net instrumental correction	net_instr_cor_sig0_20_s		
Significant waveheight			
Ku band Modeled instrumental correction	mod_instr_cor_swh_01_ku		
18 Hz Ku band Net instrumental correction	net_instr_cor_swh_20_ku		
18 Hz S band Net instrumental correction	net_instr_cor_swh_20_s		

Data Set Variable	Parameter name	std	enh
Geophysical corrections			
Altimeter range			
Model dry tropospheric corrections	mod_dry_tropo_cor_01		
Model dry tropospheric corrections (ERA reanalysis)	mod_dry_tropo_cor_reanalysis_01		
18 Hz Model dry tropospheric corrections (ERA reanalysis)	mod_dry_tropo_cor_reanalysis_20		
Model wet tropospheric corrections	mod_wet_tropo_cor_01		
Model wet tropospheric corrections (ERA reanalysis)	mod_wet_tropo_cor_reanalysis_01		
18 Hz Model wet tropospheric corrections (ERA reanalysis)	mod_wet_tropo_cor_reanalysis_20		
Radiometer wet tropospheric correction at 1 Hz	rad_wet_tropo_cor_01		
Radiometer wet tropospheric correction using SST and Gamma at 1 Hz	rad_wet_tropo_cor_sst_gam_01		
GPD+ wet tropospheric correction at 1 Hz	gpd_wet_tropo_cor_01		
Ku band Altimeter ionospheric correction	iono_cor_alt_01_ku		
S band Altimeter ionospheric correction	iono_cor_alt_01_s		
18 Hz Ku band Altimeter ionospheric correction	iono_cor_alt_20_ku		
Ku band filtered ionospheric correction	filtered_iono_cor_alt_01_ku		
GIM-derived ionospheric correction (Ku band) Note: Bent model for the prototype	iono_cor_gim_01_ku		
Ku band Sea state bias correction	sea_state_bias_01_ku		
S band Sea state bias correction	sea_state_bias_01_s		

Data Set Variable	Parameter name	std	enh
Backscatter coefficient geophysical corrections			
Ku band Atmospheric attenuation correction	atm_cor_sig0_01_ku		
S band Atmospheric attenuation correction	atm_cor_sig0_01_s		
Geophysical parameters			
Mean sea surface height above reference ellipsoid (Solution 1)	mean_sea_surf_sol1_01		
18 Hz Mean sea surface height above reference ellipsoid (Solution 1)	mean_sea_surf_sol1_20		
Mean sea surface height accuracy (Solution 1)	mean_sea_surf_sol1_acc_01		
18 Hz Mean sea surface height accuracy (Solution 1)	mean_sea_surf_sol1_acc_20		
Mean sea surface height above reference ellipsoid (Solution 2)	mean_sea_surf_sol2_01		
18 Hz Mean sea surface height above reference ellipsoid (Solution 2)	mean_sea_surf_sol2_20		
Mean dynamic topography	mean_dyn_topo_01		
Mean dynamic topography accuracy	mean_dyn_topo_acc_01		
Geoid height	geoid_01		
Ocean depth / Land elevation	odle_01		
Inverted barometer height correction	inv_bar_cor_01		
Inverted barometer height correction (ERA reanalysis)	inv_bar_cor_reanalysis_01		
High frequency fluctuations of the sea surface topography	hf_fluct_cor_01		

Data Set Variable	Parameter name	std	enh
High frequency fluctuations of the sea surface topography (ERA reanalysis)	hf_fluct_cor_reanalysis_01		
Geocentric ocean tide height (GOT model)	ocean_tide_sol1_01		
Geocentric ocean tide height (FES model)	ocean_tide_sol2_01		
Equilibrium long period ocean tide height	ocean_tide_eq_01		
Non-equilibrium long period ocean tide height	ocean_tide_non_eq_01		
Load tide height (GOT model)	load_tide_sol1_01		
Load tide height (FES model)	load_tide_sol2_01		
Solid earth tide height	solid_earth_tide_01		
Geocentric pole tide height	pole_tide_01		
Rain rate	rain_rate_01		
Rain attenuation	rain_att_01_ku		
Environmental parameters			
U-component of the model wind vector	wind_speed_mod_u_01		
U-component of the model wind vector (ERA reanalysis)	wind_speed_mod_u_reanalysis_01		
V-component of the model wind vector	wind_speed_mod_v_01		
V-component of the model wind vector (ERA reanalysis)	wind_speed_mod_v_reanalysis_01		
Altimeter wind speed	wind_speed_alt_01_ku		
Radiometer water vapor content	rad_water_vapor_01		
Radiometer liquid water content	rad_liquid_water_01		
Total electron content	total_electron_content_01		
Off-nadir angles			

Data Set Variable	Parameter name	std	enh
Square of the WF-derived off-nadir angle (Ku band)	off_nadir_angle_wf_ocean_01_ku		
Square of the WF-derived off-nadir angle validity flag (Ku band)	off_nadir_angle_wf_ocean_qual_01_ku		
18 Hz Ku band Square of the off nadir angle	off_nadir_angle_wf_ocean_20_ku		
Square of the WF-derived off-nadir angle (Ku band) validity flags	off_nadir_angle_wf_ocean_qual_20_ku		
RMS of the square of the WF-derived off-nadir angle (Ku band)	off_nadir_angle_wf_ocean_rms_01_ku		
Number of valid points for the square of the WF-derived off-nadir angle (Ku band)	off_nadir_angle_wf_ocean_numval_01_ku		
Square of the PF-derived off-nadir angle	off_nadir_angle_pf_01		
Brightness temperatures			
Channel 1 main beam BT	tb_238_01		
Channel 2 main beam BT	tb_365_01		
Standard deviation of channel 1 main beam BT	tb_238_std_01		
Standard deviation of channel 2 main beam BT	tb_365_std_01		
Level 2 quality information (additional)			
Geophysical flags			
Meteorological maps availability (ERA reanalysis)	meteo_map_avail_reanalysis_01		
Rain flag	rain_flag_01_ku		
Ocean/Sea-ice flag	open_sea_ice_flag_01_ku		
“Open water” class member ship	open_water_class_01_ku		

Data Set Variable	Parameter name	std	enh
“First-year ice” class member ship	first_year_ice_class_01_ku		
“Multi-year ice” class member ship	multi_year_ice_class_01_ku		
“Wet ice” class member ship	wet_ice_class_01_ku		
Ice-sheet snow facies type flag (nominal solution: Ku and S band)	ice_sheet_snow_facies_flag_01		
Ice-sheet snow facies type flag (degraded solution: Ku band only)	ice_sheet_snow_facies_flag_01_ku		
Interpolation flags			
Mean sea surface Solution 1 interpolation flag	interp_flag_mss_sol1_01		
18 Hz Mean sea surface Solution 1 interpolation flag	interp_flag_mss_sol1_20		
Mean sea surface Solution 2 interpolation flag	interp_flag_mss_sol2_01		
18 Hz Mean sea surface Solution 2 interpolation flag	interp_flag_mss_sol2_20		
Mean dynamic topography interpolation flag	interp_flag_mdt_01		
Geocentric ocean tide height (GOT) interpolation flag	interp_flag_ocean_tide_sol1_01		
Geocentric ocean tide height (FES) interpolation flag	interp_flag_ocean_tide_sol2_01		
Radiometer along-track averaging flag	rad_along_track_avg_flag_01		
Quality flags			
Use of climatological values for the computation of Sigma0 atmospheric attenuation	climato_use_flag_01		
Filtered altimeter ionospheric correction: 1 Hz Ku band	filtered_iono_cor_alt_qual_01_ku		
18 Hz Quality flag for echo	echo_cor_range_qual_20_ku		

Data Set Variable	Parameter name	std	enh
correction			
18 Hz Quality flag for geo correction	geo_cor_range_qual_20_ku		
1 Hz GPD+ wet tropospheric correction quality flag	gpd_wet_tropo_cor_qual_01		
Waveforms			
Ku band Waveform peakiness	peakiness_01_ku		
S band Waveform peakiness	peakiness_01_s		
18 Hz Ku band Waveform peakiness	peakiness_20_ku		
18 Hz S band Waveform peakiness	peakiness_20_s		
Level 1b quality information			
Ku band Chirp band identifier	chirp_band_01_ku		
18 Hz Ku band Chirp band identifier	chirp_band_20_ku		
18 Hz Ku band Chirp band identifier quality flag	chirp_band_qual_20_ku		
1 Hz S-Band loss flag	flag_loss_01_s		
18 Hz calibration repository selection flag	flag_cal_selection_20		
1 Hz USO anomaly flag	flag_uso_anomaly_01		
1 Hz USO quality flag	flag_uso_quality_01		
1 Hz Altimeter instrument flag: Ku band flight calibration	alt_instr_flag_flight_cal_01_ku		
1 Hz Altimeter instrument flag: S band flight calibration	alt_instr_flag_flight_cal_01_s		
1 Hz Altimeter instrument flag: PTR band id	alt_instr_flag_ptr_band_id_01		
1 Hz Altimeter instrument flag: decoded redundancy error	alt_instr_flag_red_error_01		
18 Hz Fault identifier	fault_id_20		

Data Set Variable	Parameter name	std	enh
18 Hz Waveform samples fault identifier	waveform_fault_id_20		
18 Hz Instrument mode id at data block level	inst_mode_id_db_20		
18 Hz Ku-band number of measurement for flight calibration factor evaluation	flight_cal_numval_01_ku		
18 Hz S-band number of measurement for flight calibration factor evaluation	flight_cal_numval_01_s		
radiometer instrument flag temperature	rad_instr_flag_temp_01		
radiometer instrument flag obdh	rad_instr_flag_obdh_01		
radiometer instrument flag redundancy indicator	rad_instr_flag_red_01		
radiometer instrument flag power bus protection	rad_instr_flag_power_01		
radiometer instrument flag overvoltage protection	rad_instr_flag_over_01		
18 Hz manoeuvre presence flag	flag_man_pres_20		
18 Hz manoeuvre plane flag	flag_man_plane_20		
18 Hz noise power measurement	noise_power_20		
18 Hz AGC noise power measurement	agc_noise_power_20		
18 Hz reference power value	ref_power_20		
Waveforms samples			
18 Hz Ku band Waveform samples	waveform_fft_20_ku		
18 Hz Ku band Waveform samples from dft	waveform_dft_20_ku		
18 Hz S band Waveform samples	waveform_fft_20_s		
Individual echoes			

Data Set Variable	Parameter name	std	enh
Time-tags			
2 kHz Time tag	time_2k		
18 Hz Index of the 2 kHz measurement	ind_meas_18hz_2k		
2 kHz Data block confidence flag	db_conf_flag_2k		
Locations			
2 kHz Latitude	lat_2k		
2 kHz Longitude	lon_2k		
Orbit parameters			
2 kHz Altitude	alt_2k		
2 kHz Orbital altitude rate	orb_alt_rate_2k		
Tracker ranges			
2 kHz Ku-band corrected tracker range	tracker_range_2k		
Tracker AGCs			
2 kHz Ku-band corrected tracker AGCs	agc_2k		
2 kHz Ku-band Scaling factor	scale_factor_2k		
Waveform samples			
2 kHz Ku band Waveform samples	waveform_power_2k		
2 kHz Ku band Waveform phases	waveform_phase_2k		

14.13.1.5.3 General description of the Level 2 parameters

14.13.1.5.3.1 Time tags (1 Hz and 18 Hz)

time_01	UTC: 1 Hz		double	
units	Unit name	seconds since 2000-01-01 00:00:00.0		
calendar	Reference Time Calendar	gregorian		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	time		

time_20	UTC: 18 Hz		double	
units	Unit name	seconds since 2000-01-01 00:00:00.0		
calendar	Reference Time Calendar	gregorian		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	time		

14.13.1.5.3.2 Index of the 1 Hz measurement

ind_meas_1hz_20	Index of the 1Hz measurement		short	
units	Unit name	count		

14.13.1.5.3.3 Index of the first 18Hz measurement

ind_first_meas_18hz_01	Index of the first 18Hz measurement		int	
units	Unit name	count		

14.13.1.5.3.4 Time tags (1 Hz and 18 Hz)

UTC_day_01	day UTC: 1 Hz		short	
units	Unit name	days since 2000-01-01 00:00:00.0		
UTC_sec_01	Second in the day UTC: 1 Hz		double	
units	Unit name	seconds		

UTC_day_20	day UTC: 18 Hz		short	
units	Unit name	days since 2000-01-01 00:00:00.0		
UTC_sec_20	Second in the day UTC: 18 Hz		double	
units	Unit name	seconds		

14.13.1.5.3.5 Index of fft samples in the waveforms: Ku band

fft_sample_ind_ku	index of fft samples in the waveforms: Ku band		byte	
units	Unit name	count		

14.13.1.5.3.6 Index of dft samples in the waveforms: Ku band

dft_sample_ind_ku	index of dft samples in the waveforms: Ku band		short	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.1; // double		

14.13.1.5.3.7 Index of fft samples in the waveforms: S band

fft_sample_ind_s	index of fft samples in the waveforms: S band		byte	
units	Unit name	count		

14.13.1.5.3.8 Location (latitude and longitude) at 1 Hz and 18 Hz

lat_01	latitude: 1 Hz		int	
units	Unit name	degrees_north		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	latitude		

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
comment	Positive latitude is North latitude, negative latitude is South latitude			

lon_01	longitude: 1 Hz		int	
units	Unit name	degrees_east		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	longitude		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
comment	East longitude relative to Greenwich meridian			

lat_20	latitude: 18 Hz		int	
units	Unit name	degrees_north		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	latitude		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
comment	Positive latitude is North latitude, negative latitude is South latitude			

lon_20	longitude: 18 Hz		int	
units	Unit name	degrees_east		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	longitude		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
comment	East longitude relative to Greenwich meridian			

14.13.1.5.3.9 Slope corrected location (latitude and longitude) at 18 Hz

lat_cor_20	slope-corrected latitude: 18 Hz		int	
units	Unit name	degrees_north		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	latitude		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Latitude of the actual echoing point, accounting for surface slope models. Positive latitude is North latitude, negative latitude is South latitude			
lon_cor_20	slope-corrected longitude: 18 Hz		int	
units	Unit name	degrees_east		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	longitude		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Longitude of the actual echoing point, accounting for surface slope models. East longitude relative to Greenwich meridian			

14.13.1.5.3.10 Source Packet Counter

seq_count_01	sequence count: 1 Hz		int	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.11 Instrument mode id at source packet level

instr_mode_id_sp_01	instrument mode id at source packet level: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b		
flag_meanings	Flag meanings	tracking		

		pset_trk pset_loop_out		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.12 Nominal tracking data identifier (at 1 Hz and 18 Hz)

nominal_tracking_01	nominal tracking data identifier: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Possible values are: 0 meaning \'nominal tracking data\', 1 meaning \'not nominal tracking data\'			

nominal_tracking_20	nominal tracking data identifier: 18 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Possible values are: 0 meaning \'nominal tracking data\', 1 meaning \'not nominal tracking data\'			

14.13.1.5.3.13 MCD flag orbital processing status

mcd_flag_orb_state_rest_01	MCD flag orbital processing status: 1 Hz		byte	
flag_values	Flag values	3b, 4b, 5b, 6b, 7b, 8b		
flag_meanings	Flag meanings	op_ajusted op_maneuver pre_interpolated_gap pre_extrapolated_L1 pre_extrapolated_L1S2 pre_extrapolated_S2		
coordinates	lon_01 lat_01			

_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Orbital processing status for OFL products. Possible values are: 3 meaning \'ajusted DORIS orbit\', 4 meaning \'estimated DORIS orbit during maneuver\', 5 meaning \'estimated DORIS orbit after interpolation (data gap)\', 6 meaning \'estimated DORIS orbit extrapolated on a time interval less than 1 day\', 7 meaning \'estimated DORIS orbit extrapolated on a time interval from 1 day to 2 days\', 8 meaning \'estimated DORIS orbit extrapolated on a time interval larger than 2 days or after maneuver\'. The nominal value is 3			

14.13.1.5.3.14 MCD flag meteo data state

mcd_flag_meteo_map_avail_01	MCD flag meteo data state: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b		
flag_meanings	Flag meanings	2_maps_nominal 2_maps_degraded 1_map no_map		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Meteo data state. 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\', 3 meaning \'no map\'.			

14.13.1.5.3.15 MCD flag processing error

mcd_flag_proc_error_01	MCD flag processing error: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Absence of processing error (arithmetic faults)			

14.13.1.5.3.16 MCD flag Ku band ocean retracking

mcd_flag_retracking_ocean_01_ku	MCD flag ocean retracking: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Ku Ocean retracking OK			

14.13.1.5.3.17 MCD flag S band ocean retracking

mcd_flag_retracking_ocean_01_s	MCD flag ocean retracking: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: S Ocean retracking OK			

14.13.1.5.3.18 MCD flag Ku band ice-1 retracking

mcd_flag_retracking_ice1_01_ku	MCD flag ice-1 retracking: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Ku Ice-1 retracking OK			

14.13.1.5.3.19 MCD flag S band ice-1 retracking

mcd_flag_retracking_ice1_01_s	MCD flag ice-1 retracking: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			

_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: S Ice-1 retracking OK			

14.13.1.5.3.20 MCD flag Ku band ice-2 retracking

mcd_flag_retracking_ice2_01_ku	MCD flag ice-2 retracking: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Ku Ice-2 retracking OK			

14.13.1.5.3.21 MCD flag S band ice-2 retracking

mcd_flag_retracking_ice2_01_s	MCD flag ice-2 retracking: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: S Ice-2 retracking OK			

14.13.1.5.3.22 MCD flag Ku band sea-ice retracking

mcd_flag_retracking_sea_ice_01_ku	MCD flag sea-ice retracking: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Ku Sea-ice retracking OK			

14.13.1.5.3.23 MCD flag brightness temperature range check (channel 1)

mcd_flag_tb_238_01	MCD flag brightness temperature range check (channel 1): 1 Hz		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Brightness Temperature Range check (channel 1). \'bad\' meaning \'out of range'\			

14.13.1.5.3.24 MCD flag brightness temperature range check (channel 2)

mcd_flag_tb_365_01	MCD flag brightness temperature range check (channel 2): 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Brightness Temperature Range check (channel 2). \'bad\' meaning \'out of range'\			

14.13.1.5.3.25 MCD flag radiometer validity

mcd_flag_rad_validity_01	MCD flag radiometer validity: 1 Hz		byte	
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Radiometer validity. Result of the weighted sequence of radiometer instrument flags (rad_instr_flag_temp_01, rad_instr_flag_obdh_01 and rad_instr_flag_power_01)			

14.13.1.5.3.26 MCD flag S band anomaly

mcd_flag_anomaly_01_s	MCD flag anomaly: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Flag for S-band anomaly			

14.13.1.5.3.27 MCD flag waveform sample fault id

mcd_flag_waveform_fault_id_01	MCD flag waveform sample fault id: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Waveform samples fault Identifier. \'bad\' meaning \'Ku-band and/or S-band waveforms samples equal to zero\'			

14.13.1.5.3.28 MCD flag rx delay fault id

mcd_flag_rx_delay_fault_id_01	MCD flag rx delay fault id: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Rx delay Fault Identifier. \'bad\' meaning \'out of range\'			

14.13.1.5.3.29 MCD flag agc fault id

mcd_flag_agc_fault_id_01	MCD flag agc fault id: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: AGC Fault Identifier. \'bad\' meaning \'out of range\'			

14.13.1.5.3.30 MCD flag fault id

mcd_flag_fault_id_01	MCD flag fault id: 1 Hz		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: Fault Identifier. \'bad\' meaning \'error detected by on-board\'			

14.13.1.5.3.31 MCD flag uso

mcd_flag_uso_01	MCD flag uso: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: USO validity flag. \'bad\' meaning \'anomaly in USO value detected\'			

14.13.1.5.3.32 MCD flag obdh

mcd_flag_obdh_01	MCD flag obdh: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	MCD flag: OBDH validity flag. \'bad\' meaning \'anomaly in OBDH value detected\'			

14.13.1.5.3.33 MCD flag packet length

mcd_flag_packet_length_01	MCD flag packet length: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

comment	MCD flag: Packet Length Error flag. \'bad\' meaning \'error detected and attempt to recover made\'			

14.13.1.5.3.34 Surface type

surf_type_01	surface type: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b		
flag_meanings	Flag meanings	ocean_or_semi_enclosed_sea enclosed_sea_or_lake continental_ice land		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

surf_type_20	surface type: 18 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b		
flag_meanings	Flag meanings	ocean_or_semi_enclosed_sea enclosed_sea_or_lake continental_ice land		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.35 Surface classification

surf_class_01	surface classification: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b, 4b, 5b, 6b		
flag_meanings	Flag meanings	open_ocean land continental_water aquatic_vegetation continental_ice_snow floating_ice salted_basin		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

comment	Computed from a mask built with MODIS and GlobCover data			

surf_class_20	surface classification: 18 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b, 4b, 5b, 6b		
flag_meanings	Flag meanings	open_ocean land continental_water aquatic_vegetation continental_ice_snow floating_ice salted_basin		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Computed from a mask built with MODIS and GlobCover data			

14.13.1.5.3.36 Distance to the coast

dist_coast_01	distance to the coast: 1 Hz		int	
units	Unit name	m		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

dist_coast_20	distance to the coast: 18 Hz		int	
units	Unit name	m		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.37 Radiometer-derived surface type

rad_surf_type_01	radiometer derived surface type: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ocean land		
coordinates	lon_01 lat_01			

_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.38 Altitude (1 Hz and 18 Hz)

alt_01	altitude of the satellite: 1 Hz		int	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	height_above_reference_ellipsoid		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Altitude of satellite above the reference ellipsoid			

alt_20	altitude of the satellite: 18 Hz		int	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	height_above_reference_ellipsoid		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Altitude of satellite above the reference ellipsoid			

14.13.1.5.3.39 Orbital altitude rate (1 Hz and 18 Hz)

orb_alt_rate_01	orbital altitude rate: 1 Hz		short	
units	Unit name	m/s		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	The reference surface for the orbital altitude rate is the			

	combined mean_sea_surface/geoid surface. It is used to compute the Doppler correction on the altimeter range			

orb_alt_rate_20	orbital altitude rate: 18 Hz		short	
units	Unit name	m/s		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	The reference surface for the orbital altitude rate is the combined mean_sea_surface/geoid surface. It is used to compute the Doppler correction on the altimeter range			

14.13.1.5.3.40 Corrected tracker range: 18 Hz Ku band

tracker_range_20_ku	corrected tracker range: 18 Hz Ku band		int	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	height_above_reference_ellipsoid		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	tracker range corrected for USO frequency drift (uso_cor_20), internal path correction (int_path_cor_20_ku), Doppler correction (dop_cor_l1b_20_ku) and distance antenna-COG. It is the distance between the altimeter antenna and the surface height associated to the on-board tracking range gate inside the tracking window			

14.13.1.5.3.41 Corrected tracker range: 18 Hz S band

tracker_range_20_s	corrected tracker range: 18 Hz S band		int	

units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	height_above_reference_ellipsoid		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	tracker range corrected for USO frequency drift (uso_cor_20), internal path correction (int_path_cor_20_s), Doppler correction (dop_cor_l1b_20_s) and distance antenna-COG. It is the distance between the altimeter antenna and the surface height associated to the on-board tracking range gate inside the tracking window			

14.13.1.5.3.42 18 Hz tracker range validity flag

tracker_range_qual_20_ku	quality flag for the tracker range: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.43 18 Hz Ku band rx coarse delay

rx_delay_coarse_20_ku	rx coarse delay (multiple of 12.5ns): 18 Hz Ku band		int	
units	Unit name	count		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.44 18 Hz Ku band rx fine delay

rx_delay_fine_20_ku	rx fine delay (multiple of 12.5ns/256): 18 Hz Ku band		short	
units	Unit name	count		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.45 18 Hz USO clock smoothed

uso_clock_smoothed_20	USO clock smoothed: 18 Hz		double	
units	Unit name	s		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	1.8446744073709552E19; // double		

14.13.1.5.3.46 18 Hz Ku band Corrected AGC

agc_20_ku	corrected AGC: 18 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	AGC corrected for instrumental errors (agc_cor_20_ku)			

14.13.1.5.3.47 18 Hz S band Corrected AGC

agc_20_s	corrected AGC: 18 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	AGC corrected for instrumental errors (agc_cor_20_s)			

14.13.1.5.3.48 18 Hz Ku band Scaling factor

scale_factor_20_ku	scaling factor for backscatter coefficient evaluation: 18 Hz Ku band		int	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			

_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	This scaling factor represents the backscatter coefficient for waveform amplitude equal to 1. It is corrected for AGC instrumental errors (agc_cor_20_ku) and internal calibration (internal_cor_sig0_20_ku)			

14.13.1.5.3.49 18 Hz S band Scaling factor

scale_factor_20_s	scaling factor for backscatter coefficient evaluation: 18 Hz S band		int	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	This scaling factor represents the backscatter coefficient for waveform amplitude equal to 1. It is corrected for AGC instrumental errors (agc_cor_20_s) and internal calibration (internal_cor_sig0_20_s)			

14.13.1.5.3.50 18 Hz Ku band retracking quality flag

retracking_ocean_qual_20_ku	quality flag for the ocean retracking: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.51 18 Hz S band retracking quality flag

retracking_ocean_qual_20_s	quality flag for the ocean retracking: 18 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.52 Ku and S band Corrected altimeter range (1 Hz)

range_ocean_01_ku	corrected ocean altimeter range: 1 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality flag	range_ocean_qual_01_ku			
comment	Instrumental corrections included: USO drift correction, internal path correction, distance antenna-COG, Doppler correction, modeled instrumental errors correction and system bias			
range_ocean_01_s	corrected ocean altimeter range: 1 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality flag	range_ocean_qual_01_s			
comment	Instrumental corrections included: USO drift correction, internal path correction, distance antenna-COG, Doppler correction, modeled instrumental errors correction and system bias			

14.13.1.5.3.53 Ku and S band Corrected altimeter range (18 Hz)

range_ocean_20_ku	corrected ocean altimeter range: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality flag	range_ocean_qual_20_ku			
comment	Instrumental corrections included: USO drift correction			

	(uso_cor_20), internal path correction (int_path_cor_20_ku), distance antenna-COG (cog_cor_01), Doppler correction (dop_cor_20_ku), modeled instrumental errors correction (mod_instr_cor_range_01_ku) and system bias			
range_ocean_20_s	corrected ocean altimeter range: 18 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality flag	range_ocean_qual_20_s			
comment	Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_s), distance antenna-COG (cog_cor_01), Doppler correction (dop_cor_20_s) and system bias			

14.13.1.5.3.54 Ku and S band Altimeter range validity flag (1 Hz)

range_ocean_qual_01_ku	quality flag for the ocean altimeter range: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
range_ocean_qual_01_s	quality flag for the ocean altimeter range: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.55 Ku and S band Altimeter range validity flag (18 Hz)

range_ocean_qual_20_ku	quality flag for the ocean altimeter range: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
Comment	Flag indicating the use or not of the 18-Hz estimate of the ocean altimeter range in the computation of 1Hz estimate			
range_ocean_qual_20_s	quality flag for the ocean altimeter range: 18 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
Comment	Flag indicating the use or not of the 18-Hz estimate of the ocean altimeter range in the computation of 1Hz estimate			

14.13.1.5.3.56 Ku and S band RMS of the altimeter range at 1 Hz

range_ocean_rms_01_ku	RMS of the ocean altimeter range: 1 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			
range_ocean_rms_01_s	RMS of the ocean altimeter range: 1 Hz S band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			

14.13.1.5.3.57 Ku and S band Number of valid points for the altimeter range at 1 Hz

range_ocean_numval_01_ku	number of valid points used to compute the ocean altimeter range: 1 Hz Ku band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
range_ocean_numval_01_s	number of valid points used to compute the ocean altimeter range: 1 Hz S band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.58 Ku and S band Corrected backscatter coefficient (1 Hz)

sig0_ocean_01_ku	corrected ocean backscatter coefficient: 1 Hz Ku band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_ of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	sig0_ocean_qual_01_ku			
comment	Instrumental corrections included: AGC instrumental errors correction, internal calibration correction, modeled instrumental errors correction, atmospheric attenuation correction (atm_cor_sig0_01_ku) and system bias			
sig0_ocean_01_s	corrected ocean backscatter coefficient: 1 Hz S band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate	surface_backwards_scattering_coefficient_		

	and Forecast (CF) Metadata Conventions	of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	sig0_ocean_qual_01_s			
comment	Instrumental corrections included: AGC instrumental errors correction, internal calibration correction, modeled instrumental errors correction, atmospheric attenuation correction (atm_cor_sig0_01_s) and system bias			

14.13.1.5.3.59 Ku and S band Corrected backscatter coefficient (18 Hz)

sig0_ocean_20_ku	corrected ocean backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	sig0_ocean_qual_20_ku			
comment	Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_ku), internal calibration correction (internal_cor_sig0_20_ku), atmospheric attenuation correction (atm_cor_sig0_20_ku) and system bias			
sig0_ocean_20_s	corrected ocean backscatter coefficient: 18 Hz S band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			

_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	sig0_ocean_qual_20_s			
comment	Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_s), internal calibration correction (internal_cor_sig0_20_s), atmospheric attenuation correction (atm_cor_sig0_20_s) and system bias			

14.13.1.5.3.60 Ku band Backscatter coefficient validity flag (at 1 Hz and 18 Hz)

sig0_ocean_qual_01_ku	quality flag for the ocean backscatter coefficient: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

sig0_ocean_qual_20_ku	quality flag for the ocean backscatter coefficient: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Flag indicating the use or not of the 18-Hz estimate of the ocean backscatter coefficient in the computation of 1Hz estimate			

14.13.1.5.3.61 S band Backscatter coefficient validity flag (at 1 Hz and 18 Hz)

sig0_ocean_qual_01_s	quality flag for the ocean backscatter coefficient: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

sig0_ocean_qual_20_s	quality flag for the ocean backscatter coefficient: 18 Hz S band		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	yesno		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Flag indicating the use or not of the 18-Hz estimate of the ocean backscatter coefficient in the computation of 1Hz estimate			

14.13.1.5.3.62 Ku and S band RMS of the backscatter coefficient at 1 Hz

sig0_ocean_rms_01_ku	RMS of the ocean backscatter coefficient: 1 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			

sig0_ocean_rms_01_s	RMS of the ocean backscatter coefficient: 1 Hz S band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			

14.13.1.5.3.63 Ku and S band Number of valid points for the backscatter coefficient at 1 Hz

sig0_ocean_numval_01_ku	number of valid points used to compute the ocean backscatter coefficient: 1 Hz Ku band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			

_FillValue	Default value for unused or not computed elements	127b; // byte		

sig0_ocean_numval_01_s	number of valid points used to compute the ocean backscatter coefficient: 1 Hz S band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.64 Ku and S band Corrected square of significant waveheight at 1 Hz

square_swh_ocean_01_ku	ocean square of the significant waveheight: 1 Hz Ku band		int	
units	Unit name	m^2		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	swh_ocean_qual_01_ku			
comment	Modeled instrumental corrections not included			

square_swh_ocean_01_s	ocean square of the significant waveheight: 1 HzS band		int	
units	Unit name	m^2		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	swh_ocean_qual_01_s			
comment	Modeled instrumental corrections not included			

14.13.1.5.3.65 Ku and S band Corrected significant waveheight (at 1 Hz and 18 Hz)

swh_ocean_01_ku	corrected ocean significant waveheight: 1 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_wave_significant_height		

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	swh_ocean_qual_01_ku			
comment	Instrumental corrections included: modeled instrumental errors correction and system bias			

swh_ocean_01_s	corrected ocean significant waveheight: 1 Hz S band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_wave_significant_height		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	swh_ocean_qual_01_s			
comment	Instrumental corrections included: modeled instrumental errors correction and system bias			

swh_ocean_20_ku	corrected ocean significant waveheight: 18 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_wave_significant_height		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	swh_ocean_qual_20_ku			
comment	Instrumental corrections included: modeled instrumental errors correction (mod_instr_cor_swh_01_ku) and system bias			

swh_ocean_20_s	corrected ocean significant waveheight: 18 Hz S band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_wave_significant_height		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	swh_ocean_qual_20_s			
comment	Instrumental corrections included: system bias			

14.13.1.5.3.66 Ku and S band Significant waveheight validity flag (at 1 Hz and 18 Hz)

swh_ocean_qual_01_ku	quality flag for the ocean significant waveheight: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

swh_ocean_qual_01_s	quality flag for the ocean backscatter coefficient: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

swh_ocean_qual_20_ku	quality flag for the ocean significant waveheight: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Flag indicating the use or not of the 18-Hz estimate of the ocean			

	significant waveheight in the computation of 1Hz estimate			

swh_ocean_qual_20_s	quality flag for the ocean backscatter coefficient: 18 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yes no		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Flag indicating the use or not of the 18-Hz estimate of the ocean significant waveheight in the computation of 1Hz estimate			

14.13.1.5.3.67 Ku and S band RMS of the significant waveheight at 1 H

swh_ocean_rms_01_ku	RMS of the ocean significant waveheight: 1 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			

swh_ocean_ rms_01_s	RMS of the ocean significant waveheight: 1 Hz S band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			

14.13.1.5.3.68 Ku and S band Number of valid points for the significant waveheight at 1 Hz

swh_ocean_numval_01_ku	number of valid points used to compute the ocean significant waveheight: 1 Hz Ku band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

swh_ocean_numval_01_s	number of valid points used to compute the ocean significant waveheight: 1 Hz S band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.69 Ku and S band Epoch at 18 Hz

epoch_ocean_20_ku	Epoch ocean retracking: 18 Hz Ku band		int	
units	Unit name	s		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-15; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

epoch_ocean_20_s	Epoch ocean retracking: 18 Hz S band		int	
units	Unit name	s		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-15; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.70 Ku and S band Composite sigma at 18 Hz

sigmac_ocean_20_ku	composite sigma ocean retracking: 18 Hz Ku band		int	
units	Unit name	s		

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-15; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

sigmac_ocean_20_s	composite sigma ocean retracking: 18 Hz S band		int	
units	Unit name	s		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-15; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.71 Ku and S band Amplitude at 18 Hz

amplitude_ocean_20_ku	amplitude ocean retracking (FFT power unit): 18 Hz Ku band		int	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

amplitude_ocean_20_s	amplitude ocean retracking (FFT power unit): 18 Hz S band		int	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.72 Ku and S band Thermal noise at 18 Hz

thermal_noise_ocean_20_ku	thermal noise ocean retracking (FFT power unit): 18 Hz Ku band		int	
units	Unit name	count		

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

thermal_noise_ocean_20_s	thermal noise ocean retracking (FFT power unit): 18 Hz S band		int	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.73 Ku and S band Number of iterations of the ocean retracking at 18 Hz

number_of_iterations_ocean_20_ku	number of iterations ocean retracking: 18 Hz Ku band		byte	
units	Unit name	count		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

number_of_iterations_ocean_20_s	number of iterations ocean retracking: 18 Hz S band		byte	
units	Unit name	count		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.74 Ku and S band Mean Quadratic Error between waveform and ocean model at 18 Hz

mqe_ocean_20_ku	mean quadratic error between waveform and model ocean retracking: 18 Hz Ku band		int	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-5; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

mqe_ocean_20_s	mean quadratic error between waveform and model ocean retracking: 18 Hz S band		int	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-5; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.75 Ku band Sea surface height anomaly at 1 Hz and 18 Hz

ssha_01_ku	sea surface height anomaly: 1 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_above_sea_level		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	altitude of satellite (alt_01) - Ku band corrected ocean altimeter range (range_ocean_01_ku) - altimeter ionospheric correction on Ku band (filtered_iono_cor_alt_01_ku) - model dry tropospheric correction (mod_dry_tropo_cor_01) - radiometer wet tropospheric correction (rad_wet_tropo_cor_sst_gam_01) - sea state bias correction in Ku band (sea_state_bias_01_ku) - solid earth tide height (solid_earth_tide_01) - geocentric ocean tide height solution 2 (ocean_tide_sol2_01) - geocentric pole tide height (pole_tide_01) - inverted barometer height correction (inv_bar_cor_01) - high frequency fluctuations of the sea surface topography (hf_fluct_cor_01) - mean sea surface (mean_sea_surf_sol1_01). Altimeter ionospheric correction on Ku band (filtered_iono_cor_alt_01_ku) is superseded by GIM ionospheric correction (iono_cor_gim_01_ku) when the S-band loss flag (flag_loss_band_s) is set to \'loss\'			

ssha_20_ku	sea surface height anomaly: 18 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_above_sea_level		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	altitude of satellite (alt_20) - Ku band corrected ocean altimeter range (range_ocean_20_ku) - altimeter ionospheric correction on Ku band (filtered_iono_cor_alt_01_ku) - model dry tropospheric correction (mod_dry_tropo_cor_01) - radiometer wet tropospheric correction (rad_wet_tropo_cor_sst_gam_01) - sea state bias correction in Ku band (sea_state_bias_01_ku) - solid earth tide height (solid_earth_tide_01) - geocentric ocean tide height solution 2 (ocean_tide_sol2_01) - geocentric pole tide height (pole_tide_01) - inverted barometer height correction (inv_bar_cor_01) - high frequency fluctuations of the sea surface topography (hf_fluct_cor_01) - mean sea surface (mean_sea_surf_sol1_20). Altimeter ionospheric correction on Ku band (filtered_iono_cor_alt_01_ku) is superseded by GIM ionospheric correction (iono_cor_gim_01_ku) when the S-band loss flag (flag_loss_band_s) is set to \'loss\'			

14.13.1.5.3.76 Ku and S band retracking quality flag at 18 Hz

retracking_ice1_qual_20_ku	quality flag for the ice-1 retracking: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Ocog retracking			

retracking_ice1_qual_20_s	quality flag for the ice-1 retracking: 18 Hz S band		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Ocog retracking			

14.13.1.5.3.77 Ku and S band OCOG Corrected altimeter range at 18 Hz

range_ice1_20_ku	corrected ice-1 altimeter range: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Ocog retracking. Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_ku), distance antenna-COG			

range_ice1_20_s	corrected ice-1 altimeter range: 18 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Ocog retracking. Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_s), distance antenna-COG			

14.13.1.5.3.78 Ku and S band OCOG Corrected backscatter at 18 Hz

sig0_ice1_20_ku	corrected ice-1 backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and	surface_backwards_scattering_coef		

	Forecast (CF) Metadata Conventions	ficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Ocog retracking. Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_ku) and internal calibration correction (internal_cor_sig0_20_ku)			

sig0_ice1_20_s	corrected ice-1 backscatter coefficient: 18 Hz S band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Ocog retracking. Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_s) and internal calibration correction (internal_cor_sig0_20_s)			

14.13.1.5.3.79 Ku band OCOG Elevation of echoing points at 1 Hz and 18 Hz

elevation_ice1_01_ku	corrected ice-1 altimeter elevation: 1 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Ocog retracking. Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_ku) and distance			

	antenna-COG (cog_cor_01)			

elevation_ice1_20_ku	corrected ice-1 altimeter elevation: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Ocog retracking. Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_ku) and distance antenna-COG (cog_cor_01)			

14.13.1.5.3.80 Ku and S band ice-2 Corrected altimeter range at 18 Hz

range_ice2_20_ku	corrected ice-2 altimeter range: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Erf retracking. Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_ku), distance antenna-COG and Doppler correction (dop_cor_20_ku)			

range_ice2_20_s	corrected ice-2 altimeter range: 18 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Erf retracking. Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_s), distance antenna-COG and Doppler correction (dop_cor_20_s)			

14.13.1.5.3.81 Ku and S band ice-2 Corrected backscatter coefficient at 18 Hz

sig0_ice2_20_ku	corrected ice-2 backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Erf retracking. Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_ku) and internal calibration correction (internal_cor_sig0_20_ku)			

sig0_ice2_20_s	corrected ice-2 backscatter coefficient: 18 Hz S band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Erf retracking. Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_s) and internal calibration correction (internal_cor_sig0_20_s)			

14.13.1.5.3.82 Ku and S band ice-2 Corrected leading edge backscatter coefficient at 18 Hz

sig0_leading_edge_ice2_20_ku	corrected ice-2 leading edge backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling	0.0; // double		

	if needed)			
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Erf retracking. Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_ku) and internal calibration correction (internal_cor_sig0_20_ku)			

sig0_leading_edge_ice2_20_s	corrected ice-2 leading edge backscatter coefficient: 18 Hz S band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Erf retracking. Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_s) and internal calibration correction (internal_cor_sig0_20_s)			

14.13.1.5.3.83 Ku and S band ice-2 Width of the leading edge at 18 Hz

width_leading_edge_ice2_20_ku	width of the ice-2 leading edge: 18 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Erf retracking			

width_leading_edge_ice2_20_s	width of the ice-2 leading edge: 18 Hz S band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if	0.0; // double		

	needed)			
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Erf retracking			

14.13.1.5.3.84 Ku and S band ice-2 Slope of the first part of the trailing edge at 18 Hz

slope_first_trailing_edge_ice2_20_ku	slope of the first part of the trailing edge ice-2: 18 Hz Ku band		int	
units	Unit name	s^-1		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Erf retracking			

slope_first_trailing_edge_ice2_20_s	slope of the first part of the trailing edge ice-2: 18 Hz S band		int	
units	Unit name	s^-1		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Erf retracking			

14.13.1.5.3.85 Ku and S band ice-2 Slope of the second part of the trailing edge at 18 Hz

slope_second_trailing_edge_ice2_20_ku	slope of the second part of the trailing edge ice-2: 18 Hz Ku band		int	
units	Unit name	s^-1		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Erf retracking			

slope_second_trailing_edge_ice2_20_s	slope of the second part of the trailing edge ice-2: 18 Hz S band		int	
units	Unit name	s^-1		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Erf retracking			

14.13.1.5.3.86 Ku and S band ice-2 retracking quality flag at 18 Hz

retracking_ice2_qual_20_ku	quality flag for the ice-2 retracking: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Erf retracking			

retracking_ice2_qual_20_s	quality flag for the ice-2 retracking: 18 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Erf retracking			

14.13.1.5.3.87 Ku band sea-ice Corrected altimeter range at 18 Hz

range_sea_ice_20_ku	corrected sea ice altimeter range: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Instrumental corrections included: USO drift correction (uso_cor_20), internal path correction (int_path_cor_20_ku), distance antenna-COG and Doppler slope correction (dop_slope_cor_20_ku)			

14.13.1.5.3.88 Ku band sea-ice Corrected backscatter coefficient at 18 Hz

sig0_sea_ice_20_ku	corrected sea-ice backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_backwards_scattering_coefficient_of_radar_wave		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		

scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Instrumental corrections included: AGC instrumental errors correction (agc_cor_20_ku) and internal calibration correction (internal_cor_sig0_20_ku)			

14.13.1.5.3.89 Ku band sea-ice retracking quality flag at 18 Hz

retracking_sea_ice_qual_20_ku	quality flag for the sea-ice retracking: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.90 Reference tracking point offset at 18 Hz

offset_tracking_20	reference tracking point offset (1/256): 18 Hz		int	
units	Unit name	count		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	offset for reference tracking point			

14.13.1.5.3.91 USO frequency drift correction at 1 Hz and 18 Hz

uso_cor_01	USO frequency drift correction: 1 Hz		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Correction of the USO frequency drift on the altimeter range			

uso_cor_20	USO frequency drift correction: 18 Hz		int	
units	Unit name	m		

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Correction of the USO frequency drift on the altimeter range			

14.13.1.5.3.92 Ku and S band Internal path delay (calibration) correction at 18 Hz

int_path_cor_20_ku	Internal path correction on the altimeter range: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Internal calibration correction on the altimeter range			

int_path_cor_20_s	internal path correction on the altimeter range: 18 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Internal calibration correction on the altimeter range			

14.13.1.5.3.93 Ku and S band Level 1b Doppler correction (nadir) at 18 Hz

dop_cor_l1b_20_ku	doppler correction on the altimeter range: 18 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Nadir Doppler correction on the altimeter range, computed at Level 1b			

dop_cor_l1b_20_s	doppler correction on the altimeter range: 18 Hz S band		short	

units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Nadir Doppler correction on the altimeter range, computed at Level 1b			

14.13.1.5.3.94 Ku and S band Doppler correction (nadir) at 18 Hz

dop_cor_20_ku	doppler correction on the altimeter range: 18 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Nadir Doppler correction on the altimeter range, computed from restituted orbit			

dop_cor_20_s	doppler correction on the altimeter range: 18 Hz S band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Nadir Doppler correction on the altimeter range, computed from restituted orbit			

14.13.1.5.3.95 Ku and S band Doppler correction (slope corrected) at 18 Hz

dop_slope_cor_20_ku	slope-corrected doppler correction on the altimeter range: 18 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Slope-corrected Doppler correction on the altimeter range			

dop_slope_cor_20_s	slope-corrected doppler correction on the altimeter range: 18 Hz S band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Slope-corrected Doppler correction on the altimeter range			

14.13.1.5.3.96 Distance antenna / COG at 1 Hz

cog_cor_01	distance antenna-COG correction on altimeter range: 1 Hz		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.97 Modeled instrumental correction: Ku band at 1 Hz

mod_instr_cor_range_01_ku	modeled instrumental correction on the altimeter range: 1 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.98 Net instrumental correction: Ku and S band at 18 Hz

net_instr_cor_range_20_ku	net instrumental correction on the altimeter range: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Sum of distance antenna-COG, internal path correction (int_path_cor_20_ku), Doppler correction (dop_cor_20_ku), modeled instrumental errors correction (mod_instr_cor_range_01_ku) and system bias			

net_instr_cor_range_20_s	net instrumental correction on the altimeter range: 18 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Sum of distance antenna-COG, internal path correction (int_path_cor_20_s), Doppler correction (dop_cor_20_s) and system bias			

14.13.1.5.3.99 Ku band Echo correction at 18 Hz

echo_cor_range_20_ku	echo correction on the altimeter range: 18 Hz Ku band		short	
units	Unit name	m		
institution	LEGOS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_ref_track _20 lat_ref_track _20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	echo_cor_range_qual_20_ku			
comment	Echo shape correction on the altimeter range. This correction is valid over ice surfaces only			

14.13.1.5.3.100 Ku band geographic correction at 18 Hz

geo_cor_range_20_ku	geo correction on the altimeter range: 18 Hz Ku band		short	
units	Unit name	m		
institution	LEGOS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_ref_track_20 lat_ref_track_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	geo_cor_range_qual_20_ku			

comment	Geographic correction on the altimeter range. This correction is valid over ice surfaces only			

14.13.1.5.3.101 Reference track latitude at 18 Hz

lat_ref_track_20	Reference track latitude: 18 Hz		int	
units	Unit name	degrees_north		
institution	LEGOS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Latitude of the closest point on the reference track			

lon_ref_track_20	Reference track longitude: 18 Hz		int	
units	Unit name	degrees_east		
institution	LEGOS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-6; // double		
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Longitude of the closest point on the reference track. East longitude relative to Greenwich meridian			

14.13.1.5.3.102 Ku and S band AGC correction at 18 Hz

agc_cor_20_ku	correction for instrumental errors on AGC: 18 Hz Ku band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

agc_cor_20_s	correction for instrumental errors on AGC: 18 Hz S band		int	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		

coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.103 Ku and S band internal calibration correction on the backscatter coefficient at 18 Hz

internal_cor_sig0_20_ku	internal calibration correction on the backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		

internal_cor_sig0_20_s	internal calibration correction on the backscatter coefficient: 18 Hz S band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.104 Ku and S band Net instrumental correction on the backscatter coefficient at 18 Hz

net_instr_cor_sig0_20_ku	net instrumental correction on the backscatter coefficient: 18 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Sum of AGC instrumental errors correction (agc_cor_20_ku), internal calibration correction (internal_cor_sig0_20_ku) and system bias. The atmospheric attenuation correction (atm_cor_sig0_01_ku) is not included			

net_instr_cor_sig0_20_s	net instrumental correction on the backscatter coefficient: 18 Hz S band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			

_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Sum of AGC instrumental errors correction (agc_cor_20_s), internal calibration correction (internal_cor_sig0_20_s) and system bias. The atmospheric attenuation correction (atm_cor_sig0_01_s) is not included			

14.13.1.5.3.105 Ku band Modeled instrumental correction on the significant waveheight at1 Hz

mod_instr_cor_swh_01_ku	modeled instrumental correction on the significant waveheight: 1 Hz Ku band		short	
units	Unit name	m		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.106 Ku and S band Net instrumental correction on the significant waveheight at 18 Hz

net_instr_cor_swh_20_ku	net instrumental correction on the significant waveheight: 18 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Sum of modeled instrumental errors correction (mod_instr_cor_swh_01_ku) and system bias			

net_instr_cor_swh_20_s	net instrumental correction on the significant waveheight: 18 Hz S band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Set to 0 (no instrumental correction applied on S-band SWH)			

14.13.1.5.3.107 Model dry tropospheric corrections at1 Hz

mod_dry_tropo_cor_01	model dry tropospheric correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_dry_troposphere		
source	European Center for Medium Range Weather Forecasting			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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 instrument range to correct this range measurement for dry tropospheric range delays of the radar pulse			

14.13.1.5.3.108 Model dry tropospheric corrections (ERA Interim re-analysis) at1 Hz and 18 Hz

mod_dry_tropo_cor_reanalysis_01	model dry tropospheric correction from reanalysis: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_dry_troposphere		
source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag, from 3d meteorological reanalysis at measurement altitude. A dry tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for dry tropospheric range delays of the radar pulse			

mod_dry_tropo_cor_reanalysis_20	model dry tropospheric correction from reanalysis: 18 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_dry_troposphere		
source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag, from 3d meteorological reanalysis at measurement altitude. A dry tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for dry tropospheric range delays of the radar pulse			

14.13.1.5.3.109 Model wet tropospheric corrections at1 Hz

mod_wet_tropo_cor_01	model wet tropospheric correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_wet_troposphere		
source	European Center for Medium Range Weather Forecasting			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag. A wet tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for wet tropospheric range			

	delays of the radar pulse			

14.13.1.5.3.110 Model wet tropospheric corrections (ERA reanalysis) at1 Hz and 18 Hz

mod_wet_tropo_cor_reanalysis_01	model wet tropospheric correction from reanalysis: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_wet_troposphere		
source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag, from 3d meteorological reanalysis at measurement altitude. A wet tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for wet tropospheric range delays of the radar pulse			

mod_wet_tropo_cor_reanalysis_20	model wet tropospheric correction from reanalysis: 18 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_wet_troposphere		
source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag, from 3d meteorological reanalysis at measurement altitude. A			

	wet tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for wet tropospheric range delays of the radar pulse			

14.13.1.5.3.111 Radiometer wet tropospheric correction at1 Hz

rad_wet_tropo_cor_01	radiometer wet tropospheric correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_wet_troposphere		
source	MWR			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures and the Ku-band backscatter coefficient. A wet tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for wet tropospheric range delays of the radar pulse. This correction is valid over ocean surfaces only			

14.13.1.5.3.112 Radiometer wet tropospheric correction using SST and Gamma at 1 Hz

rad_wet_tropo_cor_sst_gam_01	radiometer wet tropospheric correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_wet_troposphere		
source	MWR			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the radiometer			

	brightness temperatures, the Ku-band backscatter coefficient, the sea surface temperature and the lapse rate (decreasing rate of the atmosphere temperature with altitude). A wet tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for wet tropospheric range delays of the radar pulse. This correction is valid over ocean surfaces only			

14.13.1.5.3.113 GPD+ wet tropospheric correction at 1 Hz

gpd_wet_tropo_cor_01	GPD+ wet tropospheric correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction _due_to_wet_troposphere		
institution	UPORTO			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag through OA space-time analysis using the GPD+ algorithm, by combining all available observations. The correction has been calibrated with respect to the SSM/I and SSMIS imaging radiometers. A wet tropospheric correction must be added (negative value) to the instrument range to correct this range measurement for wet tropospheric range delays of the radar pulse. This correction is valid over ocean surfaces. Over non-ocean surfaces equals the WTC from the ERA Interim model			

14.13.1.5.3.114 Ku and S band Altimeter ionospheric correction at1 Hz

iono_cor_alt_01_ku	altimeter ionospheric correction: 1 Hz Ku band		short	

units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_ionosphere		
source	RA2			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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. This correction is valid over ocean surfaces only			

iono_cor_alt_01_s	altimeter ionospheric correction: 1 Hz S band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_ionosphere		
source	RA2			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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. This correction is valid over ocean surfaces only			

14.13.1.5.3.115 Ku band Altimeter ionospheric correction at 18 Hz

iono_cor_alt_20_ku	altimeter ionospheric correction: 18 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_ionosphere		
source	RA2			

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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. This correction is valid over ocean surfaces only			

14.13.1.5.3.116 Ku band Filtered altimeter ionospheric correction at 1 Hz

filtered_iono_cor_alt_01_ku	filtered altimeter ionospheric correction: 1 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_ionosphere		
source	RA2			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	filtered_iono_cor_alt_qual_01_ku			
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. This correction is valid over ocean surfaces only			

14.13.1.5.3.117 Ku band GIM-derived ionospheric correction at 1 Hz

iono_cor_gim_01_ku	GIM ionospheric correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	altimeter_range_correction_due _to_ionosphere		
source	CNES/CLS v1			
institution	NASA/JPL			

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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.			

14.13.1.5.3.118 Ku and S band Sea state bias correction at 1 Hz

sea_state_bias_01_ku	sea state bias correction: 1 Hz Ku band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_bias_due_to _sea_surface_roughness		
source	Empirical solution fitted on ENVISAT V3.0 data			
institution	ESA/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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			

sea_state_bias_01_s	sea state bias correction: 1 Hz S band		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_bias_due_to _sea_surface_roughness		
source	Empirical solution fitted on ENVISAT V3.0 data			
institution	ESA/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		

coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
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			

14.13.1.5.3.119 Ku and S band Atmospheric attenuation correction on the backscatter coefficient at 1 Hz

atm_cor_sig0_01_ku	atmospheric attenuation correction on the backscatter coefficient: 1 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	climato_use_flag_01			
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures and the Ku-band backscatter coefficient if the flag indicating the use of climatological values (climato_use_flag_01) is set to 0. Computed from model wet tropospheric correction (mod_wet_tropo_cor_01) otherwise			
atm_cor_sig0_01_s	atmospheric attenuation correction on the backscatter coefficient: 1 Hz S band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	climato_use_flag_01			
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures and the Ku-band backscatter coefficient if the flag indicating the use of climatological values (climato_use_flag_01) is set to 0. Computed from model wet tropospheric correction (mod_wet_tropo_cor_01) otherwise			

14.13.1.5.3.120 Mean sea surface height above reference ellipsoid (Solution 1) at 1 Hz and 18 Hz

mean_sea_surf_sol1_01	mean sea surface height (solution 1) above reference ellipsoid: 1 Hz		int	
units	Unit name	m		
source	CNES-CLS-15			

institution	CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mss_sol1_01			
mean_sea_surf_sol1_20	mean sea surface height (solution 1) above reference ellipsoid: 18 Hz		int	
units	Unit name	m		
source	CNES-CLS-15			
institution	CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mss_sol1_20			

14.13.1.5.3.121 Mean sea surface height accuracy (Solution 1) at 1 Hz and 18 Hz

mean_sea_surf_sol1_acc_01	mean sea surface height (solution 1) accuracy: 1 Hz		int	
units	Unit name	m		
source	CNES-CLS-15			
institution	CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mss_sol1_01			
mean_sea_surf_sol1_acc_20	mean sea surface height (solution 1) accuracy: 18 Hz		int	
units	Unit name	m		
source	CNES-CLS-15			
institution	CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

quality_flag	interp_flag_mss_sol1_20			

14.13.1.5.3.122 Mean sea surface height above reference ellipsoid (Solution 2) at 1 Hz and 18 Hz

mean_sea_surf_sol2_01	mean sea surface height (solution 2) above reference ellipsoid: 1 Hz		int	
units	Unit name	m		
source	DTU15			
institution	DNSC			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mss_sol2_01			
mean_sea_surf_sol2_20	mean sea surface height (solution 2) above reference ellipsoid: 18 Hz		int	
units	Unit name	m		
source	DTU15			
institution	DNSC			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mss_sol2_20			

14.13.1.5.3.123 Mean dynamic topography at 1 Hz

mean_dyn_topo_01	mean dynamic topography above geoid: 1 Hz		int	
units	Unit name	m		
source	CNES-CLS13_REF20			
institution	CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mdt_01			

14.13.1.5.3.124 Mean dynamic topography accuracy at 1 Hz

mean_dyn_topo_acc_01	mean dynamic topography accuracy: 1 Hz		int	
units	Unit name	m		
source	CNES-CLS13_REF20			
institution	CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_mdt_01			

14.13.1.5.3.125 Geoid height at 1 Hz

geoid_01	geoid height: 1 Hz		int	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	geoid_height_above_reference_ellipsoid		
source	EGM2008			
institution	GSFC			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	Computed from the geoid model with a correction to refer the value to the mean tide system i.e. includes the permanent tide (zero frequency)			

14.13.1.5.3.126 Ocean depth / Land elevation at 1 Hz

odle_01	ocean depth/land elevation: 1 Hz		int	
units	Unit name	m		
source	ACE2			
institution	EAPRS Laboratory			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		

coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.127 Inverted barometer height correction at 1 Hz

inv_bar_cor_01	inverted barometer height correction: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_correction_due _to_air_pressure_at_low_frequency		
source	European Center for Medium Range Weather Forecasting			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag			

14.13.1.5.3.128 Inverted barometer height correction (ERA Interim re-analysis) at 1 Hz

inv_bar_cor_reanalysis_01	inverted barometer height correction from re-analysis: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_correction_due _to_air_pressure_at_low_frequency		
source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological reanalysis that surround the altimeter time-tag			

14.13.1.5.3.129 High frequency fluctuations of the sea surface topography at 1 Hz

hf_fluct_cor_01	high frequency fluctuations of the sea surface topography: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_correction_due_to_air _pressure_and_wind_at_high_frequency		
source	2.0.0			
institution	LEGOS/CLS/CNES			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Provided as a correction to the inverted barometer correction (inv_bar_cor_01)			

14.13.1.5.3.130 High frequency fluctuations of the sea surface topography (ERA reanalysis) at 1 Hz

hf_fluct_cor_reanalysis_01	high frequency fluctuations of the sea surface topography from re-analysis: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_correction_due_to_air _pressure_and_wind_at_high_frequency		
source	2.0.0			
institution	LEGOS/CLS/CNES			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Provided as a correction to the inverted barometer correction from re-analysis (inv_bar_cor_reanalysis_01)			

14.13.1.5.3.131 Geocentric ocean tide height (GOT model) at 1 Hz

ocean_tide_sol1_01	geocentric ocean tide height (solution 1): 1 Hz		int	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF	sea_surface_height_amplitude_due_to_geo		

	Climate and Forecast (CF) Metadata Conventions	centric_ocean_tide		
source	GOT4.10			
institution	GSFC			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_ocean_tide_sol1_01			
comment	Solution 1 corresponds to GOT model. Includes the corresponding loading tide (load_tide_sol1_01) and equilibrium long-period ocean tide height (ocean_tide_eq_01). The permanent tide (zero frequency) is not included in this parameter because it is included in the geoid and mean sea surface (geoid_01, mean_sea_surf_01)			

14.13.1.5.3.132 Geocentric ocean tide height (FES model) at 1 Hz

ocean_tide_sol2_01	geocentric ocean tide height (solution 2): 1 Hz		int	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_amplitude_due _to_geocentric_ocean_tide		
source	FES2014b			
institution	LEGOS/NOVELTIS/CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
quality_flag	interp_flag_ocean_tide_sol2_01			
comment	Solution 2 corresponds to FES model. Includes the equilibrium long-period ocean tide height (ocean_tide_eq_01) and the short-period part of the corresponding loading tide (load_tide_sol2_01). The permanent tide (zero frequency) is not included in this parameter because it is included in the geoid and mean sea surface			

	(geoid_01, mean_sea_surf_01)			

14.13.1.5.3.133 Equilibrium long-period ocean tide height at 1 Hz

ocean_tide_eq_01	equilibrium long-period ocean tide height: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_amplitude_due_to_equilibrium_ocean_tide		
source	Cartwright and Edden [1973] Corrected tables of tidal harmonics - J. Geophys. J. R. Astr. Soc., 33, 253-264			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	This value has already been added to the two geocentric ocean tide height values recorded in the product (ocean_tide_sol1_01 and ocean_tide_sol2_01). The permanent tide (zero frequency) is not included in this parameter because it is included in the geoid and mean sea surface (geoid_01, mean_sea_surf_01)			

14.13.1.5.3.134 Non-equilibrium long-period ocean tide height at 1 Hz

ocean_tide_non_eq_01	non-equilibrium long-period ocean tide height: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_amplitude_due_to_non_equilibrium_ocean_tide		
source	FES2014b			
institution	LEGOS/NOVELTIS/CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	This parameter is computed as a correction to the parameter			

	ocean_tide_eq_01; it contains the long-period ocean tide and the long-period load tide components. This value can be added to ocean_tide_sol2_01, so that the resulting value models the total non equilibrium geocentric ocean tide height			

14.13.1.5.3.135 Load tide height (GOT model) at 1 Hz

load_tide_sol1_01	load tide height for geocentric ocean tide (solution 1): 1 Hz		short	
units	Unit name	m		
source	GOT4.10			
institution	GSFC			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	This value has already been added to the corresponding ocean tide height value recorded in the product (ocean_tide_sol1_01)			

14.13.1.5.3.136 Load tide height (FES model) at 1 Hz

load_tide_sol2_01	load tide height for geocentric ocean tide (solution 2): 1 Hz		short	
units	Unit name	m		
source	FES2014b			
institution	LEGOS/NOVELTIS/CNES/CLS			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	This value contains the total load tide height (short-period and long-period) for the geocentric ocean tide (solution 2). To get only the ocean tide height (solution 2), do: ocean_tide_sol2_01 + ocean_tide_non_eq_01 - load_tide_sol2_01			

14.13.1.5.3.137 Solid earth tide height at 1 Hz

solid_earth_tide_01	solid earth tide height: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_amplitude_due _to_earth_tide		
source	Cartwright and Edden [1973] Corrected tables of tidal harmonics - J. Geophys. J. R. Astr. Soc., 33, 253-264			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Calculated using Cartwright and Tayler tables and consisting of the second and third degree constituents. The permanent tide (zero frequency) is not included			

14.13.1.5.3.138 Geocentric pole tide height at 1 Hz

pole_tide_01	geocentric tide height: 1 Hz		short	
units	Unit name	m		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	sea_surface_height_amplitude_due _to_pole_tide		
source	Wahr [1985] Deformation of the Earth induced by polar motion - J. Geophys. Res. (Solid Earth), 90, 9363-9368			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Calculated using Cartwright and Tayler tables and consisting of the second and third degree constituents. The permanent tide (zero frequency) is not included			

14.13.1.5.3.139 Rain rate at 1 Hz

rain_rate_01	rain rate: 1 Hz		short	
units	Unit name	mm/h		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.140 Ku band Rain attenuation at 1 Hz

rain_att_01_ku	rain attenuation: 1 Hz Ku band		short	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.141 U component of the model wind vector (forecast and ERA reanalysis) at 1 Hz

wind_speed_mod_u_01	U component of the model wind vector: 1 Hz		short	
units	Unit name	m/s		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	wind_speed		
source	European Center for Medium Range Weather Forecasting			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	mcd_flag_meteo_map_avail_01			
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag			

wind_speed_mod_u_reanalysis_01	U component of the model wind vector from re-analysis: 1 Hz		short	

units	Unit name	m/s		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	wind_speed		
source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	meteo_map_avail_reanalysis_01			
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag			

14.13.1.5.3.142 V component of the model wind vector (forecast and ERA reanalysis) at 1 Hz

wind_speed_mod_v_01	V component of the model wind vector: 1 Hz		short	
units	Unit name	m/s		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	wind_speed		
source	European Center for Medium Range Weather Forecasting			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	mcd_flag_meteo_map_avail_01			
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag			

wind_speed_mod_v_reanalysis_01	V component of the model wind vector from re-analysis: 1 Hz		short	
units	Unit name	m/s		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	wind_speed		

source	ERA Interim re-analysis			
institution	ECMWF			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	meteo_map_avail_reanalysis_01			
comment	Computed at the altimeter time-tag from the interpolation of 2 meteorological fields that surround the altimeter time-tag			

14.13.1.5.3.143 Ku band Altimeter wind speed at 1 Hz

wind_speed_alt_01_ku	altimeter wind speed: 1 Hz Ku band		short	
units	Unit name	m/s		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	wind_speed		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Should not be used over land			

14.13.1.5.3.144 Radiometer water vapor content at 1 Hz

rad_water_vapor_01	radiometer water vapor content: 1 Hz		short	
units	Unit name	kg/m^2		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	atmosphere_water_vapor_content		
source	MWR			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.1; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures and			

	the Ku-band backscatter coefficient. Should not be used over land			

14.13.1.5.3.145 Radiometer liquid water content at 1 Hz

rad_liquid_water_01	radiometer liquid water content: 1 Hz		short	
units	Unit name	kg/m^2		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	atmosphere_cloud_liquid_water_content		
source	MWR			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures and the Ku-band backscatter coefficient. Should not be used over land			

14.13.1.5.3.146 Total electron content at 1 Hz

total_electron_content_01	altimeter-derived total electron content (TECU): 1 Hz		int	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	2.147483648E9; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E10; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.147 Ku band Square of the Waveform -derived off-nadir angle at 1 Hz and 18 Hz

off_nadir_angle_wf_ocean_01_ku	square of the off nadir angle derived from waveforms: 1 Hz Ku band		short	
units	Unit name	degrees^2		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

quality_flag	off_nadir_angle_wf_ocean_qual_01_ku			

off_nadir_angle_wf_ocean_20_ku	square of the off nadir angle derived from waveforms: 18 Hz Ku band		short	
units	Unit name	degrees^2		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		
quality_flag	off_nadir_angle_wf_ocean_qual_20_ku			

14.13.1.5.3.148 Ku band Square of the Waveform -derived off-nadir angle validity flags at 1 Hz and 18 Hz

off_nadir_angle_wf_ocean_qual_01_ku	quality flag for the square of the off nadir angle derived from waveforms: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

off_nadir_angle_wf_ocean_qual_20_ku	quality flag for the square of the off nadir angle derived from waveforms: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	yesno		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	flag indicating the use or not of the 18 Hz estimate of the square of the off-nadir angle in the computation of 1Hz estimate: 18 Hz Ku band			

14.13.1.5.3.149 Ku band RMS of the square of the WF-derived off-nadir angle at 1 Hz

off_nadir_angle_wf_ocean_rms_01_ku	RMS of the square of the off-nadir angle derived from waveforms: 1 Hz Ku band		short	
units	Unit name	degrees^2		

add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	Compression of high rate elements is preceded by a detection of outliers. Only valid high-rate values are used to compute this element			

14.13.1.5.3.150 Ku band Number of valid points for the square of the WF-derived off-nadir angle

off_nadir_angle_wf_ocean_numval_01_ku	number of valid points used to compute the off-nadir angle derived from waveforms: 1 Hz Ku band		byte	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.151 Off-nadir angle derived from platform data at 1 Hz

off_nadir_angle_pf_01	off nadir angle derived from platform data: 1 Hz		short	
units	Unit name	degrees		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0E-4; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.152 23.8 GHz and 36.5 GHz main beam brightness temperature: 1 Hz

tb_238_01	23.8 GHz main beam brightness temperature: 1 Hz		short	
units	Unit name	K		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_brightness_temperature		
source	MWR			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			

_FillValue	Default value for unused or not computed elements	32767s; // short		

tb_365_01	36.5 GHz main beam brightness temperature: 1 Hz		short	
units	Unit name	K		
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	surface_brightness_temperature		
source	MWR			
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.153 Standard deviation of 23.8 GHz and 36.5 GHz main beam brightness temperature at 1 Hz

tb_238_std_01	standard deviation of 23.8 GHz main beam brightness temperature: 1 Hz		short	
units	Unit name	K		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

tb_365_std_01	standard deviation of 36.5 GHz main beam brightness temperature: 1 Hz		short	
units	Unit name	K		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.154 Meteorological maps availability from ERA reanalysis at 1 Hz

meteo_map_avail_reanalysis_01	meteorological map availability from re-analysis: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b		
flag_meanings	Flag meanings	2_maps_nominal 2_maps_degraded 1_map no_map		

coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
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\', 3 meaning \'no map\'			

14.13.1.5.3.155 Ku band Rain flag

rain_flag_01_ku	altimeter rain flag: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b, 2b, 3b, 4b, 5b		
flag_meanings	Flag meanings	no_rain rain high_rain_probability_from_altimeter high_probability_of_no_rain_from_altimeter ambiguous_situation_possibility_of_ice evaluation_not_possible		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.156 Ku band Ocean/Sea-ice flag at 1 Hz

open_sea_ice_flag_01_ku	open sea-ice flag: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b, 2b, 3b, 4b, 5b		
flag_meanings	Flag meanings	ocean first_year_sea_ice wet_ice multi_year_sea_ice ambiguous_mixture_of_type not_evaluated		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.157 Ku band "Open water" class membership at 1 Hz

open_water_class_01_ku	open water class membership: 1 Hz Ku band		byte	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if	0.0; // double		

	needed)			
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Value between 0 and 1			

14.13.1.5.3.158 Ku band "First-year ice" class membership at 1 Hz

first_year_ice_class_01_ku	first-year ice class membership: 1 Hz Ku band		byte	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Value between 0 and 1			

14.13.1.5.3.159 Ku band "Multi-year ice" class membership at 1 Hz

multi_year_ice_class_01_ku	multi-year ice class membership: 1 Hz Ku band		byte	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Value between 0 and 1			

14.13.1.5.3.160 Ku band "Wet ice" class membership at 1 Hz

wet_ice_class_01_ku	wet ice class membership: 1 Hz Ku band		byte	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

comment	Value between 0 and 1			

14.13.1.5.3.161 Ice-sheet snow facies type flag (Ku band) at 1 Hz

ice_sheet_snow_facies_flag_01	Ice-sheet snow facies type flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b, 4b, 5b, 6b, 11b, 12b, 13b, 14b, 15b, 16b, 17b		
flag_meanings	Flag meanings	not_evaluated greenland_type_1 greenland_type_2 greenland_type_3 greenland_type_4 greenland_type_5 greenland_type_6 antarctica_type_1 antarctica_type_2 antarctica_type_3 antarctica_type_4 antarctica_type_5 antarctica_type_6 antarctica_type_7		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures, and from the Ku-band and the S-band backscatter coefficient			

14.13.1.5.3.162 Ice-sheet snow facies type flag (Ku band) at 1 Hz

ice_sheet_snow_facies_flag_01_ku	Ice-sheet snow facies type flag: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b, 2b, 3b, 4b, 5b, 6b, 11b, 12b, 13b, 14b, 15b, 16b		
flag_meanings	Flag meanings	not_evaluated greenland_type_1 greenland_type_2		

		greenland_type_3 greenland_type_4 greenland_type_5 greenland_type_6 antarctica_type_1 antarctica_type_2 antarctica_type_3 antarctica_type_4 antarctica_type_5 antarctica_type_6		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Computed at the altimeter time-tag from the radiometer brightness temperatures, and from the Ku-band backscatter coefficient (without using the S-band backscatter coefficient)			

14.13.1.5.3.163 Mean sea surface Solution 1 interpolation flag at 1 Hz and 18 Hz

interp_flag_mss_sol1_01	mean sea surface (solution 1) interpolation flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

interp_flag_mss_sol1_20	mean sea surface (solution 1) interpolation flag: 18 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.164 Mean sea surface Solution 2 interpolation flag at 1 Hz and 18 Hz

interp_flag_mss_sol2_01	mean sea surface (solution 2) interpolation flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

interp_flag_mss_sol2_20	mean sea surface (solution 2) interpolation flag: 18 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.165 Mean dynamic topography interpolation flag at 1 Hz

interp_flag_mdt_01	mean dynamic topography interpolation flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.166 Geocentric ocean tide height (GOT) interpolation flag at 1 Hz

interp_flag_ocean_tide_sol1_01	ocean tide (solution 1) interpolation flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	0 = 4 points over ocean; 1 = less than 4 points			

14.13.1.5.3.167 Geocentric ocean tide height (FES) interpolation flag at 1 Hz

interp_flag_ocean_tide_sol2_01	ocean tide (solution 2) interpolation flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	0 = 4 points over ocean; 1 = less than 4 points			

14.13.1.5.3.168 Radiometer along-track averaging flag at 1 Hz

rad_along_track_avg_flag_01	radiometer along-track averaging flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good fail		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.169 Use of climatological values for the computation of Sigma0 atmospheric attenuation

climato_use_flag_01_ku	flag indicating the use of climatological values for the computation of Sigma atmospheric attenuation: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	climato_not_used climato_used		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.170 Ku band Filtered altimeter ionospheric correction at 1 Hz

filtered_iono_cor_alt_qual_01_ku	filtered altimeter ionospheric correction: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b, 2b		
flag_meanings	Flag meanings	filtering interpolation bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.171 Quality flag for echo correction at 18 Hz

echo_cor_range_qual_20_ku	quality flag of echo shape correction on range: 18 Hz Ku band		byte	
institution	LEGOS			
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_ref_track_ 20 lat_ref_track_ 20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.172 Quality flag for geo correction at 18 Hz

geo_cor_range_qual_20_ku	quality flag of geographic correction on range: 18 Hz Ku band		byte	
institution	LEGOS			
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_ref_track_ 20 lat_ref_track_ 20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.173 GPD+ wet tropospheric correction quality flag at 1Hz

gpd_wet_tropo_cor_qual_01	GPD+ wet tropospheric correction quality flag: 1Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.174 Ku and S band Waveform peakiness at 1 Hz and 18 Hz

peakiness_01_ku	peakiness: 1 Hz Ku band		int	
units	Unit name	Count		
add_offset	This offset must be added to the data after reading (and after scaling if	0.0; // double		

	needed)			
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

peakiness_01_s	peakiness: 1 Hz S band		int	
units	Unit name	Count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

peakiness_20_ku	peakiness: 18 Hz Ku band		int	
units	Unit name	Count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

peakiness_20_s	peakiness: 18 Hz S band		int	
units	Unit name	Count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.001; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.175 Ku band Chirp band identifier at 1 Hz and 18 Hz

chirp_band_01_ku	chirp band identifier: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b, 2b		
flag_meanings	Flag meanings	ku_320 ku_80		

		ku_20		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	corresponds to the minimum value of the 20 elementary estimates			

chirp_band_20_ku	chirp band identifier: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b, 2b		
flag_meanings	Flag meanings	ku_320 ku_80 ku_20		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.176 Ku band Chirp band identifier quality flag at 18 Hz

chirp_band_qual_20_ku	error flag for the chirp band id: 18 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.177 S-Band loss flag at 1 Hz

flag_loss_01_s	loss band flag: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	no_loss loss		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.178 Calibration repository selection flag at 18 Hz

flag_cal_selection_20	calibration repository selection flag: 18 Hz		byte	
flag_values	Flag values	1b, 2b, 3b,4b		
flag_meanings	Flag meanings	good		

		extrapol_1 extrapol_2 bad		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Possible values are: 1 meaning \'calibration data found less than 1 second away\', 2 meaning \'calibration data found more than 1 second away and less than 10 minutes away \', 3 meaning \'calibration data found more than 10 minutes away and less than 100 minutes away\', 4 meaning \'calibration data not found in less than 100 minutes away\'. The nominal value is 1.			

14.13.1.5.3.179 USO anomaly flag at 1 Hz

flag_uso_anomaly_01	USO anomaly flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	no_anomaly anomaly		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.180 USO quality flag at 1 Hz

flag_uso_qual_01	USO quality flag: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	good bad		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Set to \'bad\' if the USO anomaly flag (flag_uso_anomaly_01) is set to \'anomaly\' and if the calibration repository selection flag (flag_cal_selection_20) is not set to “good” for one of the 18 Hz measurement. Set to \'good\' otherwise.			

14.13.1.5.3.181 Altimeter instrument flag: Ku and S band flight calibration at 1 Hz

alt_instr_flag_flight_cal_01_ku	altimeter instrument flag flight calibration: 1 Hz Ku band		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	ok error		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	altimeter instrument flag: Flag for availability of Ku Flight calibration corrections.Possible values are: 0 meaning \'calibration parameters available\', 1 meaning \'calibration parameters not available - default values used\'			

alt_instr_flag_flight_cal_01_s	altimeter instrument flag flight calibration: 1 Hz S band		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	altimeter instrument flag: Flag for availability of S Flight calibration corrections.Possible values are: 0 meaning \'calibration parameters available\', 1 meaning \'calibration parameters not available - default values used\'			

14.13.1.5.3.182 Altimeter instrument flag: PTR band id at 1 Hz

alt_instr_flag_ptr_band_id_01	altimeter instrument flag ptr band id: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 4b, 7b		
flag_meanings	Flag meanings	ku_320 ku_80 ku_20 s_160 not_available		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Altimeter instrument flag: PTR calibration Band Identifier field. Possible values are: 0 meaning \'320 MHz (Ku)\', 1 meaning \'80 MHz (Ku)\', 2 meaning \'20 MHz (Ku)\', 4 meaning \'160 MHz (S)\', 7 meaning \'PTR samples not available			

14.13.1.5.3.183 Altimeter instrument flag: decoded redundancy error at 1 Hz

alt_instr_flag_red_error_01	altimeter instrument flag decoded redundancy error: 1 Hz		byte	
flag_values	Flag values	0b, 1b, 2b, 3b		
flag_meanings	Flag meanings	no_mismatch mismatch_hpa mismatch_rfss mismatch_hpa_rfss		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	altimeter instrument flag: Error flag for decoded redundancy flags			

14.13.1.5.3.184 Fault identifier at 18 Hz

fault_id_20	fault identifier: 18 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	0 meaning \'no error\', 1 meaning \'error detected by on-board\'			

14.13.1.5.3.185 Waveform samples fault identifier at 18 Hz

waveform_fault_id_20	waveform samples fault identifier: 18 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	0 meaning \'no error\', 1 meaning \'error detected by on-board\'			

14.13.1.5.3.186 Instrument mode id at data block level at 18 Hz

instr_mode_id_db_20	instrument mode id at data block level: 18 Hz		byte	
flag_values	Flag values	0b, 1b, 2b		
flag_meanings	Flag meanings	tracking		

		pset_trk pset_loop_out		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.187 Ku and S band number of measurement for flight calibration factor evaluation at 18 Hz

flight_cal_numval_01_ku	number of measurement for flight calibration factor evaluation: 1 Hz Ku band		short	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

flight_cal_numval_01_s	number of measurement for flight calibration factor evaluation: 1 Hz S band		short	
units	Unit name	count		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.188 Radiometer instrument flag temperature at 1 Hz

rad_instr_flag_temp_01	radiometer instrument flag temperature: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Radiometer instrument flag: \'Temp flag\' indicating uniformity of CEU temperature. Possible values are: 0 meaning \'temperature consistency\', 1 meaning \'temperature unconsistency\'			

14.13.1.5.3.189 Radiometer instrument flag obdh at 1 Hz

rad_instr_flag_obdh_01	radiometer instrument flag obdh: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	ok error		
coordinates	lon_01 lat_01			

_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	Radiometer instrument flag: \'OBDH\' flag indicating data is missing			

14.13.1.5.3.190 Radiometer instrument flag redundancy indicator at 1 Hz

rad_instr_flag_red_01	radiometer instrument flag redundancy indicator: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	nominal redundant		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	radiometer instrument flag: \'Red\' flag indicating ICU channel redundancy			

14.13.1.5.3.191 Radiometer instrument flag power bus protection at 1 Hz

rad_instr_flag_power_01	radiometer instrument flag power bus protection: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	no_protection protection		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	radiometer instrument flag: \'PBP\' flag indicating power bus protection			

14.13.1.5.3.192 Radiometer instrument flag overvoltage protection at 1 Hz

rad_instr_flag_over_01	radiometer instrument flag overvoltage protection: 1 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	no_protection protection		
coordinates	lon_01 lat_01			
_FillValue	Default value for unused or not computed elements	127b; // byte		
comment	radiometer instrument flag: flag indicating Overvoltage/Overload protection			

14.13.1.5.3.193 Manoeuvre presence flag at 18 Hz

flag_man_pres_20	manoeuvre presence flag: 18 Hz		byte	
flag_values	Flag values	0b, 1b		

flag_meanings	Flag meanings	no_manoeuvre ongoing_manoeuvre		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.194 Manoeuvre plane flag at 18 Hz

flag_man_plane_20	manoeuvre plane flag: 18 Hz		byte	
flag_values	Flag values	0b, 1b		
flag_meanings	Flag meanings	in_plane out_of_plane		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	127b; // byte		

14.13.1.5.3.195 Noise power measurement at 18 Hz

noise_power_20	noise power measurement (1/2048 FFT power unit): 18 Hz		short	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	32767s; // short		

14.13.1.5.3.196 AGC noise power measurement at 18 Hz

agc_noise_power_20	AGC noise power measurement: 18 Hz		int	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		
comment	AGC of noise power measurement			

14.13.1.5.3.197 Reference power value at 18 Hz

ref_power_20	Reference power value: 18 Hz		int	
units	Unit name	dB		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double		
scale_factor	The data must be multiplied by this factor after reading	0.01; // double		
coordinates	lon_20 lat_20			
_FillValue	Default value for unused or not computed elements	2147483647; // int		

14.13.1.5.3.198 Ku and S band Waveform samples at 18 Hz

waveform_fft_20_ku	waveform samples (I2+Q2, 1/2048 FFT power unit): 18 Hz Ku band		short	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	32768.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0; // double		
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	the echo is corrected for the intermediate frequency filter effect			

waveform_fft_20_s	waveform samples (I2+Q2, 1/8192 FFT power unit): 18 Hz S band		short	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	32768.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0; // double		
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	the echo is corrected for the intermediate frequency filter effect			

14.13.1.5.3.199 Ku band Waveform samples from dft at 18 Hz

waveform_dft_20_ku	waveform samples from DFT (I2+Q2, 1/2048 FFT power unit): 18 Hz Ku band		short	
units	Unit name	count		
add_offset	This offset must be added to the data after reading (and after scaling if needed)	32768.0; // double		
scale_factor	The data must be multiplied by this factor after reading	1.0; // double		
_FillValue	Default value for unused or not computed elements	32767s; // short		
comment	the echo is corrected for the intermediate frequency filter effect			

14.13.1.5.3.200 Time-Tag at 2 kHz

time_2k(time_2k)	UTC: 2 kHz		double
units	Unit name	seconds since 2000-01-01 00:00:00.000000"	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	time	
calendar	gregorian		
comment	Seconds elapsed from 2000-01-01, with microsecond resolution		

14.13.1.5.3.201 18 Hz index of the 2 kHz measurement

ind_meas_18hz_2k	18 Hz index of the 2 kHz measurement		short
units	Unit name	count	

14.13.1.5.3.202 Data block confidence flag at 2 kHz

db_conf_flag_2k(time_2k)	data block confidence flag: 2 kHz		byte
flag_values	Flag values	0b, 1b	
flag_meanings	Flag meanings	confident_db not_confident_db	
_FillValue	Default value for unused or not computed elements	127b	
comment	Confidence flag for IEs data block identification as first measurement after a macro-command, to be considered as a warning		

14.13.1.5.3.203 Latitude: 2 kHz

lat_2k(time_2k)	latitude: 2 kHz		int
units	Unit name	degrees_north	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	latitude	
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double	
scale_factor	The data must be multiplied by this factor after reading	1.e-06	
_FillValue	Default value for unused or not computed elements	2147483647	
comment	Positive latitude is North latitude, negative latitude is South latitude		

14.13.1.5.3.204 Longitude: 2 kHz

lon_2k(time_2k)	longitude: 2 kHz		int
units	Unit name	degrees_east	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	longitude	
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.0; // double	
scale_factor	The data must be multiplied by this factor after reading	1.e-06	
_FillValue	Default value for unused or not computed elements	2147483647	
comment	East longitude relative to Greenwich meridian		

14.13.1.5.3.205 Altitude of the satellite: 2 kHz

alt_2k(time_2k)	altitude of the satellite: 2 kHz		int
units	Unit name	m	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	height_above_reference_ellipsoid	
scale_factor	The data must be multiplied by this factor after reading	0.001	
_FillValue	Default value for unused or not computed elements	2147483647	
comment	Altitude of the satellite above the reference ellipsoid		

14.13.1.5.3.206 Orbital altitude rate: 2 kHz

orb_alt_rate_2k (time_2k)	orbital altitude rate: 2 kHz		short
units	Unit name	m/s	
coordinates	lon_2k lat_2k		
scale_factor	The data must be multiplied by this factor after reading	0.001	
_FillValue	Default value for unused or not computed elements	32767s	
comment	Spacecraft height rate provided by Orbit Propagator SW		

14.13.1.5.3.207 Corrected tracker range: 2 kHz Ku band

tracker_range_2k (time_2k)	corrected tracker range: 2 kHz Ku band		int
units	Unit name	m	
coordinates	lon_2k lat_2k		
scale_factor	The data must be multiplied by this factor after reading	0.0001	

add_offset	This offset must be added to the data after reading (and after scaling if needed)	700000	
_FillValue	Default value for unused or not computed elements	2147483647	
comment	Tracker range corrected for USO frequency drift (uso_cor_20), internal path correction (int_path_cor_20_ku) and Doppler correction (dop_cor_l1b_20_ku). It is the distance between the altimeter CoG and the surface height associated to the zero-frequency range gate.		

14.13.1.5.3.208 Corrected AGC: 2 kHz Ku band

agc_2k (time_2k)	corrected AGC: 2 kHz Ku band		short
units	Unit name	dB	
coordinates	lon_2k lat_2k		
scale_factor	The data must be multiplied by this factor after reading	0.01	
_FillValue	Default value for unused or not computed elements	32767s	
comment	AGC corrected for instrumental errors (agc_cor_20_ku)		

14.13.1.5.3.209 Scaling factor for backscatter coefficient evaluation: 2 kHz Ku band

scale_factor_2k (time_2k)	scaling factor for backscatter coefficient evaluation: 2 kHz Ku band		short
units	Unit name	dB	
coordinates	lon_2k lat_2k		
scale_factor	The data must be multiplied by this factor after reading	0.01	
_FillValue	Default value for unused or not computed elements	32767s	
comment	This scaling factor represents the backscatter coefficient for a waveform amplitude equal to 1. It is corrected for AGC instrumental errors (agc_cor_20_ku) and internal calibration (internal_cor_sig0_20_ku)		

14.13.1.5.3.210 Waveform samples: 2 kHz Ku band

waveform_power_2k (time_2k)	waveform samples (I2+Q2, FFT power unit): 2 kHz Ku band		int
units	Unit name	counts	
scale_factor	The data must be multiplied by this factor after reading	0.00048828125	
_FillValue	Default value for unused or not computed elements	2147483647; // int	
comment	Individual Echoes Power waveforms		

14.13.1.5.3.211 Waveform phases: 2 kHz Ku band

waveform_phase_2k (time_2k)	waveform phases: 2 kHz Ku band		int
units	Unit name	radian	
scale_factor	The data must be multiplied by this factor after reading	1.e-06	
_FillValue	Default value for unused or not computed elements	2147483647; // int	
comment	Individual Echoes Phase waveforms. Phase is within [-pi, pi]		

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14.14 AUXILIARY DATA FILES

The following sections define the Auxiliary Data files used by the RA-2/MWR products processor.

Note that the values of SPH_DESCRIPTOR and DS_NAME strings within the RA2/MWR auxiliary products are not included in this document. They are to be found in the corresponding Level 1b Algorithms specification documents (ISARD_ESA_L1B_ESL_DPM_022 iss.18) or Level 2 IODD (PO-ST-RA-0005-CLS iss.7.3).

Note that all the spare fields inside the auxiliary files binary datasets will always be set to zero, according to Annex A (Paragraph A.2.3) of Products Specifications.

14.14.1 RA2 Level 1B Processor Configuration File

This file contains information used to configure the processor, such as thresholds for PCD evaluation or other reference information.

FILE ID: RA2_CON_AX

TYPE: Auxiliary

USE: Level 1B RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS(176 bytes) = 1801 bytes

14.14.1.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD(G) pointing to the GADS*
GADS

The contents of the GADS are detailed in the following table.

Table 14.14.1 RA-2 Processor Configuration File GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Configuration file creation time**	MJD	12	mjd	1
2	**Length of DSR in bytes**	bytes	4	ul	1
3	**spare**	-	4	uc	4
4	**Flag for selection of specific IF filter mask correction processing** 0: no corrections 1: use always Flight Calib 2: use /flight Calib if valid 3: use always ground Calib	-	1	uc	1

N	Description	Units	Byte Size	Data Type	Dim.
5	**Flag for selection of specific USO calibration value** 1: use always Flight Calib 2: use Flight Calib if valid 3: use always ground Calib	-	1	uc	1
6	**Two values in micro-seconds representing the reference values for computed Rx delay test**	microseconds	8	sl	2
7	**Two values representing the reference values for the AGC test**	10^{-2} dB	8	sl	2
8	**Zero padding factor used for PTR evaluation. It must be an integer power of 2.**	-	4	sl	1
9	**Two values representing the reference values for PTR shift test**	10^{-2} FFT filter units	8	sl	2
10	**Two values representing the reference values for PTR power test**	10^{-2} dB	8	sl	2
11	**Positive integer representing the maximum number of measures derived from single PTR measurements to be averaged to get Flight Calibration Correction Parameters for the Ku band.**	-	4	ul	1
12	**Positive integer representing the maximum number of measures derived from single PTR measurements to be averaged to get Flight Calibration Correction Parameters for the S band.**	-	4	ul	1
13	**Positive integer representing the minimum number of calibration data from single Ku PTR measurements required for evaluation of smoothed flight calibration parameters.**	-	2	us	1
14	**Positive integer representing the minimum number of calibration data from single S PTR measurements required for evaluation of smoothed flight calibration parameters.**	-	2	us	1
15	**Positive integer defining the maximum time lag in SP multiples between two Ku PTR measurements.**	-	4	ul	1
16	**Positive integer defining the maximum time lag in SP multiples between two S PTR measurements.**	-	4	ul	1
17	**Positive number in multiples of 10^{-2} defining the scaling multiplicative factor for NPM measurement**	10^{-2}	4	ul	1
18	**Default reference value for redundancy flag of HPA subsystem required to manage event of unknown decoded value in "Red_vec_HPA" flag.** 0: chain A 3: chain B	-	1	uc	1

N	Description	Units	Byte Size	Data Type	Dim.
19	**Default reference value for redundancy flag of RFSS subsystem required to manage event of unknown decoded value in "Red_vec_RFSS" flag.** 0: chain A 3: chain B	-	1	uc	1
20	**Number of OBDH clocks between two consecutive source packets**	-	4	ul	1
21	**Tolerance of the number of OBDH clocks between two consecutive source packets**	-	4	sl	1
22	**Number of USO counter clocks between two consecutive source packets**	-	4	ul	1
23	**Tolerance on number of USO counter clocks between two consecutive source packets**	-	4	sl	1
24	**Offset in multiples of 10^{-2} for Data Blocks Datation Calculation**	10^{-2}	4	sl	1
25	**Offset in multiples of 10^{-2} for waveform delay rate compensation**	10^{-2}	4	sl	1
26	**Time lag in seconds to compare Level 0 product UTC datation and IF Mask Flight Calibration Datation for IF mask selection**	s	4	ul	1
27	**Time lag in seconds to compare Level 0 product UTC datation and USO Calibration Datation for IF mask selection**	s	4	ul	1
28	**Two non-negative values in multiples of 10^{-4} representing the reference values for IF mask quality check**	10^{-4}	8	sl	2
29	**Minimum number of IF Noise spectra to be averaged**	-	4	sl	1
30	**Number of noise samples skipped at edges of FFT filter bank in IF Mask retrieval processing**	-	2	us	1
31	**Number of packets skipped at the beginning of Level 0 Product for IF Mask retrieval processing**	-	2	us	1
32	**Two non negative values representing the reference values for Tx/Rx clock quality check.**	ps	8	sl	2
33	**ISP number in the first Level 0 Product selected for the USO Calibration processing**	-	4	ul	1
34	**ISP number in the second Level 0 product selected for the USO calibration processing**	-	4	ul	1
35	**Minimum time lag between USO datation measurements needed for USO calibration processing**	s	4	ul	1

N	Description	Units	Byte Size	Data Type	Dim.
36	**Threshold for Level 1B SPH field RA2_PROC_THRESH**	10^{-2}%	2	us	1
37	**Threshold for Level 1B SPH field RA2_HEADER_THRESH**	10^{-2}%	2	us	1
38	**Buffer Length for S-Band anomaly flag**	-	2	us	1
39	**Counter for S-Band anomaly flag**	-	2	us	1
40[1]	**step**	SP	2	us	1
41	**Smooth_fact**	10^{-7} ps	2	us	1
42	**USO_correction_switch**		1	uc	1
43[2]	**Threshold for the evaluation of the sample value wraparound, in the anomalous S-band waveform reconstruction algorithm.**	FFT power units	2	ss	1
44	**spares**	-	9	uc	9
TOTAL			**176**		

[1] three new parameters have been added due to the new USO algorithm: the time interval used to calculate each sample of the un-smoothed clock period (step), the smoothing factor used to perform the smoothing and obtain the final clock period data stream (smooth_factor), and a variable that will indicate weather the USO correction algorithm shall be run within the Level 1b, or on the contrary, the USO Clock period shall be taken from the auxiliary file (USO_correction_switch).

[2] the field number is not correlative to the one shown in the Configuration file of the Level 1b reference processor DPM, because 3 fields have been added for the USO correction algorithm.

14.14.2 RA2 Instrument Characterization Data

This file provides data which describes the basic characteristics of the instrument.

FILE ID: RA2_CHD_AX

TYPE: Auxiliary

USE: Level 1B and Level 2 RA-2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (2520) = 4145 bytes

14.14.2.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

The contents of the GADS are detailed in the following table.

Table 14.14.2 RA-2 Instrument Characterization File GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Characterisation file creation time (MJD)**	-	12	mjd	1
2	**Length of DSR in bytes**	bytes	4	ul	1
3	**spare**	-	4	uc	4
4	**Ku antenna gain**	[10-2dB]	4	sl	1
5	**S antenna gain**	[10-2dB]	4	sl	1
6	**Ku band antenna beamwidth (-3dB value)**	[10-6 deg]	4	sl	1

N	Description	Units	Byte Size	Data Type	Dim.
7	**S band antenna beamwidth (-3dB value)**	[10-6 deg]	4	sl	1
8	**Effective Tx-Rx Gain for Ku channel.** 4 values defined, according to HPA and RF subsystems crosstrapping: Tx-A/RFSS-A, Tx-A/RFSS-B, Tx-B/RFSS-B, Tx-B/RFSS-A.	[10-2dB]	16	sl	4
9	**Effective Tx-Rx Gain for S channel.** 2 values defined, one for RFSS-A and one for RFSS-B chains, according to RF subsystem crosstrapping.	[10-2dB]	8	sl	2
10	**Ku band PTR Reference Power value at Microwave Receiver Output.** Four values are defined according to HPA and RF subsystems crosstrapping: Tx-A/RFSS-A, Tx-A/RFSS-B, Tx-B/RFSS-B, Tx-B/RFSS-A	[10-2dBw]	16	sl	4
11	**S band PTR Reference Power value at Microwave Receiver Output.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping.	[10-2dBw]	8	sl	2
12	**Reference AGC used for PTR Reference Power value measurement at Ku band.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping.	[10-2dB]	8	sl	2
13	**Reference AGC used for PTR Reference Power value measurement at S band.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping.	[10-2dB]	8	sl	2
14	**Default Ku band time delay calibration factor in picoseconds derived from PTR measurement.** 4 values are defined according to HPA and RF sub-systems crosstrapping: Tx-A/RFSS-A, Tx-A/RFSS-B, Tx-B/RFSS-B, Tx-B/RFSS-A	[ps]	16	sl	4
15	**Default S band time delay calibration factor in picoseconds derived from PTR measurement.** 2values are defined according to RF sub-systems crosstrapping: RFSS-A, RFSS-B	[ps]	8	sl	2
16	**Default Ku band amplitude calibration factor derived from on ground PTR measurement.** 4 values are defined according to HPA and RF sub-systems crosstrapping: Tx-A/RFSS-A, Tx-A/RFSS-B, Tx-B/RFSSB, Tx-B/RFSS-A	[10-2dB]	16	sl	4
17	**Default S band amplitude calibration factor derived from on ground PTR measurement.** 2values are defined according to RF sub-systems crosstrapping: RFSS-A, RFSS-B	[10-2dB]	8	sl	2
18	**AGC characterization table for AGC signal conversion.** Each table in characterized by two entries (one for each RF attenuator) in the range 0-31 dB with 1 dB step resolution. Two Tables are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping.	[10-2dB]	512	sl	128

N	Description	Units	Byte Size	Data Type	Dim.
19	**Correction table for AGC fine conversion** Defined as 301 entries in the range 0..3 dB with 0.01 dB step resolution. A unique conversion table is defined for both SPSA-A and SPSA-B units. Non linearities of on board AGC loop can be compensated through this table.	[10-2dB]	1204	sl	301
20	**AGC characterization table for NPM calibration.** The table is characterised by 63 values. Two Tables are defined, one for RFSS-A and one for RFSS-B, according to RF subsystem crosstrapping.	[10-2dB]	504	sl	126
21	**Differential Delay calibration factor for the time delay measurement of the Ku channel defined during ground test activity.** It includes FEE Tx/Rx vs. calibration paths differential delay, equiphase antenna plane - antenna flange path, antenna flange - panel flange path. Two values (non negative reals) are defined, one for RFSS-A and one for RFSS-B, according to RF subsystem crosstrapping.	[ps]	8	sl	2
22	**Differential Delay calibration factor for the time delay measurement of the S channel defined during ground test activity.** It includes FEE Tx/Rx vs. calibration paths differential delay, equiphase antenna plane - antenna flange path, antenna flange - panel flange path. Two values (non negative reals) are defined, one for RFSS-A and one for RFSS-B, according to RF subsystem crosstrapping.	[ps]	8	sl	2
23	**Loss Calibration factor for the Ku channel defined during ground test activity.** Four real values are defined according to HPA RF subsystems crosstrapping: HPA-A/RFSS-A, HPA-A/RFSS-B, HPA-B/RFSS-B, HPA-B/RFSS-A	[10-2dB]	16	sl	4
24	**Loss Calibration factor for the S channel defined during ground test activity.** Two real values are defined, one for RFSS-A and one for RFSS-B, according to RF subsystem crosstrapping.	[10-2dB]	8	sl	2
25	**Nominal Tx pulse length (20 microsec).**	[ps]	4	sl	1
26	**first Ku nominal chirp bandwidth (20 Mhz).**	[kHz]	4	sl	1
27	**second Ku nominal chirp bandwidth (80 Mhz).**	[kHz]	4	sl	1
28	**third Ku nominal chirp bandwidth (320 Mhz).**	[kHz]	4	sl	1
29	**S nominal chirp bandwidth (160 Mhz).**	[kHz]	4	sl	1
30	**Chirp Slope of first Ku chirp.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping. Remark: the effective chirp slope value, including the actual sign of the slope, shall be introduced in this field.	[kHz/ microsecond]	8	sl	2

N	Description	Units	Byte Size	Data Type	Dim.
31	**Chirp Slope of second Ku chirp.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping. Remark: the effective chirp slope value, including the actual sign of the slope, shall be introduced in this field	[kHz/ microsecond]	8	sl	2
32	**Chirp Slope of third Ku chirp.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping. Remark: the effective chirp slope value, including the actual sign of the slope, shall be introduced in this field	[kHz/ microsecond]	8	sl	2
33	**Chirp Slope of S chirp.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping. Remark: the effective chirp slope value, including the actual sign of the slope, shall be introduced in this field.	[kHz/ microsecond]	8	sl	2
34	**Spares**	-	4	uc	4
35	**Tx/Rx Clock period derived from USO frequency calibration.** Two values (non negative reals) are defined, one for RFSSA and one for RFSS-B, according to RF subsystem crosstrapping.	[10-6ps]	16	ud	2
36	**Ku Pulse Repetition Interval** defined as a positive integer in multiples of fundamental Tx/ Rx clock periods (nominal value: 44560)	none	4	ul	1
37	**Ambiguity Order for Ku band: 9** (positive integer)	none	4	ul	1
38	**Ku radar wavelength.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping.	[10-6m]	8	sl	2
39	**S radar wavelength.** Two values are defined, one for RFSS-A and one for RFSSB, according to RF subsystem crosstrapping.	[10-6m]	8	sl	2
40	**Factor for PTR width computation**	10-8	4	ul	1
41	**spares**	-	12	uc	12
TOTAL			**2520**		

14.14.3 RA2 IF Mask Data File

The IF Mask data file is used to correct the amplitude of the waveform samples for the instrument IF filter shape.The IF mask may be derived on-ground or in-flight. Also, the on-ground data may differ for chain A and chain B. Thus, three files have been defined. All three files share a common format.

FILE ID: RA2_IFF_AX -- IF Mask from in-flight data

TYPE: Auxiliary

USE: Level 1B processing

UPDATED: IFA and IFB-- infrequently, IFF -- periodically, when satellite commanded into IF Calibration mode. This occurs with TBD frequency.

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (556) = 2181 bytes

14.14.3.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

The contents of the GADS are detailed in the following table.

Table 14.14.3 RA-2 IF Mask File GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**IF mask file creation time**	-	12	mjd	1
2	**Length of DSR in bytes**	bytes	4	ul	1
3	**spare**	-	4	uc	4
4	**IF mask reference time**	MJD	12	mjd	1
5	**OBDH datation word (43 bits)**	[1/524288 s]	8	ud	1

6	**128 IF Correction Mask samples**	10^{-6}	512	ul	128
7	**RFSS Redundancy Flag** 0: chain A 3: chain B	-	1	uc	1
8	**Quality Flag** 0: no errors 1: noise spectra equal to zero 2: error in inversion 3: computed IF mask samples out of range 4: averaging less than the minimum 5: error in packet length 6: Tx bit errors 7: RF subsystem chain is not defined	-	1	uc	1
9	**Number of averaged spectra**	-	2	us	1
TOTAL			**556**		

14.14.4 RA2 USO and PTR Repository file

The USO clock frequency was not constant during the ENVISAT mission. This file contains the USO clock frequency extracted in off-line mode after the end of the mission. The USO period has been computed also deoverlapping and smoothing the series in both anomaly (by cubic splines interpolation) and not anomaly scenarios (by running window averaging. The USO clock period is used to calculate the calibrated AGC and the Window Time Reference Extraction.

The Point Target Response (PTR) time delay calibration factor is computed by deoverlapping and smoothing of the PTR, after calculating the PTR parameters from a FFT computation with an enhanced Zero Padding Factor.

FILE ID: RA2_CAL_AX – USO and PTR repository from the whole ENVISAT mission

TYPE: Auxiliary

USE: Level 1B processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + DSs (70000 approximately) = 2181 bytes

14.14.4.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

The content of the GADS is detailed in the following table. The GADS is repeated every second and there is one file each satellite cycle. It contains USO frequency and PTR flight time delay extracted from RA2 Level 0 files computation in off-line mode after the end of the mission.

Table 14.14.4 RA-2 CAL repository GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Decimal days from 01-01-2000**	days	8	d	1

2	**PTR flight time delay for Ku band**	10^{-8} ns	4	sl	1
3	**PTR flight time delay for S band**	10^{-8} ns	4	sl	4
4	**PTR flight differential power for Ku band**	10^{-9} dB	4	sl	1
5	**PTR flight differential power for S band**	10^{-9} dB	4	sl	1
6	**USO frequency**	psec	8	d	128
TOTAL			**32**		

14.14.5 Ionospheric Coefficients File

This file contains the values of the polynomial coefficients to be used in the computation of the ionospheric correction from the Bent model. These coefficients cover a year.

FILE ID: RA2_IOC_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Once per year (nominally never updated)

SIZE: MPH(1247 bytes) + SPH(378 bytes) + DSs (184608 bytes) = 186233 bytes

14.14.5.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
Coefficients GADS

14.14.5.1.1 Coefficients GADS

The GADS consists of several GADS records (GADSR). Each GADSR contains a set of coefficients corresponding to one month (January to December) where the first set of coefficients is recorded followed by the second set of coefficients. The first set of coefficients (WF) is related to the f0F2 (critical frequency) parameters and is composed of 13x76x3 (j,k,l) coefficients for each month. The second set of coefficients (WM) is related to the M(3000)F2 (ratio of the maximum usable frequency to the critical frequency) parameters and is composed of 9x49x2 (j,k,l) coefficients for each month.

Table 14.14.5 RA2_IOC_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.

1	**Coefficient values** Values are ordered as follows: polynomial coefficients WFi,1,1,1 WFi,1,1,2 WFi,1,1,3 WFi,1,2,1 .... WFi,13,76,3 WMi,1,1,1 WMi,1,1,2 WMi,1,2,1 .... WMi,9,49,2	-	15384	fl	3846
TOTAL			**15384**		

14.14.6 Mean Sea Surface map (solution 1)

This file contains the values of the mean sea surface heights of the CNES_CLS-2011 model. The values are recorded on a regular grid. The coverage of the grid is from 0 to 21598 minutes in longitude and from -5400 to 5398 minutes in latitude. The resolution of the grid is 2 minutes in longitude and 2 minutes in latitude (which correspond to 10800 GADSRs).One value is recorded at each gridpoint.

FILE ID: RA2_MS1_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Once per year

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs(approx. 200 MBytes)

14.14.6.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.6.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.6 RA2_MS1_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**LAT_GRID_SIZE=**	keyword	14	uc	14
	Resolution of the grid in latitude (dφ)	degrees	15	Afl	1
	<deg> or <min>	units	5	uc	5

N	Description	Units	Byte Length	Data Type	Dim.
	newline character	terminator	1	uc	1
2	**LAT_FIRST=**	keyword	10	uc	10
	Latitude of first point on the grid (φf)	degrees	15	Afl	1
	<deg> or <min>	units	5	uc	5
	newline character	terminator	1	uc	1
3	**LAT_LAST=**	keyword	9	uc	9
	Latitude of last point on the grid (φl)	degrees	15	Afl	1
	<deg> or <min>	units	5	uc	5
	newline character	terminator	1	uc	1
4	**LON_GRID_SIZE=**	keyword	14	uc	14
	Resolution of the grid in longitude (d)	degrees	15	Afl	1
	<deg> or <min>	units	5	uc	5
	newline character	terminator	1	uc	1
5	**LON_FIRST=**	keyword	10	uc	10
	Longitude of first point on the grid (f)	degrees	15	Afl	1
	<deg> or <min>	units	5	uc	5
	newline character	terminator	1	uc	1
6	**LON_LAST=**	keyword	9	uc	9
	Longitude of last point on the grid (l)	degrees	15	Afl	1
	<deg> or <min>	units	5	uc	5
	newline character	terminator	1	uc	1
7	**DEF=**	keyword	4	uc	4
	Default value of the grid values(def)	-	11	Al	1
	newline character	terminator	1	uc	1
8	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**259**		

14.14.6.1.2 Grid Data GADS

This GADS contains several GADSRs, which provides the mean sea surface data in grid format. Each record corresponds to a longitude value.The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.7 RA2_MS1_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**MSS Heights (from first latitude to last latitude)** Ordered as follows: MSS height at first latitude point MSS height at second latitude point .... MSS height at last latitude point.	mm	21604	sl	5401
TOTAL			**21604**		

14.14.7 Mean Sea Surface map (solution 2)

This file contains the values of the mean sea surface heights of the DTU10 model. The values are recorded on a regular grid. The coverage of the grid is from 0 to 21598 minutes in longitude and from -5399 to 5399 minutes in latitude. The resolution of the grid is 2 minutes in longitude and 2 minutes in latitude.One value is recorded at each gridpoint.

FILE ID: RA2_MS2_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Once per year

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs(approx. 222.7 MBytes)

14.14.7.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.7.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.7.1.2 Grid Data GADS

This GADS contains several GADSRs, which provides the mean sea surface data in grid format. Each record corresponds to a longitude value.The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.8 RA2_MS2_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.

1	**MSS Heights (from first latitude to last latitude)** Ordered as follows: MSS height at first latitude point MSS height at second latitude point .... MSS height at last latitude point.	mm	21604	sl	5401
TOTAL			**21604**		

14.14.8 Pole Location Data File

This file contains the x and y positions of the pole relative to a mean position. This file is used to compute the geocentric pole tide height.

FILE ID: RA2_POL_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: A few times per week (the file coverage is 10 years, but the values are updated when re-estimated 2 to 3 times per week)

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (73 kBytes)= 74.16 kBytes

14.14.8.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

14.14.8.1.1 GADS

The GADS contains 3650 GADSRs. Each record corresponds to one day, and thus the file covers a period of 10 years. The format of the GADSR is shown below.

Table 14.14.9 RA2_POL_AX GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**time stamp**	mjd	12	mjd	1
2	**x-position of the pole relative to a mean position**	arcsec	4	fl	1
3	**y-position of the pole relative to a mean position**	arcsec	4	fl	1

TOTAL		**20**		

14.14.9 Platform Data File

This file contains the distance between the antenna phase center and the center of gravity of the satellite (nadir projection). It is used to compute the correction to reference the altimeter range measurement to the center of gravity.

FILE ID: RA2_PLA_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: TBD

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (TBD)= TBD

14.14.9.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

14.14.9.1.1 GADS

The GADS contains TBD GADSRs. The format of the GADSR is shown below.

Table 14.14.10 RA2_PLA_AX GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**time stamp**	mjd	12	mjd	1
2	**centre of mass correction (distance between antenna phase centre and the centre of gravity of the satellite)**	m	4	fl	1
TOTAL			**16**		

14.14.10 Ocean / Ice2 Configuration (System) File

This file contains the processing parameters used for the ocean/ice2 processing.

FILE ID: RA2_SOI_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(3178 bytes) + DSs(16008 bytes) = 20433 bytes

14.14.10.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 11 DSD *DSD pointing to the Node A11 GADS* *DSD pointing to the Node A12 GADS* *DSD pointing to the Node A21 GADS* *DSD pointing to the Node A22 GADS* *DSD pointing to the Node A24 GADS* *DSD pointing to the Node A31 GADS* *DSD pointing to the Node A32 GADS* *DSD pointing to the Node A33 GADS* *DSD pointing to the Node A34 GADS* *DSD pointing to the Node A35 GADS* *DSD pointing to the Node A35 GADS* *DSD pointing to the Node A41 GADS*
Node A11 GADS
Node A12 GADS
Node A21 GADS
Node A22 GADS
Node A24 GADS
Node A31 GADS
Node A32 GADS
Node A33 GADS

Node A34 GADS
Node A35 GADS
Node A41 GADS

14.14.10.1.1 Node A11 GADS

The format of the GADS is shown below.

Table 14.14.11 RA2_SOI_AX Node A11 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Centre of the averaged measurement**	-	8	do	1
2	**Number of Ku band FFT samples**	-	4	sl	1
3	**Number of Ku band DFT samples**	-	4	sl	1
4	**Total number of Ku band waveforms samples**	-	4	sl	1
5	**Total number of S band waveforms samples**	-	4	sl	1
6	**DFT abscissa numbering offset**	-	4	sl	1
7	**Radial distance away from nadir point at which land contamination would be sufficient to corrupt the path delay by 5mm**	m	8	do	1
8	**Reference Tx/Rx clock period**	10^{-6}ps	8	do	1
9	**Spare**		40	uc	1
TOTAL			**84**		

14.14.10.1.2 Node A12 GADS

The format of the GADS is shown below.

Table 14.14.12 RA2_SOI_AX Node A12 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Compatibility threshold for the pole location data**	s	8	do	1
2	**Threshold for meteo data nominal interpolation**	s	8	do	1
3	**Threshold for meteo data degraded interpolation**	s	8	do	1
4	**Threshold for meteo data extrapolation**	s	8	do	1

5	**Expected values of the indicator for meteo parameters**	-	28	sl	7
6	**Number of vertical levels to be extracted from profiles files**	-	4	sl	1
7	**Spare**	-	40	uc	1
TOTAL			**104**		

14.14.10.1.3 Node A21 GADS

The format of the GADS is shown below.

Table 14.14.13 RA2_SOI_AX Node A21 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Minimum expected abscissa of the central sample - ice2**	-	32	do	4
2	**Maximum expected abscissa of the central sample - ice2**	-	32	do	4
3	**Option for thermal noise computation - ice2**	-	16	sl	4
4	**Abscissa of the first sample for noise estimation - ice2**	-	32	do	4
5	**Abscissa of the last sample for noise estimation - ice2**	-	32	do	4
6	**Minimum abscissa of the leading edge - ice2**	-	32	do	4
7	**Thermal noise weighting factor for leading edge id. - ice2**	-	32	do	4
8	**Maximum abscissa for leading edge evaluation - ice2**	-	32	do	4
9	**Leading edge width threshold - ice2**	s	32	do	4
10	**Maximum left gap of the leading edge - ice2**	-	32	do	4
11	**Thermal noise weighting factor for estim. conditions - ice2**	-	32	do	4
12	**Left shift of the beginning of the leading edge - ice2**	-	32	do	4
13	**Right shift of the end of the leading edge - ice2**	-	32	do	4
14	**Minimum abscissa of the estimation window - ice2**	-	32	do	4
15	**Maximum abscissa of the estimation window - ice2**	-	32	do	4
16	**Right offset of the estimation window - ice2**	-	32	do	4
17	**Maximum abscissa of the slope window - ice2**	-	32	do	4
18	**Maximum abscissa of the slope window for mispointing - ice2**	-	32	do	4

N	Description	Units	Byte Size	Data Type	Dim.
19	**Width of the first slope window - ice2**	s	32	do	4
20	**Width of the second slope window - ice2**	s	32	do	4
21	**Width of the slope window for mispointing - ice2**	s	32	do	4
22	**Minimum number of iterations in the estimation process – ice2**	-	16	sl	4
23	**Maximum number of iterations in the estimation process – ice2**	-	16	sl	4
24	**Maximum value of the epoch increments - ice2**	s	32	do	4
25	**Maximum value of the width of leading edge – ice2**	m	32	do	4
26	**Maximum value of the amplitude increments – ice2**	FFT power unit	32	do	4
27	**Minimum value of the width of leading edge – ice2**	m	32	do	4
28	**Minimum value of the amplitude – ice2**	FFT power unit	32	do	4
29	**Threshold of the MQE ratio testing – ice2**	-	32	do	4
30	**Epoch initialization value – ice2**	m	32	do	4
31	**Width of the leading edge initialization value – ice2**	m	32	do	4
32	**Default thermal noise level**	FFT power unit	32	do	4
33	**Limit argument for the erf function**	-	8	do	1
34	**Factor applied to the WF maximum to obtain the LE threshold**	-	32	do	4
35	**Minimum abscissa of the mispointing estimation ice2**	-	32	do	4
36	**Maximum abscissa of the mispointing estimation ice2**	-	32	do	4
37	**Spare**	-	32	uc	1
TOTAL			**1112**		

14.14.10.1.4 Node A22 GADS

The format of the GADS is shown below.

Table 14.14.14 RA2_SOI_AX Node A22 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Skewness coefficient - ocean**	-	32	do	4

N	Description	Units	Byte Size	Data Type	Dim.
2	**Minimum expected abscissa of the central sample - ocean**	-	32	do	4
3	**Maximum expected abscissa of the central sample - ocean**	-	32	do	4
4	**Option for thermal noise computation - ocean**	-	16	sl	4
5	**Abscissa of the first sample for noise computation - ocean**	-	32	do	4
6	**Abscissa of the last sample for noise computation - ocean**	-	32	do	4
7	**Width of the amplitude window - ocean**	-	32	do	4
8	**Abscissa of the first sample for estimation - ocean**	-	32	do	4
9	**Abscissa of the last sample for estimation - ocean**	-	32	do	4
10	**Thermal noise weighting factor for estim. conditions - ocean**	-	32	do	4
11	**Ice2 MQE threshold - ocean**	-	32	do	4
12	**Weighting factor for amplitude estimation - ocean**	-	32	do	4
13	**Normalised amplitude threshold for epoch init. - ocean**	-	32	do	4
14	**Default value of SigmaC - ocean**	s	32	do	4
15	**Maximum number of iterations for the uniform LSE - ocean**	-	16	sl	4
16	**Uniform weighting constant - ocean**	-	32	do	4
17	**Minimum value of the adaptative gain Lambda - ocean**	-	32	do	4
18	**Maximum value of the adaptative gain Lambda - ocean**	-	32	do	4
19	**Width of the fine estimation window - ocean**	s	32	do	4
20	**Half width of the leading edge weighting zone - ocean**	-	32	do	4
21	**Order 0 weighting coef. for the first plateau - ocean**	-	32	do	4
22	**Order 1 weighting coef. for the first plateau - ocean**	-	32	do	4
23	**Order 2 weighting coef. for the first plateau - ocean**	-	32	do	4
24	**Order 3 weighting coef. for the first plateau - ocean**	-	32	do	4
25	**Order 4 weighting coef. for the first plateau - ocean**	-	32	do	4
26	**Order 5 weighting coef. for the first plateau - ocean**	-	32	do	4
27	**Order 0 weighting coef. for the leading edge - ocean**	-	32	do	4

N	Description	Units	Byte Size	Data Type	Dim.
28	**Order 1 weighting coef. for the leading edge - ocean**	-	32	do	4
29	**Order 2 weighting coef. for the leading edge - ocean**	-	32	do	4
30	**Order 3 weighting coef. for the leading edge - ocean**	-	32	do	4
31	**Order 4 weighting coef. for the leading edge - ocean**	-	32	do	4
32	**Order 5 weighting coef. for the leading edge - ocean**	-	32	do	4
33	**Order 0 weighting coef. for the trailing edge - ocean**	-	32	do	4
34	**Order 1 weighting coef. for the trailing edge - ocean**	-	32	do	4
35	**Order 2 weighting coef. for the trailing edge - ocean**	-	32	do	4
36	**Order 3 weighting coef. for the trailing edge - ocean**	-	32	do	4
37	**Order 4 weighting coef. for the trailing edge - ocean**	-	32	do	4
38	**Order 5 weighting coef. for the trailing edge -ocean**	-	32	do	4
39	**First initial value of the MQE - ocean**	-	32	do	4
40	**Second initial value of the MQE - ocean**	-	32	do	4
41	**Maximum number of iterations of the weighted LSE - ocean**	-	16	sl	4
42	**Minimum SWH value in the estimation process - ocean**	m	32	do	4
43	**Maximum SWH value in the estimation process - ocean**	m	32	do	4
44	**Minimum number of iterations in the estim. process - ocean**	-	16	sl	4
45	**Threshold of the MQE ratio testing - ocean**	-	32	do	4
46	**Spare**		40	uc	1
TOTAL			**1416**		

14.14.10.1.5 Node A24 GADS

The format of the GADS is shown below.

Table 14.14.15 RA2_SOI_AX Node A24 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**MQE threshold**	-	32	do	4
2	**Averaging threshold for the altimeter range**	-	16	sl	4

N	Description	Units	Byte Size	Data Type	Dim.
3	**Averaging threshold for the significant waveheight**	-	16	sl	4
4	**Averaging threshold for the backscatter coefficient**	-	16	sl	4
5	**Averaging threshold for the off-nadir angle**	-	16	sl	4
6	**Weighting factor for altimeter range edition**	-	32	do	4
7	**Weighting factor for significant waveheight edition**	-	32	do	4
8	**Weighting factor for backscatter coefficient edition**	-	32	do	4
9	**Weighting factor for off-nadir angle edition**	-	32	do	4
10	**Spare**	-	40	uc	1
TOTAL			**264**		

14.14.10.1.6 Node A31 GADS

The format of the GADS is shown below.

Table 14.14.16 RA2_SOI_AX Node A31 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Maximum value of solar flux**	10^{-22} W/(m^{2}Hz)	8	do	1
2	**Maximum order of the devel. of f0F2 geographical function in longitude**	-	4	sl	1
3	**Param. giving the maximum indexes of f0F2 functions for an order m**	-	36	sl	9
4	**NMAX**	-	4	sl	1
5	**Param. defining subset of f0F2 functions providing M(3000)F2 func**	-	40	sl	10
6	**Number of harmonics in the development of f0F2 and M(3000)F2**	-	8	sl	2
7	**Latitude of the North magnetic pole**	radians	8	do	1
8	**Longitude of the North magnetic pole**	radians	8	do	1
9	**Header of table YMTAB for the calculation of YM in hloc**	hour	24	do	3
10	**Header of table YMTAB for the calculation of YM in f0F2**	MHz	24	do	3
11	**12 values of YM [9]**	km	864	do	108

N	Description	Units	Byte Size	Data Type	Dim.
12	**Header of table YRAT1 for the calculation of RAT1 in DSZA**	degrees	24	do	3
13	**Header of table YRAT1 for the calculation of RAT1 in hloc**	hour	24	do	3
14	**7 values of YRAT1 [4]**	-	224	do	28
15	**Header of table YRAT2 for the calculation of RAT2 in DSZA**	degrees	24	do	3
16	**Header of table YRAT2 for the calculation of RAT2 in hloc**	hour	24	do	3
17	**7 values of YRAT2 [2]**	-	112	do	14
18	**Scale factor threshold for YT**	-	8	do	1
19	**Critical frequency threshold for YT**	MHz	8	do	1
20	**Header of tables SLOP and CEPT in fqF2**	MHz	24	do	3
21	**Header of tables SLOP and CEPT in φm**	degrees	24	do	3
22	**4 values of SLOP(1) [3]**	-	96	do	12
23	**4 values of SLOP(2) [3]**	-	96	do	12
24	**4 values of SLOP(3) [3]**	-	96	do	12
25	**4 values of CEPT(1) [3]**	-	96	do	12
26	**4 values of CEPT(2) [3]**	-	96	do	12
27	**4 values of CEPT(3) [3]**	-	96	do	12
28	**Header of table RATK for the calculation of RAT1 in DSZA**	degrees	24	do	3
29	**Header of table RATK for the calculation of RAT1 in hloc**	hour	24	do	3
30	**4 values of RATK(1) [4]**	-	128	do	16
31	**4 values of RATK(2) [4]**	-	128	do	16
32	**4 values of RATK(3) [4]**	-	128	do	16
33	**Spare**	-	40	uc	1
TOTAL			**2572**		

14.14.10.1.7 Node A32 GADS

Table 14.14.17 RA2_SOI_AX Node A32 GADS Format

N	Description	Units	Byte Size	Data Type	Dim
1	**Interpolation windows size for MSS**		4	sl	1
2	**Interpolation windows size for geoid**		4	sl	1
3	**Spare**		40	uc	1
TOTAL			**48**		

14.14.10.1.8 Node A33 GADS

The format of the GADS is shown below.

Table 14.14.18 RA2_SOI_AX Node A33 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Frequencies of the astronomical variables at 1/1/1900 0h (mean longitude of the moon, mean longitude of the sun, mean longitude of the lunar perigee, opposite of the mean longitude of the lunar ascending node, mean longitude of the solar perigee)**	degrees/day	40	do	5
2	**Phases of the astronomical variables at 1/1/1900 0h (mean longitude of the moon, mean longitude of the sun, mean longitude of the lunar perigee, opposite of the mean longitude of the lunar ascending node, mean longitude of the solar perigee)**	degrees	40	do	5
3	**Solution 1 admittance coefficients 'a' for a tidal wave number 11 to 28**	-	144	do	18
4	**Indexes of solution 1 admittance cofficients 'a' for a tidal wave number 11 to 28**	-	72	sl	18
5	**Solution 1 admittance coefficients 'b' for a tidal wave number 11 to 28**	-	144	do	18
6	**Indexes of solution 1 admittance cofficients 'b' for a tidal wave number 11 to 28**	-	72	sl	18
7	**Solution 1 admittance coefficients 'c' for a tidal wave number 11 to 28**	-	144	do	18
8	**Indexes of solution 1 admittance cofficients 'c' for a tidal wave number 11 to 28**	-	72	sl	18

N	Description	Units	Byte Size	Data Type	Dim.
9	**Frequency of the solution 1 tidal wave number 1 to 28**	radians/s	224	do	28
10	**Solution 2 admittance coefficients 'a' for a tidal wave number 12 to 29**	-	144	do	18
11	**Indexes of solution 2 admittance coefficients 'a' for tidal wave number 12 to 29**	-	72	sl	18
12	**Solution 2 admittance coefficients 'b' for tidal wave number 12 to 29**	-	144	do	18
13	**Indexes of solution 2 admittance coefficients 'b' for tidal wave number 12 to 29**	-	72	sl	18
14	**Solution 2 admittance coefficients 'c' for tidal wave number 12 to 29**	-	144	do	18
15	**Indexes of solution 2 admittance coefficients 'c' for tidal wave number 12 to 29**	-	72	sl	18
16	**Frequency of the solution 2 tidal wave number 1 to 29**	radians/s	232	do	29
17	**Frequency of the dynamical long period tidal wave number 1 to 29**	radians/s	32	do	4
18	**X averaged pole coordinate**	arcseconds	8	do	1
19	**Y averaged pole coordinate**	arcseconds	8	do	1
20	**Love numbers (H2, K2, H3, K3)**	-	32	do	4
21	**Scale amplitude factor**	-	8	do	1
22	**Gravity**	ms^{-2}	8	do	1
23	**Spare**	-	24	uc	1
TOTAL			**1952**		

14.14.10.1.9 Node A34 GADS

The format of the GADS is shown below.

Table 14.14.19 RA2_SOI_AX Node A34 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Time intervals for MWR (interp, extrap, no gap)**	s	24	do	3
2	**Header of the wind table (res, min, max)**	dB	24	do	3
3	**Tabulated values of RA-2 windspeed**	m/s	592	do	74
4	**First coefficient for computation of attenuation with**	dB	16	do	2

N	Description	Units	Byte Size	Data Type	Dim.
	model path delay (Ku and S)				
5	**Second coefficient for computation of attenuation with model path delay (Ku and S)**	dB/m	16	do	2
6	**Climatological value for Ku-Band backscatter coeff.**	dB	8	do	1
7	**Time intervals for RA2 (interp, extrap, no gap)**	s	24	do	3
8	**Rain flag coefficient**	-	8	do	1
9	**Liquid content threshold**	Kg/m2	8	do	1
10	**Delta sigma0 difference threshold**	dB	8	do	1
11	**Header of the expected Ku-band sigma0 (res,min,max)**	dB	24	do	3
12	**Tabulated values of expected Ku-Band sigma0**	dB	4000	do	500
13	**Tabulated values of uncertainty of expected Ku-Band sigma0**	dB	4000	do	500
14	**Rain rate coefficient 'a'**	dB/km	8	do	1
15	**Rain rate coefficient 'b'**	-	8	do	1
16	**Climatological freezing level value**	km	8	do	1
17	**Threshold on freezing level**	km	8	do	1
18	**Threshold on rain rate**	Mm/h	8	do	1
19	**Min value of TB23**	K	8	do	1
20	**Min value of TB36**	K	8	do	1
21	**Number of neurons**	-	4	sl	1
22	**Mean value for sigma0 in Ku band**	dB	8	do	1
23	**Standard deviation value for sima0 in Ku band**	dB	8	do	1
24	**Mean value for TB23**	K	8	do	1
25	**Standard deviation value for TB23**	K	8	do	1
26	**Mean value for TB36**	K	8	do	1
27	**Standard deviation value for TB36**	K	8	do	1
28	**Mean value for the atmospheric attenuation in Ku band**	dB	8	do	1
29	**Standard deviation value for the atmospheric attenuation in Ku-band**	dB	8	do	1

N	Description	Units	Byte Size	Data Type	Dim.
30	**W1_sigma0, weights applied to Sigma0_Ku at the first layer of the MWR neural network for the atmospheric attenuation in Ku-band**	-	96	do	12
31	**W1_TB23 weights applied to TB23 at the first layer of the MWR neural network for the atmospheric attenuation in Ku-band**	-	96	do	12
32	**W1_TB36 weights applied to TB36 at the first layer of the MWR neural network for the atmospheric attenuation in Ku-band**	-	96	do	12
33	**W2, weights applied at the second layer of the MWR neural network, for the atmospheric attenuation in Ku-Band**	-	96	do	12
34	**Bias1, bias applied at the first layer of the MWR neural network, for the atmospheric attenuation in Ku-Band**	-	96	do	12
35	**Bias2, bias applied at the first layer of the MWR neural network, for the atmospheric attenuation in Ku-Band**	-	8	do	1
36	**Mean value for the atmospheric attenuation in S band**	dB	8	do	1
37	**Standard deviation value for the atmospheric attenuation in S band**	dB	8	do	1
38	**W1_sigma0 weights applied to sigma0_Ku at the first layer of the MWR neural network for the atmospheric attenuation in S-band**	-	96	do	12
39	**W1_TB23 weights applied to TB23 at the first layer of the MWR neural network for the atmospheric attenuation in S-band**	-	96	do	12
40	**W1_TB36 weights applied to TB36 at the first layer of the MWR neural network for the atmospheric attenuation in S-band**	-	96	do	12
41	**W2, weights applied at the second layer of the MWR neural network, for the atmospheric attenuation in S-Band**	-	96	do	12
42	**Bias1, bias applied at the first layer of the MWR neural network, for the atmospheric attenuation in S-Band**	-	96	do	12
43	**Bias2, bias applied at the first layer of the MWR neural network, for the atmospheric attenuation in S-Band**	-	8	do	1
44	**Mean value for the wet tropospheric correction**	cm	8	do	1

N	Description	Units	Byte Size	Data Type	Dim.
45	**Standard deviation value for the wet tropospheric correction**	cm	8	do	1
46	**W1_sigma0 weights applied to sigma0_Ku at the first layer of the MWR neural network for the wet tropospheric correction**	-	96	do	12
47	**W1_TB23 weights applied to TB23 at the first layer of the MWR neural network for the wet tropospheric correction**	-	96	do	12
48	**W1_TB36 weights applied to TB36 at the first layer of the MWR neural network for the wet tropospheric correction**	-	96	do	12
49	**W2, weights applied at the second layer of the MWR neural network, for the wet tropospheric correction**	-	96	do	12
50	**Bias1, bias applied at the first layer of the MWR neural network, for the wet tropospheric correction**	-	96	do	12
51	**Bias2, bias applied at the first layer of the MWR neural network, for the wet tropospheric correction**	-	8	do	1
52	**Mean value for the water vapour content**	g/cm2	8	do	1
53	**Standard deviation value for the water vapour content**	g/cm2	8	do	1
54	**W1_sigma0 weights applied to sigma0_Ku at the first layer of the MWR neural network for the water vapour content**	-	96	do	12
55	**W1_TB23 weights applied to TB23 at the first layer of the MWR neural network for the water vapour content**	-	96	do	12
56	**W1_TB36 weights applied to TB36 at the first layer of the MWR neural network for the water vapour content**	-	96	do	12
57	**W2, weights applied at the second layer of the MWR neural network, for the water vapour content**	-	96	do	12
58	**Bias1, bias applied at the first layer of the MWR neural network, for the water vapour content**	-	96	do	12
59	**Bias2, bias applied at the first layer of the MWR neural network, for the water vapour content**	-	8	do	1
60	**Mean value for the liquid water content**	mg/cm2	8	do	1
61	**Standard deviation value for the liquid water content**	mg/cm2	8	do	1
62	**W1_sigma0 weights applied to sigma0_Ku at the first layer of the MWR neural network for the liquid water content**	-	96	do	12

N	Description	Units	Byte Size	Data Type	Dim.
63	**W1_TB23 weights applied to TB23 at the first layer of the MWR neural network for the liquid water content**	-	96	do	12
64	**W1_TB36 weights applied to TB36 at the first layer of the MWR neural network for the liquid water content**	-	96	do	12
65	**W2, weights applied at the second layer of the MWR neural network, for the liquid water content**	-	96	do	12
66	**Bias1, bias applied at the first layer of the MWR neural network, for the liquid water content**	-	96	do	12
67	**Bias2, bias applied at the first layer of the MWR neural network, for the liquid water content**	-	8	do	1
68	**Slope applied to sigma0_Ku inside the MWR neural network**	-	8	do	1
69	**Bias applied to sigma0_Ku inside the MWR neural network**	-	8	do	1
70	**Slope applied to TB23 inside the MWR neural network**	-	8	do	1
71	**Bias applied to TB23 inside the MWR neural network**	-	8	do	1
72	**Slope applied to TB36 inside the MWR neural network**	-	8	do	1
73	**Bias applied to TB36 inside the MWR neural network**	-	8	do	1
74	**Limit for the computation of the exponential**	-	8	do	1
75	**Number of neurons for MWR neural network**	-	4	sl	1
76	**Mean value for sigma0 in Ku band**	dB	8	do	1
77	**Standard deviation value for sigma0 in Ku band**	dB	8	do	1
78	**Mean value for TB23**	K	8	do	1
79	**Standard deviation value for TB23**	K	8	do	1
80	**Mean value for TB36**	K	8	do	1
81	**Standard deviation value for TB36**	K	8	do	1
82	**Mean value for SST**	K	8	do	1
83	**Standard deviation value for SST**	K	8	do	1
84	**Mean value for Gamma**	K/km	8	do	1
85	**Standard deviation value for Gamma**	K/km	8	do	1
86	**Mean value for WTC**	cm	8	do	1

N	Description	Units	Byte Size	Data Type	Dim.
87	**Standard deviation value for WTC**	cm	8	do	1
88	**W1_sigma0_Wet_H_Rad, Weights applied to sigma0_Ku at the first layer of the MWR neural network using Gamma/SST for wet tropospheric correction**	-	96	do	12
89	**W1_TB23_Wet_H_Rad, Weights applied to sigma0_Ku at the first layer of the MWR neural network using Gamma/SST for wet tropospheric correction**	-	96	do	12
90	**W1_TB36_Wet_H_Rad, Weights applied to sigma0_Ku at the first layer of the MWR neural network using Gamma/SST for wet tropospheric correction**	-	96	do	12
91	**W1_SST_Wet_H_Rad, Weights applied to sigma0_Ku at the first layer of the MWR neural network using Gamma/SST**	-	96	do	12
92	**W1_Gamma_Wet_H_Rad, Weights applied to sigma0_Ku at the first layer of the MWR neural network using Gamma/SST**	-	96	do	12
93	**W2_Wet_H_Rad, Weights applied to sigma0_Ku at the first layer of the MWR neural network for wet tropospheric correction using Gamma/SST**	-	96	do	12
94	**Bias1_Wet_H_Rad, biases applied at the first layer of the MWR neural network, for wet tropospheric correction using Gamma/SST**	-	96	do	12
95	**Bias2_Wet_H_Rad, biases applied at the second layer of the MWR neural network, for wet tropospheric correction using Gamma/SST**	-	8	do	1
96	**Slope applied to Sigma0_Ku inside the MWR neural network**	-	8	do	1
97	**Bias applied to Sigma0_Ku inside the MWR neural network**	-	8	do	1
98	**Slope applied to TB23 inside the MWR neural network**	-	8	do	1
99	**Bias applied to TB23 inside the MWR neural network**	-	8	do	1
100	**Slope applied to TB36 inside the MWR neural network**	-	8	do	1
101	**Bias applied to TB36 inside the MWR neural network**	-	8	do	1
102	**Slope applied to SST inside the MWR neural network**	-	8	do	1
103	**Bias applied to SST inside the MWR neural network**	-	8	do	1
104	**Slope applied to Gamma inside the MWR neural network**	-	8	do	1
105	**Bias applied to Gamma inside the MWR neural network**	-	8	do	1
106	**Limit for the computation of the exponential**	-	8	do	1

N	Description	Units	Byte Size	Data Type	Dim.
107	**Gamma_Int_Clim, Climatoligical Gamma value**	K/km	8	do	1
108	**SST_Int_Clim, Climatoligical SST value**	K	8	do	1
109	**Delta offset to be applied to sigma 0 in S-Band**	dB	8	do	1
110	**Number of row inside the mask**	-	8	ss	4
111	**Day of the season**	-	8	ss	4
112	**Mask Winter North**	-	28	ss	14
113	**Mask Summer North**	-	28	ss	14
114	**Mask Winter South**	-	28	ss	14
115	**Mask Summer South**	-	28	ss	14
116	**M_VAR_GRO**	-	24	do	3
117	**Std_VAR_GRO**	-	24	do	3
118	**C_GRO**	-	96	do	12
119	**M_VAR_ANT**	-	24	do	3
120	**Std_VAR_ANT**	-	24	do	3
121	**C_ANT**	-	48	do	6
122	**Alpha**	-	8	do	1
123	**K_GRO**	-	2	ss	1
124	**K_ANT**	-	2	ss	1
125	**Min_VAL**	-	8	do	1
126	**Minimum day of the year**	-	2	us	1
127	**Minimum day of the year 2**	-	2	us	1
128	**Maximum day of the year**	-	2	us	1
129	**Mimimum latitude**	degree	8	do	1
130	**Mimimum latitude 2**	degree	8	do	1
131	**Maximum latitude**	degree	8	do	1
132	**Bias to apply to the Sigma 0 Ku over Greenland**	dB	8	do	1
133	**Bias to apply to the Sigma 0 Ku over Antarctica**	dB	8	do	1

N	Description	Units	Byte Size	Data Type	Dim.
134	**Bias to apply to the TB23 over Greenland**	K	8	do	1
135	**Bias to apply to the TB23 over Antarctica**	K	8	do	1
136	**Bias to apply to the TB36 over Greenland**	K	8	do	1
137	**Bias to apply to the TB36 over Antarctica**	K	8	do	1
138	**Mean values for Greenland for continental ice(Ku/S)**	dB,K,/,dB	32	do	4
139	**Standard deviation values for Greenland for continental ice(Ku/S)**	dB,K,/,dB	32	do	4
140	**Mean values for Antarctica for continental ice(Ku/S)**	dB,K,/,dB	32	do	4
141	**Standard deviation values for Antarctica for continental ice(Ku/S)**	dB,K,/,dB	32	do	4
142	**Classifier tie-points coordinates for Greenland for continental ice (Ku/S)**	-	224	do	28
143	**Classifier tie-points coordinates for Antarctica for continental ice (Ku/S)**	-	224	do	28
144	**Fuzziness exponent for continental ice (Ku/S)**	-	8	do	1
145	**Number of tie-points for continental ice (Ku/S)**	-	2	ss	1
146	**Bias to apply to the Sigma0 Ku over Greenland**	dB	8	do	1
147	**Bias to apply to the Sigma0 Ku over Antarctica**	dB	8	do	1
148	**Bias to apply to the Sigma0 S over Greenland**	dB	8	do	1
149	**Bias to apply to the Sigma0 S over Antarctica**	dB	8	do	1
150	**Bias to apply to the TB23 over Greenland**	K	8	do	1
151	**Bias to apply to the TB23 over Antarctica**	K	8	do	1
152	**Bias to apply to the TB36 over Greenland**	K	8	do	1
153	**Bias to apply to the TB36 over Antarctica**	K	8	do	1
154	**Mean values for Greenland for continental ice(Ku)**	dB,K,/,dB	24	do	3
155	**Standard deviation values for Greenland for continental ice(Ku)**	dB,K,/,dB	24	do	3
156	**Mean values for Antarctica for continental ice(Ku)**	dB,K,/,dB	24	do	3
157	**Standard deviation values for Antarctica for continental ice(Ku)**	dB,K,/,dB	24	do	3
158	**Classifier tie-points coordinates for Greenland for continental ice (Ku)**	-	144	do	18
159	**Classifier tie-points coordinates for Antarctica for continental ice (Ku)**	-	144	do	18

N	Description	Units	Byte Size	Data Type	Dim.
160	**Fuzziness exponent for continental ice (Ku)**	-	8	do	1
161	**Number of tie-points for continental ice (Ku)**	-	2	ss	1
162	**Bias to apply to the Sigma0 Ku over Greenland (Ku)**	dB	8	do	1
163	**Bias to apply to the Sigma0 Ku over Antarctica (Ku)**	dB	8	do	1
164	**Bias to apply to the TB23 over Greenland (Ku)**	K	8	do	1
165	**Bias to apply to the TB23 over Antarctica (Ku)**	K	8	do	1
166	**Bias to apply to the TB36 over Greenland (Ku)**	K	8	do	1
167	**Bias to apply to the TB36 over Antarctica (Ku)**	K	8	do	1
168	**Spare**	-	32	uc	32
TOTAL			**13918**		

Note: For field 15 and 16, a number of 500 elements have been chosen. This number may change following recommendations of experts.

14.14.10.1.10 Node A35 GADS

The format of the GADS is shown below.

Table 14.14.20 RA2_SOI_AX Node A35 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Coef. for inverted barometer height calculation**	mm/hPa	8	do	1
2	**Gravity at mean sea level and 45° latitude**	m/s2	8	do	1
3	**Equatorial gravity**	m/s2	8	do	1
4	**Somigliana's constant**	-	8	do	1
5	**Molar mass of dry air**	kg	8	do	1
6	**Molar mass of water vapour**	kg	8	do	1
7	**Mean vertical gradient of temperature**	K/m	8	do	1
8	**Earth rotation rate**	rad/s	8	do	1
9	**Universal gas constant**	J/mole.K	8	do	1
10	**ECMWF model coefficients to convert hybrid levels to pressure values: A**	Pa	1600	do	200

11	**ECMWF model coefficients to convert hybrid levels to pressure values: B**	-	1600	do	200
12	**S1/S2 pressure variability option**		2	us	1
13	**Spare**	-	40	uc	40
TOTAL			**3314**		

14.14.10.1.11 Node A37 GADS

The format of the GADS is shown below.

Table 14.14.21 RA2_SOI_AX Node A37 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Half-width of the filtering window (in measurements) for the median filter**	-	4	sl	1
2	**Minimum number of the valid points for the median filter**	-	4	sl	1
3	**Half-width of the filtering window (in measurements) for the Lanczos filter**	-	4	sl	1
4	**Cut-off period of the Lanczos filter**	-	4	sl	1
5	**Minimum number of the valid points for the Lanczos filter**	-	4	sl	1
6	**Half-width of the spline interpolation**	-	4	sl	1
7	**Maximal distance between the point to be computed and the ends of the interpolation window**	Km	8	do	1
8	**Minimum threshold on range standard deviation for selection of the data**	m	8	do	1
9	**Maximum threshold on range standard deviation for selection of the data**	m	8	do	1
10	**Minimum number of values per 1 Hz-packet used for the range compression**	-	4	sl	1
11	**Spare**	-	40	uc	40
TOTAL			**92**		

14.14.10.1.12 Node A41 GADS

The format of the GADS is shown below.

Table 14.14.22 RA2_SOI_AX Node A41 GADS Format

N	Description	Units	Byte Size	Data Type	Dim.

1	**Number of averaged waveforms in Ku band**	-	4	sl	1
2	**Minimum acceptable percentage of RA2 processing error free DSR**	10-2%	2	us	1
3	**Minimum acceptable percentage of MWR processing error free DSR**	10-2%	2	us	1
4	**Threshold for S-Band flag anomaly**	-	4	sl	1
5	**Spare**	-	36	uc	1
TOTAL			**48**		

14.14.11 RA2 Constants Data File

This file contains constants used during processing.

FILE ID: RA2_CST_AX

TYPE: Auxiliary

USE: Level-1B and Level 2 RA-2 / MWR processing

UPDATED: TBD

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (88 bytes)= 1713 bytes

14.14.11.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

14.14.11.1.1 GADS

The format of the GADS is shown below.

Table 14.14.23 RA2_CST_AX GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Semi-major axis of WGS84 ellipsoid**	m	8	do	1
2	**Semi-minor axis of WGS84 ellipsoid**	m	8	do	1
3	**Inverse of flattening coefficient of WGS84 ellipsoid**	-	8	do	1
4	**Pi**	-	8	do	1

5	**Velocity of light**	m/s	8	do	1
6	**Mean satellite altitude**	m	8	do	1
7	**Cold space temperature for Channel 1**	K	8	do	1
8	**Cold space temperature for Channel 2**	K	8	do	1
9	**Spare**	-	24	do	3
TOTAL			**88**		

14.14.12 Ice1 / Sea Ice Configuration (System) File

This file contains the processing parameters used for the ice1/sea ice processing.

FILE ID: RA2_ICT_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (124 bytes) = 1749 bytes

14.14.12.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

14.14.12.1.1 GADS

The format of the GADS is shown below.

Table 14.14.24 RA2_ICT_AX GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**retracker threshold OCOG Ku**	FFT power units	8	do	1
2	**retracker threshold OCOG S**	FFT power units	8	do	1
3	**retracker threshold sea ice Ku**	FFT power units	8	do	1
4	**retracker threshold sea ice S**	FFT power units	8	do	1
5	**retracker start bin OCOG Ku**	filters	2	us	1
6	**retracker start bin OCOG S**	filters	2	us	1
7	**retracker start bin sea ice Ku**	filters	2	us	1
8	**retracker start bin sea ice S**	filters	2	us	1
9	**retracker end bin OCOG Ku**	filters	2	us	1
10	**retracker end bin OCOG S**	filters	2	us	1
11	**retracker end bin sea ice Ku**	filters	2	us	1

N	Description	Units	Byte Size	Data Type	Dim.
12	**retracker end bin sea ice S**	filters	2	us	1
13	**retracker lower bound OCOG Ku**	filters	2	us	1
14	**retracker lower bound OCOG S**	filters	2	us	1
15	**retracker upper bound OCOG Ku**	filters	2	us	1
16	**retracker upper bound OCOG S**	filters	2	us	1
17	**retracker lower bound sea ice Ku**	filters	2	us	1
18	**retracker lower bound sea ice S**	filters	2	us	1
19	**retracker upper bound sea ice Ku**	filters	2	us	1
20	**retracker upper bound sea ice S**	filters	2	us	1
21	**additional end gate1 Ku**	filters	2	us	1
22	**additional end gate1 S**	filters	2	us	1
23	**additional power threshold Ku**	-	8	do	1
24	**additional power threshold S**	-	8	do	1
25	**additional gate threshold Ku**	-	8	do	1
26	**additional gate threshold S**	-	8	do	1
27	**noise power first gate Ku**	filters	2	us	1
28	**noise power first gate S**	filters	2	us	1
29	**noise power last gate Ku**	filters	2	us	1
30	**noise power last gate S**	filters	2	us	1
31	**peakiness low threshold**	-	8	do	1
32	**peakiness high threshold**	-	8	do	1
TOTAL			**124**		

14.14.13 Sea State Bias Table File

This file contains the values of the sea state bias corrections for the Ku bands and S band. It is a double input table depending on significant waveheight and windspeed. The coverage for SWH is from 0 to 12 m with a resolution of 0.25 m, while the coverage for windspeed is from 0 to 25 m/s with a resolution of 0.25 m/s. Two values are recorded at each gridpoint, one for Ku band and one for S band.

FILE ID: RA2_SSB_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (39826 bytes)

14.14.13.1 14.6.13.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.13.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.25 RA2_SSB_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**SWH_GRID_SIZE=**	keyword	14	uc	14

N	Description	Units	Byte Length	Data Type	Dim.
	Resolution of the grid in SWH (dSWH)	m	15	Afl	1
	<m>	units	3	uc	3
	newline character	terminator	1	uc	1
2	**SWH_FIRST=**	keyword	10	uc	10
	SWH of first point on the grid (SWHf)	m	15	Afl	1
	<m>	units	3	uc	3
	newline character	terminator	1	uc	1
3	**SWH_LAST=**	keyword	9	uc	9
	SWH of last point on the grid (SWHl)	m	15	Afl	1
	<m>	units	3	uc	3
	newline character	terminator	1	uc	1
4	**WS_GRID_SIZE=**	keyword	13	uc	13
	Resolution of the grid in wind speed (dWS)	m/s	15	Afl	1
	<m/s>	units	5	uc	5
	newline character	terminator	1	uc	1
5	**WS_FIRST=**	keyword	9	uc	9
	Wind speed of first point on the grid (WSf)	m/s	15	Afl	1
	<m/s>	units	5	uc	5
	newline character	terminator	1	uc	1
6	**WS_LAST=**	keyword	8	uc	8
	Wind speed of last point on the grid (WSl)	m/s	15	Afl	1
	<m/s>	units	5	uc	5
	newline character	terminator	1	uc	1
7	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**234**		

14.14.13.1.2 Grid Data GADS

This GADS provides the data in grid format.The GADS consists of several GADSRs. Each record corresponds to a SWH value. The first record corresponds to the first value of the SWH, and the last record is relative to the last value of the SWH. Two values are provided at each wind speed, one for Ku-band and one for S-band. The format of each GADSR is given below.

Table 14.14.26 RA2_SSB_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Sea state bias corrections** Ordered as: Sea state bias correction for Ku band at WS_f Sea state bias correction for S band at WS_f Sea state bias correction for Ku band at WS_f+dWS Sea state bias correction for S band at WS_f+dWS ..... Sea state bias correction for Ku band at WS_l Sea state bias correction for S band at WS_l	m	808	fl	202
TOTAL			**808**		

14.14.14 Modified Dip Map File

This file contains the values of the modified magnetic dip used in the computation of the ionospheric correction from the Bent model. The values are recorded on a regular grid. The coverage of the grid is from 0 to 358 degrees in longitude and from -82 to 82 degrees in latitude. The resolution of the grid is 2 degree in longitude and 2 degree in latitude. One value is recorded at each gridpoint.

FILE ID: RA2_DIP_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (60019 bytes)

14.14.14.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.14.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.14.1.2 Grid Data GADS

This GADS provides the magnetic dip data in grid format.The GADS consists of several GADSRs. Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.27 RA2_DIP_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Magnetic dip values (from first latitude to last latitude)**	radians	332	fl	83
TOTAL			**332**		

14.14.15 Cartwright Amplitudes File

This file contains the values of Cartwright amplitudes of the tidal constituents harmonic coefficients and amplitude.

FILE ID: RA2_SET_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs(9788) = 11693 bytes

14.14.15.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.15.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.28 RA2_SET_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**N20=**	keyword	4	uc	4
	Number of values for the order 20	-	6	As	1
	newline character	terminator	1	uc	1

2	**N21=**	keyword	4	uc	4
	Number of values for the order 21	-	6	As	1
	newline character	terminator	1	uc	1
3	**N22=**	keyword	4	uc	4
	Number of values for the order 22	-	6	As	1
	newline character	terminator	1	uc	1
4	**N30=**	keyword	4	uc	4
	Number of values for the order 30	-	6	As	1
	newline character	terminator	1	uc	1
5	**N31=**	keyword	4	uc	4
	Number of values for the order 31	-	6	As	1
	newline character	terminator	1	uc	1
6	**N32=**	keyword	4	uc	4
	Number of values for the order 32	-	6	As	1
	newline character	terminator	1	uc	1
7	**N33=**	keyword	4	uc	4
	Number of values for the order 33	-	6	As	1
	newline character	terminator	1	uc	1
8	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**128**		

14.14.15.1.2 Grid Data GADS

This GADS provides the data in grid format.The GADS consists of several GADSRs. Each record corresponds to six harmonic coefficients and amplitude. The first record is related to the first term of the order N20. The last record is related to the last term of the order N33. The format of each GADSR is given below.

Table 14.14.29 RA2_SET_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Harmonic coefficient $k1_{i,j}$	-	2	ss	1
2	Harmonic coefficient $k2_{i,j}$	-	2	ss	1
3	Harmonic coefficient $k3_{i,j}$	-	2	ss	1
4	Harmonic coefficient $k4_{i,j}$	-	2	ss	1
5	Harmonic coefficient $k5_{i,j}$	-	2	ss	1
6	Harmonic coefficient $k6_{i,j}$	-	2	ss	1
7	amplitude $amp_{i,j}$	m	8	do	1
TOTAL			**20**		

In the table above, “i" represents the order (20, 21, 22, 30, 31, 32, 33) and “j” represents the number of terms for each order (103, 162, 119, 17, 35, 31, 16) with j running faster than i.

14.14.16 Ocean Tide Solution 1 Map File

This file contains the values of the harmonic coefficients for the eight of the principal tide waves of the GOT4.8 model. They are used for the computation of the non-equilibrium ocean tide height. The values are recorded on a regular grid. The coverage of the grid is from 180 W to 179.5 E degrees in longitude and from -90 to +90 degrees in latitude. The resolution of the grid is 0.5 degree in longitude and 0.5 degree in latitude. Ten values of the harmonic coefficients (A1) and ten values of the harmonic coefficients (A2) are recorded at each grid point.

FILE ID: RA2_OT1_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx 19 Mbytes)

14.14.16.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS Grid Data GADS

14.14.16.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.16.1.2 Grid Data GADS

This GADS provides the harmonic coefficients in grid format. Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.30 RA2_OT1_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**coefficient A1 for tide wave 1 at** φ_f	10^{-1}mm	4	sl	1
2	**coefficient A2 for tide wave 1 at** φ_f	10^{-1}mm	4	sl	1
3	**coefficient A1 for tide wave2 at** φ_f	10^{-1}mm	4	sl	1
4	**coefficient A2 for tide wave 2 at** φ_f	10^{-1}mm	4	sl	1
...		...	...	...	1
20	**coefficient A2 for tide wave 10 at** $\varphi_f + d\varphi$	10^{-1}mm	4	sl	1
21	**coefficient A1 for tide wave 1 at** $\varphi_f + d\varphi$	10^{-1}mm	4	sl	1
22	**coefficient A2 for tide wave 1 at** $\varphi_f + d\varphi_f$	10^{-1}mm	4	sl	1
23	**coefficient A1 for tide wave 2 at** $\varphi_f + d\varphi$	10^{-1}mm	4	sl	1
...		...	...	...	1
7219	**coefficient A1 for tide wave 10 at** φ_l	10^{-1}mm	4	sl	1
7220	**coefficient A2 for tide wave 10 at** φ_l	10^{-1}mm	4	sl	1
TOTAL			**28880**		

Φ_f, Φ_l and $d\Phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.17 Ocean Tide Solution 2 Map File

This file contains the coefficients for the diurnal and semi-diurnal elastic ocean tide calculation (solution 2 algorithm). This file is composed from:

- The FES library configuration file (ocean) which reference the coefficients files (ASCII files)
- The coefficients files themselves in NetCDF format

FILE ID: RA2_OT2_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx 63 Mbytes)

14.14.17.1 Format

The file structure is decribed here below.

14.14.17.1.1 FES library configuration file (ASCII)

The FES library configuration file consists of a set of 6 consecutive lines for each wave (xx, yy, …) to be used :

TIDE_*XX*_FILE = *file_path*
TIDE_*XX* _LATITUDE = lat
TIDE_*XX* _LONGITUDE = lon
TIDE_*XX* _AMPLITUDE = Ha
TIDE_*XX* _PHASE = Hg
TIDE_*XX* _PHASE_LAG = 1
TIDE_*YY*_FILE = *file_path*
TIDE_*YY*_LATITUDE = lat
…/…

14.14.17.1.2 Coefficient files (netCDF)

The description of the ocean tide coefficients files is given below :

Global attributes	
Conventions	CF1.0, POC revision 2010
grid_type	regular
file_name	file_name
production	production
creation_date	creation_date

Dimension	
lat	2881
lon	5761

Variables

Ha	tidal elevation amplitude		float
units	Unit name	cm	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	tidal_elevation_amplitude	
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.f	
scale_factor	The data must be multiplied by this factor after reading	1.f	
coordinates	lon lat		
_FillValue	Default value for unused or not computed elements	1.e+10f	
content	YX		

lon	longitude		float
units	Unit name	degree_east	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	longitude	
valid_max	360		
valid_min	0		

lat	latitude		float
units	Unit name	degree_north	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	latitude	
valid_max	90		
valid_min	-90		

Hg	tidal elevation phaselag		float
units	Unit name	degree	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	tidal_elevation_phaselag	
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.f	
scale_factor	The data must be multiplied by this factor after reading	1.f	
coordinates	lon lat		
_FillValue	Default value for unused or not computed elements	1.e+10f	
content	YX		

14.14.18 Tidal Loading Coefficients Map File (Solution 1)

This file contains the values of the harmonic coefficients for the eight principal tide waves of the GOT4.8 model. The values are recorded on a regular grid. The coverage of the grid is from 180 W to 179.5 E degrees in longitude and from -90 to 90 degrees in latitude. The resolution of the grid is 0.5 degree in longitude and 0.5 degree in latitude.

Ten values of the harmonic coefficients (B1) and ten values of the harmonic coefficients (B2) are recorded at each gridpoint.

FILE ID: RA2_TLG_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx. 9 Mbytes)

14.14.18.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid data GADS*
General GADS
Grid Data GADS

14.14.18.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.18.1.2 Grid Data GADS

This GADS provides the data in grid format.Each record corresponds to a longitude value.The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.31 RA2_TLG_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**coefficient B1 for tide wave 1 at φf**	10^{-1} mm	2	ss	1
2	**coefficient B2 for tide wave 1 at φf**	10^{-1} mm	2	ss	1
3	**coefficient B1 for tide wave 2 at φf**	10^{-1} mm	2	ss	1
4	**coefficient B2 for tide wave 2 at φf**	10^{-1} mm	2	ss	1
...		...	...	...	1
20	**coefficient B1 for tide wave 10 at φf**	10^{-1} mm	2	ss	1
21	**coefficient B2 for tide wave 10 at φf**	10^{-1} mm	2	ss	1
22	**coefficient B1 for tide wave 1 at φf +dφ**	10^{-1} mm	2	ss	1
23	**coefficient B2 for tide wave 1 at φf +dφ**	10^{-1} mm	2	ss	1
24	**coefficient B1 for tide wave 2 at φf +dφ**	10^{-1} mm	2	ss	1
...		...	...	...	1
7219	**coefficient B1 for tide wave 10 at φl**	10^{-1} mm	2	ss	1
7220	**coefficient B2 for tide wave 10 at φl**	10^{-1} mm	2	ss	1
TOTAL			**14440**		

Φ_f, Φ_l and $d\Phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.19 Long Period Ocean Tide Coefficients Map File

The coefficients for the long period ocean tide calculation files are composed from:

- The FES library configuration file (equilibrium long period) which reference the coefficients files (ASCII file)
- The coefficients files themselves (NetCDF files)

FILE ID: RA2_LPT_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx 31 Mbytes)

14.14.19.1 Format

The file structure is decribed here below.

14.14.19.1.1 FES library configuration file (ASCII)

The FES library configuration file consists of a set of 6 consecutive lines for each wave (xx, yy, …) to be used :

TIDE_*XX*_FILE = *file_path*
TIDE_*XX* _LATITUDE = lat
TIDE_*XX* _LONGITUDE = lon
TIDE_*XX* _AMPLITUDE = Ha
TIDE_*XX* _PHASE = Hg
TIDE_*XX* _PHASE_LAG = 1
TIDE_*YY*_FILE = *file_path*
TIDE_*YY*_LATITUDE = lat
…/…

14.14.19.1.2 Coefficients files (netCDF)

The description of the ocean tide coefficients files is given below:

Global attributes	
Conventions	CF1.0, POC revision 2010
grid_type	regular
file_name	file_name
production	production
creation_date	creation_date

Dimension	
lat	2881
lon	5761

Variables

Ha	tidal elevation amplitude		float
units	Unit name	cm	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	tidal_elevation_amplitude	
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.f	
scale_factor	The data must be multiplied by this factor after reading	1.f	
coordinates	lon lat		
_FillValue	Default value for unused or not computed elements	1.e+10f	
content	YX		

lon	longitude		float
units	Unit name	degree_east	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	longitude	
valid_max	360		
valid_min	0		

lat	latitude		float
units	Unit name	degree_north	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	latitude	
valid_max	90		
valid_min	-90		

Hg	tidal elevation phaselag		float
units	Unit name	degree	
standard_name	Name of the physical quantity following the NetCDF Climate and Forecast (CF) Metadata Conventions	tidal_elevation_phaselag	
add_offset	This offset must be added to the data after reading (and after scaling if needed)	0.f	
scale_factor	The data must be multiplied by this factor after reading	1.f	
coordinates	lon lat		

_FillValue	Default value for unused or not computed elements	1.e+10f	
content	YX		

14.14.20 Geoid Height File

The values are recorded on a regular grid. The coverage of the grid is from (180° + 1/24° W) to (180° - 1/24° E) in longitude and from (-90° + 1/24°) to (90° - 1/24°) in latitude. The resolution of the grid is 1/12 degree in longitude and 1/12 degree in latitude. One value is recorded at each gridpoint.

FILE ID: RA2_GEO_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx 35.6 Mbytes)

14.14.20.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.20.1.1 General GADS

The general GADS shall follow the format described in Table 14.6.6.1.1-1.

14.14.20.1.2 Grid Data GADS

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The layout for one record is given below.

This GADS provides the geoid height data in grid format. Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude (4320 GADSRs, assuming 0.25 degree

resolution). The format of each GADSR is given below.

Table 14.14.32 RA2_GEO_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	geoid height at ϕ_f	mm	4	sl	1
2	geoid height at $\phi f+d\phi$	mm	4	sl	1
...	…	…	…	…	..
2160	geoid height at ϕ_l	mm	4	sl	1
TOTAL			**8640**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.21 Ocean Depth/Land Elevation File

This file contains the values of the ocean depth or land elevation. The values are recorded on a regular grid. The coverage of the grid is from 10800.5 minutes to 10799.5 minutes in longitude and from -5400 minutes to 5399.5 minutes in latitude. The resolution of the grid is 0.5 minutes (1/120°) in longitude and 0.5 minutes (1/120°) in latitude. One value is recorded at each gridpoint.

FILE ID: AUX_DEM_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx 889.9 Mbytes)

14.14.21.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.21.1.1 General GADS

The general GADS shall follow the format described in Table 14.6.6.1.1-1.

14.14.21.1.2 Grid Data GADS

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude (43200 GADSRs, assuming 0.5 minutes resolution). The format of each GADSR is given below.

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The layout for one record is given below.

Table 14.14.33 AUX_DEM_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Ocean depth / Land elevation at ϕ_f	m	2	ss	1
2	Ocean depth / Land elevation at $\phi f+d\phi$	m	2	ss	1
...	…	…	…	…	..
21600	Ocean depth / Land elevation at ϕ_l	m	2	ss	1
TOTAL			**43200**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.22 RA2 Slope Model for Greenland Data File

This file contains the Greenland slope data to be used in the ice1/sea ice processing.

FILE ID: RA2_SL1_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 48 MBytes)

14.14.22.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Slopes GADS*
General GADS
Slopes GADS

14.14.22.1.1 General GADS

The contents of the General GADS are detailed in the following table.

Table 14.14.34 RA2_SL1_AX General GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Model Number**	-	2	us	1
2	**Hemisphere flag**	-	2	us	1
3	**corner X**	m	8	do	1
4	**corner y**	m	8	do	1
5	**X-number**	-	2	us	1
6	**Y-number**	-	2	us	1

7	**resolution**	m	8	do	1
TOTAL			**32**		

14.14.22.1.2 Slopes GADS

This GADS is composed of X-number by Y-number (from field 5 and 6 in the general GADS record above) 2-dimensional (x,y) arrays (records) representing range slopes. For this GADS, up to 2000 x 3000 GADSRs are expected. The content of this GADS is ordered so that the y-index is incremented more rapidly than the x-index. The contents of the GADSR are detailed in the following table.

Table 14.14.35 RA2_SL1_AX Slopes GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**x slope component**	-	4	fl	1
2	**y slope component**	-	4	fl	1
TOTAL			**8**		

14.14.23 RA2 Slope Model for Antarctica Data File

This file contains the Antarctica slope data to be used in the ice1/sea ice processing.

FILE ID: RA2_SL2_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 356 MBytes)

14.14.23.1 Format

The file structure is identical to that of the Greenland Slope Model file (RA2_SL1_AX) described in Section 14.8.22. The only difference is the number of GADSR in the Slopes GADS. For this file, up to 6670x6670 GADSRs are expected.

14.14.24 Surface Classification Mask Map File

The surface classification mask is a combination of GlobCover and MODIS data and classifies points on the Earth Surface using a 7-states flag. The surface classification mask values are the following:

0 = “open ocean”
1 = “land”
2 = “continental waters”
3 = “aquatic vegetation”
4 = “continental ice and snow”
5 = “floating ice”
6 = “salted basin”

The values are recorded on a regular grid. The grid coverage is from -10799.75 minutes to 10799.75 minutes in longitude and from -5399.75 minutes to 5399.75 minutes in latitude. The resolution of the grid is 0.5 minutes in longitude and 0.5 minutes in latitude. One value is recorded at each gridpoint.

FILE ID: RA2_SCF_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (up to approx. 889.9 MBytes)

14.14.24.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid data GADS

14.14.24.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.24.1.2 Grid Data GADS

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.36 RA2_SCF_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Surface classification at ϕ_f**	-	1	sc	1
2	**Surface classification at $\phi_f + d\phi$**	-	1	sc	1
...		...	...	...	…
21600	**Surface classification at ϕ_l**	-	1	sc	1
TOTAL			**21600**		

where ϕ_f, ϕ_l and $d\varphi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude

14.14.25 Theoretical Distance to the Shore Map File

This file contains the values of the theoretical distance to the shore. The values are recorded on a regular grid. The grid coverage is from -2880 degrees to 2880 degrees in longitude and from -1440 to 1440 degrees in latitude. The resolution of the grid is 1/16 degree in longitude and 1/16 degree in latitude. One value is recorded at each gridpoint.

FILE ID: RA2_SHD_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 63.3 MBytes)

14.14.25.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.25.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.25.1.2 Grid Data GADS

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.37 RA2_SHD_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Theoretical distance value at ϕ_f	km	4	fl	1
2	Theoretical distance value at $\phi f+d\phi$	km	4	fl	1
...	…	…	…	…	..
2881	Theoretical distance value at ϕ_l	km	4	fl	1
TOTAL			**11524**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the latitude of the first point, the latitude of the last

point and the grid resolution in latitude.

14.14.26 Seasonal Freezing Level File

This file contains the values of the seasonal freezing level for the 4 seasons. The freezing level parameter (unit is Km) is computed from monthly tables provided by IFREMER (Tournadre).

The values are recorded on a regular grid. The grid coverage is from 0 degrees to 360 degrees in longitude and from -70 degrees to 70 degrees in latitude. The resolution of the grid is 5 degrees in longitude and 2.5 degrees in latitude.

FILE ID: RA2_SFL_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 65 KBytes)

14.14.26.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.26.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.26.1.2 Grid Data GADS

Each grid point has 4 values corresponding respectively to the following periods: October-December, January-March, April-June, July-September. Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. . The format of each GADSR is given below.

Table 14.14.38 RA2_SFL_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Freezing level winter value at ϕ_f	km	4	fl	1
2	Freezing level spring value at ϕf	km	4	fl	1
3	Freezing level summer value at ϕf				
4	Freezing level fall value at ϕf				
5	Freezing level winter value at $\phi_f + d\phi$				
...	…	…	…	…	..
228	Freezing level fall value at ϕ_l	km	4	fl	1
TOTAL			**912**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.27 Freezing Level File

The freezing level table has a dependency on both brightness temperatures: it covers the 140K to 280K range in 23.8GHz brightness temperature (hereafter called TB23) and the 130K to 280K range in 36.5GHz brightness temperature (hereafter called TB36), with a step of 1K in both cases. The freezing level parameter is provided by IFREMER (Tournadre).

FILE ID: RA2_SFT_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 83.2 KBytes)

14.14.27.1 14.6.13.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.27.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.39 RA2_SFT_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**TB23_GRID_SIZE =**	keyword	14	uc	14
	Resolution of the grid in TB23 (dTB23)	K	15	Afl	1
	<K>	units	3	uc	3

N	Description	Units	Byte Length	Data Type	Dim.
	newline character	terminator	1	uc	1
2	**TB23_FIRST=**	keyword	11	uc	11
	TB23 of first point on the grid (TB23f)	K	15	Afl	1
	<K>	units	3	uc	3
	newline character	terminator	1	uc	1
3	**TB23_LAST=**	keyword	10	uc	10
	TB23 of last point on the grid (TB23l)	K	15	Afl	1
	<K>	units	3	uc	3
	newline character	terminator	1	uc	1
4	**TB36_GRID_SIZE=**	keyword	15	uc	15
	Resolution of the grid in wind speed (dTB36)	K	15	Afl	1
	<K>	units	3	uc	3
	newline character	terminator	1	uc	1
5	**TB36_FIRST=**	keyword	11	uc	11
	TB36 of first point on the grid (TB36f)	K	15	Afl	1
	<K>	units	3	uc	3
	newline character	terminator	1	uc	1
6	**TB36_LAST=**		10	uc	10
	TB36 of last point on the grid (TB36l)	K	15	Afl	1
	<K>	units	3	uc	3
	newline character	terminator	1	uc	1
7	**DEF=**	keyword	4	uc	4
	Default value of the grid values (def)	-	11	Al	1
	newline character	terminator	1	uc	1
7	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**253**		

14.14.27.1.2 Grid Data GADS

Each record corresponds to one tabulated TB23. The first record corresponds to the first value of the TB23, and the last record is relative to the last value of the TB23. The format of the GADS is shown below.

Table 14.14.40 RA2_SFT_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Freezing level value at ϕ_f	km	4	fl	1
2	Freezing level value at $\phi f + d\phi$	km	4	fl	1
...	…	…	…	…	..
151	Freezing level value at ϕ_l	km	4	fl	1
TOTAL			**604**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the TB36 of the first point, the TB36 of the last point and the grid resolution in TB36.

14.14.28 Rain Rate Table File

The rain rate correction table is a function of the rain rate: it covers the 0.01mm/h to 30mm/h range in rain rate, with a step of 0.01mm/h. The rain rate correction parameter is provided by IFREMER (Tournadre).

FILE ID: RA2_RRC_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 11.9 KBytes)

14.14.28.1 14.6.13.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.28.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.41 RA2_RRC_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**RR_GRID_SIZE =**	keyword	13	uc	13
	Resolution of the grid in rain rate (dRR)	mm/h	15	Afl	1
	<mm/h>	units	6	uc	6
	newline character	terminator	1	uc	1
2	**RR_FIRST=**	keyword	9	uc	9
	Rain rate of first point on the grid (RRf)	mm/h	15	Afl	1

N	Description	Units	Byte Length	Data Type	Dim.
	<K>	units	6	uc	6
	newline character	terminator	1	uc	1
3	**RR _LAST=**	keyword	8	uc	8
	Rain rate of last point on the grid (RRl)	mm/h	15	Afl	1
	<mm/h>	units	6	uc	6
	newline character	terminator	1	uc	1
7	**DEF=**	keyword	4	uc	4
	Default value of the grid values (def)	-	11	Al	1
	newline character	terminator	1	uc	1
7	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**163**		

14.14.28.1.2 Grid Data GADS

The format of the GADS is shown below.

Table 14.14.42 RA2_RRC_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Rain rate correction value at ϕ_f	mm/h	4	fl	1
2	Rain rate correction value at $\phi f + d\phi$	mm/h	4	fl	1
...	…	…	…	…	..
3000	Rain rate correction value at ϕ_l	mm/h	4	fl	1
TOTAL			**12000**		

14.14.29 Lapse Rate Climatology File

The lapse rate climatology (Gamma) table covers the -60° to 60° range in latitude and 0° to 359° range in longitude, with 1° of resolution. The Gamma parameter (unit is K/km) is computed through a linear fit of the temperature decrease rate with altitude (between surface and 800 mb level) from 3D ECMWF fields.

FILE ID: RA2_LRC_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 170.1 KBytes)

14.14.29.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.29.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.29.1.2 Grid Data GADS

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.43 RA2_LRC_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Gamma value at ϕ_f	K/km	4	fl	1
2	Gamma value at $\phi f+d\phi$	K/km	4	fl	1
...	…	…	…	…	..
121	Gamma value at ϕ_l	K/km	4	fl	1
TOTAL			**484**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.30 S1 and S2 tide grids of monthly means of global amplitude

The S1/S2 tide grids of monthly means of global amplitude correspond to monthly grids covering -90° to 90° range in latitude and 0° to 358.875° range in longitude, with 1.125° of resolution. These two files contain the values of the monthly values for amplitude for both S1 and S2 waves (for the 12 months).

FILE ID: RA2_S1A_AX and RA2_S2A_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 2.4 MBytes)

14.14.30.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.30.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.30.1.2 Grid Data GADS

The S1 and S2 tide grids of monthly means of global amplitude consist of two binary files, one file for the S1 wave and the other for the S2 wave. Each grid point has 12 values corresponding respectively to the 12 months of the year.

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.44 RA2_S1A_AX and RA2_S2A_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Amplitude on month 01 (January) at ϕ_f	Pa	4	fl	1
2	Amplitude on month 02 (February) at ϕf	Pa	4	fl	1
3	Amplitude on month 03 (March) at ϕf	Pa	4	fl	1
4	Amplitude on month 04 (April) at ϕf	Pa	4	fl	1

5	Amplitude on month 05 (May) at ϕf	Pa	4	fl	1
6	Amplitude on month 06 (June) at ϕf	Pa	4	fl	1
7	Amplitude on month 07 (July) at ϕf	Pa	4	fl	1
8	Amplitude on month 08 (August) at ϕf	Pa	4	fl	1
9	Amplitude on month 09 (September) at ϕf	Pa	4	fl	1
10	Amplitude on month 10 (October) at ϕf	Pa	4	fl	1
11	Amplitude on month 11 (November) at ϕf	Pa	4	fl	1
12	Amplitude on month 12 (December) at ϕf	Pa	4	fl	1
13	Amplitude on month 01 (January) at $\phi_{f + d\phi}$	Pa	4	fl	1
...	…	…	…	…	..
1932	Amplitude on month 12 (December) at ϕ_l	Pa	4	fl	1
TOTAL			**7728**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.31 S1 and S2 tide grids of monthly means of global phase

The S1/S2 tide grids of monthly means of global phase correspond to monthly grids covering -90° to 90° range in latitude and 0° to 358.875° range in longitude, with 1.125° of resolution. These two files contain the values of the monthly values for phase for both S1 and S2 waves (for the 12 months).

FILE ID: RA2_S1P_AX, RA2_S2P_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 2.4 MBytes)

14.14.31.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.31.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.31.1.2 Grid Data GADS

The S1 and S2 tide grids of monthly means of global phase consist of two binary files, one file for the S1 wave and the other for the S2 wave. Each grid point has 12 values corresponding respectively to the 12 months of the year.

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The format of each GADSR is given below.

Table 14.14.45 RA2_S1P_AX and RA2_S2P_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	Phase on month 01 (January) at ϕ_f	degree	4	fl	1
2	Phase on month 02 (February) at ϕf	degree	4	fl	1
3	Phase on month 03 (March) at ϕf	degree	4	fl	1
4	Phase on month 04 (April) at ϕf	degree	4	fl	1

5	Phase on month 05 (May) at ϕf	degree	4	fl	1
6	Phase on month 06 (June) at ϕf	degree	4	fl	1
7	Phase on month 07 (July) at ϕf	degree	4	fl	1
8	Phase on month 08 (August) at ϕf	degree	4	fl	1
9	Phase on month 09 (September) at ϕf	degree	4	fl	1
10	Phase on month 10 (October) at ϕf	degree	4	fl	1
11	Phase on month 11 (November) at ϕf	degree	4	fl	1
12	Phase on month 12 (December) at ϕf	degree	4	fl	1
13	Phase on month 01 (January) at $\phi_{f + d\phi}$	degree	4	fl	1
...	…	…	…	…	..
1932	Phase on month 12 (December) at ϕ_l	degree	4	fl	1
TOTAL			**7728**		

where ϕ_f, ϕ_l and dϕ are respectively the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.32 Modelled Instrumental Correction File

The modelled instrumental corrections table consist of one Level2 instrumental corrections table for the Ku-band SWH, built from a simulator of the altimeter and from the on-ground retracking algorithm (ocean-1), accounting in particular for the instrumental features provided by the RA-2 internal calibration, excluding the low-pass filter effects which are accounted for through the level 1b corrected waveforms.

The modelled instrumental corrections table is a function of the SWH: it covers the 0m to 12m range in SWH, with a step of 0.1m. The modelled instrumental correction parameters are provided by CLS.

FILE ID: RA2_MI1_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 671 bytes)

14.14.32.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.32.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.46 RA2_MI1_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**SWH_GRID_SIZE =**	keyword	14	uc	14
	Resolution of the grid in SWH (Step_SWH)	m	15	Afl	1
	<m>	units	3	uc	3

N	Description	Units	Byte Length	Data Type	Dim.
	newline character	terminator	1	uc	1
2	**SWH _FIRST=**	keyword	10	uc	10
	SWH of first point on the grid (Min_SWH)	m	15	Afl	1
	<m>	units	3	uc	3
	newline character	terminator	1	uc	1
3	**SWH_LAST=**	keyword	9	uc	9
	SWH of last point on the grid (Max_SWH)	m	15	Afl	1
	<m>	units	3	uc	3
	newline character	terminator	1	uc	1
7	**DEF=**	keyword	4	uc	4
	Default value of the grid values (SWH_def)	-	11	Al	1
	newline character	terminator	1	uc	1
7	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**157**		

14.14.32.1.2 Grid Data GADS

The format of each GADSR is given below.

Table 14.14.47 RA2_MI1_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	SWH instrumental correction value at ϕ_f	K/km	4	fl	1
2	SWH instrumental correction value at $\phi f+d\phi$	K/km	4	fl	1
...	…	…	…	…	..
121	SWH instrumental correction value at ϕ_l	K/km	4	fl	1
TOTAL			**484**		

where ϕ_f, ϕ_l and $d\phi$ are respectively the SWH of the first point, the SWH of the last point and the grid resolution in SWH.

14.14.33 Ice 2 Echo and Geo correction File

This file contains the parameters necessary to compute the Ice-2 retracking “echo” and “geo” corrections, aimed at accounting for the snowpack characteristics change above the ice sheet. It is an empirical table build by the LEGOS using ENVISAT GDR products.

The Ice-2 echo and geo corrections model file is a function of the pass number and of the index of the reference point within the pass.

FILE ID: RA2_LEG_AX

TYPE: Auxiliary

USE: Level 2 processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (approx. 221 Mbytes)

14.14.33.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.33.1.1 General GADS

The GADS contains information describing the whole file. The format of the GADS is shown below.

Table 14.14.48 RA2_LEG_AX General GADS Format

N	Description	Units	Byte Length	Data Type	Dim.
1	**PN_GRID_SIZE =**	keyword	13	uc	13
	Resolution of the grid in number of passes (dPN)	-	15	Afl	1
	</>	units	3	uc	3
	newline character	terminator	1	uc	1
2	**PN_FIRST=**	keyword	9	uc	9

N	Description	Units	Byte Length	Data Type	Dim.
	Pass number of first point on the grid (PNf)	-	15	Afl	1
	</>	units	3	uc	3
	newline character	terminator	1	uc	1
3	**PN_LAST=**	keyword	8	uc	8
	Pass number of last point on the grid (PNl)	/	15	Afl	1
	</>	units	3	uc	3
	newline character	terminator	1	uc	1
4	**PTS_GRID_SIZE=**	keyword	14	uc	14
	Resolution of the grid in number of points (dPTS)	-	15	Afl	1
	</>	units	3	uc	3
	newline character	terminator	1	uc	1
5	**PTS_FIRST=**	keyword	10	uc	11
	index of first point on the grid (PTSf)	-	15	Afl	1
	</>	units	3	uc	3
	newline character	terminator	1	uc	1
6	**PTS_LAST=**		9	uc	10
	index of last point on the grid (PTSl)	-	15	Afl	1
	<K>	units	3	uc	3
	newline character	terminator	1	uc	1
7	**DEF=**	keyword	4	uc	4
	Default value of the grid values (def)	-	11	Al	1
	newline character	terminator	1	uc	1
7	**Spare (blank characters)**	-	50	uc	50
	newline character	terminator	1	uc	1
TOTAL			**244**		

14.14.33.1.2 Grid Data GADS

Each record corresponds to a pass number value. The first record corresponds to the first

value of the pass number (1), and the last record is relative to the last value of the pass number (1002). The format of each GADSR is given below.

Table 14.14.49 RA2_LEG_AX Grid Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	latm value at ϕ_f	deg	8	do	1
2	lonm value at ϕ_f	deg	8	do	1
3	sigm value at ϕ_f	dB	8	do	1
4	lem value at ϕ_f	s	8	do	1
5	tem value at ϕ_f	10^6 s^{-1}	8	do	1
6	dhdsig value at ϕ_f	m/dB	8	do	1
7	dhdle value at ϕ_f	10^{-6} m/s^{-1}	8	do	1
8	dhdte value at ϕ_f	m/s	8	do	1
9	dhdx value at ϕ_f	-	8	do	1
10	dhdy value at ϕ_f	-	8	do	1
11	latm value at ϕ_f+1	deg	8	do	1
...	…	…	…	…	..
27630	dhdy value at ϕ_l	-	8	do	1
TOTAL			**221040**		

Where:

- ϕ_f and ϕ_l are respectively the index of the first point and the index of the last point.

- latm is the latitude for the given pass and point location

- lonm is the longitude for the given pass and point location

- sigm is the backscatter coefficient for the given pass and point location

- lem is the ice-2 width of the leading edge for the given pass and point location

- tem is the ice-2 trailing edge slope for the given pass and point location

- dhdsig is the derivative of the height among the ice-2 backscatter coefficient for the given pass and point location

- dhdle is the derivative of the height among the ice-2 width of the leading edge for the given pass and point location

- dhdte is the derivative of the height among the ice-2 trailing edge slope for the given pass and point location

- dhdx is the derivative of the height among the x stereographic coordinate for the given pass and point location

- dhdy is the derivative of the height among the y stereographic coordinate for the given pass and point location

14.14.34 Sea Surface Temperature Seasonal File

The Sea Surface Temperature file is used for the computation of the MWR wet tropospheric corrections. These data files are generated by CLS in NetCDF format from the NOAA 1/4° daily Optimum Interpolation Sea Surface Temperature (or daily OISST). They are in NetCDF format.

The content of this file is constituted by:
Sea Surface Temperature (variable Grid_0001)

The NOAA 1/4° daily Optimum Interpolation Sea Surface Temperature (or daily OISST) is an analysis constructed by combining observations from different platforms (satellites, ships, buoys) on a regular global grid. A spatially complete SST map is produced by interpolating to fill in gaps.

FILE ID: RA2_SST_AX

TYPE: Auxiliary

USE: Level 2 MWR processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(658 bytes) + DSs (approx. 171.6 Kbytes)

14.14.34.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSD *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Grid Data GADS

14.14.34.1.1 General GADS

The general GADS shall follow the format described in Table 14.14.6.

14.14.34.1.2 Grid Data GADS

See http://www.ncdc.noaa.gov/oisst for more detailed information.

14.14.35 MWR Instrument Characterization Data

MWR radiometer is characterized during on-ground/pre-flight calibration in terms of radio frequency front-end relevant parameters such as switching assembly insertion losses, hot load mismatching, cold (sky horn) chain very accurate characterization, IF gain characteristics in terms of linearity, variation in temperature, noise figure, stability and sensitivity measurement, etc. Data is included for Channel 1 (23.6 GHz) and Channel 2 (36.5 GHz).

FILE ID: MWR_CHD_AX

TYPE: Auxiliary

USE: Level 1B MWR processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(1218 bytes) + DSs (4312 bytes) = 6777 bytes

14.14.35.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 4 DSD *DSD pointing to the Thermistor Polynomial GADS* *DSD pointing to the Thermistor Limits GADS* *DSD pointing to the Receiver GADS* *DSD pointing to the Characterization GADS*
Thermistor Polynomial GADS
Thermistor Limits GADS
Receiver GADS
Characterization GADS

14.14.35.1.1 Thermistor Polynomial GADS

This GADS contains the thermistor polynomial coefficients to be used to evaluate the 32 on-board thermistors. The contents of the GADS are detailed in the following table.

Table 14.14.50 MWR_CHD_AX Thermistor Polynomial GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Thermistor N1 coefficients 10 coefficients relevant to Thermistor n1 ordered by 0 to 9.**	10^{-15}	80	sd	10
2	**Thermistor N2 coefficients 10 coefficients relevant to Thermistor n2 ordered by 0 to 9.**	10^{-15}	80	sd	10
..	**...**	....	..	..	..
32	**Thermistor N32 coefficients 10 coefficients relevant to Thermistor n32 ordered by 0 to 9.**	10^{-15}	80	sd	10
33	**Spare**	-	40	uc	40
TOTAL			**2600**		

14.14.35.1.2 Thermistor Limits GADS

This GADS provides the expected maximum and minimum limits in temperature of the most significant thermistors. The format of the GADS is shown in the table below.

Table 14.14.51 MWR_CHD_AX Thermistor Limits GADS Format

N	Contents	Units	Byte Size	Data Type	Dim.
1	**Temperature variation of CEU board (24 GHz channel)**	10^{-2} K	4	sl	1
2	**Temperature variation of CEU board (36 GHz channel)**	10^{-2} K	4	sl	1
3	**Minimum and maximum Dicke load temperature (24 GHz channel)**	10^{-2} K	8	sl	2
4	**Minimum and maximum Dicke load temperature (36 GHz channel)**	10^{-2} K	8	sl	2
5	**Minimum and maximum hot load temperature (24 GHz channel)**	10^{-2} K	8	sl	2
6	**Minimum and maximum hot load temperature (36 GHz channel)**	10^{-2} K	8	sl	2
7	**Minimum and maximum mixer temperature (24 GHz channel)**	10^{-2} K	8	sl	2
8	**Minimum and maximum mixer temperature (36 GHz channel)**	10^{-2} K	8	sl	2

N	Contents	Units	Byte Size	Data Type	Dim.
9	**Minimum and maximum IF module temperature (24 GHz channel)**	10^{-2} K	8	sl	2
10	**Minimum and maximum IF module temperature (36 GHz channel)**	10^{-2} K	8	sl	2
11	**Minimum and maximum receiver temperature (24 GHz channel)**	10^{-2} K	8	sl	2
12	**Minimum and maximum receiver temperature (36 GHz channel)**	10^{-2} K	8	sl	2
13	**Minimum and maximum expected brightness temperatures for channel 1**	10^{-2} K	4	us	2
14	**Minimum and maximum expected brightness temperatures for channel 2**	10^{-2} K	4	us	2
15	**Spares**	-	4	uc	4
TOTAL			**100**		

14.14.35.1.3 Receiver GADS

This GADS provides information related to the behavior of the receiver vs. on-board temperature and to the input noise temperature. The format of the GADS is shown in the table below.

Table 14.14.52 MWR_CHD_AX Receiver GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Linear coefficient for gain vs. temperature response (24 GHz channel)**	10^{-5} 1/K	4	sl	1
2	**Quadratic coefficient for gain vs. temperature response (24 GHz channel)**	10^{-5} 1/K^{-2}	4	sl	1
3	**Linear coefficient for gain vs. temperature response (36 GHz channel)**	10^{-5} 1/K	4	sl	1
4	**Quadratic coefficient for gain vs. temperature response (36 GHz channel)**	10^{-5} 1/K^{-2}	4	sl	1
5	**Spares**	-	16	uc	16
TOTAL			**32**		

14.14.35.1.4 Characterization GADS

The format of the GADS is shown below. The GADS uses the structures mwr_char_info, mwr_mode_info_nominal, mwr_mode_info_redundant and mwr_drift_info, which are also defined below.

Table 14.14.53 MWR_CHD_AX Characterization GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Channel characterization information for nominal mode**	-	760	mwr_mode_info_nominal	1
2	**Channel characterization information for redundant mode**	-	800	mwr_mode_info_redundant	1
TOTAL			**1560**		

The mwr_mode_info_nominal structure used above is defined in the table below.

Table 14.14.54 mwr_mode_info_nominal Structure

N	Description	Units	Byte Size	Data Type	Dim.
1	**Channel characterization information for the 24 GHz channel at 0 degrees C.**	-	76	mwr_char_info	1
2	**Channel characterization information for the 24 GHz channel at 10 degrees C.**	-	76	mwr_char_info	1
3	**Channel characterization information for the 24 GHz channel at 20 degrees C.**	-	76	mwr_char_info	1
4	**Channel characterization information for the 24 GHz channel at 30 degrees C.**	-	76	mwr_char_info	1
5	**Channel characterization information for the 24 GHz channel at 40 degrees C.**	-	76	mwr_char_info	1
6	**Channel characterization information for the 36 GHz channel at 0 degrees C.**	-	76	mwr_char_info	1
7	**Channel characterization information for the 36 GHz channel at 10 degrees C.**	-	76	mwr_char_info	1
8	**Channel characterization information for the 36 GHz channel at 20 degrees C.**	-	76	mwr_char_info	1
9	**Channel characterization information for the 36 GHz channel at 30 degrees C.**	-	76	mwr_char_info	1

10	**Channel characterization information for the 36 GHz channel at 40 degrees C.**	-	76	mwr_char_info	1
TOTAL			**760**		

The mwr_mode_info_redundant structure used above is defined in the table below.

Table 14.14.55 mwr_mode_info_redundant Structure

N	Description	Units	Byte Size	Data Type	Dim.
1	**Channel characterization information for the 24 GHz channel at 0 degrees C.**	-	76	mwr_char_info	1
2	**Channel characterization information for the 24 GHz channel at 10 degrees C**	-	76	mwr_char_info	1
3	**Channel characterization information for the 24 GHz channel at 20 degrees C.**	-	76	mwr_char_info	1
4	**Channel characterization information for the 24 GHz channel at 30 degrees C.**	-	76	mwr_char_info	1
5	**Channel characterization information for the 24 GHz channel at 40 degrees C.**	-	76	mwr_char_info	1
6	**Channel characterization information for the 36 GHz channel at 0 degrees C.**	-	76	mwr_char_info	1
7	**Channel characterization information for the 36 GHz channel at 10 degrees C.**	-	76	mwr_char_info	1
8	**Channel characterization information for the 36 GHz channel at 20 degrees C.**	-	76	mwr_char_info	1
9	**Channel characterization information for the 36 GHz channel at 30 degrees C.**	-	76	mwr_char_info	1
10	**Channel characterization information for the 36 GHz channel at 40 degrees C.**	-	76	mwr_char_info	1
11	**36.5 GHz channel drift analysis**		28	mwr_drift_info	1
12	**Spare**	-	12	uc	12
TOTAL			**800**		

The mwr_char_info structure used above is defined in the table below:

Table 14.14.56 mwr_char_info Structure

N	Description	Units	Byte Size	Data Type	Dim.
1	**Look angle**	10^{-4} rad	4	sl	1
2	**Beam efficiency of main antenna**	10^{-2} %	4	sl	1
3	**Main Antenna Reflector trans. Coeff**	10^{-6}	4	sl	1
4	**Sky horn trans. coeff. for hot/cold switch [a_ch]**	10^{-6}	4	sl	1
5	**Hot load trans. coeff. for hot/cold switch [a_hc]**	10^{-6}	4	sl	1
6	**Measurement antenna transmission coeff. measure-calibration switch [a_a]**	10^{-6}	4	sl	1
7	**Calibration transmission coeff. measure-calibration switch [a_cal]**	10^{-6}	4	sl	1
8	**Measurement antenna transmission coeff. Dicke switch [a_m]**	10^{-6}	4	sl	1
9	**Calibration transmission coeff. Dicke switch [a_re]**	10^{-6}	4	sl	1
10	**Sky horn waveguides trans. coeff. [a_cw]**	10^{-6}	4	sl	1
11	**Measurement antenna waveguides trans. coeff. [a_r]**	10^{-6}	4	sl	1
12	**Sky horn feed trans. coeff. [a_cc]**	10^{-6}	4	sl	1
13	**Measurement antenna feed trans. coeff. [a_feed]**	10^{-6}	4	sl	1
14	**Sky horn isolation coefficient hot load calibration switch [b_ch]**	10^{-6}	4	sl	1
15	**Hot load isolation. coefficient for hot load switch [b_hc]**	10^{-6}	4	sl	1
16	**Measurement antenna isolation coeff. measure-calibration switch [b_a]**	10^{-6}	4	sl	1
17	**Calibration isolation coeff. measure-calibration switch [b_cal]**	10^{-6}	4	sl	1
18	**Measurement antenna isolation coeff. Dicke switch [b_m]**	10^{-6}	4	sl	1
19	**Calibration isolation coeff. Dicke switch [b_re]**	10^{-6}	4	sl	1
TOTAL			**76**		

The mwr_drift_info structure used above is defined in the table below:

Table 14.14.57 mwr_drift_info Structure

N	Description	Units	Byte Size	Data Type	Dim.
1	Date first day of the period during which the 36.5 GHz channel drift has been analysed (expressed in elapsed decimal day since 01/01/2000)	-	4	sl	1
2	Duration during which the drift has been analysed (expressed in days)	-	4	sl	1
3	count drop of the 36.5 GHz channel hot load during the analysed period	-	4	sl	1
4	count drop of the 36.5 GHz channel sky horn during the analysed period	-	4	sl	1
5	first parameter of the correction on the antenna count of the 36.5 GHz channel (derived from from the hot and cold calibration counts correction)	-	4	sl	1
6	second parameter of the correction on the antenna count of the 36.5 GHz channel (derived from from the hot and cold calibration counts correction)	-	4	sl	1
7	third parameter of the correction on the antenna count of the 36.5 GHz channel (derived from from the hot and cold calibration counts correction)	10^{-7}	4	sl	1
TOTAL			**28**		

14.14.36 MWR Processor Configuration File

This file contains data used to configure the MWR processor.

FILE ID: MWR_CON_AX

TYPE: Auxiliary

USE: Level 1B MWR processing

UPDATED: infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS (40 bytes) = 1665 bytes.

14.14.36.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD pointing to the GADS*
GADS

The contents of the GADS are detailed in the following table.

Table 14.14.58 MWR Processor Configuration File

N	Description	Units	Byte Size	Data Type	Dim.
1	**File creation time**	MJD	12	mjd	1
2	**spare**	-	4	uc	4
3	**spare**	-	4	uc	4
4	**Moving window size** size of the gain and offset smoothing filter (min. value = 1, max. value = 188)	samples	2	us	1
5	**DSR validity threshold [0..7]**	-	2	us	1
6	**Processing error threshold**	10^{-2} %	4	fl	1
7	**Header error threshold**	10^{-2} %	4	fl	1
8	**Telemetry error threshold**	10^{-2} %	4	fl	1
9	**Pointing Configuration**	-	2	us	1
10	**Side lobe table**	-	2	us	1

TOTAL		**40**		

14.14.37 MWR Secondary Lobe Temperature File

This data base is necessary to retrieve the main lobe brightness temperature.In fact, it is used to extract the secondary lobe temperature as function of the orbit in terms of latitude, in order to retrieve the effective main lobe temperature. Its format is the following as provided by the costumer. It is a collection of values stored as latitude (in milli degrees) followed by the 24 GHz sidelobes temperature, then the 36 GHz sidelobe temperature. The latitude varies from -85 to +85 degrees. Total expected accuracy ≈ 3K; sidelobes temperature inaccuracy contribution < 1K.

FILE ID: MWR_SLT_AX

TYPE: Auxiliary

USE: Level 1B MWR processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS(7.1 Mbytes)

14.14.37.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD *DSD(G) pointing to the GADS*
GADS

The contents of the GADS are detailed in the following table.

Table 14.14.59 MWR Secondary Lobe Temperature File GADS Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Secondary Lobe Data Base Creation Time**	-	12	mjd	1
2	**Transmission coefficient of the reflector for Channel 1**	10^{-2}%	2	us	1
3	**Transmission coefficient of the reflector for Channel 2**	10^{-2}%	2	us	1

N	Description	Units	Byte Size	Data Type	Dim.
4	**Global secondary lobes contribution including cosmic background, sun and satellite contributions, for channel 1**	10^{-3}K	2	us	1
5	**Global secondary lobes contribution including cosmic background, sun and satellite contributions, for channel 2**	10^{-3}K	2	us	1
6	**Eta_earth for channel 1** Efficiency factor for earth contribution on the secondary lobes for channel 1	10^{-6} %	4	sl	1
7	**Eta_earth for channel 2** Efficiency factor for earth contribution on the secondary lobes for channel 2	10^{-6} %	4	sl	1
8	**Start Latitude** Upper limit of the latitude range of data base validity (-90)	10^{-6} deg	4	sl	1
9	**Stop Latitude** Bottom limit of the latitude range of data base validity (+90)	10^{-6} deg	4	sl	1
10	**Latitude step** Step of the of data base data (10)	10^{-6}deg	4	sl	1
11	**Secondary Lobes (24 GHz)** 18 real numbers representing the secondary lobes contribution to the brightness temperature	K	72	fl	18
12	**Secondary Lobes (36 GHz)** 18 real numbers representing the secondary lobes contribution to the brightness temperature	K	72	fl	18
13	**Efficiency factor for sun contribution on the secondary lobes for Channel 1**	10^{-6}%	4	sl	1
14	**Efficiency factor for sun contribution on the secondary lobes for Channel 2**	10^{-6}%	4	sl	1
15	**Sun secondary lobes contribution for Channel 1**	10^{-3}K	4	sl	1
16	**Sun secondary lobes contribution for Channel 2**	10^{-3}K	4	sl	1
17	**Efficiency factor for sky contribution on the secondary lobes for Channel 1**	10^{-6}%	4	s1	1
18	**Efficiency factor for sky contribution on the secondary lobes for Channel 2**	10^{-6}%	4	s1	1
19	**Sky secondary lobes contribution for Channel 1**	10^{-6}K	4	sl	1
20	**Sky secondary lobes contribution for Channel 2**	10^{-6}K	4	sl	1
21	**Efficiency factor for satellite contribution on the secondarylobes for Channel 1**	10^{-6}%	4	sl	1

N	Description	Units	Byte Size	Data Type	Dim.
22	**Efficiency factor for satellite contribution on the secondarylobes for Channel 2**	10^{-6} %	4	sl	1
23	**Start Longitude - Upper limit of the latitude range of database validity (-180)**	10^{-6}deg	4	sl	1
24	**StopLongitude - Upper limit of the latitude range of database validity (+179)**	10^{-6}deg	4	sl	1
25	**Longitude step - Step of the of data base data (+1)**	10^{-6}deg	4	sl	1
26	**Start Latitude - Upper limit of the latitude range of data base validity (-80)**	10^{-6}deg	4	sl	1
27	**Stop Latitude - Bottom limit of the latitude range of data base validity (+80)**	10^{-6}deg	4	sl	1
28	**Latitude step - Step of the of data base data (+1)**	10^{-6}deg	4	sl	1
29	**Earth secondary lobes contribution for Channel 1 (Spring) ordered by latitude and longitude**	K	924480	fl	231120
30	**Earth secondary lobes contribution for Channel 1 (Summer) ordered by latitude and longitude**	K	924480	fl	231120
31	**Earth secondary lobes contribution for Channel 1 (Autumn) ordered by latitude and longitude**	K	924480	fl	231120
32	**Earth secondary lobes contribution for Channel 1 (Winter) ordered by latitude and longitude**	K	924480	fl	231120
33	**Earth secondary lobes contribution for Channel 2 (Spring) ordered by latitude and longitude**	K	924480	fl	231120
34	**Earth secondary lobes contribution for Channel 2 (Summer) ordered by latitude and longitude**	K	924480	fl	231120
35	**Earth secondary lobes contribution for Channel 2 (Autumn) ordered by latitude and longitude**	K	924480	fl	231120
36	**Earth secondary lobes contribution for Channel 2 (Winter) ordered by latitude and longitude**	K	924480	fl	231120
TOTAL			**7397713**		

14.14.38 MWR Land/Sea Flag Table File

This file contains the values of the land/sea flag.The values are recorded on a regular grid. The coverage of the grid is from 0 minutes to 21598 minutes in longitude and from -5400 minutes to 5398 minutes in latitude. The resolution of the grid is 2 minutes in longitude and 2 minutes in latitude. One value is recorded at each gridpoint.

FILE ID:MWR_LSF_AX

TYPE:Auxiliary

USE: Level 2 RA2/MWR processing

UPDATED:infrequently

SIZE:MPH(1247 Bytes) + SPH(658Bytes) + GADS(55.62 MBytes)

14.14.38.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 2 DSDs *DSD pointing to the General GADS* *DSD pointing to the Grid Data GADS*
General GADS
Data GADS

The contents of the GADS are detailed in the following table.

14.14.38.1.1 Header GADS

The general GADS shall follow the format described in Table 14.6.6.1.1-1

14.14.38.1.2 Data GADS

The land/sea flag has the following meanings:

0: oceans or semi-enclosed seas
1: enclosed seas or lakes
2: continental ice
3: land

Each record corresponds to a longitude value. The first record corresponds to the first value of the longitude, and the last record is relative to the last value of the longitude. The contents of one record are detailled in the following table:

Table 14.14.60 MWR_LSF_AX Data GADSR Format

N	Description	Units	Byte Size	Data Type	Dim.
1	**Land/Sea flag at** φf	-	1	sc	1
2	**Land/Sea flag at** φf+dφ		1	sc	1
	...				1
5400	**Land/Sea flag at** φl		1	sc	1
TOTAL			**5400**		

Where φ_f, φ_l, and dφ, are respectively, the latitude of the first point, the latitude of the last point and the grid resolution in latitude.

14.14.39 Altitude of Meteorological grid points File

This file contains the longitude and latitude of the meteorological Gaussian grid points, along with the altitude value (in meters).
A Gaussian grid is a grid for which the spacing of the latitudes is not regular, the spacing of the lines of latitude is symmetrical about the Equator and the longitudes of the grid points are defined by giving the number of points along each line of latitude.
The grid is usually defined by its number "N" which is the number of lines of latitude between a Pole and the Equator. Concerning the use for ERA-Interim data, the Gaussian grid is N128.

FILE ID: RA2_MET_AX

TYPE: Auxiliary

USE: Level 2 RA-2 processing

UPDATED: Infrequently

SIZE: MPH(1247 bytes) + SPH(378 bytes) + GADS(130320 bytes) = 131945 bytes.

14.14.39.1 Format

The file structure is shown in the table below:

MPH
Auxiliary Data SPH (as described in Volume 16) with 1 DSD: *DSD pointing to the Grid Data GADS*
Grid Data GADS

14.14.39.1.1 Grid Data GADS

The content of this GADS is fully described in section 10 of "Spécifications de l'interface entre SSALTO et Météo France" document (SMM-IF-M/METEO-EA-11804-CN).

14.14.40 ECMWF Reanalysis Data Files

This section concerns the ERA-Interim Meteorological data provided by ECMWF, which are relative to the computation of the wet and dry tropospheric corrections, the inverted barometer and the 10 m wind vectors.

The ERA-Interim series is a global atmospheric reanalysis from 1979 to present and enables to have a homogeneous meteo dataset in terms of model. The data are provided on a N128 Gaussian grid, with a 6-hours interval (00h, 06h, 12h, 18h)..

The parameters the RA2/MWR processing is concerned with are:
The model levels parameters:
the specific humidity at each of the 60 model levels (133)
the temperature at each of the 60 model levels (130)
The surface parameters:
the mean sea level pressure (151)
the surface pressure (134)
the orography (129)
the U-component of the 10 m wind vector (165)
the V-component of the 10 m wind vector (166)

The numbers in brackets correspond to the identification number of each parameter in the ECMWF catalog.

14.14.40.1 Format

The format and content of the so-called GRIB products is the same as the analysed grids described in "*Spécifications de l'interface entre SSALTO et Météo France*" document (SMM-IF-M/METEO-EA-11804-CN).
Each input file contains one parameter for one time and is in GRIB format. The profile products contain all the model levels within the same product.

14.14.41 Orbit State vectors

The Orbit State Vectors files available from the FOS, and DOR_POR_AX and DOR_VOR_AX products are defined in Volume 16.

14.14.42 ENVISAT-1 Attitude Data File

The ENVISAT-1 Attitude data file is common to many instruments and is thus described in Volume 16.

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14.15 PRODUCT SUMMARY SHEETS

The data on the following pages is extracted from the product summary information contained in the DDT data base.

RA-2 IF Calibration and BITE Mode Level 0

PRODUCT ID	**RA2_CAL_0P**
PRODUCT NAME	**RA-2 IF Calibration and BITE Mode Level 0**
DESCRIPTION	**This product contains time ordered AISPs acquired while the instrument is in IF Calibration or BITE Modes. In IF Calibration mode the instrument collects thermal noise samples to get an estimate of the IF filter shape. Digital BITE mode is used to verify the Tx/Rx chain and on-board digital processing. The product is produced systematically when the instrument data is IF Calibration or BITE data. No further PDS products are created directly from this product.**
APPLICATIONS	**The primary application of this data is instrument monitoring and calibration.**
DELIVERY TIME	**The NRT version is available from the PDHS 3 hours after data acquisition. The OFL (fully consolidated) version of the product is available from the LRAC 2 weeks after acquisition.**
COVERAGE	**No geographical coverage -- on-board monitoring product.**
THROUGHPUT	**products created infrequently**
PRODUCT SIZE	**1 MB maximum / orbit**
GEOMETRICAL SAMPLING	**N/A**
GEOMETRIC RESOLUTION	**N/A**
GEOMETRIC ACCURACY	**N/A**
RADIOMETRIC RESOLUTION	**N/A**
RADIOMETRIC ACCURACY	**N/A**
AUXILIARY DATA	**Orbit state vectors; Time correlation parameters.**
ALGORITHMS USED	**Satellite positioning; time correlation**

.

RA-2 Measurement Mode Level 0

PRODUCT ID	**RA2_ME__0P**
PRODUCT NAME	**RA-2 Measurement Mode Level 0**
DESCRIPTION	**This product contains time ordered, annotated Instrument Source Packets from the nadir pointing, pulse limited radar altimeter, which is used to measure sea level and land topography along the satellite ground track. It is the nominal Level 0 product for the RA-2 instrument.**
APPLICATIONS	**Archived product forming basis for all higher level processing.**
DELIVERY TIME	**Product available from PDHS within 3 hours from data take. Available from the LRAC starting 2 weeks after acquisition.**
COVERAGE	**Full orbit**
THROUGHPUT	**1 product per orbit.**
PRODUCT SIZE	**aprrox. 5400 source packets x 12111 bytes/packet + header = max 75 MB/orbit**
GEOMETRICAL SAMPLING	**measurements approx. 390 m along track. Vertical altitude range : 764 to 825 km, Wave height range 0.125 m to 5 m.**
GEOMETRIC RESOLUTION	**horizontal: approx. 19 km per measurement. Vertical: maximum of 48.9 cm at max. BW of 320 MHz.**
GEOMETRIC ACCURACY	**vertical: Altitude accuracy < 4.5 cm, Wave height < 5% or 6 cm**
RADIOMETRIC RESOLUTION	**Range of cross section over ocean: -10 to 50 dB**
RADIOMETRIC ACCURACY	**Accuracy of cross section over ocean: 0.2 dB**
AUXILIARY DATA	**Orbit state vectors; Time correlation parameters.**
ALGORITHMS USED	**Satellite positioning; Time correlation**
NOTES	**Created systematically when data received from the instrument is Measurement Mode data.**

RA-2 Geophysical Data Record products

PRODUCT ID	**RA2_GDR_2P**
PRODUCT NAME	**RA-2 Geophysical Data Record**
DESCRIPTION	**These products contain wind-speed, wave height, range and orbital altitude measurements along with water vapour measurements from the MWR.**
APPLICATIONS	**Measurement of ocean surface winds and waves, water vapour.**
DELIVERY TIME	**The GDR is generated during RA2 reprocessing baseline v3.0 .**
COVERAGE	**Pole to pole, half orbit**
THROUGHPUT	**2 products of each type per orbit**
PRODUCT SIZE	**7 MB/ product**
GEOMETRICAL SAMPLING	**measurements approx. 390 m along track. Vertical altitude range : 764 to 825 km, Wave height range 0.125 m to 5 m.**
GEOMETRIC RESOLUTION	**horizontal: approx. 19 km per measurement. Vertical: maximum of 48.9 cm at max. BW of 320 MHz.**
GEOMETRIC ACCURACY	**vertical: Altitude accuracy < 4.5 cm, Wave height < 5% or 6 cm**
RADIOMETRIC RESOLUTION	**Range of cross section over ocean: -10 to 50 dB**
RADIOMETRIC ACCURACY	**Accuracy of cross section over ocean: 0.2 dB**
AUXILIARY DATA	**Orbit state vectors; time correlation parameters; MWR MDS**
ALGORITHMS USED	**independent processing by 4 retrackers range estimation geophysical parameters estimation validation**
NOTES	**The product is produced systematically from the Level 1B product. The N version is processd systematically using DORIS Navigator orbit estimation and the NRT Level 1B product. The P version is processed systematically using DORIS preliminary orbit estimation and the OFL Level 1B product. The V (fully consolidated) version is processed systematically using the DORIS Precise orbit estimation and the OFL Level 1B product.**

RA-2 Sensor Geophysical Data Record

PRODUCT ID	**RA2_MWS_2P**
PRODUCT NAME	**RA-2 Sensor Geophysical Data Record**
DESCRIPTION	**This product contains the geophysical Data Record augmented with waveforms and associated parameters from the Level 1B product. It is the most complete and precise RA-2 product produced.**
APPLICATIONS	**Scientific applications requiring extremely precise RA-2 data**
DELIVERY TIME	**The SGDR is generated during RA2 reprocessing baseline v3.0**
COVERAGE	**Pole to pole, half orbit**
THROUGHPUT	**2 passes (products) per orbit**
PRODUCT SIZE	**Approx. 31 MB**
GEOMETRICAL SAMPLING	**measurements approx. 390 m along track. Vertical altitude range : 764 to 825 km, Wave height range 0.125 m to 5 m.**
GEOMETRIC RESOLUTION	**horizontal: approx. 19 km per measurement. Vertical: maximum of 48.9 cm at max. BW of 320 MHz.**
GEOMETRIC ACCURACY	**vertical: Altitude accuracy < 4.5 cm, Wave height < 5% or 6 cm**
RADIOMETRIC RESOLUTION	**Range of cross section over ocean: -10 to 50 dB**
RADIOMETRIC ACCURACY	**Accuracy of cross section over ocean: 0.2 dB**
AUXILIARY DATA	**Orbit state vectors; time correlation parameters; MWR MDS (from the GDR product) 18 Hz Waveforms MDS Burst Waveforms MDS**
ALGORITHMS USED	**same as for the Geophysical Data Record fully consolidated product and the Level 1B fully consolidated product**
NOTES	**This product is produced sytematically from the OFL Level 1B product and the OFL Geophysical Data Record product.**

DISTRIBUTION LIST

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