

CRYOSAT OCEAN DATA QUALITY STATUS SUMMARY



Prepared by: E. Turner (Telespazio UK)

CryoSat Quality Team (IDEAS-QA4EO)

Approved by: A. Di Bella (Serco c/o ESA-ESRIN)

CryoSat Data Quality Manager

J. Bouffard (ESA-ESRIN)

CryoSat, ESA Technical Officer

AMENDMENT RECORD SHEET

The Amendment Record Sheet below records the history and issue status of this document.

ISSUE	DATE	CHANGE LOG
1	14 August 2019	Prepared following the implementation of COP IPF1 v3.7 & IPF2 v3.9.
2	20 November 2019	Update following the completion of the COP Baseline-C reprocessing campaign.
3	16 August 2022	Update following the implementation of COP IPF1 v3.13 & IPF2 v3.13.

TABLE OF CONTENTS

1	Introduction.....	4
1.1	Purpose and Scope	4
1.2	Applicable Ice Processing Baseline and Ice Products	4
1.3	Referenced Documents	5
1.4	Acronyms and Abbreviations.....	5
2.	Overview.....	7
2.1	Summary Table of Tracked Anomalies	7
2.2	Summary Table of Planned Evolutions.....	8
3.	Anomalies	9
3.1	Level 1 Data Anomalies	9
3.2	Level 2 Data Anomalies	11
3.3	Anomalies affecting L1 and L2 Data	15
4	Planned Evolutions	17
5	IPF Anomalies Closed With The Latest CryoSat Baseline	18

1 INTRODUCTION

1.1 Purpose and Scope

This document provides details of all known anomalies and planned evolutions which are being tracked, and that could affect the quality of the CryoSat [Ocean Level 1B \(L1B\)](#) and [Level 2 \(L2\)](#) data products generated operationally by the [CryoSat Ocean Processor](#) (COP) and [distributed by ESA](#).

This list of anomalies and potential evolutions is complete and up to date as of **16th August 2022**. An updated version of this document is released following every processor upgrade and includes any additional anomalies identified since the previous version of this document.

1.2 Applicable Ocean Processing Baseline and Ocean Products

The anomalies and evolutions discussed in this document are related to CryoSat data products processed with the latest version of the CryoSat Ocean Processors; Baseline-C (COP-IPF1 v3.13 & COP-IPF2 v3.13). Further information on historic processor versions and dates of when operational CryoSat data production with each processor commenced is available on the [CryoSat IPF Baseline](#) webpage.

Figure 1 highlights (in red) the CryoSat Ocean Products, generated operationally, to which this document is applicable. Further information on the products is also provided below, and in the [CryoSat Ocean Product Handbook](#).

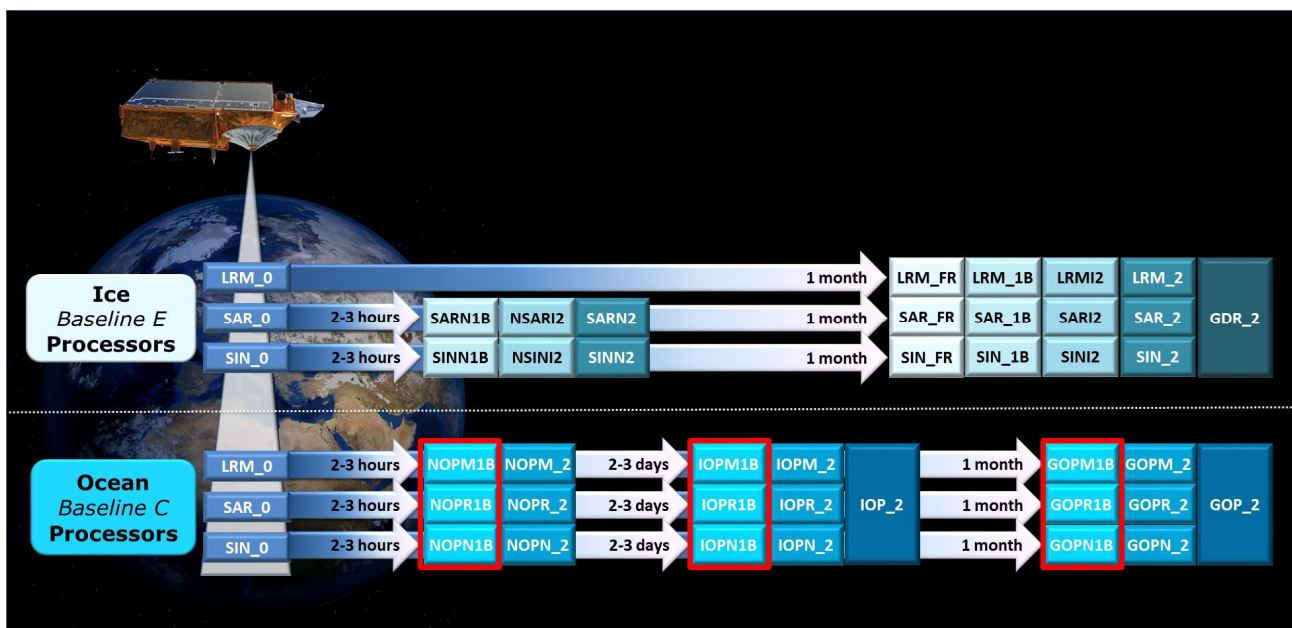


Figure 1. CryoSat Data Products

The CryoSat Ocean products are dedicated to the study of ocean surfaces, and provided specifically for the needs of the oceanographic community. Three classes of products are generated, with different delivery latency:

- Near-Real Time Ocean Products (NOP)
- Intermediate Ocean Products (IOP)
- Geophysical Ocean Products (GOP)

These products are then further classified according to the acquisition mode (LRM, SAR and SARIn). The processing applied to generate these products is the same in all cases and the only difference lies in the use of different input auxiliary files. This refers to the use of different orbit files, and different corrections included and applied.

NOP are delivered within 3 hours from sensing (i.e. outside the blind orbits) and are generated using the Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS) Navigator Orbit with geophysical corrections computed from the Forecast meteorological Auxiliary Data Files (ADFs) where available. This Near Real Time (NRT) processing is a new feature of the Baseline-C IPF.

IOP are generated 2-3 days after data sensing acquisition for medium-range ocean forecasting and use DORIS preliminary orbits (CNES Medium Orbit Ephemeris) with geophysical corrections computed from Analysis meteorological ADFs, and when these are not available in time, the Forecast meteorological ADFs.

GOP are typically generated 30 days after data sensing acquisition using consolidated DORIS precise orbits (CNES Precise Orbit Ephemeris) and processed with geophysical corrections computed from the Analysis meteorological ADFs.

The CryoSat NetCDF Ocean products are designed to contain LRM/ Pseudo-LRM (PLRM) and SAR/ SARIn altimeter data together in the same product file. The formats of the L1B products are the same whatever the operating mode, and therefore the SAR/ SARIn-derived parameters are redundant in LRM/ Pseudo-LRM. L1B NOP, IOP and GOP contain all the engineering parameters needed to generate the L2 products, together with corrections to be applied for range and tidal effects.

1.3 Referenced Documents

The following list is a list of documents with a direct bearing on the content of this report. Where referenced in the text, these are identified as RD.n, where 'n' is the number in the list below:

- RD.1 CryoSat Ocean netCDF Product Format Specification (L1B & L2) [PFS-OCE],
C2-RS-ACS-ESL-5266, 3.1, 28/09/2017
- RD.2 Baseline-C CryoSat Ocean Processor Product Handbook
4.0, 05/12/2017

1.4 Acronyms and Abbreviations

ADF	Auxiliary Data File
AR	Anomaly Report
CalVal	Calibration/Validation
CNES	Centre National d'Etudes Spatiales
COP	CryoSat Ocean Processor
DORIS	Doppler Orbitography and Radiopositioning Integration by Satellite
DSD	Data Set Descriptor
ECMWF	European Centre for Medium Range Weather Forecasts

ESA	European Space Agency
GOP	Geophysical Ocean Product
IDEAS+	Instrument Data quality Evaluation and Analysis Service
IOP	Intermediate Ocean Product
IPF	Instrument Processing Facility
L0/L1B/L2	Level 0/Level 1B/Level 2
LRM	Low Resolution Mode
MCD	Measurement Confidence Data
NOP	Near Real Time Ocean Product
NRT	Near Real Time
PLRM	Pseudo Low Resolution Mode
SAR	Synthetic Aperture Radar
SARIn	SAR Interferometric
SSHA	Sea Surface Height Anomaly

2. OVERVIEW

2.1 Summary Table of Tracked Anomalies

The tables below lists all the current anomalies which are open on the operational CryoSat Ocean Baseline-C products and **are visible to users**. These will be fixed in an upcoming processing baseline.

The table also summarises which specific data processor and product mode/level is affected by each anomaly. Further details on each anomaly can be found in [Section 3](#) of this document.

Table 1: Anomalies affecting the CryoSat Ocean products

Anomaly ID	Product Type/ Mode/ Level Affected								To be fixed in Baseline
	Level 1B			Level 2			Pole-to-Pole		
	NOP	IOP	GOP	NOP	IOP	GOP	IOP	GOP	
CRYO-COP-2	No	No	No	SARIn	SARIn	SARIn	SARIn	SARIn	D (TBC)
CRYO-COP-3	All	All	All	All	All	All	All	All	D (TBC)
CRYO-COP-16	No	No	No	LRM	LRM	LRM	No	No	D (TBC)
CRYO-COP-17	SAR & SARIn	SAR & SARIn	SAR & SARIn	No	No	No	No	No	D (TBC)
CRYO-COP-28	No	No	No	All	All	All	All	All	D (TBC)
CRYO-COP-29	No	No	No	All	All	All	All	All	D (TBC)
CRYO-COP-30	No	No	No	No	No	No	All	All	D (TBC)
CRYO-COP-36	All	All	All	All	All	All	All	All	D (TBC)
CRYO-COP-37	SAR & SARIn	SAR & SARIn	SAR & SARIn	No	No	No	No	No	D (TBC)
CRYO-COP-46	No	No	No	All	All	All	All	All	D (TBC)
CRYO-COP-48	No	No	SAR & SARIn	No	No	No	No	No	D (TBC)
CRYO-COP-49	No	No	SARIn	No	No	No	No	No	D (TBC)

CRYO-COP-55	No	No	No	SAR & SARIn	SAR & SARIn	SAR & SARIn	No	No	D (TBC)
CRYO-COP-57	No	No	No	No	No	No	All	All	D (TBC)
CRYO-COP-58	No	No	No	All	All	All	All	All	D (TBC)
CRYO-COP-59	All	All	All	All	All	All	All	All	D (TBC)
CRYO-COP-63	No	No	No	No	No	No	All	All	D (TBC)

2.2 Summary Table of Planned Evolutions

The table below lists a number of evolutions, which are being considered for the next CryoSat Ocean Processor Baseline (Baseline-D). Further details for each evolution can be found in [Section 5](#) of this document.

Table 2: Evolutions considered for the next COP update

Evolution ID	Title	Future Ocean Processor Baselines
CRYO-COP-27	New field to link COP and OSAR/OSARIN chains	D (TBC)
CRYO-COP-39	Gain Variation correction in Ocean OSAR/OSARIN vs COP	D (TBC)
CRYO-COP-41	Evolution: COP LRM Processor and CAL1 files reading	D (TBC)

3. ANOMALIES

3.1 Level 1 Data Anomalies

AR ID	CRYO-COP-17	AR Title	Incorrect setting of flag_mcd_20 fields
Affected Processor Mode		IPF1 SAR & SARIn	
Description	<p>An issue was detected with the configuration of the L1B Measurement Confidence Data (MCD) flags (<i>flag_mcd_20_ku</i>). The following flags are currently incorrectly set, and should be ignored by users:</p> <ul style="list-style-type: none"> - 8 for all L1B SAR mode products: according to the Product Format Specification this implies that the <i>'attitude_cor_missing'</i> flag is set, although it is not. - 4 for L1B SARIn mode products: according to the Product Format Specification 4 is not a possible flag value for this field. <p>The flag configuration will be updated and aligned with the <i>'flag_mcd_20_hr_ku'</i> field in the next COP update.</p>		
AR Status	Solution identified. To be resolved in the next COP update.		

AR ID	CRYO-COP-37	AR Title	L1_Processing_Quality mismatch between values in DBL global attributes and HDR
Affected Processor Mode		IPF1 SAR & SARIn	
Description	<p>The <i>'l1b_processing_quality_hr'</i> field in the global attributes section of the netCDF file is currently set to zero in all L1B SAR and SARIn mode ocean products. As a result the <i>'l1b_proc_flag_hr'</i> is set to 1 (=percentage of errors greater than threshold).</p> <p>This is because the <i>'l1b_processing_quality_hr'</i> field is currently not set/ used in the OSAR and OSARIn chains of the current release.</p> <p>A modification is required to make the <i>'l1b_processing_quality_hr'</i> available in the OSAR and OSARIn chains. With this field implemented, the <i>'l1b_proc_flag_hr'</i> will be automatically in agreement.</p> <p>A solution has been developed and will be included in the next COP update.</p>		
AR Status	Solution identified. To be resolved in the next COP update.		

AR ID	CRYO-COP-48	AR Title	Baseline-C: Incorrect DSD within .HDR file of L1B SAR & SARIn
Affected Processor Mode		IPF1 SAR & SARIn	
Description	<p>There is currently an inconsistency in the HDR files of L1B GOP SAR and SARIn mode products. It is expected for the L1B GOP SAR and SARIn processing to use the Star Tracker ATTROP file (STR_ATTROP) and for the file to be listed in a Data Set Descriptor (DSD) in the HDR file. This file is present and correct in L1B GOP SAR and SARIn mode products:</p> <pre><Data_Set_Descriptor> <Data_Set_Name>STAR_TRACKER_ATTROP_FILE</Data_Set_Name> <Data_Set_Type>R</Data_Set_Type> <File_Name>CS_OFFL_STR_ATTROP_XXXXXXXXTXXXXXX_XXXXXXXXTXXXXXX_C001.EEF</File_Name></pre> <p>However there is also an additional DSD referring to the Star Tracker ATTREF file (STR_ATTREF) but containing a duplicate STR_ATTROP:</p> <pre><Data_Set_Descriptor> <Data_Set_Name>STAR_TRACKER_ATTREF_FILE</Data_Set_Name> <Data_Set_Type>R</Data_Set_Type> <File_Name>CS_OFFL_STR_ATTROP_XXXXXXXXTXXXXXX_XXXXXXXXTXXXXXX_C001.EEF</File_Name></pre> <p>This duplicate DSD is not expected and should be removed.</p> <p>A fix will be implemented in the next COP update.</p>		
AR Status	To be resolved in a future COP update.		

AR ID	CRYO-COP-49	AR Title	L1B GOPN product with stop time of 60s
Affected Processor Mode		IPF1 SARIn	
Description	<p>During the Ocean Baseline-C reprocessing activities, one GOP SARIn product was found to have a stop time of 60s in its filename, which prevented the conversion of the product to EOSIP:</p> <pre>CS_LTA__SIR_GOPN1B_20150630T234143_20150630T234160_C001 CS_LTA__SIR_GOPN_2_20150630T234143_20150630T234160_C001</pre> <p>The product validity falls close to (18 minutes before) the time when a leap second was added to Coordinated Universal Time (UTC). It is thought that the processor may have added the leap second too early resulting in the unusual filename stop time.</p> <p>Further investigation is required to understand this issue and resolve it in the future.</p>		
AR Status	Under investigation. To be resolved in a future COP update.		

3.2 Level 2 Data Anomalies

AR ID	CRYO-COP-2	AR Title	Adjustment of Sigma0 bias in SARIn mode
Affected Processor Mode		IPF2 SARIn	
Description	<p>Following Calibration/ Validation (CalVal) analysis of 3 months of SARIn mode ocean data, it was decided that the Sigma0 bias needs to be adjusted for SARIn mode ocean products. This requires an update to the L2 processing parameter auxiliary data file.</p> <p>Whilst this change was implemented in COP IPF2 v3.2, it was noted that the tuning was performed based on a limited data set (3 months), and it is likely that further improvements can be made. Further improvements could be explored to the next COP update.</p>		
AR Status	Further investigation required. To be resolved in a future COP update.		

AR ID	CRYO-COP-16	AR Title	H2Corr-related SSHA Crossover bias
Affected Processor Mode		IPF2 LRM	
Description	<p>During analysis of 1 year of test Baseline-C GOP data, CLS observed a 1-2 cm bias in the Sea Surface Height Anomaly (SSHA) measurements in LRM data. The root cause is suspected to be related to the implementation of the H2COR truncation introduced at Baseline-C, which has resulted in a pseudo time tag bias of 394 μs.</p> <p>Users can correct the SSHA using the following equation:</p> $ssh_{a_01_corrected} = ssh_{a_01} - 394.E-6 * orb_alt_rate_01$		
AR Status	Under investigation. To be resolved in a future COP update.		

AR ID	CRYO-COP-28	AR Title	Incorrect Product_Location in L2 GOP product
Affected Processor Mode		IPF2 All	
Description	<p>An issue has been observed with occasional L2 ocean products which have incorrect location information and the stop latitude/ longitude in the header (.HDR) files is set to the error value '-214748365'.</p> <p>Inspection of the latitude and longitude variables in the data file reveals that continuous valid '1 Hz' values (<i>lat_01 / lon_01</i>) and '20 Hz PLRM' values (<i>lat_20_plrm_ku / lon_20_plrm_ku</i>) are provided, however the '20 Hz' values (<i>lat_20_ku / lon_20_ku</i>) do not continue to the end of the product (and are set to NaN). Where NaN values are encountered at the end of the product, the error value is set in the HDR files.</p> <p>This is caused by an anomaly in the L2 COP specialised processor and the bad management of cases where the 20 Hz PLRM measurements have no corresponding 1 Hz measurement, and will be resolved in a future COP update.</p>		
AR Status	To be resolved in a future COP update.		

AR ID	CRYO-COP-29	AR Title	Problem with 20Hz and 1Hz mapping in L2 GOP
Affected Processor Mode		IPF2 All	
Description	<p>The L2 netCDF ocean products contain a mapping variable '<i>ind_meas_1hz_20_ku</i>' which tells you, for each 20 Hz data sample, which 1 Hz data sample it belongs to. This enables 1 Hz variables to be associated with 20 Hz variables.</p> <p>An issue has been observed with occasional L2 ocean products where a 20 Hz data sample (at the start/ end of the product) is valid, but does not belong to a 1 Hz measurement. In such cases the value for '<i>ind_meas_1hz_20_ku</i>' is set to the error value -32768.</p> <p>Possible solution to be discussed with ESA and implemented in a future COP update.</p>		
AR Status	Further investigation required. To be resolved in a future COP update.		

AR ID	CRYO-COP-30	AR Title	L1_Processing_Quality mismatch between values in DBL global attributes and HDR
Affected Processor Mode		IPF2 P2P only	
Description	<p>An issue has been observed affecting the ocean netCDF Pole-to-Pole (P2P) products.</p> <p>The '<i>l1b_processing_quality</i>' field reported in the global attributes section of the data product is not correct since it refers to the last L2 product processed (and included in the P2P). The value of this field in the HDR file is also incorrect as it is set to zero in all P2P products. The '<i>l1b_processing_quality</i>' should be updated and should match between the HDR and the data file.</p> <p>A solution has been developed and will be included in in a future COP update.</p>		
AR Status	Solution identified. To be resolved in a future Baseline update.		

AR ID	CRYO-COP-46	AR Title	Invalid first/last records in L2 IOP
Affected Processor Mode		IPF2 All	
Description	<p>An issue has been observed with L2 ocean products which have incorrect location information (start latitude/ longitude) in the header (.HDR) files. The '<i>start_lat</i>' and '<i>start_lon</i>' in the Specific Product Header do not correspond to the first record in the data file, but to the second record. This is because, in these cases the first and last records of the product are flagged as invalid.</p> <p>Possible solution to be discussed with ESA and implemented in a future COP update.</p>		
AR Status	Further investigation required. To be resolved in a future COP update.		

AR ID	CRYO-COP-55	AR Title	COP IPF2: Mispointing angles for SAMOSA retracker
Affected Processor Mode		IPF2 SAR & SARIn	
Description	An issue affecting occasional L2 SAR and SARIn products.		

	<p>The platform mispointing is not correctly accounted for in the L2 COP implementation of SAMOSA retracker used in SAR/SARin modes.</p> <p>The mispointing angles are multiplied by 1E+15 and then divided by 1E+15 for sake of avoiding some numerical instabilities. When the mispointing angles are multiplied by 1E+15 they are stored in integer 32 format and can overpass the storage capacity of the variable they are stored in when the mispointing angle are large.</p> <p>In these cases (when the mispointing angles are large), the angles that are input to the SAMOSA retracking are wrong. This has an impact on the altimeter estimates by the SAMOSA retracker.</p> <p>Possible solution to be discussed with ESA and implemented in a future COP update.</p>
AR Status	Further investigation required. To be resolved in a future COP update.

AR ID	CRYO-COP-57	AR Title	Time jumps in L2 P2P products
Affected Processor Mode		IPF2 P2P	
Description	<p>There is an issue in occasional P2P products where the time values of some individual data points jump backwards compared to the adjacent data points.</p> <p>In comparison, the equivalent L2 product shows a small gap at the same location, but no jump in datation. Therefore it is suspected that these jumps are produced during the concatenation of the individual L2 products to form the L2 P2P product.</p> <p>Where users observe this issue in P2P products we encourage them to use the equivalent L2 products.</p> <p>Possible solution to be discussed with ESA and implemented in a future COP update.</p> <p>This AR is linked to CRYO-COP-63.</p>		
AR Status	Further investigation required. To be resolved in a future COP update.		

AR ID	CRYO-COP-58	AR Title	Mismatch in 1Hz to 20Hz time mapping
Affected Processor Mode		IPF2 All	
Description	<p>There is a problem affecting the time variables in L2 and P2P products.</p> <p>The variable time_1hz_20_ku gives the time of the 1 Hz measurement to which the 20 Hz measurement belongs. Sometimes this is shifted from the corresponding 1 and 20 Hz times.</p> <p>This issue is also present in the corresponding L2 products, however there is no obvious pattern to where the problem occurs.</p> <p>The equivalent PLRM mapping variable time_1hz_20_plrm_ku does not appear to be affected in L2 or P2P products.</p> <p>Possible solution to be discussed with ESA and implemented in a future COP update.</p>		
AR Status	Further investigation required. To be resolved in a future COP update.		

AR ID	CRYO-COP-63	AR Title	P2P products with embedded/ overlapping L2 inputs
Affected Processor Mode		IPF2 All	
Description	<p>There is an issue in occasional P2P products affecting the ordering of data points.</p> <p>This happens when there are embedded or overlapping L2 inputs, e.g. a small 2s L2 GOPN product is covered fully by a long L2 GOPR product. When the P2P product is constructed, the processor ingests and appends the product chronologically based on their start times, regardless of whether they are overlapping, which causes some data points to be appended in the wrong order.</p> <p>Where users observe this issue in P2P products we encourage them to use the equivalent L2 products.</p> <p>Possible solution to be discussed with ESA and implemented in a future COP update.</p> <p>This AR is linked to CRYO-COP-57.</p>		
AR Status	Further investigation required. To be resolved in a future COP update.		

3.3 Anomalies affecting L1 and L2 Data

AR ID	CRYO-COP-3	AR Title	Meteo fields set to default over land & continental ice
Affected Processor Mode		IPF1 & IPF2 All	
Description	<p>There is currently an issue affecting all ocean products, where the Meteo correction values are not provided over surface type 'continental ice'. This affects the corrections derived from the ECMWF models (Dry Tropospheric correction, Wet Tropospheric correction, Inverse Barometric correction and the U- and V-components of the model wind vector). Nominal correction values are provided over all other surface types.</p> <p>This issue will be resolved in the next COP update.</p>		
AR Status	Solution identified – due to be closed with Baseline-D.		

AR ID	CRYO-COP-36	AR Title	Tai_utc_difference attribute to be updated
Affected Processor Mode		IPF1 & IPF2 All	
Description	<p>The time variables in the L1B and L2 ocean products have an attribute for 'tai_utc_difference'. This value is currently incorrect in the L1B and the L2 products. The value should be set to 37 and should be consistent between all time variables in all L1B and L2 products.</p> <p>The value reported in the Product Format Specification has been correctly updated to 37, but the products have not yet been updated to match this.</p> <p>This will be implemented in the next COP update.</p>		
AR Status	To be resolved in a future Baseline update.		

AR ID	CRYO-COP-59	AR Title	Discrepancies between Ocean Baseline-C PHB and products
Affected Processor Mode		IPF1 & IPF2 All	
Description	<p>There are currently some discrepancies between the Baseline-C CryoSat Ocean Product Handbook (v 4.1, 5 Dec 2019) and the products.</p> <p>Echo Scaling: Section 3.5.4 of the Handbook gives a formula to retrieve the SAR and SARin power echo waveform in Watts. In that formula, the variable echo_scale_factor_20_ku should be echo_scale_factor_20_hr_ku. In addition, the LRM/PLRM waveform should be divided and not multiplied by the scale factor.</p> <p>Backscattering: Section 3.5.7 of the Handbook states that the backscatter coefficient is not corrected for atmospheric attenuation, whereas the description of the L2/L2P2P variables sig0_ocean_01/20 states otherwise.</p> <p>Version of DTU solution: Sections 3.8.2 and 3.8.3 mention DTU15, whereas the description of the L2/L2P2P variables mean_sea_surf_sol2_01 and mean_dyn_topo_sol2_01 mentions DTU13.</p>		

	<p>Echo flag: The variable <code>flag_echo_20_hr_ku</code> is set to -23808 for all measures in several L1 SAR files, whereas its description does not include this value as a possible flag.</p> <p>These discrepancies will be fixed in the next COP update.</p>
AR Status	Due to be closed with Baseline-D.

4 PLANNED EVOLUTIONS

Evolution ID	CRYO-COP-27	Evolution Title	New field to link COP and OSAR/OSARIN chains
Processor Mode		IPF1 & IPF2 All	
Description	<p>In the L1B and L2 netCDF Ocean products there are index fields linking the 1 Hz and 20 Hz values from the CryoSat Ocean Processor (COP), and at L2 linking the 1 Hz and 20 Hz plrm values from the OSAR/OSARIN chain. What is missing is the link across the processing chains so that hr/plrm fields can be linked to 1 Hz fields from the COP chain. This will be useful for all users for linking, for example, the 1 Hz surface type (COP chain) to the correction fields for the OSAR/OSARIN chain.</p> <p>This could be done in a number of ways, however, the suggestion from the IPF maintainers is to add a dedicated field that links the 20 Hz hr/plrm OSAR/OSARIN times with the 1 Hz COP times, so that the link between the information is logically driven.</p>		
Evolution Status	Further R&D required. Potential changes to be implemented a future COP update.		

Evolution ID	CRYO-COP-39	Evolution Title	Gain Variation correction in Ocean OSAR/OSARIN vs COP
Processor Mode		IPF1 LRM	
Description	<p>It has been observed that the COP IPF1 Pseudo-LRM (PLRM) processor computes its own Gain Variation correction differently from the other L1B CryoSat processors. Whilst this is not necessarily a problem, investigation is ongoing to understand the difference between the different corrections and to agree on the best approach.</p>		
Evolution Status	Further R&D required. Potential changes to be implemented a future COP update.		

Evolution ID	CRYO-COP-41	Evolution Title	Evolution: COP LRM Processor and CAL1 files reading
Processor Mode		IPF1 LRM	
Description	<p>Currently the COP IPF1 LRM processor is only able to read the first record of the Calibration 1 (CAL1) file. There are some cases where the first record is set to zero, but the records after this are valid and could be used.</p> <p>Investigation is ongoing to suggest a possible evolution for the COP IPF1 LRM processor to enable it to read all records.</p>		
Evolution Status	Further R&D required. Potential changes to be implemented a future COP update.		

5 IPF ANOMALIES CLOSED WITH THE LATEST CRYOSAT BASELINE

Details of the last IPF upgrades are provided on the ESA webpage. The table below lists all of the anomalies, which were resolved with the [Ocean Processor versions](#) in operation since May 2021.

Anomaly ID	Title	Status	Component	Implemented in release:
CRYO-COP-1	20Hz times set to Default Value	Resolved	IPF1 & IPF2	COP IPF1 v3.2 & IPF2 v3.2
CRYO-COP-4	Missing and duplicated DSDs in L1B/L2 products	Resolved	IPF1 & IPF2	COP IPF1 v3.6 & COP IPF2 v3.8
CRYO-COP-5	Surface Type Statistics in L2: wrong percentage computed	Resolved	IPF2	COP IPF1 v3.2 & IPF2 v3.2
CRYO-COP-6	Missing hr global attributes in L1B	Resolved	IPF1 & IPF2	COP IPF1 v3.2 & IPF2 v3.2
CRYO-COP-7	P2P IOP missing inputs	Resolved	IPF2	COP IPF1 v3.2 & IPF2 v3.2
CRYO-COP-8	Naming Discrepancies in Global Attributes & Product Variables	Resolved	IPF1 & IPF2	COP IPF1 v3.6 & COP IPF2 v3.8
CRYO-COP-9	Star Tracker Usage	Resolved	IPF1	COP IPF1 v3.2 & IPF2 v3.2
CRYO-COP-15	Geophysical Constants File	Resolved	Config	COP IPF1 v3.7 & COP IPF2 v3.9
CRYO-COP-19	Inconsistent NOP processing behaviour when AUXI Meteo files are missing	Resolved	IPF1	COP IPF1 v3.6 & COP IPF2 v3.8
CRYO-COP-23	COP IPF1 L0 Header Template	Resolved	IPF1	COP IPF1 v3.5 & COP IPF2 v3.7
CRYO-COP-24	COP - Anomaly in L2 IOP and GOP products : hf_fluct_cor_01	Resolved	SAD	COP IPF1 v3.6 & COP IPF2 v3.8
CRYO-COP-25	Ocean product headers refer to wrong reference document	Resolved	IPF1 & IPF2	COP IPF1 v3.7 & COP IPF2 v3.9
CRYO-COP-26	COP TDS: Mismatch in values between HDR and global attributes	Resolved	IPF1	COP IPF1 v3.6 & COP IPF2 v3.8
CRYO-COP-34	Digital Object Identifier field implementation in L1b and L2 COP	Resolved	IPF1 & IPF2	COP IPF1 v3.7 & COP IPF2 v3.9
CRYO-COP-35	COP TDS: High number of Ocean Retracking flags in L2 GOP	Resolved	IPF1	COP IPF1 v3.7 & COP IPF2 v3.9