

**1. Overview**

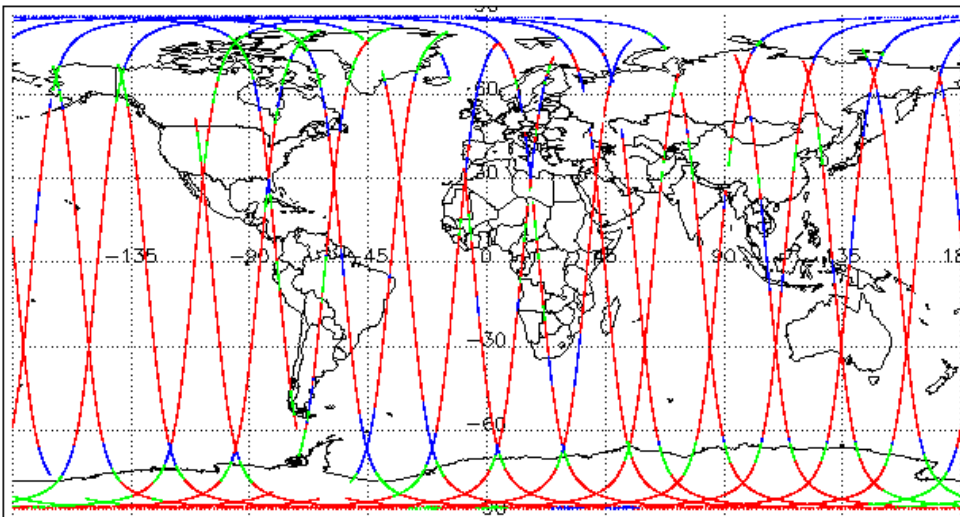
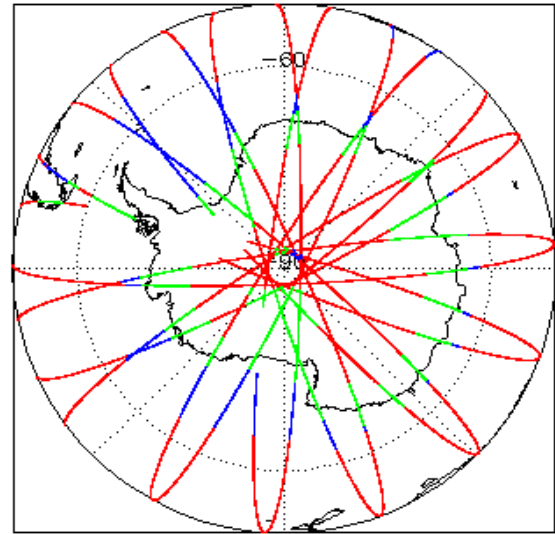
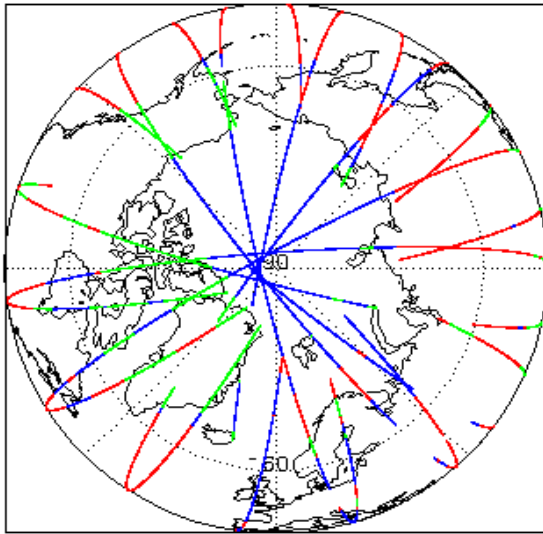
|                           |  |
|---------------------------|--|
| <b>Report Production:</b> | 07-Jan-2021  |
| <b>Processor Used:</b>    | CryoSat Ocean Processor                                      |
| <b>Data Used:</b>         | Near Real Time Ocean Products (NOP)<br>L1B & L2 Science Data |

| Check                                     | L1 & L2                      |
|---|------------------------------|
| Server check: science-pds.cryosat.esa.int | Nominal                      |
| Server check: calval-pds.cryosat.esa.int  | Nominal                      |
| Product Software Check                    | Nominal                      |
| Product Format Check                      | Nominal                      |
| Product Header Analysis                   | Nominal                      |
| Auxiliary Data File Usage Check           | Nominal                      |
| Auxiliary Correction Error Check          | See Section 5.4              |
| Measurement Confidence Data Check         | See Section 4.5, 4.6 and 5.5 |
| Measurement Quality Flag Check            | See Section 5.6              |
| Ocean Retracking Quality Check            | See Section 5.7              |
| QCC Error/ Warning Check                  | See Section 7.1 and 7.2      |

**Mission / Instrument News**

|             |  |
|-------------|--|
| 05-Jan-2021 | SIRAL unavailability from 05/01/2021 01:32:08 to 05/01/2021 02:26:08: missing SARIN-1 and SAR data<br>SIRAL unavailability from 05/01/2020 03:09:16 to 05/01/2020 11:54:38: missing all SIRAL data |
| 06-Jan-2021 | None   |
| 07-Jan-2021 | Nothing planned  |

**2. Global Coverage**



**Mode Coverage**

|  |       |
|--|-------|
|  | LRM   |
|  | SAR   |
|  | SARin |

**3. Instrument Configuration**

The SIRAL instrument configuration for the day of acquisition is provided below.

|                                    |                |
|------------------------------------|----------------|
| <b>SIRAL instrument(s) in use:</b> | SIRAL - A      |
| <b>Star Tracker(s) in use:</b>     | Star Tracker 1 |

**4. NOP Level 1B Data Quality Check**

**4.1 L1B Product Format Check**

Each product, retrieved and unpacked from the science server, is checked to ensure it consists of both an XML header file (.HDR) and a binary product file (.DBL).

Number of products with errors: 0

## 4.2 L1B Product Header Analysis

For all products, a series of pre-defined checks are performed on the MPH and SPH in order to identify any inconsistencies and/or errors raised by the ground-segment processing chain.

**L1B Processing Quality HR:** The l1b\_proc\_flag\_hr flag is currently set all L1B IOPR and IOPN products because the l1b\_processing\_quality\_hr field is not correctly configured in the OSAR and OSARIn chains. A modification is required in the next release.

Number of products with errors: 0

## 4.3 L1B Auxiliary Data File Usage Check

Each product is checked for missing Data Set Descriptors with respect to a pre-determined baseline and also to check the validity of Auxiliary Data Files is correct.

**Dynamic Atmospheric Correction:** The DAC is missing in all products because the auxiliary files required are not available in time for processing. This known and expected behaviour.

Number of products with errors: 0

## 4.4 L1B Auxiliary Correction Error Check

CryoSat L1B data includes a correction error flag for each measurement record. The bit value of this flag indicates any problems when set.

Number of products with errors: 0

## 4.5 L1B Measurement Confidence Data Check

CryoSat L1B data includes a measurement confidence flag for each measurement record. The bit value of this flag indicates any problems when set.

> **Attitude Correction Missing:** This flag is currently set in error for NOPR products due to a configuration issue. This is being investigated and will be updated in the next SW update.

Number of products with errors: 1

| Product   | Test Failed         | Description  |
|---|---------------------|--|
| CS_OFFL_SIR_NOPM1B_20210106T213754_20210106T220321_C001 | Power scaling error | There is an error in the scaling of the L1B waveform for one or more records |

## 4.6 L1B Waveform Group Data Check

CryoSat L1B data includes a waveform data flag for each measurement record. The bit value of this flag indicates any problems when set.

> **Loss of Echo Flag:** This flag is currently set for products over land, but this is to be expected.

Number of products with errors: 14

| Product   | Test Failed  | Description  |
|---|--------------|--|
| CS_OFFL_SIR_NOPM1B_20210106T085902_20210106T085920_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPM1B_20210106T164002_20210106T171202_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPN1B_20210106T072250_20210106T072505_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPN1B_20210106T082614_20210106T082833_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPN1B_20210106T172412_20210106T172818_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPN1B_20210106T181723_20210106T181852_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPN1B_20210106T190609_20210106T190844_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPN1B_20210106T204228_20210106T204448_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPR1B_20210106T040143_20210106T040358_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPR1B_20210106T064111_20210106T064650_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPR1B_20210106T071707_20210106T071915_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPR1B_20210106T085609_20210106T085901_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPR1B_20210106T191106_20210106T191315_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_NOPR1B_20210106T204801_20210106T205022_C001 | Loss of Echo | The tracking echo is missing for one or more records |

## 5. NOP Level 2 Data Quality Check

### 5.1 L2 Product Format Check

Each product, retrieved and unpacked from the science server, is checked to ensure it consists of both an XML header file (.HDR) and a binary product file (.DBL).

Number of products with errors: 0

### 5.2 L2 Product Header Analysis

For all products, a series of pre-defined checks are performed on the MPH and SPH in order to identify any inconsistencies and/or errors raised by the ground-segment processing chain.

Number of products with errors: 0

### 5.3 L2 Auxiliary Data File Usage Check

Each product is checked for missing Data Set Descriptors with respect to a pre-determined baseline and also to check the validity of Auxiliary Data Files is correct.

**Wind Model File Usage:** This file is currently not included in all L2 products.

Number of products with errors: 0

### 5.4 L2 Auxiliary Correction Error Check

For all products, the auxiliary corrections within the Geophysical Group are checked for the default error value (32767).

**Currently, there are some common auxiliary correction errors raised in the Level 2 products which are expected due to surface type. All common flags are summarised in the list below, followed by a table highlighting any additional issues which may arise from this test.**

> **ECMWF Meteo Corrections:** Currently the following corrections are not computed over CONTINENTAL ICE: Dry Tropospheric Correction, Wet Tropospheric Correction, Inverse Barometric Correction and the U-Wind and V-Wind components of the ECMWF model wind vector. This is a known anomaly (CRYO-COP-3) and will be resolved in a future IPF update.

> **Mean Sea Surface:** The error value is currently set for products over land and sea ice, but this is to be expected.

> **Mean Dynamic Topography:** The error value is currently set for products over land and sea ice, but this is to be expected.

> **Altimetric Wind Speed Error:** The error value is currently set for products over land and sea ice, but this is to be expected.



|   |   |   |
|---|---|---|
| CS_OFFL_SIR_NOPR_2_20210106T054550_20210106T055134_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1)   | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) for one or more records  |
| CS_OFFL_SIR_NOPR_2_20210106T072505_20210106T072843_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1)   | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) for one or more records  |
| CS_OFFL_SIR_NOPR_2_20210106T072844_20210106T073149_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1)   | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) for one or more records  |
| CS_OFFL_SIR_NOPR_2_20210106T090335_20210106T090856_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1)   | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) for one or more records  |
| CS_OFFL_SIR_NOPR_2_20210106T154832_20210106T155549_C001 | Mean Dynamic Topography (1)   | There is an error with the Mean Dynamic Topography height for one or more records   |
| CS_OFFL_SIR_NOPR_2_20210106T171645_20210106T171742_C001 | Mean Dynamic Topography (1), Total Geocentric Ocean Tide (GOT), Total Geocentric Ocean Tide (FES), Non- | There is an error with the Mean Dynamic Topography (solution 1), the Total Geocentric Ocean Tide (solution 1: GOT and solution 2: FES) and the Non-Equilibrium Long Period Ocean Tide for one or more records |
| CS_OFFL_SIR_NOPR_2_20210106T221750_20210106T222202_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1)   | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) for one or more records  |
| CS_OFFL_SIR_NOPR_2_20210106T235509_20210107T000246_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1)   | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) for one or more records  |

## 5.5 L2 Measurement Confidence Data Check

CryoSat L2 data includes a measurement confidence flag for each 20-Hz measurement record. The bit value of this flag indicates any problems when set.

**Number of products with errors:** 1

| Product   | Test Failed         | Description   |
|---|---------------------|---|
| CS_OFFL_SIR_NOPM_2_20210106T213754_20210106T220321_C001 | Power scaling error | There is an error in the scaling of the L2 waveform for one or more records |

## 5.6 L2 Measurement Quality Flag Check

### L2 Quality Flags (20Hz)

CryoSat L2 data includes Quality Flags for each 20 Hz, 20 Hz PLRM and 1 Hz measurement record. The bit value of this flag indicates any problems when set.

**Currently, there are several common flags raised in the Level 2 products, which are summarised below. The table provides the full list of products flagged.**

> **Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags:** These flags are currently set for some records over ocean.

> **OCOG Altimeter Range and Backscatter Quality Flags:** These flags are currently set for some records over continental ice.

**Number of products with errors:** 84

| Product   | Test Failed  | Description  |
|---|--|--|
| CS_OFFL_SIR_NOPM_2_20210105T235945_20210106T000544_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T000714_20210106T003548_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T004337_20210106T004535_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T005842_20210106T013240_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T013854_20210106T014416_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T014615_20210106T015211_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T022219_20210106T022423_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T022504_20210106T022558_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T023831_20210106T024658_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T024943_20210106T031200_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T031749_20210106T031857_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T031903_20210106T032310_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T032523_20210106T033814_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T034002_20210106T034540_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |





|   |  |  |
|---|--|--|
| CS_OFFL_SIR_NOPM_2_20210106T210020_20210106T212424_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T212656_20210106T213527_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T213754_20210106T220321_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T223530_20210106T223717_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T223719_20210106T230243_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPM_2_20210106T230910_20210106T231327_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPM_2_20210106T231640_20210106T234218_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPN_2_20210106T054045_20210106T054136_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPN_2_20210106T063904_20210106T064110_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPN_2_20210106T105906_20210106T105937_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPN_2_20210106T220321_20210106T220713_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T022424_20210106T022504_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T033815_20210106T034002_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T050309_20210106T050600_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T055534_20210106T055828_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T141649_20210106T142009_C001 | OCOG Altimeter Range Quality, OCOG Backscatter Quality   | The OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T145711_20210106T145949_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T193822_20210106T194058_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality, OCOG Altimeter Range and Backscatter Quality | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |

## L2 Quality Flags (20Hz PLRM)

Currently, there are several common flags raised in the Level 2 products, which are summarised below. The table provides the full list of products flagged.

> **Ocean Altimeter Range, SSHA, SWH and Backscatter PLRM Quality Flags:** These flags are currently set for occasional records over sea ice.

> **OCOG Altimeter Range and Backscatter PLRM Quality Flags:** These flags are currently set for occasional records over continental ice.

**Number of products with errors:** 78

| Product   | Test Failed  | Description  |
|---|--|--|
| CS_OFFL_SIR_NOPN_2_20210106T032310_20210106T032434_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPN_2_20210106T034541_20210106T034808_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPN_2_20210106T050136_20210106T050308_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPN_2_20210106T054045_20210106T054136_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPN_2_20210106T054449_20210106T054550_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |







|   |  |  |
|---|--|--|
| CS_OFFL_SIR_NOPR_2_20210106T085609_20210106T085901_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T090335_20210106T090856_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T092416_20210106T092521_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T113939_20210106T114150_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T122717_20210106T123145_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T131830_20210106T132106_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T135549_20210106T135603_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T141012_20210106T141041_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T141050_20210106T141350_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T145711_20210106T145949_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T153426_20210106T153534_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T154832_20210106T155549_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T162433_20210106T162748_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T180118_20210106T180749_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T191106_20210106T191315_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T192529_20210106T192539_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T201817_20210106T202202_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG Range and Backscatter Quality Flags have been set for one or more records.  |
| CS_OFFL_SIR_NOPR_2_20210106T204448_20210106T204526_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T204711_20210106T204724_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T221750_20210106T222202_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |
| CS_OFFL_SIR_NOPR_2_20210106T230244_20210106T230447_C001 | Ocean Altimeter Range, SSHA, SWH and Backscatter Quality PLRM, OCOG Altimeter Range and Backscatter Quality PLRM | The Ocean Altimeter Range, SSHA, SWH and Backscatter Quality Flags and the OCOG Altimeter Range and Backscatter Quality Flags have been set for one or more records. |

## L2 Quality Flags (1 Hz & 1Hz PLRM)

Currently, there are several common flags raised in the Level 2 products, which are summarised below.

> 1Hz and 1Hz Ocean SSHA Quality Flags: These flags are currently set for products over sea ice, which is to be expected.

Number of products with errors: 180

## 5.7 L2 Ocean Retracking Quality Check

### L2 Retracking Flags (20Hz)

CryoSat L2 data includes an ocean retracking quality flag for each 20-Hz measurement record. The bit value of this flag indicates any problems when set.

**Ocean Retracking Quality Flag:** This flag is currently set for products falling at ocean/ land boundaries, but this is expected.

Number of products with errors: 59

### L2 Retracking Flags (20Hz, PLRM)

CryoSat L2 data includes an ocean retracking quality flag for each 20-Hz PLRM measurement record. The bit value of this flag indicates any problems when set.

**Ocean Retracking Quality Flag (PLRM):** This flag is currently set for products NOPR and NOPN products over sea ice, but this is to be expected.

## 7. NOP QCC Report Analysis

The Quality Control for CryoSat (QCC) facility performs a primary survey of data products immediately after production by the PDS and LTA processing facilities. A list of the tests which raised errors or warnings is provided below.

| Product type | No. Products | No. QCC Reports | No. Valid | No. Warnings | No. Errors |
|--------------|--------------|-----------------|-----------|--------------|------------|
| SIR_NOPM1B   | 198          | 198             | 6         | 192          | 0          |
| SIR_NOPR1B   | 105          | 105             | 0         | 105          | 0          |
| SIR_NOPN1B   | 102          | 102             | 3         | 99           | 0          |
| SIR_NOPM_2   | 198          | 198             | 146       | 52           | 0          |
| SIR_NOPR_2   | 105          | 105             | 29        | 74           | 2          |
| SIR_NOPN_2   | 102          | 102             | 49        | 53           | 0          |

### 7.1 QCC Errors

Number of QCC reports with errors:

5

Total number of occurrences of each error

| Product Type | RLOBOPNCDF | RL | RLOBOPNCDF | RL | - | - | - | - | - | - |
|--------------|------------|----|------------|----|---|---|---|---|---|---|
| SIR_NOPR_2   | 2          | 2  | 2          | 2  | - | - | - | - | - | - |

#### Test Description Key:

| Abbreviation | Test name                       | Details   |
|--------------|---------------------------------|---|
| RLOBOPNCDF   | RangeLatitudeOrBlankOP_7NetCDF  | Latitude should be between -90E7 and 90E7 - NetCDF    |
| RL           | RangeLatitude_7                 | Latitude should be between -90E7 and 90E7             |
| RLOBOPNCDF   | RangeLongitudeOrBlankOP_7NetCDF | Longitude should be between -180E7 and 180E7 - NetCDF |
| RL           | RangeLongitude_7                | Longitude should be between -180E7 and 180E7          |

### 7.2 QCC Warnings

Number of QCC reports with warnings

1744

Total number of occurrences of each warning

| Product Type | BCSHNCDF | IOHHMOOR | MVIOEPFNCDF | MVIOEPNCDF | MVIONCDF | RBSZOPEPFNCDF | RBSZOPEPFPLRMNCDF |
|--------------|----------|----------|-------------|------------|----------|---------------|-------------------|
| SIR_NOPM1B   | 192      | 0        | 0           | 0          | 0        | 0             | 0                 |
| SIR_NOPM_2   | 0        | 0        | 40          | 38         | 0        | 42            | 0                 |
| SIR_NOPN1B   | 96       | 0        | 0           | 0          | 0        | 0             | 0                 |
| SIR_NOPN_2   | 0        | 0        | 10          | 36         | 3        | 27            | 24                |
| SIR_NOPR1B   | 101      | 0        | 0           | 0          | 0        | 0             | 0                 |
| SIR_NOPR_2   | 0        | 2        | 33          | 49         | 2        | 25            | 21                |

| Product Type | RBSZOPEPNCDF | RNELPOTONCDF | RPEOPFDLRMNCDF | RPEOPFDPLRMSARNCDF | RPEOPFDPLRMSINNCDF | RPEOPFDSARNCDF | RPEOPFDSINNCDF |
|--------------|--------------|--------------|----------------|--------------------|--------------------|----------------|----------------|
| SIR_NOPM1B   | 0            | 0            | 0              | 0                  | 0                  | 0              | 0              |
| SIR_NOPM_2   | 33           | 1            | 37             | 0                  | 0                  | 0              | 0              |
| SIR_NOPN1B   | 0            | 0            | 0              | 0                  | 0                  | 0              | 0              |
| SIR_NOPN_2   | 14           | 1            | 0              | 0                  | 31                 | 0              | 37             |
| SIR_NOPR1B   | 0            | 0            | 0              | 0                  | 0                  | 0              | 0              |
| SIR_NOPR_2   | 6            | 2            | 0              | 52                 | 0                  | 58             | 0              |

| Product Type | RPEOPLRMNCDF | RPEOPASARNCDF | RPEOPASINNCDF | RSSBONCDF | RSSHAOFNCDF | RSSHAOFPLRMNCDF | RSSHAONCDF |
|--------------|--------------|---------------|---------------|-----------|-------------|-----------------|------------|
| SIR_NOPM1B   | 0            | 0             | 0             | 0         | 0           | 0               | 0          |
| SIR_NOPM_2   | 30           | 0             | 0             | 4         | 28          | 0               | 2          |
| SIR_NOPN1B   | 0            | 0             | 0             | 0         | 0           | 0               | 0          |
| SIR_NOPN_2   | 0            | 0             | 35            | 4         | 42          | 51              | 20         |
| SIR_NOPR1B   | 0            | 0             | 0             | 0         | 0           | 0               | 0          |
| SIR_NOPR_2   | 0            | 50            | 0             | 1         | 57          | 42              | 8          |

| Product Type | RSWHOEPFNCDF | RSWHOEPFDLRMNCDF | RSWHOEPNCDF | SPHRTASCNSCDF | SOOHIFHD | SCSTODHRNCDF | SCSTODNCDF |
|--------------|--------------|------------------|-------------|---------------|----------|--------------|------------|
| SIR_NOPM1B   | 0            | 0                | 0           | 1             | 0        | 0            | 0          |
| SIR_NOPM_2   | 33           | 0                | 2           | 1             | 0        | 0            | 0          |
| SIR_NOPN1B   | 0            | 0                | 0           | 0             | 0        | 45           | 0          |
| SIR_NOPN_2   | 30           | 33               | 8           | 0             | 0        | 0            | 0          |
| SIR_NOPR1B   | 0            | 0                | 0           | 0             | 0        | 105          | 5          |
| SIR_NOPR_2   | 36           | 52               | 0           | 0             | 6        | 0            | 0          |

#### Test Description Key:

| Abbreviation       | Test name   | Details  |
|--------------------|---|--|
| BCSHNCDF           | BurstCounterStep20HzNetCDF                                  | The burst counter should be one higher with regard to the previous burst counter   |
| IOHHMOOR           | IndexOf1Hzin20HzMappingOutOfRange                           | The mapping of 20 Hz to 1 Hz measurements should be in the range 0 to (number of 1 Hz samples - 1)                                       |
| MVIOEPFNCDF        | MissingValueInOceanExcludingPolarFD2NetCDF                  | The value should not be a 'missing value' for surface type 0 only for latitudes between -70 and 70 degrees                               |
| MVIOEPNCDF         | MissingValueInOceanExcludingPolarNetCDF                     | The value should not be a 'missing value' for surface type 0 only for latitudes between -70 and 70 degrees                               |
| MVIONCDF           | MissingValueInOceanNetCDF                                   | The value should not be a 'missing value' for surface type 0 only  |
| RBSZOPEPFNCDF      | RangeBackscatterSigmaZeroOPOceanExcludingPolarFD2NetCDF     | The backscatter sigma zero should be between 700 and 7500 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees |
| RBSZOPEPFPLRMNCDF  | RangeBackscatterSigmaZeroOPOceanExcludingPolarFD2PLRMNetCDF | The backscatter sigma zero should be between 700 and 7500 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees |
| RBSZOPEPNCDF       | RangeBackscatterSigmaZeroOPOceanExcludingPolarNetCDF        | The backscatter sigma zero should be between 700 and 7500 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees |
| RNELPOTONCDF       | RangeNELPOceanTideOceanNetCDF                               | The Non-equilibrium long period ocean loading tide height should be between -40mm and 40mm (or missing) for surface type = ocean         |
| RPEOPFDLRMNCDF     | RangePeakinessExcludingPolarOPFD2LRMNetCDF                  | The Peakiness should be between 0 and 6400 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                |
| RPEOPFDPLRMSARNCDF | RangePeakinessExcludingPolarOPFD2PLRMSARNetCDF              | The Peakiness should be between 0 and 15000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees               |
| RPEOPFDPLRMSINNCDF | RangePeakinessExcludingPolarOPFD2PLRMSINNetCDF              | The Peakiness should be between 0 and 90000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees               |
| RPEOPFDSARNCDF     | RangePeakinessExcludingPolarOPFD2SARNetCDF                  | The Peakiness should be between 0 and 15000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees               |
| RPEOPFDSINNCDF     | RangePeakinessExcludingPolarOPFD2SINNetCDF                  | The Peakiness should be between 0 and 90000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees               |
| RPEOPLRMNCDF       | RangePeakinessExcludingPolarOPLRMNetCDF                     | The Peakiness should be between 0 and 6400 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                |
| RPEOPASARNCDF      | RangePeakinessExcludingPolarOPSARNetCDF                     | The Peakiness should be between 0 and 15000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees               |
| RPEOPASINNCDF      | RangePeakinessExcludingPolarOPSINNetCDF                     | The Peakiness should be between 0 and 90000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees               |
| RSSBONCDF          | RangeSeaStateBiasCorrectionOceanNetCDF                      | The sea state bias correction should be between -500mm and 0mm (or missing) for surface type = ocean                                     |
| RSSHAOFNCDF        | RangeSeaSurfaceHeightAnomalyOceanFD3NetCDF                  | The sea surface height anomaly should be between -3000mm and 3000mm (or missing) for surface type = ocean                                |
| RSSHAOFPLRMNCDF    | RangeSeaSurfaceHeightAnomalyOceanFD3PLRMNetCDF              | The sea surface height anomaly should be between -3000mm and 3000mm (or missing) for surface type = ocean                                |

|                   |  |  |
|-------------------|--|--|
| RSSHAONCDF        | RangeSeaSurfaceHeightAnomalyOceanNetCDF                    | The sea surface height anomaly should be between -3000mm and 3000mm (or missing) for surface type = ocean                                    |
| RSWHOEPFDNCDF     | RangeSignificantWaveHeightOceanExcludingPolarFD2NetCDF     | The significant wave height should be between 0mm and 15000mm (or missing) for surface type = ocean for latitudes between -70 and 70 degrees |
| RSWHOEPFDPLRMNCDF | RangeSignificantWaveHeightOceanExcludingPolarFD2PLRMNetCDF | The significant wave height should be between 0mm and 15000mm (or missing) for surface type = ocean for latitudes between -70 and 70 degrees |
| SPHRTASCNSNCDF    | SPH_Rel_Time_ASC_Node_Stop_v2_NetCDF                       | Rel_Time_ASC_Node_Stop mismatch  |
| SOOHIFHD          | SameOrOneHigher1HzIndexFor20HzData                         | The 1 Hz index of a 20 Hz sample should be the same or 1 higher than its previous sample   |
| SCSTODHRNCDF      | SequenceCounterStepTODHRNetCDF                             | The sequence counter should be modulo 4 higher with regard to the previous sequence counter  |
| SCSTODNCDF        | SequenceCounterStepTODNetCDF                               | The sequence counter should be one higher (modulo 16384) with regard to the previous sequence counter  |

### 7.3 Missing QCC Reports

Number of products with missing QCC reports: 0