

**1. Overview**

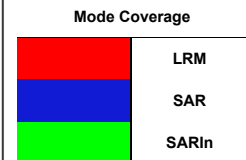
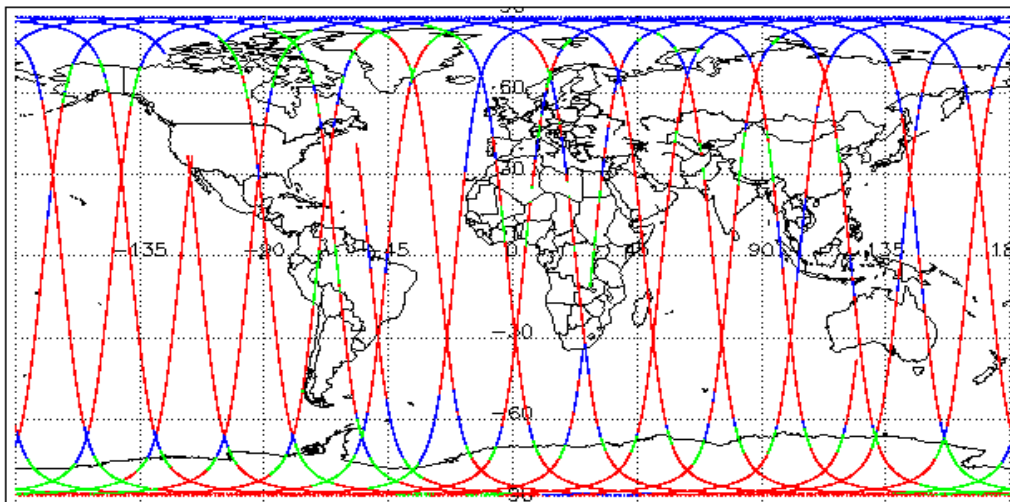
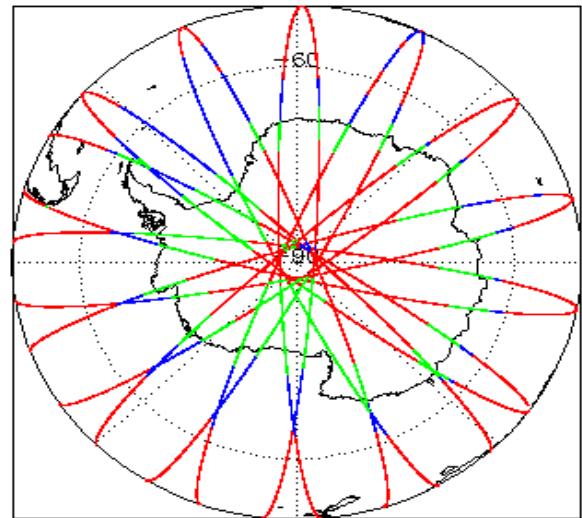
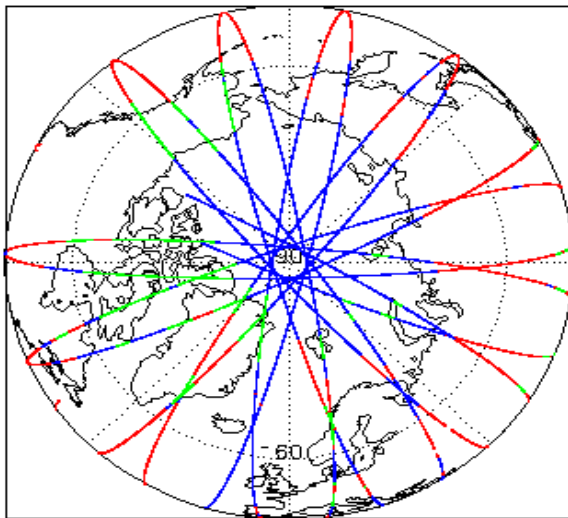
|                           |  |
|---------------------------|--|
| <b>Report Production:</b> | 25-Jun-2021  |
| <b>Processor Used:</b>    | CryoSat Ocean Processor  |
| <b>Data Used:</b>         | Geophysical Ocean Products (GOP)<br>L1B, L2 & P2P Science Data |

| Check                                      | L1 & L2                      | P2P                          |
|--|------------------------------|------------------------------|
| Server check: science-pds.cryosat.esa.int  | Nominal                      | Nominal                      |
| Server check: calval-pds.cryosat.esa.int   | Nominal                      | Nominal                      |
| Product Software Check                     | Nominal                      | Nominal                      |
| Product Format Check                       | Nominal                      | Nominal                      |
| Product Header Analysis                    | Nominal                      | Nominal                      |
| Auxiliary Data File Usage Check            | Nominal                      | Nominal                      |
| Auxiliary Correction Error Check           | See Section 5.4              | See Section 6.4              |
| Measurement Confidence Data Check          | See Section 4.5, 4.6 and 5.5 | See Section 6.5              |
| Range, SWH & Backscatter Measurement Check | See Section 5.6              | See Section 6.6              |
| Ocean Retracking Quality Check             | See Section 5.7              | See Section 6.7              |
| QCC Error/ Warning Check                   | See Section 7.1 and 7.2      | See Section 7.1, 7.2 and 7.3 |

**Mission / Instrument News**

|             |                 |
|-------------|-----------------|
| 26-May-2021 | None            |
| 27-May-2021 | None            |
| 28-May-2021 | Nothing planned |

**2. Global Coverage**



**3. Instrument Configuration**

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

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

**4. GOP 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 GOPR and GOPN 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.

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 GOPR products due to a configuration issue. This is being investigated and will be updated in the next SW update.

Number of products with errors: 2

| Product   | Test Failed         | Description  |
|---|---------------------|--|
| CS_OFFL_SIR_GOPM1B_20210527T043542_20210527T043902_C001 | Power scaling error | There is an error in the scaling of the L1B waveform for one or more records |
| CS_OFFL_SIR_GOPM1B_20210527T154350_20210527T154945_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 some products over land, but this is to be expected.

Number of products with errors: 15

| Product   | Test Failed  | Description  |
|---|--------------|--|
| CS_OFFL_SIR_GOPM1B_20210527T190941_20210527T190947_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPM1B_20210527T201256_20210527T203143_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T075231_20210527T075346_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T130253_20210527T130822_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T155444_20210527T155506_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T165241_20210527T165404_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T174209_20210527T174554_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T190854_20210527T190940_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPN1B_20210527T205115_20210527T205341_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPR1B_20210527T041817_20210527T042222_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPR1B_20210527T061333_20210527T061523_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPR1B_20210527T091416_20210527T092123_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPR1B_20210527T105906_20210527T110123_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPR1B_20210527T124942_20210527T125019_C001 | Loss of Echo | The tracking echo is missing for one or more records |
| CS_OFFL_SIR_GOPR1B_20210527T141257_20210527T141949_C001 | Loss of Echo | The tracking echo is missing for one or more records |

## 5. GOP 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.

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. The affected products are not reported in the table below.

> **Sea State Bias & Sea State Bias PLRM:** The error value is currently set for products over 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.

Number of products with errors: 54



|   |   |   |
|---|---|---|
| CS_OFFL_SIR_GOPR_2_20210527T005209_20210527T005311_C001 | Mean Dynamic Topography (1)                       | There is an error with the Mean Dynamic Topography (solution 1) for one or more records   |
| CS_OFFL_SIR_GOPR_2_20210527T010222_20210527T010917_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_GOPR_2_20210527T024046_20210527T024555_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_GOPR_2_20210527T041817_20210527T042222_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_GOPR_2_20210527T042222_20210527T042615_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1) | There is an error with the GPD Wet Tropospheric correction, the MSS height (solution 1) and tidal corrections for one or more records |
| CS_OFFL_SIR_GOPR_2_20210527T055653_20210527T060423_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_GOPR_2_20210527T060737_20210527T060939_C001 | Mean Dynamic Topography (1)                       | There is an error with the Mean Dynamic Topography (solution 1) for one or more records   |
| CS_OFFL_SIR_GOPR_2_20210527T061333_20210527T061523_C001 | Mean Dynamic Topography (1)                       | There is an error with the Mean Dynamic Topography (solution 1) for one or more records   |
| CS_OFFL_SIR_GOPR_2_20210527T073212_20210527T074224_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_GOPR_2_20210527T074225_20210527T074347_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_GOPR_2_20210527T091416_20210527T092123_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_GOPR_2_20210527T092123_20210527T092541_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_GOPR_2_20210527T105406_20210527T105905_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_GOPR_2_20210527T105906_20210527T110123_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_GOPR_2_20210527T114236_20210527T114427_C001 | Mean Sea Surface (1)                              | There is an error with the MSS height (solution 1) for one or more records  |
| CS_OFFL_SIR_GOPR_2_20210527T123354_20210527T123456_C001 | Mean Dynamic Topography (1)                       | There is an error with the Mean Dynamic Topography (solution 1) for one or more records   |
| CS_OFFL_SIR_GOPR_2_20210527T123456_20210527T124035_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_GOPR_2_20210527T141257_20210527T141949_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_GOPR_2_20210527T155507_20210527T160008_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_GOPR_2_20210527T173218_20210527T174208_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_GOPR_2_20210527T191259_20210527T192104_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_GOPR_2_20210527T205342_20210527T210125_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_GOPR_2_20210527T223245_20210527T224000_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:** 2

| Product   | Test Failed         | Description   |
|---|---------------------|---|
| CS_OFFL_SIR_GOPM_2_20210527T043542_20210527T043902_C001 | Power scaling error | There is an error in the scaling of the L2 waveform for one or more records |
| CS_OFFL_SIR_GOPM_2_20210527T154350_20210527T154945_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:** 78

| Product   | Test Failed  | Description  |
|---|--|--|
| CS_OFFL_SIR_GOPM_2_20210526T235148_20210527T000647_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_GOPM_2_20210527T000918_20210527T001414_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_GOPR_2_20210527T204218_20210527T204542_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_GOPR_2_20210527T205342_20210527T210125_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_GOPR_2_20210527T213703_20210527T213830_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_GOPR_2_20210527T215012_20210527T215312_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_GOPR_2_20210527T223245_20210527T224000_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_GOPR_2_20210527T231635_20210527T231655_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_GOPR_2_20210527T232802_20210527T233407_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_GOPR_2_20210527T234731_20210527T234944_C001 | OCOG Altimeter Range Quality PLRM, OCOG Backscatter Quality  | The OCOG 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:** 205

## 5.8 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 over land and sea ice, but this is to be expected. The number of products with this error flag set is given below.

**Number of products with errors:** 65

### 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 GOPR and GOPN products over sea ice, but this is to be expected.

**Number of products with errors:** 151

## 6. GOP L2 Pole-to-Pole Data Quality Check

### 6.1 P2P 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 NetCDF product file (.nc).

**Number of products with errors:** 0

### 6.2 P2P 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

### 6.3 P2P 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.

**Number of products with errors:** 0

### 6.4 P2P 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. The affected products are not reported in the table below.

> **Sea State Bias & Sea State Bias PLRM:** The error value is currently set for products over 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.

**Number of products with errors:** 29

| Product  | Test Failed  | Description   |
|--|--|---|
| CS_OFFL_SIR_GOP_2_20210527T001422_20210527T010401_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1), Total Geocentric Ocean Tide (GOT) | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) and the Total Geocentric Ocean Tide height (solution 1: GOT) for one or more records |
| CS_OFFL_SIR_GOP_2_20210527T010401_20210527T015337_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_GOP_2_20210527T015337_20210527T024315_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_GOP_2_20210527T024315_20210527T033252_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1), Total Geocentric Ocean Tide (GOT) | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) and the Total Geocentric Ocean Tide height (solution 1: GOT) for one or more records |

|   |   |  |
|---|---|--|
| CS_OFFL_SIR_GOP_2__20210527T033252_20210527T042230_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_GOP_2__20210527T042230_20210527T051206_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_GOP_2__20210527T051206_20210527T060145_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_GOP_2__20210527T060145_20210527T065121_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_GOP_2__20210527T065121_20210527T074100_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_GOP_2__20210527T074100_20210527T083036_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_GOP_2__20210527T083036_20210527T092014_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1), Total Geocentric Ocean Tide (GOT), Total Geocentric Ocean Tide (FES), Non-Equilibrium Long Period Ocean Tide | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1), the Total Geocentric Ocean Tide height (solution 2: FES) and the Non-equilibrium Long Period Ocean Tide height for one or more records |
| CS_OFFL_SIR_GOP_2__20210527T092014_20210527T100950_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_GOP_2__20210527T100950_20210527T105929_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_GOP_2__20210527T105929_20210527T114905_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_GOP_2__20210527T114905_20210527T123843_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_GOP_2__20210527T123843_20210527T132820_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_GOP_2__20210527T132820_20210527T141758_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_GOP_2__20210527T141758_20210527T150734_C001 | Mean Sea Surface (1), Mean Dynamic Topography (1), Total Geocentric Ocean Tide (GOT)  | There is an error with the MSS height (solution 1) and the Mean Dynamic Topography height (solution 1) and the Total Geocentric Ocean Tide height (solution 1: GOT) for one or more records  |
| CS_OFFL_SIR_GOP_2__20210527T150734_20210527T155713_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_GOP_2__20210527T155713_20210527T164649_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_GOP_2__20210527T164649_20210527T173628_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_GOP_2__20210527T173628_20210527T182604_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_GOP_2__20210527T182604_20210527T191542_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_GOP_2__20210527T191542_20210527T200518_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_GOP_2__20210527T200518_20210527T205457_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_GOP_2__20210527T205457_20210527T214433_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_GOP_2__20210527T214433_20210527T223411_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_GOP_2__20210527T223411_20210527T232348_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_GOP_2__20210527T232348_20210528T001326_C002 | 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   |

## 6.5 P2P Measurement Confidence Data Check

CryoSat P2P 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:** 2

| Product   | Test Failed         | Description   |
|---|---------------------|---|
| CS_OFFL_SIR_GOP_2__20210527T042230_20210527T051206_C001 | Power scaling error | There is an error in the scaling of the L2 waveform for one or more records |
| CS_OFFL_SIR_GOP_2__20210527T150734_20210527T155713_C001 | Power scaling error | There is an error in the scaling of the L2 waveform for one or more records |

## 6.6 P2P Measurement Quality Flag Check

### P2P Quality Flags (20Hz)

CryoSat P2P data includes Quality Flags for each 20 Hz, 20 Hz PLRM and 1 Hz measurement record, copied from the corresponding L2 products.

Since the P2P Quality Flags are copied directly from the L2 Quality Flags, please see Section 5.6 for the full list of products affected.

**Number of products with errors:** 30

### P2P Quality Flags (20Hz PLRM)

Since the P2P Quality Flags are copied directly from the L2 Quality Flags, please see Section 5.6 for the full list of products affected.

**Number of products with errors:** 28

### P2P Quality Flags (1 Hz & 1Hz PLRM)

Since the P2P Quality Flags are copied directly from the L2 Quality Flags, please see Section 5.6 for the full list of products affected.

Number of products with errors: 30

## 6.8 P2P Ocean Retracking Quality Check

### P2P Retracking Flags (20Hz)

Cryosat P2P data includes an ocean retracking quality flag (field 19) for each 20-Hz 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 GOPR and GOPN products over sea ice, but this is to be expected.

Number of products with errors: 30

### P2P Retracking Flags 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 GOPR and GOPN products over sea ice, but this is to be expected.

Number of products with errors: 30

## 7. GOP 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_GOPM1B   | 155          | 155             | 2         | 153          | 0          |
| SIR_GOPR1B   | 119          | 119             | 0         | 119          | 0          |
| SIR_GOPN1B   | 97           | 97              | 1         | 96           | 0          |
| SIR_GOPM_2   | 155          | 155             | 102       | 53           | 0          |
| SIR_GOPR_2   | 119          | 119             | 27        | 92           | 0          |
| SIR_GOPN_2   | 97           | 97              | 37        | 59           | 1          |
| SIR_GOP_P2P  | 29           | 29              | 0         | 28           | 1          |

### 7.1 QCC Errors

Number of QCC reports with errors: 2

Total number of occurrences of each error

| Product Type | RLOBOPNCDF | RL | RLOBOPNCDF | RL | - | - | - | - | - | - | - |
|--------------|------------|----|------------|----|---|---|---|---|---|---|---|
| SIR_GOPN_2   | 1          | 1  | 1          | 1  | - | - | - | - | - | - | - |
| SIR_GOP_2    | 1          | 1  | 1          | 1  | - | - | - | - | - | - | - |

#### Test Description Key:

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

### 7.2 QCC Warnings

Number of QCC reports with warnings: 2272

Total number of occurrences of each warning

| Product Type | BCSHNCDF | IOHHMOOR | MVIOEPFNCDF | MVIOEPCDF | MVIONCDF | RBSZOPEPFNCDF | RBSZOPEPFPLRMNCDF |
|--------------|----------|----------|-------------|-----------|----------|---------------|-------------------|
| SIR_GOPM1B   | 153      | 0        | 0           | 0         | 0        | 0             | 0                 |
| SIR_GOPM_2   | 0        | 0        | 44          | 43        | 0        | 35            | 0                 |
| SIR_GOPN1B   | 95       | 0        | 0           | 0         | 0        | 0             | 0                 |
| SIR_GOPN_2   | 0        | 1        | 9           | 32        | 4        | 27            | 27                |
| SIR_GOPR1B   | 115      | 0        | 0           | 0         | 0        | 0             | 0                 |
| SIR_GOPR_2   | 0        | 0        | 41          | 59        | 0        | 49            | 37                |

| Product Type | RBSZOPEPCDF | RNELPOTONCDF | ROLTONCDF | RPEOPFDLRMNCDF | RPEOPFDPLRMSARNCDF | RPEOPFDPLRMSINNCDF | RPEOPFDSARNCDF |
|--------------|-------------|--------------|-----------|----------------|--------------------|--------------------|----------------|
| SIR_GOPM1B   | 0           | 0            | 0         | 0              | 0                  | 0                  | 0              |
| SIR_GOPM_2   | 31          | 0            | 1         | 37             | 0                  | 0                  | 0              |
| SIR_GOPN1B   | 0           | 0            | 0         | 0              | 0                  | 0                  | 0              |
| SIR_GOPN_2   | 21          | 0            | 1         | 0              | 0                  | 21                 | 0              |
| SIR_GOPR1B   | 0           | 0            | 0         | 0              | 0                  | 0                  | 0              |
| SIR_GOPR_2   | 20          | 4            | 0         | 0              | 58                 | 0                  | 64             |

| Product Type | RPEOPFDSINNCDF | RPEOPLRMNCDF | RPEOPSARNCDF | RPEOPSINNCDF | RSSBONCDF | RSSHAOFDNCDF | RSSHAOFDPLRMNCDF |
|--------------|----------------|--------------|--------------|--------------|-----------|--------------|------------------|
| SIR_GOPM1B   | 0              | 0            | 0            | 0            | 0         | 0            | 0                |
| SIR_GOPM_2   | 0              | 33           | 0            | 0            | 5         | 30           | 0                |
| SIR_GOPN1B   | 0              | 0            | 0            | 0            | 0         | 0            | 0                |
| SIR_GOPN_2   | 30             | 0            | 0            | 26           | 22        | 37           | 50               |
| SIR_GOPR1B   | 0              | 0            | 0            | 0            | 0         | 0            | 0                |
| SIR_GOPR_2   | 0              | 0            | 56           | 0            | 4         | 76           | 38               |

| Product Type | RSSHAONCDF | RSWHOEPCDF | RSWHOEFDPLRMNCDF | RSWHOEPCDF | SPHRTASCNSCDF | SOOHIFHD | SCSTODHRNCDF |
|--------------|------------|------------|------------------|------------|---------------|----------|--------------|
| SIR_GOPM1B   | 0          | 0          | 0                | 0          | 0             | 0        | 0            |
| SIR_GOPM_2   | 3          | 38         | 0                | 3          | 0             | 0        | 0            |
| SIR_GOPN1B   | 0          | 0          | 0                | 0          | 0             | 0        | 44           |
| SIR_GOPN_2   | 29         | 27         | 28               | 16         | 0             | 1        | 0            |
| SIR_GOPR1B   | 0          | 0          | 0                | 0          | 0             | 0        | 119          |
| SIR_GOPR_2   | 11         | 49         | 61               | 2          | 1             | 1        | 0            |

| Product Type | IOHHMOOR | MVIOEPFNCDF | MVIOEPCDF | MVIONCDF | RBSZOPEPFNCDF | RBSZOPEPFPLRMNCDF | RBSZOPEPCDF |
|--------------|----------|-------------|-----------|----------|---------------|-------------------|-------------|
| SIR_GOP_2    | 12       | 29          | 29        | 4        | 29            | 16                | 28          |

| Product Type | RNELPOTONCDF | ROLTONCDF | RPEOPFDPLRMSINNCDF | RPEOPFDSINNCDF | RPEOPSINNCDF | RSSBONCDF | RSSHAOFDNCDF |
|--------------|--------------|-----------|--------------------|----------------|--------------|-----------|--------------|
| SIR_GOP_2    | 4            | 1         | 17                 | 29             | 22           | 21        | 29           |

| Product Type | RSSHAOFDPLRMNCDF | RSSHAONCDF | RSWHOEPCDF | RSWHOEFDPLRMNCDF | RSWHOEPCDF | SPHLPQWNCDF | - |
|--------------|------------------|------------|------------|------------------|------------|-------------|---|
| SIR_GOP_2    | 17               | 25         | 29         | 18               | 15         | 29          |   |

#### 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  | MissingValueIntOceanExcludingPolarFD2NetCDF | The value should not be a 'missing value' for surface type 0 only for latitudes between -70 and 70 degrees |

|                    |   |  |
|--------------------|---|--|
| MVIOEPNCDF         | MissingValueIntOceanExcludingPolarNetCDF                    | The value should not be a 'missing value' for surface type 0 only for latitudes between -70 and 70 degrees                                   |
| MVIONCDF           | MissingValueIntOceanNetCDF                                  | The value should not be a 'missing value' for surface type 0 only  |
| RBSZOPEPFDNCDF     | RangeBackscatterSigmaZeroOPOceanExcludingPolarFD2NetCDF     | The backscatter sigma zero should be between 700 and 7500 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees     |
| RBSZOPEPFDPLRMNCDF | 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             |
| ROLTONCDF          | RangeOceanLoadingTideOceanNetCDF                            | #/NA   |
| RPEPOFDLRMNCDF     | RangePeakinessExcludingPolarOPFD2LRMNetCDF                  | The Peakiness should be between 0 and 6400 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                    |
| RPEPOFDPLRMSARNCDF | RangePeakinessExcludingPolarOPFD2PLRMSARNNetCDF             | The Peakiness should be between 0 and 15000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                   |
| RPEPOFDPLRMSINNCDF | RangePeakinessExcludingPolarOPFD2PLRMSINNetCDF              | The Peakiness should be between 0 and 90000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                   |
| RPEPOFDSARNCDF     | RangePeakinessExcludingPolarOPFD2SARNNetCDF                 | The Peakiness should be between 0 and 15000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                   |
| RPEPOFDSINNCDF     | RangePeakinessExcludingPolarOPFD2SINNetCDF                  | The Peakiness should be between 0 and 90000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                   |
| RPEPOLRMNCDF       | RangePeakinessExcludingPolarOPLRMNetCDF                     | The Peakiness should be between 0 and 6400 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                    |
| RPEPOPSARNCDF      | RangePeakinessExcludingPolarOPSARNNetCDF                    | The Peakiness should be between 0 and 15000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                   |
| RPEPOPSINNCDF      | RangePeakinessExcludingPolarOPSINNetCDF                     | The Peakiness should be between 0 and 90000 (or missing) for surface type = ocean for latitudes between -70 and 70 degrees                   |
| RSSBCONCDF         | RangeSeaStateBiasCorrectionOceanNetCDF                      | The sea state bias correction should be between -500mm and 0mm (or missing) for surface type = ocean   |
| RSSHAOFDNCDF       | RangeSeaSurfaceHeightAnomalyOceanFD3NetCDF                  | The sea surface height anomaly should be between -3000mm and 3000mm (or missing) for surface type = ocean                                    |
| RSSHAOFDPLRMNCDF   | 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 |
| RSWHOEPNCDF        | RangeSignificantWaveHeightOceanExcludingPolarNetCDF         | 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: 1

| Product name |
|--------------|
| 0            |

| Product name   |
|--|
| CS_OFFL_SIR_GOP_2_20210527T232348_20210528T001326_C002 |