Sentinel-3 Marine Centre Status
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Presentation outline

Marine Centre:

• Current Status
• Overall Status & Activities
• Data Production and Orbit Usage

• Last Reprocessing
• Product Quality

• Future PBs
• EUM S3 Altimetry Webpage (sral.eumetsat.int)
• Product Portfolio
Satellite

- All Sentinel-3A & B platform operations are performed nominally, including manoeuvres (In-plane and Out-of-Plane), security key changes and regular and annual calibration activities.
  - Support to Sigma0 transponder testing
  - OLTC updates (S3A: 27/07/2020, S3B: 22/06/2020)
- **Sentinel-3A&B topography instruments are all performing nominally.**

Anomalies

- S3B calibration issue after OLTC update (UNS 6018)
- No other relevant anomalies to report, several missing/late dumps (CGS issues) resulting in lower KPIs
S3 Production and Dissemination Status

- Sentinel-3A
  - Production Completeness (NRT/STC/NTC)
    - In nominal conditions Completeness is above 98.5%
  - Production Timeliness (NRT/STC/NTC)
    - In nominal conditions Timeliness is above 98.5%

- Sentinel-3B
  - Production Completeness (NRT/STC/NTC)
    - In nominal conditions Completeness is above 98.5%
  - Production Timeliness (NRT/STC/NTC)
    - In nominal conditions Timeliness is above 98.5%

There are no systematic issues affecting the production of the data in time.

When values drop below KPIs, due to maintenance activities or contingencies and on a very exceptional matter.
  - Most relevant issue to report happened last Oct/Nov (UNS 5300).

On-going work for preparation of Marine PDGS to S3C
Marine Center Status – Data production

S3A/B L1&L2 Completeness AND Timeliness @ ODA

<table>
<thead>
<tr>
<th>Timeliness</th>
<th>Completeness</th>
<th>Threshold</th>
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</thead>
<tbody>
<tr>
<td>NRT</td>
<td>98.5%</td>
<td>&lt; 3 hours</td>
</tr>
<tr>
<td>STC</td>
<td>98.5%</td>
<td>&lt; 48 hours</td>
</tr>
<tr>
<td>NTC</td>
<td>98.5%</td>
<td>&lt; 30 days</td>
</tr>
</tbody>
</table>

Minor underperformances in case of:
- Delayed/Lost delivery from Ground Station
- Ground segment maintenance
- Delayed mandatory ADFs

S3A and S3B Altimetry L1 and L2 products @ ODA

Major issue in the Marine Ground Segment (UNS 5300)
- Critical impact in internal DB, a lot of manual intervention.
- Timeliness & Completeness lost at NRT/STC but kept at NTC

Data access issue, data produced, but CODA/ODA users could not access it for couple days. EUMETCast not affected. (UNS 6149)
Marine Center Status – Mean Timeliness

<table>
<thead>
<tr>
<th>Timeliness</th>
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<tbody>
<tr>
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</tr>
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<td>NTC</td>
<td>98.5%</td>
<td>&lt; 30 days</td>
</tr>
</tbody>
</table>

S3A and S3B SR_2_WAT___ (Level 2)

~NRT: 02:04 (H)
~STC: 40:23 (H)
~NTC: 25.27 (D)

Minor underperformance in case of:
- Delayed/Lost delivery from Ground Station
- Ground segment maintenance
- Delayed mandatory ADFs
For both satellites **above 99.5%** the 1\textsuperscript{st} option GNSS-ROE or DORIS (best options) used > 99.8% of the time
For both satellites above 99.8% the 1\textsuperscript{st} option.
For both satellites above 99.9% the 1\textsuperscript{st} option…. SALP & EUMETSAT teams have improved NTC orbits delivery mechanisms since 2019/12 (no more missing POESAX orbits)
Marine Processing Baselines (Today)

Available at http://codarep.eumetsat.int

Available at:
https://coo.eumetsat.int (rolling archive of 12 months for NTC)
https://copportal.eumetsat.int (complete archive, except reprocessing)

Versions older than Baseline Collection 004 should not be used

BASELINE COLLECTION 004
Reprocessing

- Full mission reprocessing for S3A and S3B
  - More details here: https://www.eumetsat.int/website/home/News/DAT_4852830.html

- “Latest and greatest” PB used (PB 2.61) [installed in 2020/01/21]
  - Filtered Ionospheric correction
  - Correction of a software issue for 20Hz SWH
  - Update of Mean Sea Surface (MSS) to DTU18
  - Update of FES2014 Tide Model library to the latest version of the library
  - Improved Wind Model for very low/high wind speeds

- Update of Characterisation of Sentinel-3 SRAL/MWR instruments:
  - SRAL Antenna Aperture 3dB and Internal Path delays
  - MWR Antenna Patterns
  - More details here: https://www.eumetsat.int/website/home/News/DAT_4762430.html

- Plus (reprocessing only):
  - Updated POD platform/attitude ADFs
  - Updated POE-F standard orbits used (S3A/B)

Starting from L0 and redoing calibrations and science processing for both MWR and SRAL

- Baseline Collection increased to 004
  - Can be seen in the filename S3A_SR_2_WAT(...)MR1_R_NT_004.SEN3

- L2 made available to the users (S3VT and upon request) by 2020/01/28

- L1 (L1A, B-S, B) and L2 available in CODAREP by 2020/06/05
Data has been filtered for open-ocean, excluded any sea-ice contamination, and limited to the -0.5 meters to 8 meters of SWH.
Product Performance Overview – SWH

Recomputed with RADS. Filtered for outliers (|SLA| < 0.5m and |lat| < 66) and aggregated into 10 day average.

Mean levels auto-aligned:
- J3 → 0.0 cm
- S3A (003) → J3 - 8.5 cm
- S3A (004) → J3 - 8.5 cm

Different PBs with Jumps

Stdev:
- J3 → 1.24 m
- S3A SAR (003) → 1.33 m
- S3A SAR (004) → 1.28 m
Product Performance Overview – SWH (2)

Mean levels auto-aligned:
- **J3**
- S3B SAR $\rightarrow$ J3 - 10.6 cm
- S3A SAR $\rightarrow$ J3 - 8.6 cm

**Graph:**
- J3 (μ: 2.3761)
- S3B SAR (μ: 2.3761) $+[-0.1056 \text{ offset}]$
- S3A SAR (μ: 2.3761) $+[-0.0858 \text{ offset}]$

**Data:**
- S3B SAR $\rightarrow$ J3 - 10.6 cm
- S3A SAR $\rightarrow$ J3 - 8.6 cm
SSHA differences BC 004 (new) x BC 003 (old)

SSHA Comparison [PB 2.45 x PB 2.61]

No filtering has been applied to the data, just removed SSHA values larger than |0.5|m
Recomputed with RADS. Filtered for outliers (|SLA| < 0.5m and |lat| < 66) and aggregated into 10 day average. Same MSS/Tides/etc. used for S3A and J3.

**Stdev**

- J3 → 9.70 cm
- S3 (003) → 9.72 cm
- S3 (004) → 9.64 cm

**Mean levels auto-aligned:**

- J3
- S3A SAR (BC003) → J3 - 4.43 cm
- S3A SAR (BC004) → J3 - 4.45 cm

**Linear Regression**

- J3 → 4.5 mm/y
- S3 (003) → 5.9 mm/y (+1.4)
- S3 (004) → 5.2 mm/y (+0.7)
- S3 PLRM (004) → 4.3 mm/y (-0.2)

**Filter Iono Improvement**

Different PBs with Jumps
Mean levels auto-aligned:

- **J3**: S3A PLRM → J3 - 5.66 cm
- **S3A SAR**: S3A SAR → J3 - 4.45 cm
Wind Speed differences BC 004 (new) x BC 003 (old)

Data has been filtered for open-ocean, excluded any sea-ice contamination, and limited to the 0 to 30 m/s
Alt Wind Speed x Model

Wind Speed x ECMWF model

Recomputed with RADS. Filtered for outliers (|SLA| < 1 and |lat| < 66) and aggregated into 10 day average.

Mean:
- J3 ➔ 0.400 m/s
- S3A SAR (003) ➔ 0.131 m/s
- S3A SAR (004) ➔ 0.125 m/s

Stdev:
- J3 ➔ 1.221 m/s
- S3A (003) ➔ 1.132 m/s
- S3A (004) ➔ 1.129 m/s
Product Performance Overview – Wind Speed (2)

Wind Speed x ECMWF model

S3A SAR
S3B SAR
J3

J3 (κ: 0.3722)
S3B SAR (κ: 0.0510)
S3A SAR (κ: 0.1496)

S3 Reprocessing BC004
S3 ‘live data’
Marine Processing Baselines (Today)

S3A SRAL on

2016 2017 2018 2019 2020

S3B SRAL on

Reprocessing "BC 004" PB 2.61

Available at http://coderep.eumetsat.int

PB 2.61

PB 2.68 MARINE

July 2020

Next minor PB 2.7x MARINE

Dec 2020

Today

Available at:
https://coderep.eumetsat.int (rolling archive of 12 months for NTC)
https://ecoportal.eumetsat.int (complete archive, except reprocessing)

Versions older than Baseline Collection 004 should not be used

BASELINE COLLECTION 004
Starting with PB 2.68 MARINE (July 2020)

- **Differences on common Ocean/Sea Ice between SR_2_WAT and SR_2_LAN**
  - Different evolutions MRN and LND side
    - L2 Marine IPF under full EUM responsibility, including evolution and maintenance

- **Updated L2 Land/Sea mask**
  - Same mask both centres
  - Different responsibilities (gradually):
    - Open Ocean & Coastal Zone & Leads:
      - Full EUM responsibility
    - Land, Inland Waters and Ice (including sea-ice freeboard):
      - Full ESA responsibility

- **L1 still the same** (for the time being, split schedule to be agreed between agencies)
  - Updated L1A format (avoiding repeated calibrations)
    - Note anomaly SIIIMPC-4568 – only 1 Cal2 available in L1A, to be fixed in next PB
  - Faster reading of data
  - Autocal update (low impact, sigma0/wind)
  - Other fixes bugs *under the hood*
Previous Marine Centre Mask (< PB 2.68-MARINE)

Marine Centre produces data in the blue and green areas.

Original MLM +

Major in-land water bodies common: Great Lakes, Caspian, Lake Victoria
Current Mask Land/Marine

Sea Ice extent now common

Changes in the coast:
Common 25k each side of the coastline

Major in-land water bodies common: Great Lakes, Caspian, Lake Victoria

Marine Centre produces data in the blue and green areas
Sea Ice extent now common

Changes in the coast:
Common 25k each side of the coastline

Major in-land water bodies common: Great Lakes, Caspian, Lake Victoria

Marine Centre produces data in the blue areas

@ https://www.eumetsat.int/website/home/Satellites/CurrentSatellites/Sentinel3/AltimetryServices/AltimetryMarineProducts/index.html
Marine Processing Baselines (Future)


Reprocessing "BC 004" PB 2.61

Available at: http://codarep.eumetsat.int

PB 2.61

PB 2.68 MARINE

Next minor PB 2.7x MARINE

Available at:
https://coda.eumetsat.int (rolling archive of 12 months for NTC)
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Minor PBs the rest of the year 2020
No change in the mission science timeline
Highlights for Future evolutions (2020-2021-2022)

Dec 2020 (TBC):
- Internal tides, angle of approach, MDT CNES/CLS 18, etc.
- No change to the science timeline

Spring 2021:
- PLRM updates (L1+L2)
- MRN/LND mask at L1 (TBC)

Fall 2021:
- Drift fix:
  - Calibration Processing update
  - Range Walk
- Zero-Masking
- Updated Pole Tide (TBC)
- MSSs: DTU20, CNES-CLS 20 (TBC)

2021/2022:
- GPD+ wet tropo correction in the products
- SAR SSB
- MOG2D in NRT
- Sea ice concentration from OSI SAF
The dual-frequency Synthetic Aperture Radar Altimeter (SRAL) on Sentinel-3 provides sea surface topography measurements in SAR mode, with a spatial resolution as narrow as 300 m.

SRAL is supported by a microwave radiometer for atmospheric correction and by a DORIS receiver, Global Navigation Satellite System, and laser retroreflector to determine its position in space with pinpoint accuracy.

Altimetry data can be used to determine sea and lake surface height, significant wave height, surface wind speed, and sea ice height and thickness.

The products will be available in:
- Near-Real-Time (NRT): products shall be available to the users within three hours after sensing.
- Short Time Critical (STC): products available to the users within 48 hours after sensing.
- Non-Time-Critical (NTC): products available to the users within one month after sensing.

The second table below lists the current operational altimetry products.

A full list of our ocean products can be found on our Ocean Products page.

### Sentinel-3 SRAL Marine User Handbook

#### Timeline and Overview of the SRAL/MWR Processing Baselines

<table>
<thead>
<tr>
<th>PROCESSING BASELINE DEPLOYMENT DATE</th>
<th>PROCESSING BASELINE VERSION</th>
<th>SRAL L1 PRODUCT NOTICE</th>
<th>SRAL L2 PRODUCT NOTICE</th>
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<tbody>
<tr>
<td>21 Jan 2020</td>
<td>2.61</td>
<td>Copernicus S3 Product Notice — Altimetry</td>
<td>Sentinel-3 Product Notice — STM L2 Marine</td>
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<tr>
<td>14 Feb 2019</td>
<td>2.45</td>
<td>Copernicus S3 Product Notice — Altimetry</td>
<td>Sentinel-3 Product Notice — STM L2 Marine</td>
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<tr>
<td>06 Dec 2018</td>
<td>2.33 (S3A)/1.13 (S3B)</td>
<td>Copernicus S3 Product Notice — Altimetry</td>
<td>Sentinel-3 Product Notice — STM L2 Marine</td>
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</table>
EUMETSAT’s User Notification Service (UNS)

How to get the User Announcements

You can receive the notifications of any issue occurring in the Sentinel-3 ground segment or spacecraft via an email notification. This is also applicable also to any other EUMETSAT mission (even is just for data distribution).

You need to have an account in the EUMETSAT EOPortal (the same portal used to access to CODA or Data Centre).

If you don’t have an account you need to go the EOPortal (https://eoportal.eumetsat.int) and select “New User – Create New Account“ and follow the email instructions.

If you already have an account just go to the URL: https://eoportal.eumetsat.int and select “User Notification Service” (top image of this box), then you can select what elements are relevant (examples on the image on the bottom right side of this box).

At any time the user announcements can be seen at https://uns.eumetsat.int/
# Sentinel-3 Altimetry Marine Products Portfolio

## Main “S3 Altimetry” Page @ EUM
[sral.eumetsat.int](https://sral.eumetsat.int)

## Starting point to download of Marine products (S3,J3,etc.): [eoportal.eumetsat.int](https://eoportal.eumetsat.int)

<table>
<thead>
<tr>
<th>Status</th>
<th>Product</th>
<th>EUMETCast (NRT/STC)</th>
<th>ODA CODA</th>
<th>Data Centre</th>
<th>AVISO+</th>
<th>CMEMS</th>
<th>Timeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S3A: operational</strong></td>
<td><strong>SRAL L1A</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td><strong>SRAL L1B</strong></td>
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<td>(produced by CNES/CLS)</td>
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<td></td>
<td><strong>SRAL L3 SLA</strong></td>
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<td>✓</td>
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<td>NRT/STC, NTC</td>
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<tr>
<td><strong>S3B: operational (since December 2018)</strong></td>
<td><strong>SRAL L2P WAVE</strong></td>
<td>✓</td>
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<td>Will also include WIND (starting July 2020)</td>
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<tr>
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<td><strong>SRAL L3 WAVE</strong></td>
<td>✓</td>
<td>✓</td>
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<td>NRT</td>
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<td>(produced by CNES/CLS)</td>
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</tbody>
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Copernicus [Altimetry] Land Products for Africa: SR_2_LAN (STC/NTC) distributed via EUMETCast Africa