



## Copernicus S3 Product Notice – Altimetry

<b>Mission</b>		
<b>Mission</b>	S3A & S3B	
<b>Sensor</b>	SRAL / MWR	
<b>Product</b>	L1 NRT, STC and NTC	
<b>Product Notice ID</b>		
<b>Product Notice ID</b>	S3.PN-STM-L1.06	
<b>Issue/Rev Date</b>	28/11/2018	12/02/2019
<b>Version</b>	2.0	
<b>Preparation</b>	This Product Notice was prepared by the S3 Mission Performance Centre and by ESA and EUMETSAT experts	
<b>Approval</b>	Joint ESA-EUM Mission Management	

### Summary

This is a Product Notice (PN) for the Copernicus Sentinel-3A and Sentinel-3B Surface Topography Mission (STM) Level-1A, Level-1BS and Level-1B products. The Product Notice is applicable to all timeliness: Near Real Time (NRT), Short Time Critical (STC) and Non-Time Critical (NTC), but please note that L1A and L1B-S are only produced in STC and NTC and they are not produced when the SRAL instrument is operated in LRM mode.

The Notice describes the Level-1 current status, product quality and limitations, and product availability status.



### Processing Baseline

	S3A	S3B
<b>Processing Baseline including ADFs</b>	<ul style="list-style-type: none"> <li>Processing Baseline: 2.45</li> </ul> <p>Some Static Auxiliary Data Files (ADFs), which are instrument specific, are different between S3A and S3B. The processor version is the same and unchanged.</p>	<ul style="list-style-type: none"> <li>Processing Baseline: 1.17</li> </ul>
<b>IPFs version</b>	<ul style="list-style-type: none"> <li>SR_1 IPF version: 06.16</li> </ul>	

### Current Operational Processing Baseline

IPF	IPF Version	In OPE since
S3A SR1	06.16	<b>Land Centres:</b> 2019-02-14  <b>Marine Centre:</b> 2019-02-14
S3B SR1		<b>Land Centre:</b> 2019-02-14  <b>Marine Centre:</b> 2019-02-14



## Status of the Processing Baseline

### Sentinel-3

The same processors and versions are used for S3A and S3B:

- SRAL L1 IPF (SR-1): version 06.16

Some Static Auxiliary Data Files (ADFs), which are instrument specific, are different between S3A and S3B. The list of ADFs can be found at the end of the document.

The collection of IPF version and ADFs is known as Processing Baseline (PB). For S3A the PB number is 2.45 and for S3B is 1.17. Currently these numbers are internal to the PDGS; only IPF version and ADFs names/versions are available in the products.

The quality of L1 products is within the mission requirements.

Note that since IPF version 06.09 the L1 products are generated with internal netcdf4 compression enabled. This is transparent to the user.

The deployment dates in the Land and Marine Centres are specified above.

## Known product quality limitations

### Common to S3A and S3B

The Copernicus Sentinel-3A and Sentinel-3B STM products have some known processing limitations, which are reported in the next pages.

#### **Notice #S3-1: Longer calibration time window:**

- Since IPF version 06.13 the time window of the on-board calibrations (CAL2) applied to the measurement data has been extended within the ground processing: both Ku and C band use a 27 days average calibration. This provides smoother calibration and less day-to-day variations in the scientific data.

#### **Notice #S3-2: Number of beams in the stack:**

- The number of stack beams to build the 20 Hz waveform is set to 180. All the useful beams in the stack are used.



**Notice #S3-3: The CAL1 PTR Power is noisy (“EUM/Sen3/AR/3311”):**

- Since IPF version 06.13, the noise present on the SRAL CAL1 PTR (Point Target Response) power has been reduced thanks to the application of an averaged CAL2 correction. Note that it has no impact on the scientific data in Ku-band and a small effect in C-band.

**Notice #S3-4: C Band CAL2 Filter Mask is quite noisy (“EUM/Sen3/AR/3739”):**

- It is observed that the CAL2 Filter mask in C Band has still a high level of speckle noise. Since IPF version 06.13, the CAL2 Filter mask in Ku Band is used for processing the C-band parameters.

**Notice#S3-5: SRAL acquisition mode in L1 products (SIIMPC-2065):**

- Since IPF version 06.14, the SRAL data during which SRAL altimeter operates in acquisition mode are available in the SRAL Level 1 SAFE products. All these data are gathered in a separate NetCDF file named as follows “acquisition.nc”. Note that this evolution has not impact on the measurement file “measurement.nc”. When no acquisition information is available, no “acquisition.nc” file is available.

**Specific to S3A**

The Copernicus Sentinel-3A STM products have some known processing limitations, which are reported in the next pages.

**Anomaly #S3A-3: EUM/Sen3/AR/3404: Issue in L0 IPF in computing the ANX Cross Time (SIIMPC 1918)**

- An error has been detected in the computation of the ANX time that leads to an error of up to 8 seconds in the equator crossing time. This currently affects L1 and L2. This ANX value is used internally to generate the start/stop times of the pole-to-pole passes (STC and NTC) which was now improved.
- Fixed in version 06.14

**Specific to S3B**

The Copernicus Sentinel-3B STM products have some known processing limitations, which are reported in the next pages.



**Anomaly #S3B-1: Track numbering exceeds maximum number during drifting phase (SIIMPC-2825)**

- During the drifting phase between 8 May and 6 June 2018, track numbering exceeds 770, which is the nominal track number for Sentinel-3 27 day repeat cycle.
- Affects S3B data during the drifting phase. It will be corrected in a future reprocessing.

**Anomaly #S3B-2: Degraded SRAL calibration quality for S3B between 6 June and 21 June 2018 (SIIMPC-2823)**

- Due to different parameterisation of SRAL commanding on board, SRAL Level 1 products acquired between 7 June and 21 June have been processed with old CAL1 data.
- The impact on the L1 and L2 data is negligible.
- It will be possibly corrected in a future reprocessing.

**Anomaly #S3B-3 “S3B STC/NTC passes are not properly cut during drift” (EUM/Sen3/AR/4993)**

- During the drift phase, the pass duration in STC and NTC was not properly calculated and this lead to slight offset in start/stop times of the passes. The offset value varies during the drift, up to a 5 seconds difference with the real pole crossing.
- This anomaly will be corrected in a future reprocessing.

**Notice #S3B-1: Jump on C-band S3B data due to different SRAL thermal conditions**

- On the 29 May, due to different thermal conditions on SRAL sensor, a jump of 0.2 dB on the SRAL C-band CAL1 power value occurred.
- This calibration is averaged into a 10-day window and applied to L1 data. Thus between 29 May and 7 June 2018 the L2 science data is affected by this jump.
- No further mitigation actions are foreseen.

**Notice #S3B-2: S3B GNSS NRT Orbits (ROE AX) are used less often than in S3A**

- The best orbit quality in NRT is obtained with ROE orbits (GNSS NRT orbits). It shall be noted that these orbits on the case of S3B are not used 100% of the time, like in S3A. This affected both the Marine (50-75%) and Land (70-99%) Centres.
- Note that this issue was relevant only during the commissioning of S3B and has returned to normality (100% usage ROE) since S3B is on its final orbit. Note also that the orbit information is recomputed at L2, where the ROE usage has reached normality.



### Products Availability

- Copernicus Open Access Hub (<https://scihub.copernicus.eu/>), NRT, STC and NTC
- Copernicus Online Data Access (<https://codal.eumetsat.int/>), NRT, STC and NTC
- EUMETCast (<https://eoportal.eumetsat.int/>), NRT and STC
- EUMETSAT Data Centre (<https://eoportal.eumetsat.int/>), NRT, STC and NTC
- EUMETSAT Online Data Access (<ftp://oda.eumetsat.int/>), NRT, STC and NTC (see details below)
- FTP server address login: login password: password
- Other

Product	EUMETCast	ODA*	CODA**	EUMETSAT Data Centre
L1B	NRT, STC	NRT, STC, NTC	NRT, STC, NTC	NRT, STC, NTC
L1A	-	STC, NTC	STC, NTC	STC, NTC
L1BS	-	STC, NTC	STC, NTC	STC, NTC

\* ODA is available only for Copernicus Services and S3VT users

\*\* CODA is the Copernicus Online Data Access service available to all users

### Any other useful information

- Since IPF version 06.12, the baseline collection number in the products filename changed from 2 to 3 to reflect the major evolutions introduced by this Processing Baseline. As an example, the filename for STC products will be labeled as O\_ST\_003.SEN3 instead of O\_ST\_002.SEN3
- Note that the SRAL NRT products are 10 minutes length, instead of being dump based as originally specified – this is part of the new Product Definition.
- The fine tracker word is not applied in the L1B waveforms creating saw tooth behavior on the radargram. This is not considered an anomaly since the range can be computed using the tracker and epoch provided in the product or from the epoch coming from any external retracking applied by the users. All versions are impacted.
- For Sentinel-3B, SRAL was switched-on on 8 May. Until 6 June, the S3B satellite drifted in its orbit to end up 30 seconds ahead of the S3A satellite, at which point the tandem phase started.
- The geographic coverage of S3B mission was partial until 29 May 2018. Indeed, since the altimeter PRF was not changed during the drifting phase, there have been no SRAL acquisitions below 50°S until 24 May 2018, then partial coverage between 24 and 29 May.



- SRAL operated:
  - in LRM Closed Loop mode from 8 May till 6 June 2018;
  - in SAR Closed Loop mode from 7 June till 14 June 2018;
  - in LRM Closed Loop mode from 14 June till 11 July 2018;
  - in SAR Open Loop mode from 11 July till 8 August 2018;
  - in SAR Closed Loop mode from 8 August till 5 September 2018;
  - in SAR Open Loop mode since 5 September 2018.
  
- S3B satellite reached its final orbit on 23 November 2018.
- Note that the strategy of cycle numbering during the S3B drifting phase is that the cycle number is incremented at each major satellite manoeuvre. This results in very short cycles from Cycle 2 to Cycle 8. Between Cycle 9 (start of the tandem phase) and cycle 13 (end of tandem phase), the repeat cycles have the nominal duration of 27 days. Then, cycles 14 to 17 are also shorter than 27 days during the second drifting phase needed to reach the final orbit.
- Since 28 May 2018, CNES MOE used in STC products have been improved by using Doris and GPS observations in the orbit solution. This improvement is present for both S3A and S3B.
- CNES MOE used in STC products were produced with Doris measurements only between 7 June and 14 June 2018. After 14 June, situation came back to nominal with orbit solution generated with both Doris and GPS measurements. This issue only affects S3B.



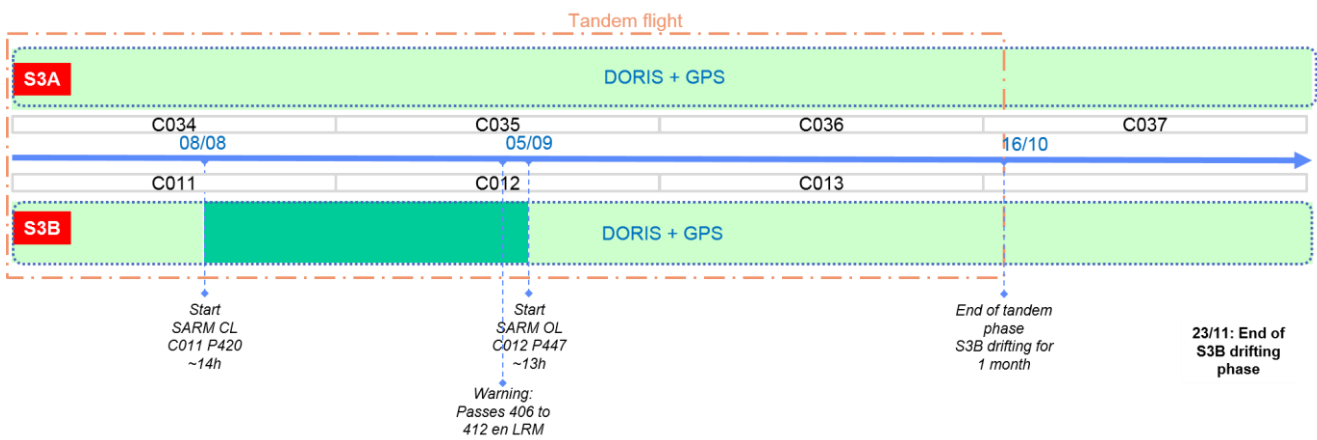
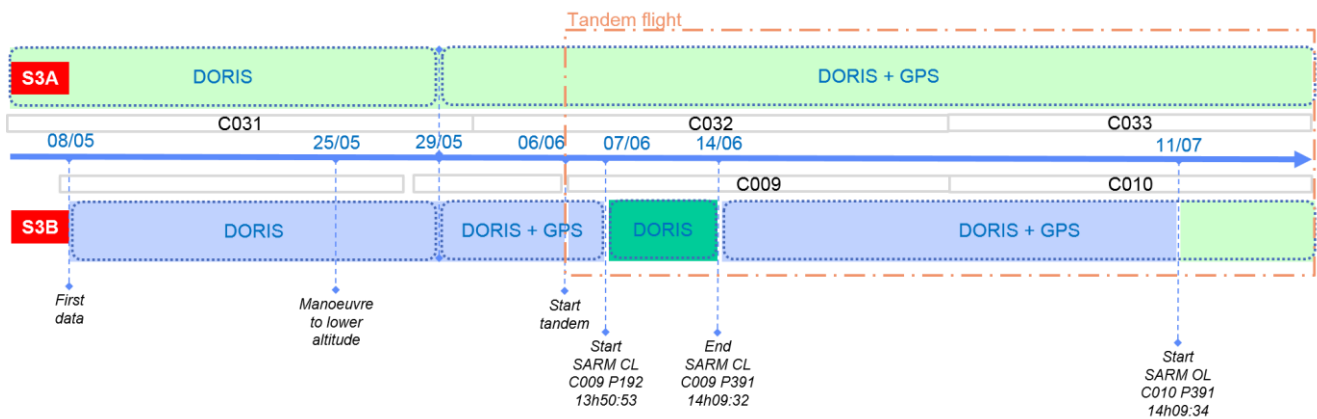
European Union Programme



SARM Open Loop

SARM Closed Loop

LRM







## User Support

- Questions about STM products can be asked to the Sentinel-3 User Support desk at:
  - [eosupport@copernicus.esa.int](mailto:eosupport@copernicus.esa.int)
  - [ops@eumetsat.int](mailto:ops@eumetsat.int)

## References

- Sentinel-3 Mission Requirements Traceability Document (MRTD), C. Donlon, EOP-SM/2184/CD-cd, 2011
  - <https://sentinel.esa.int/documents/247904/1848151/Sentinel-3-Mission-Requirements-Traceability>
- Product Data Format Specification – SRAL and MWR Level 1, Ref: S3IPF.PDS.003.1, Issue: 2.10, Date: 28/02/2018
  - <https://sentinel.esa.int/web/sentinel/user-guides/sentinel-3-altimetry/document-library>

## Static ADFs List.

The following list is the complete list of static ADF used by the processors. Any change from the previous processing baseline is highlighted. A brief description of the role of each ADF in processing is in the product manifest.

### S3A/S3B Common:

- S3\_AX\_\_CST\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3\_SR\_\_LSM\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3

### S3A:

- S3A\_SR\_1\_CONCAX\_20160216T000000\_20991231T235959\_20171130T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SR\_1\_CONMAX\_20160216T000000\_20991231T235959\_20180213T120000\_\_\_\_\_MPC\_O\_AL\_007.SEN3
- **S3A\_SR\_\_CHDRAX\_20160216T000000\_20991231T235959\_20181127T120000\_\_\_\_\_MPC\_O\_AL\_004.SEN3**
- **S3A\_SR\_\_CHDNAX\_20160216T000000\_20991231T235959\_20181127T120000\_\_\_\_\_MPC\_O\_AL\_004.SEN3**

### S3B:

- S3B\_SR\_1\_CONCAX\_20180425T000000\_20991231T235959\_20180409T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3B\_SR\_1\_CONMAX\_20180425T000000\_20991231T235959\_20180409T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- **S3B\_SR\_\_CHDNAX\_20180425T000000\_20991231T235959\_20181127T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3**
- **S3B\_SR\_\_CHDRAX\_20180425T000000\_20991231T235959\_20181127T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3**



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***End of the Product Notice***