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Sentinel-3A Product Notice – STM L2 Marine ("Spring-2018 Reprocessing Campaign")

Product Information	
Mission	S3-A
Sensor	SRAL/MWR
Product	L2 NTC (Marine Reprocessed Dataset from "Spring-2018 Reprocessing Campaign")
Product Notice Details	
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Preparation	This Product Notice was prepared by EUMETSAT with the support of the ESA and the S3 Mission Performance Centre experts
Approval	EUMETSAT Mission Management

Summary

This document is the Product Notice for the public release of Sentinel-3 Surface Topography Mission (STM) Level-2 Non-Time Critical (NTC) products from the so called "Spring 2018" Reprocessing Campaign.

The Notice describes the STM reprocessed dataset, processing baseline, product quality and limitations, and product availability status.



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Processing Information

Processing Baseline

- Processing Baseline (PB) **2.27**
 - SRAL L1 IPF (SR-1): version **06.13**
 - MWR L1 IPF (MW-1): version **06.04**
 - SRAL/MWR L2 IPF (SM-2): version **06.12**
 - The list of Static Auxiliary Data Files that are part of the Processing Baseline can be found at the end of the document.

Description

Status of the Processing Baseline (PB)

The processing baseline used for the reprocessing is **PB 2.27**, detailed above. It consists of the same baseline used for the generation of the operational products in the Marine Centre since **2018-02-14**.

The Reprocessed dataset have a consistent set of STM products with **baseline collection 003**, identified in the SAFE folder name. This baseline collection was introduced with major changes in the PB 2.24. The PB version used in the reprocessing campaign is PB 2.27 and has only minor updates wrt to PB 2.24.

The reprocessing used the NTC (Non-Time Critical) standard for orbits and ADFs (orbits, platform information, corrections, etc.).

Product Availability

The Reprocessed dataset spans from **2016-03-01** to **2018-01-20**. This reprocessing provides a consistent dataset since the beginning of the mission.

Data after 2018-01-20 have already been produced with the current PB 2.27 and are available via the normal EUMETSAT data access mechanisms.

There are few gaps in this period, due of issues on data reception or internal PDGS anomalies, these gaps are reported in Section 4.3 of the detailed Data Quality Report [1] but are mostly related to the early part of the reprocessing period.

EUMETSAT makes the Marine Reprocessed Dataset available from the Copernicus Online Data Access (CODA) service, more details on page 8.

L2 Marine Products Quality:

The quality of L2 WAT product is within the mission requirements for the 3 SRAL parameters (range, SWH, and wind speed).

Some anomalies occurred during the early mission phase which have an impact on the SRAL data quality (e.g. mispointing, Space Wire ASIC Anomaly); these anomalies and the impact in the data have been accessed and are fully described in the detailed Data Quality Report [1].

General known limitations are described in the following sections.

The sea ice processing is not yet optimised but is mainly due to a 'bad timing' of the S-3A launch date vis-à-vis of the season timing (winter) for performing the expected processing parameterisation. Improvements to the sea-ice ground processing are foreseen in the near future.



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Known product quality limitations

The Sentinel-3A STM products have some known processing limitations which are reported in the next pages as «Anomalies» or «Notices». Anomalies are related to issues on the processing baseline (e.g. *bugs*) whilst Notices are limitations which are planned to be improved in the medium-long term (e.g. *algorithm evolution, calibration campaigns, etc.*).

Notices on the products

- **Notice #1 – MWR calibration is not completed**

MWR calibration is not completed, so the radiometer measurement values and derived quantities do not have an optimised performance.

The MWR L1 brightness temperatures exhibit a difference of up to 1 K between ascending and descending tracks for the 23.8 GHz channel. Work is ongoing to understand the source of this difference.

In the L2 products the radiometer wet tropospheric correction deduced from 5 parameters has not been calibrated yet and should not be used (*rad_wet_tropo_cor_sst_gam_01_ku* and *rad_wet_tropo_cor_sst_gam_01_plrm_ku*).

The composite wet tropospheric correction has not been calibrated yet and should not be used (*comp_wet_tropo_cor_01_ku* and *comp_wet_tropo_cor_01_plrm_ku*).

- **Notice #2 - MWR parameters not computed due to MWR calibration over open ocean**

During MWR calibrations over open ocean, the brightness temperatures for both channels are not computed and set to default values in the product.

As a consequence, 1 Hz parameters derived from the MWR are set to default values, except for the atmospheric attenuation. This affects the wet tropospheric correction, water vapour content and cloud liquid water content.

The MWR calibration sequence has been reviewed and modified. The new calibration timeline was updated on 2018-03-01 08:19 UTC to have a calibration sequence every 30 seconds, each of them 0.6 seconds long. After this last update, the MWR wet tropospheric correction no longer exhibits temporal gaps.

- **Notice #3 - Mean values of Ku band and C band sigma0**

The Ku-band sigma0 in all modes (LRM, PLRM and SAR) has been biased to be aligned on Envisat mean value (10.8 dB without the atmospheric attenuation). A system bias of –25.95 dB was added to the sigma0 in SARM Ku-band and –2 dB to the sigma0 in LRM and PLRM Ku-band.

Note also that the sigma0 derived from ice sheet retracers exhibits a mean value close to 42 dB.

The C-band sigma0 in all modes (LRM and PLRM) has not been biased and exhibit a mean value around 11 dB which is lower by 4 dB compared to Jason-2.



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- **Notice #4 - Noise on the dual frequency ionospheric correction**

The higher noise of the C band range inherent to the PLRM processing contributes to a higher noise in the dual frequency ionospheric correction.

- **Notice #5 - Sea State Bias (SSB) is not optimised for S3**

The SSB correction has not been tuned for Sentinel-3A. It is based instead on the Jason-2 SSB model, for LRM, PLRM as well as SARM.

- **Notice #6 – Some geophysical flags have not been tuned for Sentinel-3A**

Some geophysical flags were derived from Envisat mission and have not been tuned for Sentinel-3A.

The rain flag is presently based on Envisat flag and it has not been tuned for Sentinel-3A mission.

The ocean/sea ice flag is presently based on Envisat flag and it has not been tuned for Sentinel-3A mission.

- **Notice #7 – CNES/CLS 15 MSS is set to default values in certain zones (“EUM/Sen3/NCR/3484”)**

The MSS CNES-CLS15 is set to default value over inland waters, the Beaufort Sea, certain Antarctic regions, and over land. This means it cannot be used to provide a global SSHA. This issue does not affect the SSHA value in the product, as it is computed with DTU15. In case the user wants to use this MSS instead of the default DTU15, they should be aware of this.

- **Notice #8 – Shortcoming in SWH measurement at low wave height**

At low wave heights, below 1.5 meter, a significant number of SAR 20Hz SWH measurements take a value of 0. This appears to be related to the fitting mechanism used, and a solution is being investigated. During the averaging to 1 Hz measurements, the 20 Hz values set to 0 are considered valid and included in the averaging, thus lowering the value of the averaged 1 Hz measurements at low wave height.

A different averaging mechanism can be performed by an interested user starting from the 20Hz SWH, using the association indexes between 1 Hz and 20 Hz measurements and excluding the 20 Hz SWH measurements set to the boundary value of 0.

- **Notice #9 – OCOG retracker to be better tuned for C band (“EUM/Sen3/NCR/3970”)**

The fields OCOG retracker range (*range_ocog_20_c*) and sigma0 in C Band (*sig0_ocog_20_c*) are set to *_FillValue* at a higher rate than expected over Open Ocean. Further parameterisation of the OCOG retracker is needed and will be done in a future version of the IPF.

Anomalies on the products

The following anomalies affect the “Spring 2018” Reprocessed dataset

- **Anomaly “EUM/Sen3/NCR/3448” - GIM Iono Correction occasionally set to *_FillValue***

The ionospheric GIM correction (*iono_cor_gim_01_ku*) can be set to *_FillValue* on certain products that cross the midnight boundary. The post-midnight period of the product, will have the GIM iono correction set to the *_FillValue*.

- **Anomaly “EUM/Sen3/AR/3404” – ANX cross time not accurately computed**

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 present in this reprocessing. The issue was solved with the more recent PB 2.33. The start/stop of the L1/L2 pass files in this reprocessing is not affected by this issue, just the reported ANX time in the product.



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- **Anomaly “EUM/Sen3/NCR/3971” and “EUM/Sen3/NCR/3972” – Bad handling of _FillValue in some PLRM fields**

The field *swh_ocean_20_plrm_ku* is computed from the field *sigmac_ocean_20_plrm_ku* (stored in the *enhanced_measurement.nc*). In certain conditions it can be observed that for the points where *sigmac_ocean_20_plrm_ku* is set to *_FillValue* the *swh_ocean_20_plrm_ku* takes a “valid” but incorrect value. A similar situation happens for *amplitude_ocean_20_plrm_ku* and *sig0_ocean_20_plrm_ku*.

Limited product degradation

- **Anomaly “EUM/Sen3/NCR/3403” – Issue in range positioning the SAR waveform at Greenwich Meridian**

A few 20-Hz geophysical measurements (range, wave height and sigma nought) are systematically padded to *FillValue* at Greenwich meridian cross in SAR and PLRM mode. This issue is related to an issue in the OLTC on board of S3A. This affects some 20Hz measurements crossing the meridian, but it is not enough to invalidate the 1-Hz data. It affects about 21 seconds of data per cycle.

Affects data with sensing time before 18/12/2017 (issue fixed with update of new zone database file)

Processing Baseline (PB 2.27) – Static ADFs

The following list is the complete list of static ADF used by the processors. Any change from the previous Reprocessing Dataset (“Spring 2017 Reprocessing Campaign”) is highlighted in **red**. A brief description of the role of each ADF in processing is in the product manifest.



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• MWR L1

- S3A_MW_1_SLC_AX_20000101T000000_20991231T235959_20160603T120000_____MPC_O_AL_002.SEN3
- S3A_MW__STD_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_MW__CHDNAX_20160216T000000_20991231T235959_20161014T120000_____MPC_O_AL_002.SEN3
- S3A_MW__CHDRAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3

• SRAL L1

- S3_AX__CST_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR_1_CONCAX_20160216T000000_20991231T235959_20171130T120000_____MPC_O_AL_003.SEN3
- S3_SR_1_CONMAX_20160216T000000_20991231T235959_20171130T120000_____MPC_O_AL_006.SEN3
- S3_SR__LSM_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR__CHDNAX_20000101T000000_20991231T235959_20160603T120000_____MPC_O_AL_002.SEN3
- S3A_SR__CHDRAX_20000101T000000_20991231T235959_20160603T120000_____MPC_O_AL_002.SEN3

• SRAL/MWR L2

- S3_SR_2_CON_AX_20160216T000000_20991231T235959_20180109T120000_____MPC_O_AL_010.SEN3
- S3A_SR_2_CCT_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR_2_IC01AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_IC02AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR_2_IC03AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_IC04AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR_2_IC05AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_IC06AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR_2_IC07AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_IC08AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_IC09AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_IC10AX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3A_SR_2_SSBLAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_SR_2_SSBSAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_CP00AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_CP06AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_CP12AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_CP18AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_EOT2AX_20160216T000000_20991231T235959_20170713T120000_____MPC_O_AL_002.SEN3
- S3_SR_2_FLT_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_GEO_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_LNEQAX_20160216T000000_20991231T235959_20170713T120000_____MPC_O_AL_002.SEN3
- S3_SR_2_LRC_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_LT2_AX_20160216T000000_20991231T235959_20170713T120000_____MPC_O_AL_002.SEN3
- S3_SR_2_LUTEAX_20160216T000000_20991231T235959_20170713T120000_____MPC_O_AL_002.SEN3
- S3_SR_2_LUTFAX_20160216T000000_20991231T235959_20170713T120000_____MPC_O_AL_002.SEN3
- S3_SR_2_LUTSAX_20160216T000000_20991231T235959_20170713T120000_____MPC_O_AL_002.SEN3



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- S3_SR_2_SIGSAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_SSM_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_SST_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_SURFAX_20160216T000000_20991231T235959_20161010T120000_____MPC_O_AL_002.SEN3
- S3_SR_2_WNDLAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_WNDSAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_EOTLAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3_SR_2_LT1_AX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- 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_SR___CHDRAX_20000101T000000_20991231T235959_20160603T120000_____MPC_O_AL_002.SEN3
- S3A_SR___CHDNAX_20000101T000000_20991231T235959_20160603T120000_____MPC_O_AL_002.SEN3
- S3A_MW___CHDRAX_20000101T000000_20991231T235959_20151214T120000_____MPC_O_AL_001.SEN3
- S3A_MW___CHDNAX_20160216T000000_20991231T235959_20161014T120000_____MPC_O_AL_002.SEN3

Products Availability

- Copernicus Online Data Access (<https://codarep.eumetsat.int/>), SRAL L2 NTC Reprocessed Dataset

Other useful information

[1] – Detailed Data Quality Report for “S3A STM Reprocessing - "Spring 2018" (Level 0 to Level 2)”: Ref: EUM/OPS-SEN3/REP/18/978053, Issue 1

<https://www.eumetsat.int/website/home/Data/CopernicusServices/Sentinel3Services/Altimetry/index.html>

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>



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SRAL/MWR Product Data Format Specifications:

- [Product Data Format Specification - SRAL/MWR Level 2 Marine products](#)
- [Product Data Format Specification - SRAL and MWR Level 1 products](#)

<https://www.eumetsat.int/website/home/Data/CopernicusServices/Sentinel3Services/Altimetry/index.html>

End of the Product Notice