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Sentinel-3 Product Notice – SYnergy

Mission		S3A & S3B
Sensor		SYNERGY products (combination of OLCI and SLSTR)
Product		<ul style="list-style-type: none">• SY_2_SYN• SY_2_VG
Product Notice ID		S3.PN-SYN-L2.08
Issue/Rev Date		28/10/2022
Version		1.1 (known limitations section updated)
Preparation		This Product Notice was prepared by the Sentinel 3 (S3) Mission Performance Centre and by ESA experts
Approval		ESA Mission Management

Summary

This is a product notice for the release of operational Sentinel-3 SYNERGY Level 2 products to user's community. The notice gives a clear indication of the current status of the latest processing baseline delivered for SYN products and known limitations. The products are currently available via the Copernicus Open Access Hub.

The latest SYNERGY processing baseline corrects two issues which are detailed hereafter.



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Processing Baseline

	Common to S3A/S3B
Processing Baseline ID	<ul style="list-style-type: none"> • SYN_L2_.002.16.00 • SYN_L2V.002.08.00
IPFs version	<ul style="list-style-type: none"> • SY_2 IPF version: 06.23 • SY_2_VGS IPF version: 06.11
	<ul style="list-style-type: none"> • OL_1 IPF version: 06.13 (OL_L1_.003.00.00)
	<ul style="list-style-type: none"> • SL_1 IPF version: 06.19 (SL_L1_.004.04.00)
	<ul style="list-style-type: none"> • PUG version: 03.45

Current Operational Processing Baseline

IPF	IPF Version	In operations since (creation date)
S3A		
OL1	06.13	23/08/2022
SL1	06.19	09/02/2022
SY2	06.23	23/08/2022
SY2-VGS	06.11	23/08/2022
PUG	03.45	19/07/2022
S3B		
OL1	06.13	31/08/2022
SL1	06.19	09/02/2022
SY2	06.23	09/09/2022
SY2-VGS	06.11	09/09/2022
PUG	03.45	19/07/2022



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Status of the Processing Baseline

Common to S3A and S3B

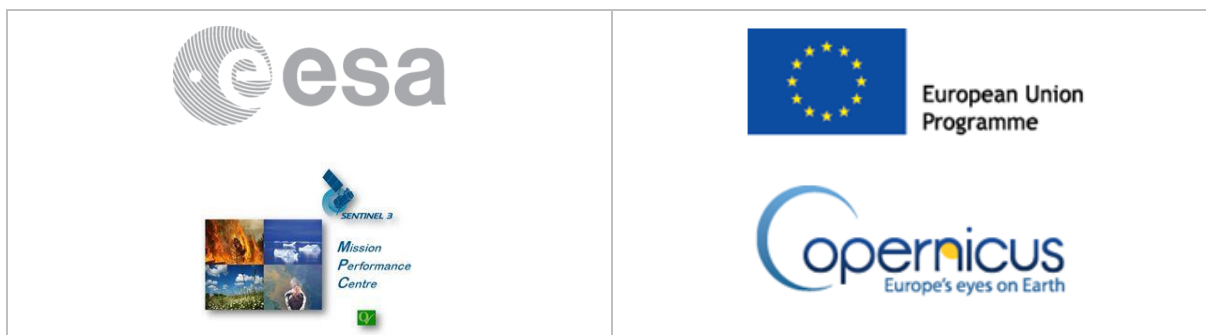
- Several issues have been corrected on VGT-like processing chain:
 - The robustness of the status map flag has been improved regarding VGT TOA/surface reflectance. There is no more pixel associated with a VGT radiometry set to `_FillValue` and a status map set to "GOOD".
 - In particular, the handling of inland water pixels has been reviewed and corrected. The status map flag is now set to "BAD" and no more unfilled pixel is taken into account in the projection into 1 km Plate Carrée grid.
 - The CRS (Coordinate reference System) parameter is now correctly provided into VGT-like product and the attributes associated with TOA reflectance inside `SY_2_VGP` products have been corrected.
 - Over high latitude, the Western part of the SYNERGY VGT-like orbits was affected by a checkerboard pattern, preventing the provision of radiometry and surface flag. This issue is now corrected.
- SYNERGY VGT daily and decadal composites are providing a NDVI dataset for all pixels. To be consistent with VGT and PROBA-V products, this NDVI dataset is defined as a surface NDVI value. In addition, to enable the composition of decadal product using a Top of Atmosphere NDVI value, the SYNERGY VGT-S1 products are also providing TOA NDVI, in the `TOA_NDVI` dataset.

Specific to S3A

- Nothing specific to S3A

Specific to S3B

- Nothing specific to S3B



Known product quality limitations

Common to S3A and S3B

- Despite these evolutions and corrections, some choices and limitations need to be underlined:
- To avoid strong interfaces between the different aerosol models and waiting for an update of the corresponding Auxiliary Data Files, only the continental model is considered. This limitation can create erroneous patterns over deserts or mountains.
- Similarly, to OLCI level 2 products, camera interfaces can also be visible on some SYN L2 products.
- A degraded VIS/SWIR Radiometric Calibration is affecting SLSTR L1 products and is affecting also the SYNERGY L2 Aerosol retrieval and Surface reflectance. A vicarious calibration assessment to quantify S1 to S6 radiometric calibration adjustment has been performed over desert sites performed by RAL, providing first-order radiometric corrections and its inclusion in SYN L2 processing is currently under investigation.
- As the aerosol retrieval algorithm is different between “nadir-only view” area (based only on spectral constraints) and “dual-view” area (based only on both angular and spectral constraints), a transition between these two areas can be observed in some SYN L2 products. In most products, this transition is visible through sharp differences in the Aerosol Optical thickness Values.
- The combination of {SYN_success; SYN_aerosol_filled; SYN_AOT_climato} flags can be misleading. These flags are firstly defined on the macro-pixel resolution. Then, during the aerosol interpolation, for each 300m pixel, the flags associated with the 4 closest macro-pixels are taken into account:
- If only one of these macro-pixels is flagged cosmetic fill SYN_aerosol_filled or SYN_AOT_climato, the 300m pixel is flagged accordingly.
- However, the 300m pixel is flagged as SYN_success if the 4 macro-pixels are flagged as SYN_success.
- As a consequence, depending on the used macro-pixels, a 300m pixel can be flagged by both SYN_AOT_climato and SYN_aerosol_filled.
- If successfully retrieved AOT values are available, those will be always used for the interpolation. However, if a 300m pixel is interpolated from 3 SYN_success macro-pixels and one SYN_aerosol_filled macro-pixel, it will be flagged as SYN_aerosol_filled and not SYN_success.
- The VGT band mapping is performed using hyperspectral interpolation from OLCI and SLSTR bands. A Spectral Response Function (SRF) is then applied on these hyperspectral bands to create VGT



radiometry. **The current SRF is the one associated with SPOT-VG1.** An update to the SRF associated with PROBA-V is planned for end of 2022.

- The hyperspectral interpolation, used during the creation of VGT bands, is applied simultaneously on both SLSTR and OLCI radiometric measurements. As consequences, the SLSTR bands S2 and S3 are wrongly contributing to respectively B2 and B3 band mapping.

A correction with a clear distinction between OLCI and SLSTR contribution is planned for end of 2022.

- Several cloud flags are provided in the SYN L2 products: SLSTR L1 basic cloud and OLCI bright pixel flags transferred from L1 product, and the dedicated SYNERGY cloud flag derived from the IDEPIX approach. However, some cloud contamination can be observed on AOD dataset, and **no cloud shadow detection** is considered in the SYNERGY processing
- The SYN L2 VGT-P product is a segment product, i.e. providing only one orbit per product with each parameter projected on the 1km Plate Carrée grid. To avoid having large empty areas, the width of the plate-Carrée grid is limited in longitude to provide only the relevant interval. This restriction is performed by selecting the maximum and minimum longitudes sampled inside Sentinel-3 orbit, which might be misleading when the S3 orbit is overpassing the $-180/180^\circ$ interface. In that case, the extent of the VGT-P product will be the full globe without impact the size of the product.

Specific to S3A

- Nothing specific to S3A

Specific to S3B

- Nothing specific to S3B



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Products Availability

- Copernicus Open Access Hub (<https://scihub.copernicus.eu/>)
- S3 Expert Users Data Hub
- Other

Any other useful information

- SYN products are now available in Short-Term Critical (STC) timeliness since the 4th of June 2019
- During the period from the 30th of May and the 7th of Jun 2019, either STC or NTC products are available, but not both.

User Support

- Questions about SYN products can be asked to the Sentinel-3 User Support desk at:
 - eosupport@copernicus.esa.int

References

- OLCI L1 Product Notice
 - S3.PN.OLCI-L1.10, v1.0 dated on 29/08/2022
- SLSTR L1 Product Notice
 - S3.PN.SLSTR-L1.09, v1.1 dated on 20/01/2022
- Product Data Format Specification – SYNERGY Level 1 & 2 Instrument Products, Ref: S3IPF.PDS.006, Issue: 1.14, Date: 12/07/2022
<https://sentinel.esa.int/web/sentinel/user-guides/sentinel-3-synergy/document-library>
- SYN Land User Handbook, ref. S3MPC.HBK.003, Issue 1.1, Date: 28/04/2021
<https://sentinel.esa.int/documents/247904/4598110/Sentinel-3-Synergy-Land-Handbook.pdf>



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Static ADFs

S3A

- S3A_SL_1_MCHDAX_20160216T000000_20991231T235959_20170120T120000_____ MPC_O_AL_003.SEN3
- S3A_SY_1_GCPBAX_20160216T000000_20991231T235959_20170120T120000_____ MPC_O_AL_003.SEN3
- S3A_OL_1_MCHDAX_20160216T000000_20991231T235959_20170120T120000_____ MPC_O_AL_003.SEN3
- S3A_SY_1_PCP_AX_20160216T000000_20991231T235959_20170120T120000_____ MPC_O_AL_005.SEN3
- S3_SY_1_CDIBAX_20000101T000000_20991231T235959_20151214T120000_____ MPC_O_AL_001.SEN3
- **S3A_SY_2_PCP_AX_20160216T000000_20991231T235959_20220713T120000_____ MPC_O_AL_006.SEN3**
- S3A_SY_2_RAD_AX_20160216T000000_20991231T235959_20190912T120000_____ MPC_O_AL_003.SEN3
- S3A_SY_2_RADPAX_20160216T000000_20991231T235959_20190912T120000_____ MPC_O_AL_002.SEN3
- S3A_SY_2_RADSAX_20160216T000000_20991231T235959_20190912T120000_____ MPC_O_AL_002.SEN3
- S3A_SY_2_SPCPAX_20000101T000000_20991231T235959_20151214T120000_____ MPC_O_AL_001.SEN3
- S3_SY_2_AODCAX_20000101T000000_20991231T235959_20180704T120000_____ MPC_O_AL_001.SEN3
- S3A_SY_2_PCPSAX_20160216T000000_20991231T235959_20181207T120000_____ MPC_O_AL_002.SEN3

S3B

- S3B_SL_1_MCHDAX_20180425T000000_20991231T235959_20180409T120000_____ MPC_O_AL_001.SEN3
- S3B_SY_1_GCPBAX_20180425T000000_20991231T235959_20180409T120000_____ MPC_O_AL_001.SEN3
- S3B_OL_1_MCHDAX_20180425T000000_20991231T235959_20180409T120000_____ MPC_O_AL_001.SEN3
- S3B_SY_1_PCP_AX_20180425T000000_20991231T235959_20180409T120000_____ MPC_O_AL_001.SEN3
- S3_SY_1_CDIBAX_20000101T000000_20991231T235959_20151214T120000_____ MPC_O_AL_001.SEN3
- **S3B_SY_2_PCP_AX_20180425T000000_20991231T235959_20220713T120000_____ MPC_O_AL_004.SEN3**
- S3B_SY_2_RAD_AX_20180425T000000_20991231T235959_20190912T120000_____ MPC_O_AL_002.SEN3
- S3B_SY_2_RADPAX_20180425T000000_20991231T235959_20190912T120000_____ MPC_O_AL_002.SEN3
- S3B_SY_2_RADSAX_20180425T000000_20991231T235959_20190912T120000_____ MPC_O_AL_002.SEN3
- S3B_SY_2_SPCPAX_20180425T000000_20991231T235959_20180409T120000_____ MPC_O_AL_001.SEN3
- S3_SY_2_AODCAX_20000101T000000_20991231T235959_20180704T120000_____ MPC_O_AL_001.SEN3
- S3B_SY_2_PCPSAX_20180425T000000_20991231T235959_20181207T120000_____ MPC_O_AL_002.SEN3

End of the Product Notice