



S3 Product Notice – OLCI

Mission	S3A & S3B	
Sensor	OLCI	
Product	OL_1_EFR in NRT and NTC OL_1_ERR in NRT and NTC	
Product Notice ID	S3.PN-OLCI-L1.08	EUM/OPS-SEN3/DOC/21/1220643
Issue/Rev Date	28/04/2021	
Version	1.0	
Preparation	This Product Notice was prepared by the S3 Mission Performance Centre and by ESA and EUMETSAT experts	
Approval	Joint ESA-EUM Mission Management	

Summary

This Product Notice addresses both Sentinel-3A and -3B Ocean and Land Colour Imager (OLCI-A and OLCI-B) Level-1B processing baselines deployed on 28/04/2021, 2.76A and 1.54B respectively. The Notice is applicable to Near Real Time (NRT) and Non-Time Critical (NTC) timeliness.

The Notice describes the current Level-1B status, the processing baseline, the product quality and known limitations for both OLCI-A and OLCI-B.

The processor changes do not have immediate impact on OLCI Level-1B products. The changes will however allow improved detection and processing through instrument anomalies when they happen, and the processing of OLCI-A early mission data affected by a NAVATT time stamp anomaly.



Processing Baselines

	S3A	S3B
Processing Baseline	<ul style="list-style-type: none"> Processing Baseline: 2.76 	<ul style="list-style-type: none"> Processing Baseline: 1.54
IPFs version	<ul style="list-style-type: none"> OL_1 IPF version: 06.11 	<ul style="list-style-type: none"> OL_1 IPF version: 06.11
	<ul style="list-style-type: none"> PUG version: 03.39 	<ul style="list-style-type: none"> PUG version: 03.39

Current Operational Processing Baselines

IPF	IPF / PB Version	In the operation since
S3A OL1	06.11 / 2.76	<p>Land Centres:</p> <p>NRT mode: 28/04/2021 08:35 UTC NTC mode: 28/04/2021 08:35 UTC</p> <p>Marine Centre:</p> <p>NRT mode: 28/04/2021 08:35 UTC NTC mode: 28/04/2021 08:35 UTC</p>
S3B OL1	06.11 / 1.54	<p>Land Centres:</p> <p>NRT mode: 28/04/2021 08:35 UTC NTC mode: 28/04/2021 08:35 UTC</p> <p>Marine Centre:</p> <p>NRT mode: 28/04/2021 08:35 UTC NTC mode: 28/04/2021 08:35 UTC</p>
PUG	03.39	



Status of the Processing Baselines

S3A

The current processing baseline for Sentinel-3A OLCI Level-1B products is v2.76. The baseline was deployed on 28/04/2021 at the Land and Marine Centres.

This Processing Baseline includes IPF updates without immediate impact on OLCI L1B products. The updates will however enable and improve OLCI L1 processing in case of instrument anomalies, manoeuvres, and for the early period of OLCI-A mission. In more details, the major changes from the last processing baseline v2.74 are the following:

- **Improved instrument anomaly detection and handling.** Several OLCI anomalies occurred since mission start, which were not appropriately handled by the processor. In some cases, undetected corrupted data were processed up to Level 1 and Level 2 products. In other cases, partial data corruption (e.g. affecting only one camera among five) was misinterpreted as a processing configuration issue, causing processing abortion and data gaps at Level 1 and 2. This OLCI IPF evolution introduces additional quality control on instrument data to ensure better filtering of corrupted data while processing all valid data to Level 1B. All known OLCI anomalies are now correctly handled by the updated software.
- Software **correction of the NAVATT time stamp anomaly**, impacting the early OLCI-A and SLSTR-A mission data (4 to 24/4/2016, anomaly S3-NC-ESA-COM-0028). This change allows to (re)process these early data with a georeferencing accuracy equivalent to the rest of the mission.

The quality status of this processing baseline is as follows:

Geometric Calibration

- OLCI-A geolocation accuracy meets the mission requirements in terms of global RMS value (0.5 pixel according to [S3 MRTD, 2011](#)) with a RMS performance below 0.3 pixel. Validation of the Geometric Calibration, using Landsat ground control points on current datasets (Q1 2021) shows the following geolocation accuracy per camera:

Camera Module	Georeferencing Biases (pixels)	
	Across Track	Along Track
1	-0.05	-0.01
2	-0.04	-0.07
3	-0.01	-0.15
4	-0.03	-0.16
5	-0.05	-0.13



The misregistration at the interfaces of each camera is below 0.1 pixels.

Spectral Calibration

- OLCI-A spectral model accuracy meets the mission requirements ([S3 MRTD, 2011](#)). The model uses in-flight data from spectral calibrations. The calibrations bring small changes to the central wavelengths compared to OLCI-A pre-launch characterizations and a more significant change to channel Oa1 (400 nm) with up to 0.4nm difference. Consistently with the solar spectrum variability, the most significant change is in in-band irradiance of channel Oa1 (up to around 1.5%) with the same impact on radiometry. OLCI-A spectral response information and datasets are provided in a separate note ([S3 OLCI-A SRF, 2016](#)).

Radiometric Calibration

- Radiometric validation results demonstrate that OLCI-A absolute radiometric calibration has a positive bias of about 2 to 3 percent throughout all bands, with the exception of band Oa21 (1020nm) at about 6 percent, OLCI being too bright. Actions are in place to achieve OLCI radiometric compliancy (2% absolute accuracy for bands ≤ 900 nm, 5% > 900 nm, [S3 MRTD, 2011](#)).
- OLCI-A Radiometric Gain Model is based on the set of in-flight radiometric calibrations ending on 08/08/2020. It includes radiometric gain coefficients at a reference date (07/12/2016) and a long-term evolution model. The set of radiometric gain coefficients used to derive both the Reference Gains and the Evolution Model have been computed using up-to-date geometric and spectral calibration, instrument settings, an upgraded diffuser BRDF model based on in-flight data, and diffuser ageing (browning) correction. The Radiometric Model is continuously monitored against new Radiometric Calibration acquisitions.

S3B

The current processing baseline for Sentinel-3B OLCI Level-1B products is v1.54. The baseline was deployed on 28/04/2021 at the Land and Marine Centres.

This Processing Baseline includes IPF updates without immediate impact on OLCI L1B products. The updates will however enable and improve OLCI L1 processing in case of instrument anomalies, manoeuvres. In more details, the major change from the last processing baseline v1.52 is the following:

- **Improved Instrument Anomaly detection and handling.** Several OLCI anomalies occurred since mission start, which were not appropriately handled by the processor. In some cases, undetected corrupted data were processed up to Level 1 and Level 2 products. In other cases, partial data corruption (e.g. affecting only one camera among five) was misinterpreted as a processing configuration issue, causing processing abortion and data gaps at Level 1 and 2. The OLCI IPF evolution introduces additional quality control on instrument data to ensure better filtering of corrupted data while processing all valid data to Level 1B. All known OLCI anomalies are now correctly handled by the updated software.



The quality status of this processing baseline is as follows:

Geometric calibration

- OLCI-B geolocation accuracy meets the mission requirements in terms of global RMS value (0.5 pixel according to [S3 MRTD, 2011](#)) with a RMS performance below 0.3 pixel. Validation of the current Geometric Calibration, using Landsat ground control points on current datasets (Q1 2021) shows the following geolocation accuracy per camera:

Camera Module	Georeferencing Biases (pixels)	
	Across Track	Along Track
1	0.01	-0.02
2	0.01	-0.04
3	0.02	-0.05
4	0.03	-0.03
5	0.01	-0.07

The misregistration at the interfaces of each camera is below 0.2 pixel.

Spectral calibration information

- The OLCI-B spectral model is based on the pre-launch spectral characterisation. Spectral calibration acquisitions carried out so far have shown a very close agreement to the pre-launch characterization with small changes to the central wavelengths of max. 0.25 nm. Moreover, the calibrations show an excellent consistency across the spectral range and also with time. OLCI spectral response information and datasets are provided in a separate note ([S3 OLCI-B SRF, 2018](#)).

Radiometric calibration information

- Radiometric validation results demonstrate that OLCI-B provides measurements within the mission requirements of < 2% for the spectral range $\leq 900\text{nm}$ ([S3 MRTD, 2011](#)). OLCI-B radiometry is comparable to MERIS and by about 1-2% lower than OLCI-A (OLCI-A has a bright bias). Similarly to OLCI-A the 1020nm band is subject to a bright bias of about 4%.
- OLCI-B Radiometric Gain Model is based on the set of in-flight radiometric calibrations ending on 09/08/2020. It includes radiometric gain coefficients at a reference date (18/06/2018) and a long-term evolution model. The set of radiometric gain coefficients used to derive both the Reference Gains and the Evolution Model has been computed using up-to-date geometric and spectral calibration, instrument settings and the upgraded diffuser BRDF model based on in-flight data. Correction for diffuser ageing (browning) is now included. The Radiometric Model is continuously monitored against new Radiometric Calibration acquisitions.



Known product quality limitations

Common to S3A and S3B

Radiometric Calibration

- Anomalously low radiances occur in some bands for pixels at the edge of saturated areas, and the radiances do not correspond to geophysical expectations. The issue is present over bright clouds for both OLCI-A and OLCI-B instruments. All OLCI bands can be affected but for any single scene, if the issue occurs, it is limited to a few bands. The anomaly is described in a dedicated document ([S3MPC.ACR.MEM.087, 2020](#)).
- Vertical striping at the first 100 pixels at camera interfaces in bands O19 and O20, known as periodic noise, is now mitigated by using the most recent dark signal measurements. Residual periodic noise may be occasionally present.
- Single anomalous pixels, in particular in the region of the South Atlantic Anomaly, may occur due to prompt particle events.

Straylight

- Verification and update of the OLCI straylight correction performance is ongoing.

Flags

- Accuracy of OLCI L1B product flags is under assessment. No issue has been identified so far.

Per-pixel uncertainty estimates

- Uncertainty estimates for OLCI radiances for all bands are not yet available in the products.

S3A

- Nothing specific to S3A

S3B

Spatial continuity at camera interfaces for OLCI-B L1 and L2 products

- Apparent spatial discontinuities of up to 4 pixels have been identified at the interface between cameras 2 and 3 of OLCI-B. The discontinuities have been verified as an artefact of the spatial regridding process where georeferencing of pixels still remains correct. In other words, specific spatial features may appear twice, on each side of the cameras interface in the image grid, but their respective geolocation is extremely close (ground distances below 1 meter in the verification test scenes). The root cause for this issue has been found as a shortcoming of the spatial regridding process and a correction is under study. This issue does not affect OLCI-A, even if it goes through the same spatial regridding process, because of a better continuity between adjacent cameras.



Products Availability

- Copernicus Open Access Hub (<https://scihub.copernicus.eu/>), NRT and NTC
- Copernicus Online Data Access (CODA) (<https://coda.eumetsat.int/>), NRT and NTC
- EUMETCast (<https://eoportal.eumetsat.int/>), NRT
- EUMETSAT Data Centre (<https://eoportal.eumetsat.int/>), NRT and NTC

Product	EUMETCast	ODA*	CODA	EUMETSAT Data Centre
L1 RR	NRT	NRT, NTC	NRT, NTC	NRT, NTC
L1 FR	NRT	NRT, NTC	NRT, NTC	NRT, NTC

* ODA is available only for Copernicus Services and S3VT users

Any other useful information

- For further details on OLCI L1B status and validation results, refer to S3 OLCI Cyclic Quality Reports available from <https://sentinels.copernicus.eu/web/sentinel/technical-guides/sentinel-3-olci/data-quality-reports>.

User Support

- Questions about OLCI products can be asked to the Sentinel-3 User Support desk at:
 - eosupport@copernicus.esa.int
 - 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>
- Sentinel-3 OLCI-A and OLCI-B spectral response functions (SRF), Sentinel 3 CalVal Team, S3-TN-ESA-OL-660, 2016
<https://sentinel.esa.int/web/sentinel/technical-guides/sentinel-3-olci/olci-instrument/spectral-response-function-data>
- OLCI anomalous spectral samples - user note, S3MPC.ACR.MEM.087, 2020
 - <https://www.eumetsat.int/media/47581>
- Product Data Format Specification – OLCI Level 1 Instrument Products, Ref: S3IPF.PDS.004.1, Issue: 2.2, Date: 09/10/2017
 - <https://sentinel.esa.int/web/sentinel/user-guides/sentinel-3-olci/document-library>
 - <https://www.eumetsat.int/media/38641>
- S3 OLCI Cyclic Quality Reports, Ref. S3MPC.ACR.PR, issued monthly, <https://sentinels.copernicus.eu/web/sentinel/technical-guides/sentinel-3-olci/data-quality-reports>
- S3 OLCI Land User Handbook, <https://sentinel.esa.int/documents/247904/4598066/Sentinel-3-OLCI-Land-Handbook.pdf>
- S3 OLCI Marine User Handbook, <https://www.eumetsat.int/media/45743>

Static ADFs updated

S3A

- S3A_OL_1_EO_AX_20160425T103700_20991231T235959_20210309T120000_____MPC_O_AL_010.SEN3
- S3A_OL_1_PRG_AX_20160425T095210_20991231T235959_20210309T120000_____MPC_O_AL_004.SEN3
- S3A_OL_1_RAC_AX_20160425T103700_20991231T235959_20210309T120000_____MPC_O_AL_006.SEN3
- S3A_OL_1_SPC_AX_20160425T103700_20991231T235959_20210309T120000_____MPC_O_AL_008.SEN3

S3B

- S3B_OL_1_EO_AX_20180618T000000_20991231T235959_20210309T120000_____MPC_O_AL_004.SEN3
- S3B_OL_1_PRG_AX_20180618T000000_20991231T235959_20210309T120000_____MPC_O_AL_004.SEN3
- S3B_OL_1_RAC_AX_20180425T000000_20991231T235959_20210309T120000_____MPC_O_AL_003.SEN3
- S3B_OL_1_SPC_AX_20180425T000000_20991231T235959_20210309T120000_____MPC_O_AL_003.SEN3

End of the Product Notice