



## S3 Product Notice – OLCI

<b>Mission</b>	S3A & S3B	
<b>Sensor</b>	OLCI	
<b>Product</b>	<ul style="list-style-type: none"> <li>• OLCI-A and OLCI-B Operations: <ul style="list-style-type: none"> <li>○ OL_1_EFR in NRT and NTC</li> <li>○ OL_1_ERR in NRT and NTC</li> </ul> </li> <li>• OLCI-B reprocessed time series: <ul style="list-style-type: none"> <li>○ OL_1_EFR and OL_1_ERR in NTC</li> <li>○ Reprocessing time period 15 May 2018 – 29 October 2019</li> </ul> </li> </ul>	
<b>Product Notice ID</b>	S3.PN-OLCI-L1.07	EUM/OPS-SEN3/DOC/19/1128998
<b>Issue/Rev Date</b>	27/05/2020	
<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 Product Notice addresses both Sentinel-3A and -3B Ocean and Land Colour Imager (OLCI-A and OLCI-B) Level-1B processing baselines deployed on 29/10/2019 and used for OLCI-B reprocessing. It is applicable to Near Real Time (NRT) and Non-Time Critical (NTC) timeliness in Operations and reprocessed OLCI-B NTC.

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 main change to the previous processing baseline is related to the improvement in OLCI-B geometric performances and the update of calibration gains and dark currents for both OLCI-A and OLCI-B.



Processing Baselines		
	S3A	S3B
<b>Processing Baseline</b>	<ul style="list-style-type: none"> <li>Processing Baseline: 2.58</li> </ul>	<ul style="list-style-type: none"> <li>Processing Baseline: 1.30</li> </ul>
<b>IPFs version</b>	<ul style="list-style-type: none"> <li>OL_1 IPF version: 06.08</li> </ul>	<ul style="list-style-type: none"> <li>OL_1 IPF version: 06.08</li> </ul>
	<ul style="list-style-type: none"> <li>PUG version: 03.35</li> </ul>	<ul style="list-style-type: none"> <li>PUG version: 03.35</li> </ul>

Operational Deployment Dates of the Processing Baseline		
IPF	IPF / PB Version	Into operation since
S3A OL1	06.08 / 2.58	<p><b>Land Centres:</b></p> <p>NRT mode: 29/10/2019 08:35 UTC            NTC mode: 29/10/2019 08:35 UTC</p> <p><b>Marine Centre:</b></p> <p>NRT mode: 29/10/2019 08:35 UTC            NTC mode: 29/10/2019 08:35 UTC</p>
S3B OL1	06.08 / 1.30	<p><b>Land Centres:</b></p> <p>NRT mode: 29/10/2019 08:35 UTC            NTC mode: 29/10/2019 08:35 UTC</p> <p><b>Marine Centre:</b></p> <p>NRT mode: 29/10/2019 08:35 UTC            NTC mode: 29/10/2019 08:35 UTC</p>
PUG	03.35	



## Status of the Processing Baselines

### S3A

The corresponding processing baseline for Sentinel-3A OLCI Level-1B products is v2.58. This baseline was deployed on 29/10/2019 at the Land and Marine Centres.

The major changes from the last processing baseline v2.55 are the following:

- Update of the Dark Correction Tables to minimize Periodic Noise impact for OLCI-A.
- Update of the Radiometric Gain Model to correct for the drift of all channels and most notably for Oa01.

The quality status of this baseline products 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 around 0.1 pixel. Validation of the Geometric Calibration, using Landsat ground control points on current datasets (dated on 7 October 2019) shows the following geolocation accuracy per camera:

Camera Module	Georeferencing Biases (pixels)	
	Across Track	Along Track
1	0.0	-0.02
2	0.0	-0.01
3	0.0	-0.05
4	0.0	-0.05
5	0.0	0.0

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  $\leq 900$  nm, 5%  $> 900$  nm, [S3 MRTD](#), 2011).
- OLCI-A Radiometric Gain Model is based on the set of in-flight radiometric calibrations ending on 28/08/2019. 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 reprocessing baseline for Sentinel-3B OLCI Level-1B products is v1.30. This baseline was deployed operationally on 29/10/2019 at the Land and Marine Centres and is used in OLCI-B full mission reprocessing up to that deployment date.

The major change from the last processing baseline v1.27 is the following:

- Update of the Geometric Calibration Models (alignment between instrument and S3-B platform) to consistently improve georeferencing accuracy across the mission.
- Update of the Dark Correction Tables to minimize Periodic Noise impact for OLCI-B.
- Update of the Radiometric Gain Model to introduce a consistent instrument evolution across the mission and to correct for the drift of all channels and most notably for Oa01.

The quality status of this baseline products 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 around 0.2 pixel over the whole reprocessing validation dataset (max daily RMS is 0.29). Validation of the updated Geometric Calibration, using



Landsat ground control points on 32 days of reprocessed data between 15 May 2018 and 4 October 2019 shows the following geolocation accuracy per camera:

Camera Module	Georeferencing Biases (pixels) time average and [min,max]	
	Across Track	Along Track
1	0.0 [-0.07, 0.13]	-0.02 [-0.15, 0.09]
2	0.01 [-0.06, 0.13]	0.0 [-0.09, 0.09]
3	0.01 [-0.06, 0.13]	-0.02 [-0.07, 0.06]
4	0.02 [-0.05, 0.13]	-0.01 [-0.06, 0.05]
5	0.01 [-0.05, 0.12]	-0.01 [-0.07, 0.09]

Note that all the maximum Across-track biases around 0.13 pixel are obtained for the same day.

The misregistration at the interfaces of each camera is below 0.1 pixel, except between camera 1 and camera 2 where the across-track offset reaches 0.2 pixels around Fall 2018.

### 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 have been derived in two versions, each covering specific instrument programming (before and after fine tuning of the electronic gains). The early mission one is based on in-flight calibrations acquired from 08/05/2018 to 27/08/2018, the second is based on the set of in-flight radiometric calibrations from 27/08/2018 to 02/10/2019. The datasets used to derive the gain models included a large temporal overlap to ensure the best continuity between the two models. Each RGM includes radiometric gain coefficients at a reference date (08/05/2018 and 18/06/2018, respectively) and a long-term evolution model. The set of radiometric gain coefficients used to derive both the Reference Gains and the Evolution Models 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 included.

**Known product quality limitations**

**Common to S3A and S3B**

**Radiometric Calibration**

- Vertical striping at the first 100 pixels at camera interfaces can be observed in bands O19 and O20. The effect is known as periodic noise. A correction for this noise is under investigation.
- Single anomalous pixels, in particular in the region of the South Atlantic Anomaly, may occur due to prompt particle events.

**Straylight**

- Verification 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**

- Nothing specific to S3B



**Products Availability**

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

Product	SciHub	EUMETCast	ODA*	CODA	EUMETSAT Data Centre
<b>L1 RR</b>	NRT, NTC	NRT	NRT, NTC	NRT, NTC	NRT, NTC
<b>L1 FR</b>	NRT, NTC	NRT	NRT, NTC	NRT, NTC	NRT, NTC

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

**OLCI-B reprocessed mission time series (15 May 2018 – 29 October 2019):**

- Copernicus Open Access Hub (<https://scihub.copernicus.eu/>)
- Copernicus Online Data Access for Reprocessing (<https://codarep.eumetsat.int/>)

Product	SciHub	CODArep
<b>L1 RR</b>	NTC	NTC
<b>L1 FR</b>	NTC	NTC

**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](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>
- Sentinel-3 OLCI-A and OLCI-B spectral response functions (SRF), Sentinel 3 CalVal Team, S3-TN-ESA-OL-660, 2016, <https://earth.esa.int/web/sentinel/technical-guides/sentinel-3-olci/olci-instrument/spectral-response-function-data>
- 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/website/home/Data/TechnicalDocuments/index.html>
- 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>

### Static ADFs updated

#### S3A

- S3A\_OL\_1\_CAL\_AX\_20190927T171839\_20991231T235959\_20191009T120000\_\_\_\_\_MPC\_O\_AL\_022.SEN3
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#### S3B

- S3B\_OL\_1\_CAL\_AX\_20191007T204320\_20991231T235959\_20191009T120000\_\_\_\_\_MPC\_O\_AL\_008.SEN3
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**End of the Product Notice**