



S3 Product Notice – OLCI

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|--------------------------|--|-----------------------------|
| Mission | S3A & S3B | |
| Sensor | OLCI | |
| Product | <ul style="list-style-type: none"> • OL_1_EFR in NRT and NTC • OL_1_ERR in NRT and NTC | |
| Product Notice ID | S3.PN-OLCI-L1.05 | EUM/OPS-SEN3/DOC/19/1083411 |
| Issue/Rev Date | 21/05/2019 | |
| 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 11/04/2019. It 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 main change to the previous release of this product notice is related to the revision of OLCI-A and OLCI-B radiometric evolution modelling and to geometric re-calibration of OLCI-B.



Processing Baselines

| | S3A | S3B |
|----------------------------|---|---|
| Processing Baseline | <ul style="list-style-type: none"> Processing Baseline: 2.48 | <ul style="list-style-type: none"> Processing Baseline: 1.20 |
| IPFs version | <ul style="list-style-type: none"> OL_1 IPF version: 06.08 | <ul style="list-style-type: none"> OL_1 IPF version: 06.08 |
| | <ul style="list-style-type: none"> PUG version: 03.35 | <ul style="list-style-type: none"> PUG version: 03.35 |

Current Operational Processing Baselines

| IPF | IPF / PB Version | Into operation since |
|---------|------------------|--|
| S3A OL1 | 06.08 / 2.48 | <p>Land Centres:</p> <p>NRT mode: 11/04/2019 13:01 UTC NTC mode: 11/04/2019 13:01 UTC</p> <p>Marine Centre:</p> <p>NRT mode: 11/04/2019 13:01 UTC NTC mode: 11/04/2019 13:01 UTC</p> |
| S3B OL1 | 06.08 / 1.20 | <p>Land Centres:</p> <p>NRT mode: 11/04/2019 13:01 UTC NTC mode: 11/04/2019 13:01 UTC</p> <p>Marine Centre:</p> <p>NRT mode: 11/04/2019 13:01 UTC NTC mode: 11/04/2019 13:01 UTC</p> |
| PUG | 03.35 | |



Status of the Processing Baselines

S3A

The current processing baseline for Sentinel-3A OLCI Level-1B products is v2.48. The baseline was deployed in the processing centres on 11/04/2019 at the Land and Marine Centres. The status of the baseline is as follows:

The major changes from the last processing baseline v2.42 are the following:

- Update of the Radiometric Gain Model: the OLCI-A RGM, including a long-term instrument sensitivity evolution term, has been revised using the extended Radiometric Calibration dataset available at end of January. It corrects for a small deviation of the previous model from observed trends, in particular for channel Oa01. Estimated step change from the previous RGM is below 0.2% for all channels except at 400nm where it can reach 0.3% (camera 4) and 0.5% (camera 3).
- Update of the Dark Correction Tables to minimize Periodic Noise impact.

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 0.3 pixel. Validation of the updated Geometric Calibration, using Landsat ground control points on Non Time Critical data since 14 March 2018 shows the following geolocation accuracy per camera:

| Camera Module | Georeferencing Biases (pixels) | |
|---------------|--------------------------------|-------------|
| | Across Track | Along Track |
| 1 | -0.07 | -0.12 |
| 2 | -0.04 | -0.09 |
| 3 | -0.03 | -0.24 |
| 4 | -0.02 | -0.11 |
| 5 | -0.04 | -0.08 |

It must be noted that the Along-Track bias of camera 3 is degraded with respect to other cameras performance due to an apparent small drift that is not fully captured by the last geometric calibration.



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 is comparable with its heritage instrument, MERIS, and that OLCI 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 entire set of in-flight radiometric calibrations. 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 and instrument settings and most of all 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 v1.20. The baseline was deployed in the processing centres on 11/04/2019 at the Land and Marine Centres.

The major changes from the last processing baseline v1.15 are the following:

- Update of the Radiometric Gain Model: OLCI radiometric calibration is now based on a self-standing Radiometric Model including a long-term instrument sensitivity evolution term. Estimated step change from the previous RGM is up to $\pm 0.5\%$.
- Update of the Dark Correction Tables to minimize Periodic Noise impact
- Correction of geolocation drift observed in the past months



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 0.3 pixel. Validation of the updated Geometric Calibration, using Landsat ground control points on Non Time Critical data since 12 April 2019 shows the following geolocation accuracy per camera:

| Camera Module | Georeferencing Biases (pixels) | |
|---------------|--------------------------------|-------------|
| | Across Track | Along Track |
| 1 | -0.02 | -0.09 |
| 2 | -0.01 | -0.06 |
| 3 | -0.03 | 0.01 |
| 4 | -0.02 | 0.02 |
| 5 | 0.00 | 0.03 |

It must be noted that already noted Along-Track drifts may still be present for at least cameras 1 and 2 and corresponding performances may degrade in a near future. Further monitoring will allow to better assess the impact of the last Geometric Calibration (introduced on the 11/04/2019) and take appropriate actions if required.

- 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 now based on the entire set of in-flight radiometric calibrations. 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 not yet included. The Radiometric Model is continuously monitored against new Radiometric Calibration acquisitions.

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

Geometric accuracy

- A slight degradation of the geolocation accuracy is observed at the very edge of camera 1 towards West



Products Availability

- Copernicus Open Access Hub (<https://scihub.copernicus.eu/>), NRT and NTC
- Copernicus Online Data Access (<https://codam.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

** CODA is Copernicus Online Data Access and is available to all users

Any other useful information

- None

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 spectral response functions (SRF), Sentinel 3 CalVal Team, S3-TN-ESA-OL-660, 2016: <https://sentinels.copernicus.eu/documents/247904/2700436/Sentinel-3-OLCI-A-spectral-response-functions>
- Sentinel-3 OLCI-B spectral response functions from pre-flight characterisation, Sentinel 3 CalVal Team, <https://sentinels.copernicus.eu/documents/247904/2700436/Sentinel-3-OLCI-B-spectral-response-functions>
- 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>

Static ADFs updated

S3A

- S3A_OL_1_CAL_AX_20190214T161447_20991231T235959_20190320T120000_____MPC_O_AL_020.SEN3
- S3A_OL_1_INS_AX_20160216T000000_20991231T235959_20190320T120000_____MPC_O_AL_006.SEN3
- S3A_OL_1_RAC_AX_20160425T103700_20991231T235959_20190320T120000_____MPC_O_AL_005.SEN3
- S3A_OL_1_SPC_AX_20160425T103700_20991231T235959_20190320T120000_____MPC_O_AL_007.SEN3

S3B

- S3B_OL_1_CAL_AX_20190317T203033_20991231T235959_20190320T120000_____MPC_O_AL_006.SEN3
- S3B_OL_1_INS_AX_20180618T000147_20991231T235959_20190320T120000_____MPC_O_AL_004.SEN3
- S3B_OL_1_RAC_AX_20180425T000000_20991231T235959_20190320T120000_____MPC_O_AL_002.SEN3
- S3B_OL_1_SPC_AX_20180425T000000_20991231T235959_20190320T120000_____MPC_O_AL_002.SEN3

End of the Product Notice