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S3 Product Notice – OLCI

Mission		S3-A
Sensor		OLCI
Product		<ul style="list-style-type: none">• OL_2_LFR in NRT and NTC• OL_2_LRR in NRT and NTC
Product Notice ID		S3A.PN-OLCI-L2L.02
Issue/Rev Date		06/11/2017
Version		1.0
Preparation		This Product Notice was prepared by the S3 Mission Performance Centre and by ESA experts
Approval		ESA Mission Management

Summary

This is a Product Notice for the public release of Sentinel-3 Ocean and Land Colour Instrument (OLCI) Level-2 products at Near Real Time (NRT) and Non Time Critical (NTC) timeliness.

The Notice describes the OLCI current processing baseline, product and quality limitations, and product availability status.



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Processing Baseline

Processing Baseline	<ul style="list-style-type: none">IPF Processing Baseline: 2.23
IPFs version	<ul style="list-style-type: none">OL_1 IPF version: 06.07OL_2 IPF version: 06.11PUG version: 03.30

Current Operational Processing Baseline

IPF	IPF Version	In operation since (creation time)
OL1	06.07	NRT mode: 05/07/2017 13:00 UTC NTC mode: 05/07/2017 12:50 UTC
OL2	06.11	NRT mode: 11/10/2017 08 :53 UTC NTC mode: 11/10/2017 08 :15 UTC
PUG	03.30	NRT mode: 23/10/2017 08:38 UTC NTC mode: 23/10/2017 08:49 UTC



Status of the Processing Baseline

The current Processing Baseline for Sentinel-3A OLCI Level-2 Land products is v2.16 as deployed in the Land Centre on 5 July 2017. The summary of Level 1 product quality is first discussed with impact on Level 2 products (for more details, please refer to OLCI Level-1 Product Notice for the Processing Baseline v2.16). Level 2 product quality status is described in the following section.

Level 1 Product Summary:

- **Radiometric Calibration**

- OLCI absolute radiometry has a positive bias of up to 2 to 3 percent, throughout all bands, with the exception of band Oa21 (1020nm) at about 6 percent. Actions are in place to achieve OLCI radiometric compliancy (2% absolute accuracy < 900 nm and 5% absolute accuracy > 900 nm, [S3 MRTD, 2011](#)).
- OLCI radiometric temporal behaviour is stable. OLCI radiometric evolution is modelled using radiometric calibrations with the nominal solar diffuser since April 2016. The accurate evolution model has been developed using new OLCI solar diffuser relative Bidirectional Reflectance. The accurate evolution model has been refined using the latest Radiometric Calibration data and now accounts for diffuser ageing.

- **Spectral Calibration**

- OLCI spectral model accuracy meets the mission requirements ([S3 MRTD, 2011](#)).
- OLCI spectral response information is provided in a separate note ([S3 OLCI-A SRF, 2016](#)). OLCI SRF datasets are given in section 7 of this document.

- **Geometric Calibration**

- OLCI geolocation accuracy meets the mission requirements in terms of global RMS value (< 0.5 pixel RMS according to [S3 MRTD, 2011](#)). Monitoring using Landsat ground control points shows that the geolocation accuracy varies per camera. The current geometric performance per camera is given below:

Camera Module	Across Track Pixel Bias	Along Track Pixel Bias
1	-0.37	-0.25
2	-0.36	-0.18
3	-0.31	-0.55
4	-0.29	-0.11
5	-0.27	-0.08

Positive/Negative corresponds to East/West for ACT and North/South for ALT. Camera 3 along-track performance has slightly exceeded the required accuracy and a recalibration is currently under analysis.



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Level 2 Product Summary:

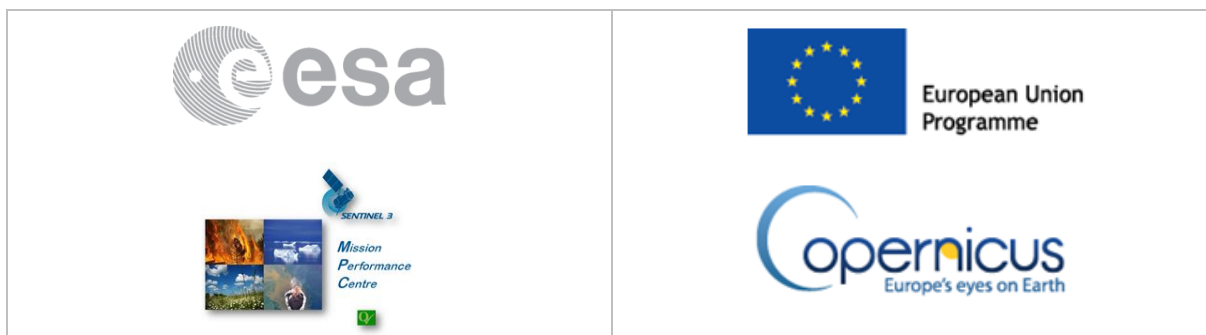
• **Pixel classification and flagging**

- OLCI pixel classification, particularly cloud flagging, has been significantly improved since the first Level 2 land data by integrating a neural net trained with manually classified pixels and by revising the pixel classification logic. In general, the cloud flagging is clear sky conservative.
- For building temporal or spatial synthesis, or working in unsupervised mode, it is recommended that the users exclude pixels which are flagged by at least one of the following flags, to exclude unreliable pixels for the individual products. All flags are available in the Level 2 product:
 - CLOUD
 - CLOUD_AMBIGUOUS
 - CLOUD_MARGIN
 - SNOW_ICE
 - For OCTI: OCTI_fail or LQSF_OTCI_CLASS_CLSN
 - For OGVI: OGVI_fail

Vegetation biophysical products

The core land product includes two vegetation biophysical products providing continuity of MERIS products:

- **OLCI Global Vegetation Index (OGVI):** providing the Fraction of Absorbed Photosynthetically Active Radiation (FAPAR); this bio-geophysical product is essential to study the plant photosynthetic process, and it is often used in diagnostic and predictive models computing primary productivity of the vegetation canopies. In addition, this parameter is also an input for the estimation of assimilation of CO₂ in vegetation. FAPAR ranges from 0-1.. Validation of the FAPAR is on-going: The seasonal changes were assessed with products derived from the same algorithm, i.e. providing instantaneous green FAPAR, using third party instrument (MODIS); the results show high correlation of 0.96 with rmse equal to 0.07. Seasonality comparisons against ground-based measurements, which provide only proxy values, have shown that OLCI FAPAR described well the seasonal changes over various types of crops and more ground-truth is under collection for validation purposes. Associated rectified channels over bright surface have been assessed over CEOS Libya site by looking at the temporal stability. Few remaining cloud shadows appear and a drop in both channels have been identified. Further studies will start to explain these changes.
- **OLCI Terrestrial Chlorophyll Index (OTCI):** providing indication of the content of Chlorophyll in the canopy, it is based on the heritage of MERIS Terrestrial Chlorophyll Index (MTCI). This index has several advantages: it is easily calculated and suitable for automation, it is strongly correlated with the Red-Edge Position (REP) and unlike REP, it is sensitive to high values of chlorophyll content.



Information on canopy chlorophyll content is an important indication of plant health and photosynthetic capacity. OTCI ranges from 1-6.5. Validation of the OTCI is ongoing but results of several study sites among which is a campaign in the New Forest (UK) have shown a correlation of ca. 0.9 between upscaled Canopy Chlorophyll Content CCC and near-contemporaneous OLCI L2 products, giving confidence in the product. More validation work with additional in situ data is currently performed.

- Several planned campaigns for 2017 will support the continuous validation efforts for both OLCI land products.
- Both products have additional layers associated with errors and uncertainty. Initial validation shows good performance of both products over a range of vegetation types.

Specific Updates for PB 2.23

- The behavior of the H2O transmittance function to average input reflectances across a sliding window has been extended to reflectances over inland waters.
- Over bright surfaces the OLCI L2 OGVI parameter has been set to 0 instead of previously NaN.

Known product quality limitations

- Residual Level 2 flag limitations
 - OLCI Level 2 flags may still show limitations despite significant improvements and validations, including the cloud flag set: CLOUD, CLOUD_AMBIGUOUS, CLOUD_MARGIN. Some examples:
 - clouds may be falsely detected as SNOW_ICE
 - camera boundaries may be noticeable

Products Availability

- Copernicus Open Access Hub (<https://scihub.copernicus.eu/>), NRT and NTC
- FTP server address login: login password: password
- Other



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Any other useful information

- None

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>
- Product Data Format Specification – OLCI Level 1 & 2 Instrument Products, Ref: S3IPF.PDS.002, Issue: 1.6, Date: 29/06/2015
<https://sentinel.esa.int/web/sentinel/user-guides/sentinel-3-olci/document-library>

User Support

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

Static L2 ADFs updated

- None

End of the Product Notice