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## S3 Product Notice – SLSTR

Product Information	
Mission	S3-A
Sensor	SLSTR
Product	<ul style="list-style-type: none"><li>Level 2 Land Surface Temperature</li></ul>
Product Details	
Product Notice ID	S3A.PN-SLSTR-L2L.02
Issue/Rev Date	05/07/2017
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 release of Sentinel-3 Sea and Land Surface Temperature Radiometer (SLSTR) Level-2 Land Surface Temperature product. The Notice describes the SLSTR current processing baseline relevant to Land Surface Temperature, product quality and limitations, and product availability.



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### Processing Baseline

<b>Processing Baseline</b>	<ul style="list-style-type: none"><li>IPF Processing Baseline: 2.17</li></ul>
<b>IPFs version</b>	<ul style="list-style-type: none"><li>SL_1 IPF version: 06.14</li><li>SL_2 IPF version: 06.12</li><li>PUG version: 03.29</li></ul>

### Current Operational Processing Baseline

<b>IPF</b>	<b>IPF Version</b>	<b>In operation since (creation date/time)</b>
SL1	06.14	NRT mode: 05/07/2017 13:15 UTC NTC mode: 05/07/2017 12:34 UTC
SL2	06.12	NRT mode: 05/07/2017 13:16 UTC NTC mode: 05/07/2017 12:42 UTC
PUG	03.29	NRT mode: 05/07/2017 13:07 UTC NTC mode: 05/07/2017 12:53 UTC



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## Status of the Processing Baseline

The current processing baseline for Sentinel-3A SLSTR Level-2 Land Surface Temperature is v2.16, deployed in the Land processing centres on 05/07/2017. New IPF and ADF versions include all changes since the last Processing Baseline (v2.13) previously deployed on 27/04/2017 for NTC and on 04/05/2017 for NRT.

The quality status of the baseline products is as follows:

### Level-2 LST Products

- **LST**
  - Validation and intercomparison activities show the Land Surface Temperature product, using the latest set of retrieval coefficients, to be performing in line with the accuracy stated in the mission requirements (< 1K as per S3\_MR\_420).
  - Fixes to the implementation of the retrieval algorithm and associated auxiliary data have been made. These include, i) the across-track interpolation; ii) correct assignment of biome and fractional vegetation cover; and iii) improvements to the noise estimation in the uncertainty budget.
- **Basic cloud screening**
  - Significant improvements have been made in the basic cloud screening over land during daytime with optimisation of the Visible Cloud Test.



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## Known product quality limitations

**Sentinel-3A SLSTR Level-1B** processing baseline v2.16 has the following known limitations:

### Geometric Calibration Model

- SLSTR oblique view geolocation and co-registration to the nadir view has been improved, currently estimated (using robust statistics) at  $-0.3 \pm 0.2$  pixel across-track and approximately  $-0.1 \pm 0.2$  in the along-track. The nadir view geolocation is currently estimated at approximately  $-0.1 \pm 0.6$  pixel along-track and  $-0.5 \pm 0.1$  pixel across-track.

### VIS/SWIR Radiometric Calibration Information

- Analysis performed by the MPC shows that the radiometric calibration of S1-S3 channels is within 3% of the corresponding channels on OLCI. Analysis for S5 and S6 show that there is a discrepancy of approximately 14% and 20% respectively

### S7, S8, S9 co-registration

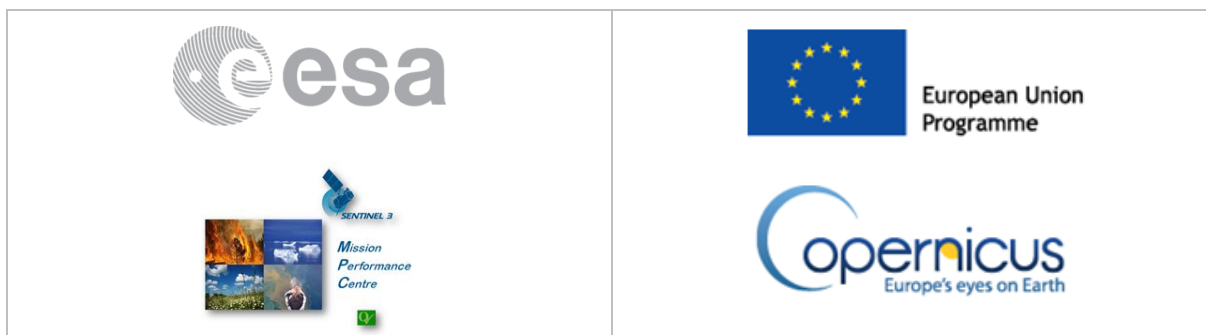
- A small sub-pixel miss-alignment has been observed between S7 and co-registered S8/S9 pixels.

### Fire Channel Co-Registration

- A mis-registration between the S7 and F1 channels has been observed. This is due to the specific geometry of the F1 detector, which is designed to be sensitive to high radiances needed for fire detection. Investigations are on-going to determine the mis-alignment with a view to implementing a solution.

### Calibration issue for very cold (~200 K) measurements using channel S8.

- For very cold measurements (~200 K) using channel S8, it is important to note that the two detectors have slightly different lower limits to their dynamic range. Detector 1 reaches its lower limit before detector 0, and so the values of detector 1 can be flagged as "no\_signal" when detector 0 is still recording a signal. This produces a checkerboard pattern in very cold parts of the image. Based on intercomparison with IASI data, the nearby detector 0 measurements, although not flagged, give degraded values and should be used with caution. Investigation of this issue is on-going, in particular regarding the possibility to extend the S8 dynamic range to lower BT values.



### Differences between NRT and NTC products

- There are sporadic differences both in measurement and annotation data files between NRT and NTC products. Investigation is on-going to determine root cause and correction.

### Basic Cloud Screening

- Although significant improvements have been made towards resolving many of the issues with the cloud screening modules, the basic cloud screening does not yet perform optimally and areas of under-flagging and over-flagging remain. In particular, the following three tests are displaying issues, and are under further investigation and not taken into account in the summary\_cloud flag:
  - 1.6 small histogram tests
  - 2.25 small histogram tests
  - IR histogram tests

### Alignment of Tie-point grids and image grids

- The products provide information on two types of grid: the full resolution image grids and tie-point grids. The image grid contains the radiometric values and the precise latitude/longitude/altitude for each pixel at the channel resolution (0.5 km or 1 km) and for both earth views. Ancillary information that can be provided at lower spatial resolution (geometric solar and satellite angles, meteo information) are given on tie-point grids (1 km rows x 16 km columns). It should be noted that the tie-point grids are not perfectly aligned to the image grid in the along track direction. This means that there is a small offset between the image grid rows and the tie-point grid rows. This will result in small errors in the interpolation of data from the tie-point grid to the image grid. It is important to understand that the information on the tie-point grid does not require accurate geo-location (which is why they are on tie points).
- The across-track columns are aligned to the image grid although the number of tie point columns extends beyond the image grid.



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**Sentinel-3A SLSTR Level-2 LST processing baseline v2.16** has the following known limitations:

### Dynamic Range

- The lower end of the S8 dynamic range is currently between ~200 K, which means very cold clouds or the very coldest surfaces are outside this range resulting in areas of fill values in the Level-2 LST product. A proposal for changing the dynamic range to between ~183 K and ~343 K is being assessed. Further updates are therefore expected.

### Basic Cloud Screening

- One test of the “summary\_cloud” flag - the Fog/low stratus test, which is only performed at night, is causing substantial over-flagging for the land. It is however advised that the user still use the “summary\_cloud” since removal of the Fog/low stratus test results in significant under-flagging. Further investigation will confront this issue. A future evolution would likely focus on adaption at the biome level.

### LST Uncertainty

- The LST theoretical uncertainties are noise-limited at present and require evolution of the algorithm. The latest knowledge of LST uncertainties is not included in the existing model and updates are expected in the future.
- The user is advised to consider the following uncertainties, banded by atmosphere type, as a more representative upper estimate:
  - 0.8K for polar regions
  - 1.5K for mid-latitudes
  - 2K for equatorial latitudes

## 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

### User Support

- Questions about SLSTR products can be ask to the Sentinel-3 User Support desk at:
  - [eosupport@copernicus.esa.int](mailto:eosupport@copernicus.esa.int)

### References

- SLSTR L1 Product Notice, ref. S3A.PN.SLSTR-L1.01, dated on 27/04/2017
- Product Data Format Specification – SLSTR 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-slstr/document-library>



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## Static ADFs

- S3A\_SL\_2\_PCP\_AX\_20160216T000000\_20991231T235959\_20170505T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SL\_2\_D2\_CAX\_20160216T000000\_20991231T235959\_20170116T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SL\_2\_D3\_CAX\_20160216T000000\_20991231T235959\_20170116T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SL\_2\_N2\_CAX\_20160216T000000\_20991231T235959\_20170116T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SL\_2\_N3\_CAX\_20160216T000000\_20991231T235959\_20170116T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SL\_2\_N3RCAX\_20160216T000000\_20991231T235959\_20170116T120000\_\_\_\_\_MPC\_O\_AL\_003.SEN3
- S3A\_SL\_2\_F1N\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_S7N\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_S7O\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_S8N\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_S8O\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_S9N\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_S9O\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_SDI2AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_SDI3AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_SSESAX\_20000101T000000\_20991231T235959\_20160721T120000\_\_\_\_\_MPC\_O\_AL\_002.SEN3
- S3\_SL\_2\_SST\_AX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3A\_SL\_2\_LSTCAX\_20160216T000000\_20991231T235959\_20161125T120000\_\_\_\_\_MPC\_O\_AL\_002.SEN3
- S3A\_SL\_2\_LSTEAX\_20160216T000000\_20991231T235959\_20170116T120000\_\_\_\_\_MPC\_O\_AL\_002.SEN3
- S3\_SL\_2\_LSTBAX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3\_SL\_2\_LSTVAX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3
- S3\_SL\_2\_LSTWAX\_20000101T000000\_20991231T235959\_20151214T120000\_\_\_\_\_MPC\_O\_AL\_001.SEN3

**End of the Product Notice**