SENTINEL-3 SLSTR MONITORING AT EUMETSAT – THE PLAN

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 # 6 Group B

1. Background (concept and need of a monitor)

- The concept is inspired by the **NOAA** SST Quality Monitor (**SQUAM**) (Dash *et al.*, 2010) with a focus on **Sentinel-3A SLSTR** SST product(s) under the **Copernicus** program. For benchmarking and development purposes, **EUMETSAT** operational Metop-B AVHRR and IASI SST products are also included. The idea has progressed from a past EUMETSAT Vis. Scientist activity of P. Dash, from NOAA to EUMETSAT.
- The S3 Monitor has an enhanced ability to perform both **Global** and **Regional** analyses. The choice of regions is flexible, but based on the OSI SAF classification, **15** oceanic regions of interest (**ROI**) have been pre-selected (Fig. 1).
- The system is **Scalable** and **Flexible** for testing of third party data streams, if required (*e.g.*, AMSR-2, HY-2A *etc*).
- The comparison of S3 SSTs with those from other advanced polar sensors, such as NPP VIIRS is out of the scope of this work and will be carried out under related validation activities (S3VT), where strategic partners have shown interest for a collaborative work, such as NOAA SQUAM.

Why an S3 SST Monitor is needed?

- Evaluate the performances of S3 SST products in quasi near-real time (NRT). These include: **SST algorithm**, **Retrieval domain**, **Cloud-detection**, unforeseen **Operational issues** (not listed), **Inter-comparison** with OSI SAF Metop-B SSTs, and **provide feedback** for further product improvement.

How the implementation will be made?

- Automated quasi-NRT, Global and Regional
- Basic analyses (visual inspection) in the state space (T_S) and in-depth analyses (visual and statistical) in the difference space, *i.e.*, deviations from a set of references: $\Delta T_S = T_S - T_{REF}$.
- The choice of T_{REF} (*in situ* and Level-4 fields):
  - Validation (*vs. in situ*); matches will be generated by Felyx (www.felyx.org) under a federated project with the OSI SAF. The space-time window needs to be determined using a sensitivity study (*cf.*, Dash *et al.*, 2015).
  - Monitoring and cross-consistency checks (*vs.* L4s: CMC 0.1°, OSTIA 0.05°, OSTIA monthly climate)

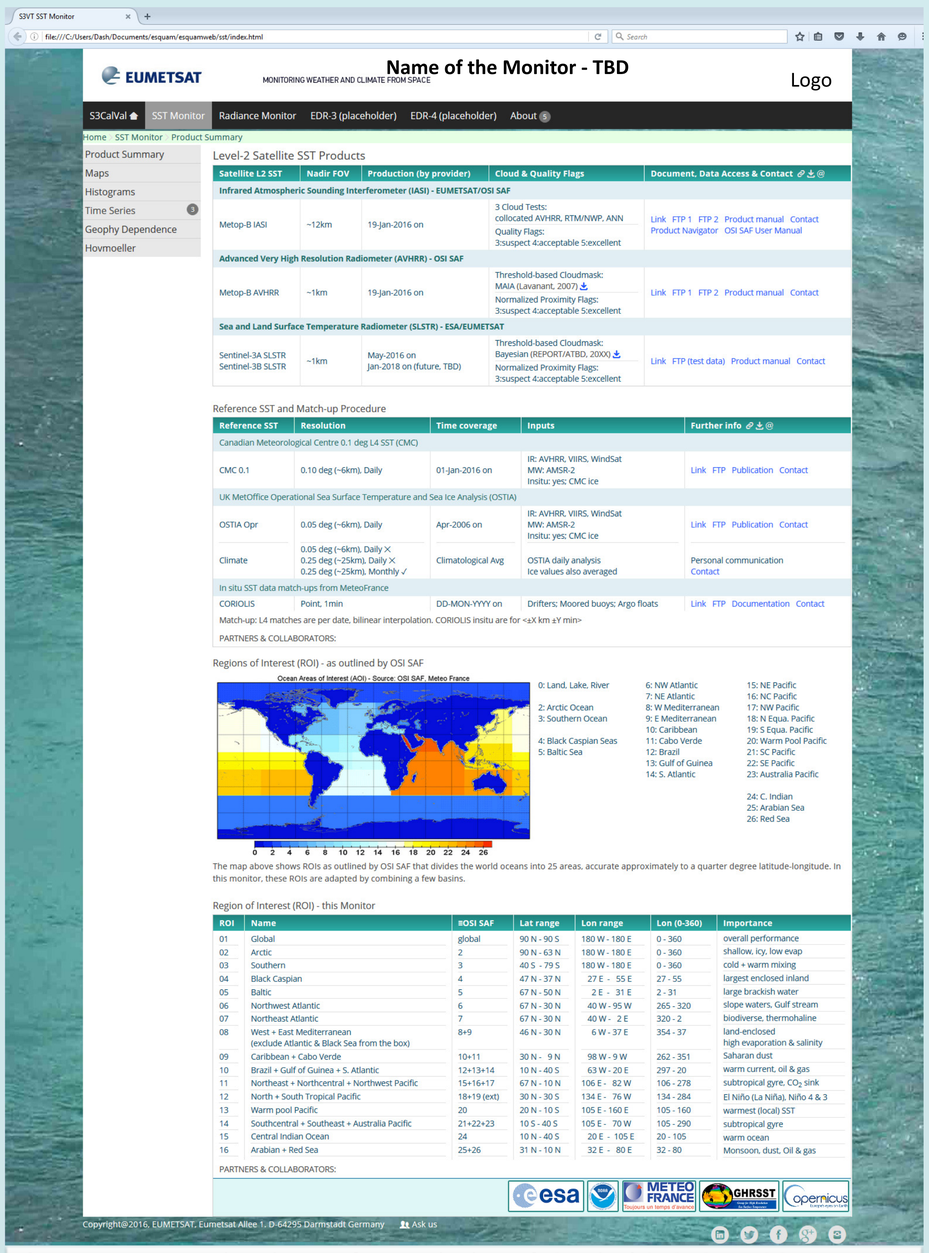


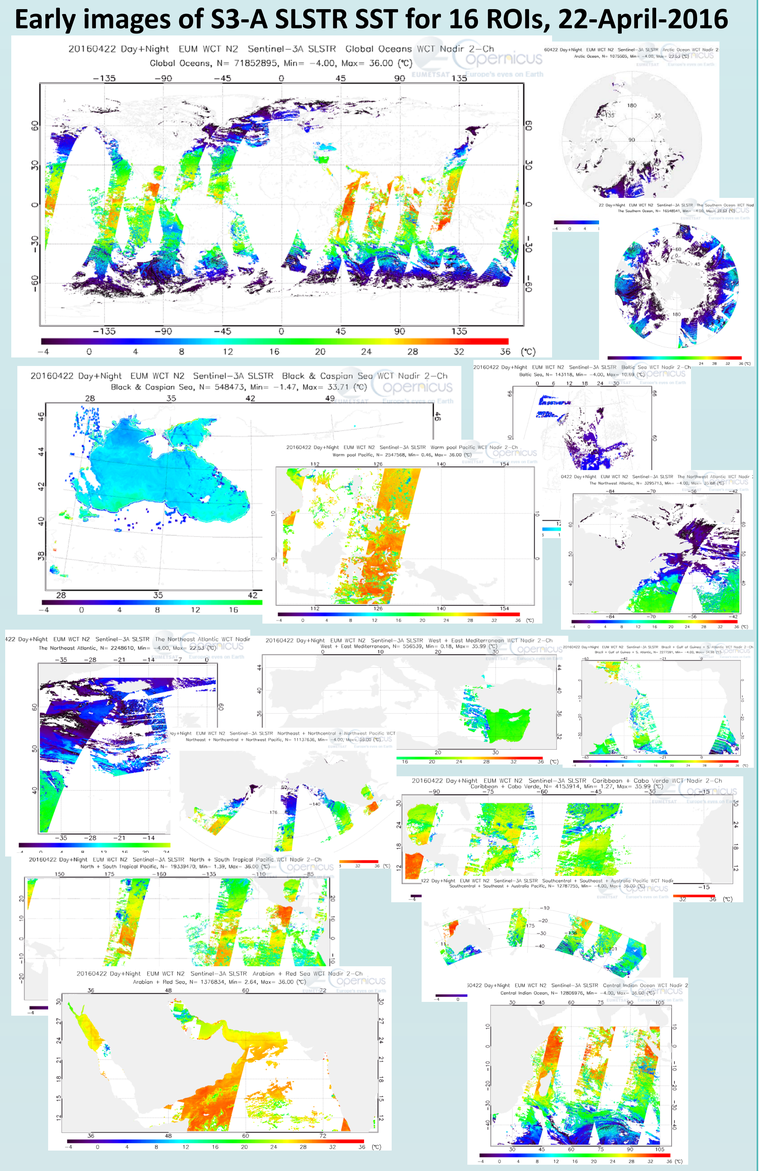
Fig. 1: A proposed webpage for monitoring of Sentinel-3 SLSTR SSTs. For the purposes of benchmarking, EUMETSAT operational Metop-B AVHRR and IASI SSTs will also be included. The concept is inspired by the NOAA SST Quality Monitor (SQUAM). For oceanographic analyses, monitoring will be performed for Global and 15 Regional areas of interest (ROI) as outlined above. Besides SST, the monitor is flexible enough to be adapted for other products (*e.g.*, Ocean Color), if deemed necessary, and placeholders are created (see top banner).

Wish to see a demo using IASI SST? Ask Us or attend the GHRSST CDR-TAG breakout meeting on 7-June-2016, 16:30 - 18:00 hours.

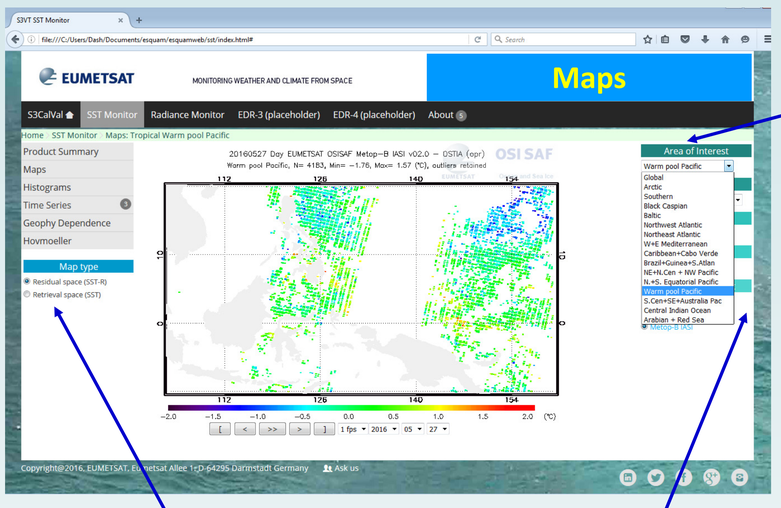
2. S3A SLSTR SST facts (related presentations)

- Sentinel-3A was launched on 16 Feb 2016. S3A SLSTR SST in GHRSST Data Format Specification (GDS) L2P format will be provided, as is available. See ***Poster-32*** by O'Carroll *et al.* (this meeting) for further details: "*Sentinel-3 marine centre and operations of SLSTR SST*". See also ***Posters 48*** and ***49*** (Tomazic *et al.*, this meeting).

Early images of S3-A SLSTR SST for 16 ROIs, 22-April-2016



3. Metop-B IASI SST in S3 Monitor (as a prototype)



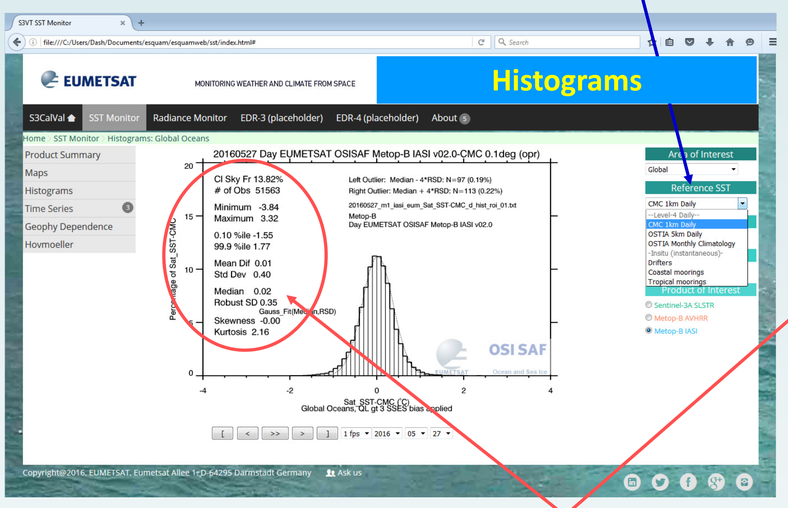
Region of Interest (ROI). A choice of 16 ROIs

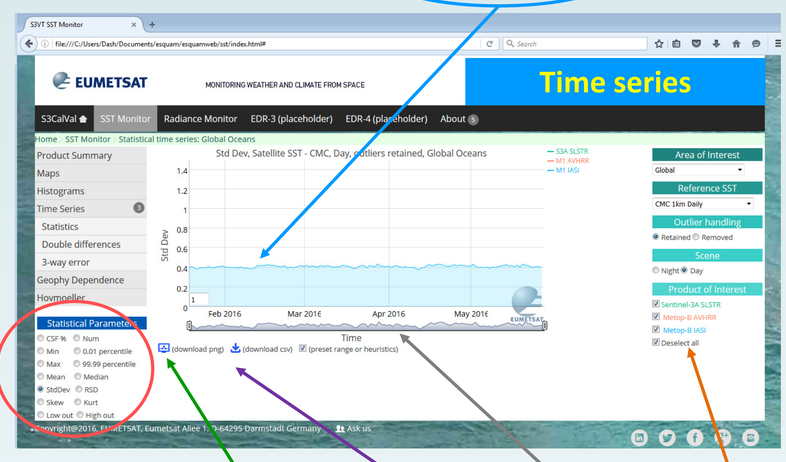
Reference SSTs (CMC, OSTIA, Climate, In situ)

Interactive plots

Maps are generated for both SST and SST differences

Separated by Day and Night, and outlier conditions





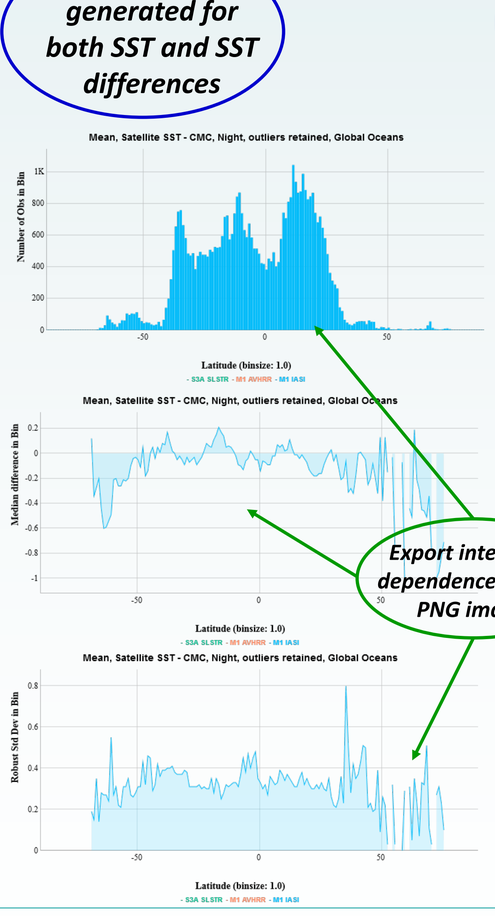
Exportable to PNG images

Download as CSV

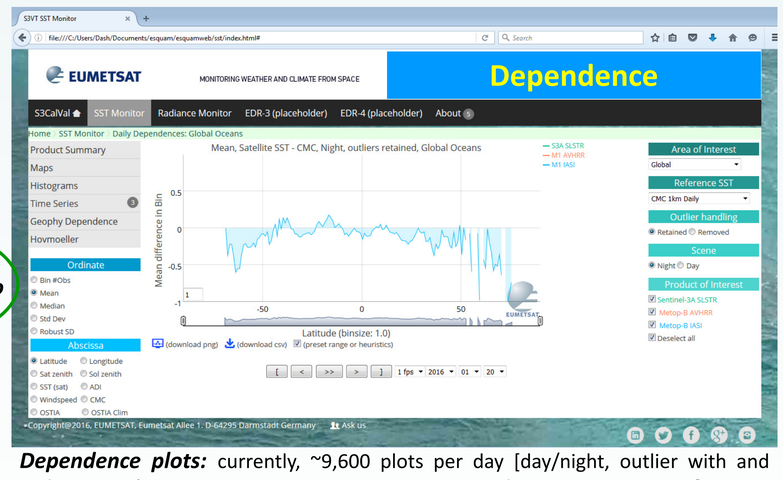
(Un)select products

Range slider

A range of statistical parameters for monitoring stability of SST and product inter-comparison; also assess the performance of cloud-mask algorithm and data coverage, e.g., clear-sky fraction percentage (CSF).



Export interactive dependence plots to PNG images



Dependence plots: currently, ~9,600 plots per day [day/night, outlier with and without, 3 references, 10 x-axis parameters, 5 statistical parameters, 16 ROIs]: 2 x 2 x 3 x 10 x 5 x 16 = 9600. With interactive plots, the data storage size is low (~3kb/plot).

4. Summary and outlook

- Work is in progress to set a comprehensive 360° view monitoring tool, for Copernicus Sentinel-3A SLSTR SST products. For comparing against a benchmark, two operational EUMETSAT products will be also included, Metop-B AVHRR and Metop-B IASI.
- Initial prototype with Metop-B IASI SST is being tested to develop the infrastructure.

References

- Dash, Ignatov, Kihai, Sapper (2010), The SST Quality Monitor (SQUAM) , J. of Atm. & Oceanic Tech, 27(11), 1899-1917.
- Dash, Ignatov, Kihai, Petrenko *et al*. (2015), Validation of SST against in situ data: effect of space-time collocation criteria, The 16th GHRSST Science Team Meeting, 20-24 July, 2015, ESA/ESTEC, The Netherlands.

Acknowledgments

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