Sci4MaST

Scientific Service Framework for Copernicus Sea and Sea-ice Surface Temperature Product Improvement and Cal/Val Tool Development and Evolution

E. Da Silva[1], *F. Poustomis[1], C. Merchant[2], O. Embury[2], N. McCarroll[2], S. Eastwood[3], S. Saux Picart[4], J-F. Piollé[5], E. Bodéré[5], D. Briand[5], C. André[5], J. L. Høyer[6], G. Dybkjær [6], C. Bearzotti[6], I. Karagali[6], P. Wind[6], V. Henningsen[6], M. Bertin[1], E. Munesa[1], M. Glinton[1], M. El Hajj[1], A. O'Carroll[7]*

1. NOVELTIS, France – 2.University of Reading, England – 3. Norwegian Meteorological Institute, Norway – 4. Météo France, France – 5. Ifremer, France – 6. The Danish Meteorological Institute, Denmark – 7. EUMETSAT, Germany

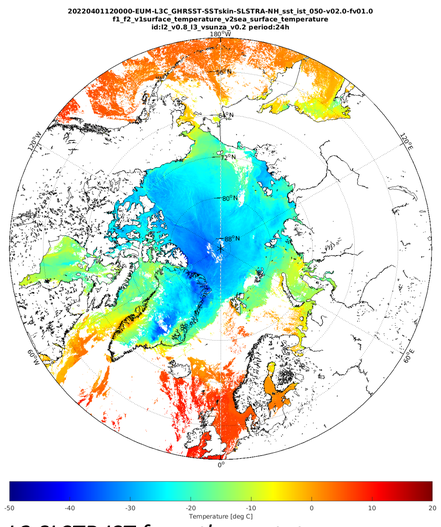
Corresponding author: elodie.dasilva@noveltis.fr

About

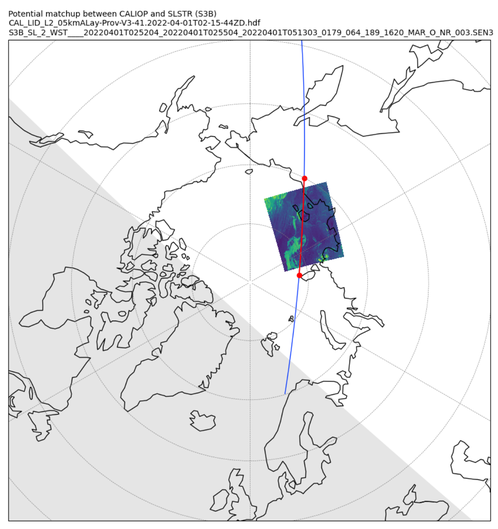
Sea surface and **sea-ice surface temperature** (**SST** and **IST**) are key essential climate variables to understand the **climate evolution** and essential inputs to **numerical weather prediction systems**. Space observations represent a major asset since they provide global coverage, with a better than daily revisit frequency.
EUMETSAT has major undertakings to contribute to a continuous delivery of high-quality surface temperature data over the Ocean and Sea Ice. In particular, in the frame of Copernicus, EUMETSAT is in charge of the distribution of well-calibrated **Sentinel-3 marine products**, including SST and IST derived from **SLSTR**.
EUMETSAT is also in charge of the technical management of the **GHRSST Project Office** (PO), that plays a major role by coordinating the activities and impulsing initiatives, to maximise the contributions of this expert group towards SST data improvement and valorisation.

Activity 1: Improvement to Sentinel-3 SLSTR sea and sea-ice surface temperature product quality

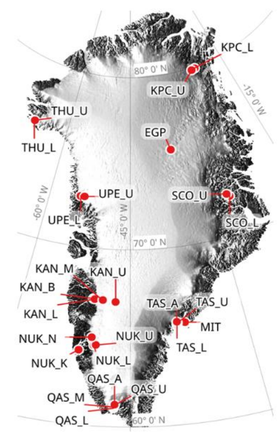
Thanks to its **two-point calibration** and **dual view** of a significant portion of its swath, SLSTR is a unique sensor for SST and IST retrievals that provides **exceptionally low-bias surface temperature estimates**. Actually, Ice Surface Temperature is a product that is less mature, but is gaining traction for understanding Arctic change and for NWP.
To support the definition and prototyping of the SLSTR Day-1 Sea Ice Surface Temperature product, this activity focuses on the improvement of the Cloud Mask (CMa) and Cloud Probability (CMa-prob) when applied to SLSTR L1B products for the retrieval of IST.
First part of the activity consists in proposing a **recommended configuration of** EUMETSAT Nowcasting Satellite Application Facility (NWC SAF) **Polar Processing Software (PPS)** to improve these CMa and Cma-prob products.
Second part of the activity consists in **identifying near real time in situ and satellite data** streams to **validate the PPS cloud mask** when applied to SLSTR L1B products, and other data streams to **validate the updated prototype SLSTR IST product** after the revisions of the cloud mask and quality level.



L3 SLSTR IST from the prototype processor with the current of-of box implementation of the PPS cloud mask (Cma)



Identification of potential matchup between CALIOP and SLSTR (S3B)



Map of Greenland with PROMICE automatic weather stations

Activity 2: Improvement to sea and sea-ice surface temperature monitoring and Cal/Val capability and tools

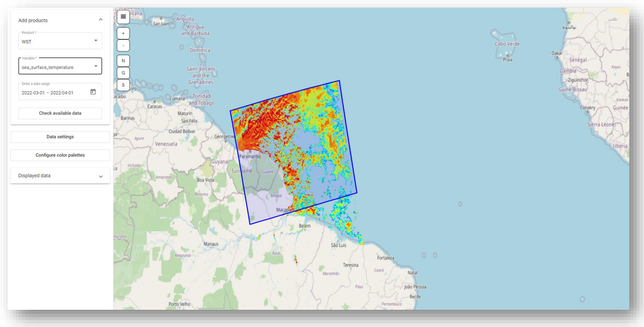
The core L2 SST Cal/Val activities focus on SST bias characterisation by comparison with in situ measurements, and and inter-satellite and inter-algorithm comparisons against level-4 (L4) SST analyses. To conduct these analyses, a range of different tools have been developed by EUMETSAT. This activity covers the **improvement of these tools and the developments of new tools.**

✓ Implementation of a **Multi-Mission Match-Up Database** (MMDB) production system to generate routinely or in backlog mode satellite to *in situ* match-ups:
- Based on **felyx**, a free software solution, whose aim is to provide EO data producers and users with a flexible tool to allow the quality and performance of data streams
- **Data downloader** with extended connectors
- **Job scheduling system** (jobard), supporting job array distributed processing on any platform (standalone PC, cloud, HPC)
- **Reporting** and **alerting** capabilities
- **Open source**

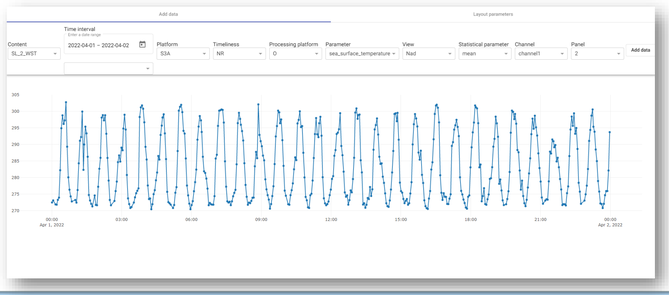
✓ Implementation and operation of the **GHRSST Central Data Discovery and Cataloguing Service** (GHRSST-DDC):

✓ Evolution of the EUMETSAT marine Surface Temperature Cal/Val tools to enable multi-level, mission and parameter inter-comparisons:

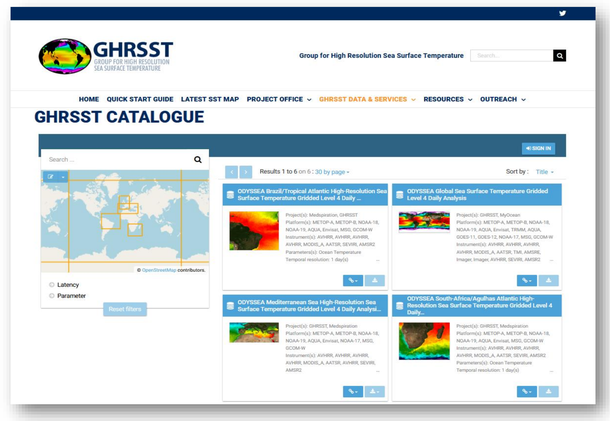
- **Interactive mapping/imaging tool prototype**



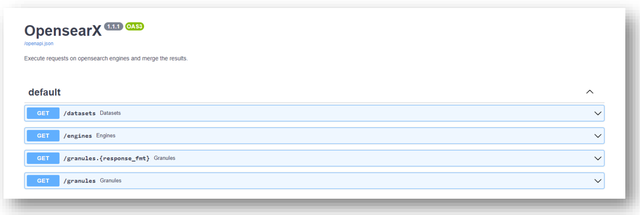
- **Interactive graphing/time series tool prototype**



- **Central catalogue** : https://www.ghrsst.org/ghrsst-data-services/ghrsst-catalogue/

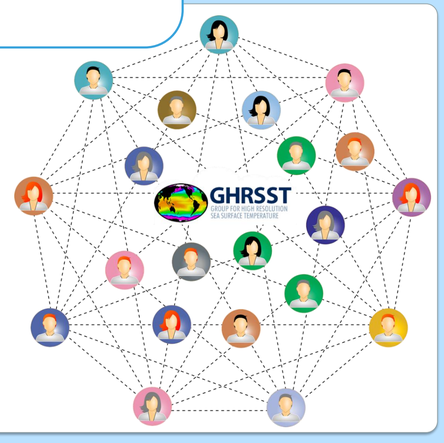


- **Inventory metasearch service**: https://opensearch-ghrsst.ifremer.fr



Activity 3: Project Office of the Group for High Resolution Sea-Surface Temperature (GHRSST PO)

Effective **coordination at international level** within the GHRSST science team to sustain scientific progress within SST area:
- Infrastructure and maintenance of the **GHRSST website**: https://www.ghrsst.org/
- Use of **social media** @ghrsst
- Management of **GHRSST documentation**: https://zenodo.org/communities/ghrsst
- **Capacity building** to promote the GHRSST activities (including at international events) and attract more members and product users
- Organisation of the **annual GHRSST science team meeting**
- **Administrative support** to the Advisory Council, Task Teams and Technical Working groups



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