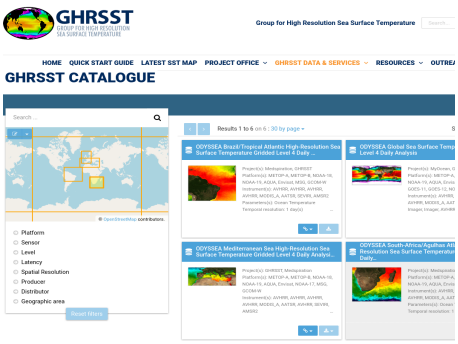
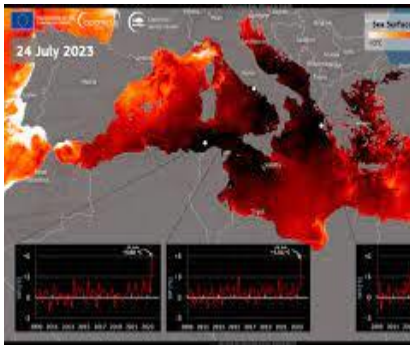
GHRSST
GROUP FOR HIGH RESOLUTION SEA SURFACE TEMPERATURE

Annual Report 2023





The GHRSST Project Office is funded by the European Union Copernicus Programme and is hosted by the Danish Meteorological Institute, Sankt Kjelds Plads 11, 2100 Copenhagen (DK).
The GHRSST website is performed in the frame of the Sci4MaST project led by NOVELTIS and funded by the European Union Copernicus Programme.

E-mail:
Chiara Bearzotti gpc@ghrsst.org
Erika Hayashi erh@ghrsst.org

Connect with us on social media
Website: https://www.ghrsst.org/

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Cover: Sea surface temperature anomaly in July 2023 (Data: E.U. Copernicus Marine Service Information)

Foreword

This annual report for 2023 provides a review of the key activities and results of the Group for High Resolution Sea Surface Temperature (GHRSST) international science team and of the activities involving sea surface temperature users.

GHRSST is an open international science team that promotes the application of satellites for monitoring Sea-Surface Temperature (SST) by enabling SST data producers, users and scientists to collaborate within an agreed framework of best practice. GHRSST provides a framework for SST data sharing, best practices for data processing and a forum for scientific dialogue, bringing SST to the user.

The GHRSST annual meeting, the 24th International Science Team meeting (GHRSST XXIV, GHRSST24), took place from 16 to 20 October 2023 online and in person in Ahmedabad (India), and was hosted by the Indian Space Research Organisation (ISRO) and Space Application Center (SAC). This yearly symposium for SST experts, scientists, data producers and users included 6 science sessions, two workshops with more than 86 presentations and posters and more than 150 participants attending online and in person. Highlights from the sessions included discussions on best practices for satellite-derived sea surface temperature data producers and on the challenges to be faced by GHRSST in the upcoming years.

During 2023, the GHRSST Project Office has been working on connecting the players of the GHRSST community by organising regular GHRSST Talks to share knowledge and understanding, foster the exchange and growth of the community and also welcome contributions from early career researchers. Moreover, efforts to stay connected with the GHRSST community via monthly reminders and updates across platforms with external audiences have been undertaken.

What is GHRSST?

The Group for High Resolution Sea Surface Temperature (GHRSST) is an **open international science group** that coordinates research and operational developments in satellite-derived sea surface temperature (SST) and promotes the application of satellites for monitoring SST by enabling SST data producers, users and scientists to collaborate within an agreed framework of best practices.

Governance

GHRSST comprises an elected International Science Team of researchers and operational practitioners. The Science Team comprises data production activities, scientific research and users. The Science Team is organised into Technical Advisory Groups (TAGs) focused on particular challenges and activities (https://www.ghrsst.org/about-ghrsst/organisation).
There are four TAGs within GHRSST:

- User Data and Services Technical Advisory Group (UDS-TAG)
- Climate Data Records Technical Advisory Group (CDR-TAG)
- Analysis and Intercomparison Technical Advisory Group (IC-TAG)
- Estimation and Validation Technical Advisory Group (EV-TAG)

Several Task Teams are initiated to address and work on identified issues and tasks within a set timeframe and to report to the GHRSST community on an annual basis on their level of progress.

Major stakeholders are represented in the GHRSST Advisory Council, which advises the GHRSST Science Team on its strategy. The GHRSST Project Office, located at the Danish Meteorological Institute and funded by the European Union Copernicus Programme, supports the day-to-day coordination and working of the GHRSST science team and community.

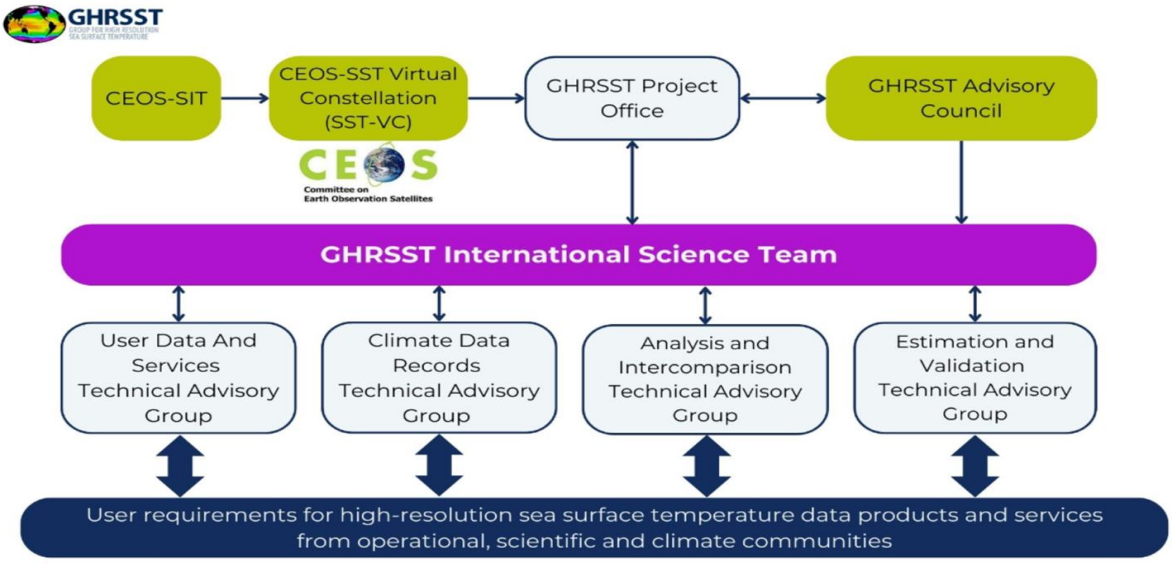


Figure 1: GHRSST governance structure

International collaboration

GHRSST comprises researchers and operational practitioners of SST from several worldwide institutes and agencies. These bodies are represented by the set of logos shown below. Participation in GHRSST is increasing as new groups join the GHRSST community.

Figure 2: GHRSST patrons and sponsors are worldwide institutes and agencies.

CEOS SST Virtual Constellation

GHRSST also acts as the Science Team for **the Committee on Earth Observation Satellites (CEOS) Virtual Constellation for Sea Surface Temperature (CEOS SST-VC).**

The Sea Surface Temperature Virtual Constellation (SST-VC) is a committee serving as the formal link between GHRSST and the broader CEOS community (https://ceos.org/).

CEOS
Committee on
Earth Observation Satellites

This committee coordinates space-based, ground-based, and data delivery systems to meet common requirements within a specific domain. CEOS SST-VC leverages inter-agency collaboration and partnerships to address observation gaps, sustain the routine collection of critical observations, and minimize duplication/overlaps while maintaining the independence of individual CEOS Agency contributions.

GHRSST services

GHRSST provides:

- A framework for sea surface temperature knowledge and data sharing.
- Best practices for data processing and assessing uncertainties in the satellite SSTs.
- A forum for scientific dialogue including how to provide SSTs for operational weather and ocean forecasting, climate studies and bringing SST to the operational users and scientific researchers.

GHRSST contributors offer:

- Data processing through Data Assembly Centres, combining satellite and Numerical Weather Prediction fields in common data formats for ease of access and analysis.
- A variety of tailored methods for downloading and accessing full products or subsets.
- Online visualisation of data quality through diagnostic comparisons.

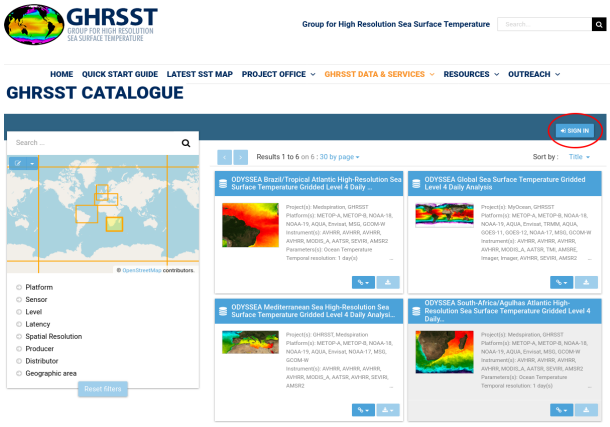
On the GHRSST website, the information on the GHRSST services has been expanded and integrated by providing two entry points:

- one for the **GHRSST Data Producers and Data Assembly Centres:** this section assists those organisations acting as data producers and data assembly centres on how to feed the Central Catalogue, with manuals and tutorials.
- one for the GHR**SST data users**: in this section the potential users of GHRSST-formatted data are guided through with information on the tools for validating SST products in near real-time and tools for the quick-looks/visualisation of SST products.

Major GHRSST components and services

The GHRSST Central Catalogue

The central catalogue is hosted on the GHRSST website and is maintained by the GHRSST Project Office (GPO): it functions as a central catalogue for all GHRSST datasets with a collection of level metadata, and federated search and discovery services. The portal allows SST users to discover and search all GHRSST products and granules with no need to know the data producer or distributor. In this new system, two entities are involved: the data producers (GDPs) and the distributing centres (DACs). Further details are reported on page 10 of this report.



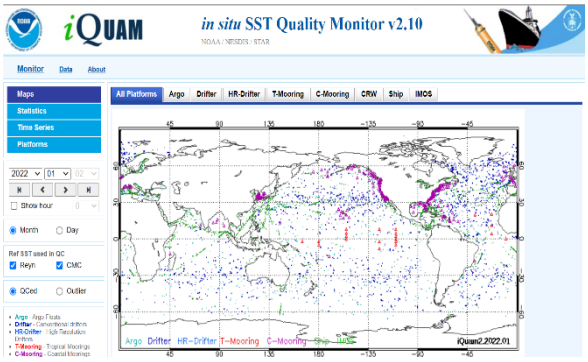
Felyx

The aim of the felyx activities was to provide an open-source, flexible and reusable software system that can be used to evaluate and monitor the quality and performance of Earth Observation (EO) data streams. Felyx was originally developed by IFREMER, PML and Pelamis and funded by the European Space Agency. Further activities developing felyx producing a multi-matchup dataset (MMDB) have been funded by the European Union's Copernicus programme and managed by EUMETSAT. Activities continued with the GHRSST Task Team on MMDBs, with further information here: https://www.ghrsst.org/about-ghrsst/task-teams/task-team-on-matchup-database-standards-mdb-tt

iQUAM and SQUAM

The in-situ data quality monitor, iQUAM, and SST summary quality monitor, SQUAM, systems are provided and hosted by NOAA.

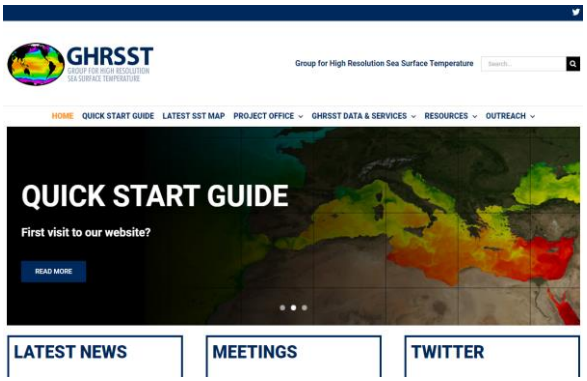
For further details, please see http://www.star.nesdis.noaa.gov/sod/sst/iquam/ and http://www.star.nesdis.noaa.gov/sod/sst/squam/ respectively.



GHRSST products, services and tools

On the GHRSST website, we have published information on how to access GHRSST products, services and tools to exploit GHRSST data.

For further details, please see https://www.ghrsst.org/ghrsst-data-services/



GHRSST Primary Documentation

The following documents are the primary documentation provided by GHRSST. All the documents are available in open access in Zenodo.

GHRSST Strategy and Implementation Plan (GDIP) https://zenodo.org/record/4700521
Six main strategic themes of GHRSST result from the GHRSST Terms of References, i.e., from the necessity to maintain the data flow which GHRSST users rely on (Strategic Aim I), together with quality estimates (Strategic Aim II) as well as from the necessity to nurture the science (Strategic Aim III) which allows the users to make full use of the information. The interaction between operational, scientific and user communities is a crucial driver for progress, reflected in complimenting Strategic Aim IV (develop and maintain user interaction). Further, GHRSST strives to strengthen links with the international community (Strategic Aim V) and gives recommendations for the future (Strategic Aim VI).

GHRSST Data Specification (GDS) https://doi.org/10.5281/zenodo.6984989
The GHRSST Data Processing Specification (GDS) is the key document for the GHRSST community: it provides a detailed technical specification for producing GHRSST L2, L3 and L4 products. The latest version of this document is the GDS 2.1 version 0, lastly revised in summer 2022. A new revision (v2.2) of this document is foreseen in 2024 to improve inconsistencies in global and variable attributes. A larger revision (v3.0) is foreseen in 2024/2025 to improve consistency of products at high latitudes and introduce sea-ice surface temperature, to include improvements to uncertainties, and integrations on ultra-high resolution and cloud format specifications.
Cite as: The Group for High Resolution Sea Surface Temperature Science Team, Piollé, Jean-François, Armstrong, Ed, Casey, Kenneth, & Donlon, Craig. (2022). The Recommended GHRSST Data Specification (GDS) (GDS 2.1 revision 0). Zenodo. https://doi.org/10.5281/zenodo.6984989

Climate Data Assessment Framework (CDAF) https://zenodo.org/record/4700356
The GHRSST Climate Data Assessment Framework (CDAF) provides authoritative, comparable information about GHRSST datasets that allows users to make their judgement on the suitability of SST datasets for use as Climate Data Records (CDRs) in their applications.
Version: 1.0.5. Cite as: Merchant, Christopher, Mittaz, Jonathan, & Corlett, Gary. (2014). Climate Data Assessment Framework (GHRSST Document Reference CDR-TAG_CDAF v 1.0.5, 4 June 2014). Zenodo.

Coral Heat Stress User SST Requirements https://doi.org/10.5281/zenodo.4700411
The document contains recommendations on satellite SST requirements for use by coral scientists, users and coral reef managers. Version: 1.0 of 7 August 2020. Cite as: Skirving, William, Co-Chairs, & Task Team Members. (2020). Coral Heat Stress User SST Requirements (TT_CHS-D01-UReqV1). Science Team Meeting (2020) (STM2020). Zenodo.

User Requirements Document (URD) https://zenodo.org/records/10539233
This document describes the SST products, services and additional information the large variety of users requires for their applications. As GHRSST service providers are not funded through GHRSST but through a wide range of national and international bodies, this URD can only be considered as

advisory, not mandatory for GHRSST members.

Validation Protocol Document (VPD) https://zenodo.org/records/10539276
Validation of GHRSST SST products is essential to provide users with confidence in their content. This document summarises the procedures agreed upon by the GHRSST International Science Team to ensure commonality of methods across the GHRSST community.

Sea surface temperature:
An introduction to users on the set of GHRSST formatted products

This booklet is an easy guide for SST users on how to use the set of GHRSST formatted products. This simple document has been exceptionally well received by the SST user community.

Download the latest version:
https://zenodo.org/records/10539712

Figure 3: Cover of the introductory document

Major GHRSST achievements in 2023

GHRSST has been extremely successful in revolutionising the way satellite SST datasets are developed, shared, and applied in modern oceanography, meteorology, and climate centres. Success is achieved by solving scientific, operational, and technical problems and also by cooperation at an international level to agree on data product definitions and standards that are acceptable to users, producers, and data managers. GHRSST coordinates and conducts research, establishes procedures and protocols, provides near real-time data access portals and user services, and implements near real-time quality control monitoring services. Large volumes of data and data services are harnessed together to deliver the new generation of global coverage high-resolution SST data thereby meeting GHRSST User Requirements.

The Framework for GHRSST Data Provision and the GHRSST Central Catalogue

GHRSST pioneered a Regional/Global Task Sharing Framework (R/GTS)[1] which uses a scientifically and technically feasible strategy to acquire existing SST data products, add additional information and create a new generation of products in a common format.
In 2022, a new system based on the decentralisation of data ingestion and distribution, was designed to prepare GHRSST for future growth and facilitate the integration of new data producers. The framework is illustrated below and is extensively described in the GHRSST R/G TS System Architecture (GSA) report. In this new system, two entities are involved: the data producers (GDPs) and the distributing centres (DACs).

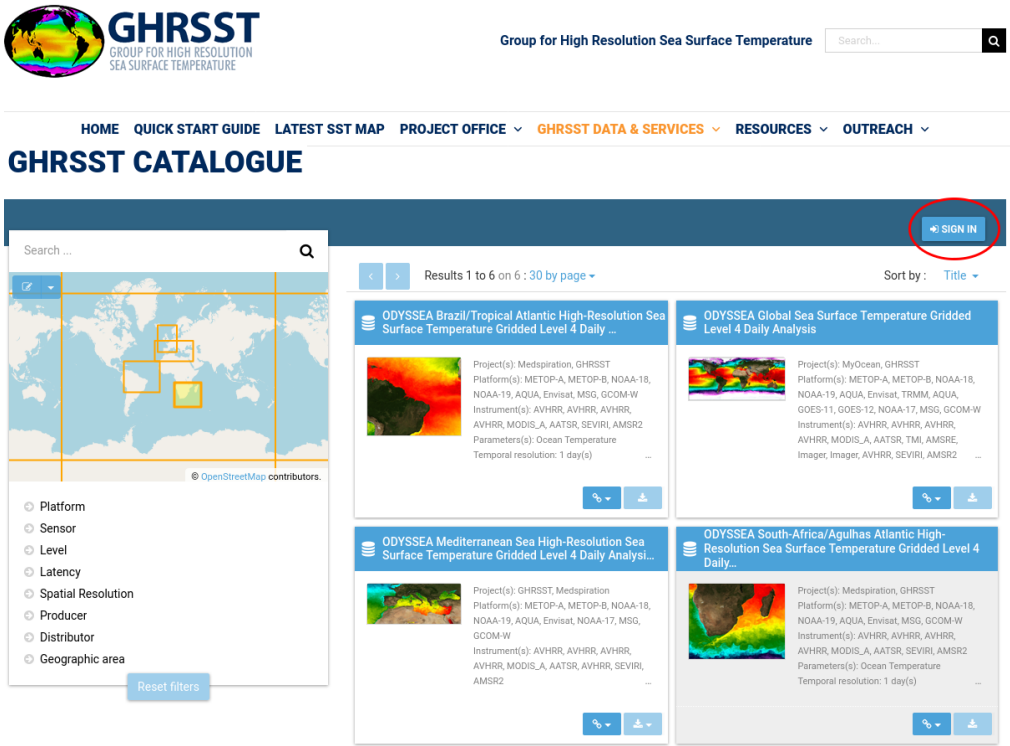


Figure 4: Interface of the GHRSST central catalogue

[1] https://www.ghrsst.org/about-ghrsst/task-teams/task-team-on-evolution-of-the-regional-global-task-sharing-r-g-ts-tt/

The GHRSST central catalogue is hosted on the GHRSST website and is maintained by the GHRSST Project Office (GPO): it functions as a central catalogue for all GHRSST datasets with a collection of level metadata, and federated search and discovery services. The portal allows SST users to discover and search all GHRSST products and granules with no need to know the data producer or distributor. The implementation of the central catalogue was initiated in 2022, supported by EUMETSAT and Copernicus. All DACs have agreed to provide metadata to the central catalogue. The DACs' level of readiness to provide data access (e.g., HTTP(S), FTP, THREDDS, and OpeNDAP) and granule search (OpenSearch) services have been verified. Most of the DACs can provide HTTP(S) and OpenSearch services. Each DAC implements a minimum set of services for granule data access, search and discovery, production/distribution metrics and long-term archiving.

Resources

- A list of the DAC and GDPs is available on the GHRSST website: https://www.ghrsst.org/ghrsst-data-services/
- Piollé, Jean-François. (2020). GHRSST R/G TS System Architecture GSA. Zenodo. https://doi.org/10.5281/zenodo.4926440
- Piollé, Jean-François, & Armstrong, Ed. (2022, June 27). The evolution of the Regional GHRSST Task sharing: The Central Catalogue. https://doi.org/10.5281/zenodo.7189430 https://zenodo.org/record/7189430#.Y8U6d3aZOHs
- Central catalogue on the GHRSST website: https://www.ghrsst.org/ghrsst-data-services/ghrsst-catalogue/
- A video explaining how the Central Catalogue works: https://www.ghrsst.org/ghrsst-data-services/products/
- OpenSearch federated search service: https://opensearch-ghrsst.ifremer.fr
- OpenSearch example notebook: https://github.com/GHRSST/ghrsst-opensearch

Progress of the Task Teams

GHRSST Task Teams are set up to address particular issues identified by the GHRSST Science Team. Task Teams (TTs) are proposed and agreed upon at the annual Science Team Meetings (STM). Each task team has a chair and co-chair and a team of volunteers, the task team members. Each chair is required to appoint an early-career scientist as co-chair to encourage participation in GHRSST and ensure the continuation of knowledge.

Some of the key highlights related to the progress of the task teams are reported here below.

Shipborne Radiometry: The partners in this task team are involved in a UK-funded project, the ASTeRN, the Advanced Surface Temperature Radiometer Network, funded by the UK government Earth Observation Investment plan. The project is to design and manufacture radiometers with the capability to measure sea, land and ice surface temperatures with high accuracy and precision. The design is based on a recent study funded by ESA and performed by RAL and the University of Southampton. The radiometers will be calibrated to standards traceable to SI realised by NPL standards. The current UK in situ radiometer designs (ISAR, SISTeR) are now 20+ years old.
A new generation of radiometers is required to enhance and maintain the capability for the next decade, provide additional spectral channels for atmospheric characterisation, extend the capability for measuring Land Surface Temperatures, address obsolescence issues and improve manufacturability and maintainability. The new radiometer design will be an evolution of existing designs: the same basic measurement approach as existing instruments but drawing on lessons learned and incorporating modern components. Ships4SST study has already defined requirements for the next generation. More updates can be found in Zenodo.

Coral Heat Stress: Updates have been included in the SST User Requirements document, such as the update to the section about the need for SST resolution, as the extreme marine heatwave in the Caribbean has highlighted the need for higher resolution satellite SST. An update to the section about diurnal resolution needs has also been implemented, including the need for mortality products that require information about day and night SST. A new section has been included to discuss the unique requirements of the marine biology science community who work in polar waters. More updates can be found in Zenodo.

Cloud masking: In the past year, advancement has been achieved by Met Norway with the Sci4MaST project (funded by Copernicus), using cloud lidar and SynObs to test masks. In the Sci4MaST project the focus has been on the testing the NWC SAF PPSv2021 cloud products software and checking if the software can improve cloud marking over sea ice. The teams have also used Caliop cloud lidar data and synoptical cloud observations to validate the cloud mask products (data from 2019). The test performed were aimed at checking how classical cloud mask and cloud mask probability can be combined to improve cloud masking and quality level scheme. The results were also presented at the S3VT conference in December 2023 (link to the talk).

Additionally, the teams improved the use of thermal and reflectance imagery for SLSTR, reducing overflagging from thermal texture, with a publication of an article on “Improving the combined use of reflectance and thermal channels for ocean and coastal cloud detection for the Sea and Land

Surface Temperature Radiometer (SLSTR)" (Bulgin et al. 2023, doi https://doi.org/10.1016/j.rse.2023.113531). Reflectance imagery is used to aid daytime cloud detection in thermal remote sensing. The paper presents new approaches to utilization of reflectance for sea surface temperature (SST) remote sensing for the Sea and Land Surface Temperature Radiometer (SLSTR). The new chair of this task team, Mingkun Liu, has also applied physically based deep learning for cloud detection. Her study proposed an innovative Spectral-and-Textural-Information-Guided deep neural Network (STIGNet) on the cloud detection for the Chinese Ocean Color and Temperature Scanner (COCTS) onboard the Haiyang-1C (HY-1C) satellite. The STIGNet utilize a combined spectral and textural information as the model input, containing a large amount of potential physical-informed features. Additionaly, the STIGNet incorporates an edge learning module, designed to emphasize the identification of cloud edges, which can automatically encode the textural information into the modeling process, leading to performance improvement.

SST Climatology and L4 Intercomparison: The task focusing on the validation of the L2, L3, and L4 SST gradients in highly variable regions using SailDrone has been finalised. Eight SailDrones deployments of the USA West Coast took place to validate Modis L2 and MUR L4 SST at 1KM resolution; the deployments have ensured better accuracies for the MUR products and have proven the ability of the SailDrone to accurately validate near-shore satellite SST products. A paper on this topic has been published in open access by the team (Koutantou, Brunner and Vazquez-Cuervo, 2023 https://doi.org/10.3390/rs15092277). A major result of the paper was that Level 2 data when applying the right quality flags would lead to better correlations with SailDrone. The task team also progressed on the task focusing on the development of science to calculate SST fronts and inter-comparison: The approach and results have been published in a paper in January 2023 (Ciani et al. 2023, https://doi.org/10.3390/rs15041163). Additionally, the lead author presented the results in the GHRSST Talk in August 2023. The research activity is devoted to the retrieval of SST gradients from the future ESA Earth Explorer 10 mission "Harmony", which (among other objectives covering land and sea-ice monitoring) will provide simultaneous observations of surface roughness and SST to support air-sea interaction studies.

The work focusing on inter-comparison of feature resolution and spatial consistency of L4 products is ongoing, and is based on the use of L4 SST products for the computation of ocean surface currents.

The task on the "Salinity as independent data to validate SST gradient" has been also finalized with the following results: The coastal upwelling and the California Current, leading to frontal activity, have been captured by gradients in both Sea Surface Temperature (SST) and Sea Surface Salinity (SSS). It was found that the differences between the SST and SSS gradients are mainly associated with the limitations of the microwave-derived SSS coverage near land and its reduced spatial resolution. A paper has been published on this topic (Vazquez-Cuervo et al. https://doi.org/10.3390/rs15020484). Several other tasks are still ongoing in this task team and there is potential interest to implement an additional activity on SST fronts and Ocean Color Fronts. The work focusing on the validation of gradients in the Arctic region is also ongoing.

Interested in joining GHRSST and contributing to the GHRSST Task Teams?

Please get in touch with the chairs/co-chairs of the Task Teams or the GHRSST Project Office:

https://www.ghrsst.org/about-ghrsst/task-teams/

Outcomes of the GHRSST24 Science Team Meeting

The 24th International GHRSST Science Team Meeting was held on 16-20 October 2023 as a virtual and in-person meeting. The in-person part of the meeting was hosted by the Indian Space Research Organisation (ISRO) and the Indian Space Application Center (SAC). The focus of the meeting was on the science applications for operations users of SST in India, with a dedicated session on the topic. Additional sessions provided continuity with the topics covered by the last two annual meetings: in the next years, several new satellites will be launched, continuing the provision of accurate SST observations. New evolutions, including the introduction of very high spatial resolution missions, will provide new opportunities for applications but will also require developments within retrievals, validation and calibration, product assessment, and also on processing and product generation. It is therefore important that the new developments within high-resolution SST products are coordinated with the ongoing international SST activities.

Indian Space Research Organisation (ISRO)

Space Applications Centre (SAC)

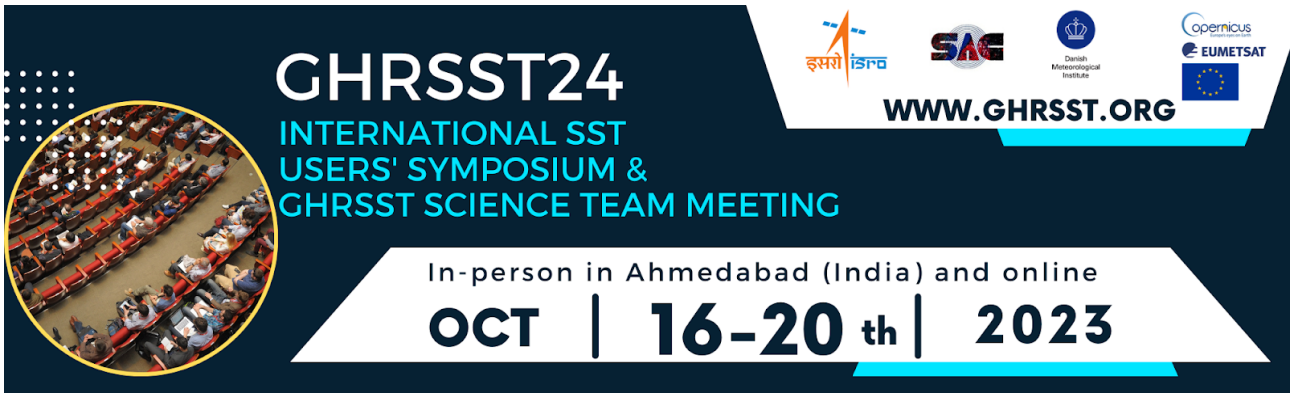


Figure 7: ISRO and SAC, sponsors of the GHRSST24 meeting (top) and banner of the meeting (bottom)

The meeting was very well received: participants enjoyed the in-person and online formats as well as the hybrid sessions. The conference part of the meeting was structured in six science sessions:

- Science Session 1 – Science applications for operational users of SST in India
- Science Session 2 – Processing and product generation
- Science Session 3 – Calibration, Validation and Product Assessment
- Science Session 4 – Retrieval Algorithms
- Science Session 5 – Computing and products
- Science Session 6 – High-resolution future satellite missions.

Two workshops were also held:

- Workshop W1: What are the next GHRSST priorities? This session consulted the GHRSST community on the definition of GHRSST progress and the assessment of the priorities in the upcoming years regarding data access and usage, high-latitudes, feature resolution/coasts, L3/L4 applications and microwave SST.
- Workshop W2: What are the best practices for SST data producers? This session showcased the experience in SST data production using the GHRSST data specifications, and shared knowledge/experience with other SST producers, who might be interested in adopting the GHRSST data specifications in the future.

The presentations, posters and all recordings are accessible on Moodle:
https://training.eumetsat.int/enrol/index.php?id=490

Key take-home messages

SST products, following the GHRSST Data Specification, rely on a combination of low-Earth orbit infrared and microwave satellite imagery, geostationary orbit infrared satellite imagery, and in-situ data from moored and drifting buoys, Argo floats, and Fiducial Reference Measurements (FRM) for product validation. The products comprise a suite of global high-resolution SST products to support operational forecast systems, climate science, and diverse applications, and to facilitate a wide range of research in the broader scientific community.

Over the next few years, several new satellites are planned to be launched, including infrared and microwave instruments in polar and geostationary orbits. The high spatial resolution of SST will continue to be maintained and improved including those with very high-resolution SST observations less than 100 metres.

This new evolution will provide new opportunities for applications but will also require new developments within different areas of operations. At the recent GHRSST science team meeting, a list of GHRSST Priorities and key considerations from 2023 was discussed.

- GHRSST is to continue preparations for new SST missions and datasets including the further new generation geostationary and low-earth orbit SST, Copernicus reference SST, microwave SST and ultra-high resolution coastal SST.
- There is a very clear priority in 2023 on coastal SST and ultra-high resolution SST, including potentially developing new dedicated products, connections with space agencies on user requirements (e.g. algorithms, cloud-masking, uncertainties) and advising users on the most appropriate SST products for coastal applications. There is a recommendation

for a new coastal SST Task Team including relevant experts, to prepare users for these new ultra-high-resolution SST observations.

- There is a need for revising information on Single Sensor Error Statistics (SSES) bias and standard deviation, for strengthening and developing observational (total standard) uncertainties, but mostly for creating a framework and best practices for defining SSES and uncertainties, rather than leaving it only to individual data producers.
- The GHRSST Data Specification (GDS) should be updated to focus on evolving new data models and formats (cloud too), preparations for ultra-high resolution SST, consistency of high latitude products, in addition to sea-ice surface temperature and observational uncertainties.
- There is also a strong need for communication on marine heat waves (MHW) and the development of climate indicators from GHRSST. This could include a dashboard for MHW visualisation.

Capacity building and Disseminating knowledge

GHRSST talks: A new format for bringing the community together, growing it and exchanging knowledge

This is a format introduced by the GHRSST Project Office with the support of the international Science Team for improving **capacity building** across the GHRSST community, **fostering knowledge exchange**, and **attracting early-career researchers** to the GHRSST community.
In 2023, the first speakers were lined up for this concept in early 2023. On average, we have had two talks per month. All the talks, presentations and recordings are available at: https://www.ghrsst.org/outreach/ghrsst-talks/

Figure 8: Teaser of the GHRSST talk with Olafur Jonasson on NOAA 1st MODIS SST reanalysis

Training on GHRSST specified/formatted products: Which SST products in GHRSST specification are the most suitable for me?

GHRSST coordinates an extensive catalogue of Sea Surface Temperatures (SST) produced by many data producers, each with its advantages and caveats. For a potential user, with a given application in mind, this landscape can be confusing and intimidating, often resulting in reaching for the most convenient product, irrespective of its suitability. For this reason, GHRSST organised an in-person training for SST Users in Ahmedabad, on 20 October 2023 on the topic: **GHRSST specified/formatted products: Which SST products in GHRSST specification are the most suitable for me?**

This course aimed at increasing knowledge on GHRSST coordinated products for SST users and connect users to the catalogue more appropriately, outlining the ramifications for selecting level-4 gridded products of a given type (e.g. IR, microwave, blended) and therefore allowing them to make better-informed choices for their applications. The training was addressed to newcomers (e.g., undergraduates, stakeholders such as small-scale fishers, environmental managers, and early career scientists) interested in learning how to use satellite-derived SST data.

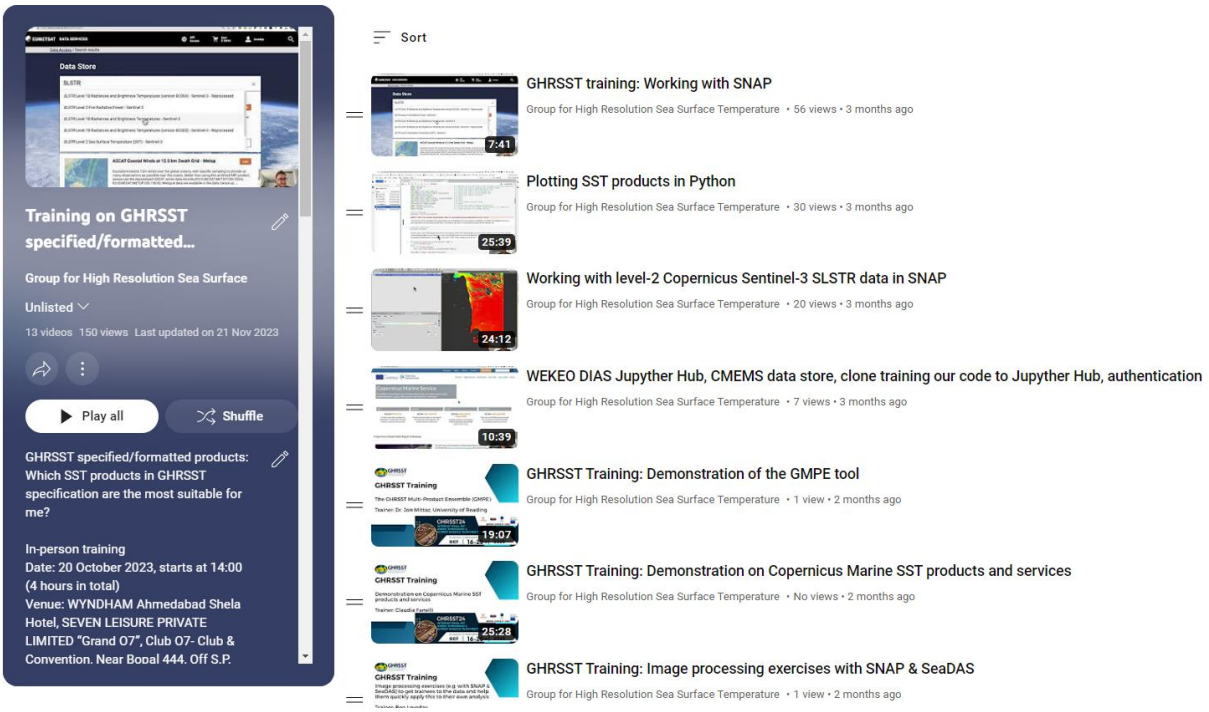


Figure 9: Training playlist on YouTube

The course considered practical examples of a broad range of applications from meso- to global scale, from event-based to climate variability. The course provided a basic introduction to L2, L3 and L4 fields as many potential users have very little knowledge about these, need guidance to decide what they need for their studies and are unaware of the consequences of their choices. The training material is now available for those who are interested in learning at their own pace. All the modules have been recorded and the materials are accessible from Moodle. A self-enrolment procedure for this training can be started anytime at this link: https://training.eumetsat.int/course/view.php?id=490&section=11

GHRSST Project Office

The GHRSST Project Office (GPO) provides the secretariat for the GHRSST Project. It provides secretarial support to the GHRSST Science Team Chair, Anne O'Carroll (EUMETSAT). Together with the GHRSST Science Team Chair, the GPO coordinates, enables and facilitates, on behalf of the GHRSST Science Team, the open exchange of relevant satellite and in-situ data streams for use within GHRSST. It provides direct logistical coordination and technical support to coordinate, enable and facilitate the GHRSST international Science Team and all subsidiary Technical Advisory Groups, the Task Teams, and the GHRSST Advisory Council. The GPO also maintains the primary GHRSST documentation.

Danish Meteorological Institute

The GPO is hosted by the Danish Meteorological Institute.

GHRSST Project Office
GHRSST Project Coordinator: Chiara Bearzotti
GHRSST Project Administrator: Erika Hayashi
Danish Meteorological Institute, Sankt Kjelds Plads 11, 2100 Copenhagen (DK)
Email: chb@ghrsst.org
Email: erh@dmi.dk

https://www.ghrsst.org/about-ghrsst/contact-us/

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