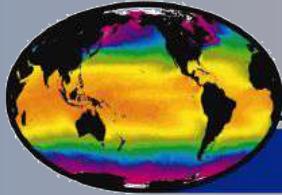


To provide operational users and the science community
with the SST measured by the satellite constellation

Sea Surface Temperature and International Framework

CES ODATIS Couleur de l'Océan
7 Mars 2023, CNES (Paris)

Slides supplied by GHRSSST Project Office



GHRSSST

Group for High Resolution
Sea Surface Temperature



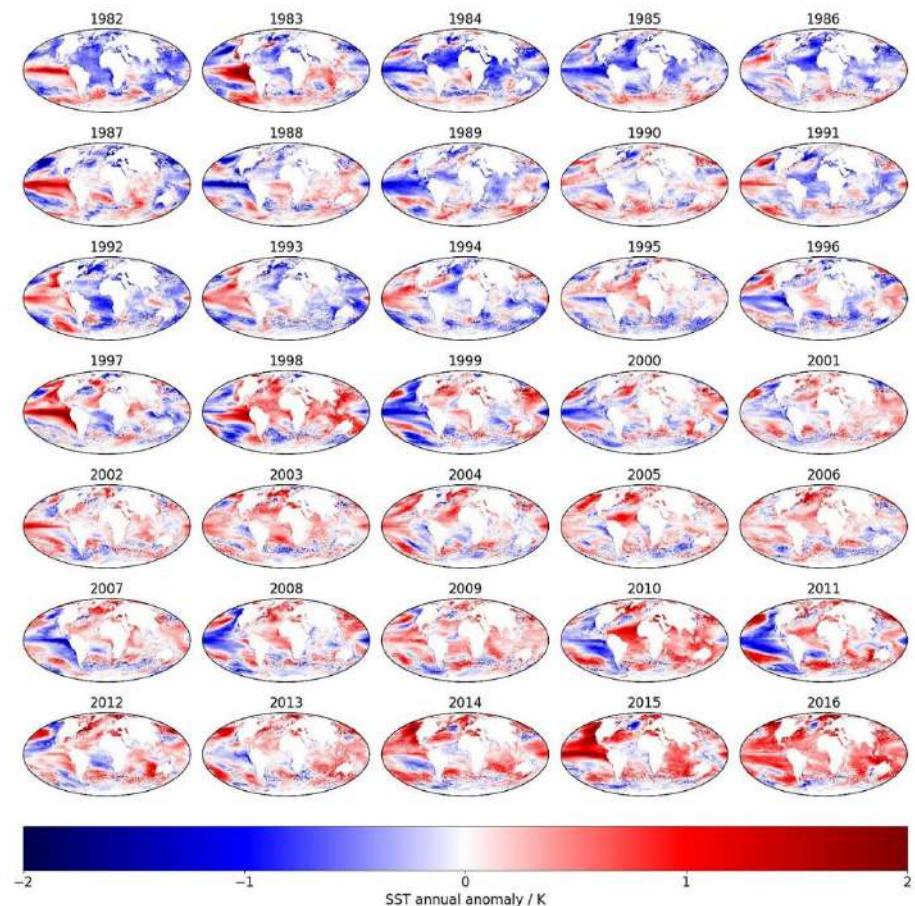
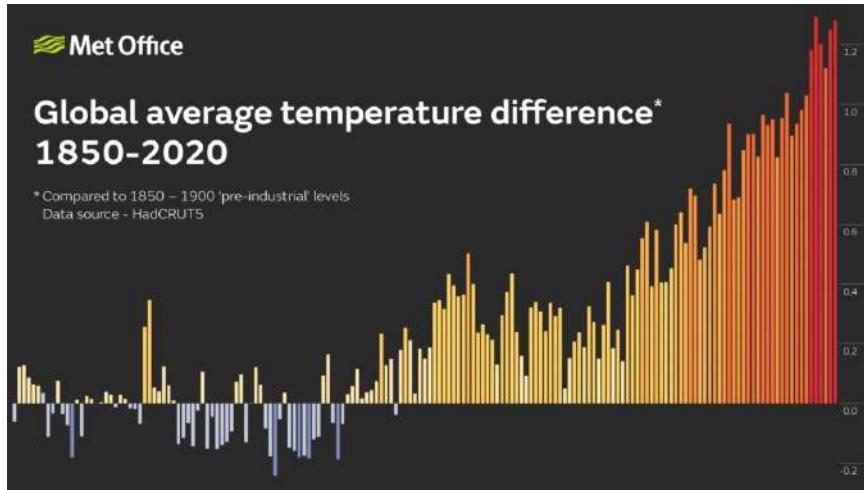
Committee on Earth
observation Satellites
Sea Surface Temperature
Virtual Constellation

SEA SURFACE TEMPERATURE



SST importance and global mean temp increase

Copernicus

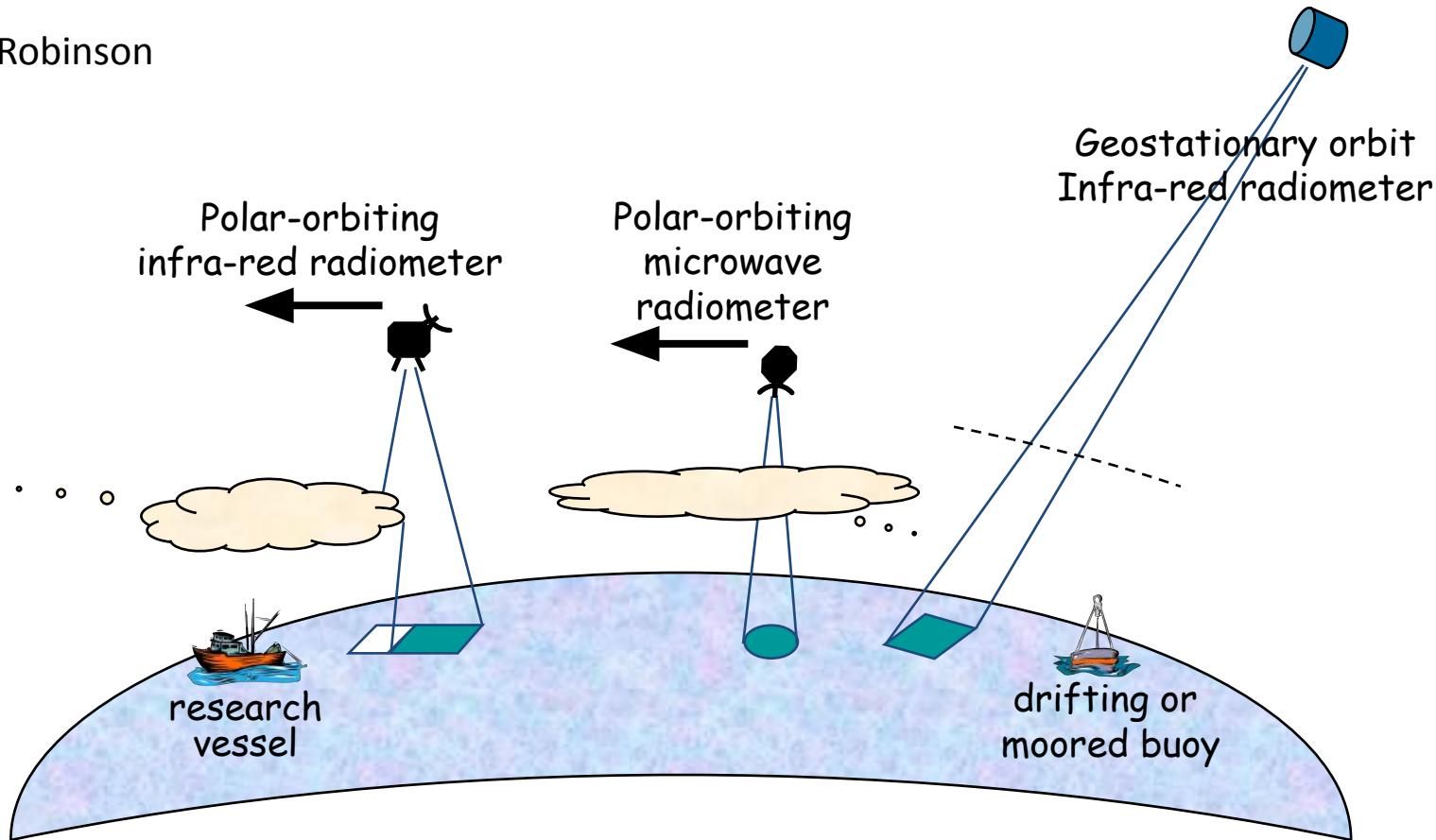


- Atmospheric circulation
- Circulation of oceans
- Ocean biogeochemistry
- Climate Change

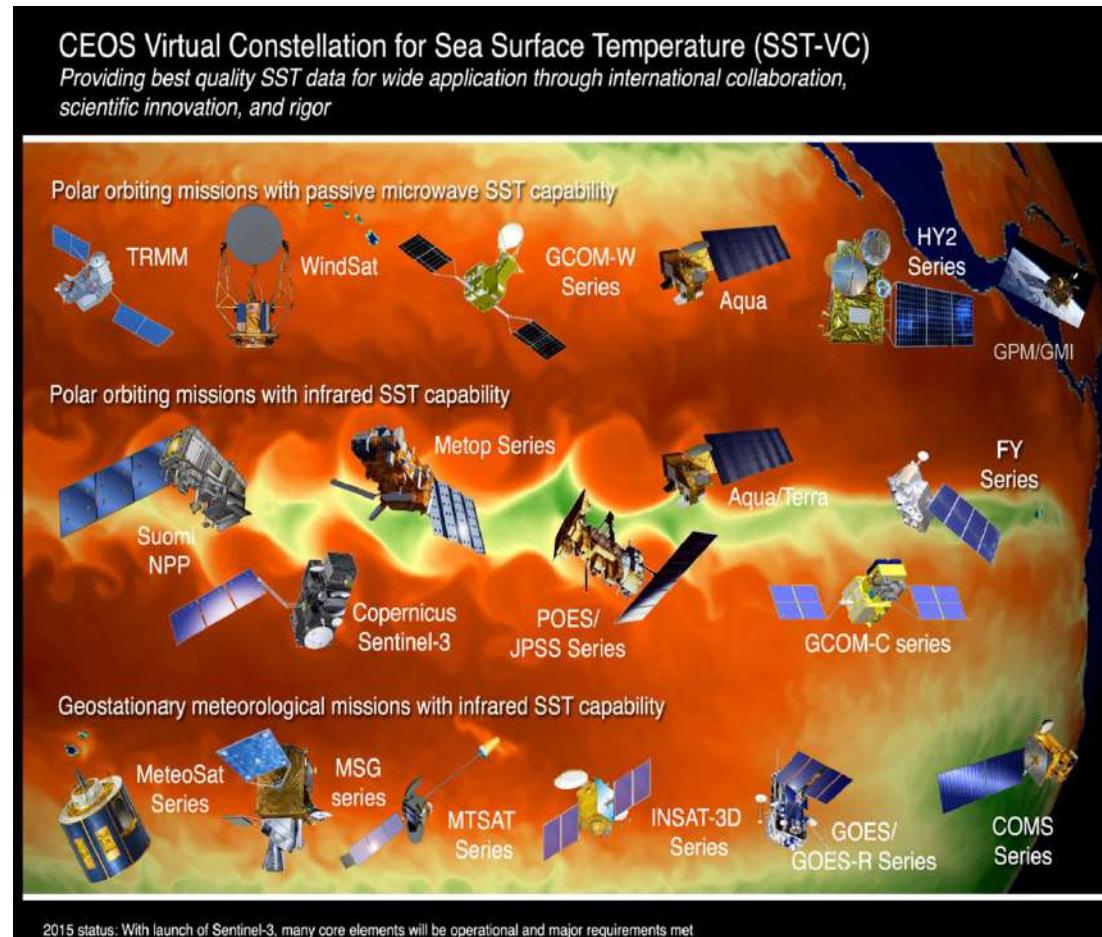
<https://scienceblog.eumetsat.int/2019/12/sea-surface-temperature-climate-data-record-generation-with-slstr/>

Platforms for measuring SST

Ian Robinson



CEOS SST-VC



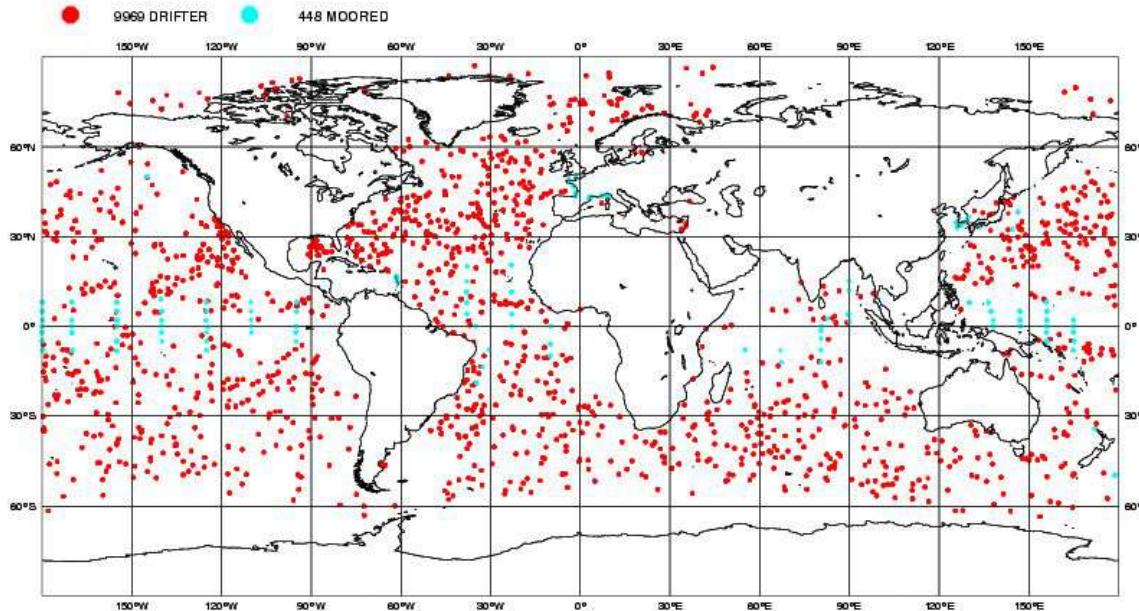
Modern in situ: buoys



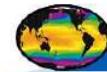
ECMWF Data Coverage (All obs DA) - BUOY

11/SEP/2010; 12 UTC

Total number of obs = 10417



©ECMWF



GHRSSST

Group for High Resolution Sea Surface Temperature

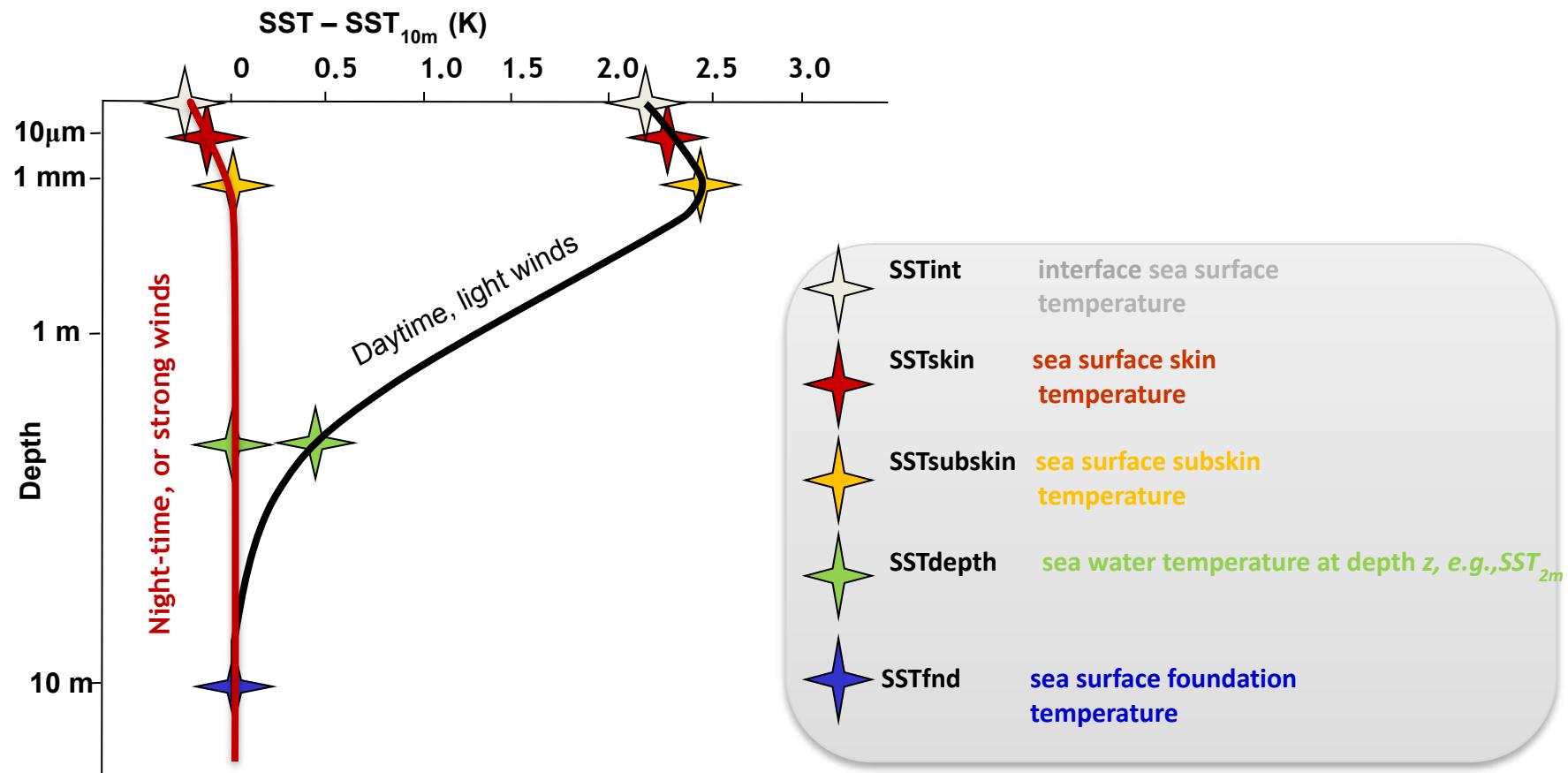


<http://www.ghrsst.org>

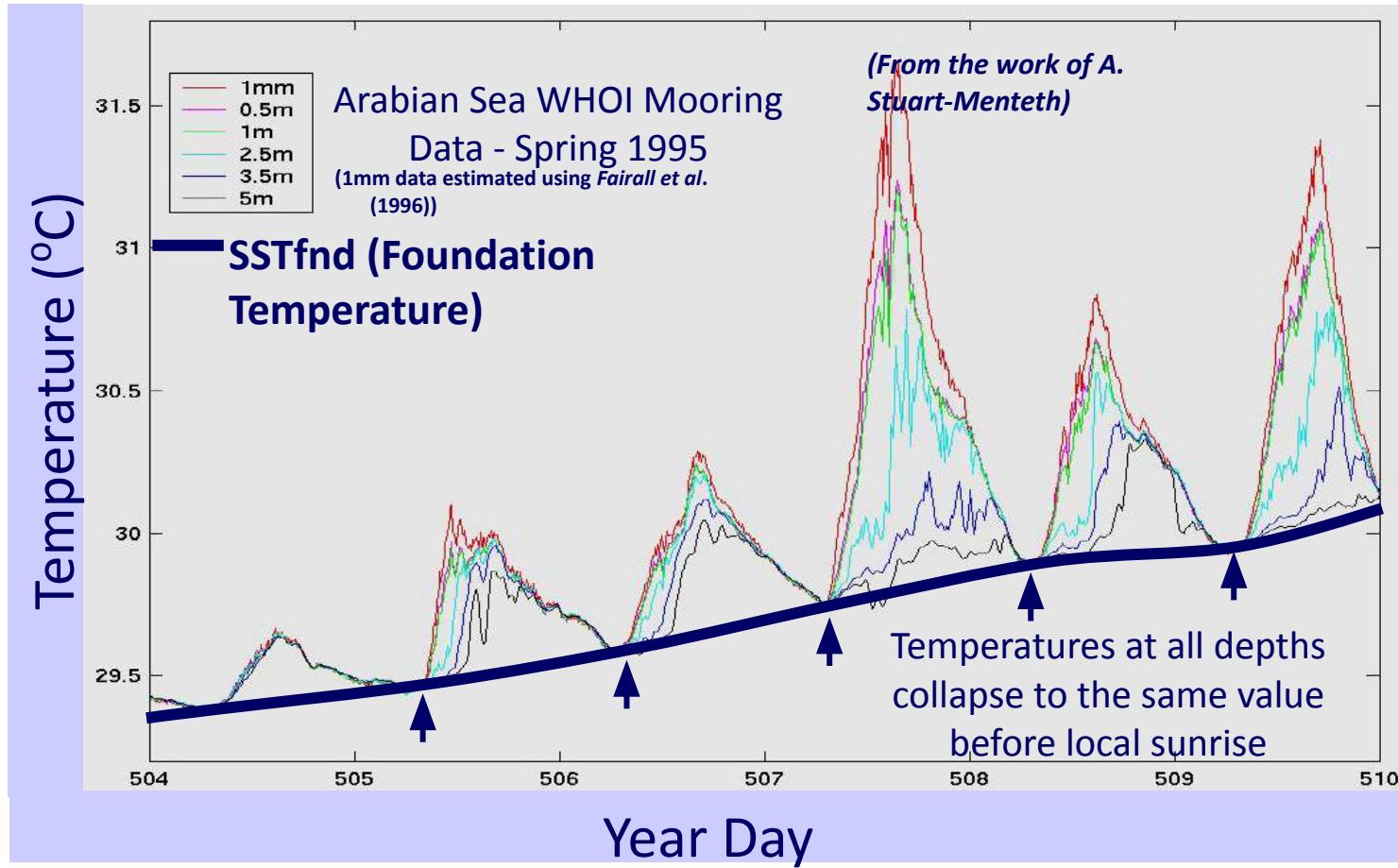


Committee on Earth
observation Satellites
Sea Surface Temperature
virtual Constellation

What is SST?



Diurnal variability



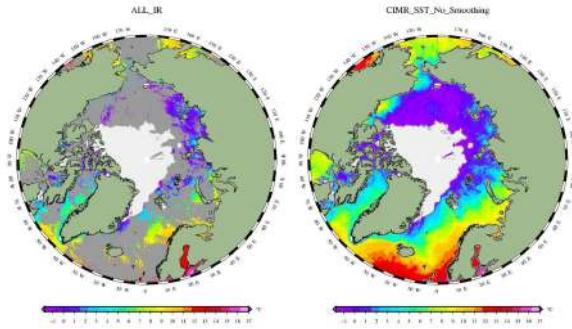
Data Processing Level

SST Product	L2 Pre-Processed [Section 8]	L3 Uncollated [Section 1010]	L3 Collated [Section 10]	L3 Super- collated [Section 10]	Analyzed SST [Section 11]	GHRSSST Multi- Product Ensemble SST [Section 12]
Acronym	L2P	L3U	L3C	L3S	L4	GMPE
Description	Geophysical variables derived from Level 1 source data at the same resolution and location as the Level 1 data, typically in a satellite projection with geographic information. These data form the fundamental basis for higher-level GHRSSST products and require ancillary data and uncertainty estimates. No adjustments to input SST have been made.	L2 data granules remapped to a space grid without combining any observations from overlapping orbits.	SST measurements combined from a single instrument into a space-time grid. Multiple passes/scenes of data can be combined.	SST measurements combined from multiple instruments into a space-time grid. Multiple passes/scenes of data are combined.	Data sets created from the analysis of lower level data that results in gridded, gap-free products. SST data generated from multiple sources of satellite data using optimal interpolation are an example of L4 GHRSSST products	GMPE provides ensemble information about various L4 data products. It provides gridded, gap-free SST information as well as information about the spread in the various L4 products.
Grid specification	Native to SST data format	Defined by data provider	Defined by data provider	Defined by data provider	Defined by data provider	Defined by data provider
Temporal resolution	Native to SST data stream	Native to data stream	Defined by data provider	Defined by data provider	Defined by data provider	Defined by data provider
Delivery timescale	As available, Ideally within 3 hours from acquisition at satellite	As available, Ideally within 3 hours from acquisition at satellite	As available, Ideally within 3 hours from acquisition at satellite	As available, Ideally within 3 hours from acquisition at satellite	Analyzed product processing window as defined by data provider.	As available, ideally within 24 hours of the input L4 products being available.
Target accuracy	Native to data stream	Native to data stream	<0.4 K	<0.4 K	< 0.4 K absolute, 0.1 K relative	< 0.4 K
Error statistics	Native to data stream if available, sensor specific error statistics otherwise	Native to data stream if available, sensor specific error statistics otherwise	Derived from input data for each output grid point.	Derived from input data for each output grid point.	Analysis error defined by data provider for each output grid point (no input data statistics are retained)	The standard deviation of the input L4 analyses is provided. This is not an error estimate but provides some idea of uncertainty.
Coverage	Native to data stream	Native to data stream	Defined by data provider	Defined by data provider	Defined by data provider	Defined by data provider

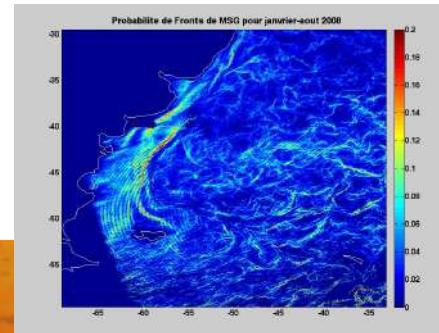


User driven priorities for SST observations in the next decade

- 1) Improving data quality in the Arctic
- 2) Improving coastal SST data quality
- 3) Improving SST feature resolution



Front. Mar. Sci. /
doi:10.3389/fmars.2019.00420





GROUP FOR HIGH RESOLUTION SEA SURFACE TEMPERATURE (GHRSSST) INTRODUCTION

Anne O'Carroll

GHRSSST Science Team Chair

Chiara Bearzotti

GHRSSST Project Office Coordinator

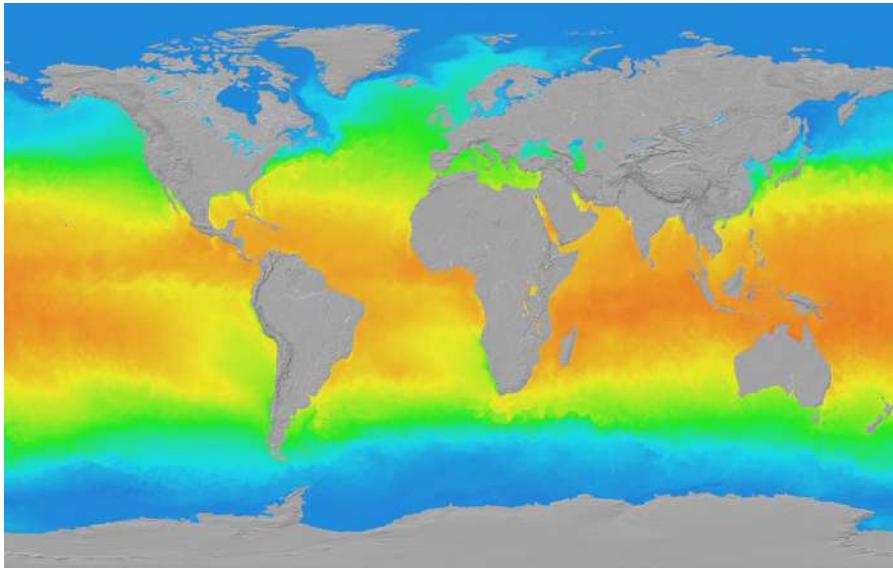
Group for High Resolution Sea Surface Temperature (GHRSSST)

The Group for High Resolution Sea Surface Temperature grew out of a GODAE Pilot Project, 1997-2008

- GHRSSST is an **open international science group**
- coordinates research and operational developments in satellite-derived sea surface temperature (SST)
- 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.



GHRSSST Mission Statement



- Framework for SST knowledge and data
- Best practices for processing and uncertainties
- Bring SST to operational users and science

GHRSSST mission: To provide operational users and the science community with the SST measured by the satellite constellation

What is GHRSSST?

- Is organized into Technical Advisory Groups and Task Teams focused on particular challenges and activities.
- Data processing through Regional and Global Data Assembly Centres, combining satellite and NWP fields in common data formats for ease of access and analysis.



What GHRSSST does

GHRSSST 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.



Task Teams

- Climate Data Assessment Framework
- GHRSSST MDB
- Feature resolution
- Shipborne radiometry
- Cloud masking
- SSEs and L4



Task Teams (continued)

- High Latitude SST
- Climatology and L4 inter-comparisons
- Coral Heat Stress User SST requirements
- HRSST for Satellite SST
- Regional and Global Task Sharing



GHRSSST Regional/Global Task Sharing



- Reference architecture document updated in 2022
- Entering implementation phase of R/GTS, involving all GHRSSST data producers and distributors

The Group for High Resolution Sea Surface Temperature Science Team, Piollé, Jean-François, Armstrong, Ed, Casey, Kenneth, & Donlon, Craig. (2022). The Recommended GHRSSST Data Specification (GDS) (GDS 2.1 revision 0). Zenodo.

<https://doi.org/10.5281/zenodo.6984989>

The Recommended GHRSSST Data Specification (GDS)
GDS 2.1

818 views 568 downloads

See more details...

Indexed in:

OpenAIRE



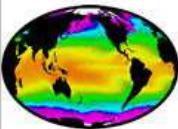
GHRSSST Central Catalogue

GHRSSST pioneered a Regional/Global Task Sharing Framework (R/GTS) 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.

A new system, with decentralisation of data ingestion and distribution, was designed in 2022 to prepare GHRSSST for future growth and facilitate the integration of new data producers (Data producers, GDPs and Distributing centres, DACs).

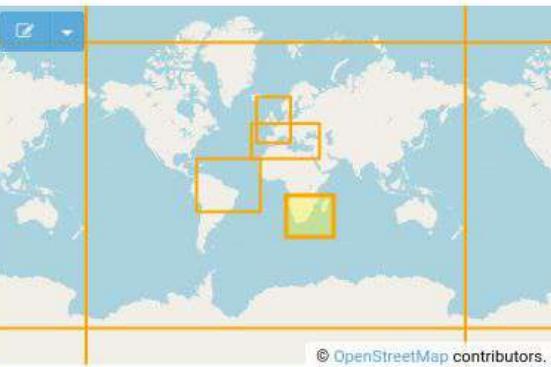
<https://www.ghrsst.org/about-ghrsst/task-teams/task-team-on-evolution-of-the-regional-global-task-sharing-r-g-ts-tt/>





GHRSSST CATALOGUE

Search ... 

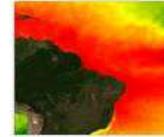
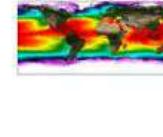
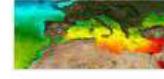
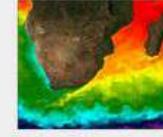


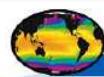
OpenStreetMap contributors.

Platform
 Sensor
 Level
 Latency
 Spatial Resolution
 Producer
 Distributor
 Geographic area

Reset filters

Results 1 to 6 on 6 : 30 by page ▾ Sort by : Title ▾

 ODYSSEA Brazil/Tropical Atlantic High-Resolution Sea Surface Temperature Gridded Level 4 Daily ...  <p>Project(s): Medspiration, GHRSSST Platform(s): METOP-A, METOP-B, NOAA-18, NOAA-19, AQUA, Envisat, MSG, GCOM-W Instrument(s): AVHRR, AVHRR, AVHRR, AVHRR, MODIS_A, AATSR, SEVIRI, AMSR2 Parameters(s): Ocean Temperature Temporal resolution: 1 day(s)  </p>	 ODYSSEA Global Sea Surface Temperature Gridded Level 4 Daily Analysis  <p>Project(s): MyOcean, GHRSSST Platform(s): METOP-A, METOP-B, NOAA-18, NOAA-19, AQUA, Envisat, TRMM, AQUA, GOES-11, GOES-12, NOAA-17, MSG, GCOM-W Instrument(s): AVHRR, AVHRR, AVHRR, AVHRR, MODIS_A, AATSR, TMI, AMSRE, Imager, Imager, AVHRR, SEVIRI, AMSR2 Parameters(s): Ocean Temperature Temporal resolution: 1 day(s)  </p>
 ODYSSEA Mediterranean Sea High-Resolution Sea Surface Temperature Gridded Level 4 Daily Analysis...  <p>Project(s): GHRSSST, Medspiration Platform(s): METOP-A, METOP-B, NOAA-18, NOAA-19, AQUA, Envisat, NOAA-17, MSG, GCOM-W Instrument(s): AVHRR, AVHRR, AVHRR, AVHRR, MODIS_A, AATSR, AVHRR, SEVIRI, AMSR2 Parameters(s): Ocean Temperature Temporal resolution: 1 day(s)  </p>	 ODYSSEA South-Africa/Agulhas Atlantic High-Resolution Sea Surface Temperature Gridded Level 4 Daily...  <p>Project(s): Medspiration, GHRSSST Platform(s): METOP-A, METOP-B, NOAA-18, NOAA-19, AQUA, Envisat, MSG, GCOM-W Instrument(s): AVHRR, AVHRR, AVHRR, AVHRR, MODIS_A, AATSR, SEVIRI, AMSR2 Parameters(s): Ocean Temperature Temporal resolution: 1 day(s)  </p>

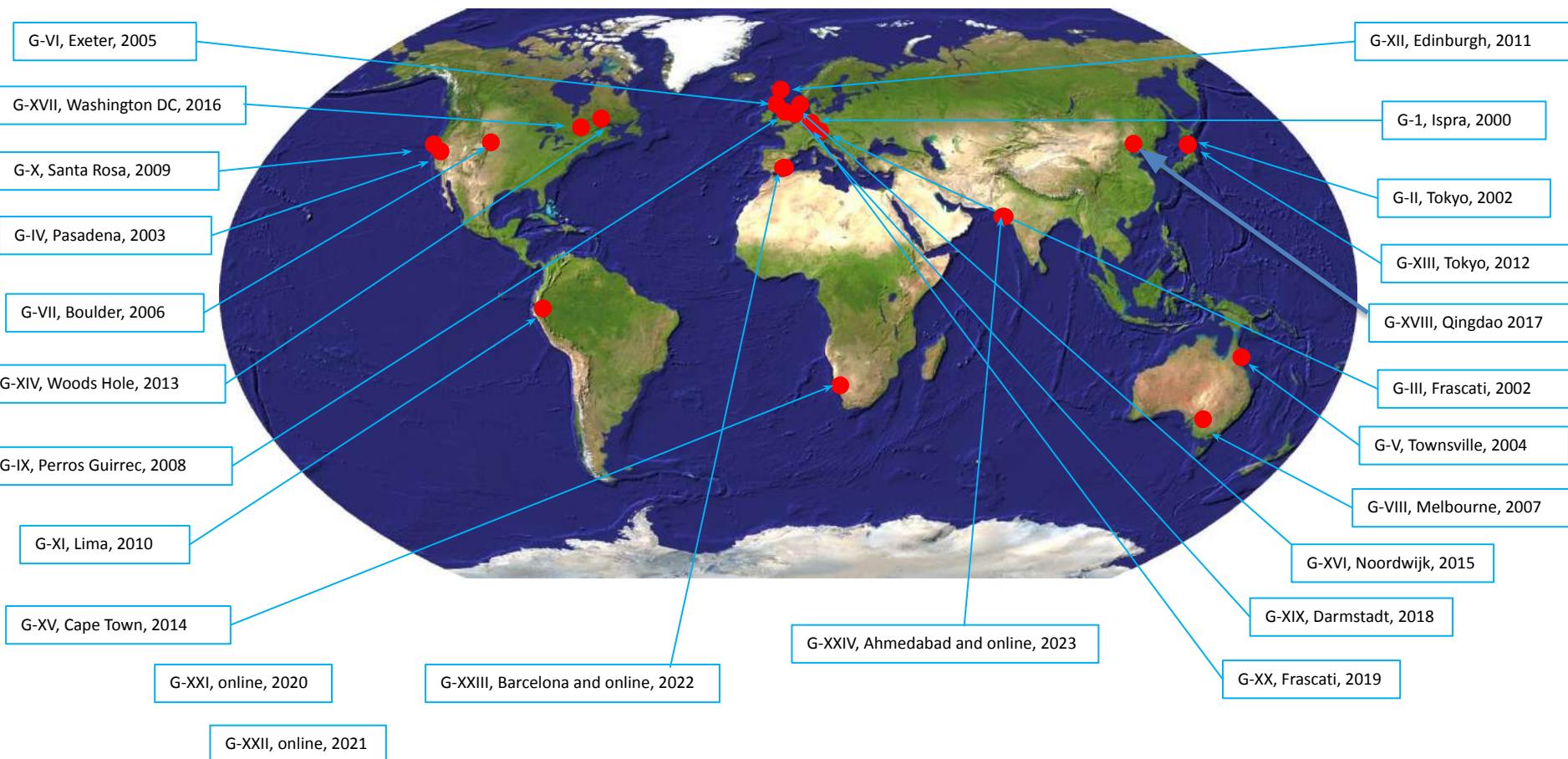


GHRSSST annual International Science Team Meetings

- These annual meetings are open to all
- Format: International SST Users' Symposium
- Next meeting: GHRSSST 24 will be a Ahmedabad (India), in-person and online, 16-20 October 2023, hosted by ISRO



International Science Team Meetings



GHRSSST Talks

- GHRSSST invites colleagues across the SST community to join us for a new series of regular online knowledge exchange events.
- Relaxed meetings are an opportunity to share ideas, discuss methods and communicate results with a specific focus on Sea Surface Temperature.
- All speakers and topics:
www.ghrsst.org/ghrssttalks

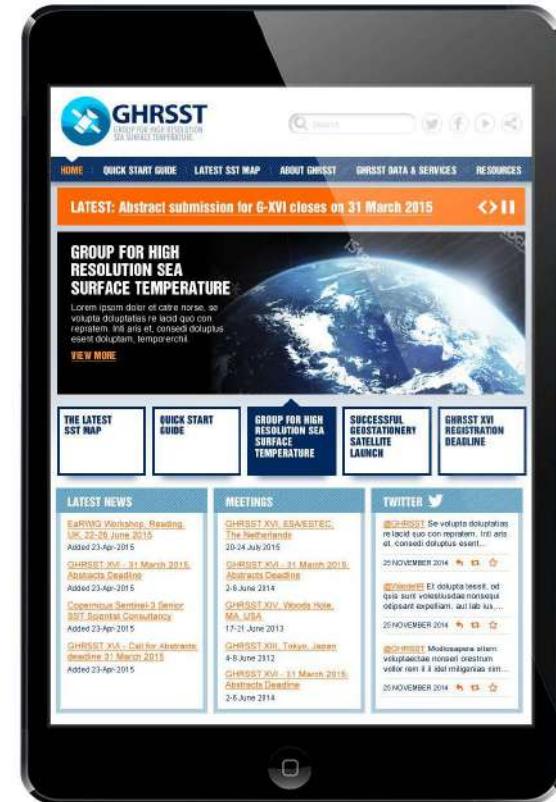


Main activities



- Run Project Office
- Provide support to Science Team (ST) and ST Chair
- Support Task Team activities
- Organise ST meetings
- Organised capacity building measures
- Maintain GHRSSST documentation
- Maintain GHRSSST website

<http://www.ghrsst.org>



Patrons and Sponsors



GHRSSST Project Office

Hosted by the Danish Meteorological Institute (DMI)

- GHRSSST Project Coordinator: Chiara Bearzotti (DMI)
- GHRSSST Project Administrator: Pia Wind (DMI)
- GHRSSST Project Office team (DMI): Jacob Høyer, Ioanna Karagali, Vivian Henningsen

Funded by EU Copernicus programme via EUMETSAT



Thank you



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<https://www.ghrsst.org/outreach/newsletter/>



SEA SURFACE TEMPERATURE IN EUROPE



SST/IST Data Producers and Providers

Level 2P (LEO)
Level 3C (GEO)

EUMETSAT / OSI SAF
(MetOp, MSG/MTG, GOES-Atlantic, VIIRS)



Copernicus / EUMETSAT
(Sentinel-3, TRUSTED buoys)

CCI / C3S
(Sentinel-3, AVHRR)

Level 3S
Level 4

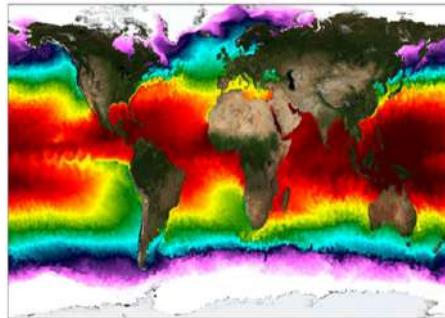
Copernicus Marine Service
(Satellite and In Situ)



UKMet
(OSTIA)

The Copernicus Marine Service SST TAC

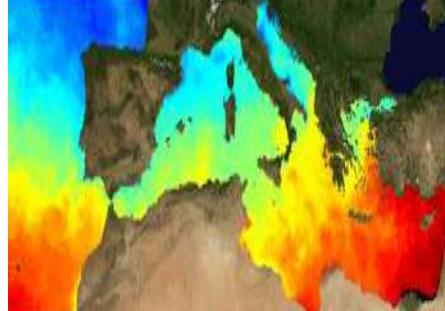
Global (GLO) Odyssea L4 NRT



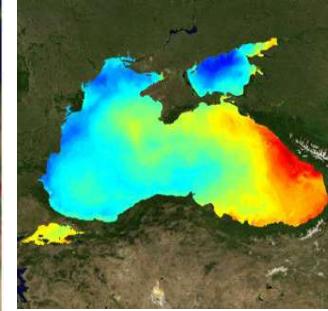
- Within Copernicus Marine Service, the SST TAC is in charge of the **Near-Real-Time (NRT)** and **Multi-Year (MY)**, also known as **Reprocessed (REP)**, production of **merged multi-sensor (L3S)**, and **gap-free (L4)** SST products for the **Global Ocean** and the **European regional Seas**
- All the SST TAC products are primarily based on satellite observations
- Currently (March 2023), the SST TAC portfolio includes **21 SST products (13 NRT/8 REP) + 18 OMIs (Ocean Monitoring Indicators)** - [recent addition of several L3S](#)

ATL (IBI+NWS)

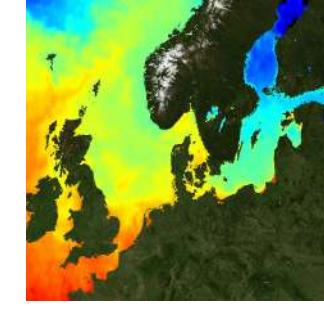
Mediterranean Sea (MED)



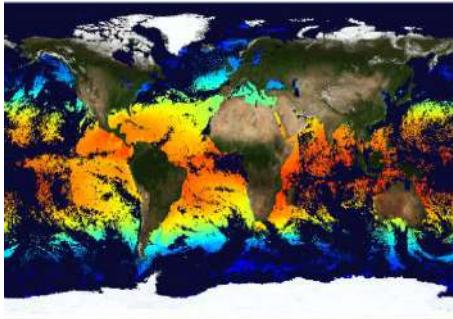
Black Sea (BS)



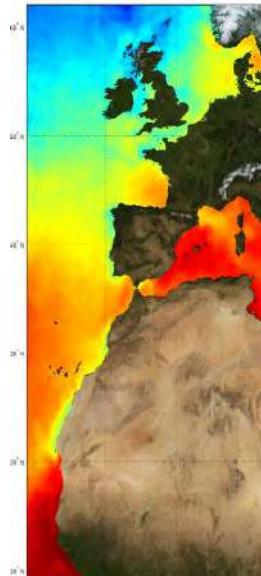
Baltic Sea (BAL)



Odyssea L3S NRT (GLO)



- Due to Brexit, since January 2023 Met Office is no more part of this consortium
- Continuous evolution to **improve the quality** and **provide new products**
- Inclusion of all relevant new sources** of data in the processing systems as they become available, as done for SLSTR from **Sentinel-3A/-3B**



PROGRAMME OF
THE EUROPEAN UNION

Copernicus
Europe's eyes on Earth

implemented by

 MERCATOR
OCEAN
INTERNATIONAL



ODATIS products

Product	Resolution	Producer	Funding project
L2P Global Metop-A, B, C	1 km	Meteo-France	OSI SAF
L3C North Atlantic Metop, VIIRS	2 km		
L3C Global Metop-A, B, C	5 km		
L3C Geostationary Atlantic MSG & GOES (soon MTG)	5 km		
L3C Geostationary Indian Ocean MSG	5 km		
L3S/L4 North Atlantic	2 km		CMEMS
L3S/L4 Global	10 km		

L2P/L3 ECOSTRESS,	60-100m	?
Landsat-9, (<i>TRISHNA, Landsat</i>)		



PROGRAMME OF
THE EUROPEAN UNION



implemented by

