26th meeting of the CEOS SIT-26

Initial proposal for a CEOS Sea Surface Temperature Virtual Constellation (SST-VC)

Craig Donlon (ESA)
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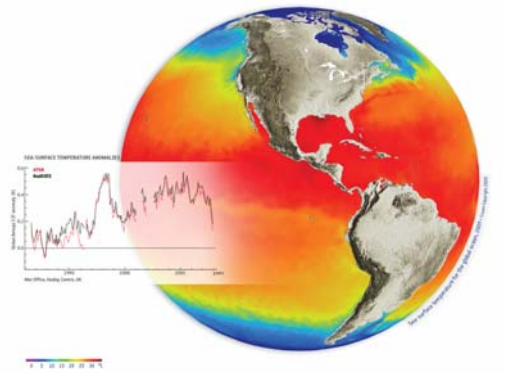
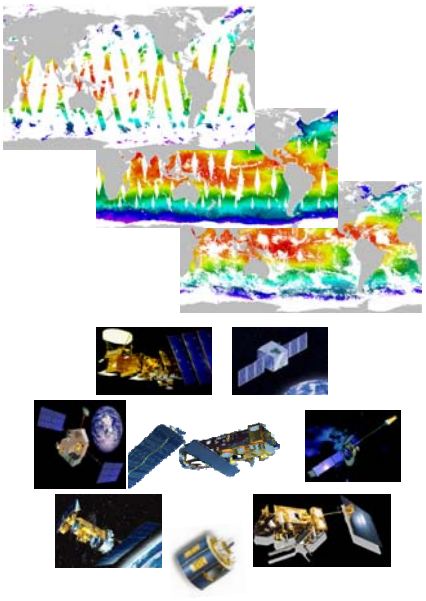
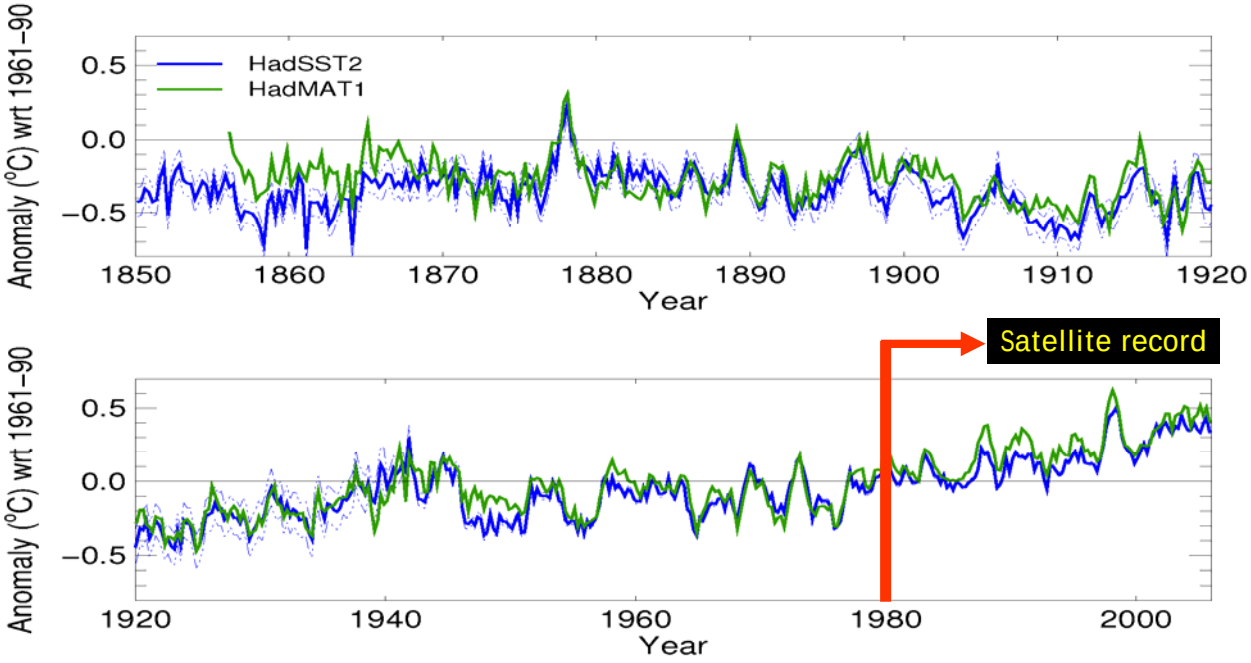


Overview

- Background
- Challenges for the SST-VC
- Relevant Missions
- Proposed Objectives
- Proposed Implementation
- Summary and Conclusions



SST: The ***First and longest*** global marine instrumental climate data record.



HadSST2 data used in IPCC Fourth Assessment Report, ***Rayner et al, 2006, JGR (Atmos). (anomalies from 1961-90)***

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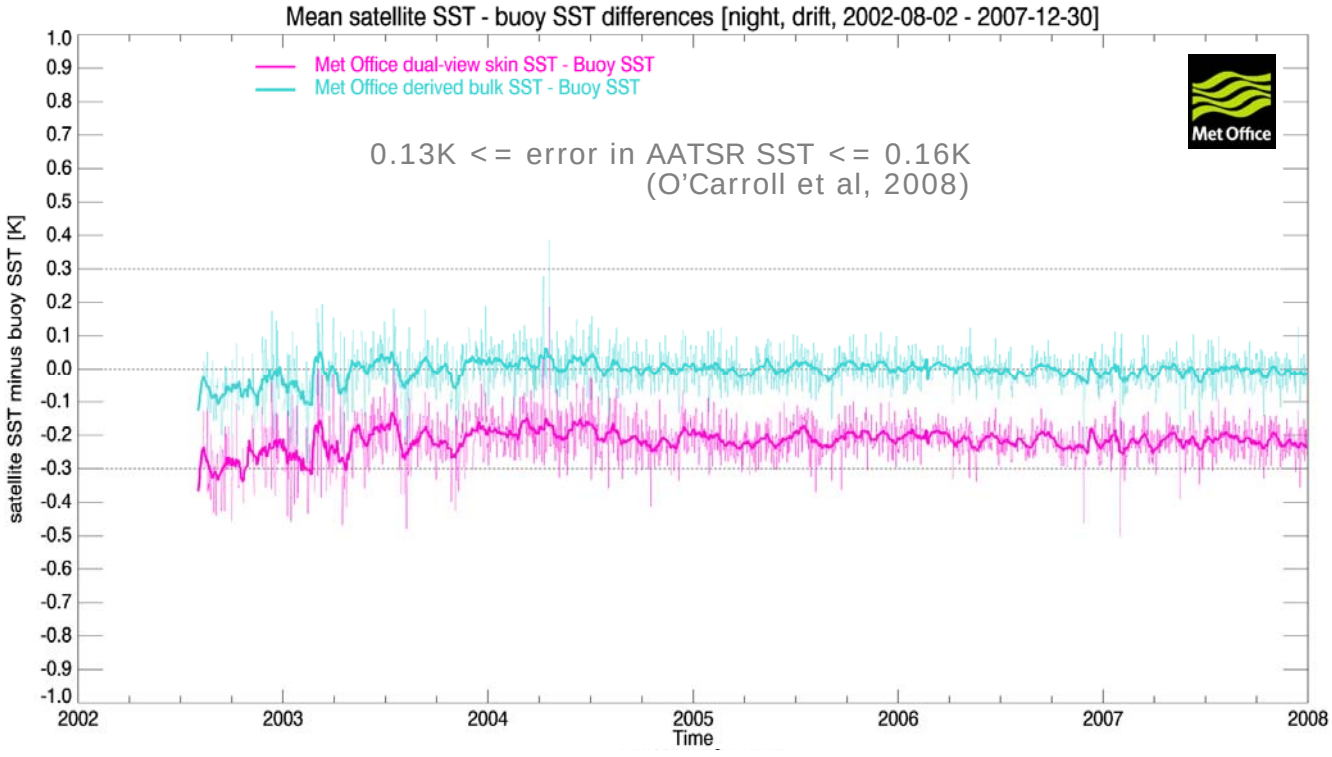
Satellite SST Bias from a variety of data…



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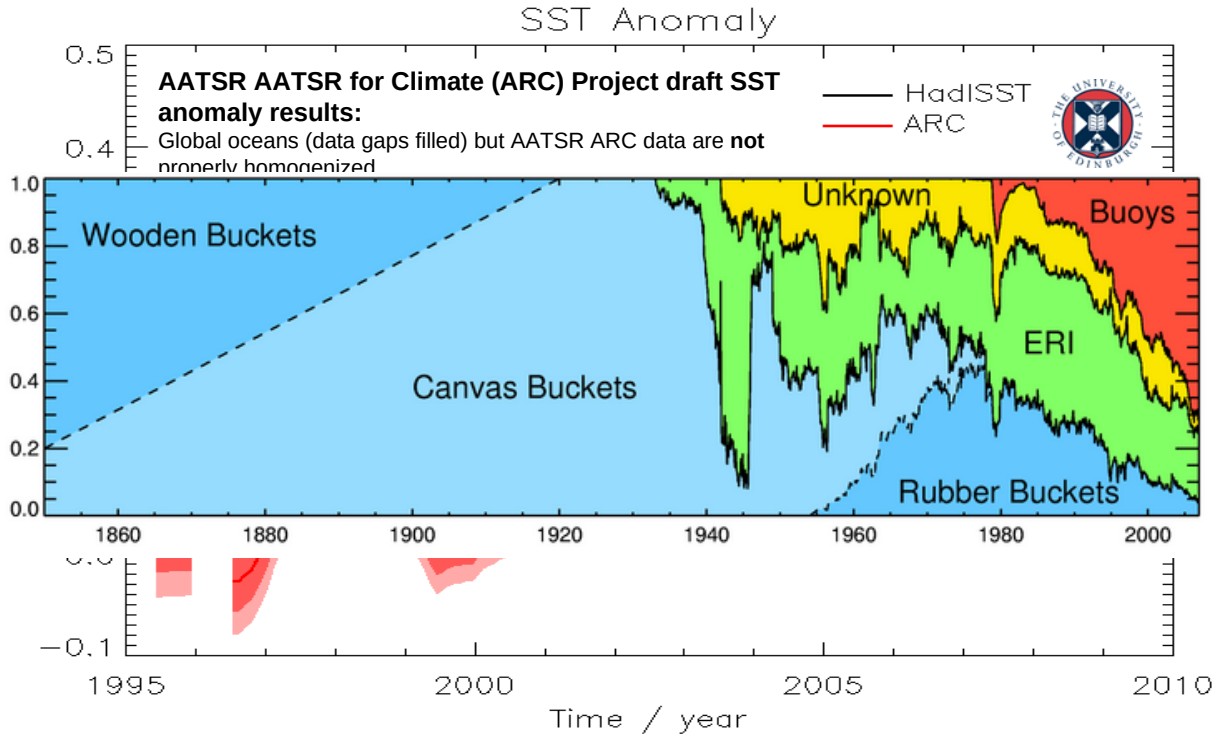
Example “Modern Era” Satellite SST record form the (A)ATSR series (preliminary results) compared to Hadley Centre HadISST Reference climatology (1995-2010)



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Long Term Stewardship and Reanalysis Facility

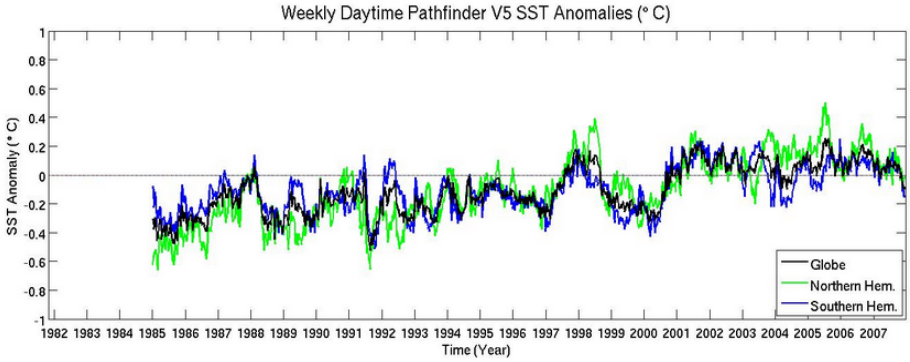
LTSRF GHRSST Long Term Stewardship and Reanalysis Facility — NOAA NODC

http://www.nodc.noaa.gov/SatelliteData/ghrsst/metrics_phaseone.html

GHRSST Reanalysis/GCOS SST-SI Diagnostics - Descriptive

For ease of display on this website, the descriptive metrics have been divided into four tables: one each of "Time-dependent Diagnostics" and "Map Diagnostics" for the Weekly and Monthly products. Time-dependent diagnostics include those with time on the x-axis; map diagnostics are on a latitude-longitude grid.

Time-dependent Diagnostics: Weekly One Degree Products

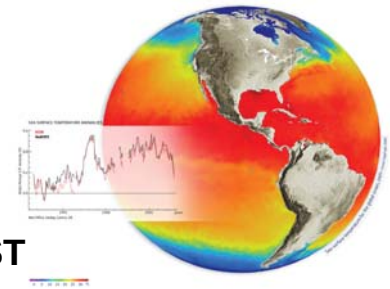


GCOS Weekly One Degree SST Anomalies - Time Series Metrics			
Data Set Name	Day/Night	Global and Hemispheric Time Series	Time-Latitude Sections
AVHRR Pathfinder V5 Q=4-7	Day Only	X O	X O
	Night Only	X O	X O
	Day/Night Average	X O	X O
AVHRR Pathfinder V5 Q==	Day Only	X O	X O
			X O
			X O
Operational AVHRR			X O
			X O
			X O
HadSST2			X O
			X O
			X O
QISSTv2	Day/Night Average	X O	X O
	Day/Night Average	X O	X O

Lots of work has been done comparing EO SST data with Climate SST analyses together with GCOS SST & Sea Ice working group

CEOS SST-VC: Challenges

- Several CEOS **Agencies have invested considerable resources in SST activities**
- The in-flight and future SST constellation **could be optimised further** to:
  - **Address GCOS and GEO activities**
  - **Strengthen CEOS Agency collaboration on SST activities through improved coordination *e.g.*,**
    - Improve **continuity of passive microwave data**
    - Make **better use of AATSR/SLSTR and other reference sensors**
    - Develop **better products and services** for users
    - Improve **calibration, validation and uncertainty estimation**
    - **Minimise duplication of activities** and provide CEOS agencies better value for money
    - **Gain wider CEOS participation in SST activities**



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GCOS

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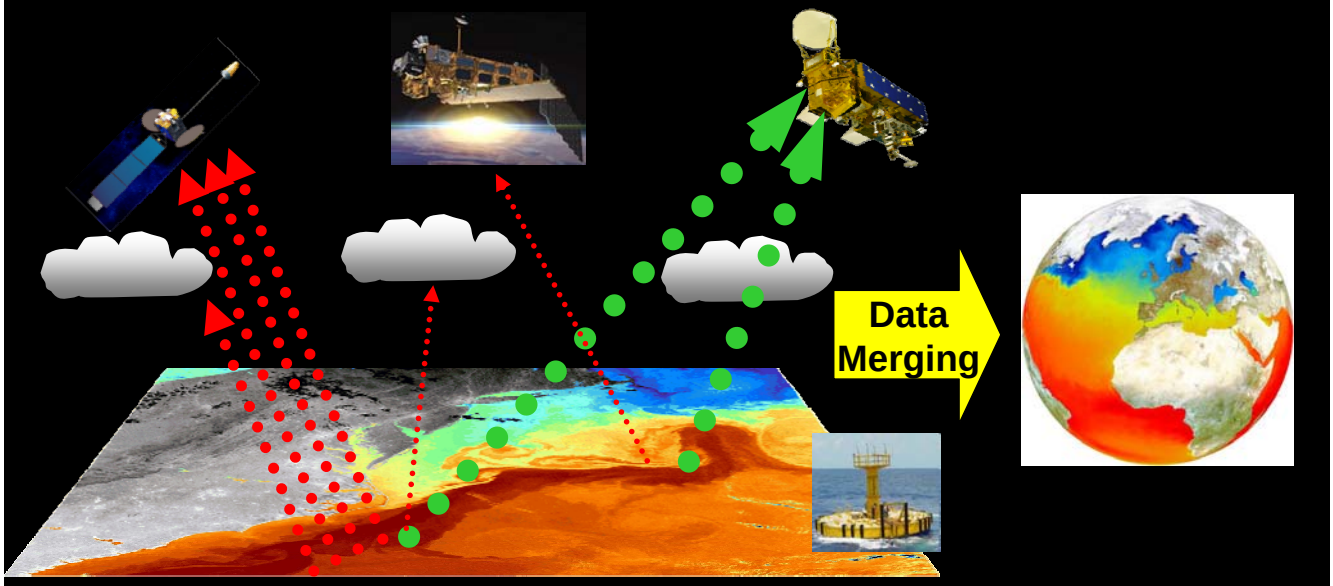
The proposed CEOS SST-VC builds on EO complementarities…



- Polar infrared has *high accuracy & spatial resolution*
- Geostationary infrared has *high temporal resolution*
- Microwave Polar orbiting has near *all-weather capability*
- In situ data provide *reality in all weather conditions*

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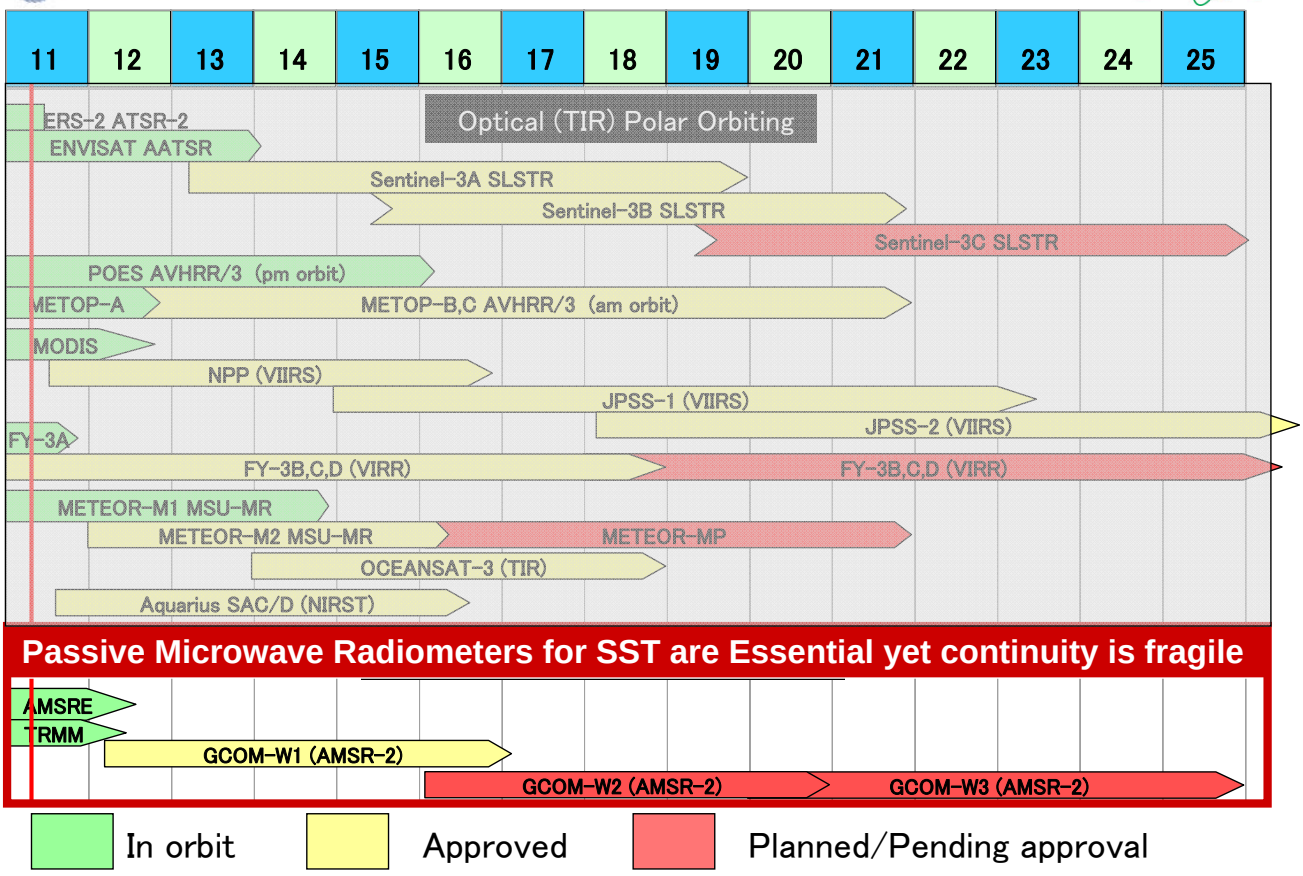
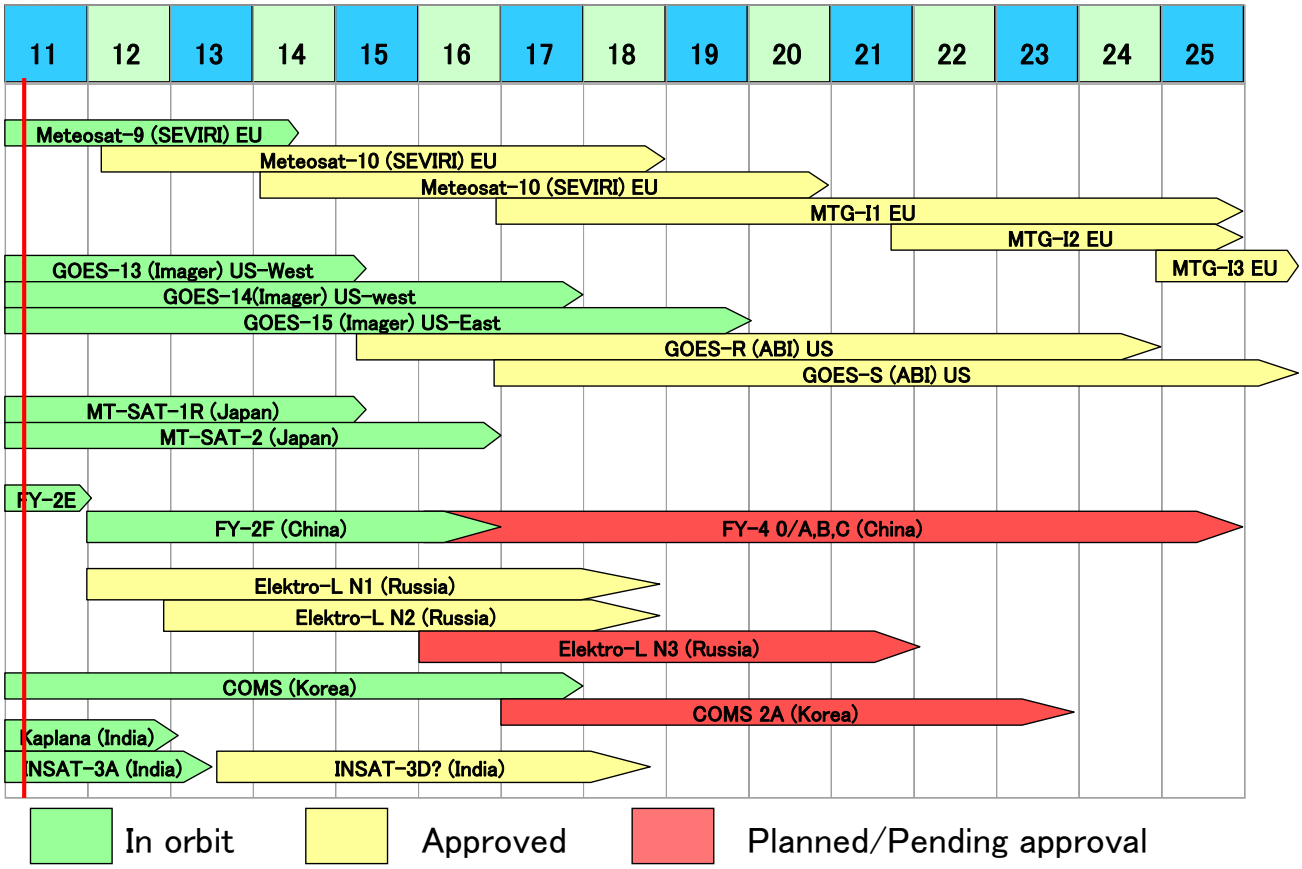
Sea Surface Temperature (Polar orbiting)

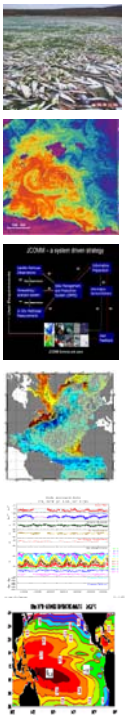


Sea Surface Temperature (Geostationary)



SST-VC: Proposed objectives

1. Develop and **improve satellite SST Essential Climate Variable** (e.g., CEOS WG-Climate)
2. **Improve user feedback** to CEOS Agencies
3. **Minimise duplication** of existing activities
4. Development and **optimization of the SST constellation: maximise synergy benefits**
5. Develop and implement **metrics** for SST services, products and users (feedback statistics to CEOS)
6. Coordinate consensus **reference documents**
7. Encourage **timely access to products**
8. Improve EO SST **calibration, inter-calibration and validation** (WGCV QA4EO implementation)
9. Develop **training activities** for satellite SST practitioners (WGEdu)
10. Liaise with the **other virtual constellations**



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GCOS/GEO Actions Addressed

- **The use of EO data in support of the GCOS SST ECV is a key focus of the SST-VC**
- **GEO tasks most relevant to the activities of the proposed SST-VC include both transverse and SBA.**

- ***Infrastructure:***
  - IN-01: GEOSS Common Infrastructure
  - IN-02: Earth Observing systems
  - IN-03: Earth Data Sets
  - IN-04: GEOSS Communication Networks
  - IN-05: Gap analyses
- ***Institutions and Development***
  - ID-01: Data sharing
  - ID-03: Developing Institutions and Individual Capacity
  - ID-04: Building Communities and Awareness
  - ID-05: Ensuring GEOSS sustainability
- ***Information Services***
  - DS-02: High Impact Weather Forecasting
  - DS-03: Climate Information
  - DS-04: Ocean Monitoring, forecasting and Resource Development
  - DS-09: Global Agricultural Monitoiring and Early Warning
  - DS-12: Global Carbon Observations and Analysis
  - DS-13: Global Ecosystem Monitoring

- **SST impacts many GEO climate, weather, ecosystem and agriculture SBA tasks e.g. aquaculture, fisheries, ocean prediction and monitoring, climate and seasonal prediction…**

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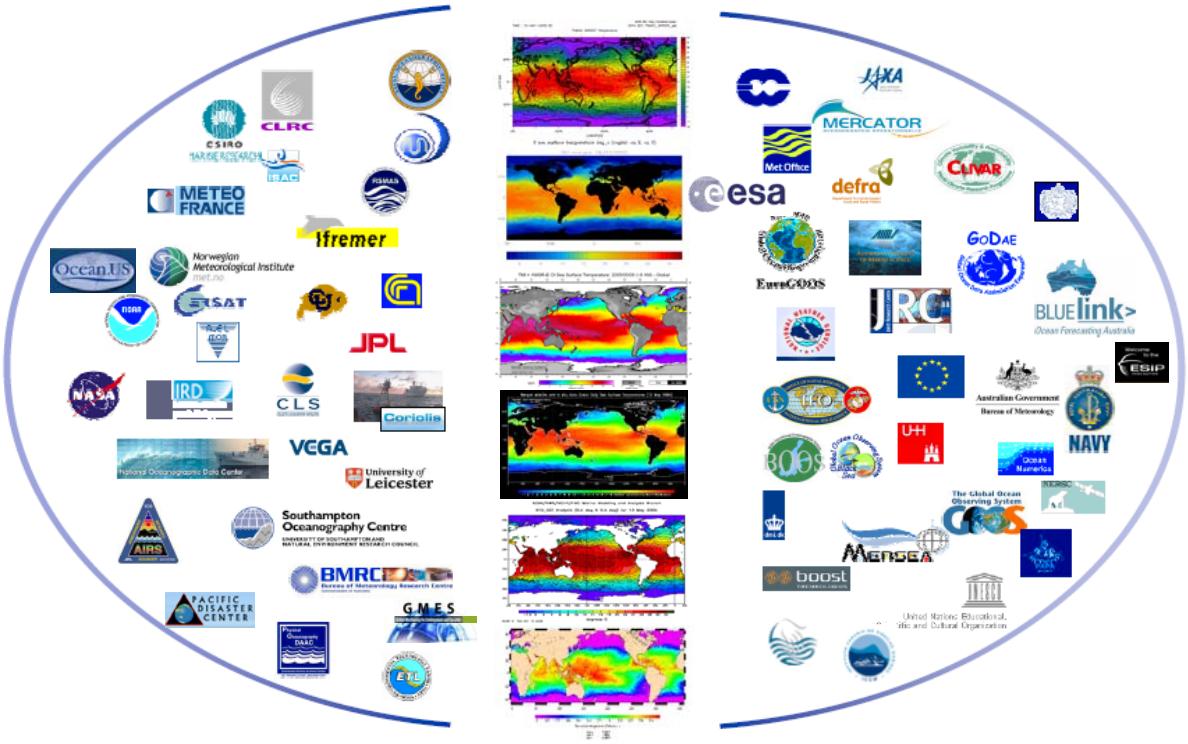
There are many Stakeholders for SST…



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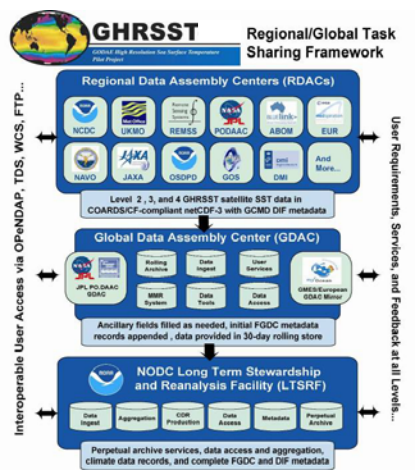
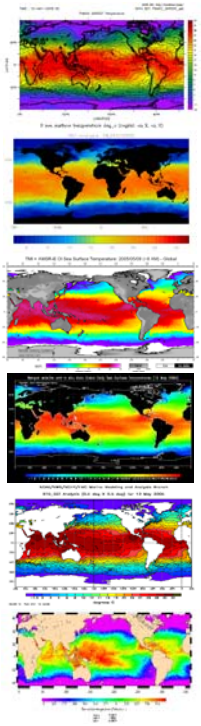
CEOS SST-VC: Implementation

- We **propose to implement the SST-VC building on the existing Group for High Resolution SST (GHRSST) framework.**
- Using this approach, the CEOS SST-VC has instant access to:
  - **A baseline SST virtual constellation** system of systems
  - **Internationally agreed SST products**, **services and** user outreach services
  - **Initial consensus technical documentation** for the constellation
  - **A functional coordination mechanism** active at the international level





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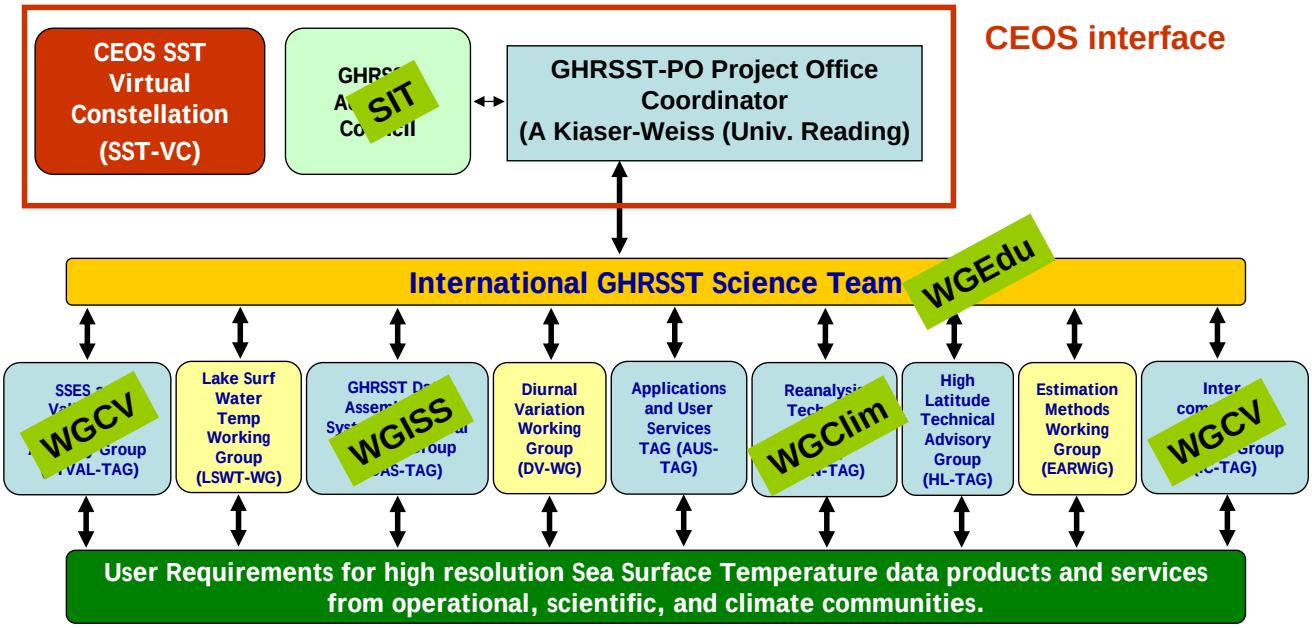
CEOS will interface to GHRSST activities using the GHRSST Stakeholder Advisory Council



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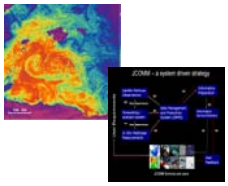
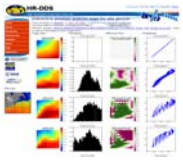
Benefits of the proposed approach

- **Strengthen CEOS Agency SST activities** through better synergy and communication;
- Nurture a global framework and **encourage wider participation of all Agencies**;
- **Better SST product and service interoperability** building on the strengths of CEOS Agencies;
- Facilitate **better data access** and **product applications**;
- Provide **value for money** by capitalising on the investments already committed to GHRSST;
- Allow a **rapid spin up of SST-VC** activities with minimal overhead.





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SST-VC: Way forward

An **Initial Proposal to CEOS for an SST-VC has been developed**

- Endorsed at the 11th GHRSST Science Team Meeting, June 2010, Lima Peru
- Presented for information to the CEOS SIT Technical Workshop participants, Montreal, September 2010
- Presented for information at the CEOS Plenary, Rio de Janeiro, October 2010

If endorsed today, the SST-VC Initial proposal will be developed into a full proposal (CEOS VC process)

- Expect this to be complete in 4th quarter 2011 if required
- To be endorsed by GHRSST Science Team
- Expect the SST-VC to coordinate the CEOS response to GCOS regarding SST (as done for GCOS-107 already)

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Summary and Conclusions

1. The **CEOS process has been followed** for VC.
2. There are **significant benefits** for an SST-VC for CEOS, GEO and GCOS ***and user/producers***
3. **GHRSST provides an excellent basis** for implementing the SST-VC
   - allowing rapid spin up and minimum duplication of activities - connecting to 'grass roots' work
   - Providing value and return on investment
   - **Request CEOS Agencies to nominate representatives to the GHRSST Advisory Council**
   - Please consider attending the Upcoming GHRSST meeting University of Edinburgh, Scotland, 27 June to 1 July, see http://www.ghrsst.org for details.
4. **CEOS SIT is invited to consider the Initial proposal for an SST-VC**

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Thank You

Any questions?

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