

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

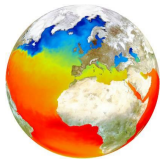
Introduction to the CEOS Virtual Constellation for Sea Surface Temperature (SST-VC) and Group for High Resolution Sea Surface Temperature (GHR SST)

Misako Kachi

on behalf of CEOS SST-VC

Kenneth Casey, Anne O'Carroll,
Victor Zlotnicki, Craig Donlon,
Helen Beggs, Christo Whittle,
PK Thapliyal, Peter Minnett,
Gary Corlett

GHR SST and CEOS SST-VC



GHR SST

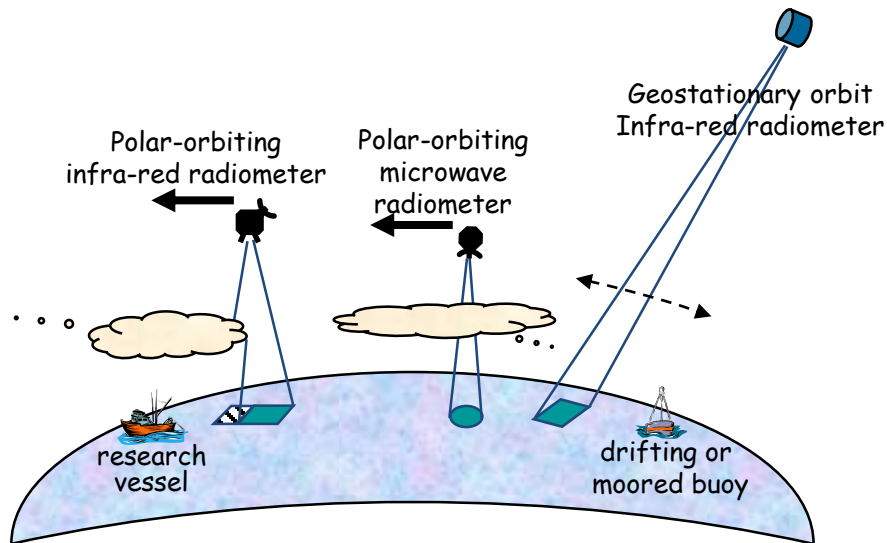
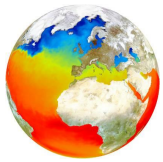
- The Group for High Resolution Sea Surface Temperature
 - Grew out of a Pilot Project of the Global Ocean Data Assimilation Experiment (GODAE), 1997-2008.
- Composed of an international Science Team of researchers and operational practitioners.
- Coordinates research and operational developments in satellite-derived SST.
- Data processing through Regional and Global Data Assembly Centers.

SST-VC

- The Sea Surface Temperature Virtual Constellation (SST-VC) serves as the formal link between GHR SST and the broader CEOS community.
- The SST-VC provides a means for CEOS to present its needs and requirements to GHR SST and for GHR SST to present its needs directly to CEOS.

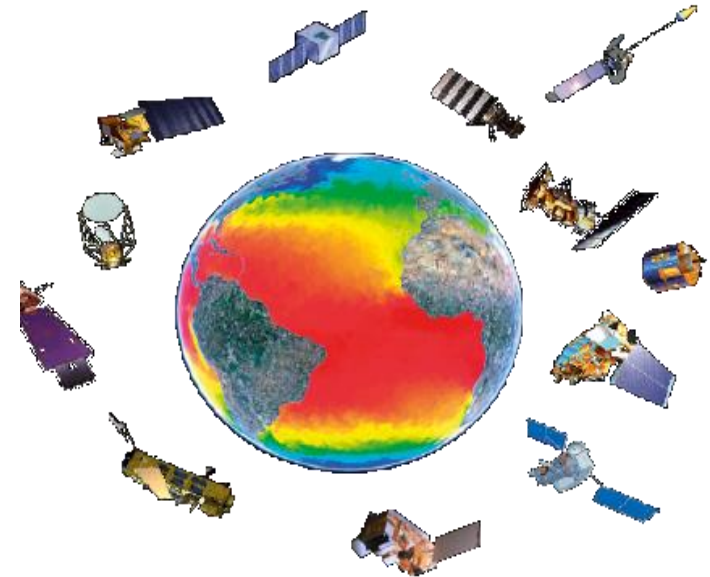


Optimizing the SST constellation



GHRSSST exploits complementary data sources

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

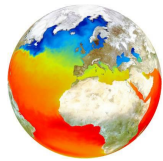


SST constellation gap analysis

- Current gaps that need attention include:
 - Redundant capability in microwave SST measurements (NSOAS)
 - Geostationary SST over Indian Ocean (ISRO; CMA)
 - Replacement 'reference' dual-view satellite radiometer (SLSTR)



Data Processing Levels

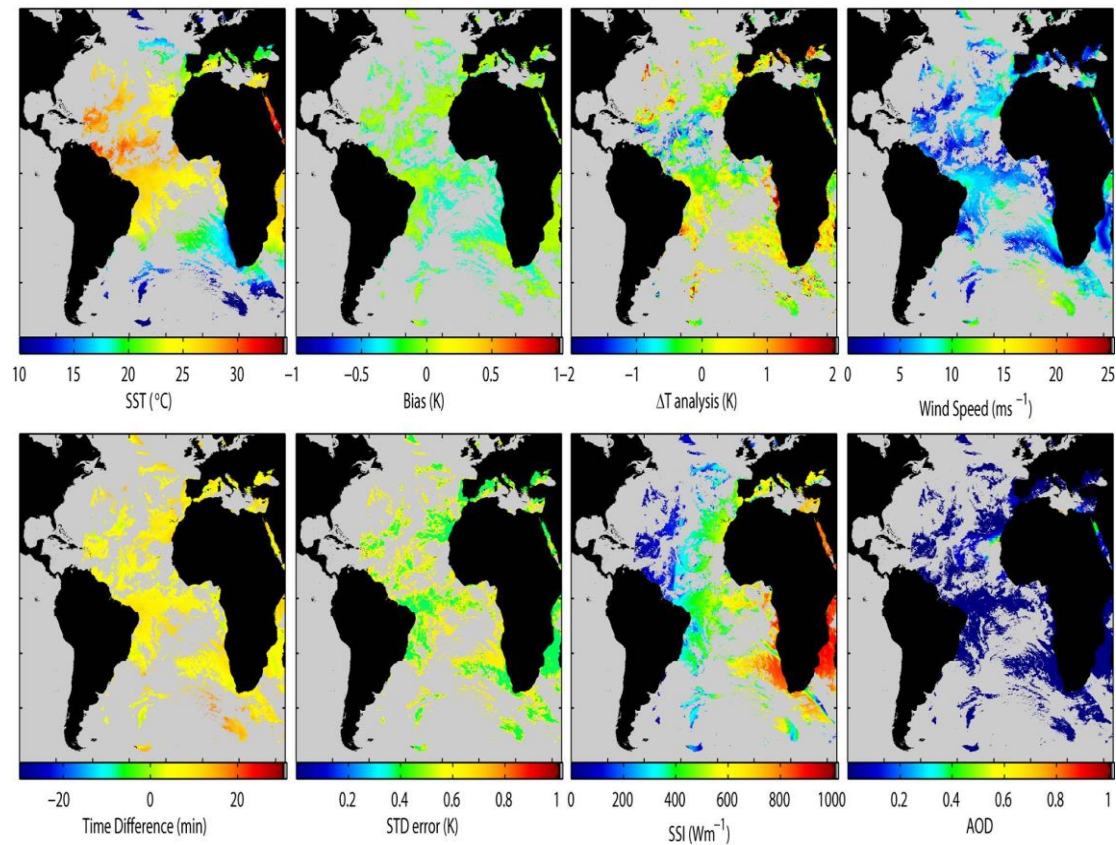
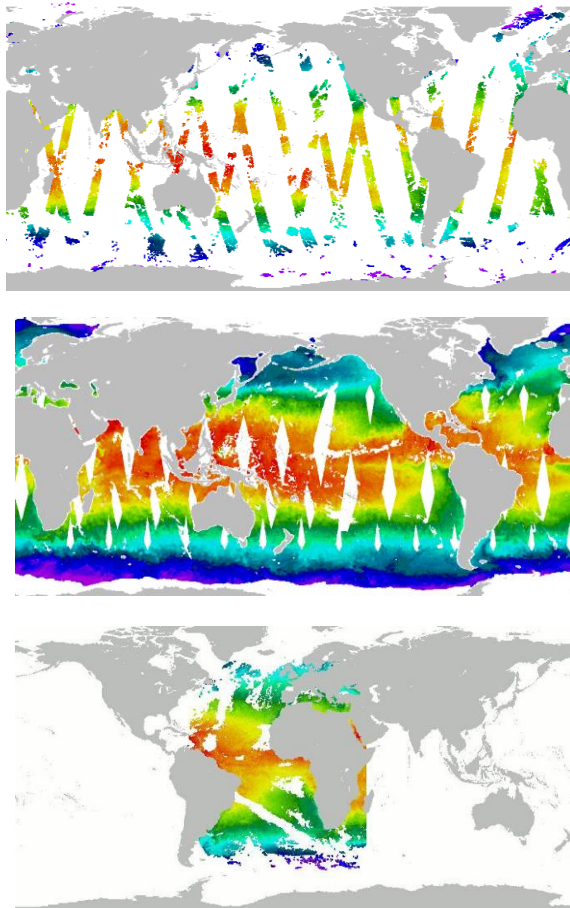
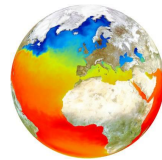


Data Level	Description
Level 0	Reconstructed, unprocessed instrument and payload data at full resolution.
Level 1B	Level 0 data that have been processed to geolocated radiances
Level 2P	Derived SST at the same resolution and location as Level 1B source data.
Level 3	Variables mapped on uniform space-time grid scales, with some degree of spatial averaging (L3U and L3S) and temporal averaging (L3C).
Level 4	Output from analyses of lower-level data (e.g., variables derived from multiple measurements).

Provided by each sensor provider

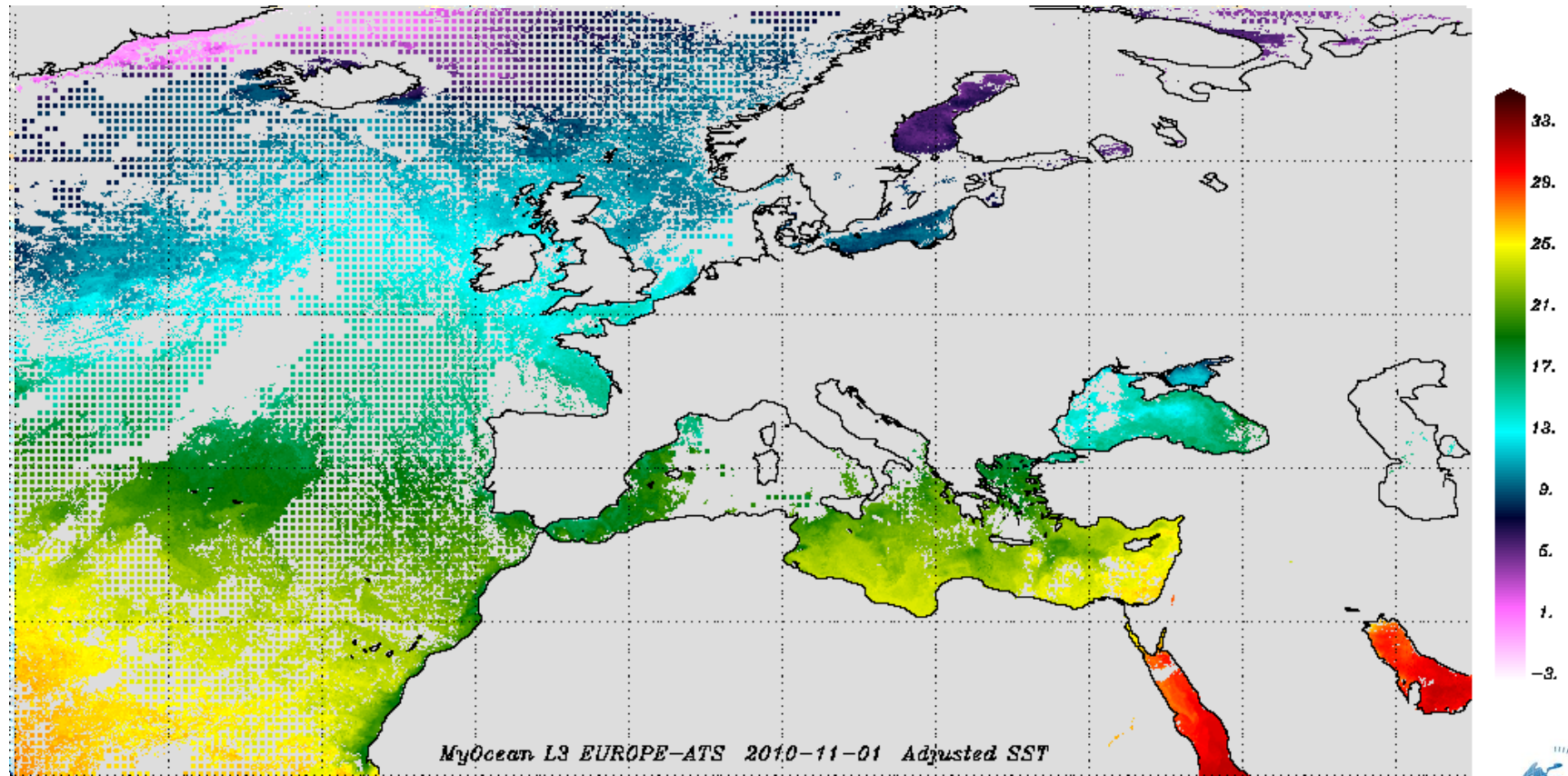
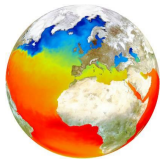
GDS format based CF compliant NetCDF

L2P: Common format with uncertainties

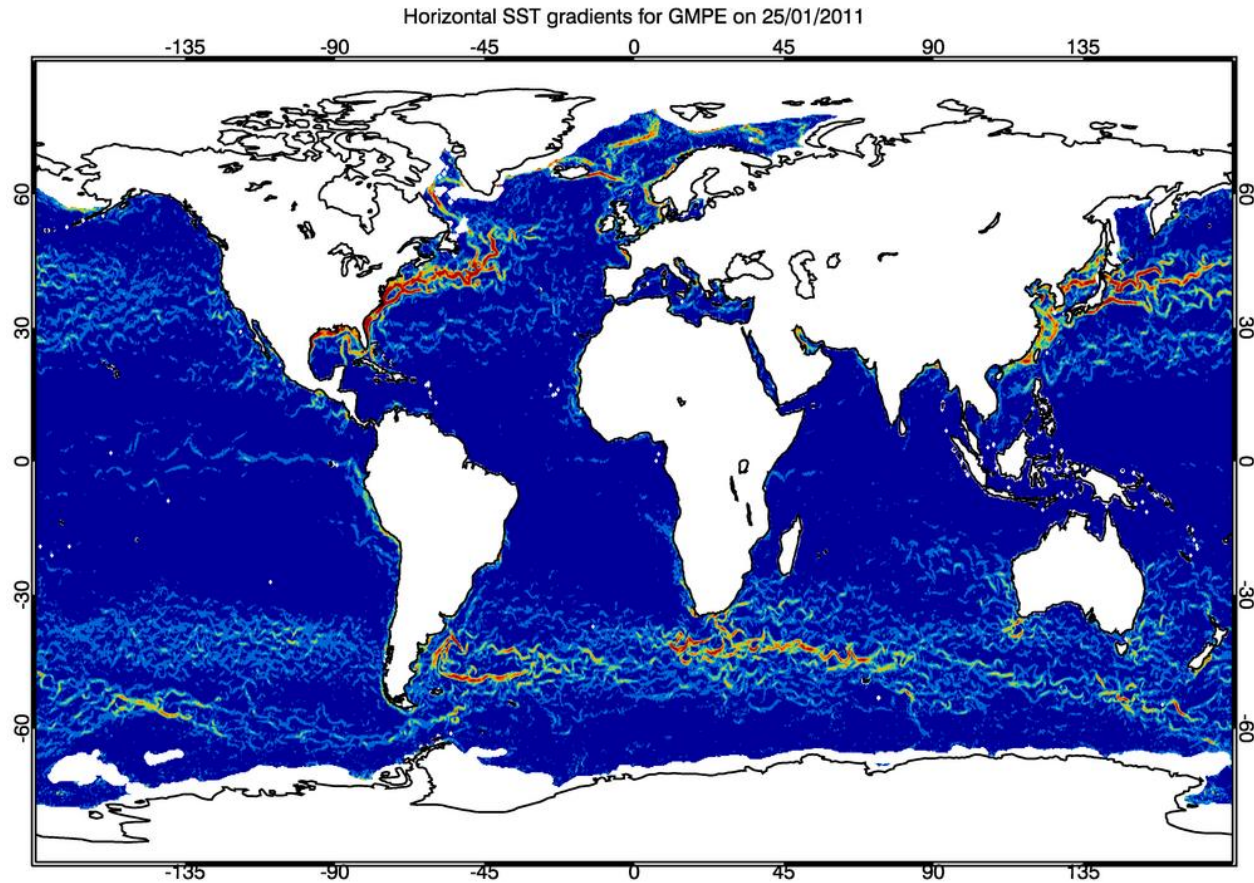
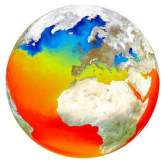


Ancillary information in L2P products: dynamic flags

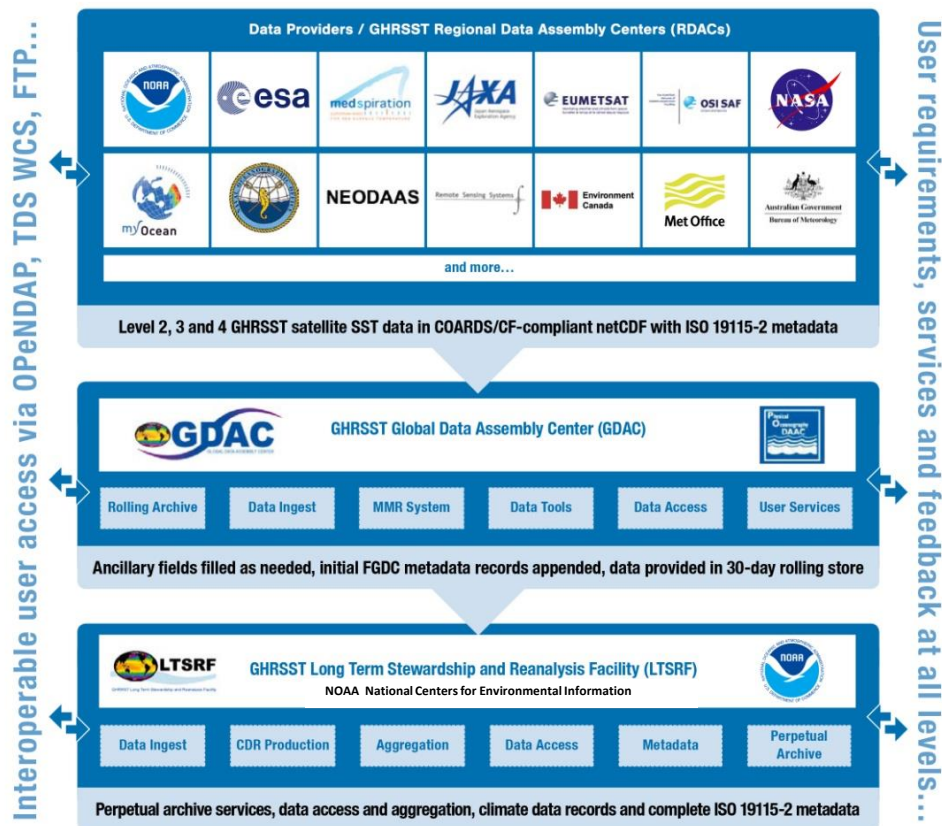
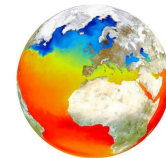
Example L3S: Multiple sensors SST_{foundation}



Example L4: GHR SST Multi-Product Ensemble (GMPE)

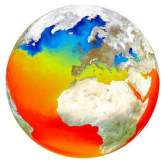


Regional/Global Task Sharing

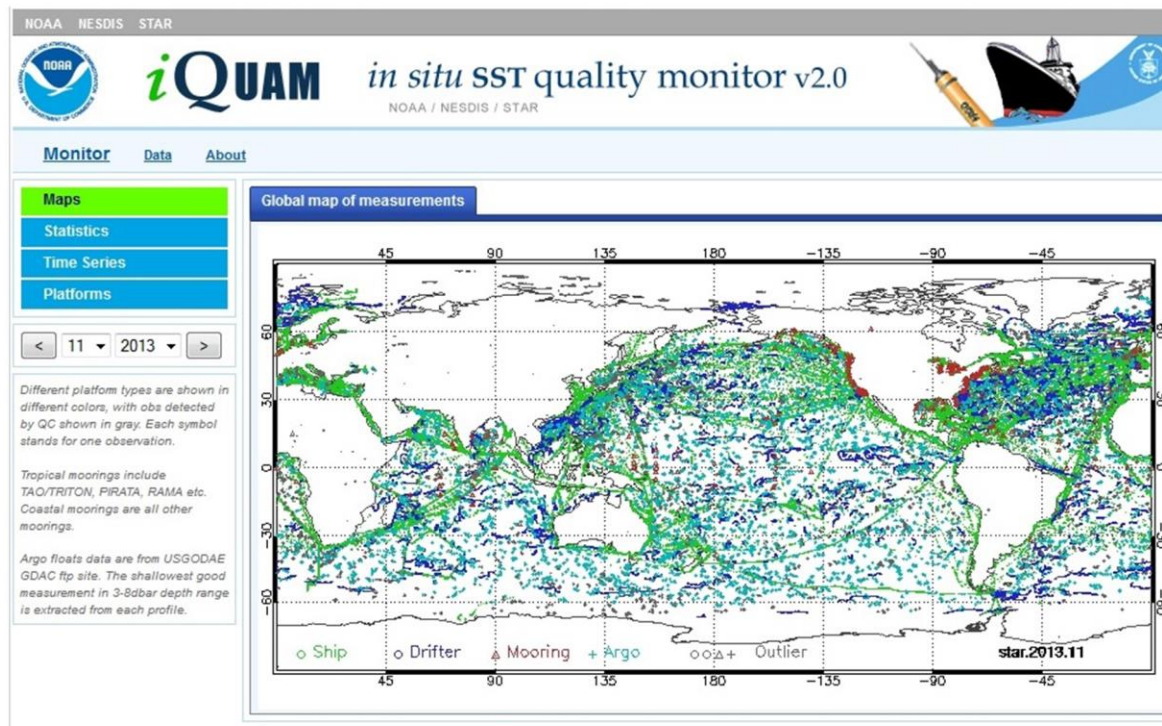


- GHR SST products generated by RDACs
 - Some RDACs are self-serve
- GHR SST offers to serve data on-behalf of RDACs
 - Optional step but recommended
 - Additional metadata for discovery services
- Real time
 - Global Data Assembly Centre (GDAC)
 - Primary system hosted by NASA JPL
 - See <http://podaac.jpl.nasa.gov/>
 - Secondary system hosted by Ifremer
 - See <http://cersat.ifremer.fr/data/collections/ghrsst> (requires simple registration)
 - Not all datasets are mirrored
- Delayed mode
 - Long-term Stewardship and Reanalysis Facility (LTSRF)
 - Hosted by NOAA NODC
 - See <http://data.nodc.noaa.gov/ghrsst/>
- Data can be accessed using many methods
 - ftp, http, DAP, WMS, WCS, LAS, Geoportal, Granules, CWI
- Any issues
 - Please contact the GHR SST Project Office (gpc@ghrsst.org)

Product Validation

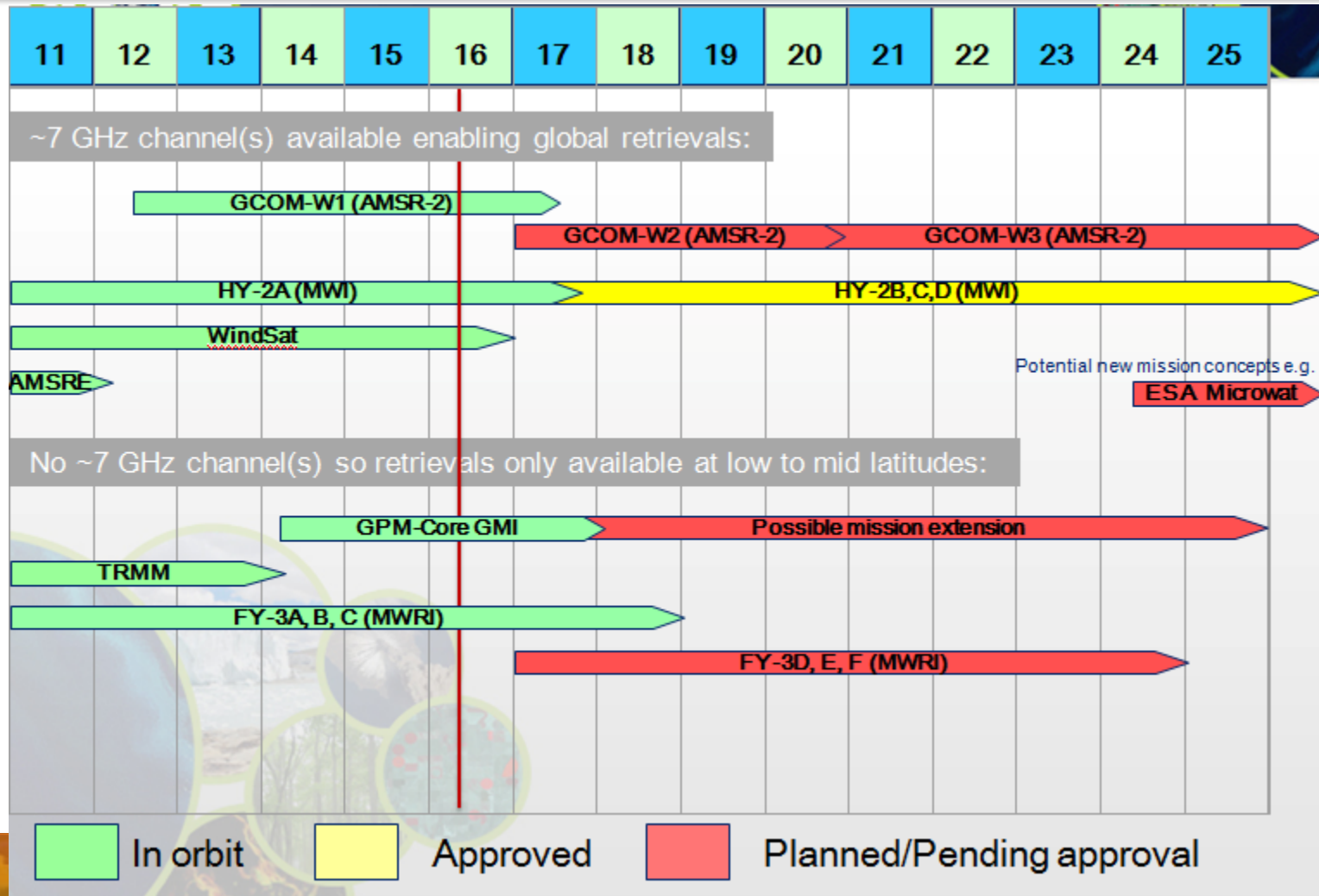
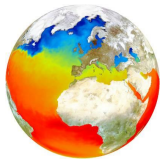


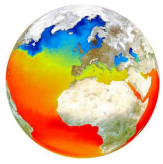
- GHR SST exploits online monitoring systems to access quality controlled *in situ* data for validation and use in L4 analyses



There are some tools such as iQuam, Felyx and SQUAM that can form the basis of standardised validation

PMW Constellation for SST



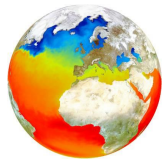


Concerns about Future PMW SST Continuities

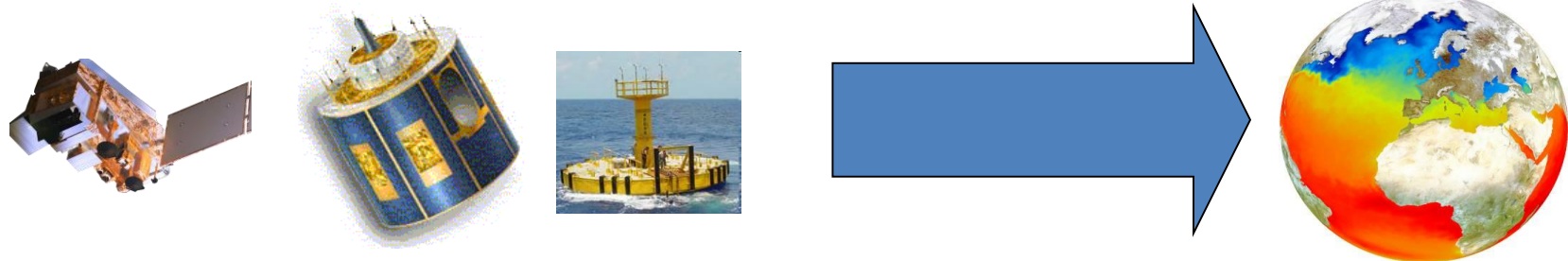
- Use of Passive Microwave Radiometers (PMW) for SST retrievals is an essential component of global constellation of SST sensors.
- Provides temperature of ocean under clouds, not possible from infrared sensors, albeit with coarser spatial resolution.
- Particularly important in high-latitude regions and in areas of extensive and persistent cloud cover or in case of a large volcanic event.
- Uncertain future for PMW SSTs, especially at high latitudes where the PMW SSTs provide valuable through-cloud data in the region where the climate is changing most rapidly.
- The current outlook means there is a high risk of a gap, particularly for SSTs using the ~ 7 GHz channel.
- Retrieval of PMW sea surface wind speed mainly uses 36-GHz channels, but that of all-weather sea surface wind speed uses both ~ 7 - and ~ 11 -GHz channels.



Summary



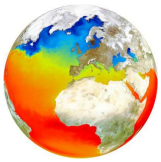
- GHR SST mission: To provide satellite-derived global SSTs with good estimates of uncertainty to operational users and the science community.



- The provision of SST data by GHR SST has grown to a mature sustainable essential service.
- CEOS SST-VC provides a means for CEOS to present its needs and requirements to GHR SST and for GHR SST to present its needs directly to CEOS.
- Concerns regarding PMW observation continuities were presented by SST-VC at the CEOS SIT meeting in April, and will be presented at the CGMS in June 2016.
- GHR SST and SST-VC seek possible collaborations and synergies with IOVWST and OSVW-VC activities. We need **coordinated efforts on data continuity of PMW.**



GHR SST Future Meeting Dates



- GHR SST-XVII
 - Near Washington DC, USA, 6th – 10th June 2016
- GHR SST-XVIII
 - Qingdao, China, 5th – 9th June 2017
- GHR SST-XIX
 - Darmstadt, Germany, 4th – 8th June 2018