

GHRSSST and the CEOS Virtual Constellation for SST

Kenneth S. Casey¹ and Craig Donlon²

¹NOAA/NESDIS National Oceanographic Data Center, Silver Spring, MD, USA; ²ESA/ESTEC (EOP-SME), Noordwijk, South Holland, Netherlands



In the last decade, the satellite-based sea surface temperature (SST) community has coalesced around the efforts of the Group for High Resolution SST (GHRSSST), developing a global, distributed, and coordinated set of SST products for both operational and climate-oriented applications. These products conform to a common content and format standard, and are made available in both near real-time and delayed mode through a three-tiered data management system consisting of Regional Data Assembly Centres, a Global Data Assembly Centre, and a Long Term Stewardship and Reanalysis Facility.



Recently, the Committee on Earth Observing Satellites (CEOS) has begun establishing a set of Virtual Constellations (VC) organized around parameters like ocean color and ocean surface vector winds. These VCs are organizing and coordinating their domains much like GHRSSST has done for SST. In 2010, GHRSSST agreed to begin the process of formalizing its relationship with CEOS through the establishment of an SST-VC. The SST-VC will serve to connect the broad GHRSSST community, consisting of agencies, universities, and commercial partners, with the CEOS organization of space agencies.

Satellites carrying SST instruments

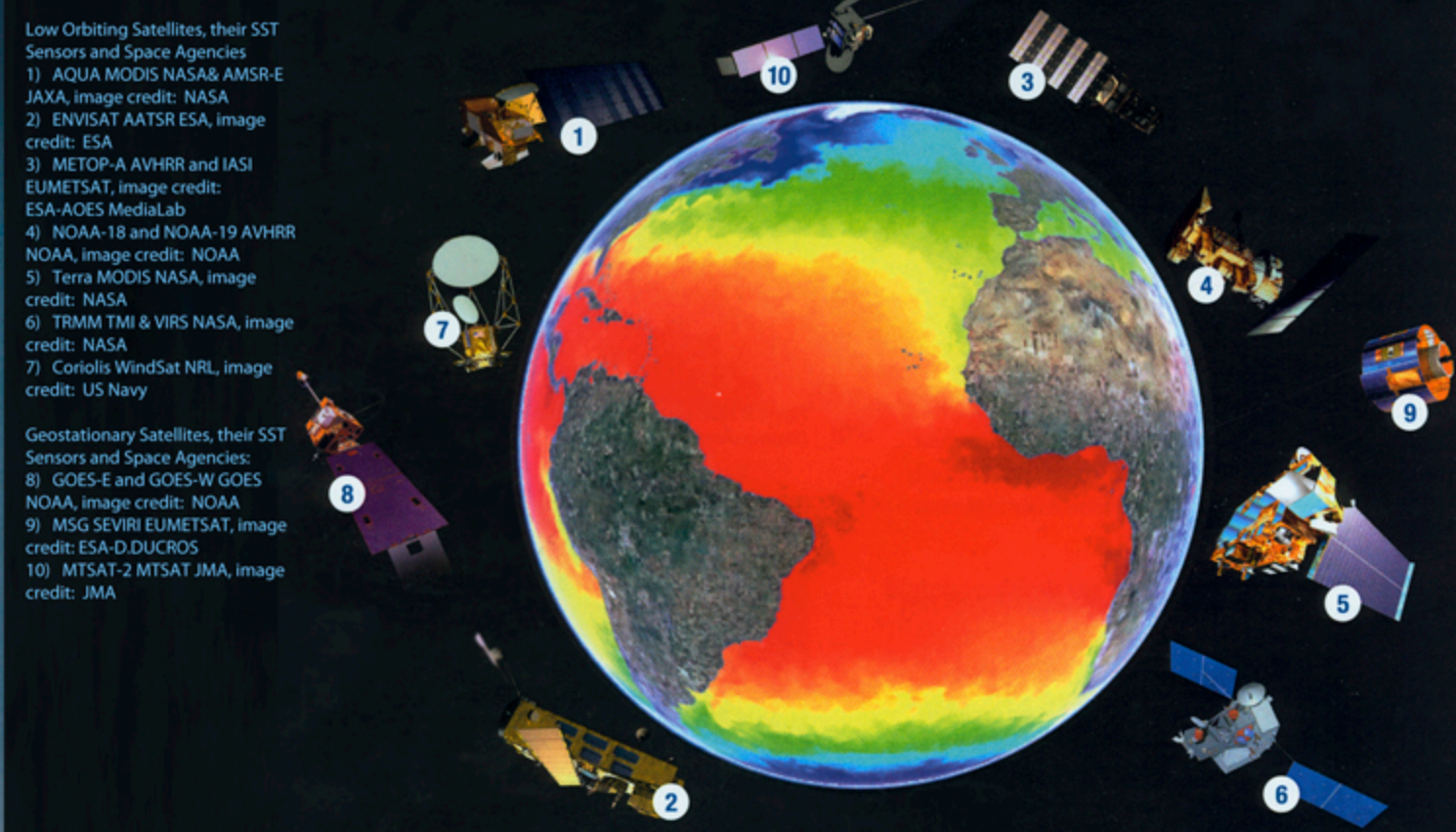


Figure 1. Four of the satellites carrying SST instruments are geostationary (GOES-E, GOES-W, MTSAT, MSG) and measure the earth disk beneath their orbit locations with limited coverage at high latitudes (five are required for full coverage of lower latitudes). TRMM TMI and VIRS operate in a low inclination orbit attuned to measurements of the tropics (40 degrees north and south). Of the remaining satellites, AMSR-E failed in October 2011 and only NOAA-19 and METOP are within their expected design lifetime.

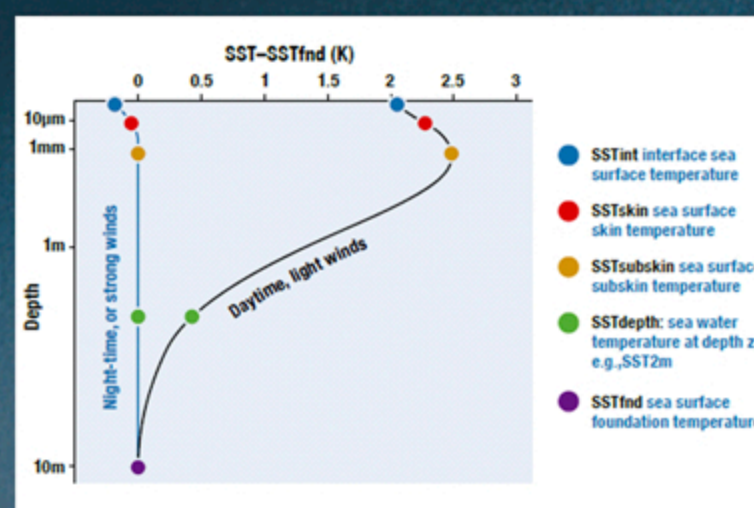


Figure 3. Hypothetical vertical profiles of temperature for the upper 10m of the ocean surface in high wind speed conditions or during the night (blue) and for low wind speed during the day (black).

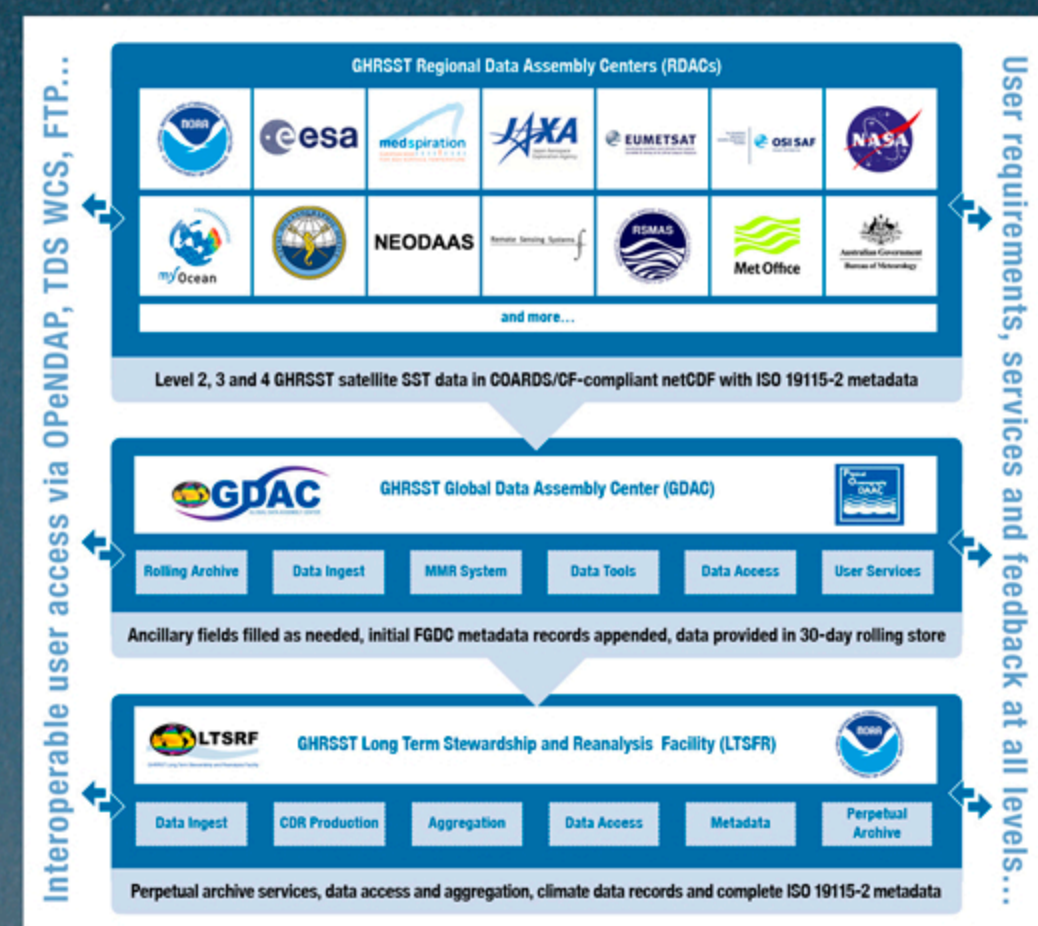


Figure 4. GHRSSST Regional/Global Task Sharing framework.

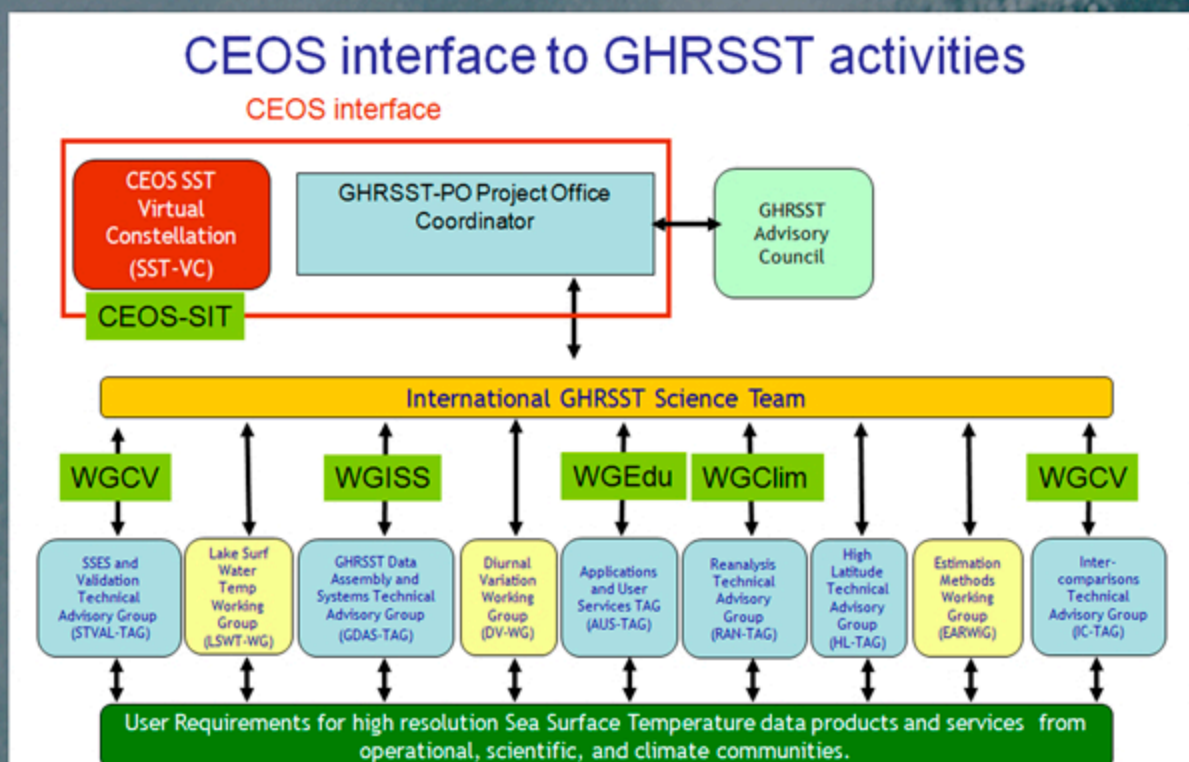
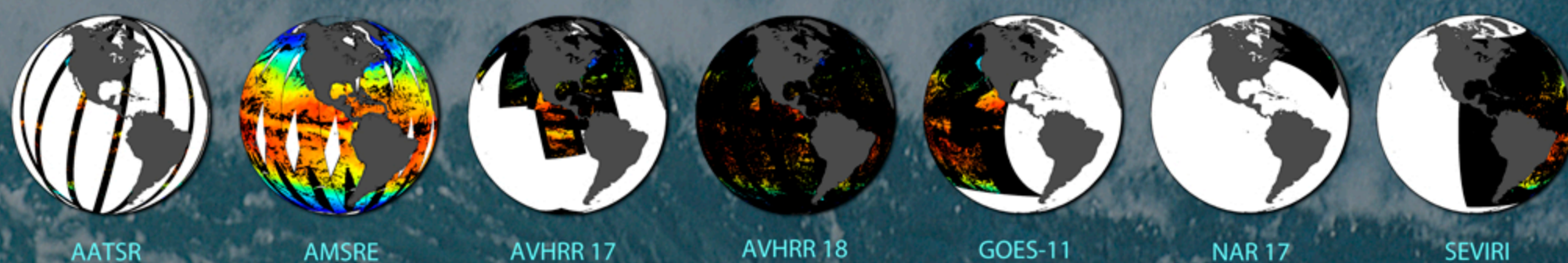


Figure 2. Mapping between GHRSSST and CEOS working groups. Overall coordination between the SST-VC and GHRSSST-Science Team will be managed through the GHRSSST International Project Office. Formal approval of the SST-VC is anticipated at the November 2011 CEOS Plenary.



GOALS of the SST-VC

- Better use of reference sensors such as ENVISAT AATSR and the Sentinel-3 SLSTR within the Constellation
- Assured long-term continuity of passive microwave SST data
- Response to climate users and climate services requirements
- Better and more homogeneous SST products and services to users
- Better international consensus product and service specification within controlled and approved documentation
- Better specification of uncertainty estimates within SST products
- Improved collaboration within the Constellation
- Improved coordination, consolidation and development of the collective SST capability
- Improved SST products, homogenization of products, services and product dissemination with better user engagement