SST Processing at the Naval Oceanographic Office

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NOAA/STAR JPSS Meeting
SST Breakout
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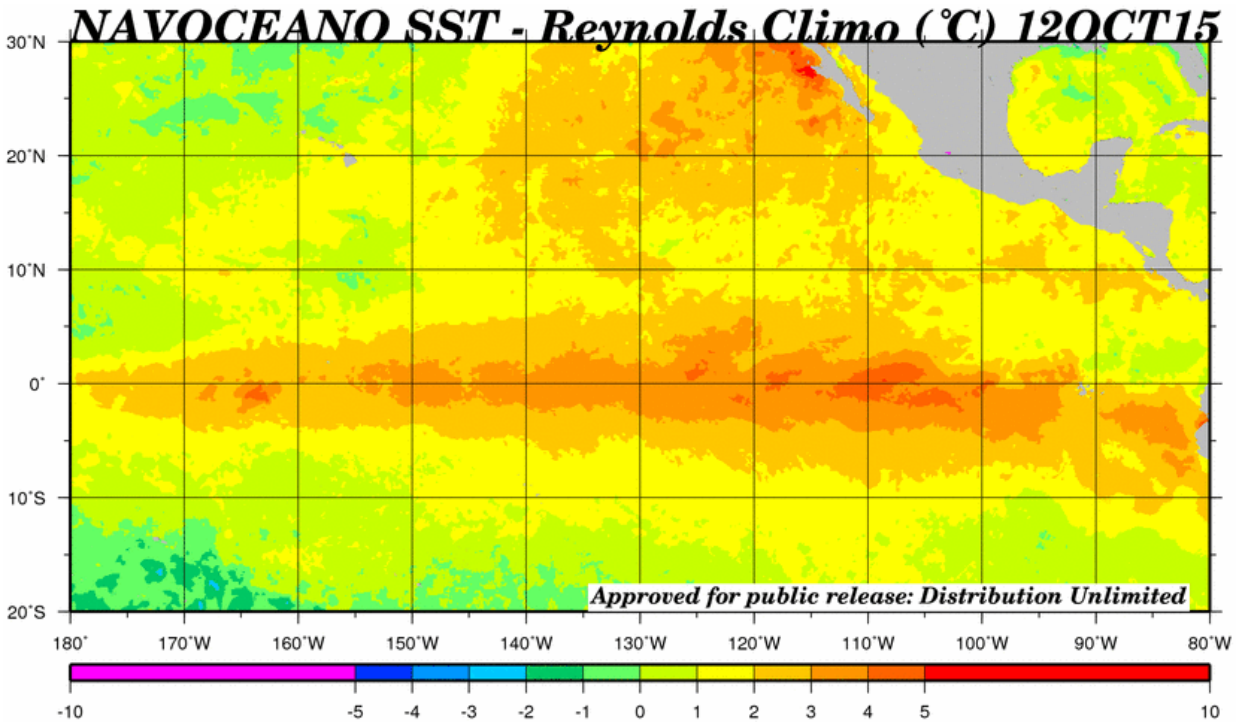
MCSST at NAVOCEANO

National Core Processing Center

- Output products
  - observational data
  - 10km fields
  - 2km gridded data
  - imagery
- Customers
  - NAVOCEANO
  - FNMOC
  - NOAA
    - NCEP
    - NCEI
  - NASA/JPL – PO.DAAC
  - GHRSST
  - Navy Fleet
- Supported Missions
  - Ocean Modeling
  - Under-Sea Warfare
  - Expeditionary Warfare
  - Maritime and Navigation missions

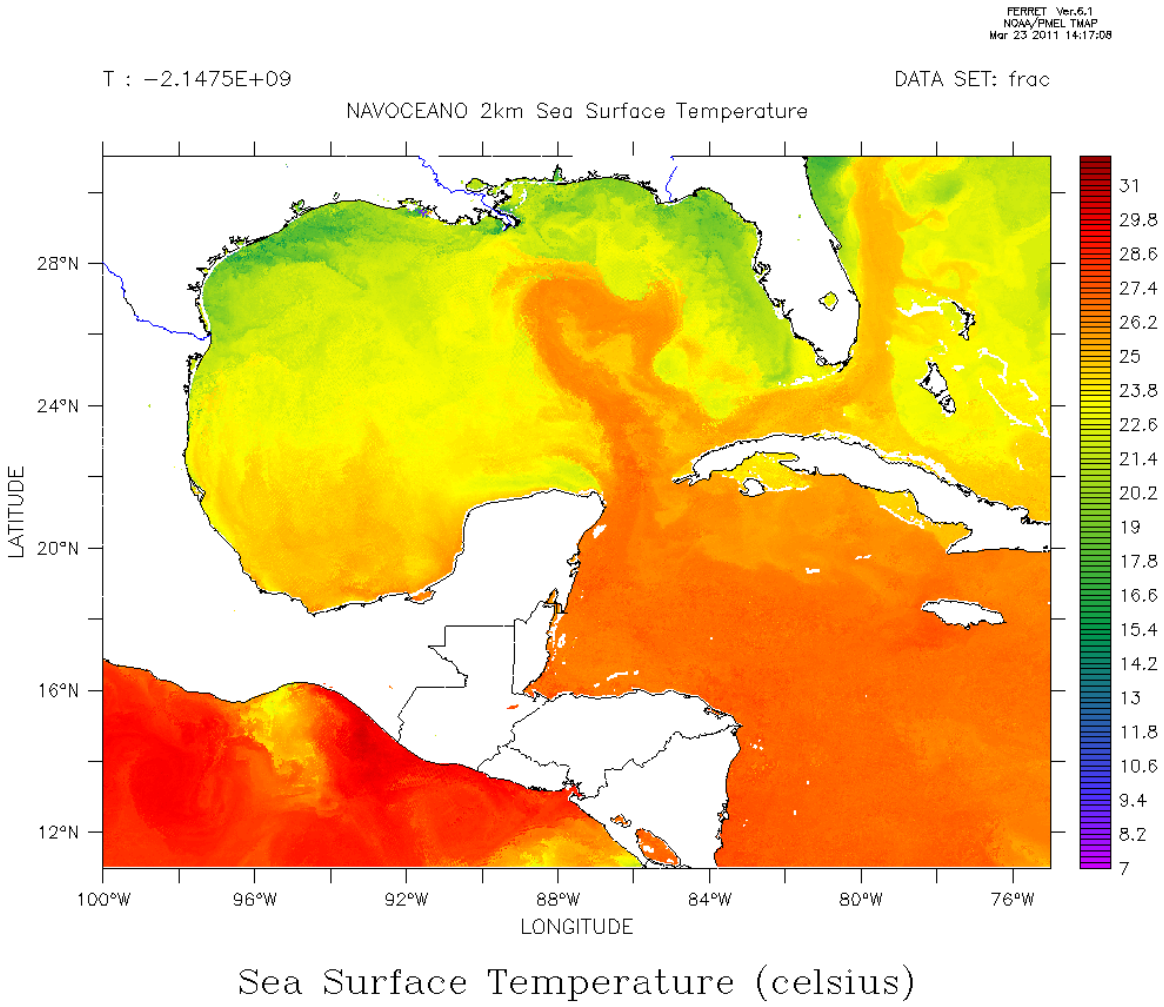


NAVO SST Quick Facts

- Processing is 24x7x365
- Over 500,000 lines of code
- 10 satellite data sources currently used
- 15,000 input files received daily (400+GB)
- 127 million SST observations daily

Satellite Sources – NAVO SSTs

- **Polar**
  - AMSR-2
  - NOAA-18 GAC
  - NOAA-19 GAC, LAC
  - METOP-A GAC, FRAC
  - METOP-B GAC, FRAC
  - SNPP
- **Geostationary**
  - GOES-13 (EAST)
  - GOES-15 (WEST)
  - Himawari-8



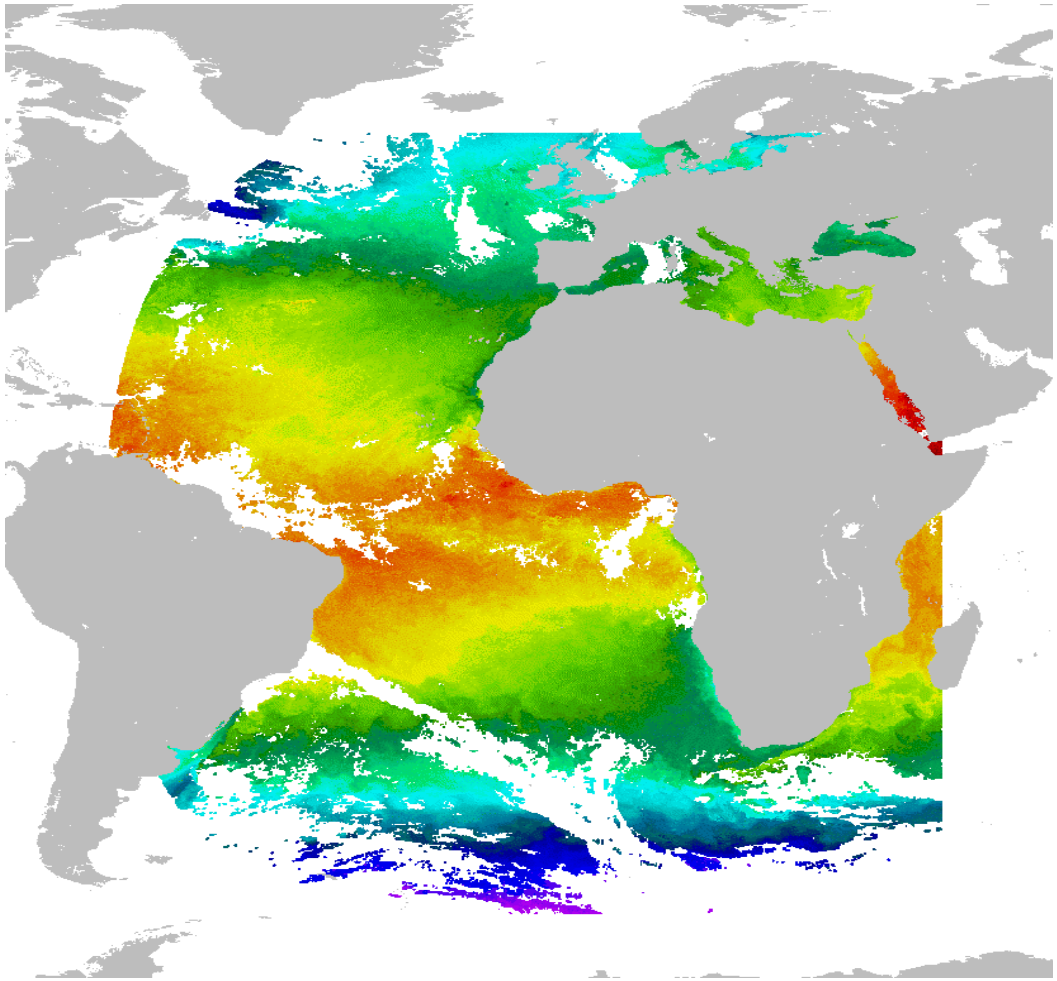
Other SST Data Sources

Current:

- MSG-3 (OSI-SAF)

Future:

- Sentinel-3 (EUMETSAT)

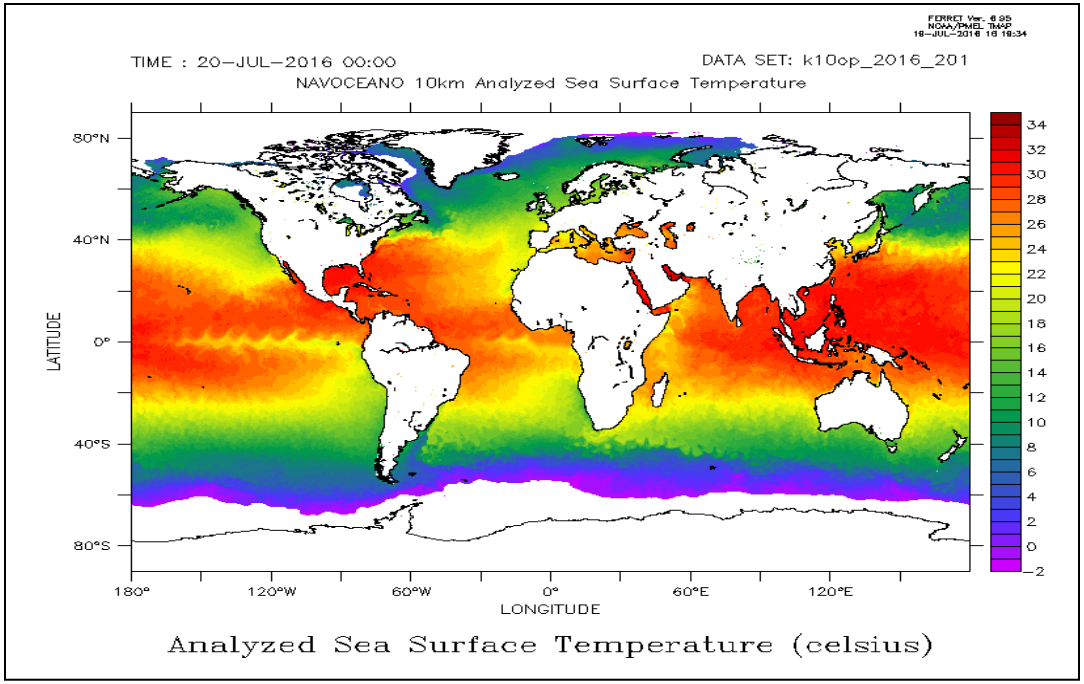


Future SST Satellite Data Sources

- Polar
  - JPSS
  - Sentinel-3
- Geostationary
  - GOES-R/S
  - MSG-4

NAVOCEANO K10 L4 Analysis

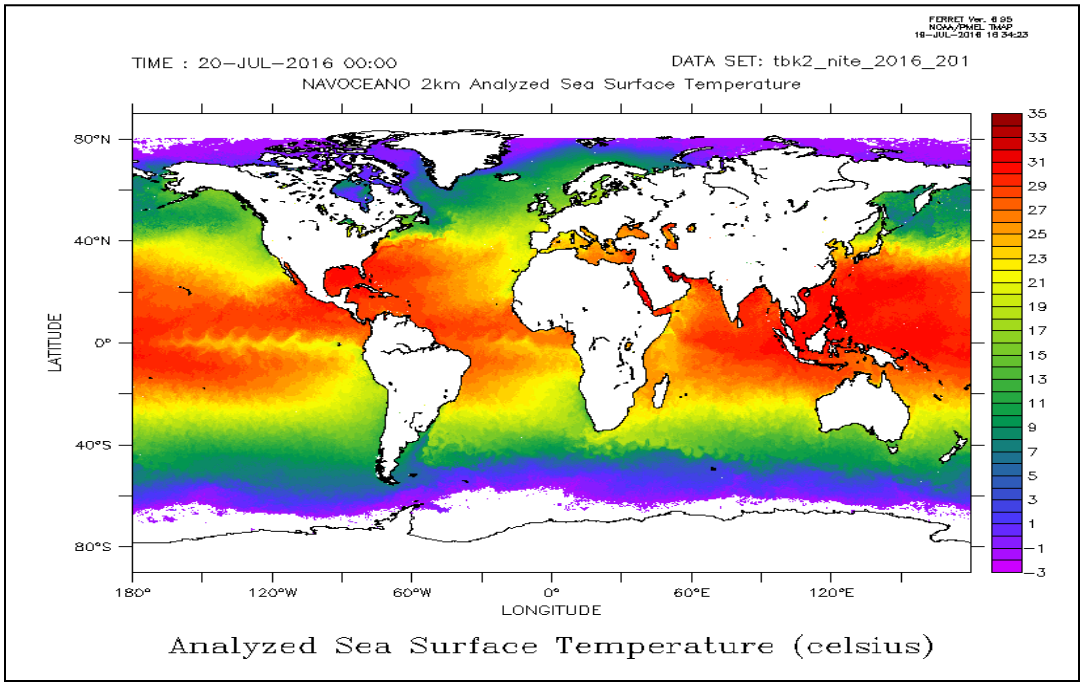
- Updated 4 times daily with the following:
  - NOAA 19 GAC 9km SST
  - NOAA 19 LAC/HRPT 2.2 km SST (regional)
  - METOP-A FRAC 2.2km SST
  - METOP-B FRAC 2.2km SST
  - MSG SST (OSI-SAF)
  - S-NPP VIIRS 1.5km SST
  - AMSR-2 SST (REMSS)
  - JPL Pentad Climo 1985 – 1999



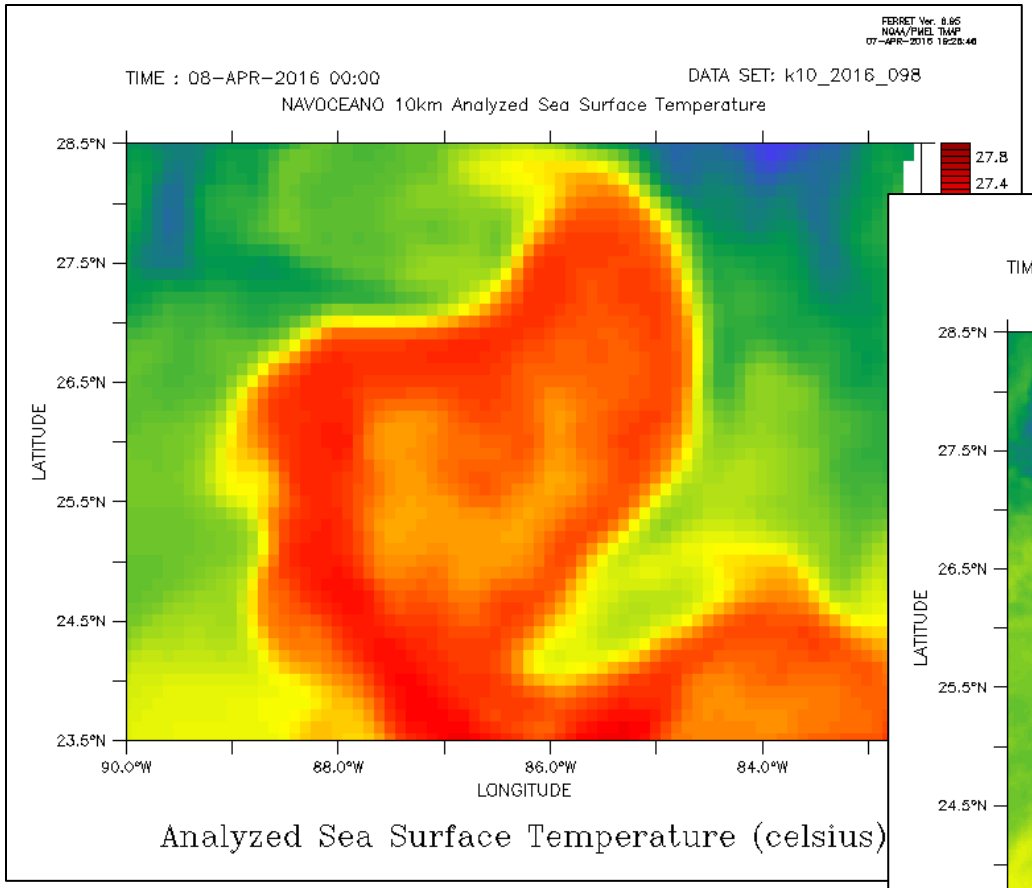
NAVOCEANO K2 L4 Analysis

- Three K2 Files maintained:
  - Daytime only
  - Nighttime only
  - All observations

- Updated 4x daily using:
  - NOAA 19 LAC/HRPT 2.2 km SST
  - METOP-A FRAC 2.2km SST
  - METOP-B FRAC 2.2km SST
  - S-NPP VIIRS 1.5km SST
  - AMSR-2 SST (REMSS)
  - JPL Pentad Climo 1985 – 1999

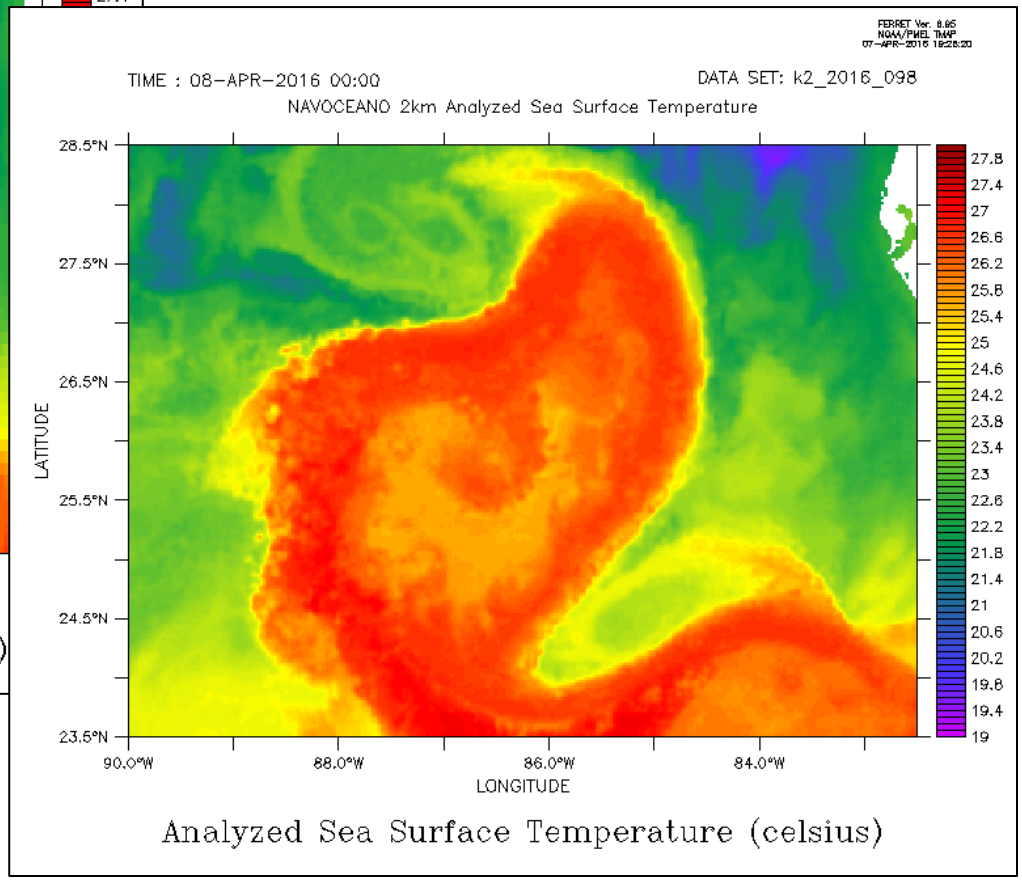


NAVOCEANO K2 versus K10



K10

K2

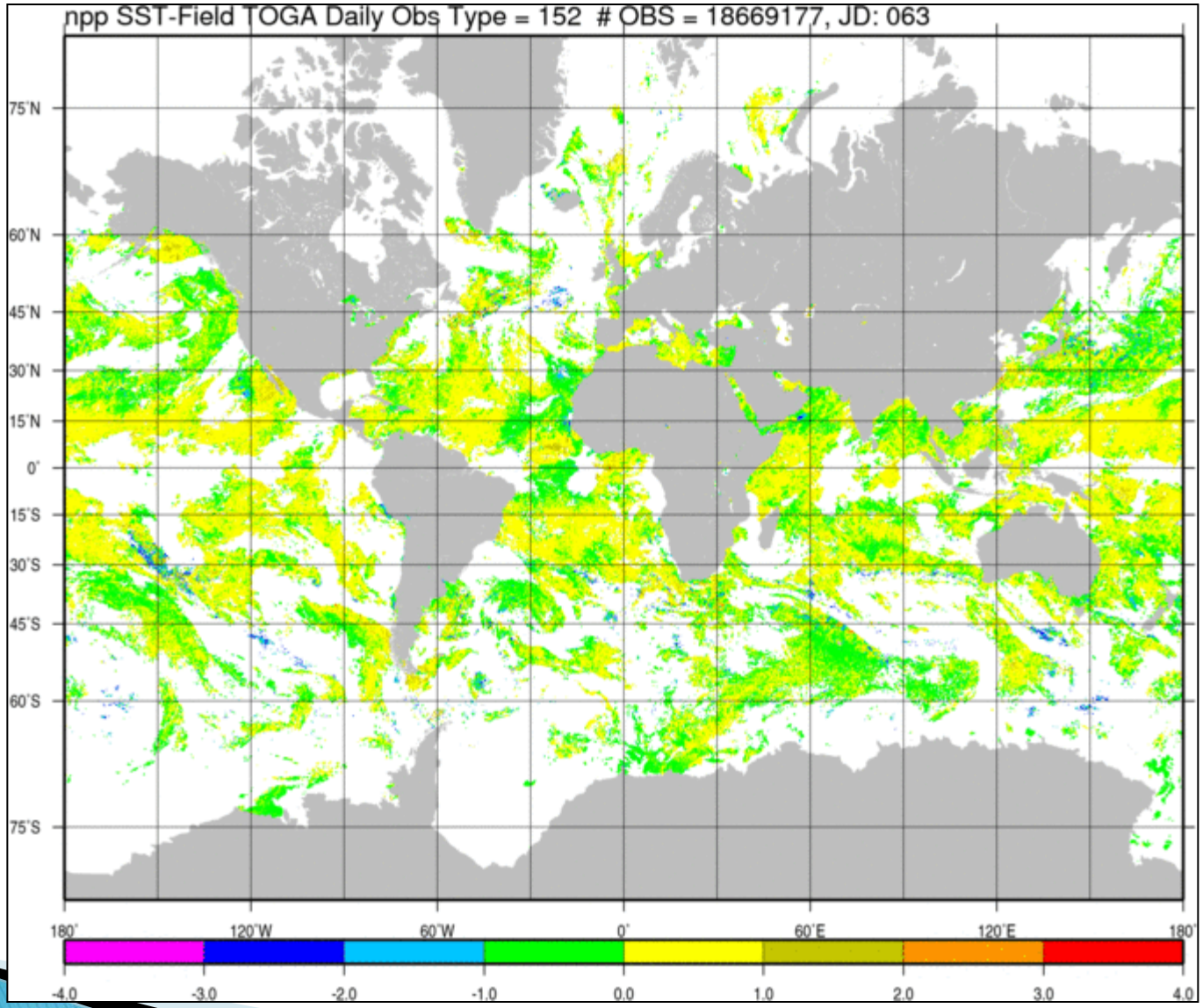


Recent VIIRS SST Updates

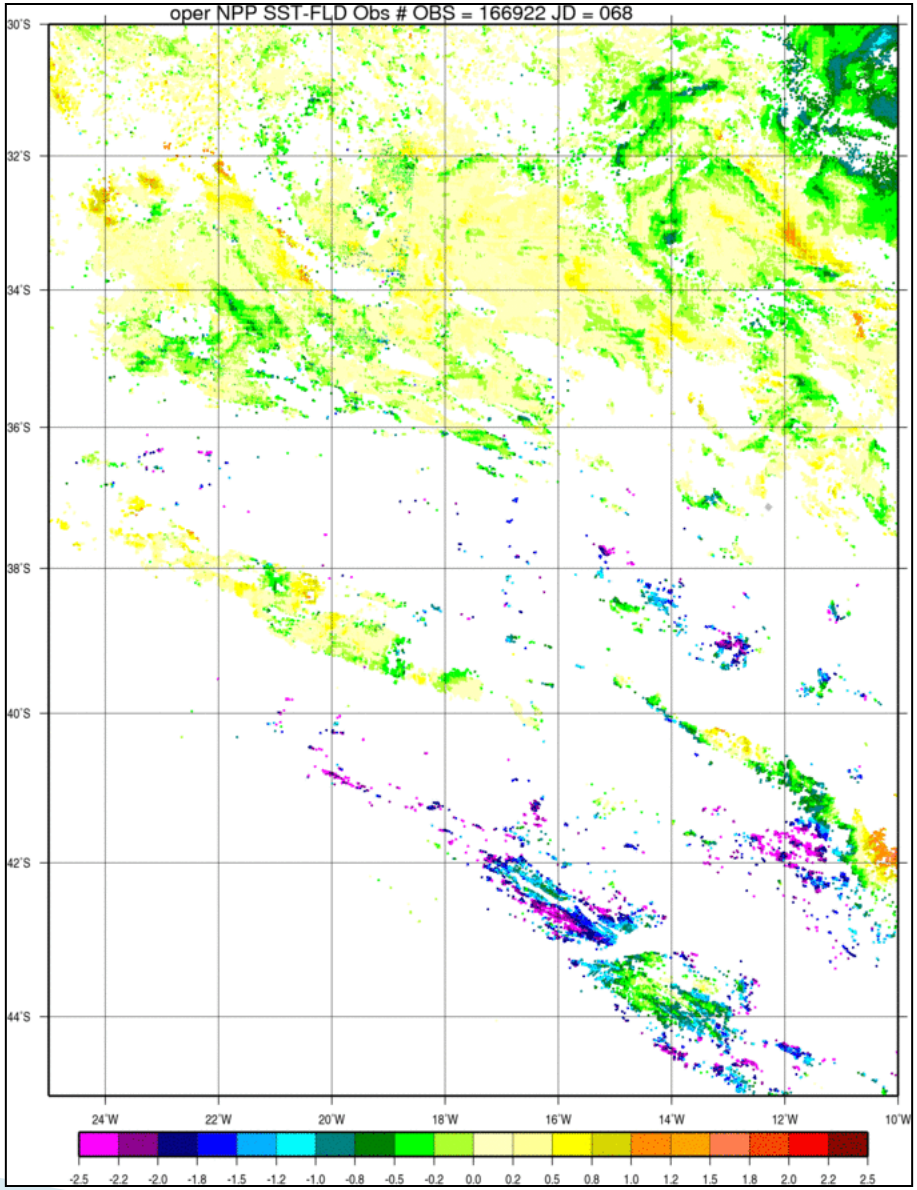
Nighttime Cloud Screening

- Visual analysis of quality control graphics indicated cloud/contamination leakage in VIIRS nighttime SST.
- Modified the nighttime IR channel uniformity tests to use a variable ("progressive") threshold based on the value of SST – Field.
- Variable threshold based on the premises:
  - We want to be more aggressive as SST – Field gets colder
  - We want a relaxed threshold near SST – Field = 0

VIIRS SST Nighttime Before and After



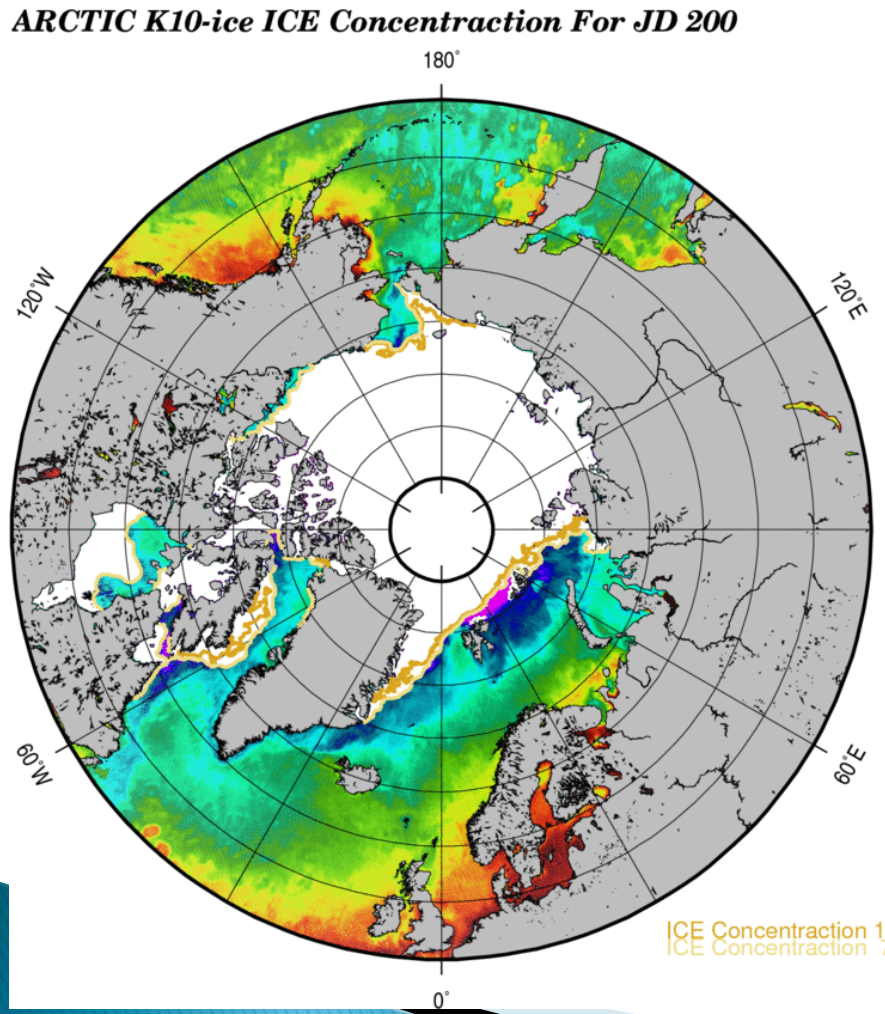
VIIRS SST Nighttime Before and After

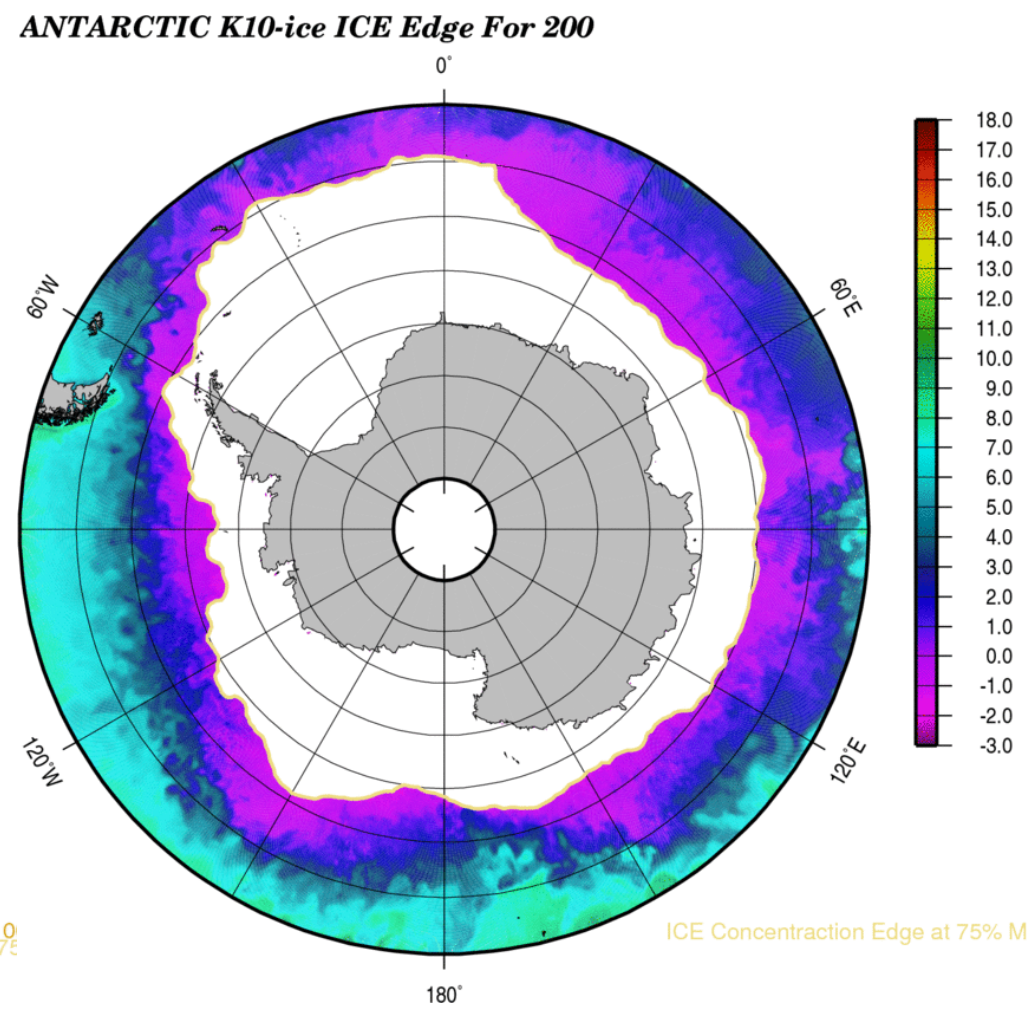


Ice Mask in K10 L4

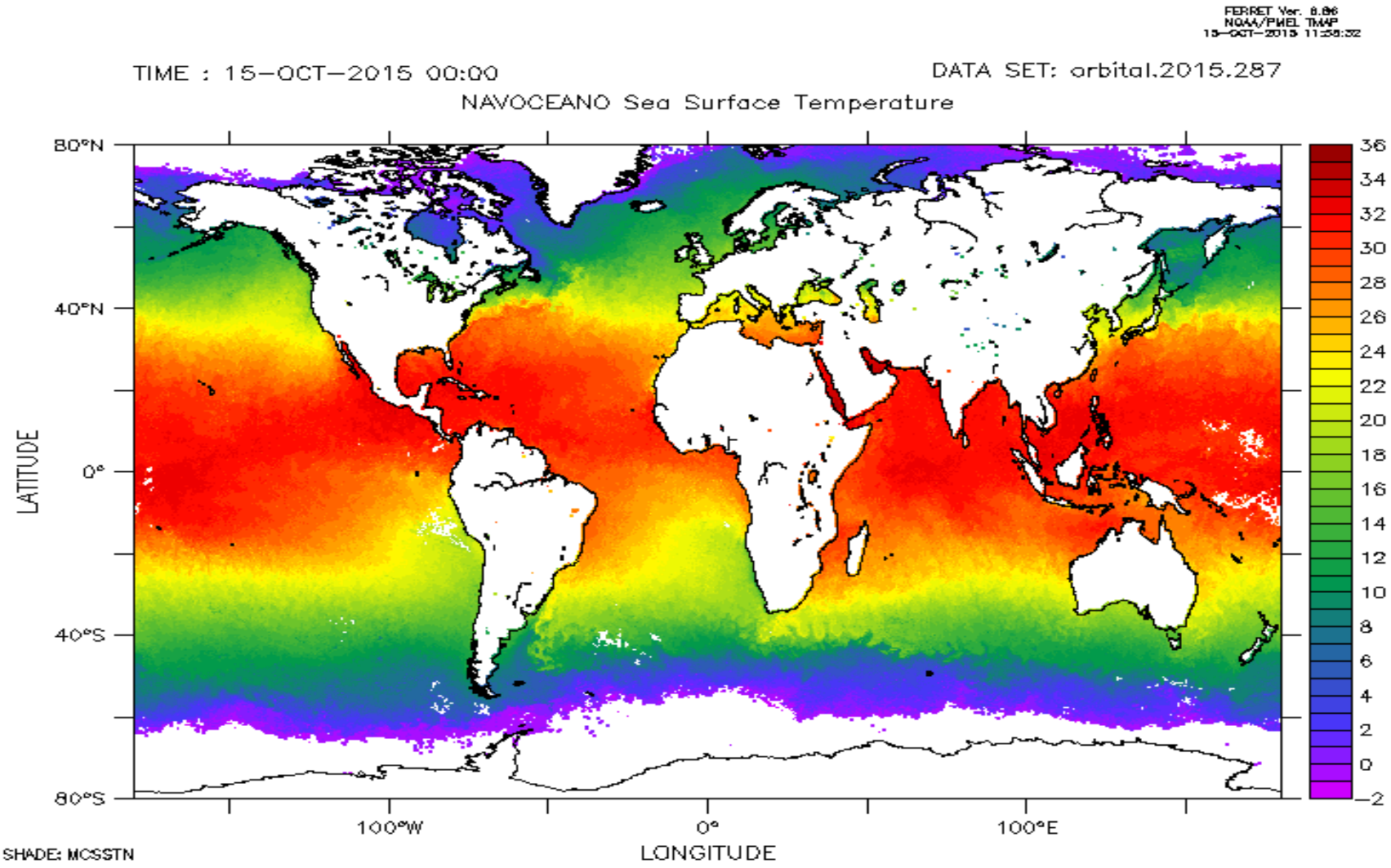
- Added National/Naval Ice Center daily Marginal Ice Zone products to the NAVOCEANO K10 L4.
- Eliminates “false” SST data input to the K10 from climatology.
- More accurate definition of ice edge.
- Aids ice edge detection for SST processes.

Arctic and Antarctic SST Coverage



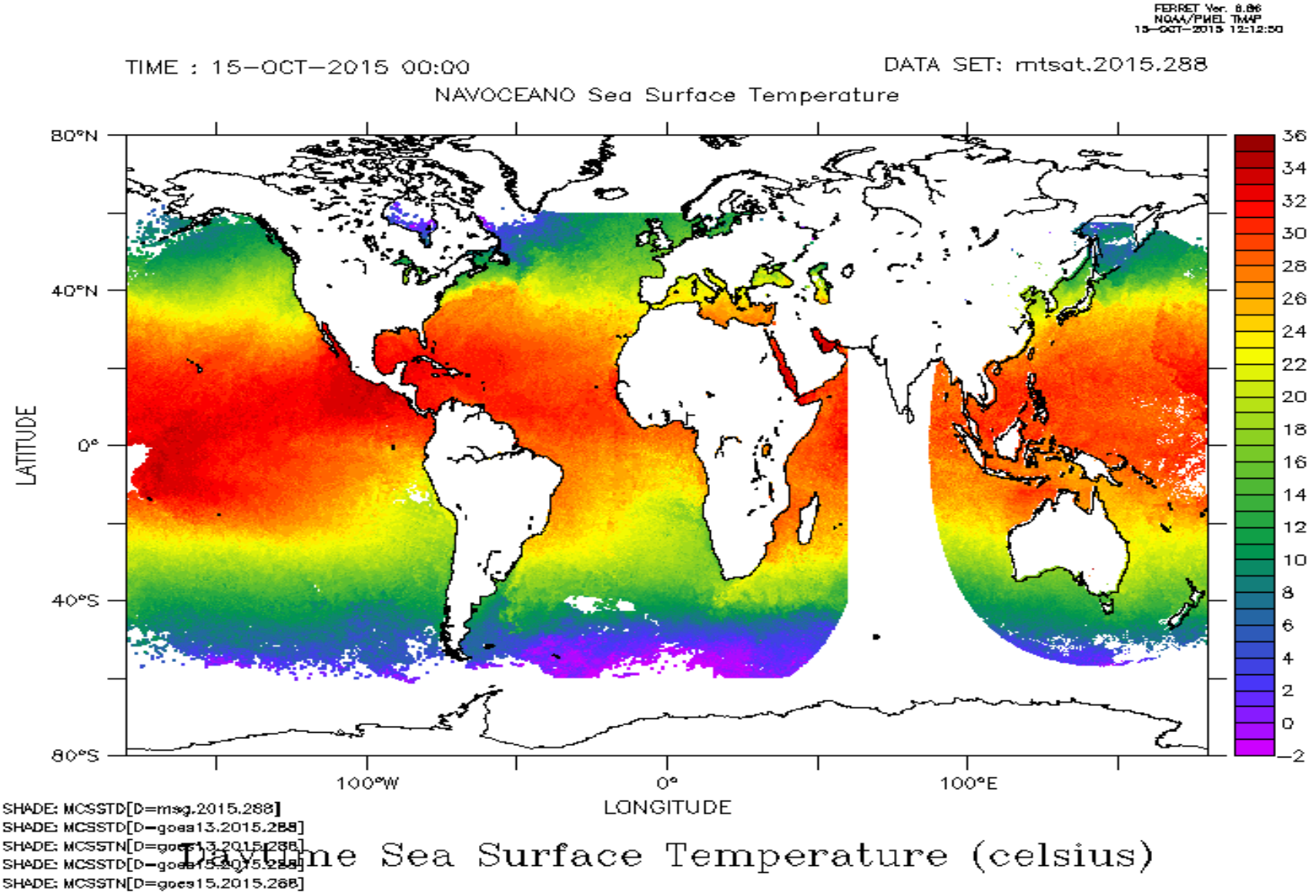


Polar Sat Weekly SST Coverage



Daytime Sea Surface Temperature (celsius)

Geostationary Weekly SST Coverage



Daytime Sea Surface Temperature (celsius)

In Conclusion

- NAVO MCSST processes and data are:
  - Accurate
  - Timely
  - Reliable
  - Efficient
  - High priority environmental data