



# Naval Oceanographic Office Regional Data Assembly Center

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# Overview

- NAVOCEANO L2P products
- NAVOCEANO K10 and K2 L4 products
- NAVOCEANO product usage on GDAC
- MCSST product statistics
- MCSST product improvements
- Recent accomplishments
- Future plans



# L2P Production

## Product

- NOAA-18 global 8.8 km
- NOAA-19 global 8.8 km
- NOAA-19 regional 2.2 km
- MetOp-A global 8.8 km
- MetOp-B global 8.8 km
- S-NPP VIIRS global 1.5 km

## Formats

GDSv2  
GDSv2  
GDSv2  
GDSv2  
GDSv2  
GDSv2



# L2P Input Data



- Calibrated and earth-located AVHRR and HIRS 1b data
  - NOAA-18 GAC/HIRS
  - NOAA-19 GAC/LAC/HRPT/HIRS
  - METOP-A GAC/HIRS
  - METOP-B GAC/HIRS
- NPOESS S-NPP VIIRS M-Band and associated geo-location files
- Navy Aerosol Analysis and Prediction System (NAAPS) aerosol optical depth data (appended to each retrieval)
- Land/Sea Mask (1km resolution)
- Climatology
- NAVOCEANO K10 L4
- Reliability estimate from SST matchups



# L2P Output File Content – GDSv2

## Variables filled by NAVOCEANO:

- adi\_dtime\_from\_sst
- aerosol\_dynamic\_indicator
- brightness\_temperature\_11um
- brightness\_temperature\_12um
- brightness\_temperature\_4um
- dt\_analysis
- l2p\_flags
- land/sea flag (*VIIRS only*)
- lat
- lon
- ni
- nj
- quality\_level
- satellite\_zenith\_angle
- sea\_surface\_temperature
- sses\_bias
- sses\_standard\_deviation
- sst\_dtime
- time



# NAVOCEANO L2P SSES

## 25 April 16



Product	Quality Level 5		Quality Level 4		Quality Level 3	
	RMS	Bias	RMS	Bias	RMS	Bias
NOAA-18 GAC	0.41 (97% of data)	-0.08	0.81	0.53	1.49	0.19
NOAA-19 GAC	0.42 (96% of data)	0.05	0.75	0.48	1.78	1.01
NOAA-19 LAC	0.43 (96% of data)	-0.03	0.72	0.33	2.18	0.63
METOP-A GAC	0.41 (98% of data)	0.00	0.74	0.44	1.98	1.15
METOP-B GAC	0.45 (98% of data)	-0.04	0.83	0.45	1.84	0.42
S-NPP VIIRS	0.37 (88% of data)	-0.04	0.63	0.11	0.87	0.22



# NAVOCEANO K10 L4 Analysis

- Updated 4 times daily with the following:
  - MSG SST (IFREMER)
  - 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
  - S-NPP VIIRS 1.5km SST
  - WindSat (microwave) SST (REMSS)
  - JPL Pentad Climo 1985 – 1999
  - National/Naval Ice Center daily Marginal Ice Zone

2016 May 02 statistics  
Matches = 32317  
RMS = 0.61  
Bias = -0.01





# NAVO Product Downloads from the GDAC March 2016



Satellite	Product	Format	Users	GB	Files
NOAA-18	GAC L2P	GDSv1	2	0	57
NOAA-18	GAC L2P	GDSv2	11	477.1	18435
NOAA-19	GAC L2P	GDSv1	3	5.9	203
NOAA-19	GAC L2P	GDSv2	13	459.4	17984
NOAA-19	LAC L2P	GDSv1	5	0	80
NOAA-19	LAC L2P	GDSv2	9	710.3	26573
MetOp-A	GAC L2P	GDSv1	1	0	1
MetOp-A	GAC L2P	GDSv2	6	154.8	7268
MetOp-B	GAC L2P	GDSv2	10	174.3	14741
SNPP	VIIRS L2P	GDSv1	8	495.3	33001
SNPP	VIIRS L2P	GDSv2	40	4924.8	474220
multiple	K10 L4	GDSv1	104	5.4	5692
TOTAL			212	7407.3	598225





# NAVOCEANO K2 L4 Analysis

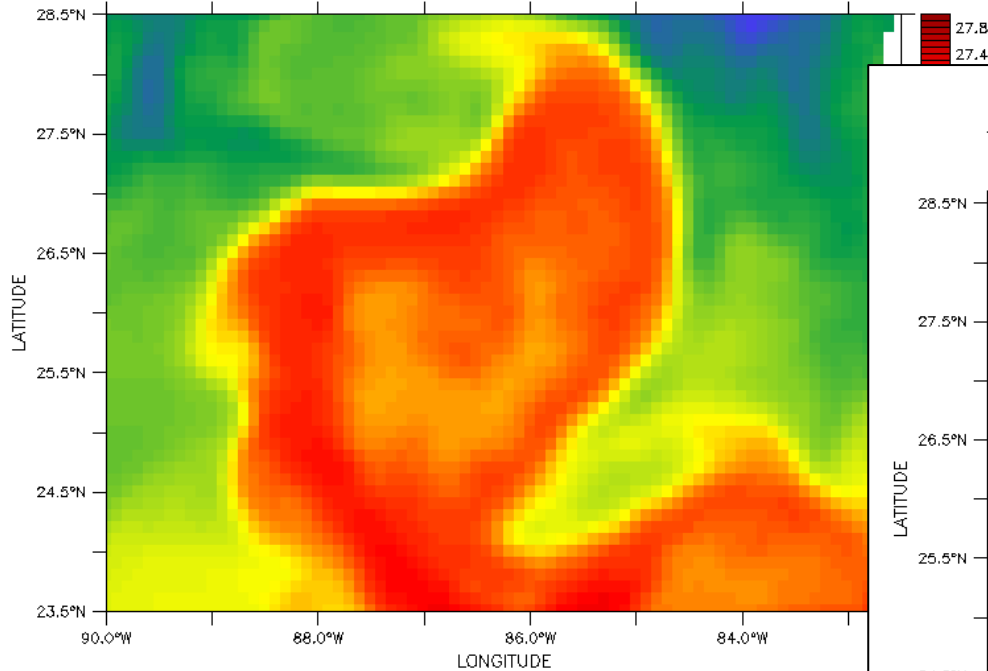
- Uses same methodology as the K10 analysis.
- Uses only high resolution satellite SST data whenever possible.
- Higher resolution fields better suited for frontal analysis and high resolution graphics.
- Updated 4 times daily with the following:
  - NOAA-19 LAC 2.2km SST
  - METOP-A FRAC 2.2km SST
  - METOP-B FRAC 2.2km SST
  - S-NPP VIIRS 1.5km SST
  - AMSR-2 microwave SST (RSS)
  - JPL Pentad Climo 1985 – 1999



# NAVOCEANO K2 versus K10

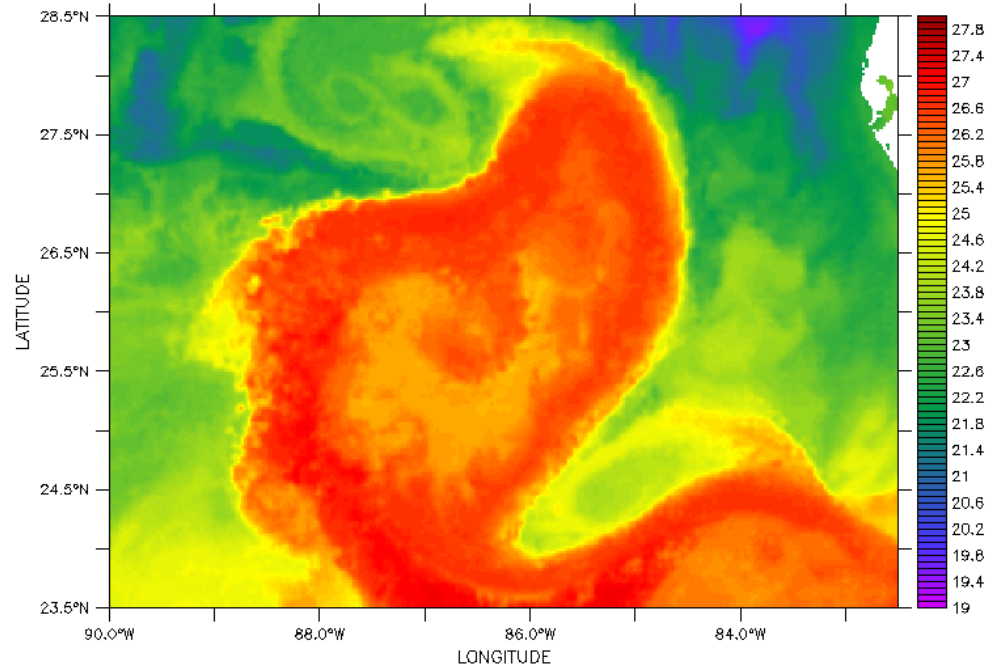


TIME : 08-APR-2016 00:00  
DATA SET: k10\_2016\_098  
NAVOCEANO 10km Analyzed Sea Surface Temperature



Analyzed Sea Surface Temperature (celsius)

TIME : 08-APR-2016 00:00  
DATA SET: k2\_2016\_098  
NAVOCEANO 2km Analyzed Sea Surface Temperature



Analyzed Sea Surface Temperature (celsius)



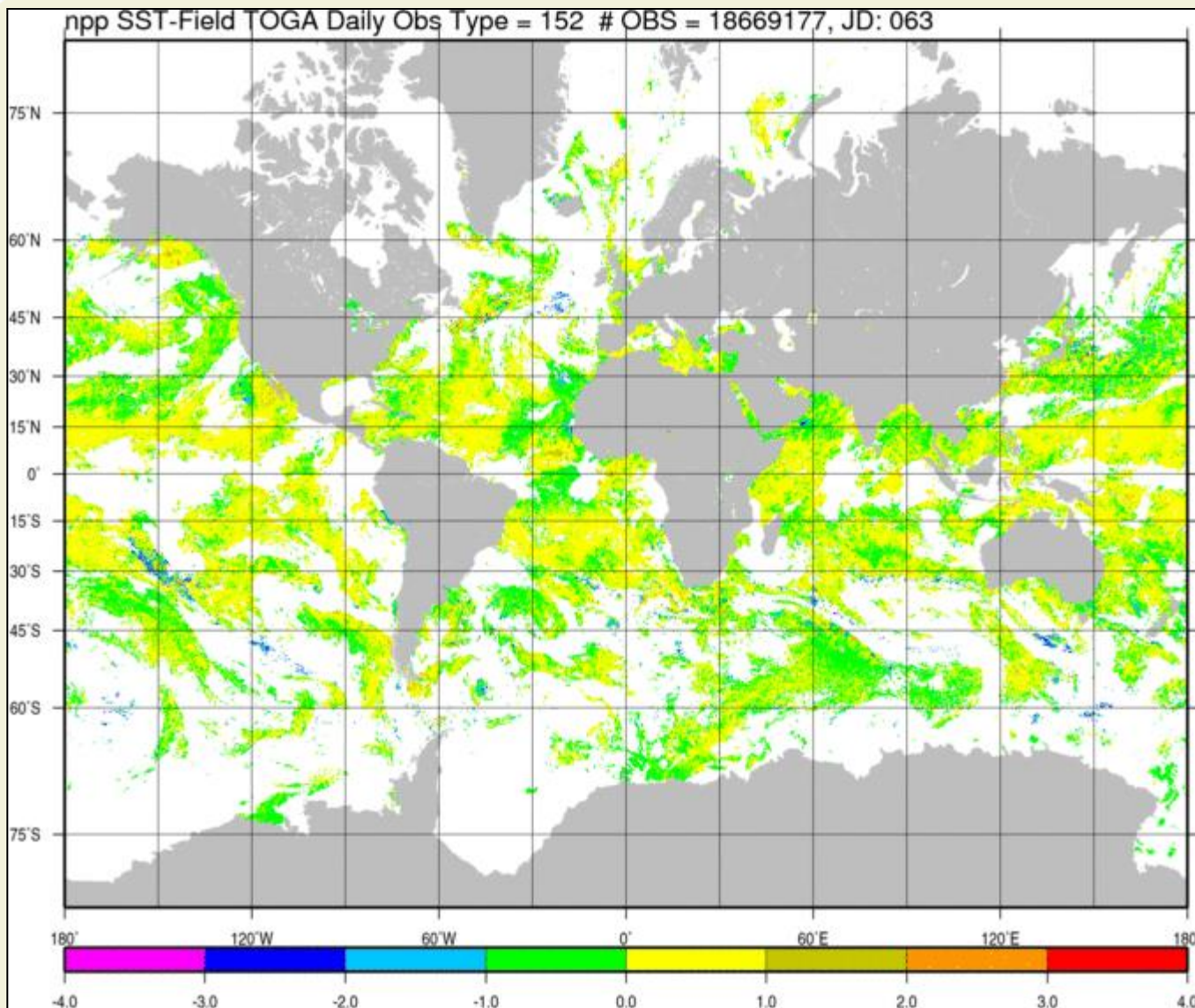
# VIIRS SST Nighttime Cloud Screening



- Visual analysis of quality control graphics indicated cloud/contamination leakage in VIIRS nighttime SST.
- Modified the nighttime 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

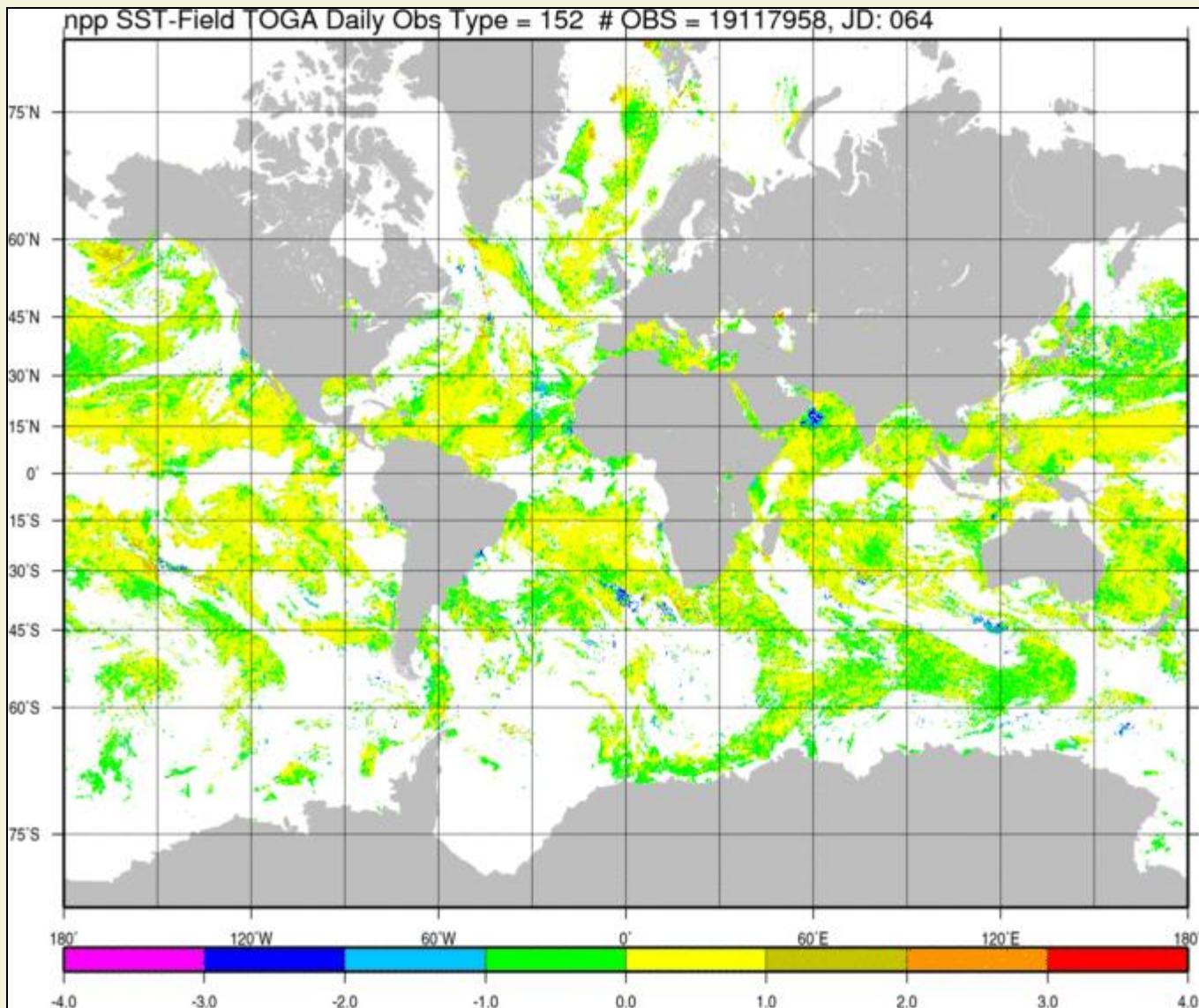


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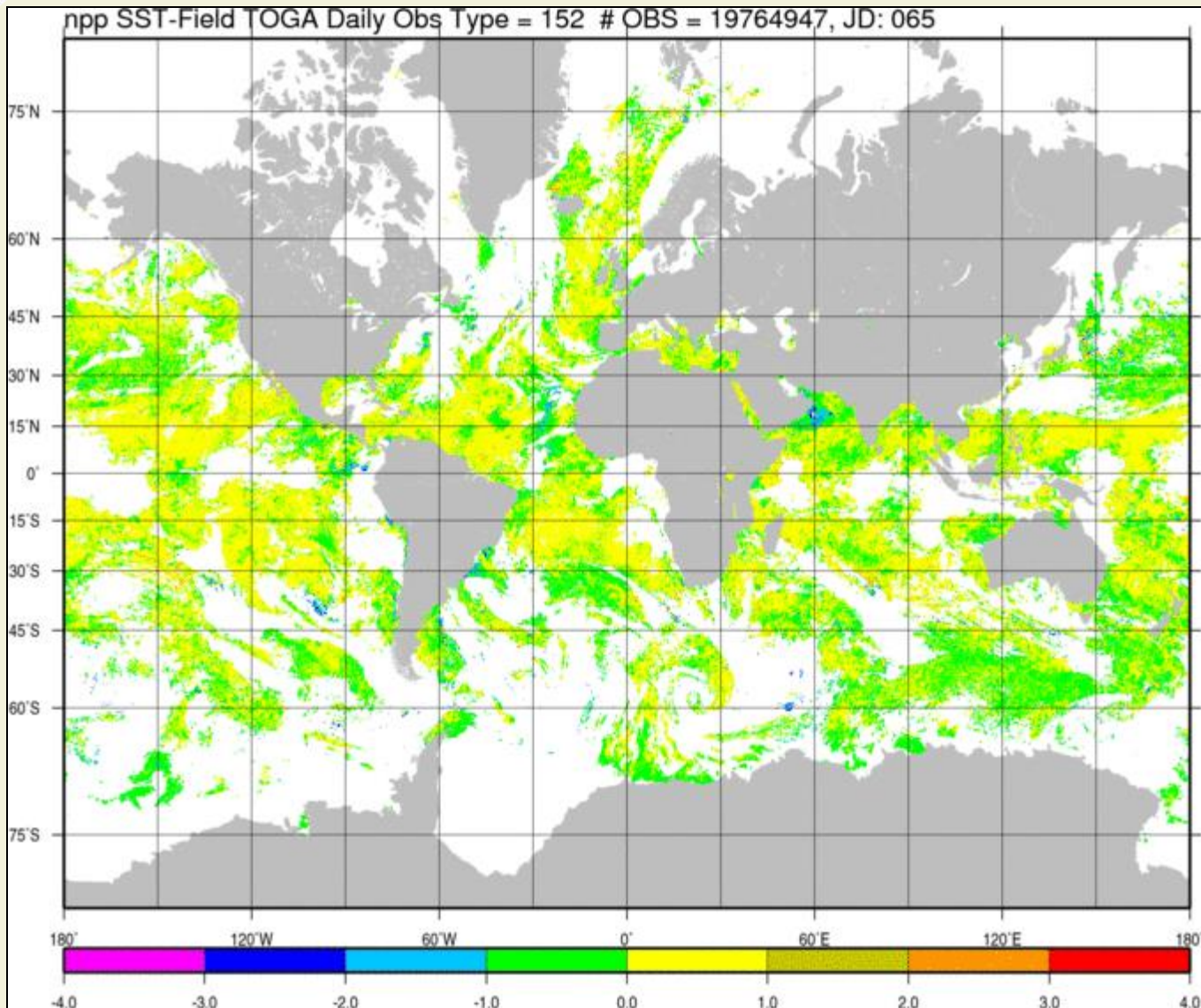
# VIIRS SST Nighttime Before and After



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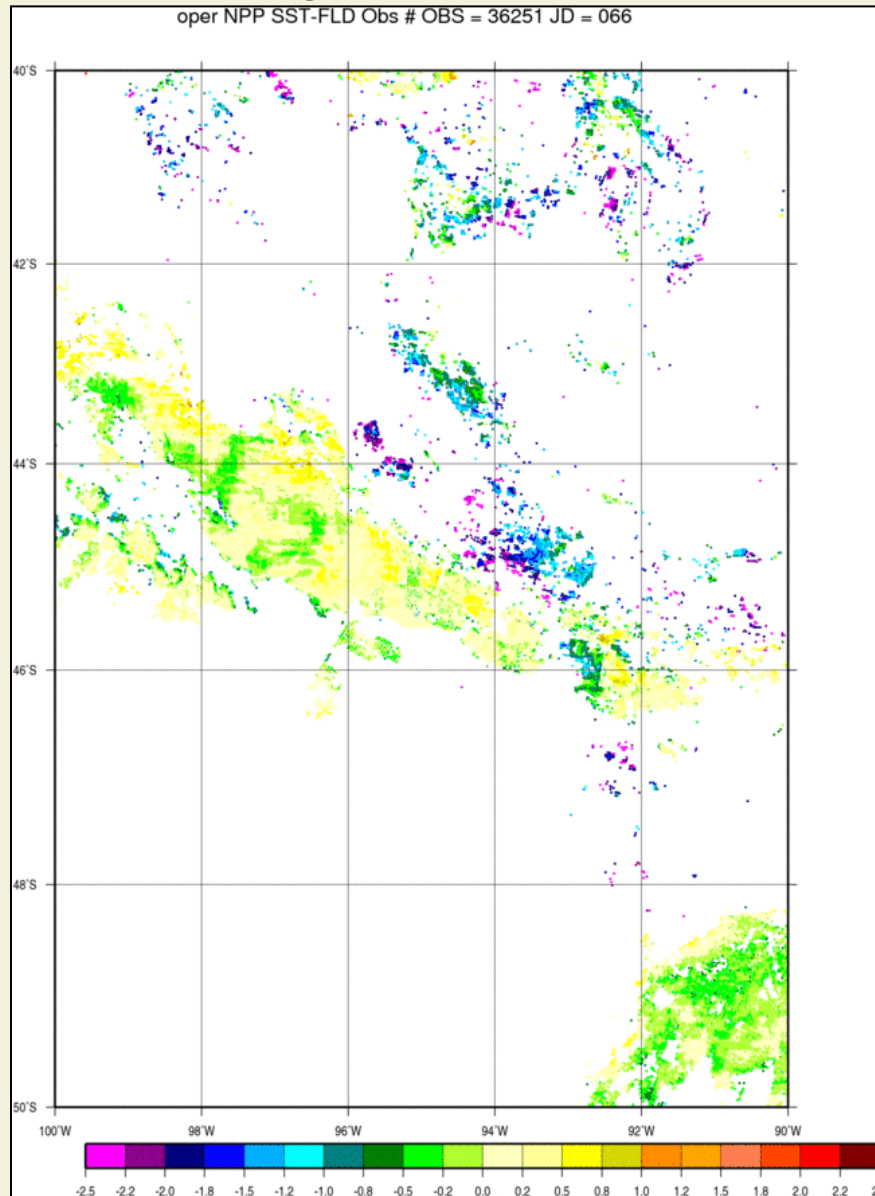
# VIIRS SST Nighttime Before and After



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# VIIRS SST Nighttime Before and After

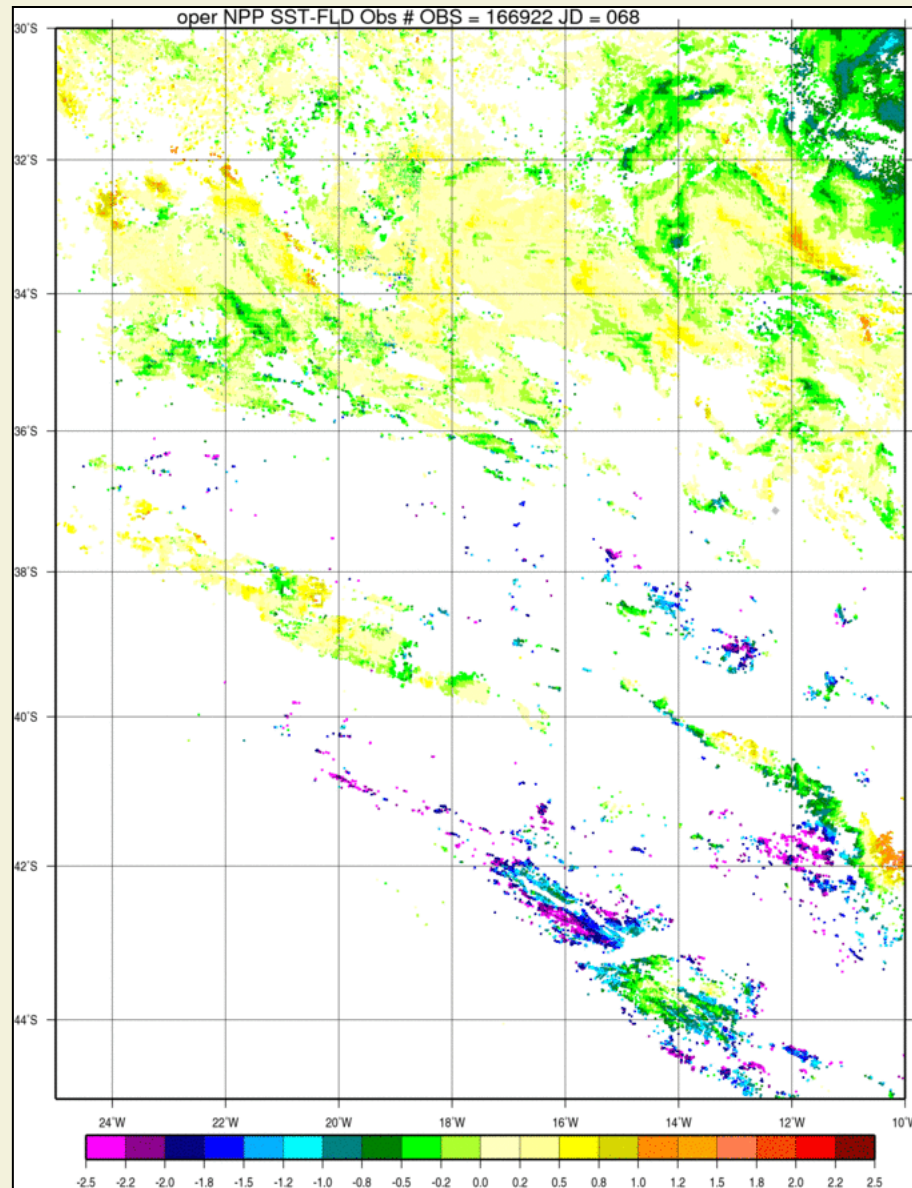


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# VIIRS SST Nighttime Before and After



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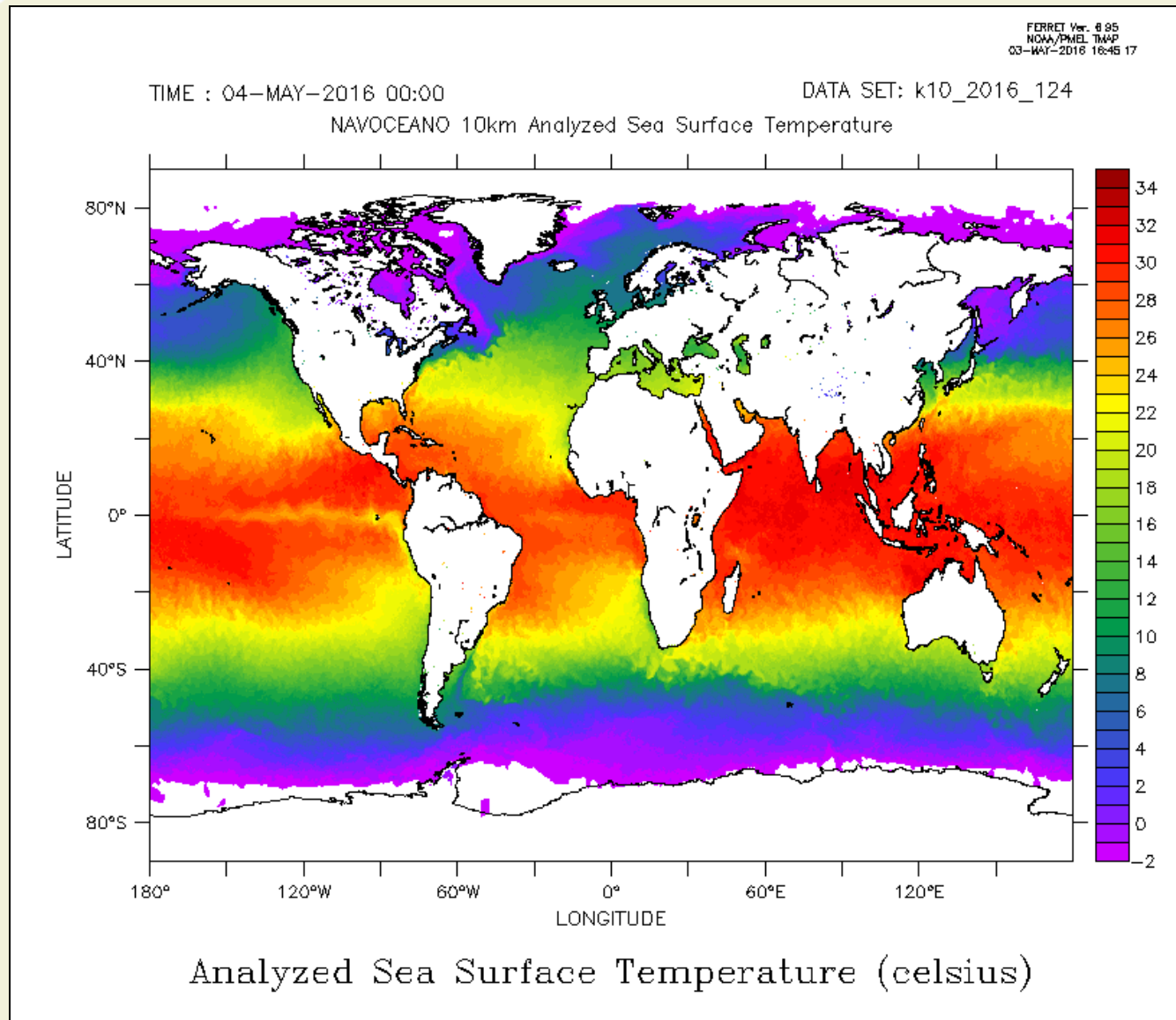
# Ice Mask in K10 L4



- 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 detection for SST processes.



# Ice Mask in K10 L4

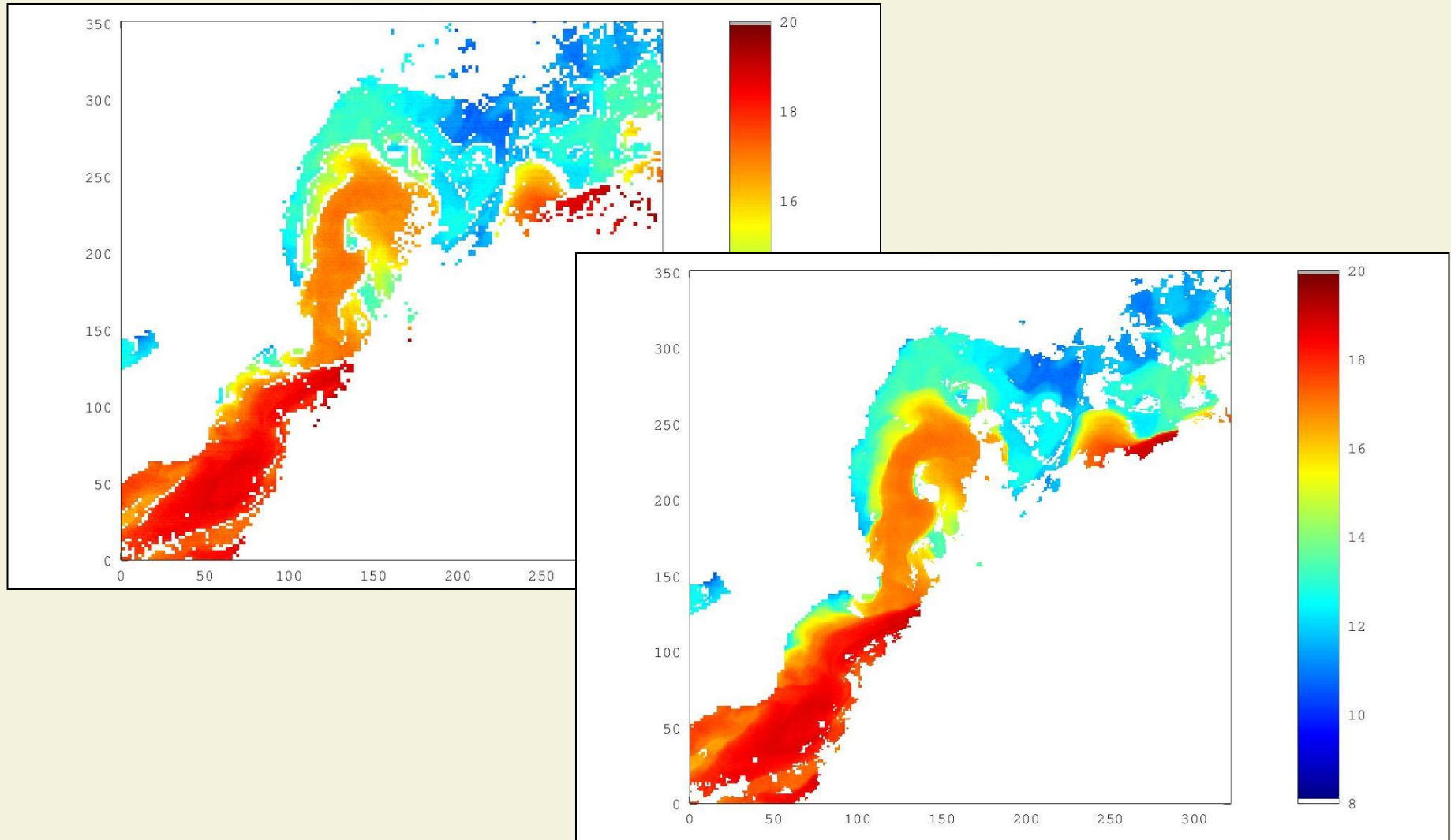




# NAVOCEANO VIIRS SST v. 3.0



Testing new method to improve daytime SST coverage on frontal boundaries.





# Accomplishments

- Updated the K2 L4
- Added ice mask to the K10 L4
- Improved ice detection
- Improved cloud screening
- Improved coverage on frontal boundaries (daytime)





# Future Plans

- Move VIIRS SST 3.0 to production
- Investigate improved frontal zone coverage for nighttime
- Continue improvements to NAVOCEANO cloud mask
- Switch to Pathfinder daily SST climatology
- Obtain Sentinel-3 L2P data
- Distribute the NAVOCEANO K2 L4 (if requested)



# Additional Information



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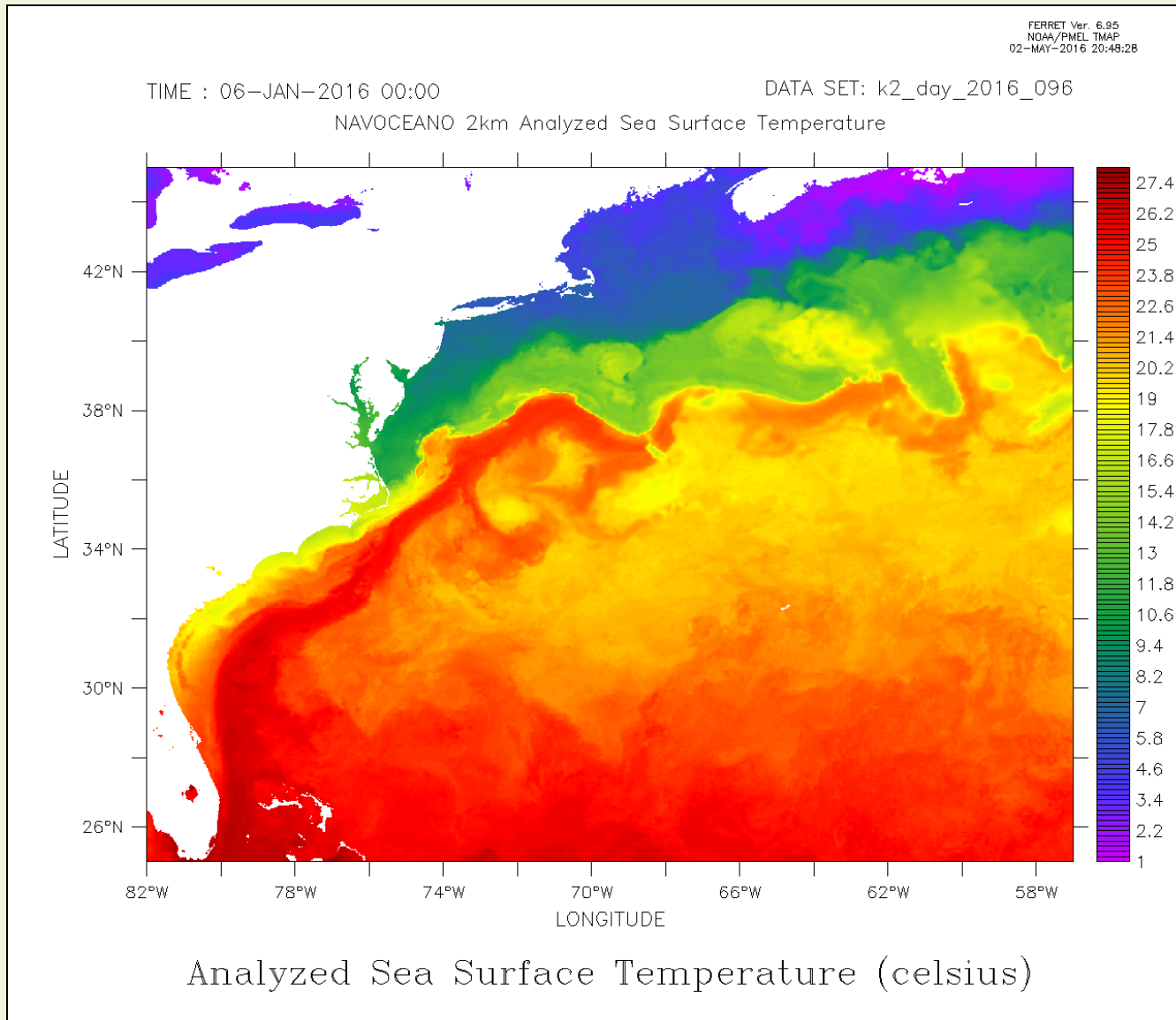
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# Thank you!



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