



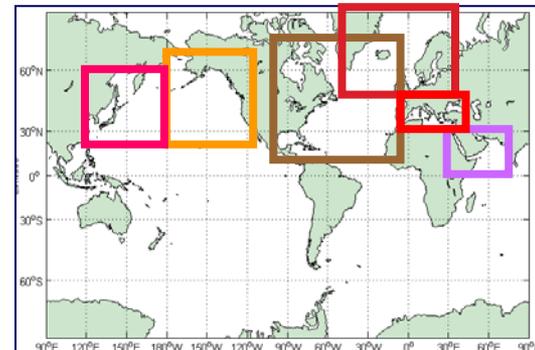
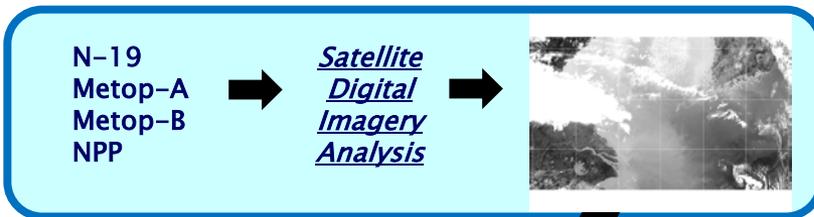
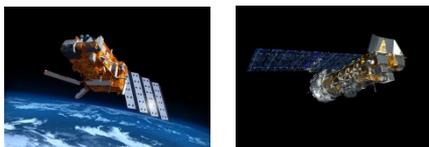
VIIRS Data Products at the Naval Oceanographic Office

Keith Willis, Daniel Olszewski, Valinda Kirkland,
Paul Lyon, and Pam Posey (NRL)

STAR JPSS Science Team Meeting
College Park, Maryland
August 27, 2015

Ocean Feature Analysis

Supports ASW and Maritime Operations
WPAC, EPAC, NLANT, WIND, GIUK, MED



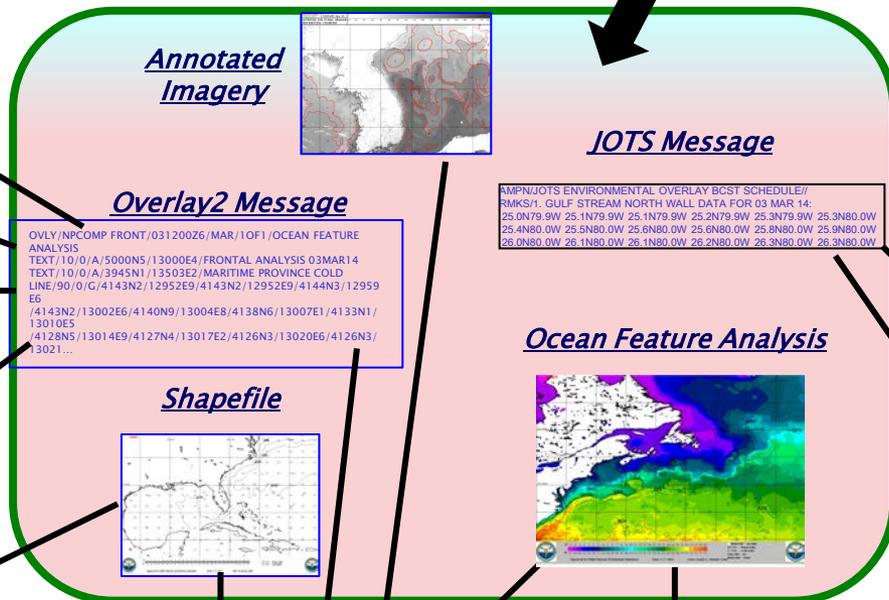
Canadian Hydrographic Office
Digital Charts
Analyses

NOAA/NWS/NCEP/EMC
Ocean Model Validation

NOAA/NWS/NCEP/OPC
24hr Wind/Wave Forecast Chart
Ocean Model Validation

NOAA/NWS Forecast Offices
Coastal Marine Forecasts
Offshore Forecasts

NRL-Stennis, NAVO, Academia
Historical Studies



NRL-Stennis
Model validation

NOAA/NWS/NCEP/NHC
Tropical Storm Prediction

UK Hydrographic Office
Digital Charts
Analyses

UK Royal Navy
Decision Aids
Staff Briefing Material
Environmental Assessments
• OPS Planning
• Area Familiarization

NAVY FLEET
ASW Decision Aids
Staff Briefing Material
Environmental Assessments
• OPS Planning
• Area Familiarization

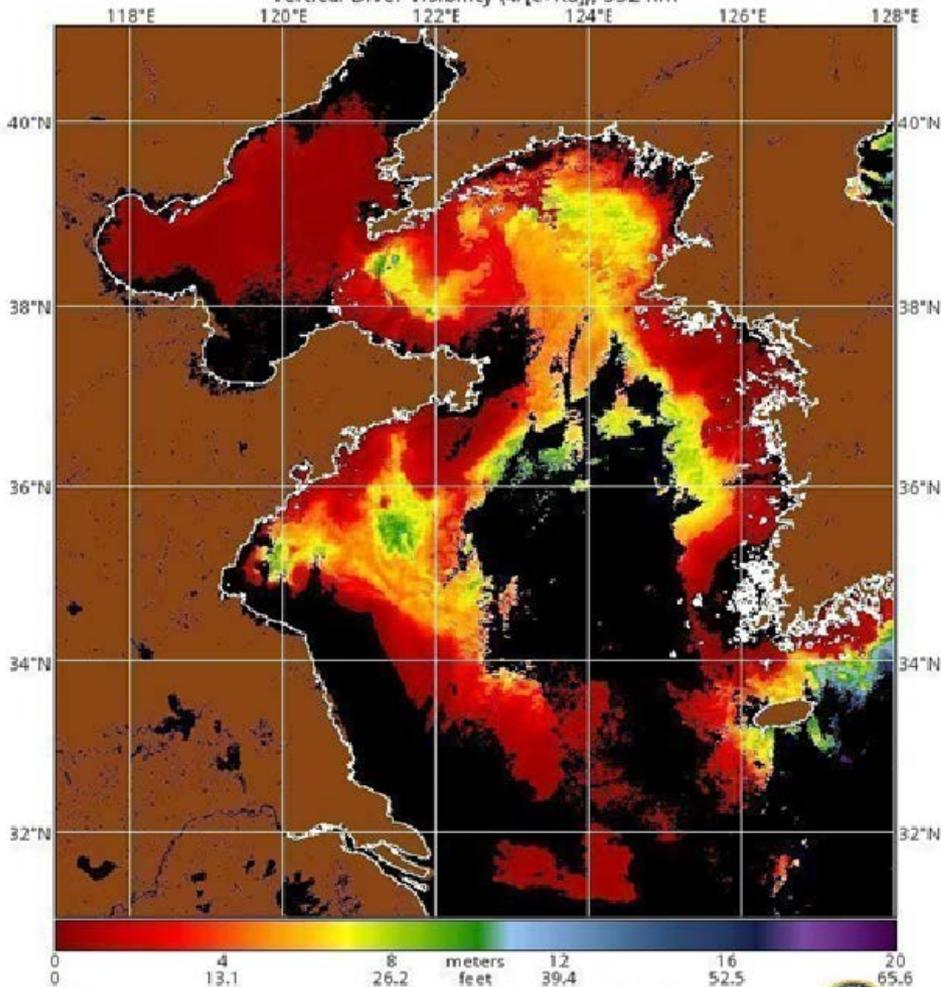
COAST GUARD ICE PATROL
Atlantic Iceberg Extent
Sea Ice Conditions



Ocean Optics



MODPM20140412014047.L4_LP_hdf_YSA Feb 10-Feb 16, 2014 (1LP)
Vertical Diver Visibility ($4/[c+Kd]$), 532 nm



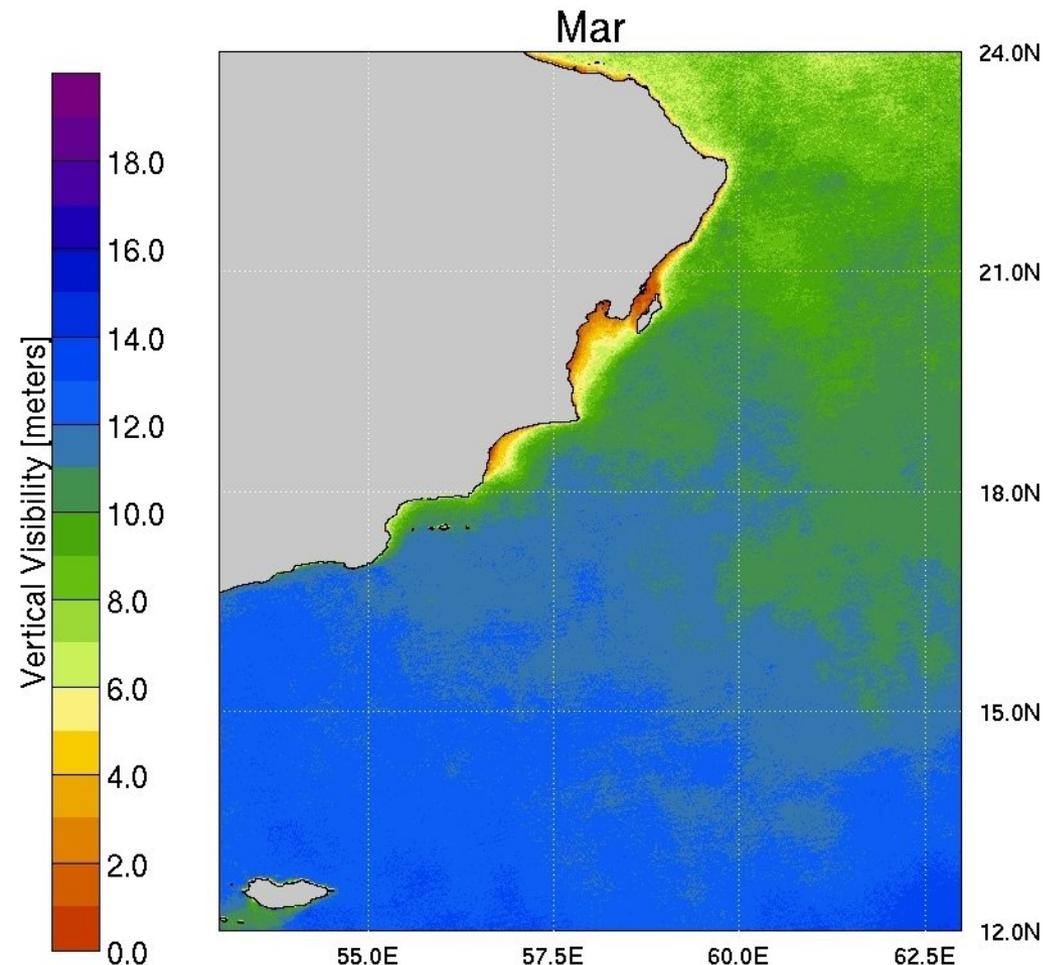
vert_vis
YellSea (MODIS-AQUA-PM)
Version 10

NAVOCEANO
Approved for Public Release
Distribution Unlimited



- Product is designed to predict optical visibility from above the water.
- 7 Day Composites can remain substantially cloud filled.

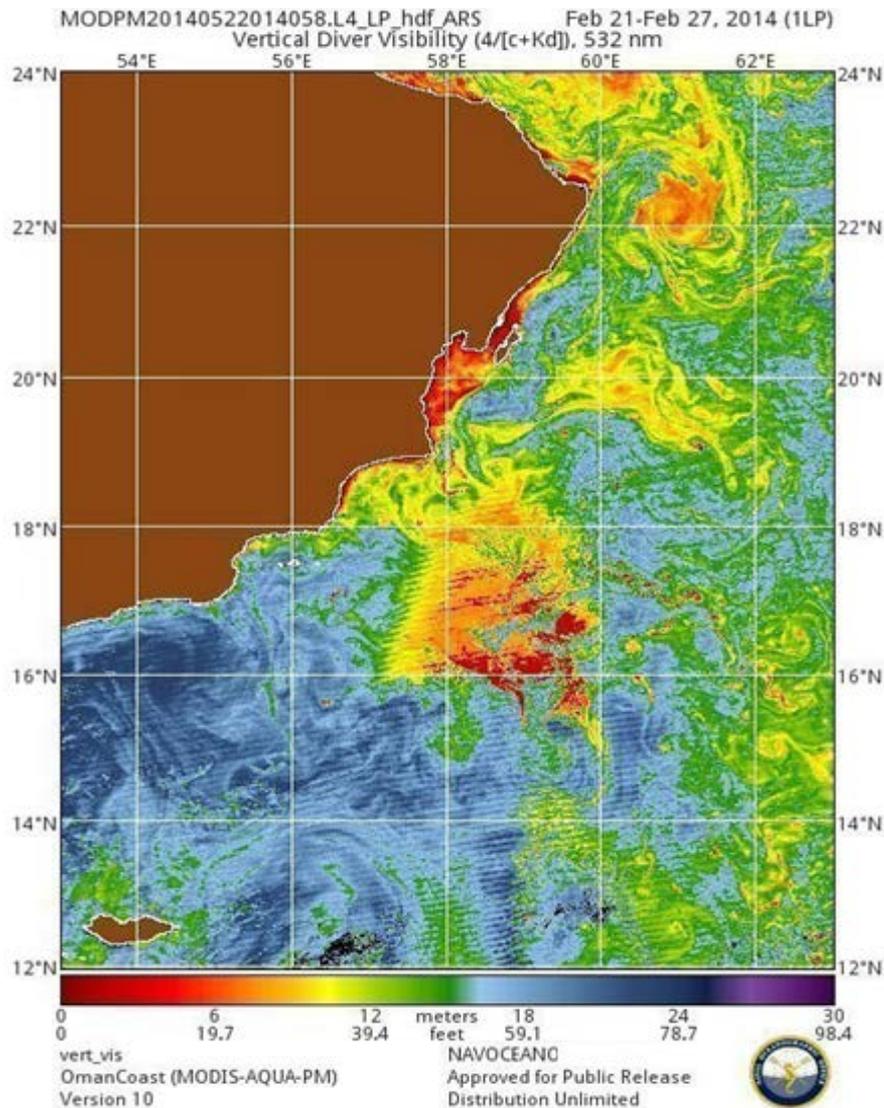
Ocean Optics



Satellite Data from 2002-2012
Approved for public release; distribution unlimited.

- Climatology products can be used for planning.
- Monthly climatology products are cloud free for most of the globe with some exceptions; Indian Ocean during Monsoon season.
- Monthly climatology products average out all but seasonally persistent features.

Ocean Optics



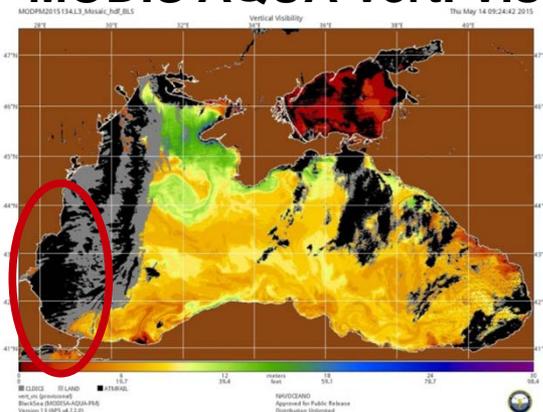
- 7 Day Composites can resolve finer detail of eddies and fronts.

Ocean Optics

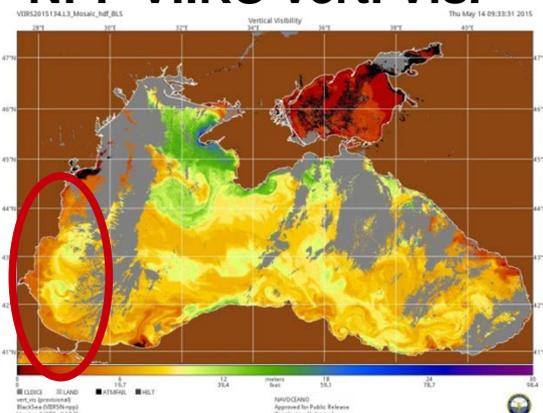


Implementation of Linear Matrix Inversion (LMI) in AOPS allows NAVO to merge Navy products from MODIS AQUA and NPP VIIRS. Multiple satellites will be used to provide **ONE** merged set of Navy products to the war fighter.

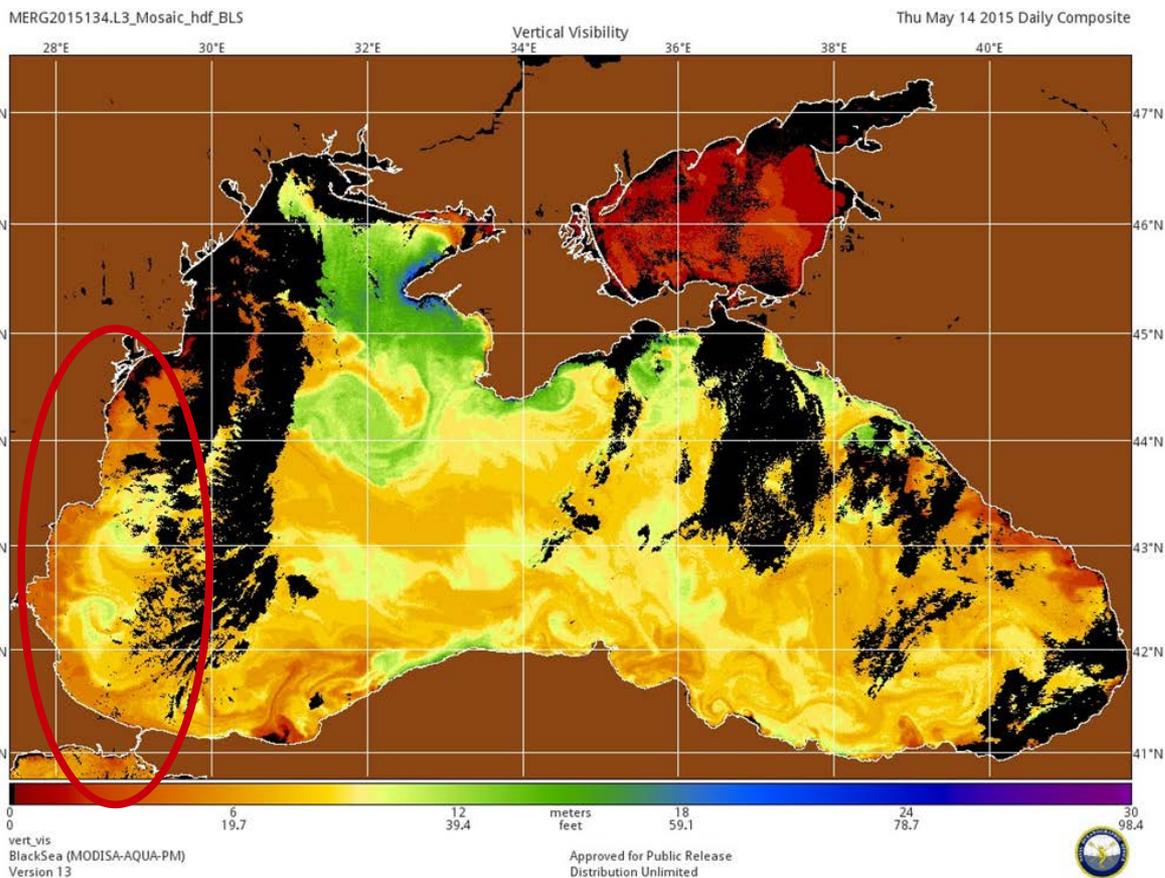
MODIS AQUA Vert. Vis.



NPP VIIRS Vert. Vis.



MERGED Vertical Visibility



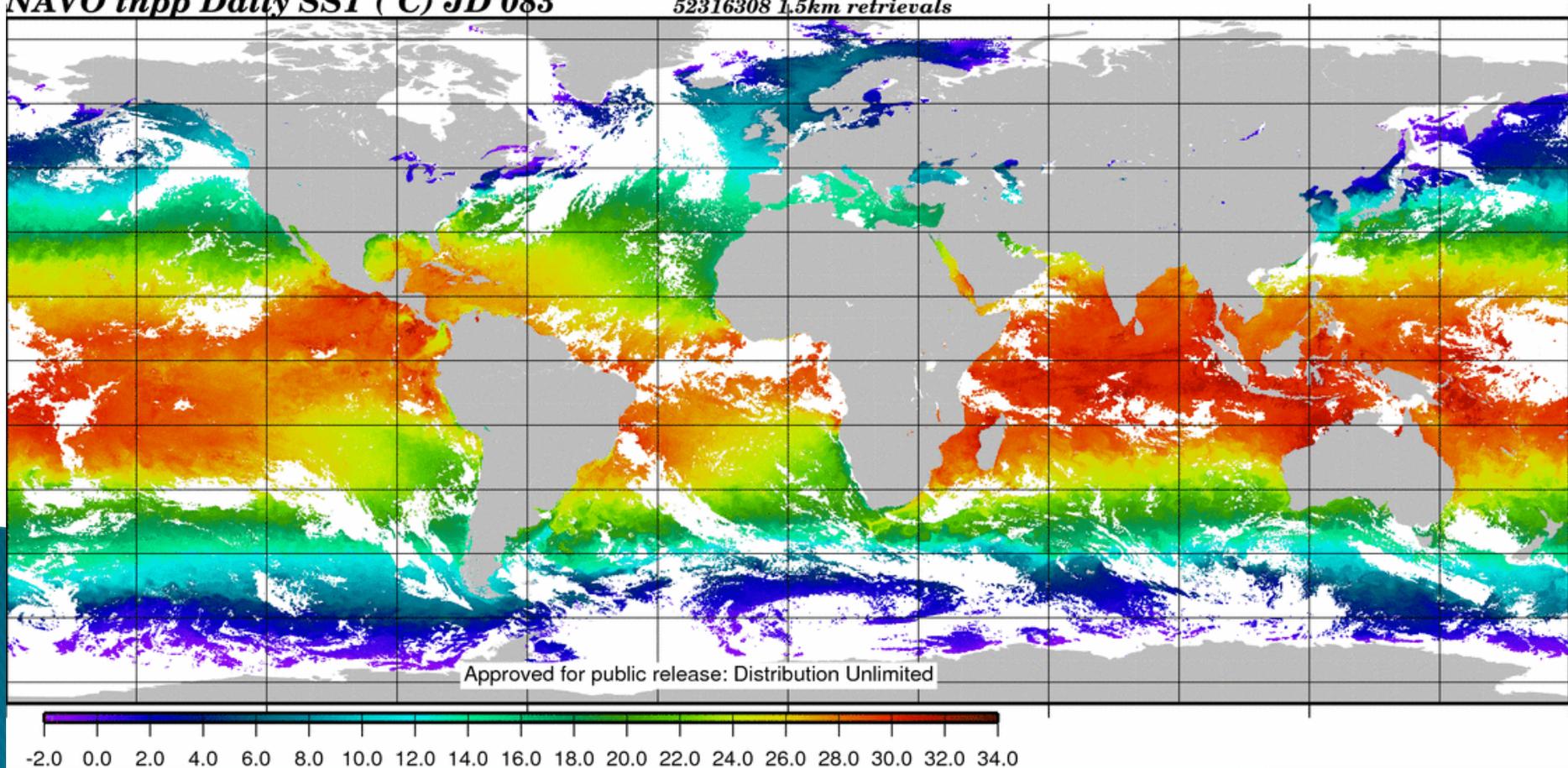
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Multi-Channel Sea Surface Temperature



NAVO *tnpp* Daily SST (°C) JD 083

52316308 1.5km retrievals



Approved for public release: Distribution Unlimited

Approved for public release . Distribution is unlimited

Satellite Sources – NAVO SSTs



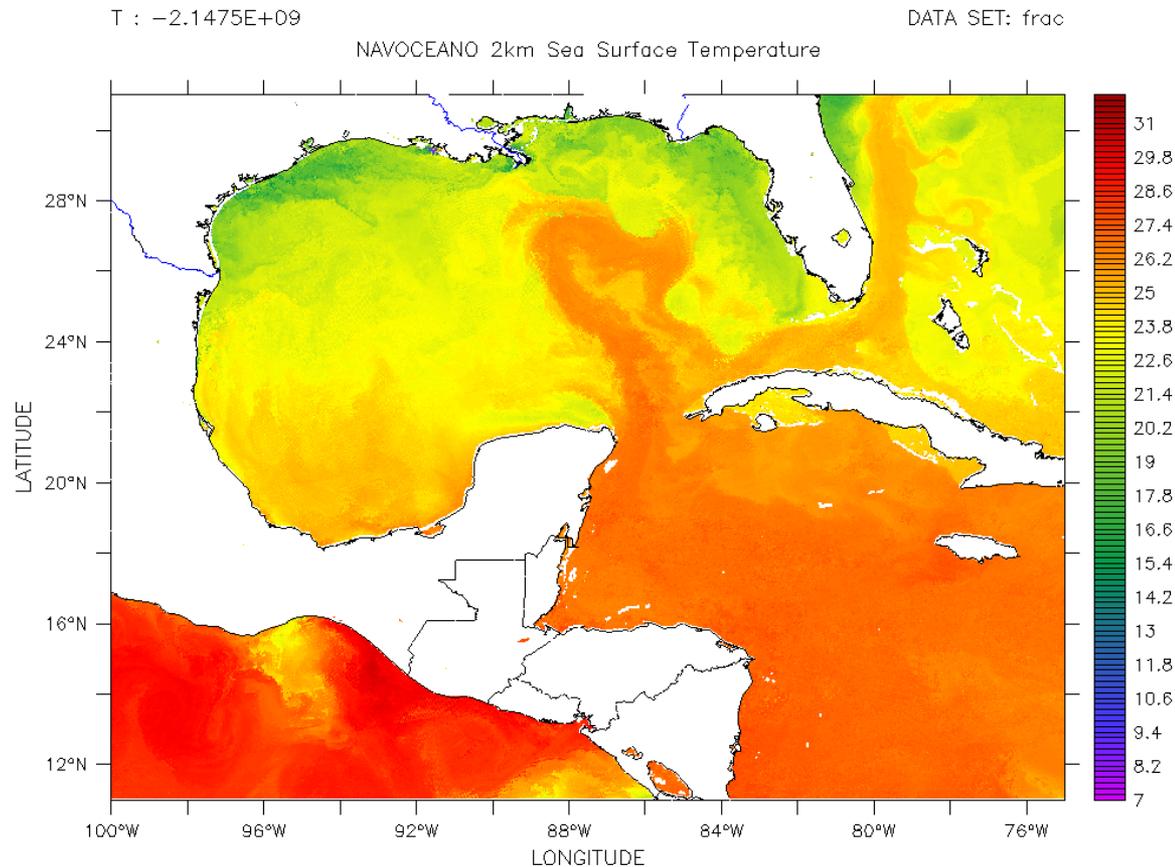
FERRET Ver.6.1
NOAA/PMEL TMAP
Mar 23 2011 14:17:08

➤ Polar

- NOAA-18 GAC
- NOAA-19 GAC, LAC
- METOP-A GAC, FRAC
- METOP-B GAC, FRAC
- SNPP

➤ Geostationary

- GOES-15 (WEST)
- GOES-13 (EAST)

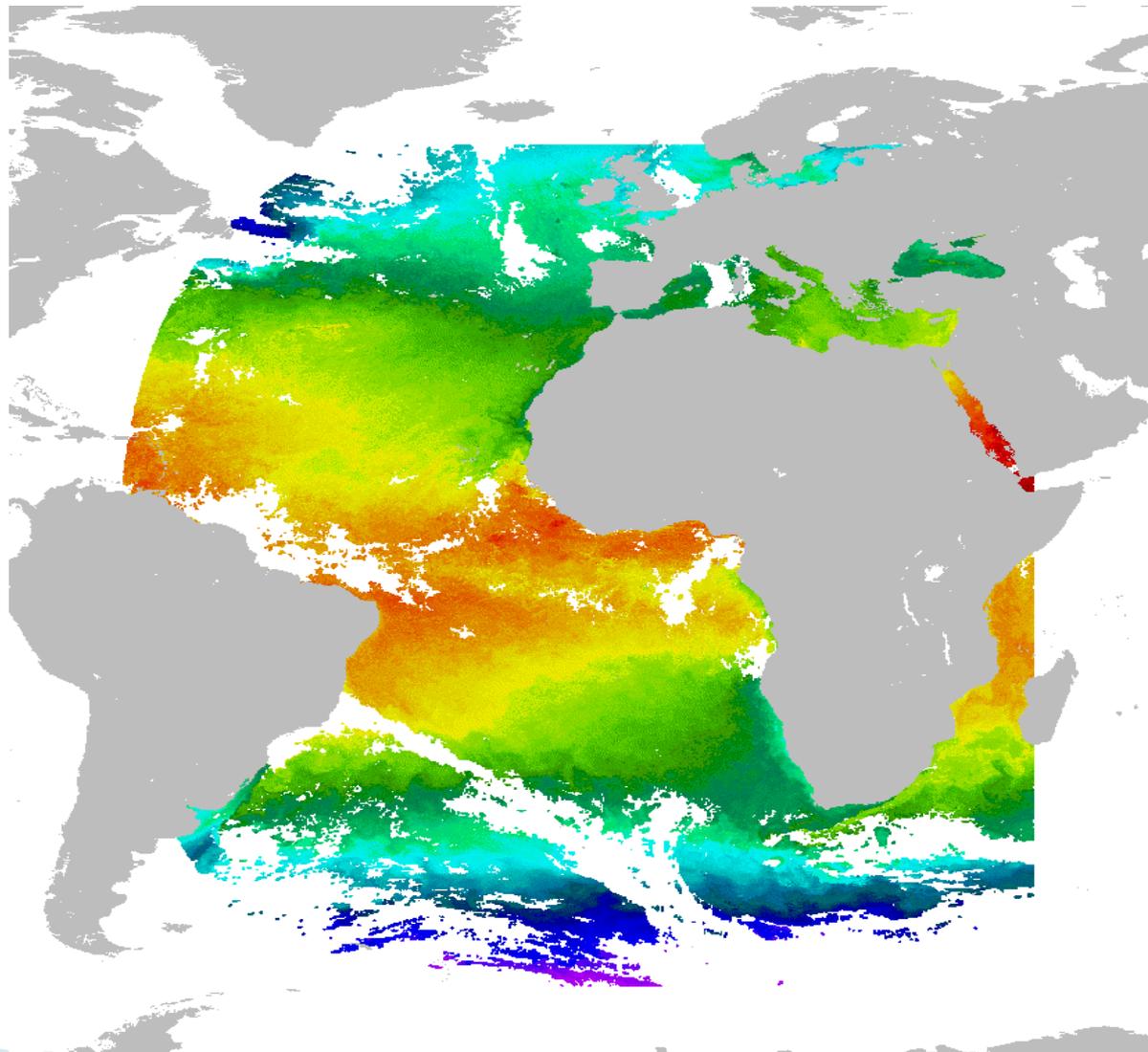


Sea Surface Temperature (celsius)

Other SST Data Sources



- MTSAT (NOAA)
- MSG-3 (IFREMER)
- WindSAT (REMSS)









Future SST Data Sources

➤ Polar

- AMSR-2
- JPSS
- Sentinel-3

➤ Geostationary

- Himawari-8
- GOES-R/S
- MSG-4

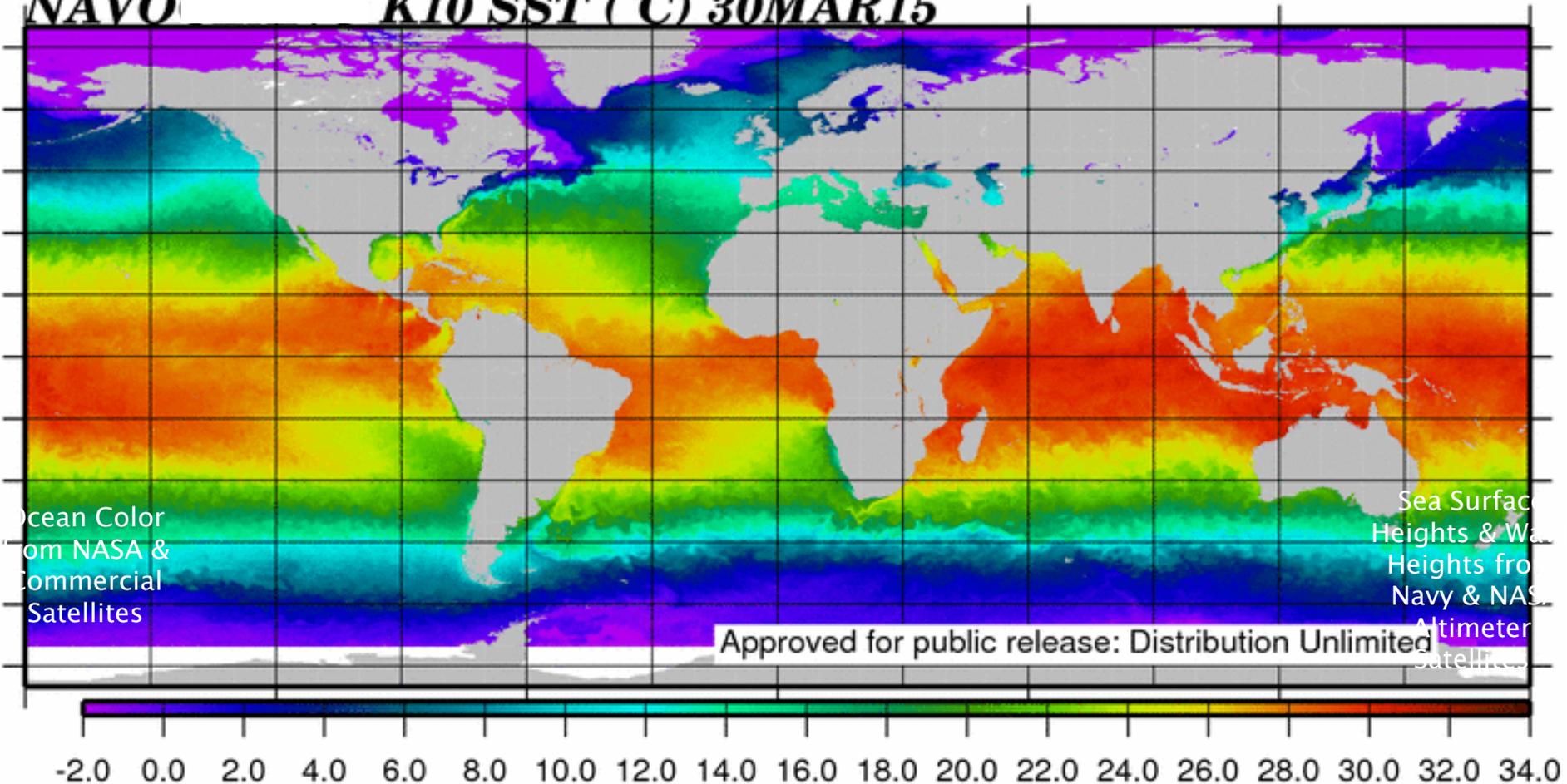


NAVO 10km Gridded SST Field



NAVO

K10 SST (°C) 30MAR15



Ocean Color
from NASA &
Commercial
Satellites

Sea Surface
Heights & Wave
Heights from
Navy & NASA
Altimeter
Satellites

VIIRS SST Enhancements



➤ NPP/VIIRS SST Process Improvements

- Full swath processing
- Extended bounds
- Improved contamination screening techniques
- New Algorithms
- High Quality

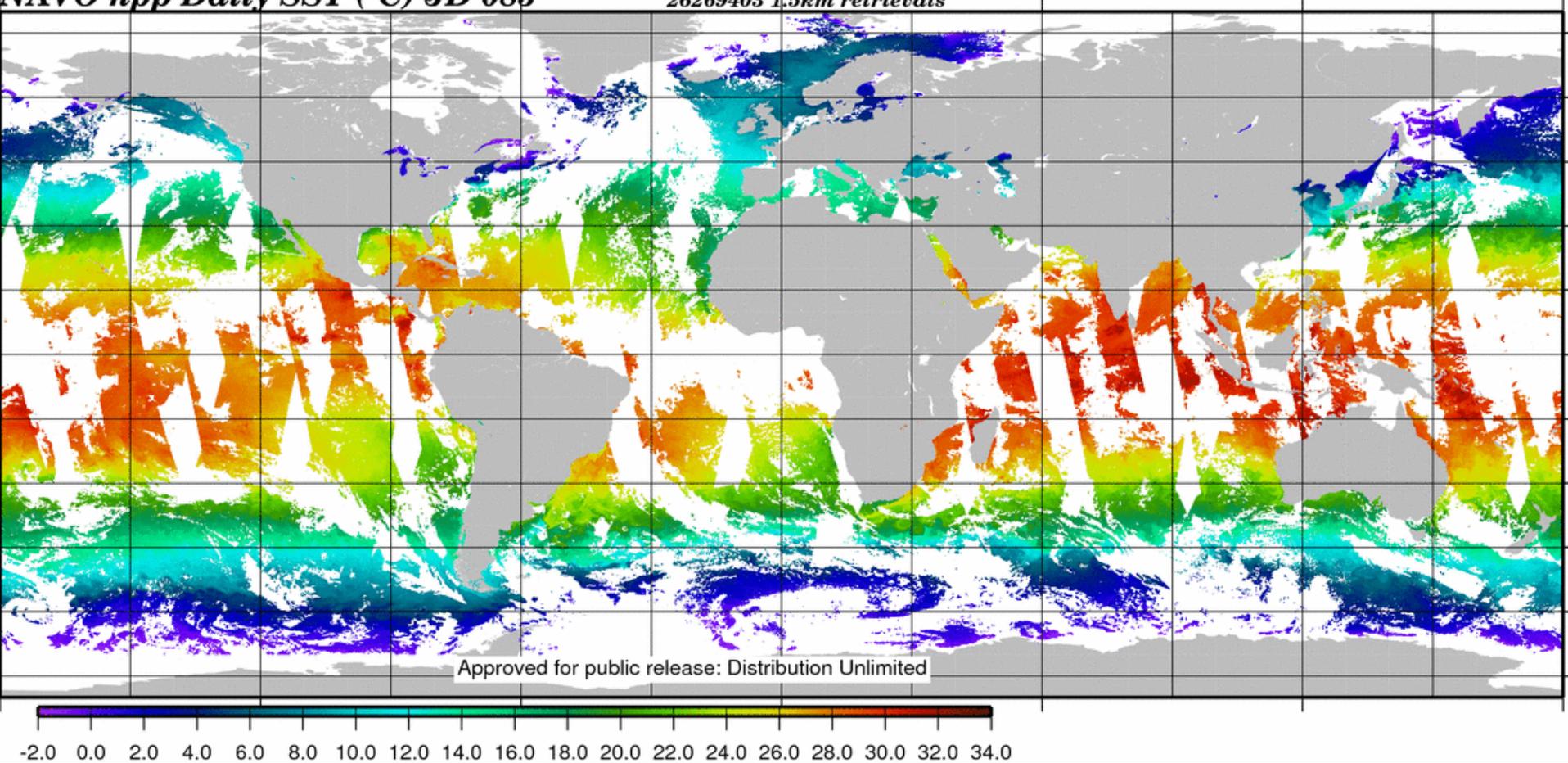


VIIRS SST Daily Coverage Before and After



NAVO *npp Daily SST (°C) JD 083*

26269403 1.5km retrievals



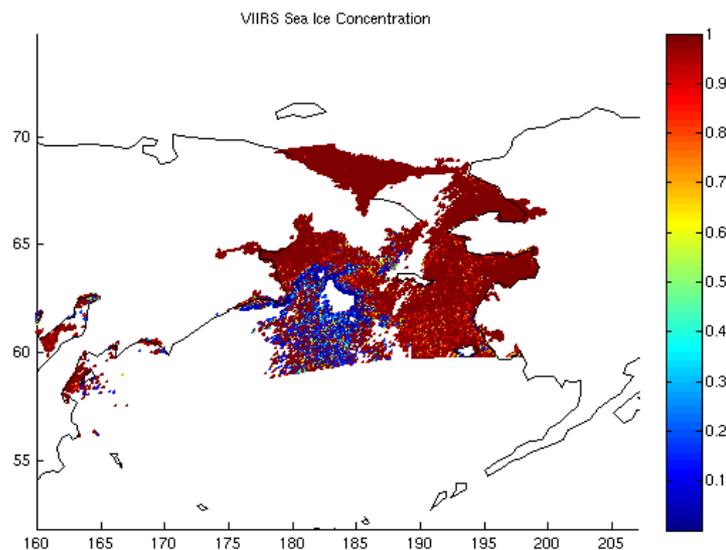
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VIIRS Ice Concentration

➤ NRL tasks for FY16:

- Determine VIIRS ice concentration EDR errors
- Update the current data assimilation module (NCODA) to include VIIRS ice concentration EDR's
- Test the assimilation of VIIRS ice concentration into the existing ice forecast systems





VIIRS Ice Surface Temperature

➤ Future NRL task:

- Investigate using VIIRS ice surface temperatures as a possible new data source for assimilation into Naval ice forecast systems.



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