

National Environmental Satellite,  
Data, and Information Service

# NOAA/NESDIS Update: GOES/POES/Non NOAA Satellites

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Enterprise user Services Coordinator  
NESDIS/OSPO/SPB  
March 6, 2024

# Outline

- User Services team
- General Satellite Update
  - GOES Constellation Status
  - POES Constellation Status
  - Non NOAA Satellites



# User Services Update

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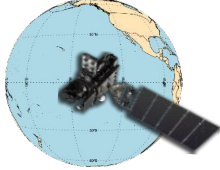
# GOES Satellite Updates



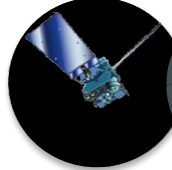
# GOES Constellation

## Current

GOES-West  
GOES-18  
137.0°W



Co-Standby  
GOES-14  
108.2°W



Standby  
GOES-17  
104.7°W

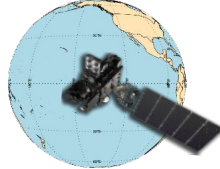


GOES-East  
GOES-16  
75.2°W

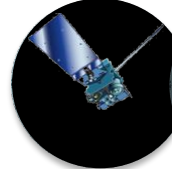


## GOES-U Post-Launch Testing

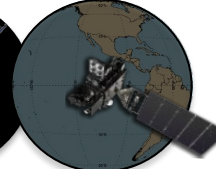
GOES-West  
GOES-18  
137.0°W



Co-Standby  
GOES-14  
108.2°W



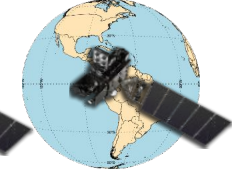
Standby  
GOES-17  
104.7°W



Checkout  
GOES-U/19  
89.5° West



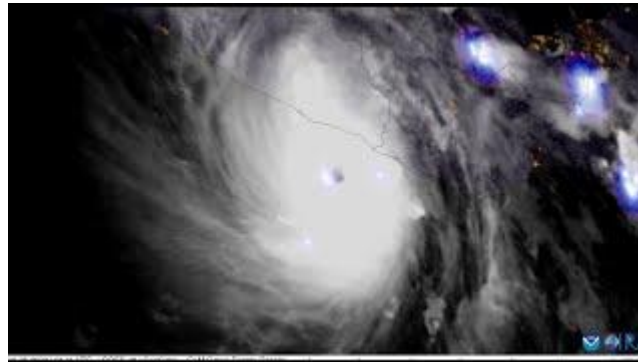
GOES-East  
GOES-16  
75.2°W



- Following successful completion of PLT phase, GOES-19 will replace GOES-16 as the GOES-East satellite.
- Final locations for GOES-16, GOES-17, and GOES-14 post GOES-19 T2O are TBD
- GOES-15 has been transferred over to U.S. Space Force, renamed EWS-G2, and is located over Indian Ocean
- GOES-17 & GOES-14 remain in Storage/Standby, and are ready to provide backup service
- GOES-U (19) launch currently NET May 20, 2024

M. Seybold

# Hurricane Otis GOES IR, GOES Visible (GLM) Flashes



# POES Satellite Updates



# NOAA-21 NOAA-20 Status

- NOAA-21 now Secondary - becomes Primary Polar Satellite: TBD March 2024
- NOAA-20 Secondary TBD March 2024
- SNPP Tertiary TBD March 2024
- NOAA-20 Rephasing (orbital Maneuver) : March 19-20, 2024





# NOAA-21 NOAA-20 SNPP Orbital

## JPSS: Orbital Configurations

- ◆ **Current Configuration**
  - ◆ NOAA-20 and SNPP are  $\frac{1}{2}$  orbit apart (i.e., ~50 min apart), where NOAA-21 is placed  $\frac{1}{4}$  orbit between the two.
  - ◆ NOAA-21 is currently designated as the secondary satellite.
- ◆ **Once NOAA-21 becomes the primary satellite in the future:**
  - ◆ NOAA-20 will move ahead  $\frac{1}{4}$  orbit.
  - ◆ NOAA-21 and NOAA-20 will be separated by  $\frac{1}{2}$  orbit (i.e., 50-min apart), and SNPP  $\frac{1}{4}$  orbit between the two.



Screenshot courtesy of NOAA/NESDIS/OSPO/TOWR-5.

# NOAA-21 NOAA-20 SNPP Data Latency (Jorel Torres CIRA)

## When to Expect JPSS Data & Data Latency

### Temporal Resolution

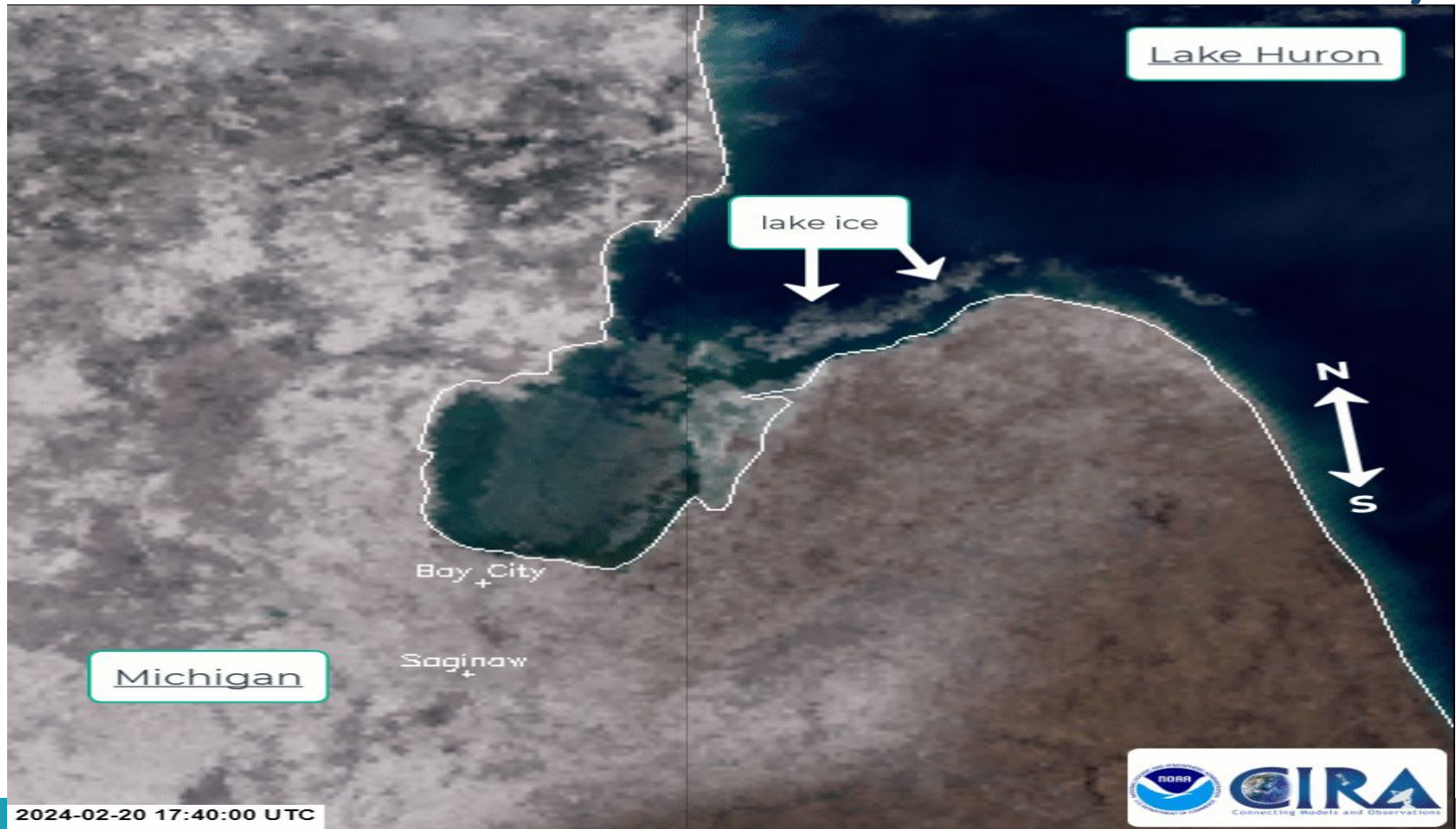
- CONUS Users
  - At any one location, expect ~3-to-5 overpasses during the night and ~3-to-5 overpasses during the day.
    - Nighttime: ~5-12Z (East-to-West)
    - Daytime: ~16-22Z (East-to-West)
- Alaska Users
  - More frequent overpasses in the northern high latitudes.
- Sequence: NOAA-20 + ~25 min + NOAA-21 + ~25 min + SNPP + ~50-min data gap, then the sequence repeats.

### Data Latency:

- For NOAA/NWS Users in AWIPS
  - SBN: ~1-1.5 hours
  - Direct Broadcast (DB): ~30-min



# Lake Huron Ice 2/20/24 NOAA-21 VIIRS (courtesy Joel Torres CIRA)



# Non NOAA Updates: Himawari



## Himawari-8/9/10 Constellation and Product Updates

- Himawari-8 was placed in standby mode on December 13, 2022. It remains at 140.7E.
- **Himawari-9 is operational at 140.7E.**
- All lingering Level-2 H-9 products are nearly operational.
  - L2 Cloud and Wind products went operational in the NCCF on June 13, 2023, and SST products went operational on December 14, 2023. L2 Rainrate product will be fully operational on March 27, 2024. Products are available for subscription in the PDA.
- Work is progressing on Himawari-10 with the contractor selections completed and announced. It is still slated to launch in 2028 and take over operations from H-9 in 2029.

## DMSP and WSF-M Updates

- All DMSP satellites (F16, F17, F18) are well beyond their planned mission life. The program is also addressing extreme obsolescence of critical ground segment hardware components. The timeframe of the sunset of the mission is still under discussions that are held internal to DoD
- **The Weather System Follow-on Microwave (WSF-M) satellite fleet will launch its first satellite on March 25, 2024 from Vandenberg AFB.**



# Non NOAA Updates: EUMETSAT



# Meteosat Configurations and MTG-I1 Updates

## Current Meteosat Constellation at a Glance

SATELLITE	LIFETIME	POSITION	SERVICES
<b>Meteosat-11</b>	15/07/2015 – Fuel lifetime is until 2033	<b>9.5°E</b>	Rapid Scan Service. Real-time Imagery.
<b>Meteosat-10</b>	05/07/2012 – Fuel lifetime is until 2030	<b>0°</b>	0° SEVIRI Image Data. Real-time Imagery.
<b>Meteosat-9</b>	28/08/2002 – Fuel lifetime is until 2022* *may be extended	<b>45.5° E</b>	Primary IODC service started 6/1/22.
<b>MTG-I1</b>	Launched 12/13/2022	<b>0°</b>	Will replace Meteosat-10 at 0° mid-2025 after parallel ops.

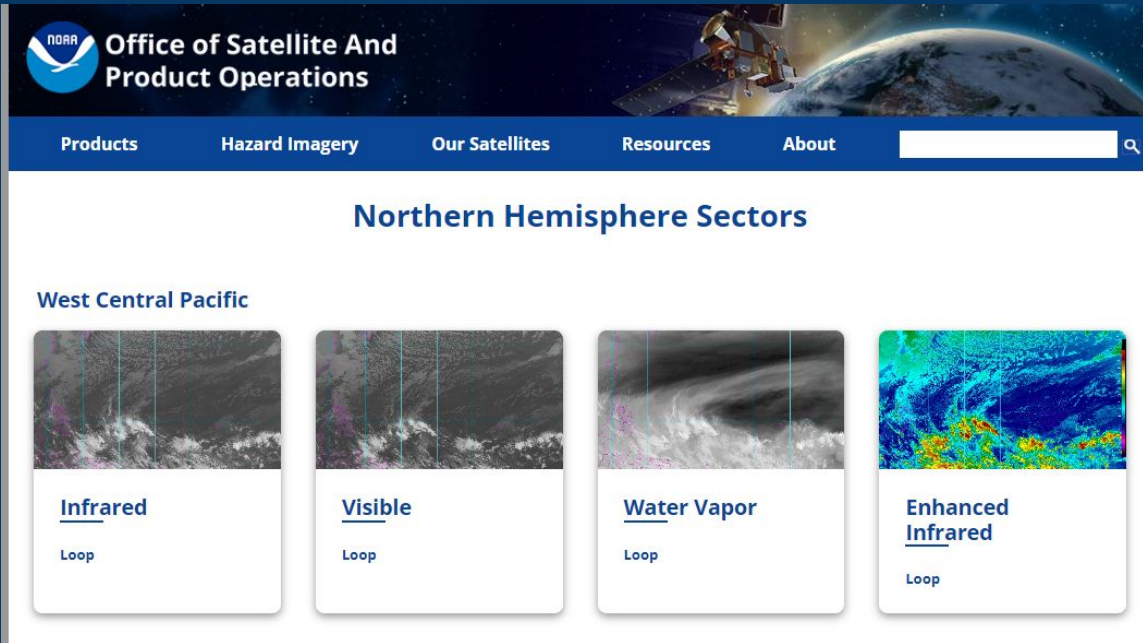
Primary Imaging Operations

- Pre-operational MTG-I1 data checkout timeline is slowly shifting right, with delays encountered
  - FCI L1c data was released in November to select NOAA (+ affiliate) users
  - LI L2 data no earlier than March 2024
  - After relocating to 0°, FCI went into to SURVIVAL mode. EUMETSAT is troubleshooting and collecting information in case there are any implications for the follow on satellites being that they use the same hardware. All dates for data release and operational approval will shift at least one month.
- It's expected that EUM & NOAA's data policy should be largely the same between MSG and MTG





# Revamped OSPO Imagery Webpage



- The OSPO Imagery webpage has been revamped. It is now organized by satellite type, mission and basin.
- The original goes.noaa.gov page with the sectors will remain active for a few months as users transition - a warning banner directs users to the new location.
- Based on the monitored traffic, it appears the site has been gaining traction with users and transition is going well.
- In the coming weeks, we will transition the goes.noaa.gov domain to STAR for **strictly GOES imagery**.
- **The URL for Guam GIFs has changed.**

**OLD:**

<https://www.ospo.noaa.gov/Products/imagery/guam.html>

**NEW:**

<https://www.ospo.noaa.gov/Products/imagery/nohemi.html>

<https://www.ospo.noaa.gov/Products/imagery/sohemi.html>





# Proposed Retirement of SAB (Satellite Analysis Branch) Tropical Dvorak Program

- No formal documented requirement. The requirement is at the RSMCs
- SAB has produced Dvorak analysis for tropical cyclones for at least 40 years
- Barazotto (2005), Benner (2011) and most recently Renkevans (2016-2018/19) have pushed for the retirement of SAB's tropical program
- NWS has led a Dvorak Tiger Team (DTT) since 2018 to identify a path forward
  - Results and recommendations expected by late March
- High level reasons for SAB Dvorak Retirement:
  - To make room for new products and services
  - Hardware/Software challenges - Migration to AWIPS-2 and future of McIDAS based services
  - Satellite data has become widely available as compared to 40 years ago
- Remote sensing capabilities and objective algorithms are widely used today, making Dvorak estimates just one tool among many.
  - New remote sensing capabilities such as scatterometer data are widely used today.
- In the Eastern and Southern Hemispheres, in particular, multiple Dvorak estimates are available independent of SAB.
  - Additional automated products and services have become available with more on the horizon (AI Dvorak) to augment
  - 
  - Staff have become more generalized (1301 vs 1340)

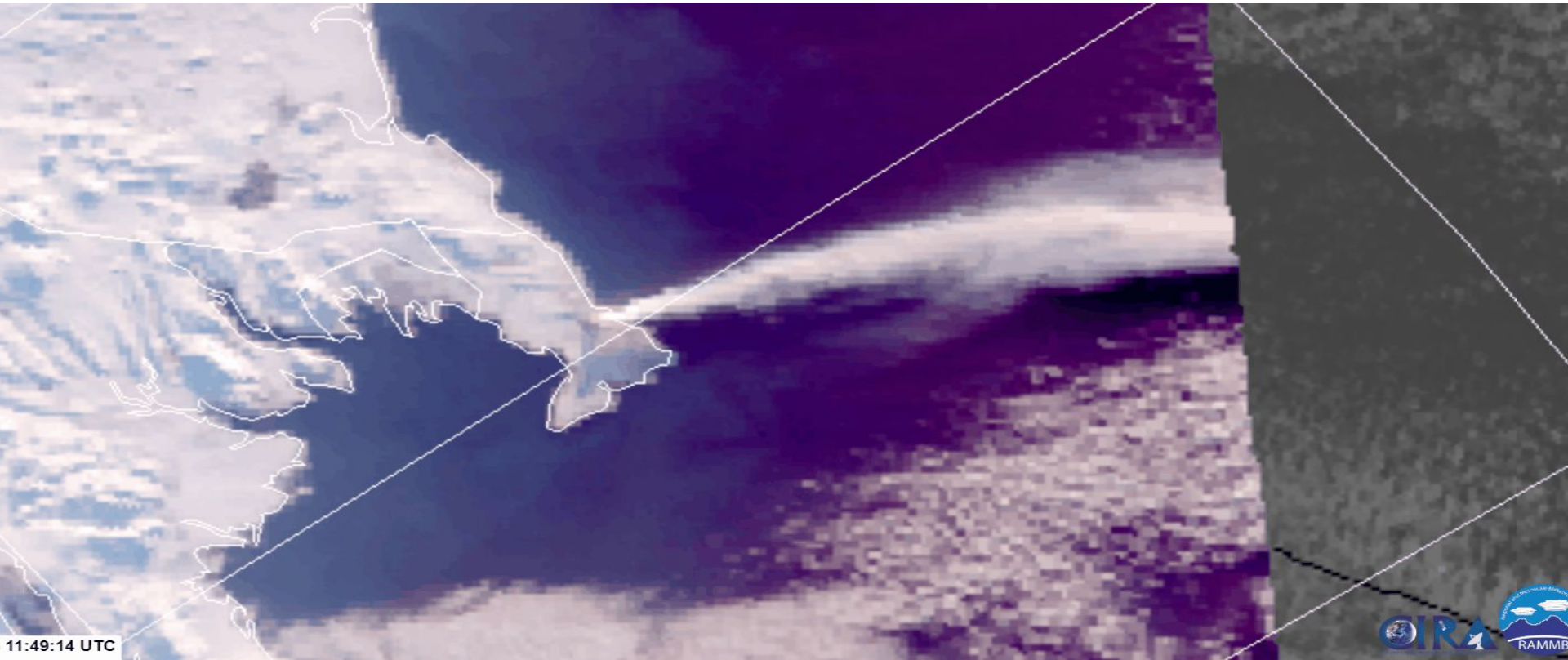


# Back up



# Iceland (Grindavik - Reykjanes Peninsula) Volcano Eruption

## NOAA-21 VIIRS Geocolor 2/8/24



11:49:14 UTC





National Environmental Satellite,  
Data, and Information Service

# An Overview of NESDIS/OSPO Tropical Cyclone Products

**Aiwu Li**

Tropical Product Area Lead

*NOAA/NESDIS/OSPO*

March 6, 2024

# About NESDIS/OSPO

- **OSPO Mission**

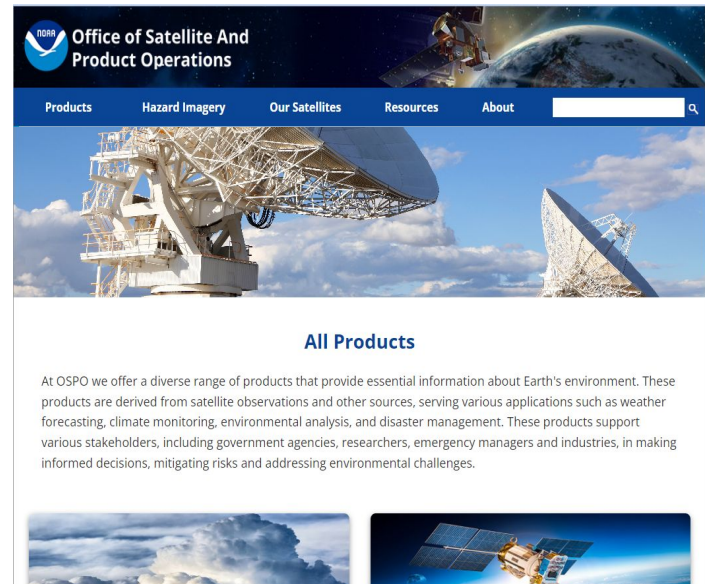
- *The Office of Satellite and Product Operations (OSPO) manages and directs NOAA's 24x7 environmental satellite operations, including command and control, data acquisition, product processing, product generation, and the distribution of environmental data and derived products to domestic and foreign users as well as associated services. ( from [OSPO Webpage](#))*

- **O&M Support at OSPO**

- All OSPO satellite product systems are running in near-RT in the product generation environments.
- Conduct configuration management of the product application baseline.
- Subscribed product users receive near real-time products from PDA.
- User notifications are issued on product updates and anomalies.
- 24x7 product operation support
- 24x7 product quality monitoring

- **OSPO Product Categories**

- Atmosphere
- Land
- Ocean
- Imagery
- Product Suites



**Office of Satellite And Product Operations**

Products Hazard Imagery Our Satellites Resources About

### All Products

At OSPO we offer a diverse range of products that provide essential information about Earth's environment. These products are derived from satellite observations and other sources, serving various applications such as weather forecasting, climate monitoring, environmental analysis, and disaster management. These products support various stakeholders, including government agencies, researchers, emergency managers and industries, in making informed decisions, mitigating risks and addressing environmental challenges.

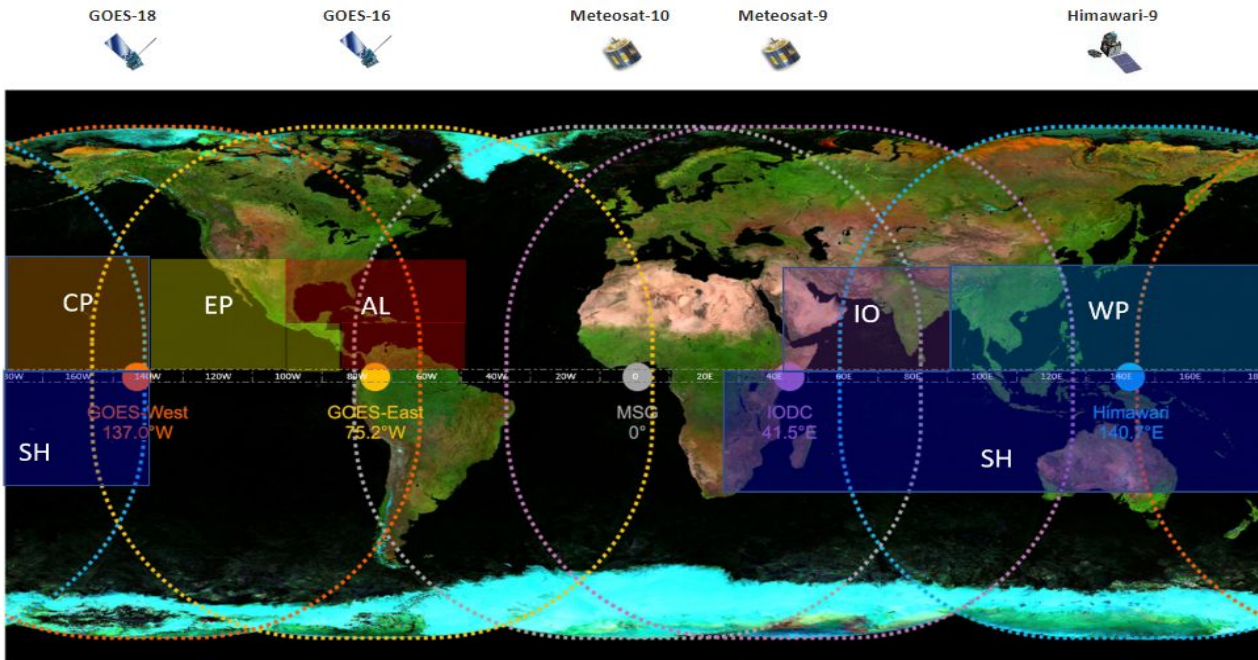
# Tropical Products Supported at OSPO

- The OSPO Tropical Cyclone(TC) products are a set of satellite-based tropical characteristics and winds products derived from the sensors of Vis, IR, MW, scatterometer, and SAR C-band on-board a number of geostationary satellites and polar-orbit satellites.

Operational TC Products	Science Teams	Operation major milestones
<b>ADT</b> Advanced Dvorak Technique	Jeff Key, Tim Olander, Chris Velden <i>NESDIS/STAR, CIMSS</i>	2007- initial version ( McIDAS-based system) on the heritage machines 2013-2022- upgraded to non-McIDAS version and migrated to NDE
<b>eTRaP</b> Ensemble Tropical Rainfall Potential	Bob Kuligowski <i>NESDIS/STAR</i>	2009 - initial version ( McIDAS-based system) on the heritage machines 2010-2021 - upgraded for new satellite capabilities (e.g. N20/N21, MetOp-B/C)
<b>HISA</b> Hurricane Intensity and Strength Algorithm	John Knaff, Mark DeMaria <i>NESDIS/STAR, CIRA</i>	2011 - initial version (AMSU TC) at te the heritage machines 2013 - added ATMS capability, implemented at NDE
<b>MTCSWA</b> Multi-platform Tropical Cyclone Surface Winds Analysis	John Knaff, Jack Dostalek <i>NESDIS/STAR, CIRA</i>	2011 - initial version ( McIDAS-based) on the heritage machines 2022 - upgraded to non-McIDAS version and migrated to NDE
<b>TCFP</b> Tropical Cyclone Formation Probability	Chris Slocum, John Knaff <i>NESDIS/STAR, CIRA</i>	2013- initial version (McIDAS-based system) on the heritage machines 2021- updated for switching to the daily Reynolds SST product.
<b>ASCAT UHR</b> ASCAT Ultra High-Res Storm Winds	Paul Chang <i>NESDIS/STAR</i>	2008- initial MetOp-A version 2010-2020 - upgraded and enabled MetOp-B capability 2024- upgraded to include MetOp-C and migrated to NCCF
<b>SAR TC</b> <i>(coming soon)</i> Sentinel Tropical Cyclone Winds	Sean Helfrich, Chris Jackson <i>NESDIS/STAR</i>	2024- Initial version (currently being implemented in NCCF)



# Satellites and Basins



## 12 Polar Satellites

- JPSS (3)
- MetOp (2)
- GPM
- GCOM-W1
- RCM(3)
- Sentinel-1A
- RadarSat-2

<b>GEOs</b>	GOES-16/18	AL, EP, CP, WP, SH
	Meteosat-9/10	IO, WP, SH, AL
	Himawari-9	WP, IO, CP, SH
<b>LEOs</b>	JPSS series MetOp series GCOM-W1, GPM	All basins

# Advanced Dvorak Technique (ADT)

- ADT utilizes the Vis and IR brightness temperature from geostationary satellites to estimate the tropical cyclone center location and intensity.
- Passive microwave data from polar satellites was introduced in 2020 for better detection of developing eyewall structure.
- ADT products are mainly used for Tropical cyclone intensity and track forecasting

## Satellites and sensors:

- GOES-16/17/18 ABI
- Meteosat-9/10/11 SEVIRI
- Himawari-8/9 AHI
- GCOM-W1 AMSR2
- GPM GMI

## NHC/JTWC ATCFs:

- b-deck
- FST
- COM

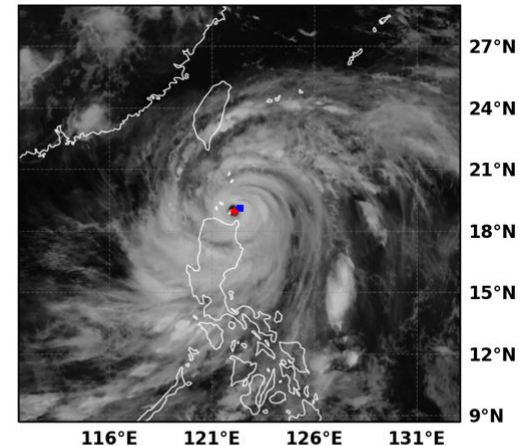
## ADT Products:

- Format: ASCII, ATCF, PNG
- Distribution: PDA, Web
- Refresh rate: 30 minutes

## Webpage:

- <https://www.ospo.noaa.gov/Products/ocean/tropical/adt.html>

Typhoon "DOKSURI"  
7/25/2023



Storm name - 05W  
Initial Guess Position - FORECAST INTERPOLATION  
Final ADT Position - ARCHER ANALYSIS  
HIM-9 INFRARED 15:20:00 UTC JUL 25 2023 NOAA  
Current Intensity - 6.1



# Ensemble Tropical Rainfall Potential(eTRaP)

- eTRaP is a simple ensemble that combines Tropical Rainfall Potential (TRaP) forecasts from multiple satellite sensors.
- eTraP products provide quantitative precipitation forecast guidance (rainfall estimates) and probabilities of precipitation for active cyclones anywhere on the globe.

## Satellites and Sensors:

- GOES-16/17/18 ABI
- Meteosat-9/10 SEVIRI
- Himawari-8/9 AHI
- SNPP/N20/N21 VIIRS/ATMS
- MetOp-B/-C AVHRR/AMSUA/MHS
- GCOM-W1 AMSR2
- GPM GMI
- *N19 AMSUA/MHS (retiring soon)*
- *F17/F18 SSMIS (retiring soon)*

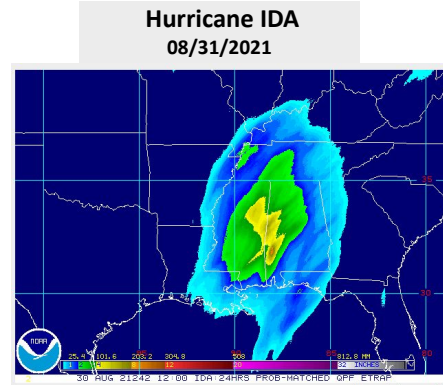
## NHC/JTWC ATCFs:

- b-deck
- FST
- SHIPS

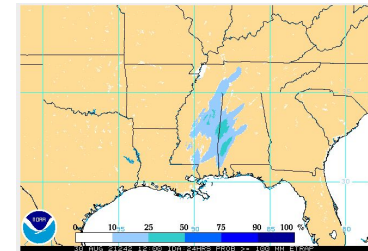
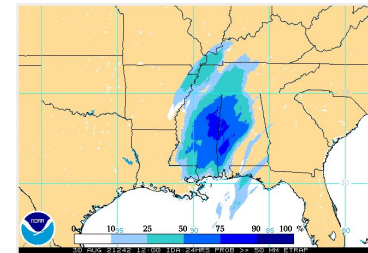
## eTRaP Products:

- Format: netCDF, PNG
- Distribution: PDA, NCEI/CLASS
- Refresh rate: 1 hour
- Resolution: 8 km

Product webpage: <https://www.ssd.noaa.gov/PS/TROP/etrap.html>



## Rainfall Probability of Precipitation(PoP)



# Hurricane Intensity and Strength Algorithm(HISA)

- HISA products are microwave-based TC products that provide estimates of tropical cyclone intensity and wind radii of 34, 50, and 64 knot in 4 quadrants relative to the storm center.
- HISA products are useful for Tropical cyclone (TC) intensity forecasting

## Satellites and Sensors:

- NPP/N20/N21 ATMS
- MetOP-B/MetOp-C AMSUA/MHS
- *N19 AMSUA/MHS (retiring soon)*

## NHC/JTWC ATCFs:

- a-deck

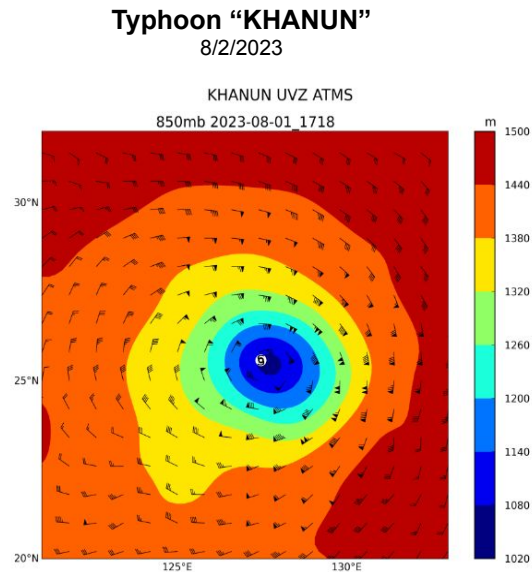
## Model Forecasts:

- NWP GFS

## HISA Products:

- Format: netCDF, ATCF, ASCII, PNG
- Distribution: PDA, NCEI/CLASS, Web
- Refresh rate: Vary
- Resolution: 0.2 degree

**Product webpage:** <https://www.ssd.noaa.gov/PS/TROP/mwtc-ospo.html>



# Multi-platform Tropical Cyclone Surface Winds Analysis(MTCSWA)

- MTCSWA uses satellite-derived wind and imagery data, from both polar and geostationary satellites, to generate storm characteristics products (e.g. wind, pressure, structure) in a per-storm basis.
- MTCSWA products are mainly used for tropical cyclone intensity estimates and storm winds forecasts

## Satellites and Sensors:

- GOES-16/-17/-18 ABI
- Meteosat-9/-10/-11 SEVIRI
- Himawari-8/-9 AHI
- MetOp-B/MetOp-C AMSUA/MHS, ASCAT
- NPP/N20/N21 ATMS

## NHC/JTWC ATCFs:

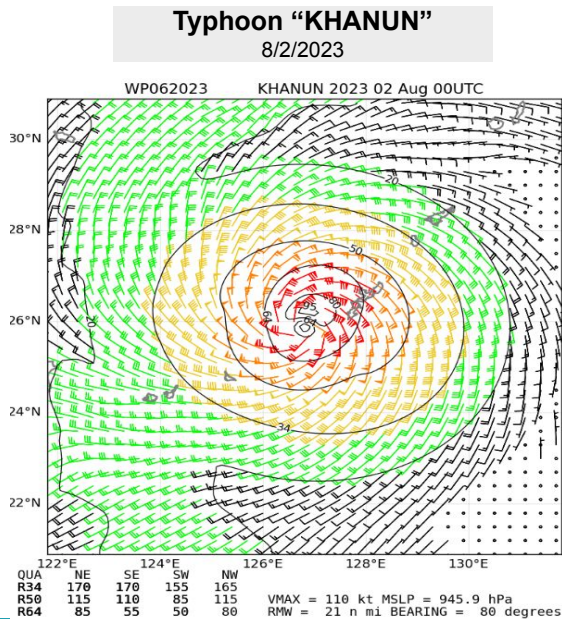
- a-deck

## MTCSWA Products:

- Format: netCDF, ATCF, PNG
- Distribution: PDA, NCEI/CLASS, Web
- Refresh rate: 3 hours
- Resolution: 10 km

## Product webpage:

- <https://www.ssd.noaa.gov/PS/TROP/mtcswa.html>



# Tropical Cyclone Formation Probability(TCFP)

- TCFP products provide the estimates of the probability of tropical cyclone formation within a certain distance (e.g. 500 km) of each grid point within the next 24 and 48 hours
- Covers global tropical domain, 0-360 E, 45S-45N
- Provide real-time, objective guidance for 48-hour probability of TC formation, which is a time period that is more consistent with the needs of NHC/JTWC forecasters

## Satellites and Sensors:

- GOES-16/-17/-18 ABI
- Meteosat-9/-10/-11 SEVIRI
- Himawari-8/-9 AHI

## NHC/JTWC ATCFs:

- a-deck
- b-deck

## Forecast and Re-analysis products:

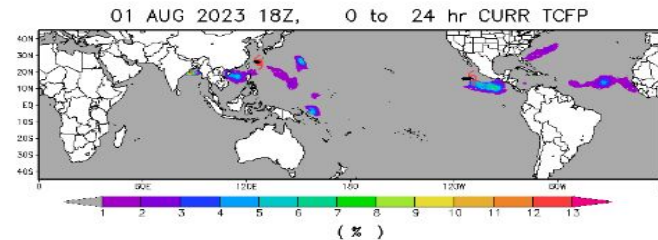
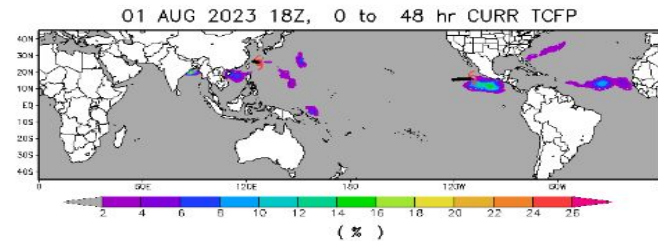
- NWP GFS
- CMC SST

## TCFP Products:

- Format: AWIPS netCDF, GeoTiff, KML, PNG
- Distribution: PDA, NCEI/CLASS, Web
- Refresh rate: 1 hour
- Resolution: 1.0x1.0 degree

## Product webpage:

- <https://www.ssd.noaa.gov/PS/TROP/TCFP/index-ospo.html>



# ASCAT Ultra High-Res Storm Winds(ASCAT UHR)

- The ASCAT Ultra High-Res (UHR) Winds are the storm-based satellite products
- ASCAT SZF measurements is used as the input to the ASCAT UHR processor to produce the UHR wind retrievals. Then use the weighted AVErAge (AVE) algorithm to generate UHR image products
- The ASCAT UHR winds are noisier than conventional 25 km ASCAT Ocean Surface Winds, but have higher spatial resolution.

## Satellites:

- MetOp-B
- MetOp-C

## Model Forecast:

- NWP GFS

## Products:

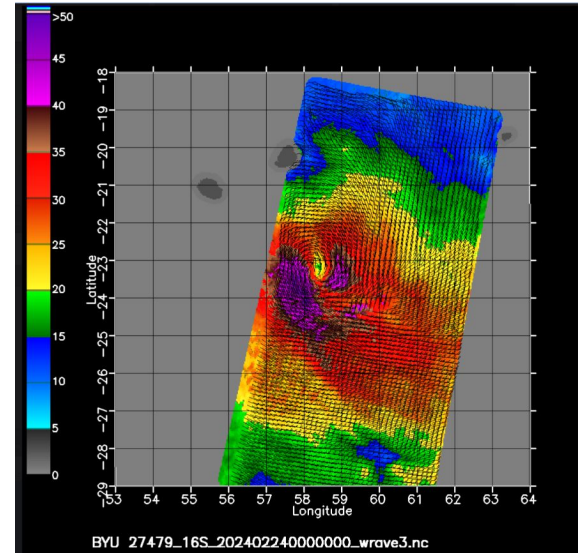
- Format: netCDF, GIF
- Distribution: PDA, NCEI/CLASS, Web
- Refresh rate: Vary
- Resolution: 5 km

## Product webpage:

- <http://www.ospo.noaa.gov/Products/atmosphere/ascat/uhr/winds/>

## NHC/JTWC ATCFs:

- a-deck



# Sentinel Tropical Cyclone Winds(SAR TC)

- SAR TC winds products are generated by SAROPS (Synthetic Aperture Radar Automated Ocean Products System). The current SAR TC products include Tropical Cyclone (TC) Winds, and high resolution TC winds imagery
- The very high resolution TC winds product can be used for TC forecasting, Integrated water forecasting, Ice forecasting, and other mission critical areas.

## Satellites:

- Sentinel-1A
- RadarSat-2
- RCM-1, RCM-2, RCM-3

## NHC/JTWC ATCF:

- b-deck

## Model Forecast:

- NWP GFS

## SAR TC Products:

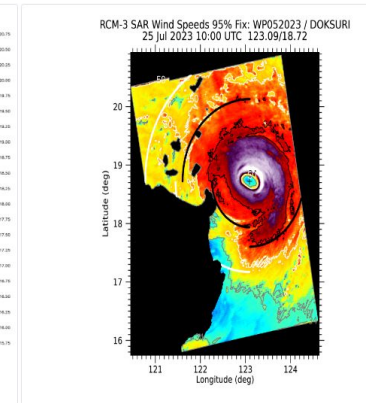
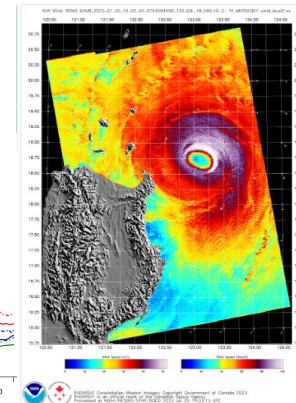
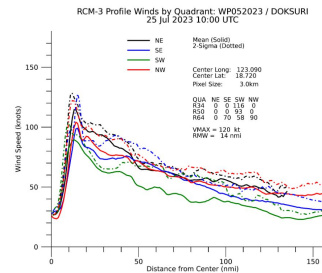
- Format: netCDF, GeoTiff, ATCF, KMZ, PNG
- Distribution: PDA, NCEI/CLASS, Web
- Refresh rate: Vary
- Resolution: 500m

## Product webpage:

- [https://www.star.nesdis.noaa.gov/socd/mecb/sar/sarwinds\\_tropical.php](https://www.star.nesdis.noaa.gov/socd/mecb/sar/sarwinds_tropical.php)

## Typhoon "DOKSURI" 7/25/2023

WP052023 / DOKSURI | RCM3 - HV | 2023-07-25 10:00:50



# Tropical Product Users

- NWS NHC/CPHC
- DOD JTWC
- NESDIS SAB
- NCEP WPC
- NCEI/CLASS
- NESDIS/STAR
- International users





# Product Upgrade Plan

## Coming up in 2024-2025

- All OSPO TC applications are expected to be migrated to NCCF (AWS cloud) before the peak of the hurricane season starts in 2024
- SAR TC will be in operational production in early summer 2024
- Geo-satellite based TC product algorithms will be updated to include the MTG capability
- New/upgraded TC products will be achieved by NCEI/CLASS.
- The latest and greatest science updates will be implemented into operations
  - ADT9.0 => AiDT (AI-enhanced ADT will introduce an AI/ML element to the current algorithm)
  - AMSUTC/NPPTC => HISA
  - TCFP=> TCFPv4
- Satellites at their EOLs will be retired for the applicable TC products.
  - NOAA-19
  - DMSP F17/F18







***Thank You for listening!***

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