



## NOAA JPSS Monthly Program Office

# AMP/STAR FY24 TTA

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# Highlights from the Science Teams (March, 2024)

## Mission Support for NOAA-21 VIIRS Outgassing

The STAR VIIRS Sensor Radiance Science team provided mission critical support to the successful Mid-Mission Outgassing (MMOG) for NOAA-21 VIIRS, working closely with the satellite mission operations at OSPO. The VIIRS instrument on NOAA-21 experienced an unprecedented larger than expected faster degradation in the SWIR and midwave TEB bands since launch. STAR scientists have been closely monitoring this degradation with extensive studies on the potential root cause. The theory is that the fast degradation is likely due to contaminants accumulated near the cold focal plane array with an uneven distribution and concentration as shown in the large spread of the degradation between detectors (Figure 1).

Working closely with the satellite operations, instrument vendor, and NASA flight project, STAR VIIRS Sensor Radiance science team proposed to perform the outgassing operation, which involves warming up the CFPA inside the cooler dewar which was at operational cryogenic temperature in order to let the contaminants escape, or outgassing. This operation started on February 26 and took 3 days to complete.

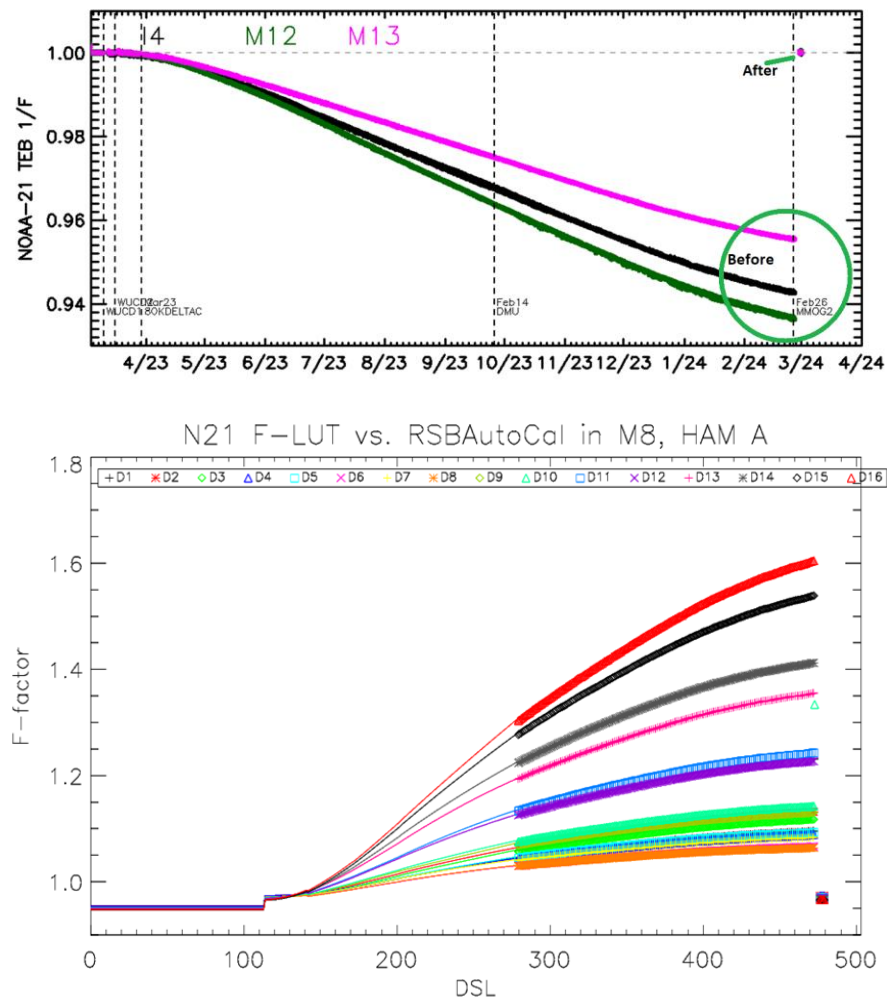


Figure. NOAA-21 VIIRS MMOG-2 successfully restored the responsivity of the instrument showing as large contrast in the “Before” and “After” TEB 1/F (or gain) values. (Upper: TEB; lower: SWIR)

## Singapore Bilateral Meeting

NOAA and Meteorological Service Singapore (MSS) agreed to cooperate in the area of fire and smoke haze detection and assessment, potentially exploring further the application and promotion of NOAA products in the region. The MSS invited NESDIS scientists to participate in bilateral discussions to start this cooperation as well as provide lectures and training to the Association of Southeast Nations (ASEAN) attending the Hotspot and Haze (H2A) workshop it was hosting from February 26-29, 2024. JPSS Project Scientist Dr. Satya Kalluri, STAR scientist Dr. Shobha Kondragunta, and STAR affiliate Dr. Amy Huff traveled to Singapore for bilateral discussions and conducting training sessions. Dr. Ivan Csiszar (STAR) participated remotely in part of the bilateral meeting, supporting discussions on the VIIRS active fire products and gave a presentation characterization as part of the workshop.

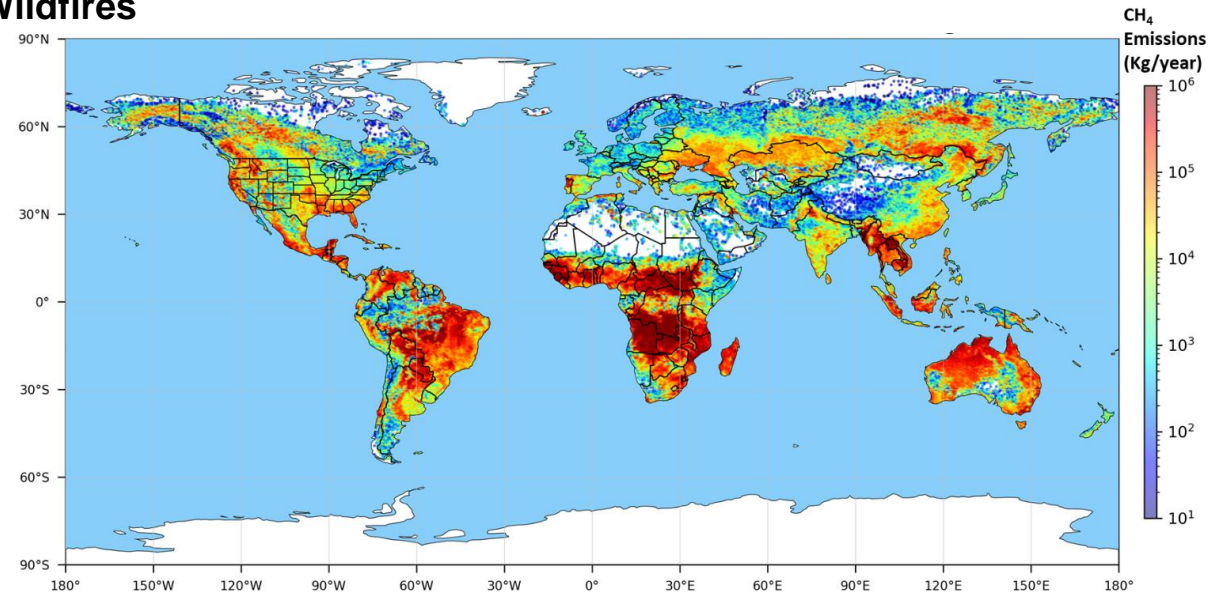


The two parties agreed to collaborate on the following topics:

- Mapping of VIIRS I-band fire detection product to M-band fire detection product resolution for consistency in their fire detection and mitigation tools
- Transition from MODIS based fire radiative power (FRP) to VIIRS for emission models
- Explore the development of regional satellite-based estimates of PM2.5 for ASEAN member states, which requires access to ground monitoring data from the member states.
- Evaluating 20 years of fire emissions climatology developed by NOAA/NESDIS to help with understanding trends and anomalies in the region.

## STAR Generated 22-year GHG Emissions from Wildfires

STAR has undertaken the reprocessing effort to generate 22 years (2000-2023) of GHG emissions from wildfires. This processing generated a consistent emissions data record from Aqua and Terra MODIS and S-NPP and NOAA-20 VIIRS. The purpose of the project was to document the contributions of different types of fires to air quality and climate in the United States along with an assessment of the role that fires play in enhancing each nation's greenhouse gas emissions from anthropogenic sectors.



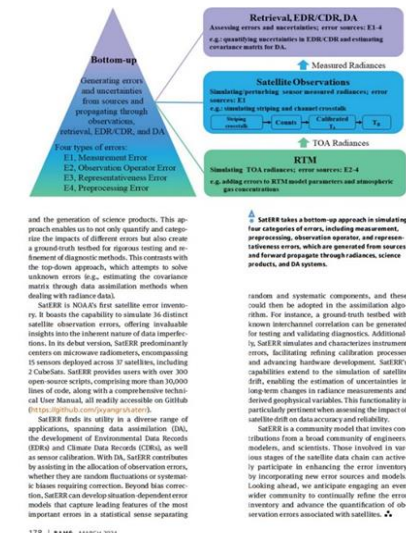
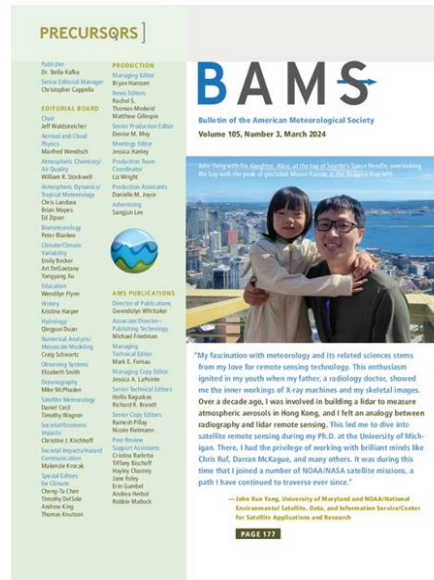
**Figure.** A 22-year (2000 - 2023) annual mean methane concentration from wildfires derived from NASA and NOAA satellites

Annual mean methane emissions from wildfires are highest (~115 kilograms per hour) in Africa, South America, Southeast Asia, and parts of Australia. These average values are comparable to methane emissions from landfills and other sources but smaller than accidental releases from pipelines and oil and gas industrial operations that are generally thousands of kilograms per year. Generally, GHG emissions from fires are one fifth of emissions from anthropogenic sources. However, regionally and seasonally, GHG emissions from fires can far exceed anthropogenic emissions, as was the case for California gigafire in 2020 and extreme fires in Canada in 2023. NOAA is planning to distribute these data to stakeholders via the United States Greenhouse Gas Center data portal in September 2024.

# Highlights from the Science Teams (March, 2024)

## BAMS Digital Edition Highlights SatERR Work

The work of STAR scientists has been featured in the March 2024 issue of the *Bulletin of the American Meteorological Society* (BAMS), the flagship journal of the American Meteorological Society. In this highlight, the BAMS editor provided readers with an overview of a satellite error inventory and simulator developed at NOAA/STAR. Scientists at NOAA/STAR have created SatERR 1.0, a comprehensive satellite error inventory and simulator aimed at improving satellite error representation and uncertainty quantification. Collaborators on this project include researchers from NASA, ECMWF, EUMETSAT, MIT, Ball Aerospace, and UW-Madison. The lead author of the project is John Yang, a member of the NOAA MiRS team, with the support from other MiRS team members. The BAMS editor delved into the origins, challenges, and stories behind the development of SatERR 1.0. This highlight underscores the significance of the work supported by NOAA projects and enhances the visibility of research at NOAA.



### Introducing SatERR 1.0

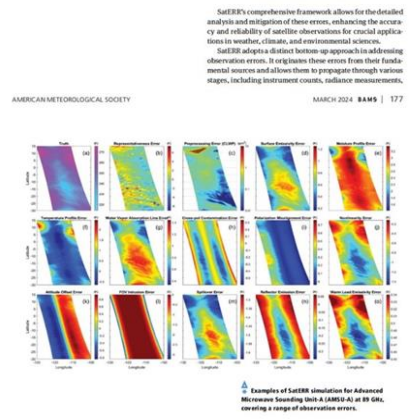
#### Improving Satellite Observation Error Representation

Key messages from "SatERR: A Community Error Inventory for Satellite Microwave Observation Error Representation and Uncertainty Quantification," by John Xun Yang (University of Maryland and NOAA), William Blackwell, Chang Du, Eugenia Kahay, Christopher Grassetti, Quanxin (Max) Liu, Ralph Ferraro, Huan Meng, Changxiu Zou, Shu-Ping Ho, Jia Yin, Veljko Perokovic, Timothy Heavens, David Posa, Arsenia Gombosi, David Draper, Sarah Miller, Rachael Koodman, and Min Chen. Published online in BAMS, January 2024. For the full, citable article, see <https://doi.org/10.1175/BAMS-D-22-2603.1>.

Satellite observations are vital for weather forecast, climate monitoring, and environmental studies. In recent years, there has been a concerted effort to develop methods for quantifying and representing errors associated with satellite observations. This has become a top priority in data assimilation, weather forecasting, and climate change. Notably, NOAA and ECMWF have organized several workshops since 2008 focusing on this very challenge. They've proposed a satellite error inventory based on a bottom-up approach that prioritizes to enhance our understanding of observation uncertainties, going beyond traditional top-down methods. As a result of these initiatives, we introduce the Satellite Error Representation and Realization (SatERR). SatERR is designed to simulate a wide spectrum of observation errors, from instrument measurement to model assimilation errors. To be more specific, SatERR encompasses four distinct categories of satellite observation errors:

- **Measurement errors:** These errors stem from instrument imperfections, including biases and noise in the radiance measurements.
- **Observation operator errors:** This category accounts for inaccuracies resulting from deficiencies in the forward model, such as those encountered in radiative transfer models (RTM) used during satellite observation assimilation.
- **Representation errors:** These errors arise from unresolved scales and processes, often tied to model parameterization and scale resolution.
- **Propagation errors:** This category pertains to errors incurred during the data processing pipeline.

SatERR's comprehensive framework allows for the detailed analysis and mitigation of these errors, enhancing the accuracy and reliability of satellite observations for crucial applications in weather, climate, and environmental sciences. SatERR adopts a distinct bottom-up approach in addressing observation errors. It originates these errors from their fundamental sources and allows them to propagate through various stages, including instrument counts, radiance measurements,



### METADATA

**BAMS:** What would you like readers to know from this article?  
**John Xun Yang (University of Maryland and NOAA/National Environmental Satellite, Data, and Information Service Center for Satellite Applications and Research):** We're excited to introduce SatERR 1.0, a comprehensive satellite error inventory project on GitHub. It simulates a wide range of satellite observation errors, from instrument measurement errors to model assimilation errors, for better satellite error representation and uncertainty quantification. This valuable resource encompasses 12 error sources across 27 satellites, including 2 CubeSats.

**What we're excited to recognize:** This major achievement and eagerly await feedback for further improvements.

**BAMS:** How did you become interested in the topic of this article?  
**JY:** My journey into this field was ignited by my engagement in a number of NOAA/NASA satellite missions such as JPSS, GPM, and TRMM. Over recent years, it has become an arduous task to assess a bottom-up simulator and error inventory. This complements the more traditional top-down approach like diagnostic integration in data assimilation, offering a fresh perspective for satellite observation error quantification.

**BAMS:** What surprised you the most about the work you document in this article?  
**JY:** Satellite observation error sources stem from instrument level through data assimilation, weather forecasting, and climate products. I was surprised that a robust error can be so complex and influential, yet the queries overlooked by nonexperts.

**BAMS:** What was the biggest challenge you encountered while doing this work?  
**JY:** Combating such an intangible weather domain is a lot of work. I'm more confident that I will be able to mention the significance of validation. On top of that, finding proof and insights from a crew of engineers and scientists is not easy.

# Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
03/06/2024	Delivery of the patch CCAP for JPSS LSA. This patch includes a fix to the scripts to run the units independently. There are also updates made to Production Rules document.	NCCF
03/14/2024	Final delivery of the HEAP_v4 J2 Provisional (Trace Gases) CCAP to NCCF for integration.	NCCF
3/20/2024	Delivery of the v1-2 patch CCAP for JPSS LSA. This patch removes unused input files from the production rules and fixes support for using NWP Snow Mask if IMS/SSMI Snow Mask is unavailable. If used, NWP Snow Mask uses GFS, CMC SST, and SVM15 as inputs. Also, the NOAA-21 test cases now use real satellite data rather than synthetic data.	NCCF
3/26/2024	Delivery of the OMPS NP V8PRO v1-1 CCAP algorithm package to CSPP.	NCCF
3/28/2024	Final delivery of the Leaf Area Index (LAI) v1-0 CCAP to NCCF for integration.	NCCF
3/28/2024	Delivery of the v3-1 patch CCAP for eTRaP. This patch clarifies production rules for the R-CLIPER unit and improves handling of global rain rate and R-CLIPER input files for the eTRaP unit.	NCCF
4/2/2024	Delivery of the v2-2 patch CCAP for ACP SO JPSS SST. This is a patch delivery CCAP to NCCF for integration, intended to achieve provisional maturity for NOAA-21 (includes two LUT updates)	NCCF
4/4/2024	Patch delivery of the GBBEPx CCAP v2-1 to the NCCF S3 bucket. This patch fixes large flux values that are generated by calculations that include areas flagged as sun glint pixels. There is no change to the Production Rules.	NCCF

## NOAA-20/21/S-NPP Operational Calibration Support:

S-NPP	Weekly OMPS TC/NP Dark Table Updates	10/3/23, 10/11/23, 10/17/23, 10/24/23, 10/31/23, 11/7/23, 11/14/23, 11/21/23, 11/28/23, 12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24, <b>03/12/24, 03/19/24, 03/26/24, 04/02/24</b>
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	10/3/23, 10/11/23, 10/17/23, 10/24/23, 10/31/23, 11/7/23, 11/14/23, 11/21/23, 11/28/23, 12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, <b>03/05/24, 03/12/24, 03/19/24, 03/26/24, 04/02/24</b>
NOAA-21	Weekly OMPS TC/NP Dark Table Updates	10/3/23, 10/11/23, 10/17/23, 10/24/23, 10/31/23, 11/7/23, 11/14/23, 11/21/23, 11/28/23, 12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, <b>03/05/24, 03/12/24, 03/19/24, 03/26/24, 04/02/24</b>
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	9/12/23, 9/26/23, 10/11/23, 10/24/23, 11/21/23, 12/05/23, 12/19/23, 01/03/24, 01/17/24, 01/30/24, 02/13/24, 02/27/24, <b>03/12/24, 03/26/24</b>
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	10/3/23, 10/17/23, 10/31/23, 11/14/23, 11/28/23, 12/12/23, 01/03/24, 01/10/24, 01/23/24, 02/06/24, 02/21/24, <b>03/05/24, 03/19/24, 04/02/24</b>
NOAA-21	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	10/3/23, 10/17/23, 10/31/23, 11/14/23, 11/28/23, 12/12/23, 01/04/24, 01/10/24, 01/23/24, 02/06/24, 02/21/24, <b>03/05/24, 03/19/24, 04/02/24</b>
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	10/23/23, 11/21/23, 12/18/23, 01/22/24, 02/15/24, <b>03/18/24</b>
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	10/23/23, 11/21/23, 12/18/23, 01/22/24, 02/15/24, <b>03/18/24</b>
NOAA-21	Monthly VIIRS LUT Update of DNB Offsets and Gains	10/23/23, 11/21/23, 12/18/23, 01/22/24, 02/15/24, <b>03/18/24</b>
NOAA-21	Monthly VIIRS DNB Straylight correction update	10/23/23, 11/21/23, 12/18/23, 01/22/24, 02/15/24, <b>03/18/24</b>



# NOAA-21 Cal/Val Maturity Reviews

## March 2024 Maturity Reviews

Product	Maturity Review	Review Date	Review Panel Recommendations
OMPS SDR (NP & TC)	Validated	03/28/24	The review team notes that updated tables proposed to resolve ADR10825 Solar Flux require close coordination with the Ozone EDR team, and that these are planned for late April 2024. The effective validated maturity date is upon implementation of the updated tables.

## April 2024 Maturity Reviews

Product	Maturity Review	Review Date	Notes
OMPS TC Ozone EDR (V8TOz)	Validated	04/25/24	delayed
OMPS NP Ozone EDR (V8Pro)	Validated	04/25/24	delayed
OMPS LP (SDR & EDR)	Beta/Provisional	04/25/24	

## May 2024 Maturity Reviews

Product	Maturity Review	Review Date	Review Panel Recommendations
TBD			



# JSTAR Code/LUT/Product Deliveries

3/11/2024	ADR10687/ CCR-6957 N20 VIIRS SDR RADIOMETRIC-PARAM-V4 LUT Update Reversal - OC
3/14/2024	ADR-10686/CCR-6956 NOAA-21 OMPS NM out-of-band stray light calibration table - fast track - ADR 10686

Date	Remaining J2-Ready DAPs to NCCF
March, 2023 (Delayed to January 2024)	<p>Ancillary data preprocessing</p> <ul style="list-style-type: none"> <li>• ASSISTT delivered LP preliminary pre-processor CCAP for SCR (Delivered to OSPO) on 9/29.</li> <li>• NDE Migration &amp; J2 Provisional final CCAP for Ancillary Data Preprocessor (miniDAP) is scheduled for February 20, 2024. However, pushed to May 16, 2024 to align with RDR to L2 final CCAP.</li> </ul> <p>RDR to L2 CCAP</p> <ul style="list-style-type: none"> <li>• Science Team Deliveries               <ul style="list-style-type: none"> <li>○ Science team V2.7LIMB for SNPP was delivered to ASSISTT on December 19, 2023</li> <li>○ Science team delivery for NOAA-21 (2.7LIMB N21 delivery to ASSISTT) is expected by the mid to late January 2024. However, changed the delivery to middle of March 2024.</li> </ul> </li> <li>• ASSISTT Deliveries               <ul style="list-style-type: none"> <li>○ NDE Migration &amp; J2 Provisional RDR to L2 CCAP Preliminary CCAP target date has been pushed to April 1, 2024.</li> <li>○ Final CCAP target date is set for June 25, 2024</li> </ul> </li> </ul>



# FY24 STAR JPSS TTA Milestones

Algorithm Updates DAPs/CCAPs	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
OMPS-NP (J2 LUT Delivery)	Jan-24	Jan-24	Delivered on January 4, 2024.	
ACSPO SST_v2 release version + patch to CCAP for MetOP	Jan-24	Jan-24	Delivered on January 16, 2024	
GBBEPx (Enterprise Fires I-Band update)	Jan-24	Jan-24	Delivered on January 19, 2024	
RAVE (Science bug fix)	Jan-24	Jan-24	Delivered on January 29, 2024	
Vegetation Health	Jan-24	Jan-24	Delivered on January 30, 2024	
GCOM RDR to ASD Converter (GRAC) - includes JAXA executable (AMSR-3)	Feb-24	Feb-24	Delivered February 02, 2024	
LST EDR J2 Provisional (updates to LSE)	Dec-23	Feb-24	Delivered on February 12, 2024.	
Ozone Mapping and Profiler Suite (OMPS) - V8TOs	Mar-24	Feb-24	Delivered on February 13, 2024.	
Multi-platform Tropical Cyclone Surface Winds Algorithm (MTCSWA)	Feb-24	Feb-24	Delivered on February 16, 2024.	
Land Surface Albedo	Mar-24	Mar-24	Delivered on March 6, 2024.	
Hyperspectral Enterprise Algorithm Package (HEAP) updated to NOAA-21	Mar-24	Mar-24	Delivered on March 11, 2024.	
LAI Initial Delivery	Feb-24	Apr-24	Delivered on March 28, 2024	
VOLCAT (Phase 1) NCCF implementation	Dec-23	May-24	Moved to <b>May 30, 2024</b>	
Cloud Mask (LUT update for J2)	Jan-24	Aug-24	Moved to <b>August 27, 2024</b>	



# FY24 STAR JPSS Milestones

Milestones (Algorithm Cal/Val and LTM)	Original Date	Forecast Date	Actual Date of Completion	Variance Explanation
JPSS-3/JPSS-4 Data System Event	Jan-24	Jan-24 (early 2024)	JPSS-3 JCT1 Dry Run (11/2/2023); JCT1 Event (01/01/2024)	Science teams are not expected to process or perform analysis on this JPSS-3/JPSS-4 test data made from JPSS-2 (Mary Hunter)
FY24 Program Management Review (all teams)	Jun-24	Jun-24		
GOSAT-GW End to End	Aug-24	Aug-24		
AST-2023 (VIIRS Annual Surface Type)	Sep-24	Sep-24		
Reprocessing and transfer of EDRs to CLASS	Sep-24	Sep-24		
JPSS-3 pre-launch test data review/analyze (SDR teams); JPSS-3/JPSS-4 activities/reviews support	Sep-24	Sep-24	On-schedule and on-going following JPSS-3 and JCT schedules	
Maintain / Update ICVS (develop ICVS modules to support various activities: monitoring, inter-sensor comparison, ...)	Sep-24	Sep-24	On-schedule and additional improvements are on-going	ICVS has implemented modules for NRT monitoring of NOAA-21 ATMS. OMPS-NM, OMPS-NP, CrIS, and VIIRS. ICVS demonstrated basic functions for LP using SNPP data as a proxy and is waiting to receive NOAA-21 LP data.
Maintain / Expand (to include JPSS-2 products) JSTAR Mapper	Sep-24	Sep-24	On-schedule and on-going; will be completed based on NOAA-21 EDR Products Provisional Maturity (March-24)	Currently NOAA-21 AF (EFIRE), MiRS, VIIRS I5 and True Color images are in JSTAR Mapper. Some of the NOAA-21 EDRs are unavailable in the SCDR, and once available after Provisional Maturity, JSTAR Mapper will assimilate them
Images of the Month	Monthly	Monthly	On-schedule and on-going	



# FY24 STAR JPSS Cal/Val Maturity Reviews

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
OMPS SDR (NP & TC Validated)	Mar-24	Mar-24	Attained Validated status – effective date depends on ADR10825 Solar Flux implementation planned for April 2024	
Clouds (V: Mar-24)	Mar-24	Mar-24	Provisional Review held (except for DCOMP and NCOMP): October 26, 2023; Attained Provisional effective March 30. DCOMP and NCOMP Provisional Review occurred virtually on December 4, 2023, and attained Validated status effective March 30.	
Aerosol AOD (V: Jun-24)	Jun-24	Jun-24	Attained Validated status effective March 30, 2023	
Aerosol ADP (V: Jun-24)	Jun-24	Jun-24	Attained Validated status effective March 30, 2023	
Volcanic Ash (V: Mar-24)	Aug-23	Aug-23	Attained Validated status effective March 30, 2023	
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow; V: Feb-24 (SI & Binary Snow); V (other) :Jul-24	Jul-24	Jul-24	Ice Thickness/Age: Attained Validated status effective May 1, 2023. Snow Cover & Fraction: Attained Validated status effective May 1, 2023. IST and Ice Concentration: Attained Validated status effective May 1, 2023.	
Active Fires (V: Jul-24)	Jul-24	Jul-24	Attained Validated status effective March 30,2023.	
LST/LSA/SR/GVF/VI (P: Jan-24; V: Jul-24 to Jan-25 FY25)	Sep-24	Sep-24	LST: Attained Validated status effective June 23, 2023. Surface Albedo: Attained Validated status effective August 30, 2023. Surface Reflectance: Attained Validated status effective Nov. 1, 2023. GVF, VI: Attained Validated status effective June 23, 2023.	
Vegetation Health (V: Apr-25 FY-25)	FY-25	FY-25	Attained Validated status effective March 30, 2023	
Ocean Color (B/P: Jan-24; V:Jul-25 FY25)	Jan-24	Sep-23	Attained Validated status effective March 1, 2024, to coincide with data availability from the NOAA CoastWatch program and MSL12 version 1.61 algorithm LUTs	
SST (V: Aug-24)	Aug-24	Aug-24	Attained Validated status effective March 20, 2023	
VPW (B/P: Jan-24; V: Mar-24)	Mar-24	Mar-24	Attained Validated status effective November 16, 2023.	
VFM (V: Jan-25)	FY-25	FY-25	Attained Validated status December 14, 2023.	
NUCAPS P: Jan-25; V: Mar-Jun-24)	Jun-24	Jun-24	Attained Validated status effective September 26, 2023.	
MiRS (V:Oct-24)	Oct-24	Oct-24	Attained Validated status effective May 12, 2023	
SFR (P: Feb-24; V: May-24)	May-24	May-24	Attained Provisional status- effective upon v2r0 algorithm currently planned for July 2024.	
OMPS NP EDR V8Pro & V8TOz & V8TOS (V: Mar-24)	Mar-24	Mar-24	OMPS NP EDR V8Pro Attained Provisional Effective June 20, 2023. OMPS NP EDR V8Toz Attained Provisional September 19, 2023. Validated review for V8TOz TC planned in April 2024. Validated review for OMPS NP V8Pro planned in April 2024.	
OMPS LP (B: Jan-24; P: Feb-24; V:Sep-24)	Sep-24	Sep-24	Beta and Provisional Review Planned for 04/25/2024	



# FY24 STAR JPSS Milestones

Operational/Program Support	Original Date	Forecast Date	Actual Completion Date
S-NPP: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24, <b>03/12/24, 03/19/24, 03/26/24, 04/02/24</b>
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	12/05/23, 12/19/23, 01/03/24, 01/17/24, 01/30/24, 02/13/24, 02/27/24, <b>03/12/24, 03/26/24</b>
S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	12/18/23, 01/22/24, 02/15/24, <b>03/18/24</b>
NOAA-20: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24, <b>03/12/24, 03/19/24, 03/26/24, 04/02/24</b>
NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	11/28/23, 12/12/23, 01/03/24, 01/10/24, 01/23/24, <b>02/06/24, 02/21/24, 03/05/24, 03/19/24, 04/02/24</b>
NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains,	Monthly	Monthly	12/18/23, <b>01/22/24, 02/15/24, 03/18/24</b>
NOAA-21: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/23/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24, <b>03/12/24, 03/19/24, 03/26/24, 04/02/24</b>
NOAA-21: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	11/28/23, 12/12/23, 01/04/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, <b>03/05/24, 03/19/24, 04/02/24</b>
NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	12/18/23, <b>01/22/24, 02/15/24, 03/18/24</b>
Mx builds deploy regression review/checkout (Mx9/MX10)			<ul style="list-style-type: none"> <li>• <b>Mx10: STAR submitted SOL Report (4/4/24)</b></li> <li>• <b>Mx10: TTO Expected on May 23, 2024</b></li> </ul>

# STAR JPSS Schedule: TTA Milestones

Task	2022		2023												2024												2025												
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7						
ATMS SDR/TDR	■	■					▶	■					▶						▶																				
CrIS SDR				■	■		▶	■				■	▶							▶																			
VIIRS SDR				■	■		▶	■				■	▶							▶																			
Imagery EDR				■	■		▶	■					▶							▶																			
Sea Surface Temperature					■	■		▶	■											▶																			
Ocean Color					■	■		▶	■									■			▶																		
OMPS Ozone (TC:V8TOz)					■	■		▶	■											■																			
OMPS Ozone (NP:V8Pro)					■	■		▶	■											■																			
OMPS LP (SDR &EDR)					■	■		▶	■											■																			
Aerosol Optical Depth (AOD)				■	■		▶	■												■																			
Aerosol Detection (ADP)				■	■		▶	■												■																			
Volcanic Ash (VolAsh)					■	■		▶	■											■																			
Cloud Mask					■	■		▶	■											■																			
Cloud Properties					■	■		▶	■											■																			
Ice Surface Temperature						▶	■	■													▶																		
Sea Ice (Age/Concentration)						▶	■	■													▶																		
Snow Cover						▶	■	■													▶																		
Active Fires					■	■		▶	■												■																		
Surface Reflectance					■	■		▶	■												■																		
Surface Albedo						▶	■	■													■																		
Land Surface Temperature						▶	■	■													■																		
Vegetation Indices						■	■		▶	■											■																		
Green Vegetation Fraction						■	■		▶	■											■																		
Vegetation Health						■	■		▶	■											■																		
Annual Surface Type						■	■		▶	■											■																		
NUCAPS						■	■		▶	■											■																		
MIRS		■				■	■		▶	■											■																		
Snow Fall Rate (SFR)		■				■	■		▶	■											■																		
VIIRS Polar Winds (VPW)						▶	■																																

Milestone Forecast	Review(EOY)	mDAP	PMR	ILUT	fLUT	iPlan	fPlan	Beta	Prov	Vail	Milestone Complete
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## Backup/Additional milestones





## STAR JPSS Schedule: TTA Milestones

Task	2022		2023												2024												2025														
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7								
Cryosphere: Blended VIIRS + microwave snow product: Add AMSR2 and GMI to the set of microwave sensors used																																									
Cryosphere: Physically-based snow and snow-free land BRDF models for snow fraction retrievals: Prepare for delivery																																									
Cryosphere: Supplemental cloud mask for daily VIIRS snow products: Compensate for cloud misses over snow by the NDE cloud																																									
Cryosphere: Ice concentration from Day-Night-Band																																									
Cryosphere: Put more ice products into RealEarth																																									
Cryosphere: Investigate the value added in including I-band product.																																									
Cryosphere: Make improvements to blended VIIRS + AMSR2 SIC product in Marginal Ice Zone.																																									
Active Fires: Baseline / eFire / NGFS cross verification and cal/val																																									
Active Fires: Reactive maintenance of Suomi NPP, NOAA-20 and NOAA-21 I-band NDE and NCCF products																																									



## STAR JPSS Schedule: TTA Milestones

Task	2022		2023												2024												2025											
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7					
OCC: Cal/Val team complete the 9th VIIRS ocean color dedicated cruise																						◆																
OCC: In situ data collections from OC Cal/Val team including NOAA dedicated cruise and other opportunities, particularly for NOAA-21 OC validation																																						
OCC: Improvement of the OCView tool for OC products monitoring																	◆																					
OCC:Producing consistent VIIRS ocean color products																		◆																				
OCC: Continue working on improvement of the ocean color data processing system (MSL12), particularly over global coastal and inland water regions																																						
OCC: Continue producing consistent VIIRS SNPP-NOAA-20 OC products and start to work on NOAA-21 OC data consistency with other two VIIRS sensors																																						
OCC: Updated DAP (MSL12) to CoastWatch, if needed																																						
SST: SST EDR Support to JPSS-3 Data System Test Event (Dependency on JPSS)																			◆																			

# STAR JPSS Schedule: TTA Milestones

Task	2022		2023												2024												2025													
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7							
SST: SST EDR Enterprise Cal/Val and ACSPO Algorithm "Agency Report" Presentation to GHRSSST science community																					◆																			
SST: SST EDR Enterprise Cal/Val Plan Initial Updates																							◆																	
SST: Promote experimental iQuam updates to live access																							◆																	
VFM: Addition of CAMEL emissivity database for the emissivity first guess																								◆																
NUCAPS: Mission-long reprocessing of NOAA-21 NUCAPS products: Reprocessing version and evaluation of reprocessed products																								◆																
SFR: Enterprise SFR science code delivery to ASSISTT including N21 provisional maturity SFR																																								◆
OMPS EDR: Reprocess NPP V8Pro for 2023																																								◆
OMPS EDR: Reprocess N20 V8Pro for full record																																							◆	

◆ Milestone Forecast    ▶ Review(EOY)    ◆ mDAP    ▶ PMR    ▶ ILUT    ▶ fLUT    ▶ IPlan    ▶ fPlan    ▶ Beta    ▶ Prov    ▶ Val    ◆ Milestone Complete

## Backup/quad charts

Accomplishments / Events:

- Ivan Csiszar continued interactions with Meteorological Service Singapore regarding the VIIRS Active Fire products
- Marina Tsidulko worked with the CSPP development team on code change to incorporate the latest algorithm update to screen spurious detections due to corrupt input SDR data
- Wei Guo created eFire DAP v1r3.3, which addresses issues related to corrupt input SDR data and some additional updates

Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

Issues/Risks:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Baseline / eFire / NGFS cross verification and cal/val	Sep-24	Sep-24		
Reactive maintenance of Suomi NPP, NOAA-20 and NOAA-21 I-band NDE and NCCF products	Sep-24	Sep-24		

Highlight: Singapore Bilateral Meeting

NOAA and Meteorological Service Singapore (MSS) agreed to cooperate in the area of fire and smoke haze detection and assessment, potentially exploring further the application and promotion of NOAA products



## Accomplishments / Events:

- Work done by STAR aerosol team is featured in NESDIS Impacts Briefings in the article entitled "Pollution". Team members Hai Zhang, Michael Cheeseman, and Pubu Ciren contributed to the work that is part of this article
- NOAA Greenhouse Gas (GHG) Team co-lead Kondragunta wrote the Impact Briefings article on GHGs. JPSS Program Scientist Kalluri and JSTAR manager Zhou and Jeff Privette (also NOAA GHG team co-lead) also contributed to the article on GHGs
- Team member Cheeseman has done a lot of analyses using reprocessed aerosol optical depth data to understand the Environmental Justice aspect of fine particle pollution. This work is informing that despite meeting the health standard, fine particle pollution disproportionately impacts racially and economically disadvantaged communities
- Team member Huff contributed to the writing of QuickGuide for VIIRS aerosol optical depth product. She also provided half-a-day training in Singapore on the use of JPSS fire and smoke products. JPSS Program Scientist Kalluri and AAC team lead Kondragunta also provided lectures on air quality products and their applications for Association of Southeast Nations (ASEAN).
- Team member Limbacher is developing a new aerosol optical depth algorithm that includes new aerosol models and numerical methods that is expected to speed up the enterprise algorithm and hopefully provide better retrievals as well.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

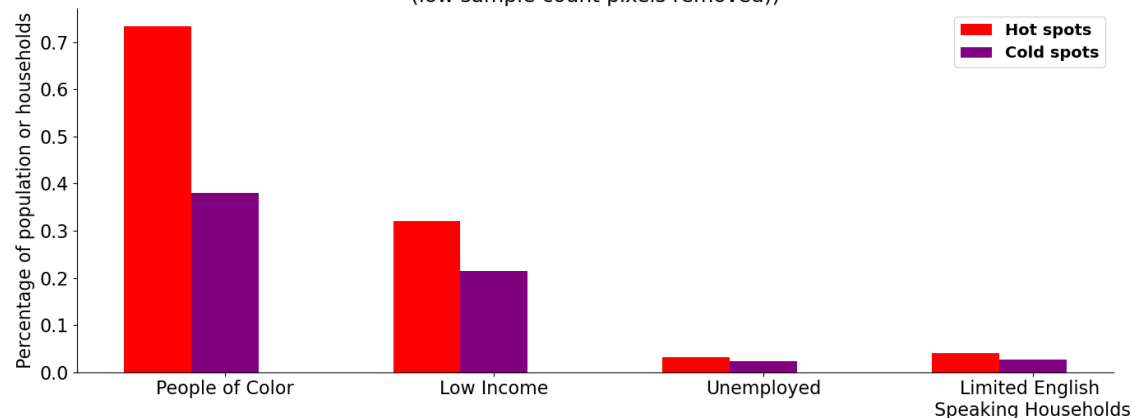
1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

No risks. Issue: Developer of the ML-SFRA has left the team; date of milestone is TBD.

## Highlight:

Socioeconomic demographics in Cold vs Hot spots (Atlanta, 98th percentile PM<sub>2.5</sub> (low sample count pixels removed))



Statistics in the figure show analysis for Atlanta where hot spots and cold spots are those areas with high and low fine particle pollution respectively based on Moran's I analysis

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Test the impact of call back ADP retrievals on "smoke/non-smoke > PM2.5" product	Jun-24	Jun-24		
Evaluation of ADP using SPARTAN data	Aug-24	Aug-24		
Evaluation of ADP using SPARTAN data	Mar-24	Mar-24		

## Accomplishments / Events:

- Finished updating the JPSS-3 ATMS S/N 305 Processing Coefficient Table (PCT) for IDPS. The satellite dependent coefficients obtained from the JPSS-3 ATMS S/N 305 Calibration Data Book - Rev. B and delta thermal vacuum test data analysis, such as full radiance based non-linearity correction coefficients. The remained coefficients need to be updated when additional measurements are available, such as mounting coefficients and SRF derived central frequency/band correction coefficients.
- Verified JPSS-3 ATMS S/N 305 PCT using NOAA-21 ATMS on-orbit operational science RDR data (Figure 1). The purpose of this verification is to check if there is significant error in PCT. Due to the discrepancies between NOAA-21 ATMS and JPSS-3 ATMS S/N 305, some coefficients have to be adjusted in order to generate meaningful data for verification, such as channel dependent spaceview/warm load count limits.
- Started working on the NOAA-20 rephasing impact on ATMS SDR data quality. Reported spacecraft/ATMS operational status metadata unusual setting after the first maneuver of rephasing (Figure 2).
- Finished drafting JPSS-3 ATMS S/N 305 pre-launch characterization report. Waiting for review comments
- Host ATMS SDR team meeting to review presentations for the upcoming MicroRad conference.
- Work with STAR IT team to upgrade working server to meet the security requirements.

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
JPSS-3 ATMS preliminary analysis of calibration coefficients	Feb-24	Mar-24	Mar-24	
ATMS Spectral Response Function (SRF) evaluation report and dataset	Mar-24	Apr-24		
ATMS geolocation correction algorithm assessment	May-24			
Improvement for lunar intrusion correction model including LUT update	Jun-24			
ATMS cold bias dynamic correction assessment and algorithms update	Sep-24			
Review/Checkout of IDPS Mx Builds SOL and I&T Deploy Regression data	Sep-24			
Review of JPSS-3/4 ATMS pre-launch data to provide Ground support	Sep-24			
Conduct maintenance including anomaly resolution of on-orbit ATMS sensors	Sep-24			
Provide support to Metop-SG Joint Cal/Val Activities	Sep-24			

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

**Issues/Risks:** Retirement of several working servers will significantly affect the data processing capability. The STAR ATMS Cal/Val Team does not have a dedicated server. The formal request to purchase a dedicated server has been initiated.

## Highlights:

Figure 1. NOAA-21 ATMS TDR channel 1 bias between JPSS-3 ATMS SN 305 PCT and ops

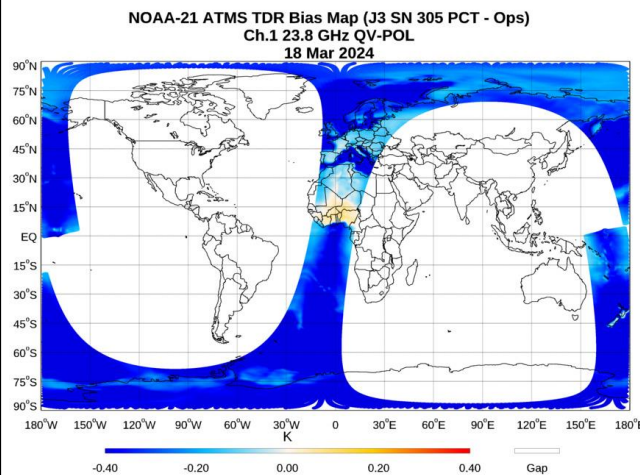
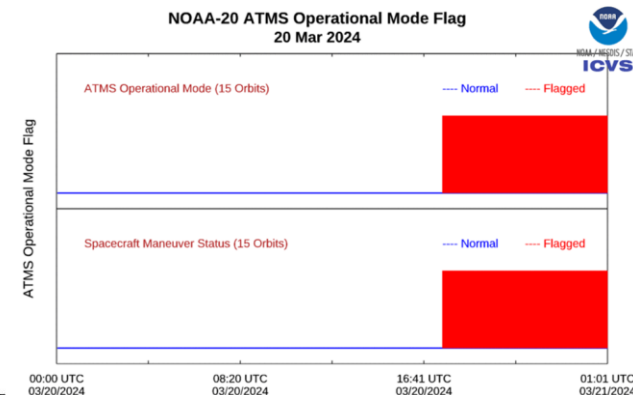


Figure 2. NOAA-20 ATMS SDR instrument and spacecraft operational status after rephasing maneuver





Accomplishments / Events:

- The Cloud team continues to investigate the usage of the ACHA cloud optical depths as a replacement for NCOMP.
- Work on the updated ECM and NOAA-21 DCOMP LUTs is currently continuing. Part of the updates for the ECM include an adjustment to the 11 and 12um channel data due to the SRF differences between N21 and NPP/N20.
- Prepared information for Office of Common Services FY24 planned activities related to sustainment in preparation for STAR/PPM TTA.

Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SDR and EDR Enterprise Cal/Val Plan Initial Updates	Jun-24			
SDR and EDR Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting	Aug-24			

Highlights:

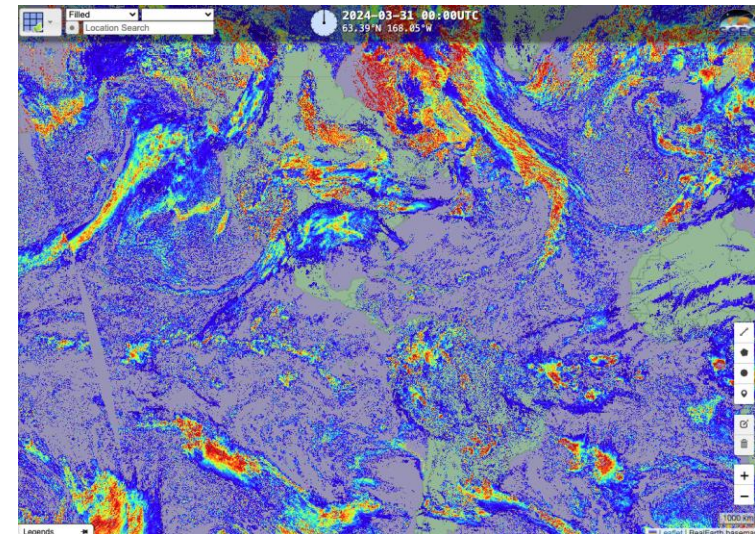


Figure 1. Example of the LTM of the NOAA-20 DCOMP product. Visualization in RealEarth allows for the team to see how the algorithm is performing in different regions.

## Accomplishments / Events:

- Lunar intrusion part 2 of the proposed NOAA-21 artifact mitigation has been tested. This demonstrates the ability to detect lunar intrusion events even during an occurring artifact period. The threshold value is used to determine a lunar intrusion event even when the NOAA-21 artifact occurred at the same time (Fig. 1)
- The CrIS geolocation accuracy code using VIIRS terrain-corrected data was modified in order to enlarge the regions of interest (Fig.). The results were presented at a CrIS SDR telecon on March 27, 2024. (Fig. 2)
- Completed the analysis of the NOAA-21 CrIS cross-talk using on-orbit data, in order to examine on-orbit Earth view spectra and assess if levels of cross-talk are detectable for JPSS-2/NOAA-21 CrIS, as compared to the behavior of SNPP and NOAA-20. NOAA-21 does not have elevated levels of cross-talk vs NOAA-20. The analysis also includes investigation of CrIS/VIIRS BT differences as a function of FOR contrast for very cold and very hot scenes (Fig. 3)
- The NOAA-20 satellite performed an orbital maneuver with the goal of placing the satellite 1/2 orbit from NOAA-21 on 3/21/2024. NOAA-20 CrIS data quality was restored to nominal following the propulsive maneuver (Figs. 4).
- Performed an initial assessment comparing the NOAA-21 CrIS spectral shift statistics since Provisional Maturity to present both before and after the change in the calibration interval, and compared this to the expected increase in spectral shift due to the interval change that was originally predicted (Fig. 5)
- Performed an analysis on NOAA-21 CrIS Temperature telemetry characteristics, including the new observation of an orbital dependence of the Stage-4 Cooler Temperature (Fig. 6).
- Initial analysis of the JPSS-4 TVAC ECT view Side 1 MN22 data was completed. Similar analysis for MN22 Side 2 data is underway but pending recalibration information for the Side 2 ICT PRT "A1" sensor. These results are used to characterize the radiometric nonlinearity and to establish and document the traceability of JPSS-4 CrIS to SI via the NIST TXR measurements of the ECT and JPSS-4 CrIS measurements of the ECT (Fig. 7)
- Continued task of JPSS CrIS spectral calibration methodology and tool development. The minimum of RMS  $a\tau_5 + b - \tau_{calc}$  was determined with higher resolution. Computed the Spectral Shift/Optimization of the Effective Neon Wavelength for the CrIS TVAC LWIR CO2 experiment and used this to verify spectral calibration. The min of RMS was determined for observed and LBLRTM transmittance. The min of RMS was calculated for HITRAN online tools and LBLRTM. Derived the spectral shift for other 8 FOVs without self-apodization by using the minimum of rms (eqn) for J2 CrIS TVAC and LBLRTM transmittance (Fig. 8)

Milestones	Original Date	Actual Completion Date	Variance Explanation
Participated in the JPSS-4 CrIS Pre-Ship Review (PSR)	May-24		
Evaluate the long-term NOAA-21 CrIS spectral reference performance after increasing the calibration interval	Jun-24		
Review and analysis of JPSS-3 and JPSS-4 CrIS pre-launch data to provide Flight and Ground support	Aug-24		
Perform characterization and mitigation activities on elevated imaginary component of NOAA-21 CrIS radiance products	Sep-24		
Review/Checkout of IDPS Mx Builds SOL and I&T Deploy Regression data	Sep-24		
Perform the transition of Cal/Val activities to the Cloud environment	Sep-24		
Conduct maintenance including investigation and anomaly resolution of on-orbit CrIS sensors	Sep-24		
Provide Support to Metop-SG Joint Cal/Val Activities	Sep-24		

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic			X		See Issues/Risks
Schedule			X		See Issues/Risks

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

**Yellow:** There is a misalignment between the IDPS ground processing environment and NOAA-STAR. The IDPS ground processing is based on RHEL Centos version 8 (RHEL8) starting with MX9 (TTO Feb 8, 2024). NOAA-STAR has migrated to RHEL Centos version 9. **There remains risks in delays to deliver ADL code updates depending on the need to make patch fixes to NOAA-STAR testing needed for future MX builds to match the IDPS Processing System.** Attempts to run the ADL MX9 on RHEL CENTOS version 9 are in progress. The CrIS Team is still in need of hardware/software resources. Presently, there is only two server dedicated to 6 CrIS Team members. Access to additional servers is still desirable. There is a risk for the CrIS SDR Team to continue on such a dual-server environment for the operational CrIS Cal/Val activities that include 5 CrIS sensors (SNPP, JPSS-1 to -4). This may affect the timely completion of deliverables and program milestones. The recommendation is to have one additional server as soon as possible (< 2 months) and add another server in the next months. A new MATLAB license has been delivered. Corresponding hardware/software quotations and SNO have been submitted. Corresponding JSTAR CrIS Risk/Issue on Hardware and Software have been submitted for JSTAR interval review on Jan. 6, 2023. UPDATE: The purchasing of the corresponding hardware and software is currently in progress, in coordination with STAR IT.

## Highlights:

(1) NOAA-21 CrIS artifact detected with the transient signal from the ICT phase (left) and a coincident lunar intrusion detected with the calculation of the lunar intrusion ratio (right).

(2) NOAA-20 CrIS geolocation accuracy assessment on 6 March 2024 using the VIIRS terrain corrected data

(3) Histograms of VIIRS minus CrIS M16 BT differences for cold scenes (200 to 220K), for various levels of FOR contrast

(4) CrIS Granules through the maneuver, from 2024-03-20T17:05:00 to 2024-03-20T17:40:00 UTC. Each color represents a different granule

(5) Change in the Spectral Shift Statistics as a function of FOV for NOAA-21 CrIS before and after the change in neon calibration interval from 109 min to 12.71 hours.

(6) New to NOAA-21, it is noticed that the Stage-4 Temp has an orbital dependence that wasn't seen in previous CrIS's. The root cause was narrowed down to this likely being due to decreased AC electronic noise, or possibly related to thermal coupling between instrument components.

(7) Differences between calibrated and predicted spectra for the roughly isothermal case with the ECT view data at 287K. CrIS calibrated spectra here use a linear calibration, and ECT view predicted spectra use the nine ECT PRT Knowledge sensor temperatures. For the "trusted" Knowledge PRTs (FOVs 2, 4, 7, 8, 9), the mean difference is negative 8 mK

(8) NOAA-21 CrIS TVAC CO2 gas cell transmittance with/without spectral shift and LBLRTM simulation plotted in wavelength domain

## Accomplishments / Events:

- NOAA-21 VIIRS Winds Now Operational.**

NESDIS/OSPO successfully promoted the NOAA-21 VIIRS Polar Winds (VPW) into operations on March 6, 2024. The NOAA-21 VPWs are now available on the Product Distribution server PDA. OSPO is working with National Weather Service (NWS) to add NOAA-21 VPWs into the GTS.

Milestones	Original Date	Actual Completion Date	Variance Explanation
Composited snow maps of SNPP, N20 and N21 VIIRS; Algorithm development and testing.	Sep-24		
Blended VIIRS + microwave snow product: Add AMSR2 and GMI to the set of microwave sensors used	Sep-24		
Physically-based snow and snow-free land BRDF models for snow fraction retrievals: Prepare for delivery	Sep-24		
Supplemental cloud mask for daily VIIRS snow products: Compensate for cloud misses over snow by the NDE cloud mask	Sep-24		
Ice concentration from Day-Night-Band	Sep-24		
Put more ice products into RealEarth	Sep-24		
Investigate the value added in including I-band product.	Sep-24		
Make improvements to blended VIIRS + AMSR2 SIC product in Marginal Ice Zone.	Sep-24		

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

None

## Highlights:

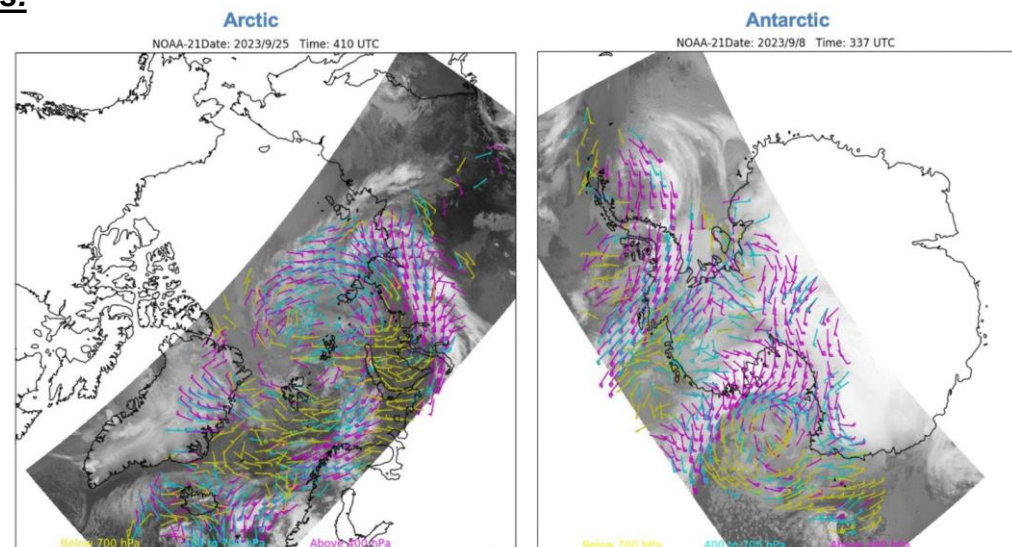


Figure 1. An example of NOAA-21 VIIRS polar winds over the Arctic (left) and Antarctic (right).

## Accomplishments / Events:

- The RWG continues to work with the UMD IT department on server access problems. The RWG members outside of UMD couldn't login the Bamboo cluster because of UMD firewall changes. Currently, the RWG members outside of UMD can access Bamboo clusters from the NOAA network, but the data transfer between ESSIC servers and STAR servers still has problems at the time of this report. The reprocessing procedure will be resumed after the firewall issue is resolved by the UMD IT department.
- The RWG is working on developing software tools for reprocessing results analysis. This month, we focused on EDR products such as cloud base height, cloud top height, cloud optical depth, etc., and conducted research on analysis of the differences between reprocessed and operational products.
- The RWG is developing collocation and comparison tools to assess the quality of reprocessed and operational EDR products against the CloudSat products.
- The RWG will further assess the reprocessing results over longer period when more data are produced.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Complete VIIRS EDR reprocessing for Clouds, polar wind, Ice Concentration; Ice Thickness; Snow Cover; and Ice Surface Temperature	Feb-23	Jun-24		1 month

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic			X		Execution delay is expected due to issues in STAR servers and UMD Bamboo system
Schedule			X		

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

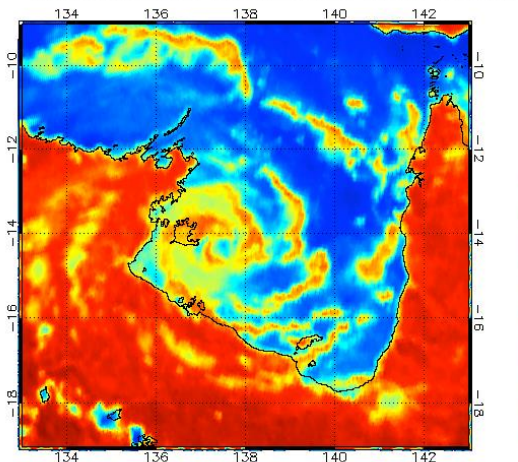
The VIIRS EDR reprocessing is now relying on the UMD Bamboo system. The system may not have sufficient disk storage to support the reprocessing. The RWG is currently doing the testing.

## Accomplishments / Events:

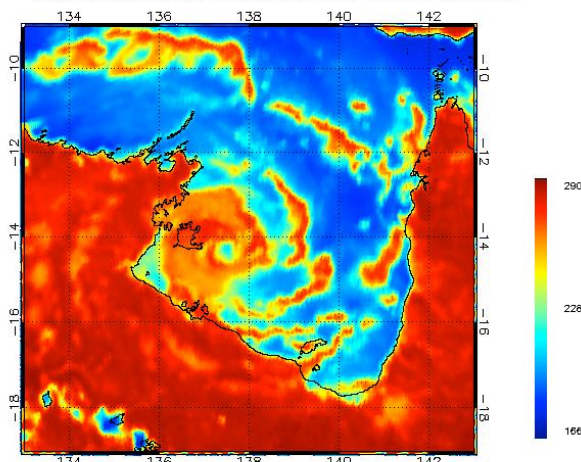
- Continued working with ASSISTT on transitioning the AMSR2 all-weather wind speed algorithm, which is currently running in the AMSR2 NRT R&D processing system.

AMSR2 captures Tropical Cyclone Megan off the coast of Australia on March, 16, 2024. The left image is the 36.5 GHz vertical polarized brightness temperature and the right image is the 36.5 GHz horizontal polarized brightness temperature.

AMSR-2 36.5GHz V-pol  
Date: 20240316-22:31 UTC Storm Name: MEGAN  
AMSR2 L1B file: GW1AM2\_202403161536\_100B.L1SNBTBR\_2220220.h5



AMSR-2 36.5GHz H-pol  
Date: 20240316-22:31 UTC Storm Name: MEGAN  
AMSR2 L1B file: GW1AM2\_202403161536\_100B.L1SNBTBR\_2220220.h5



Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
initiate and test processing changes in preparation for AMSR3 using AMSR3 proxy data	Sep-24	Sep-24		
Continue AMSR2 L1 monitoring; develop AMSR3 capabilities	Sep-24	Sep-24		

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

### Accomplishments / Events:

- Provided near real time NOAA-20 instrument performance and science data quality monitoring during the rephasing. Reported unusual science data metadata setting after the initial maneuver of rephasing. It is also found that the LTAN has small variation since the start of rephasing.
- Added new NOAA-21 spacecraft battery current monitoring products in ICVS operational website to support JPSS program and NASA flight team spacecraft health status analysis activities.
- Updated JPSS operational data gap monitoring software package to add GRAVITE as optional data source in addition to STAR central data repository so as to improve the report accuracy in a timely manner.
- Added VIIRS vs. GOES-18 ABI inter-sensor comparison ability in VIIRS vs. ABI inter-comparison package to improve the VIIRS SDR data quality inter-sensor bias vs. ABI monitoring reliability.
- Continued to provide NOAA-21 VIIRS SDR data quality monitoring to support the mid-mission outgassing activities.
- Updated the OMPS NP TomRAD simulation package using MLS profiles, EDR reflectivity, and surface pressure as the inputs. Analyzed the NOAA-20 and NOAA-21 NP simulation results.

### Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

### Issues/Risks:

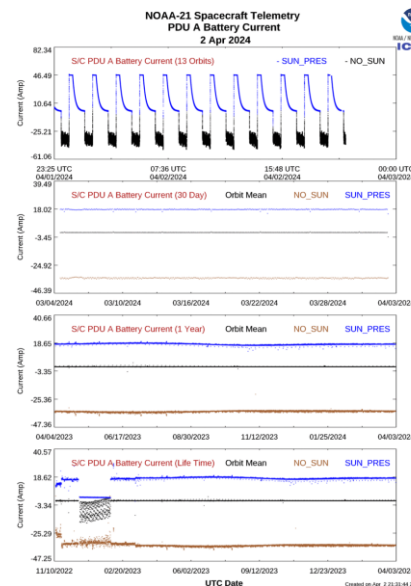
Retirement of three ICVS operational processing servers affects the refreshing rate

Milestones	Original Date	Actual Completion Date	Variance Explanation
Develop the new ICVS web page about NOAA21 NM DCC and NOAA-21 NM against VIIRS M1 and promote it to operational ICVS in support of N21 OMPS final review	Feb-24	Mar-24	
Initialize STAR2Cloud Initiative ICVS package transition discovery and assessment activities (preparation for JPSS ICVS website migration into the cloud environment)	Apr-24		
Develop new modules for monitoring of JPSS SDR data anomaly upon region or latitude	May-24		
Update ICVS vector modules (e.g., NOAA-21 dynamic visualization, data volume to support the cloud transition) and promote the web page to the operational ICVS; develop new modules in support to the J3/J4 testing by using N21 data as proxy data sets	Jun-24		
Promote the new ICVS CrIS and OMPS inter-sensor web page to public-accessible ICVS; Upgrade the ICVS ATMS inter-sensor CRTM double difference modules	Jul-24		
Upgrade ICVS user-friendly anomaly alert modules for more key parameters; update ICVS user manual	Aug-24		
Upgrade the ICVS Anomaly Watch portal with more monitoring analysis results to support OSPO and other users	Sep-24		
Initialize an ICVS core-function prototype in cloud environment	Sep-24		
Develop new ICVS modules to support J3/J4 prelaunch testing	Sep-24		
ICVS maintenance for SNPP/NOAA-20/NOAA-21 (including 3D-ATMD hurricane tool)	Sep-24		

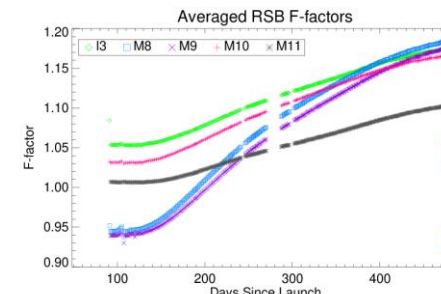
### Highlights:

### Significantly contribute to STAR SDR Teams

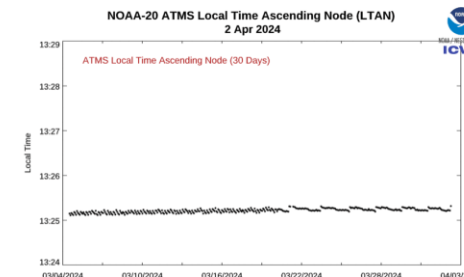
(a) New NOAA-21 S/C battery current monitoring products



(b) NOAA-21 VIIRS RSB F-factor after MMOG event



(c) NOAA-20 ATMS LTAN after the start of rephasing



## Accomplishments / Events:

- Continued testing and updating the software for all weather LST generation. Tested the code with and without parallel processing and compared their performance. It was confirmed that the parallel processing did not function as expected.
- Summarized the code comments and discussed them individually with the research assistant for update.
- Tested the updated code for Cumulative Distribution Function (CDF) matching. Processing time for global day or night data has been reduced to approximately ten minutes on the STAR Linux server, compared to 3 hours before the update.
- Organized a group discussion on the code improvements and summarized the discussion memos. Testing a direct regression method for all weather LST generation is currently in progress.
- Prepared slides summarizing the latest LST/LSE updates recently made available to NCCF.
- Provided a description of user request of 1 km GVF and NDVI data from user's perspective. Additionally, provided feedback on the form for 1-km VI DAP submission process.
- Continued the study of the I-band LST generation and conducted following activities: compiled the total precipitation water vapor data set with a spatial resolution of 0.5 degree; generated the ground subset data for I-band LST, completed the code and testing; learned how to use Google Earth Engine for cross comparison with Landsat LST data, which is an ongoing effort. (slide 2-5)
- Completed a review of a manuscript titled "Generation of global 1 km all-weather instantaneous and daily mean land surface temperature from MODIS data".

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic			X		
Schedule		X			

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
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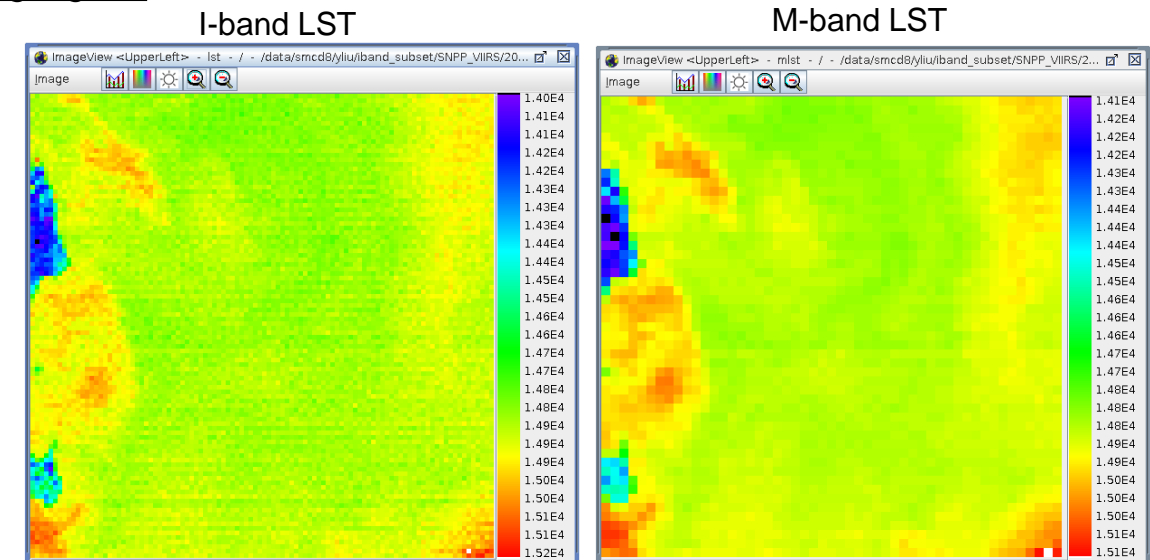
## Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
CCAP Initial Delivery - All weather LST	Oct-23	Feb-24		deferred due to scientific R2O challenges
SDR and EDR Support to JPSS-3 Data System Test Event in early 2024	Feb-24	Apr-24		
Experimental Development of high spatial resolution LST	Oct-23	May-24		
SDR and EDR Enterprise Cal/Val Plan Initial Updates	Apr-24	Jun 28-24		
CCAP final delivery-All weather LST	Jan-24	Jul-24		
SDR and EDR Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting	Apr-24	Aug 30-24		
Monitoring and Anomaly watch, analysis and report	Oct-23	Sep-24		

## Highlights:

### VIIRS I-band LST Subset Data



SNPP\_VIIRS\_iband\_Buoy\_45005\_20240301\_070915.nc

# VIIRS I-band cloud detection method review

The algorithm (hereafter VIBCM, for VIIRS I-Band Cloud Mask) consists of a sequence of six pixel-based tests that use thresholds on VIIRS top-of-atmosphere reflectances and brightness temperatures. Each test returns a binary (clear or cloudy) result. For a pixel to be classified as cloudy, it must pass all six tests:

1. **Brightness threshold.** Pixels in I1 with a reflectance greater than 0.08 are classified as cloudy.
2. **Normalized difference snow index.** Pixels with an NDSI greater than 0.7 and an I2 reflectance greater than 0.11 are classified as cloudy.
3. **Temperature threshold.** Pixels in I5 with brightness temperatures less than 312 K are classified as cloudy.
4. **Band I3-I5 composite.** In the composite defined by  $(\max(I3) - I3) * I5$ , pixels less than 485 K are classified as cloudy.
5. **Band I2/I1 ratio.** In this vegetation index proxy, pixels less than a threshold value of 2.0 are classified as cloudy.
6. **Band I2/I3 ratio.** Useful in identifying rocky/sandy areas, pixels in this test with ratios greater than 1.0 are classified as cloudy.

- Review of methods for I-band cloud detection. Because the current two-step method for VIIRS I-band LST generation assumes that the I-band pixel has the same cloud cover with the corresponding M-band pixel.
- There are few methods available for I-band cloud detection. The method shown on the left is based on the Landsat cloud detection method. Further testing is required.
- <https://www.nv5geospatialsoftware.com/portals/0/pdfs/viirs-rapid-cloudmask-poster-20121126.pdf>
- Irish, Richard. (2000). Landsat 7 automatic cloud cover assessment. Proceedings of SPIE - The International Society for Optical Engineering. 4049. 10.1117/12.410358.



# Google earth engine for cross comparison with Landsat LST data

- The I-band LST has a spatial resolution of 375 meters. We plan to use Landsat LST as a reference for cross comparison.
- Google earth engine provides a platform for analyzing and processing large geospatial datasets, with capabilities for matching and filtering dataset .
- Completed the code for latitude, longitude and temporal information extraction, cloud cover filtering, and Landsat data download
- Determination of the simultaneous overpass between Landsat and VIIRS are currently underway.

The screenshot displays the Google Earth Engine web interface. The top navigation bar includes 'Scripts', 'Docs', and 'Assets'. The main workspace is titled 'LANDSAT\_LC09\_C02\_T1\_L2+'. The script editor contains the following code:

```
1 //var ee = require('users/yulingliu/landsat9_ST');
2 var cloudMaskL457= function(image){
3   var qa = image.select('pixel_qa');
4   var cloud=qa.bitwiseAnd(1<<5)
5     .and(qa.bitwiseAnd(1<<7))
6     .or(qa.bitwiseAnd(1<<3));
7
8   var mask2=Image.mask().reduce(ee.Reducer.min());
9   return image.updateMask(cloud.not()).updateMask(mask2);
10 };
11
12 var dataset = ee.ImageCollection('LANDSAT/LC09/C02/T1_L2')
13   .filterDate('2023-10-05', '2023-10-06')
14   .filterBounds(roi)
15   .sort('CLOUD_COVER');
16   //.first();
17
18 // Applies scaling factors.
19 function applyScaleFactors(image) {
20   var opticalBands = image.select('SR_B.*').multiply(0.0000275).add(-0.2);
21   var thermalBands = image.select('ST_B.*').multiply(0.00341802).add(149.0);
22   return image.addBands(opticalBands, null, true)
23     .addBands(thermalBands, null, true);
24 }
25
26
27
```

The Inspector panel shows the 'Image Dates' for 15 elements, all from 2023-10-05. The console shows the description: 'LC09\_157024\_20231005\_20231005T062034'. The map at the bottom shows a satellite view of Central Asia, with a red polygon highlighting a region in Kazakhstan and Kyrgyzstan.

# VIIRS I-band LST subset data

HDFView 2.9@rhw1267.star1.nesdis.noaa.gov

File Window Tools Help

Recent Files /data/smcdb/yliu/iband\_subset/SNPP\_VIIRS/2024/03/01/SNPP\_VIIRS\_iband\_Buoy\_45005\_20240301\_070915.nc

SNPP\_VIIRS\_iband\_Buoy\_45005

TableView - lst - /data/smcdb/yliu/iband\_subset/SNPP\_VIIRS/2024/03/01/SNPP\_VIIRS\_iband\_Buoy\_45005\_20240301\_070915.nc

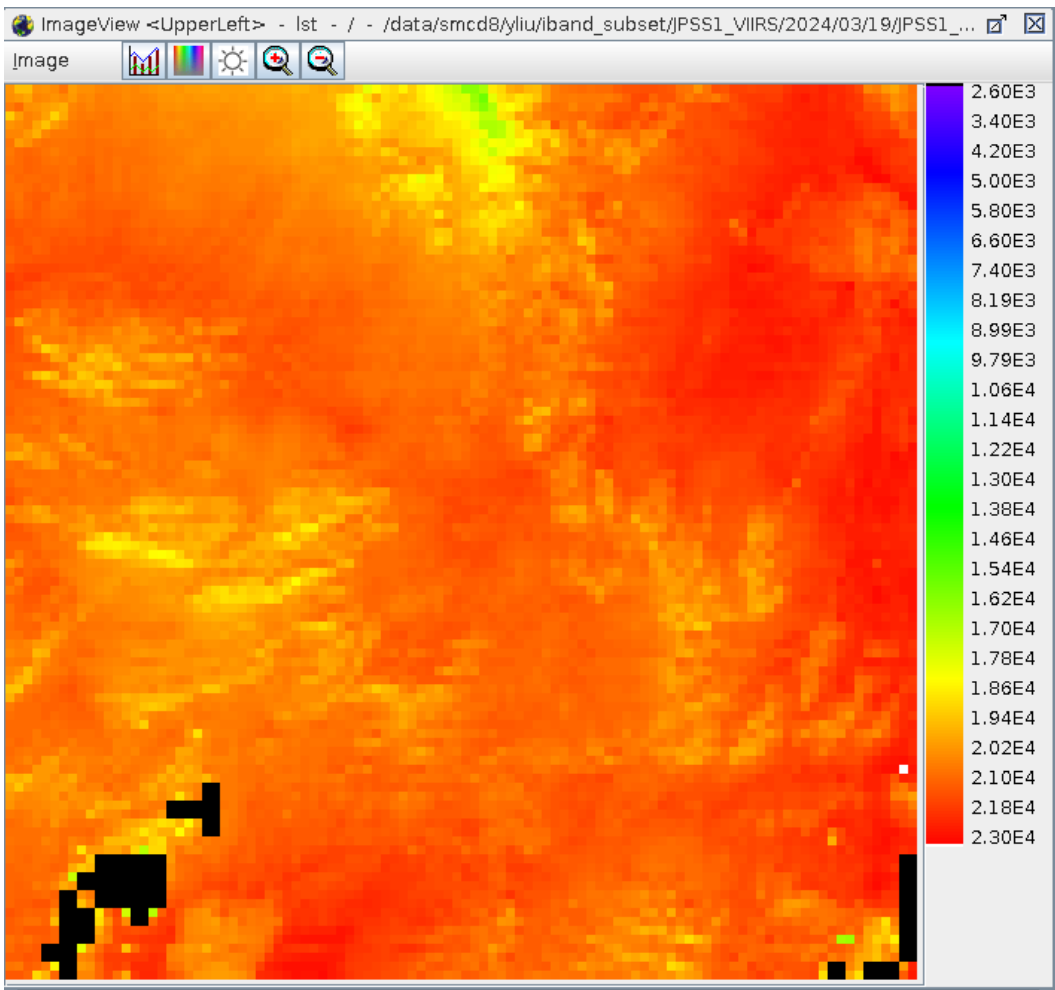
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0	14891	14817	14893	14884	14869	14883	14932	14959	14967	14981	14957	14907	14860	14858	14853	14817	14828	14855	14825	14852	14800
1	14840	14856	14871	14863	14904	14884	14852	14957	15010	15014	15024	14957	14906	14824	14841	14833	14817	14845	14862	14854	14873
2	14862	14854	14845	14874	14868	14885	14890	14932	14902	14916	14934	14939	14943	14882	14867	14846	14831	14861	14851	14831	14843
3	14845	14883	14840	14844	14840	14807	14836	14827	14860	14887	14902	14917	14944	14839	14814	14853	14852	14843	14824	14838	14863
4	14912	14828	14899	14867	14878	14884	14871	14865	14874	14893	14864	14896	14892	14934	14901	14856	14838	14871	14869	14862	14854
5	14860	14852	14873	14853	14863	14819	14834	14874	14884	14840	14840	14892	14865	14889	14969	14878	14828	14855	14869	14836	14843
6	14844	14903	14866	14888	14877	14887	14879	14901	14885	14895	14872	14844	14880	14887	14937	14946	14926	14859	14864	14873	14839
7	14874	14847	14847	14867	14871	14833	14873	14858	14832	14852	14878	14875	14851	14891	14878	14898	14928	14867	14859	14856	14859
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9	14953	14902	14876	14882	14835	14843	14853	14884	14846	14888	14895	14924	14931	14889	14915	14921	14917	14970	14939	14910	14865
10	14895	14947	14904	14917	14895	14838	14825	14938	14899	14883	14894	14844	14895	14857	14892	14868	14952	14975	14976	14905	14911
11	14928	14893	14890	14945	14906	14848	14895	14896	14894	14927	14916	14893	14865	14933	14911	14911	14887	14976	15004	15003	14966
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28	14142	14148	14160	14074	14119	14471	14919	14912	14935	14916	14916	14921	14927	14905	14935	14903	14894	14912	14871	14877	14855
29	14239	14174	14206	14115	14145	14410	14893	14880	14897	14908	14878	14889	14902	14873	14848	14858	14882	14856	14859	14845	14880
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Log Info Metadata

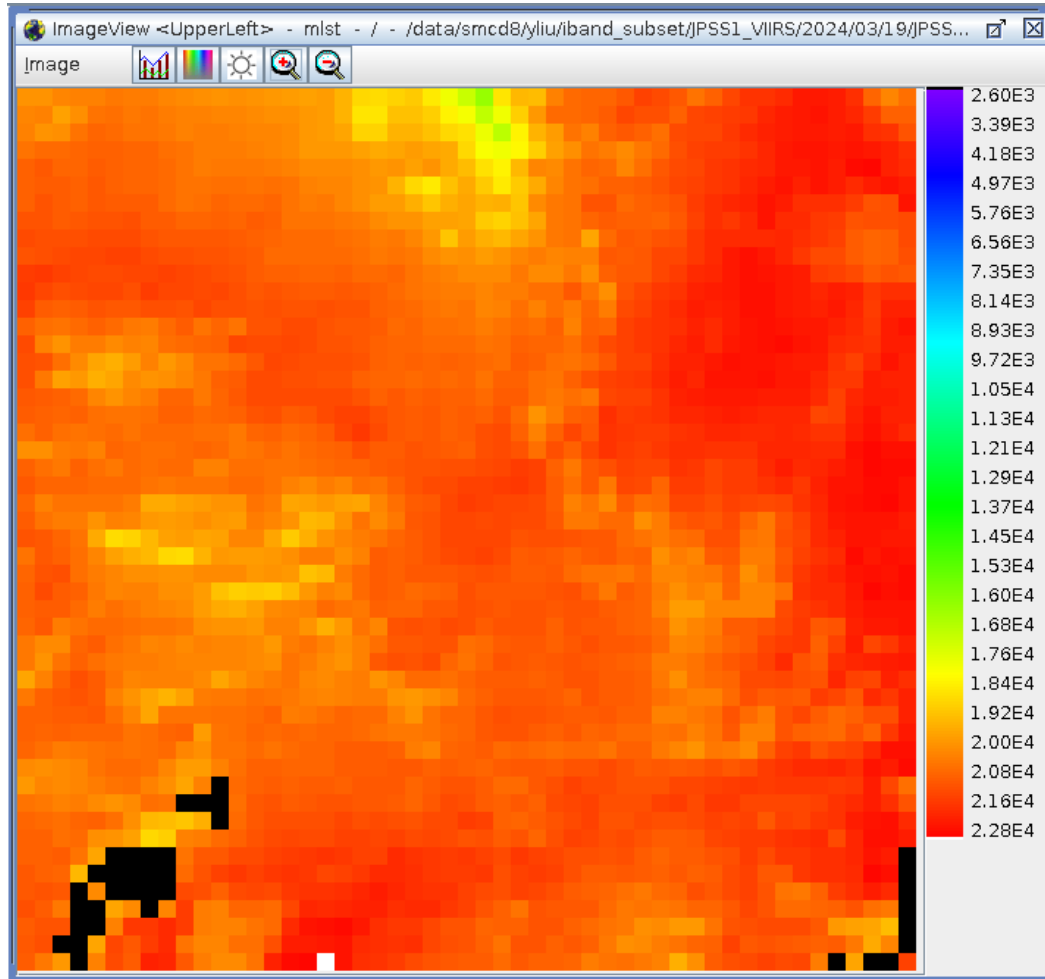
- Subset data was generated for multiple ground networks including SURFRAD, ARM, BSRN, and NDBC.
- It is currently for SNPP and NOAA-20.
- The subset data, in NetCDF format, includes brightness temperature of I-5 band, M-band 15, and band 16, geometry, quality flag and LST for I-band and M-band.
- The subset data spans from Nov. 25<sup>th</sup>, 2023 to present.

# VIIRS I-band LST subset data

/data/smcd8/yliu/iband\_subset/JPSS1\_VIIRS/2024/03/19/JPSS1\_VIIRS\_iband\_Desert\_Rock\_NV\_20240319\_202638.nc



I-band  
LST



M-band  
LST

- The map displays the subset of I-band LST data over Desert Rock station on March 19, 2024.
- The left figure is the I-band LST, while the right figure is the M-band LST.
- The LST distribution is consistent between the I-band and M-band LST with more details observed in the I-band LST.

## Accomplishments / Events:

- The final LAI package readiness for the operational product, performed the LAI verification using time series data for SNPP, NOAA20 and NOAA21, fixed the issues found in the data verification, prepared the documents including the Algorithm Theoretical Basis Document (ATBD) and product rules.
- Collect multiple field campaign ground LAI measurements and work on the reprocessing of the SR product, which will be used for deriving historical LAI data to match the ground data.
- Keep working on the LAI algorithm improvement, mainly focus on the temporal smoothing, investigated the deep learning method (i.e. Long short-term memory) for the time series data processing.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

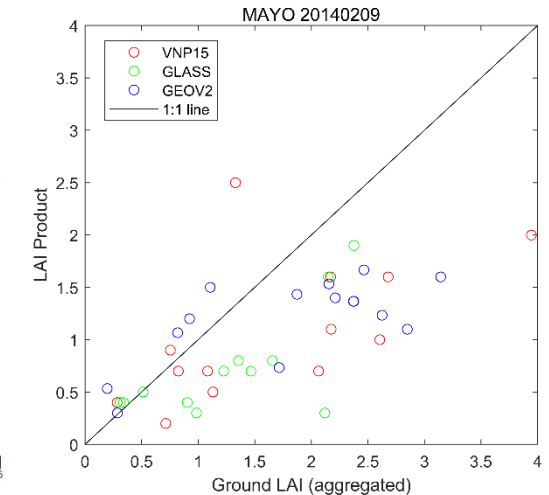
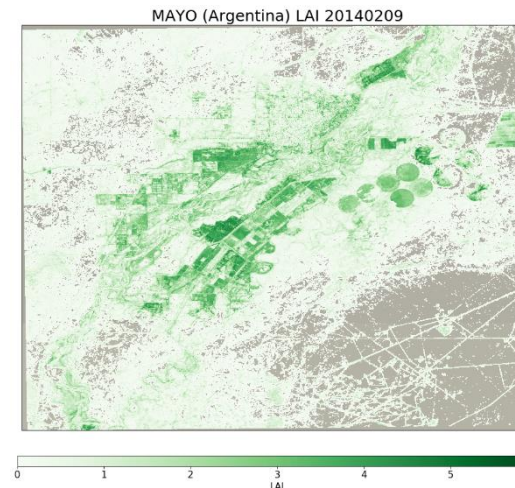
- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

None

## Highlights:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
CCAP final Delivery	Feb-24	Feb-24	Apr 1, 2024	
Incorporate the LAI test data into the LSM model to evaluate the performance in the model	May-24	May-24		
Operational readiness	Jul-24	Jul-24		
Develop LAI routine monitoring and validation tool	Sep-24	Sep-24		



Alternative LAI ground measurements from ImagineS field campaign, and reprocessing is needed for SR and LAI.

## Data verification

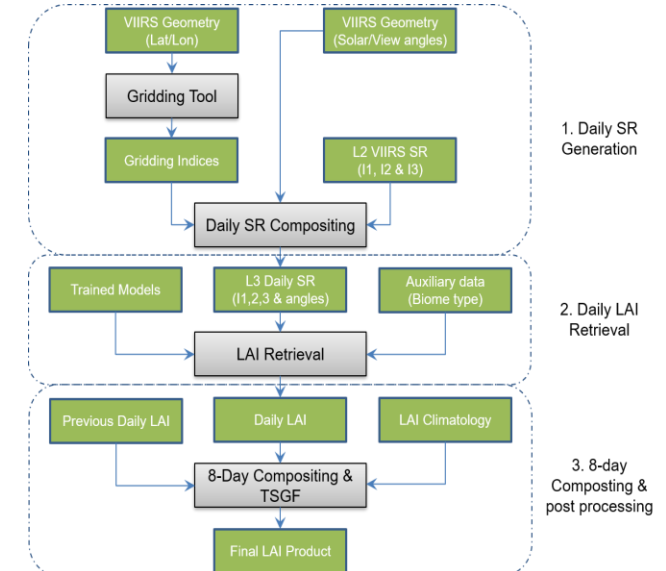
- ASSISTT team generate long time series (13 weeks) LAI datasets for verification for SNPP, NOAA20 and NOAA21.
- Verification performed for the final LAI and intermediate LAI for diagnose.
- Issue was found in the temporal smoothing and gap filling module when dealing with the exception.
- Verification demo will present later.

## Code update

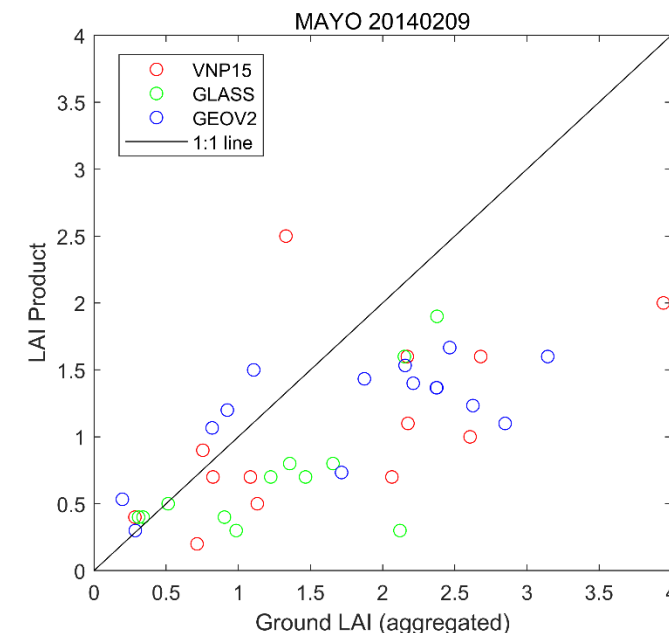
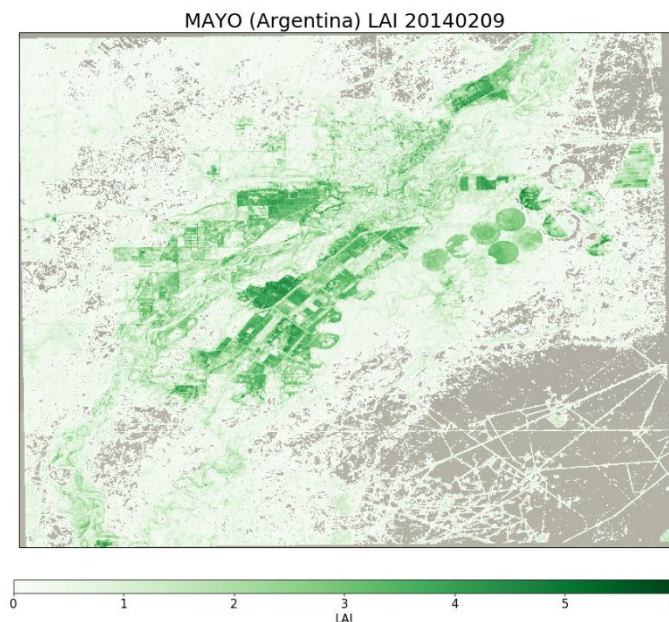
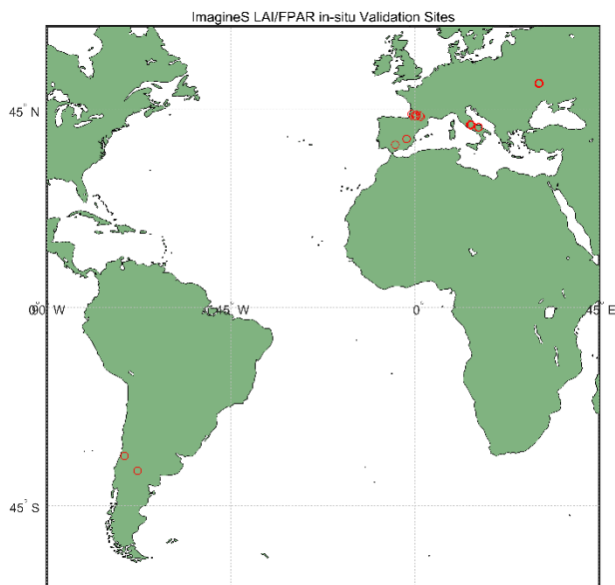
- Code updated to fix the issues found in verification.
- Standard requirement completed in the code.

## Documents

- LAI production rules
  - contains the production rules required to properly execute the driver script for LAI.
  - Rules cover the required input, how to run the driver scripts, and the expected output.
- Algorithm Theoretical Basis Document
  - Product background introduction
  - Algorithm detailed description
  - Assumption and limitation.



- Current LAI validation primarily using NEON measurement provided by Copernicus GBOV. To avoid systematic bias, alternative validation datasets are required to improve the representativeness.
- ImagineS field campaign provides high quality LAI which has been used in many LAI product validation
- The data are collected from 2013-2015
- SNPP Surface Reflectance could match that period, but a reprocessing is required to be consistent with current algorithm.
- Preliminary evaluation is performed for existing products for understanding of ground data.



## Accomplishments / Events:

- A new version of MiRS (v11.10) was delivered to ASSISTT on 15 March. In addition to updated bias corrections for NOAA-21 ATMS, the new version includes a correction to the TPW computation and removes support for snowfall rate (SFR), which is now a stand-alone algorithm.
- The science team has conducted preliminary evaluation of expected retrieval performance from the planned QuickSounder mission. Using preliminary estimates of thermal (1/f) and total noise from for the ATMS EDU, as well as current estimates for NOAA-20 ATMS instrument, retrieval simulations were conducted. Some results are shown in the highlights. The plots show the performance of temperature profile retrievals relative to ECMWF analyses for both QuickSounder and NOAA-21. Both bias and standard deviation are shown. For each, three curves are shown: simulations with no noise, simulations with only thermal (1/f) noise, and simulations with total noise. The results indicate that the NOAA-20 retrievals are slightly better than the QuickSounder retrievals, but that the differences are relatively small. As expected, adding noise to the simulated brightness temperatures leads to slightly higher retrieval errors.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget	x				
Technical / Programmatic	x				
Schedule	x				

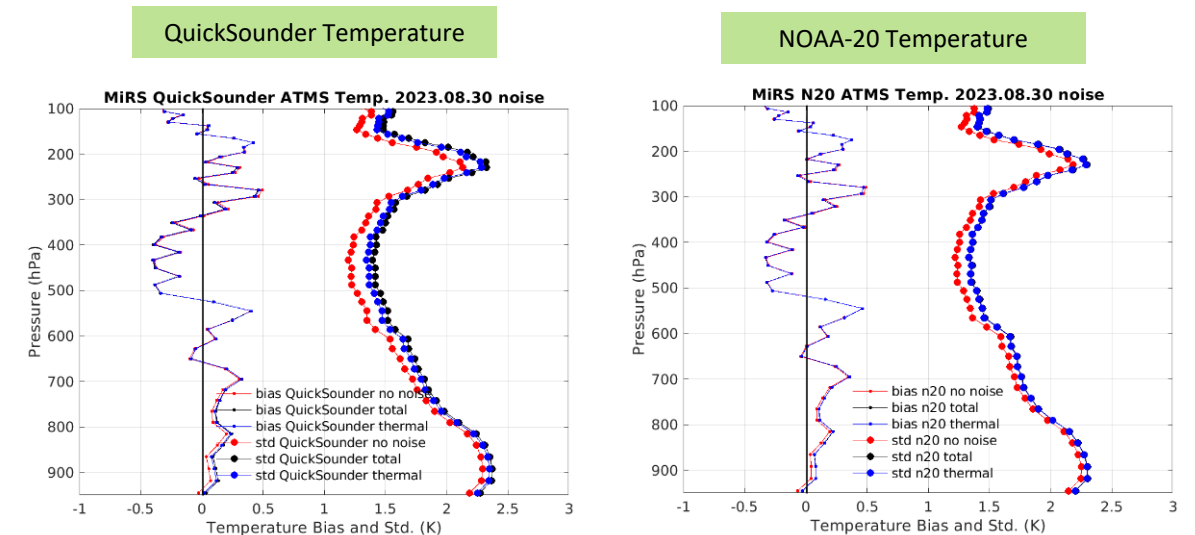
- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
MiRS DAP (v11.10): integrate SFR algorithm updates, code/science improvements, final J2 launch delivery	Feb-24	Feb-24	Mar-24	Delivered as per ASSISTT schedule.
SDR and EDR Enterprise Cal/Val Plan Initial Updates	Jun-24			
SDR and EDR Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting	Aug-24			

## Highlights:



## Accomplishments / Events:

- The JSTAR Mapper/STAR Environmental Monitoring System (STEMS) Team continued to review / improve the processes for monitoring and remedying tile production outages, particularly those related to the impact of recent Linux OS updates and have initiated conversations with the Land Surface Team to produce products as tiles for viewing in STEMS
- Dr Bomin Sun represented the NPROVS team at the GCOS Reference Upper Air Network (GRUAN) Implementation Coordination Meeting (ICM-15) held in Bern, Switzerland and provided an oral presentation entitled “*The consistency between GRUAN RAOBs and satellite hyperspectral infrared sounder measurements*”; NPROVS coordinates with several GRUAN Task Teams
- NPROVS experience extended “collocation” data gaps for the period March 5 through March 18 due to the upgrade of the operational systems which required subsequent NPROVS software modification; troubleshooting/reprocessing activities are underway.
- The NPROVS team continues to support NWS/NASA/JPL efforts to create “expanded” fields of “NUCAPS / Forecast” profiles including integration into to NPROVS for validation against radiosondes and NWS HRRR regional forecasts (**HIGHLIGHT**)

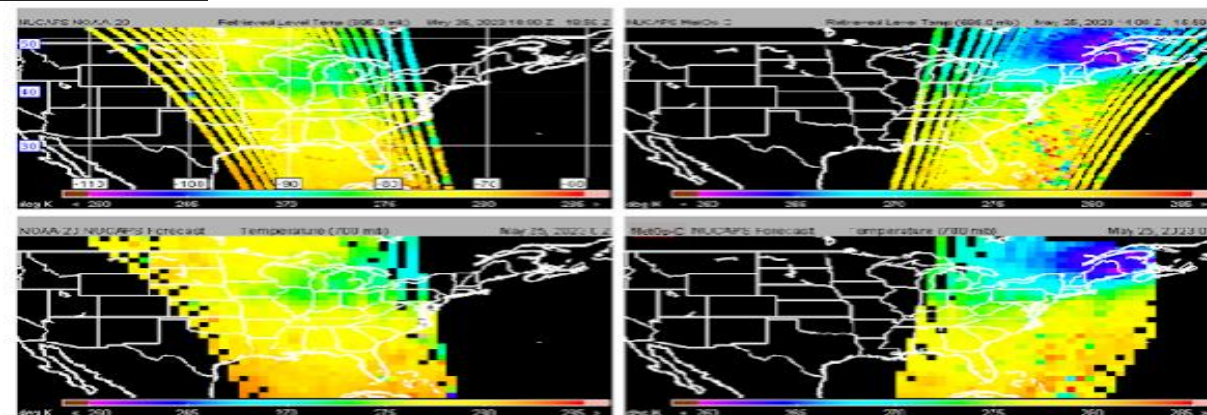
## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

**Issues/Risks:** None

## Highlights



**Figure 1** The 2 sets of upper panels show gridded fields of operational NUCAPS Temperature soundings for NOAA-20 (left) and MetOp-C (right) over the continental U.S. The lower panels show experimental NUCAPS-Forecast for the corresponding satellites 1-hour later as developed by NASA/JPL. The NUCAPS-Forecast is designed to project NUCAPS sounding up to 12-hours using NWS horizontal and vertical wind trajectory forecasts. The goal is to “create” expanded spatial/temporal coverage of satellite observations to support severe storm forecasts. The above panels demonstrate a successful transfer of NUCAP-Forecast data to NPROVS for subsequent validation versus Radiosondes and NWS regional (HRRR) nwp; troubleshooting continues.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
CPC Morphing (CMORPH) technique transferred from JSTAR Mapper to STEMS	Q2	Q2		
NPROVS Special expanded to integrate advanced GRUAN CFH moisture radiosonde	Q4	Q4		
JPSS Dedicated Radiosonde Programs expanded to include new Bankhead National Forest (BNF) ARM site in northwest Louisiana	Q3	Q3		
NPROVS User Support expanded to integrate new NWS NUCAPS-Forecast Product	Q3	Q3		
NPROVS supports maturity review leading to operational NUCAPS for NOAA-21	Q2	Q2		



## Accomplishments / Events

- Continued 'one-day a week' focus day data collection and processing of validation data sets for AVTP, AVMP, O3, OLR, CO, CH4, and CO2.
- Initiated efforts toward:
  - NUCAPS and GOSAT trace gas product evaluations by transforming the NUCAPS trace gas products matching the two layer GOSAT products (surface to 4 km, and 4 km to 12 km).
  - Development of necessary wrapper scripts for the UMBC SARTA code to include parameters necessary for the NH3 operational implementation.
  - NUCAPS and EUMETSAT product inter-comparisons using focus day data sets
  - CAMEL V3 emissivity database implementation along with LUTs for land surface spectral emissivity first guess improvements
  - Mission-long reprocessing of S-NPP/NOAA-20 NUCAPS products on NCIS using the NUCAPS v3.2 that includes the addition of averaging kernels: Provided a work plan to initiate reprocessing using focus day data sets to estimate processing time for each day and to verify with the offline in-premises server runs for code and product integrity.
  - Revisiting MetOp-B retrievals
  - AEROSE-2024 campaign data: Collected eight RAOB observations off the west coast of Africa. Supported the students with the RAOB balloon launches. Collected aerosol particle count and size distribution using a Portable Optical Particle Spectrometer in the tropical Atlantic. The data sets acquired during the campaign are being processed.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations	May-23	May-23	Mar-24	Continued updates to the data set
Addition of CAMEL emissivity database for the emissivity first guess	Mar-24	Apr-24	On-schedule	
Mission-long reprocessing of NOAA-21 NUCAPS products: Reprocessing version and evaluation of reprocessed products	Jun-24	Jun-24	On-schedule	

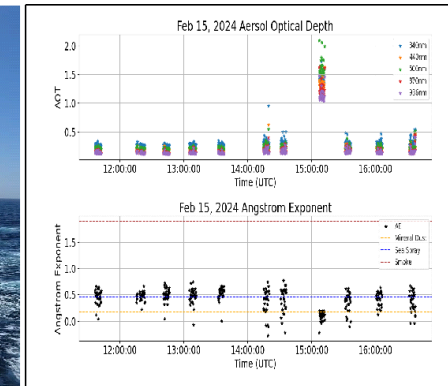
## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

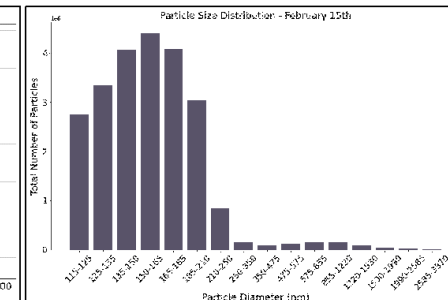
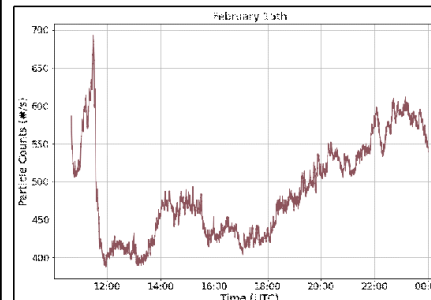
- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

None



AEROSE-2024 data sets acquired by the NUCAPS Team: (top row left) Weather balloon launch releases; (top row right) AOD on February 15 around 13.33N and 34.59W with mostly black carbon, mineral dust off Saharan desert, and sea spray; Peak of aerosol particles before 1200 UTC on February 15, followed by a drop-off, and a slower increase towards 0000 UTC. Majority of the particles are between 115 and 210 nm in diameter. (bottom row)



## Accomplishments / Events:

- Routinely producing global VIIRS-NOAA-21 ocean color products, as well as those from VIIRS-SNPP and VIIRS-NOAA-20.
- The Ocean Color Cal/Val team published a new cruise report: Ondrusek, M., M. Wang, E. Stengel, C. Kovach, A. Gilerson, E. Herrera, M. Malinowski, J. I. Goes, J. Wu, H. do R. Gomes, C. Hu, J. Cannizzaro, D. English, J. Shi, Y. Yao, S. Ladner, A. Mannino, J. E. Chaves, D. P. Farr, S. A. Freeman, H. D. Smith, N. Tuffillaro, A. Bailess, A. Belmonte, A. Barnard, J. Tan, and R. Frouin, “**Report for Dedicated JPSS VIIRS Ocean Color Calibration/Validation Cruise: Hawaii in March 2022,**” *NOAA Technical Report NESDIS 160*, J. Wei (ed.), NOAA Program & Policy Document, NOAA National Environmental Satellite, Data, and Information Service, Silver Spring, Maryland, February 2024. <https://doi.org/10.25923/g8wq-0g19>.

Milestones	Original Date	Actual Completion Date	Variance Explanation
Ocean Color J2 Provisional Code delivery to ASSIST	Apr-2024	Apr-2024	
Ocean Color Beta Maturity	Nov-2023	Mar-2024	
Ocean Color Provisional Maturity	Mar-2024	Mar-2024	
Ocean Color Validated Maturity	Jul-2025	March 2024	
<b>VIIRS calibration/validation</b>			
Continue VIIRS Cal/Val data analysis (SNPP, NOAA-20, and NOAA-21)	Sep-24		
Cal/Val team complete the 9th VIIRS ocean color dedicated cruise	Jul-24		
In situ data collections from OC Cal/Val team including NOAA dedicated cruise and other opportunities, particularly for NOAA-21 OC validation	Aug-24		
<b>VIIRS algorithm refinement (Maintenance DAP)</b>			
Improvement of the OCView tool for OC products monitoring	Aug-24		
Producing consistent VIIRS ocean color products	Aug-24		
Continue working on improvement of the ocean color data processing system (MSL12), particularly over global coastal and inland water regions	Aug-24		
<b>VIIRS OC data processing/reprocessing</b>			
Continue producing consistent VIIRS SNPP-NOAA-20 OC products and start to work on NOAA-21 OC data consistency with other two VIIRS sensors	Sep-24		
Updated DAP (MSL12) to CoastWatch, if needed	Sep-24		

Accomplishments / Events:

- Derived and delivered OMPS NM/NP weekly dark LUTs for SNPP, NOAA-20 and NOAA-21.
- Derived and delivered SNPP/NOAA-20/NOAA-21 OMPS NP solar bi-weekly LUTs.
- Continued analyzing Day-1 and synthetic solar spectra differences among 3 NMs and 3 NPs.
- Diligently on preparing figures and results for the NOAA-21 OMPS SDR Validated Maturity Review, including but not limited to the following analysis
  - NOAA-21 OMPS NM and NP dark, nonlinearity, gain and SNR analysis
  - NOAA-21 OMPS NP day-1 improvement due to the solar activity impact
  - NOAA-21 OMPS NM and NP stray light correction performance assessment, including comparison with NASA results.
  - NOAA-21 OMPS NM and NP geolocation accuracy assessment.
  - NOAA-21 OMPS NM and NP SDR quality accuracy assessment in comparison with SNPP/NOAA-20 data using multiple methods, e.g., 32-DAY averaged differences, DCC, CRTM simulations.
- Successfully completed the briefing about the NOAA-21 OMPS NM and NP SDR validation maturity review, with an action related to the ADR10825 solar pre-launch calibration error. The highlights of the NOAA-21 OMPS NM and NP SDR validated maturity analysis are given at next slide.

Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule			X		

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Finalize the NOAA-21 solar day-1 towards validated maturity; validate NOAA-21 OMPS SDR data quality using multiple ways (e.g., RTM, DCC, inter-sensor comparison with VIIRS); prepare NOAA-21 OMPS NM/NP SDR validated maturity review	Mar-24		Mar-24	
Reprocess the (SNPP, NOAA-20 and NOAA-21) OMPS NP SDR data by using the new dark, OSOL and SL tables; Initialize the OMPS and GEMS inter-sensor comparison analysis	May-24			
Document the technical reports (e.g., SL correction, solar intrusion correction, solar activity impact correction, NM along-track wavelength shift correction; update OMPS NM/NP SDR ATBD	Jul-24			
Develop new algorithm or code to support J3/J4 prelaunch testing and verification; analyze the pre-launch test data sets for J3 or J4 upon the availability of the data sets	Aug-24			
Pre-launch sensor characterization report upon available pre-launch instrument test data sets; reprocess SNPP, N20, and N21 OMPS NM SDR data using the updated LUTs; OMPS SDR enterprise Cal/Val plan updates	Sep-24			
Develop and deliver dark and OSOL LUTs for SNPP/NOAA-20/NOAA-21	Sep-24			
Maintain SNPP/NOAA-20/NOAA-21 OMPS SDR data quality	Sep-24			

**Comparison of Instrument BPS for 3 OMPS NMs and NPs**

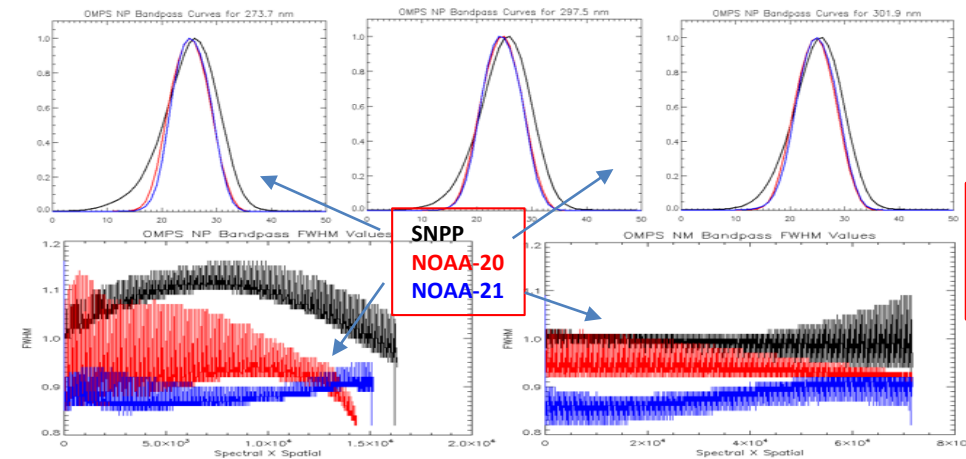
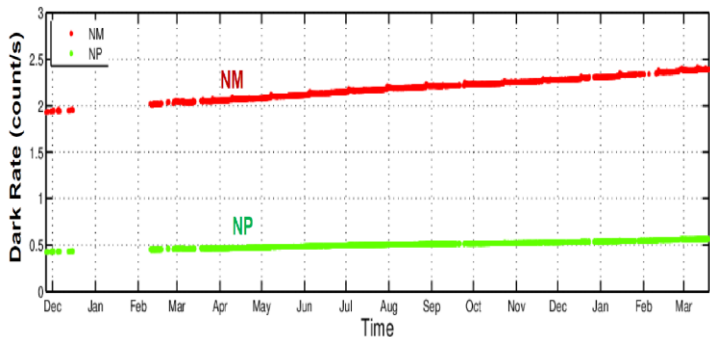


Figure: The top row of images shows examples of individual OMPS-NP bandpass curves for NPP (black), NOAA-20 (red), and NOAA-21 (blue). The three images show the bandpass values at three different

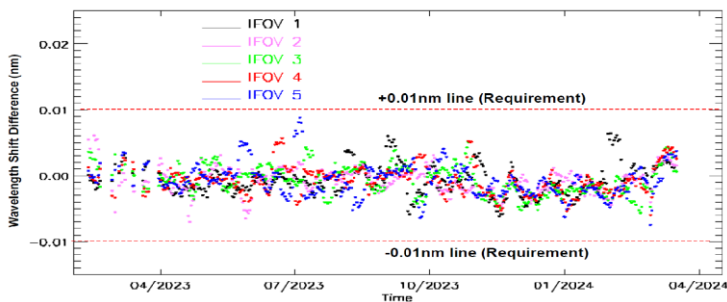
# NOAA-21 OMPS NM and NP Validated Maturity Highlights

## Dark, Wavelength shift and SNR performance

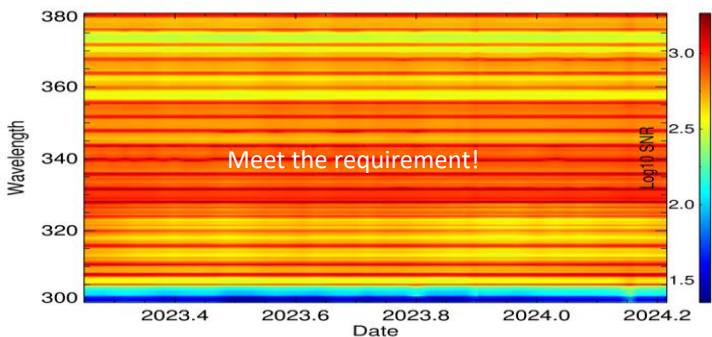
(a) NM and NP dark rate time series



(b) Diff Percent between Solar Flux- and Radiance Relative Wavelength Shifts

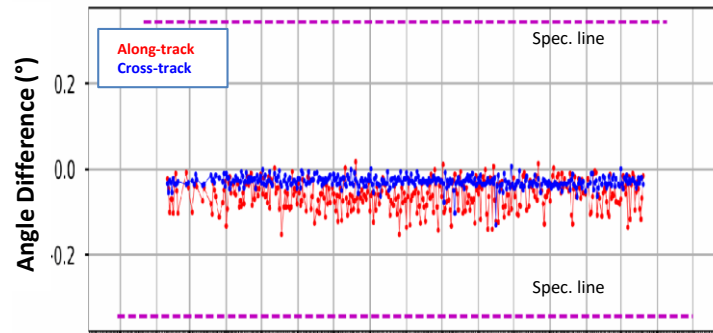


(c) NM Log10 SNR Time Series

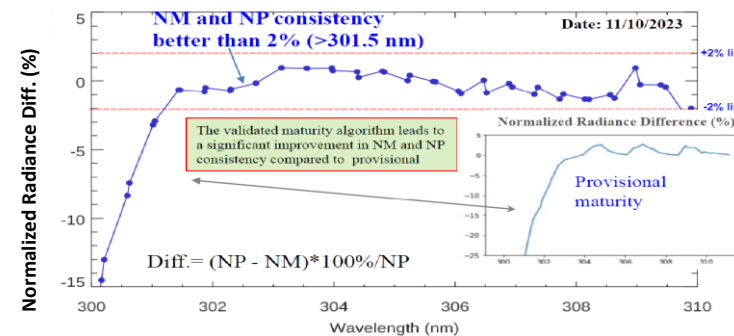


## Geolocation and Radiance (& NR) Performance

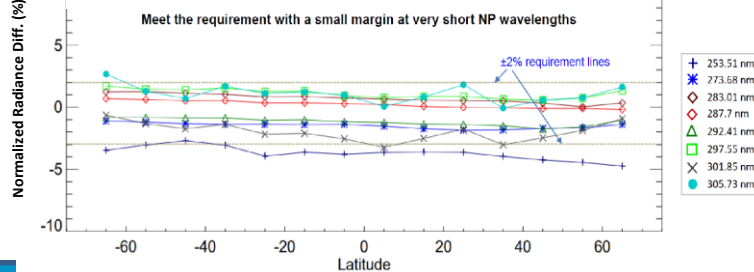
(a) NM Geolocation Error Time Series (against VIIRS)



(b) NOAA-21 NP and NM NR Consistency (Validated Maturity)

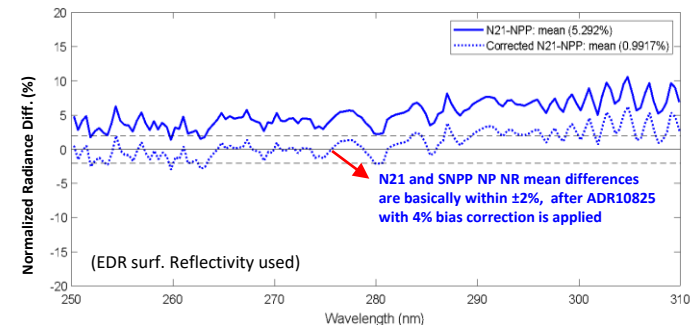


(c) 32-Day Averaged NP NR Diff. (%) between NOAA-21 and SNPP

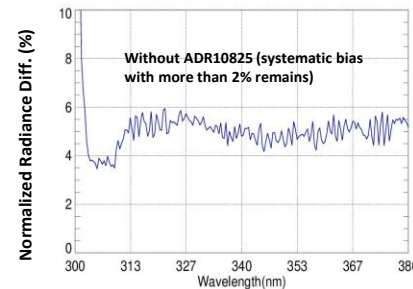


## NR Performance Cont. & User Feedback

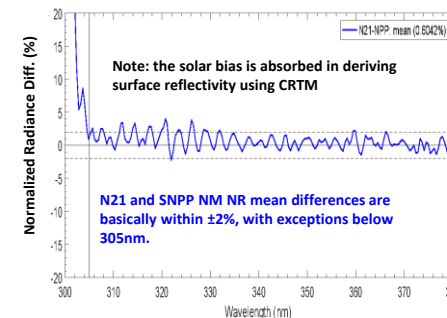
(a) 16-Day Averaged OMPS-NP NR Diff. (%) between NOAA-21 and SNPP via CRTM



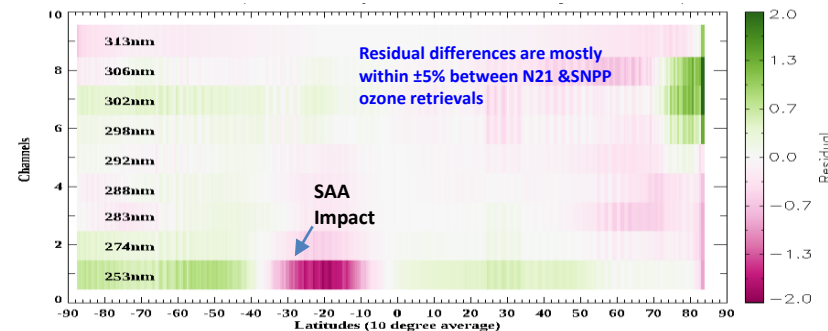
(b) Averaged NM NR Diff. (%) between NOAA-21 and SNPP via DCC



(c) 16-Day Average OMPS-NM NR Diff. (%) between NOAA-21 and SNPP via CRTM



(d) Residual Difference (%) in OMPS Ozone Retrieval (%) between NOAA-21 and SNPP



### Accomplishments / Events:

- The Ozone Team provided evaluation of the NOAA-21 OMPS NM & NP SDRs for the Validated Maturity Review. The N21 SDR changes to reach validated maturity will require the development new V8TOz and V8Pro soft calibration adjustment tables. We are working with the SDR Team to obtain reprocessed data to make those changes.
- The NOAA-21 V2Limb Level 1 and Level 2 codes were delivered to ASSISTT as Beta Maturity codes. The Level 1 part of the codes will need some small revisions to correct the processing of the first of four scan for half of the granules. The other 7/8ths of the scans are processed correctly. There will also be a table update in April as NASA implements a planned change to the instrument sample table.
- The Ozone Team has provided detailed project and spending plans for FY24 support for JPSS and Metop funding.
- The Team supported the implementation of V8Pro at the provisionally validated status on the operational NCCF system effective March 21, 2024.
- The Team provided updates to the old operational TOAST codes following failures with the new NUCAPS algorithm implementation. These updates are already in the NCCF version. We had expected it to take over operational processing well before this NUCAPS update.

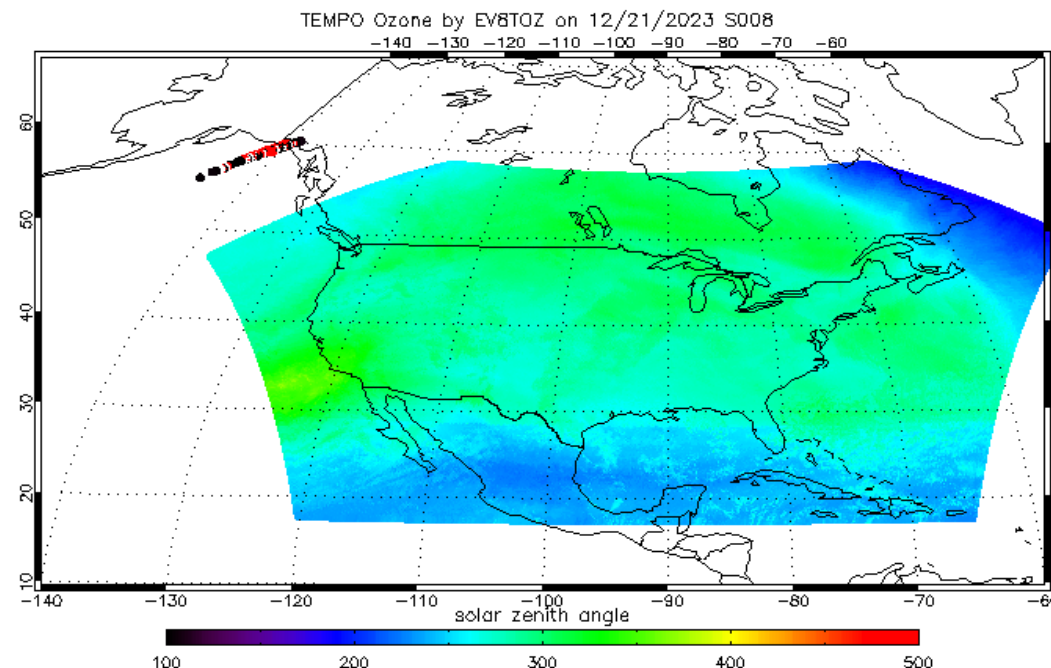
Milestones	Original / Current Date	Forecast Date	Actual Completion Date	Variance Explanation
Provide Level 1a, 1b, 1g & 2 (aerosol and ozone) for NOAA-21 OMPS V2Limb to ASSISTT	Jan-23		Mar-24	NASA R&D
Update V8TOz tables for Metop-B & -C	Apr-24	May-24		
N21 V2.7Limb to Beta	Jan-24	Apr-24		Timing Pattern
N21 V2.7Limb to Provisional	Feb-24	May-24		
N21 V2.7Limb to Fully Validated	Sep-24	Aug-24		
V8Pro to Fully Validated	Mar-24	Apr-24		SDR Progress
V8TOz & V8TOS to Fully Validated	Mar-24	Apr-24		SDR Progress
Reprocess NPP V8Pro for 2023	Apr-24		Mar-24	Dark Table
Reprocess N20 V8Pro for full record	Jun-24	TBD		SDR
J4 / N22 Revised Cal/Val Plan	Sep-24			

### Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule			X		ProTech Follow-on, SDR instability, Limb Development

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

**Issues/Risks: IMSG ProTech Contract follow-on is still not in place.**



Enterprise V8TOz Applied to TEMPO

## Accomplishments / Events:

- Distribution of data from the Copernicus Marine Service (CMEMS; [marine.copernicus.eu](http://marine.copernicus.eu)) was disabled earliest this month (March 2024). CMEMS is one of the sources of in situ SST data for the SST in situ Quality Monitor (iQuam) system. In response, we updated our iQuam data ingest scripts to work with the Copernicus Marine Toolbox software. Unfortunately, most data provider seem to be abandoning standard distribution methods (FTP/https) in favor of custom software that must be tailored to each data source.
- The main goal for the ACSPO V3.00 (scheduled for Dec 2024 release) is rework of the ACSPO VIIRS clear-sky mask (ACSM). The main goal is to reduce false positive cloud detection (over screening) in regions with dynamic SST features such as the Gulf Stream. We accomplish this by reducing ACSM reliance of comparison to low-resolution first guess SST (which lacks fine SST features) and increase reliance on spectral and texture-based cloud filters. The figure in the lower right shows comparison of ACSPO V2.80 (currently operational) imagery with the V3.00 beta 1 (V3.00B01), which is the current development version of ACSPO.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

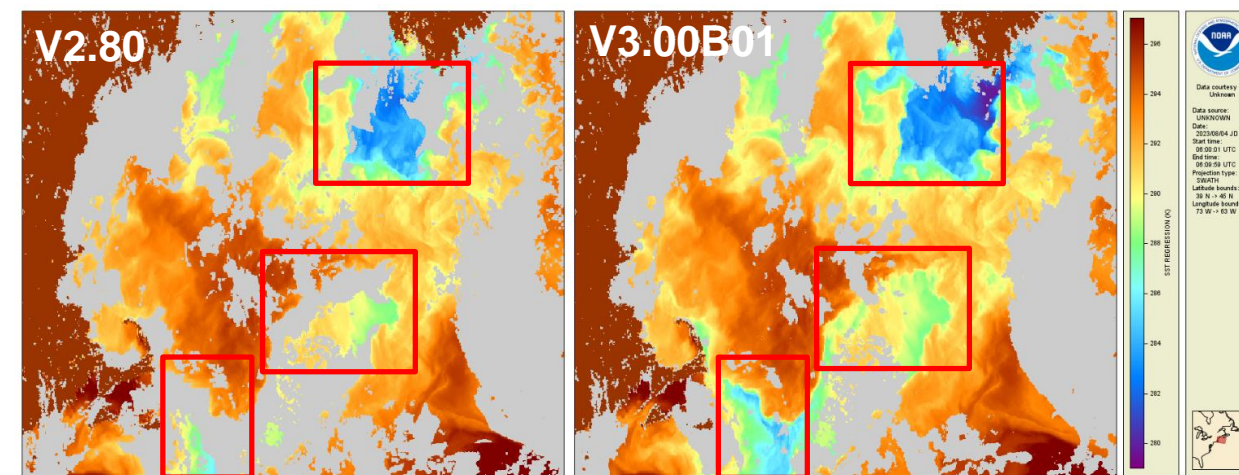
1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

NOAA STAR migration to the CentOS 9 Stream operating system will cause reduction in our capability to do full-mission VIIRS SST reprocessing. This is due to poor CentOS 9 support for parallel cluster file systems.

Discontinuation of funding for non-NOAA mission SST work will severely degrade STAR SST products used operationally across NOAA and very popular externally such as LEO L3S SST.

## Highlights: Upcoming improvements to the clear-sky mask in ACSPO V3.00



Figures shows comparison of ACSPO V2.80 (left) and V3.00B01 (right) NPP VIIRS nighttime SST imagery from the US east coast. Clear-sky mask (grey) is overlaid. Red rectangles highlight regions where over screening is reduced in V3.00B01 compared to V2.80.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SST EDR Support to JPSS-3 Data System Test Event (Dependency on JPSS)	Apr-24	Apr-24		
SST EDR Enterprise Cal/Val and ACSPO Algorithm "Agency Report" Presentation to GHRSSST science community	Jun-24	Jun-24		
SST EDR Enterprise Cal/Val Plan Initial Updates	Jul-24	Jul-24		
Promote experimental iQuam updates to live access	Aug-24	Aug-24		

## Accomplishments / Events:

- The NOAA-21 SFR Provisional Review was held on March 7<sup>th</sup>. The product was approved by the JPSS Cal/Val Maturity Review Team to be Provisional Mature on March 11<sup>th</sup>.
- The SFR team is supporting ASSISTT in the testing and integration of the SFR update package which includes the Provisional NOAA-21 and GPM SFR.
- The standalone SFR system started operational production.
- The science team started the task to cross-calibrate the SFR product for all satellites: NOAA-21, NOAA-20, S-NPP, Metop-B, Metop-C, and GPM.
- Temporarily restored the near real-time SFR website at CISESS after the CISESS IT system suffered a ransomware attack. A permanent website will be established on the AWS cloud.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Cross validation among NOAA-21, NOAA-20, and S-NPP SFR products	April-24	April-24		
SDR and EDR Enterprise Cal/Val Plan Initial Updates	Jun-24			
SDR and EDR Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting	Aug-24			

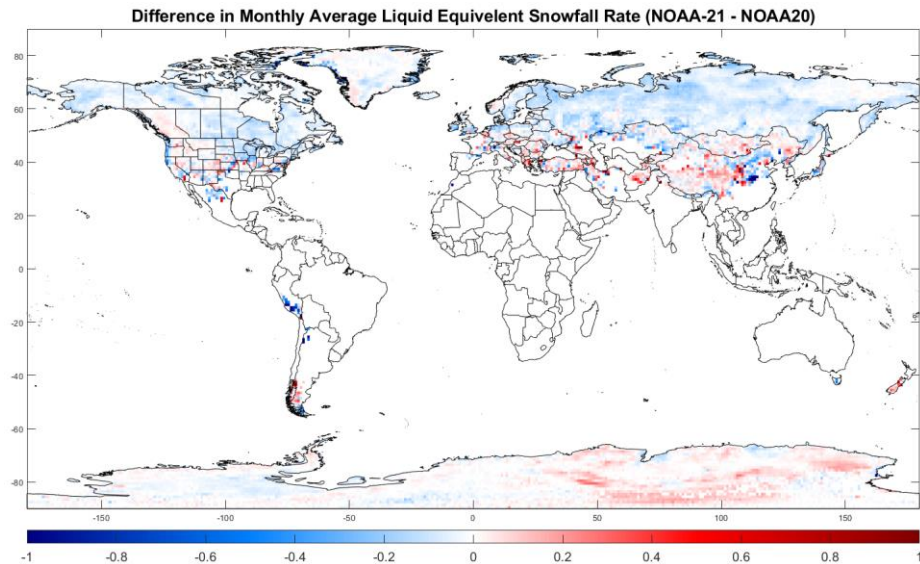
## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

**Issues/Risks:** None

## Highlights:



March 2023 monthly average SFR difference between NOAA-21 and NOAA-20. The difference is within  $\pm 0.2$  mm/hr over most of the global land.

## Accomplishments / Events:

- Updated the VIIRS Enterprise albedo ATBD from v1.3 to v2
- Updated monthly albedo climatology including snow-free and snow-included versions by including new year's data
- Keep responding during NCCF integration of VIIRS LSA
- Start to include blended VIIRS LSA from Enterprise algorithm in the LTM
- Start to revise the VIIRS BRDF package and planned to test including the JPSS-2 VIIRS observations

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

- Project has completed.
- Project is within budget, scope and on schedule.
- Project has deviated slightly from the plan but should recover.
- Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

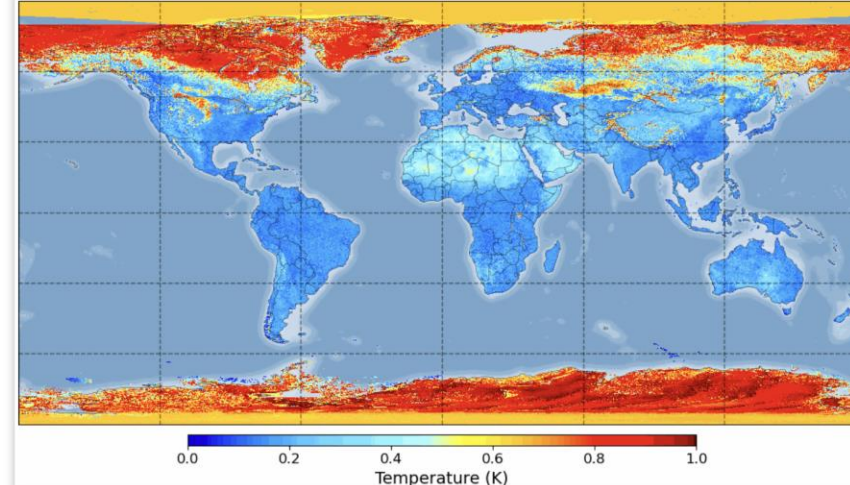
## Highlights:

Added merged JPSS VIIRS albedo in LTM

### Merged JPSS VIIRS LSA Weekly Animation

Please select:

Merged VIIRS Global Albedo (Daily Composite): Mar 26, 2024



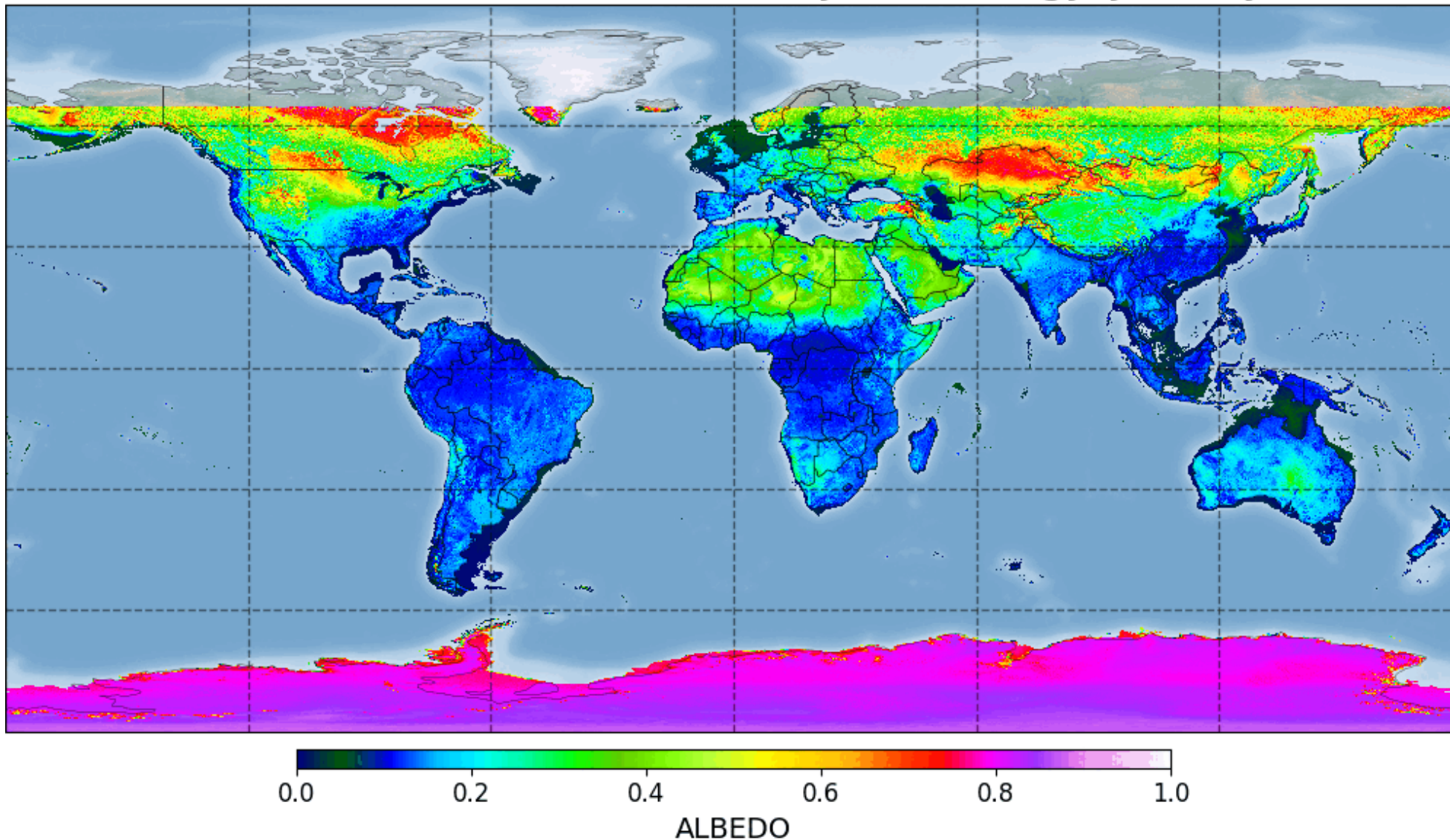
The blended (merged) L3 VIIRS LSA from both SNPP and NOAA-20 L2 LSA has been displayed on the webpage. The data will be accumulated for evaluation.

Milestones	Original Date	Forecast Date	Actual Completion	Variance Explanation
Support to JPSS-3 Data System Test Event in early 2024	Apr-2024	Apr-2024		
VIIRS BRDF/Albedo/NBAR Dataset to User	Oct-2023	May-2024	Oct-2023	
BRDF evaluation (manuscript)	Dec-2023	Jun-2024		
Enterprise Cal/Val Plan Initial Updates	Jun-2024	Jun-2024		
*NCCF Integration of BRDF/BSA/WSA/NBAR	May-2024	Jun-2024		
Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting	Aug-2028	Aug-2028		
Software package ready of blended SURFALB from all VIIRS sensors	Jun-2024	Aug-2024		



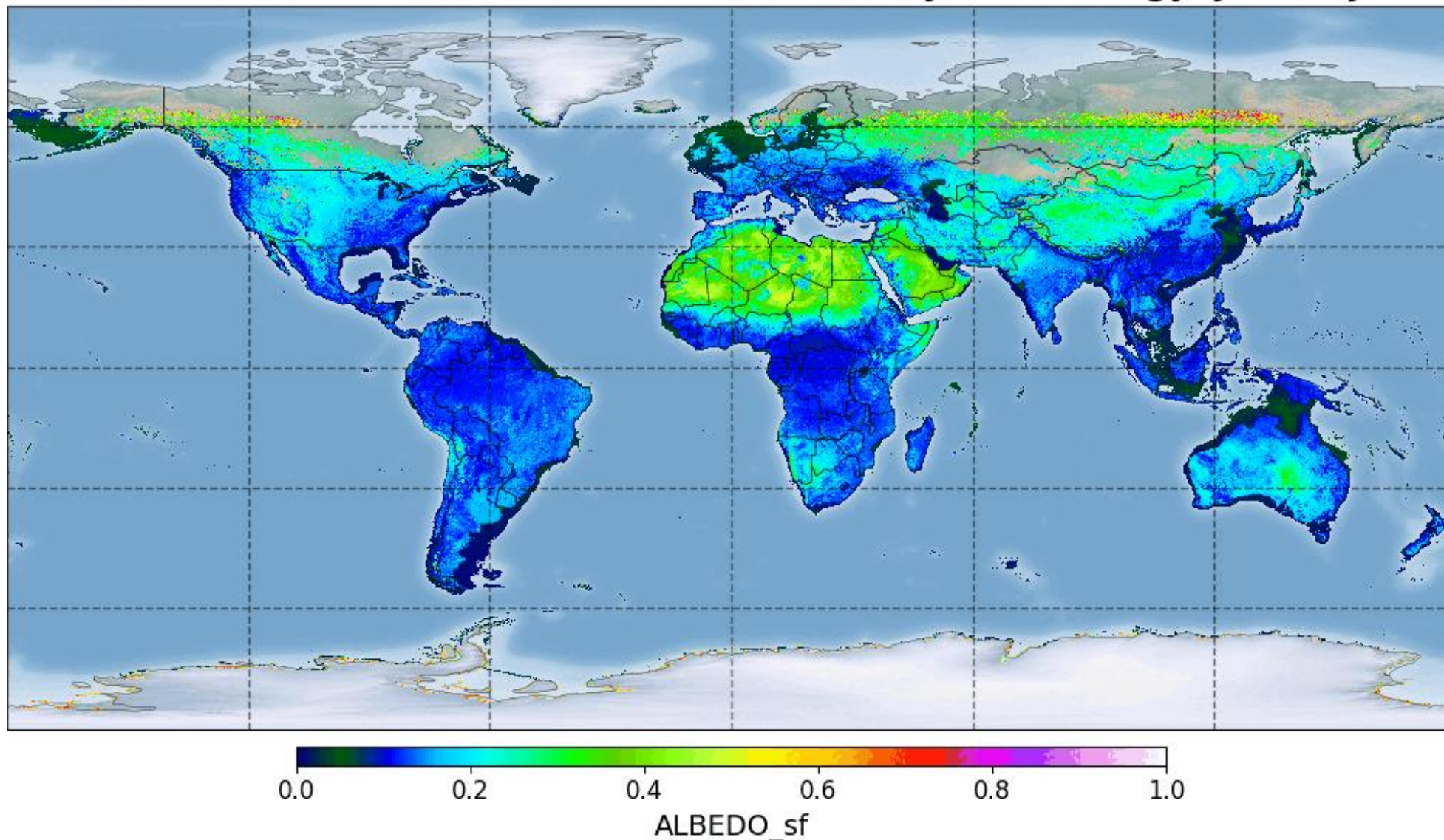
# Albedo Monthly Climatology Updated

Shortwave BSA Albedo monthly climatology: January



# Snow-free Albedo Monthly Climatology Updated

Snow-free Shortwave BSA Albedo monthly climatology: January



## Accomplishments / Events:

- Maintained the SR monitoring tools, such as daily true color image and weekly AERONET validation, fixed the issues cause by system updates.
- Keep working on the inconsistency issue within JPSS satellites, particularly for the SNPP and NOAA20, for the correction method, two approaches are tested, one is using the reprocessed SDR, and the other is using the NASA SR calibration coefficients as proxy.
- Explore the SR inter-comparison method to evaluate the inconsistency issue, using the BRDF correction method to derive the nadir SR for comparison.
- Working on the level 3 surface reflectance improvement, mainly focus on making the gridding process more efficient through the parallel computing.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

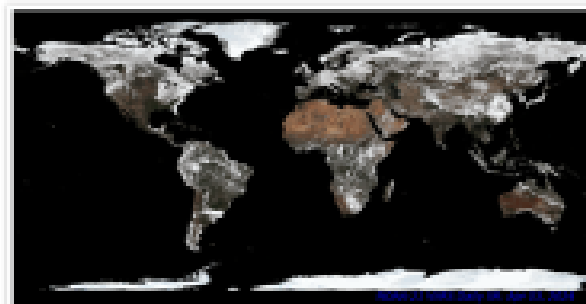
None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NCCF SR DAP redelivery and verification	Sep-23	Sep-23	Sep 20, 2023	
Mitigation algorithm development for the dust aerosol model	Dec-23	Dec-23	Dec 19, 2023	
Provisional Maturity of NOAA-21	Feb-24	Feb-24	Jan 25, 2024	
The JPSS (SNPP, N20, N21) SR consistency evaluation and correction	Mar-24	Mar-24	Mar 28, 2024	
GOES-R enterprise SR algorithm development and experimental product	Jun-24	Jun-24		
Operational Readiness Review (ORR) for NDE Migration to NCCF	Aug-24	Aug-24		

## Highlights:

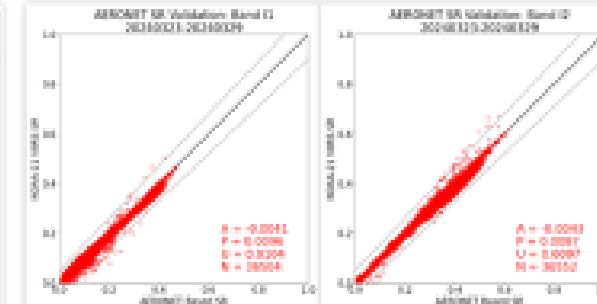
NOAA-21 VIIRS SR-Land Weekly Animation

Please select:



NOAA-21 VIIRS SR Validation Results

Please select:

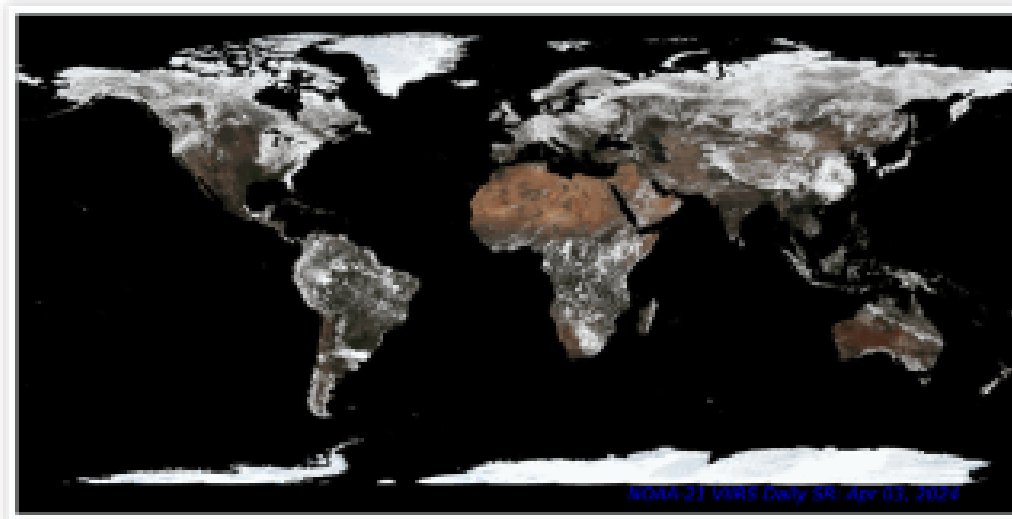


NOAA-21 routinely monitoring along with SNPP and N-20 on website, including the true color image animation and weekly AERONET validation

- Surface Reflectance Product routinely Monitoring
  - Daily gridded SR dataset for the true color bands (M3, M4 and M5).
  - Daily true color image, weekly animation display at <https://www.star.nesdis.noaa.gov/smcd/emb/land/animation.php>
  - Daily AERONET subsets (VIIRS SDR, GEO, GFS data, SR, AOD) and AERONET corrected SR (real time AOD, TPW)
  - Weekly AERONET SR validation summary display at the website.
- Daily Gridded Surface Reflectance for image band
  - Daily gridded SR for image bands (I1, I2, I3) at 500m sinusoidal tile grid.
  - Along with the geodata (solar and satellite angles) and quality flag for vegetation products (LAI, FPAR, GVF)

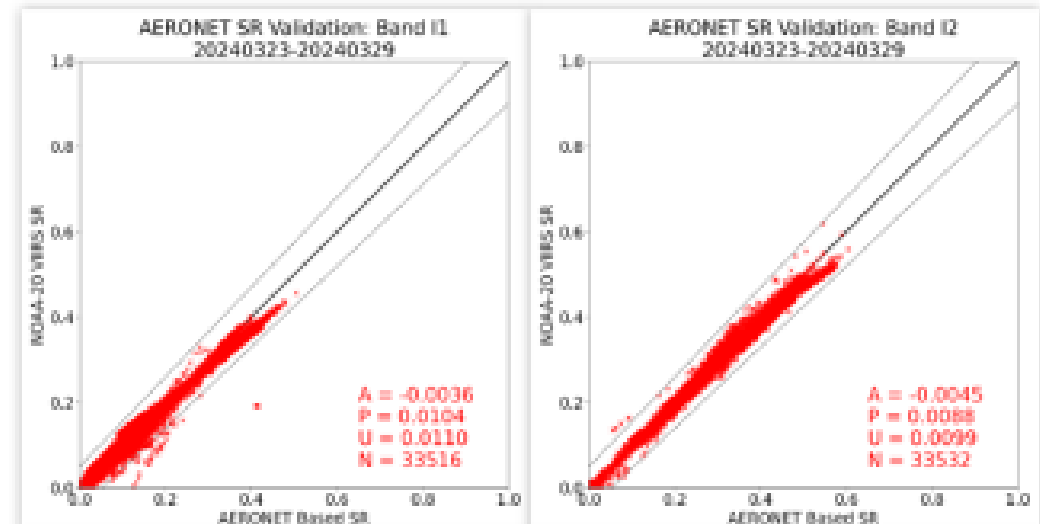
NOAA-21 VIIRS SR-Land Weekly Animation

Please select:



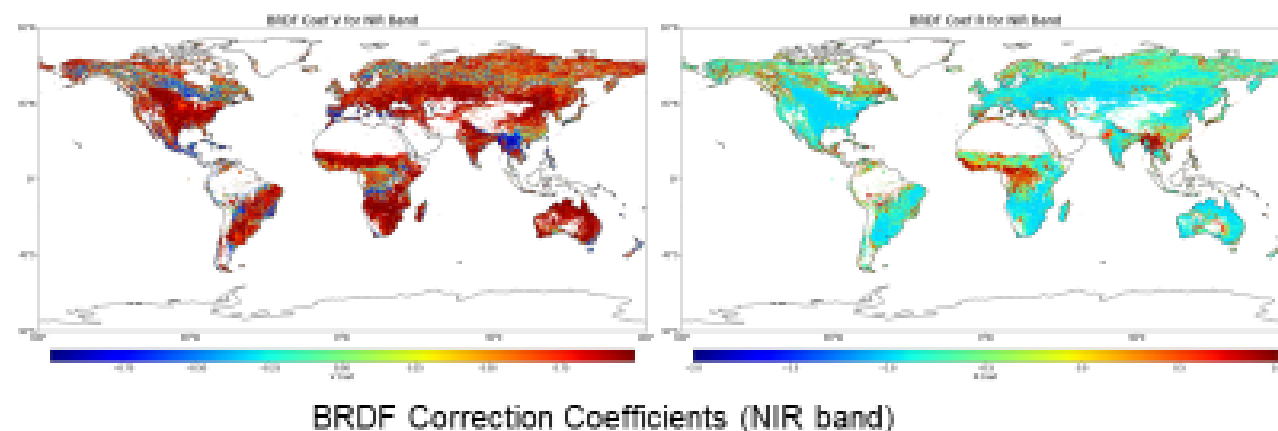
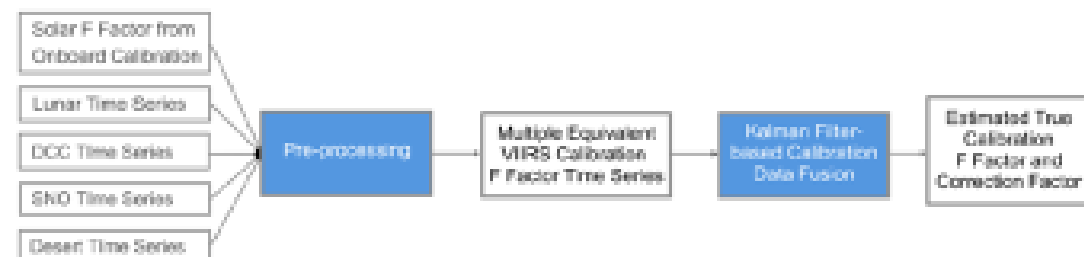
NOAA-20 VIIRS SR Validation Results

Please select:



- Correction Methods Tested:
  - Method1: Using NOAA Reprocessed SDR (NPP: 201404-202004, N20: 201801-202212)
  - Method2: Using NASA Calibration Coefficients (As an approximation)
    - Using multiple years Aqua MODIS data as reference
    - Using the deep convective cloud and sun glint as calibration targets.
- Evaluation Method:
  - BRDF Corrected SR inter-comparison
    - Using coefficients derived from multi-year MODIS data as proxy
    - 0.05\*0.05 degree grid
  - Vegetation products inter-comparison
    - Select the downstream product independent from solar or view angles (LAI or GVF)

Reprocess SDR Method (Wang, 2020, Cao, 2021)



SNPP	Slope NOAA	Intercept N	Slope NASA	Intercept NASA
I1	1.011102	2.27E-07	0.9948	0.000433*(year-2012)
I2	0.982462	7.26E-08	0.9731	0.00076*(year-2012)
I3	0.992854	-7.08E-08	0.9588	0.000586*(year-2012)

N-20	Slope NOAA	Intercept N	Slope NASA	Intercept NASA
I1	1.00463	5.14E-05	1.0333	0.001299*(year-2018)
I2	1	0.00131	1.0121	0.000514*(year-2018)
I3	0.99934	6.17E-06	1.0015	0.006207*(year-2018)

## Accomplishments / Events:

- STAR-UMD VIIRS Surface Type team has downloaded and processed S-NPP, NOAA-20, and NOAA-21 VIIRS daily granule surface reflectance data acquired in March of 2024 for the production of AST-2024.
- The team has developed the capability for routine processing of VIIRS I band data to produce global daily surface reflectance mosaics and monthly composites at the 500m resolution (see highlights).
- The team has started to train the SVM classification models based on VIIRS observations acquired in 2023. Once trained, these models will be used to produce an initial global surface type map for 2023.
- The team continues to generate monthly update to the 250 m global water surface fraction (WSF) product.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

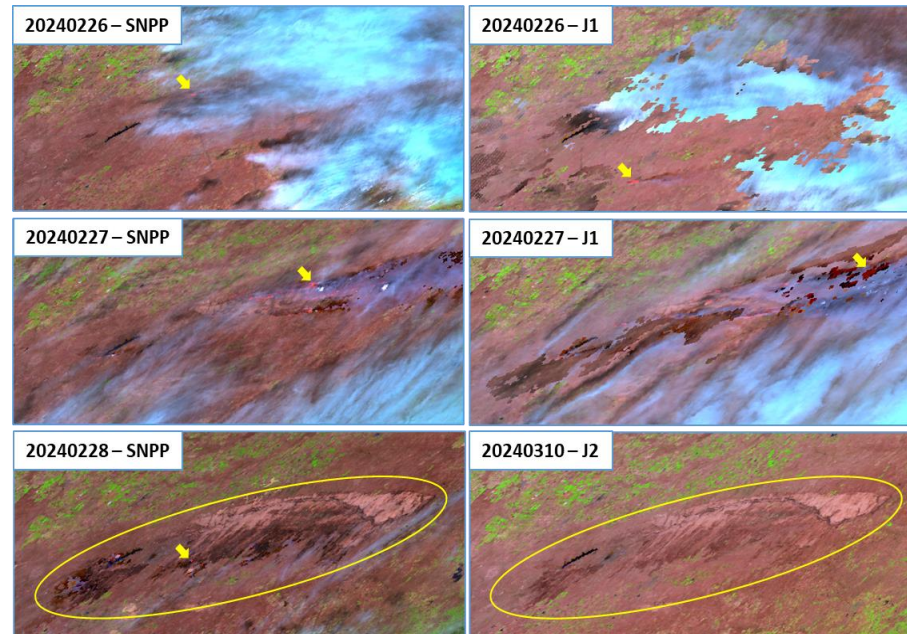
None

## Highlights:

Synergy of S-NPP, NOAA-20(I1) and NOAA-21(J2) in Monitoring the Smokehouse Creek Fire

The Smokehouse Creek Fire is the largest recorded wildfire in Texas. S-NPP and NOAA-20 recorded multiple fire pixels (some are identified by the yellow arrows) on Feb. 26<sup>th</sup> when the fire started, and numerous more as the fire spread quickly the next day. By the 28<sup>th</sup>, S-NPP provided a clear image of the large burned areas (highlighted by the yellow ellipses). While the fire was not contained until March 16, some burned areas already became spectrally indistinguishable from surrounding unburned areas in the NOAA-21 image acquired on March 10<sup>th</sup>.

The 6 images show VIIRS bands I3, I2, and I1 in red, green, and blue. The region is dominated by rangeland, which has dark brownish colors. The burned pixels became darker immediately after the fire but became much brighter in as short as a few days.



Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Monthly update of the 250m global water surface fraction product	Each M.	Each M.		
Complete global monthly composites for each of 2024 months	Each M.	Each M.		
Generate global annual classification metrics for 2023	May-24	May-24		
AST23 of IGBP 17 type map	Aug-24	Aug-24		
AST23 for EMC 20 type map	Aug-24	Aug-24		
AST23 Validation Statistics and delivery to JSTAR and users	Sept-24	Sept-24		

## Accomplishments / Events:

- Continued monitoring of vegetation health as indicated by publications of weekly vegetation health products (VHP) from currently operational NOAA-20 VIIRS observations via STAR webpage at [https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh\\_browse.php](https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_browse.php)
- Continued the development of the new code for 500m NOAA-20/21 VIIRS VHPs production/operation;
- Met with JPSS Vegetation Index/Green Vegetation Fraction team on potential integration of NDVI daily compositing algorithms for VHP, VI and GVF products
- Investigated NDVI smoothing algorithms and explored the potential of improvements of the smoothed NDVI in order to obtain more reliable VHI data product

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

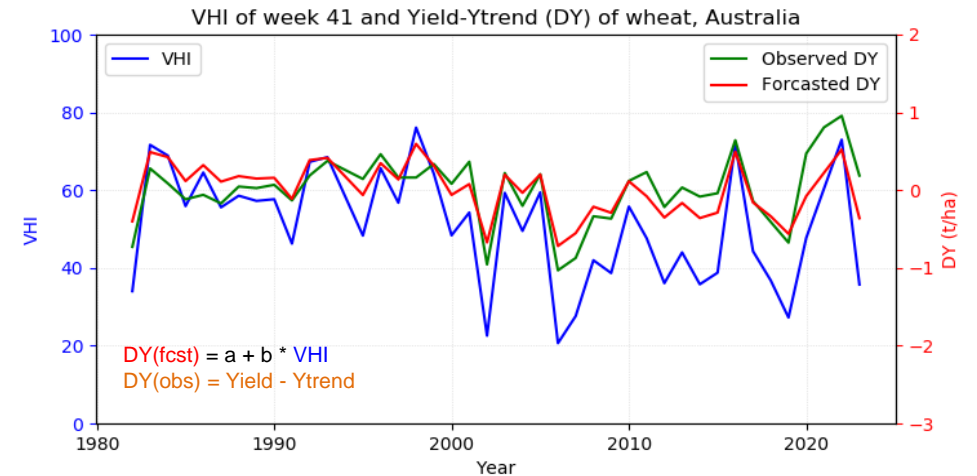
1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Update SMN & BT climatology data for S-NPP, NOAA-20 and NOAA-21 VIIRS with all available SDR/Surface Reflectance data	Jun-24			
Upgrade VHP software from 1km to 500m with legacy production at 1km, 4km and 16km for primary users at USDA	Sep-24			
Explore crop yield data for VHP validation and assess VHP potential for crop yield forecasts	Sep-24			
Assist OSPO/ASSISTT/NCCF for updated VHP software and production migration to the Cloud	Jun-24			
Verify VHP output from OSPO/ASSISTT/NCCF software for consistency with STAR science code output	Sep-24			

## Highlight: Better relationships between wheat yields and vegetation health



## Accomplishments / Events:

- Imported VI data into Google Earth Engine for potential validation against a broad range of data sets.
- Verified NCCF migration for VI was successful. GVF migration verification is in progress and will be finished soon.
- Working on plan to integrate VI and GVF with Vegetation Health production
- Vegetation Index anomalies were compared against LST and precipitation anomalies for the three months of winter 2023-2024.

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
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Schedule		X			

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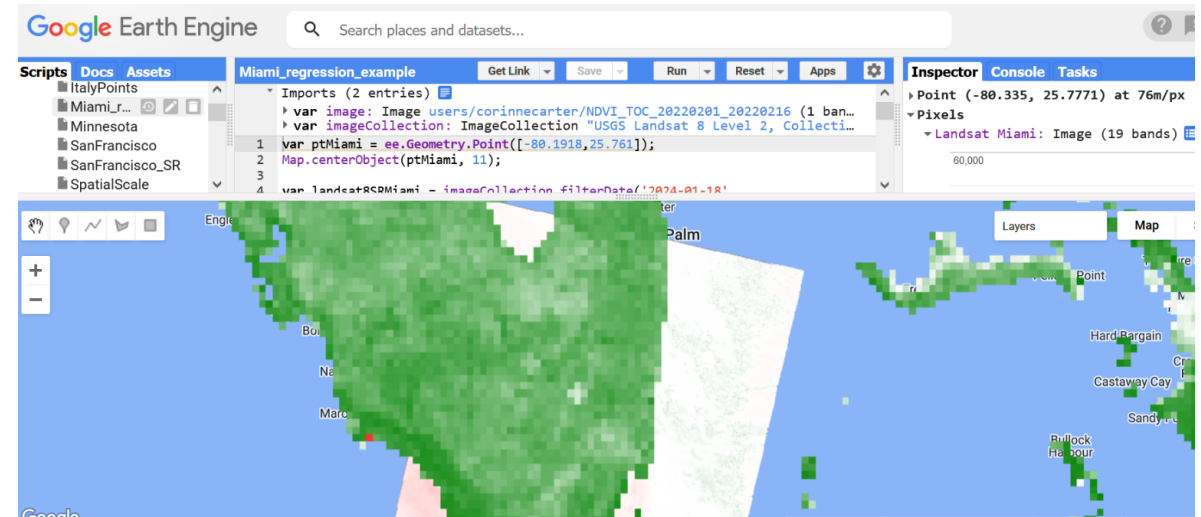
## Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Higher-resolution regional VI and GVF domain extended to global	Feb-24	Apr-24		On hold pending PCR
Experimental data test of blended VI and GVF products	Apr-24	May-24		Delays to previous milestone
Support to JPSS-3 Data System Test	Apr-24	Apr-24		
Readiness for NCCF migration	Aug-24	Aug-24		
Annual algorithms/ products performance report	Aug-24	Aug-24		
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-24	Sep-24		

## Highlights:

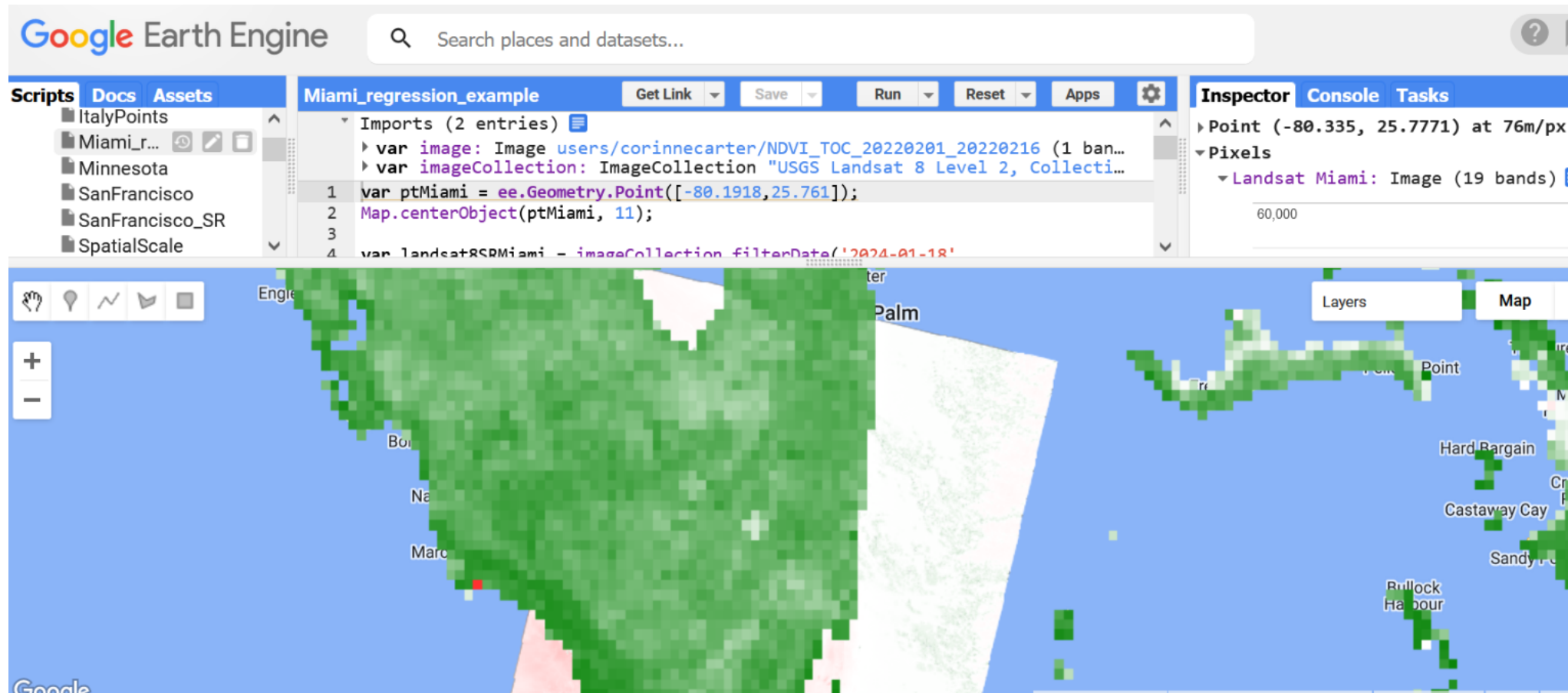
- VIIRS Vegetation Index has been read into Google Earth Engine, where many data sets are available for comparison.
- The example shown in VIIRS 4km VI against a Landsat scene in Florida.





# Potential use of Google Earth Engine for validation

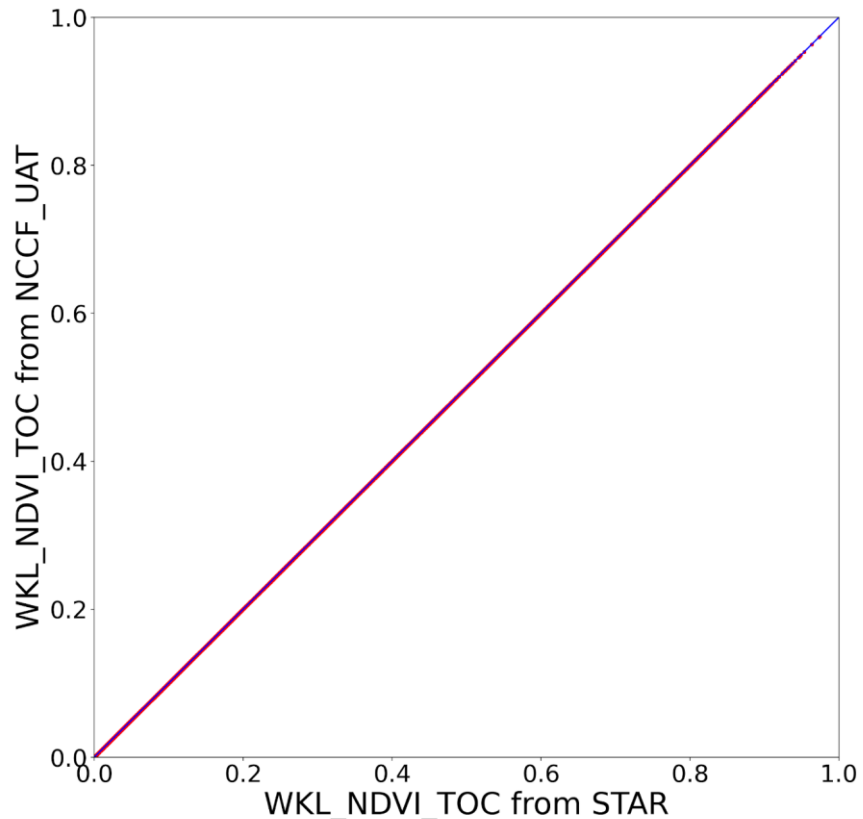
- Google Earth Engine is a cloud-based platform for exploration and analysis of Earth remote sensing data. VIIRS VI data was read in to Google Earth Engine for potential comparison to a wide range of data sets.
- Data available on Google Earth Engine include Landsat, Sentinel, and aerial photos, among others.
- For import into Earth Engine, VIIRS VI in netcdf format had to be transformed to GeoTIFF.



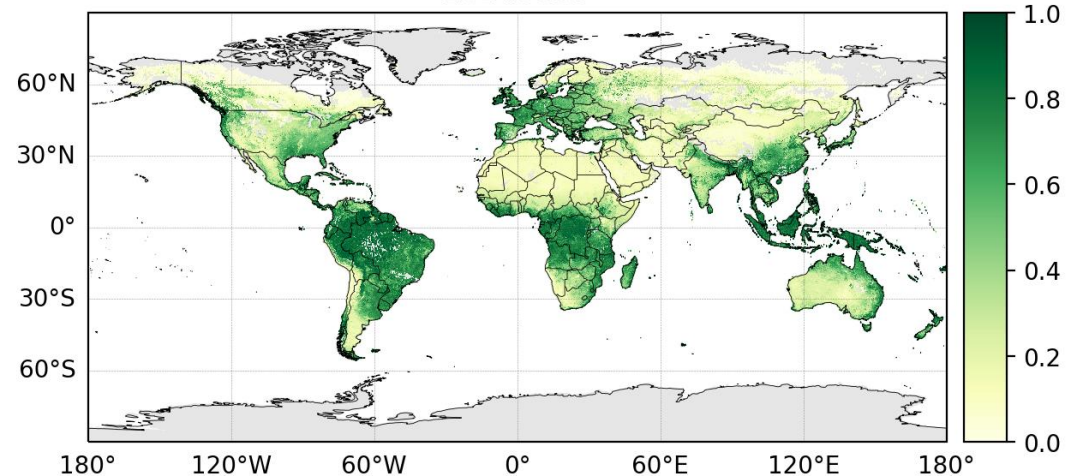
# Verification of daily and weekly VI from NCCF

- Weekly VI: 100% match
- Daily VI (not shown) was also 100% match

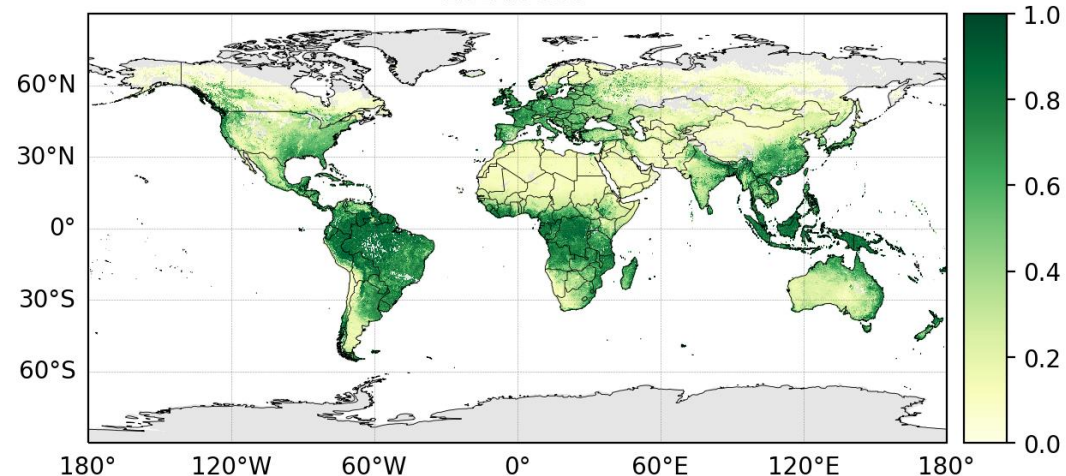
Comparison for NOAA-20 WKL\_NDVI\_TOC between STAR and NCCF\_UAT, 20240330



NOAA-20 VIIRS WKL NDVI\_TOC from STAR  
20240330



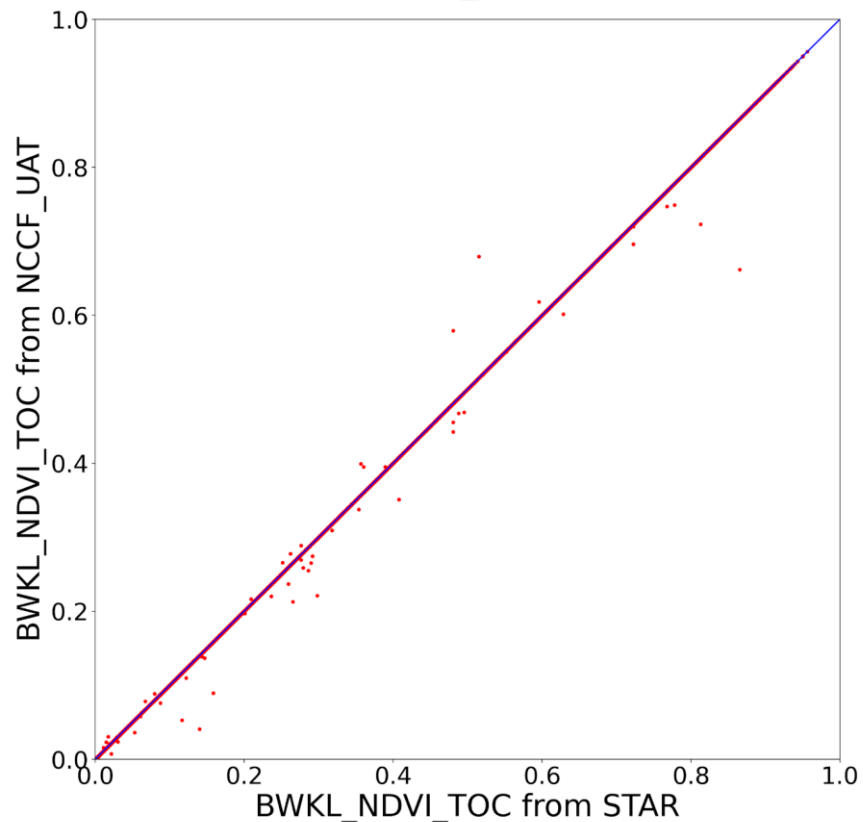
NOAA-20 VIIRS WKL NDVI\_TOC from NCCF\_UAT  
20240330



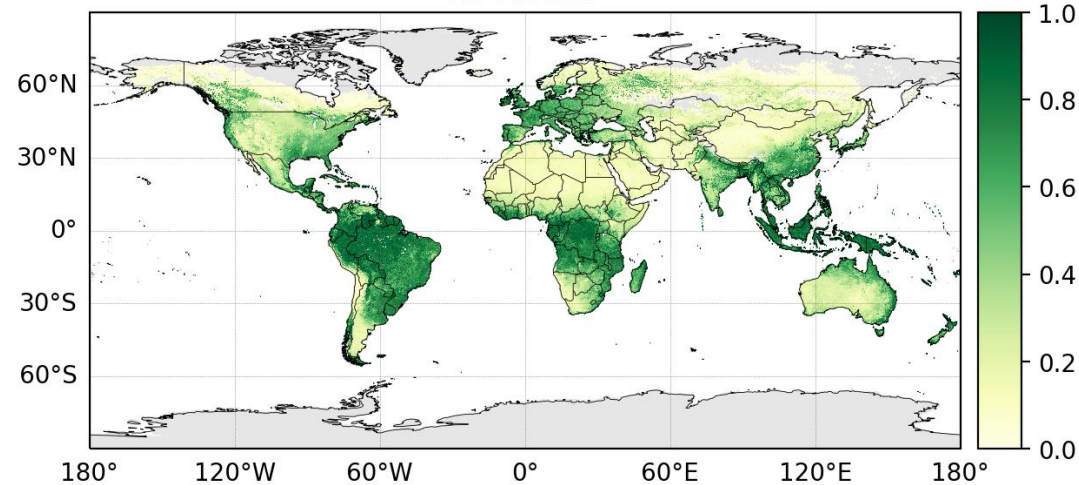
# Verification of biweekly VI from NCCF

- Biweekly VI: 95% match, and slight difference only comes from missing granules during the 16-day compositing period. This is not an issue.

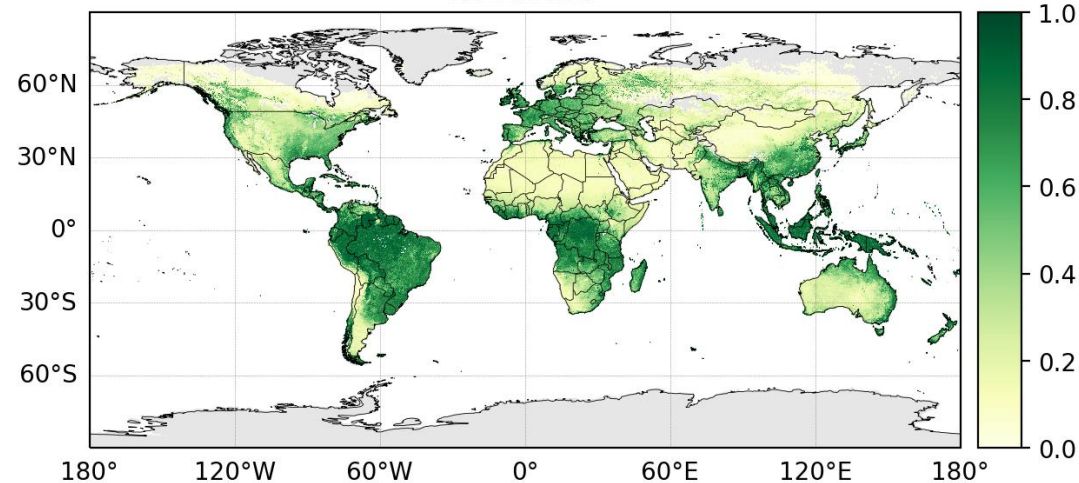
Comparison for NOAA-20 BWKL\_NDVI\_TOC between STAR and NCCF\_UAT, 20240330



NOAA-20 VIIRS BWKL NDVI\_TOC from STAR  
20240330

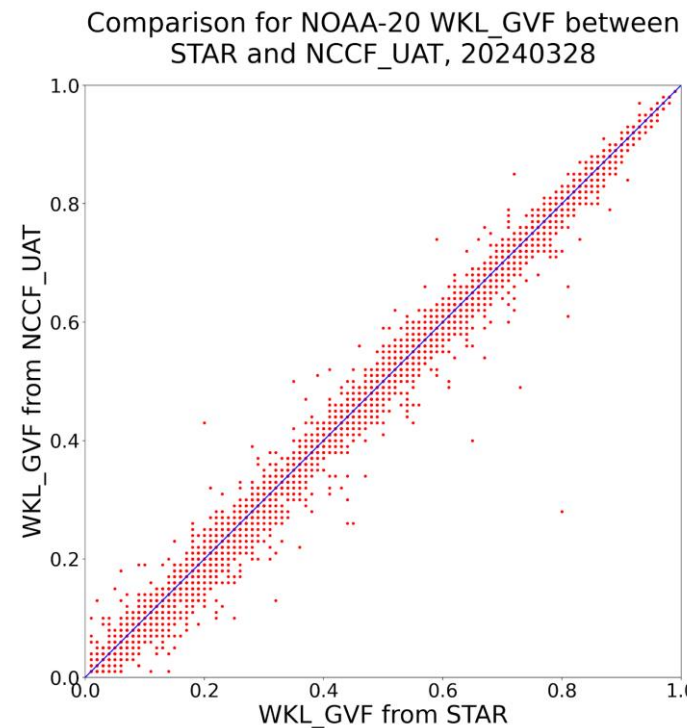
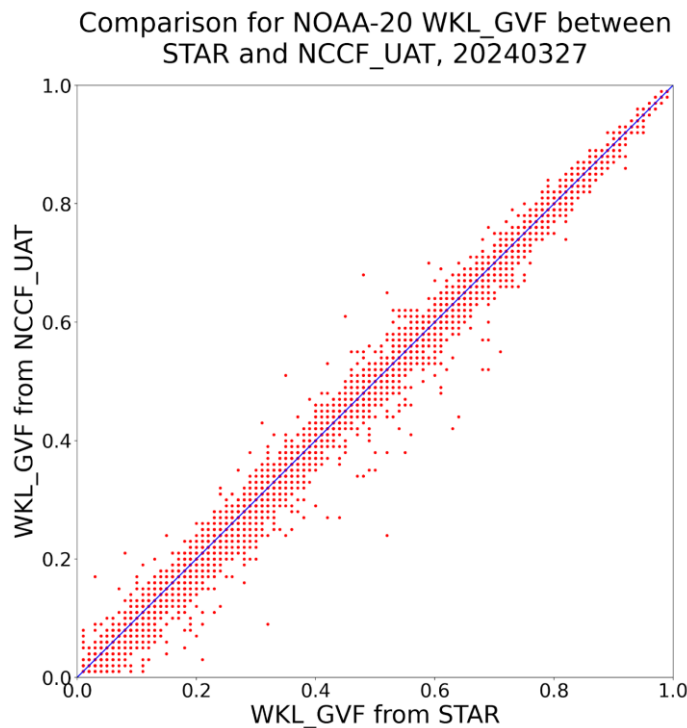
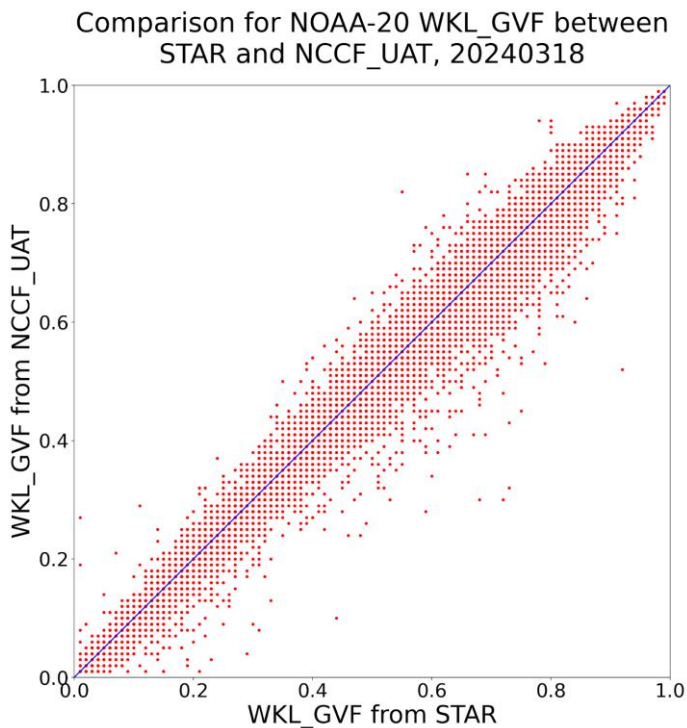


NOAA-20 VIIRS BWKL NDVI\_TOC from NCCF\_UAT  
20240330



# Verification of GVF from NCCF

- GVF matches more and more closely as time goes on (from left to right).



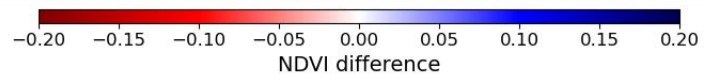
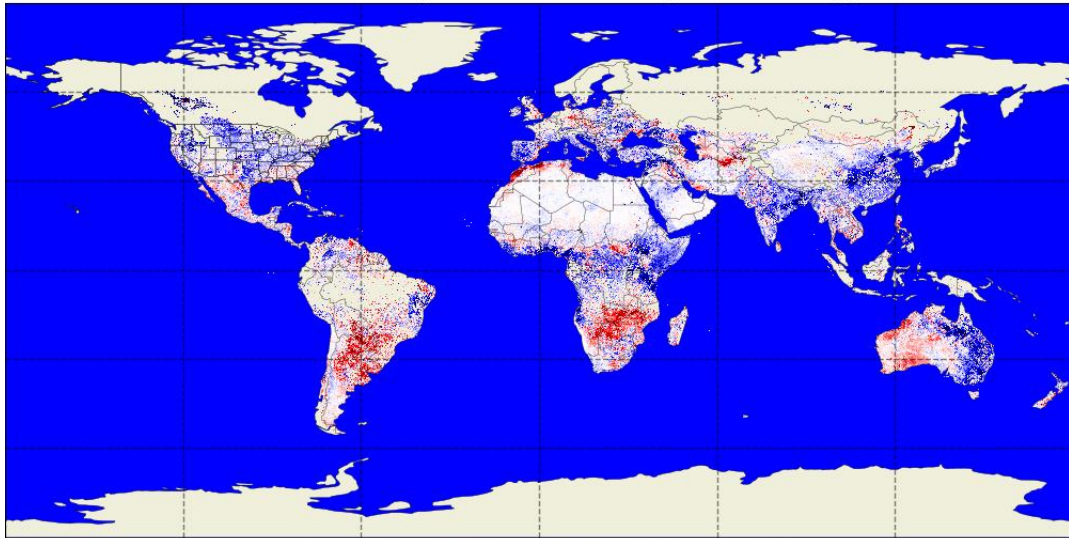
# (Northern Hemisphere) Winter 2023-2024

## VI, LST, and precipitation anomalies compared

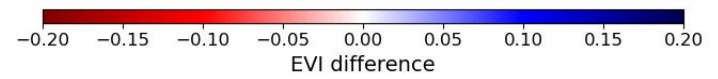
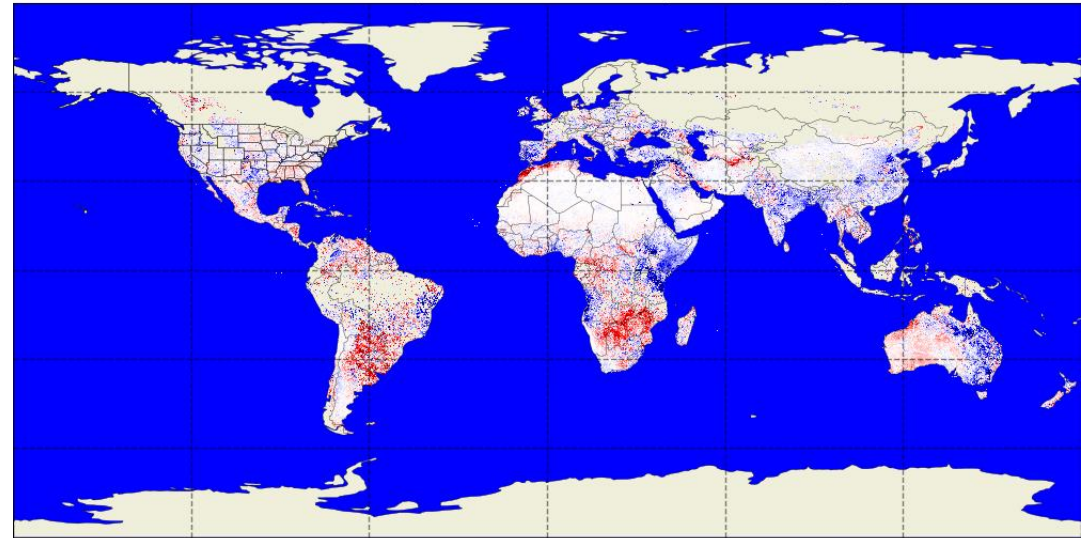
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- In general, there is a trend toward positive VI anomalies (blue) where there are warmer temperatures (red) in the Northern (winter) hemisphere, and vice versa.
- There is also a general trend toward negative VI anomalies (red) where there are warmer temperatures (red) in the Southern (summer) hemisphere, and vice versa.
- VI anomaly correlations with precipitation anomaly appear in Southern Hemisphere where low precipitation anomalies and low VI anomalies both occur in southern Africa and in South America
- There is a strong positive VI anomaly in the Sahel region that does not correlate with any LST or precipitation feature.

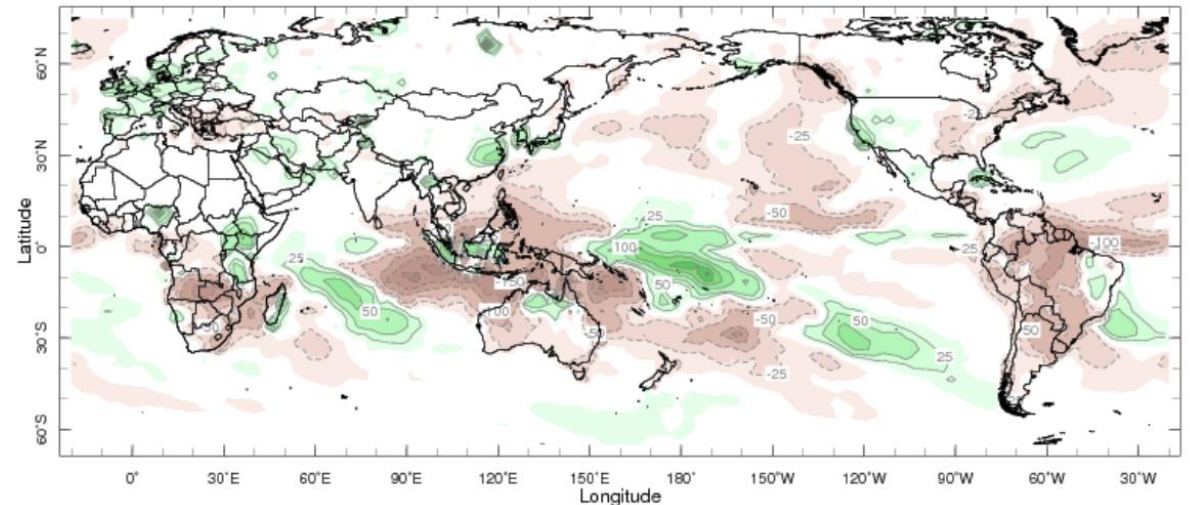
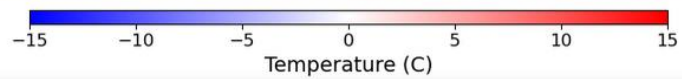
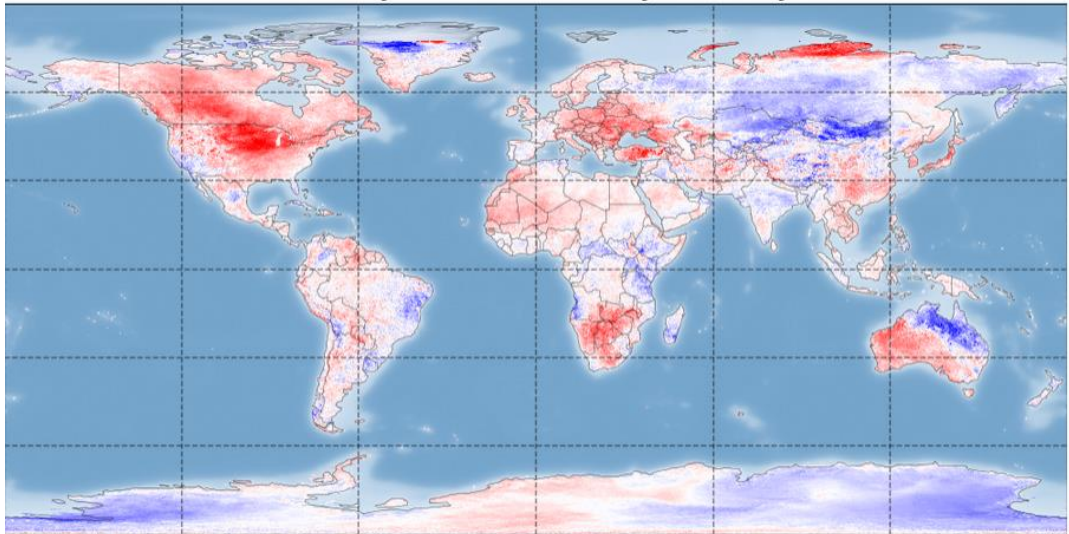
NDVI, February 2024 - February climatology



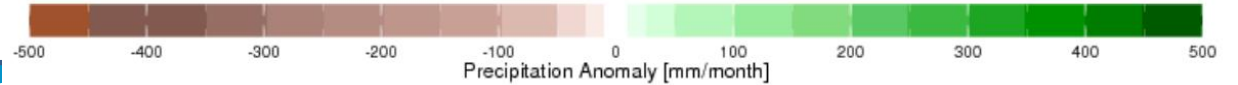
EVI, February 2024 - February climatology



NOAA-20 VIIRS daytime LST monthly anomaly: Feb, 2024



Feb 2024



## Accomplishments / Events:

- Bill Line attended the 67th Annual Dr. Robert H. Goddard Memorial Dinner in Washington DC to accept the NOAA David Johnson Award. Bill was recognized for his leadership in the development, demonstration, and training of exciting new products for forecasters that employ satellite imagery, including the GOES-R ABI and the JPSS VIIRS.
- With new hardware in place, CIRA Polar SLIDER now includes all bands (M, I, NCC), all multispectral products (RGBs, etc) for all three VIIRS (NPP, NOAA-20, NOAA-21) in the NHem, SHem, and CONUS sectors. <https://col.st/UJb99>
- Blog Posts with VIIRS Imagery
  - [Virginia/WV Wildfires](#)
  - [Texas/New Mexico Blowing Dust on 24 March 2024](#)
- 29 VIIRS Imagery Posts on CIRA Social Media this Month. A few posts:
  - [True Color Imagery of Florida cumulus clouds – 34.2K views](#)
  - [NCC Imagery of surface low off eastern US coast – 51K views](#)
  - [NCC Imagery of Iceland volcano eruption – 19.2K views](#)

## Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

1. Project has completed.
2. Project is within budget, scope and on schedule.
3. Project has deviated slightly from the plan but should recover.
4. Project has fallen significantly behind schedule, and/or significantly over budget.

## Issues/Risks:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY25 Program Management Review	Jun-24	Jun-24		
Blowing Dust Climatology Paper Submitted (Includes VIIRS Imagery)	Jul-24	Jul-24		
Prepare and deliver the initial updates for the Imagery Cal/Val plan (updated for JPSS-3), ahead of PStR	Aug-24	Aug-24		
New ASF Tool code and updated NCC LUT – Test for 3 VIIRS	Sep-24	Sep-24		
New Imagery products or product enhancements (display on SLIDER)	Sep-24	Sep-24	continuing	
Realtime Imagery monitoring and display systems (SLIDER, etc.)	Sep-24	Sep-24	continuing	
Interesting VIIRS Imagery to Social Media and Blogs	Sep-24	Sep-24	continuing	
McIDAS-X/V Enhancements for processing/display of VIIRS Imagery	Sep-24	Sep-24	continuing	
Block 2.3 Mx builds deploy regression review/checkout (Mx9, Mx10, ...)				Mx9: Jan-2024

## Highlights: Image of the Month

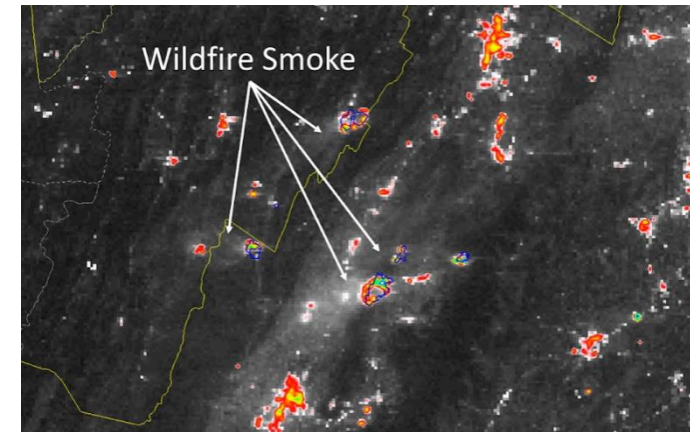


Figure: 22 March 2024 VIIRS NCC Imagery over VA/WV showing wildfires and wildfire smoke. NWS Balt/Wash leveraged VIIRS NCC Imagery to detect the smoke in their overnight analysis and forecast process. See blog post [here](#).

### Accomplishments / Events:

- Participated in the JACIE conference held in Reston, VA on March 12, 2024, and presented updates on the performance and calibration of NOAA-21 (N21) VIIRS RSB, TEB, and Geo products
- Completed checkout of the DP-TE products after deployment of the updated N21 VIIRS SDR EMISSIVE-V2 LUT before Emissive Band Calibration (the onboard blackbody warm-up/cool-down test) on Mar. 5-7, 2024
- Continued monitoring stable N21 VIIRS radiometric response in the S/MWIR bands after the degradation was stopped and reversed by MMOG-2 successfully conducted on Feb. 26-28, 2024
- Delivered for deployment in the IDPS operations the updated N21, N20 and NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired around the new moon on 3/10/2024
- Assisted in scheduling and analyzed data from N20, N21, and NPP VIIRS lunar calibration on 3/20/2024: data aligns well with long-term trends and exhibits consistency

### Overall Status:

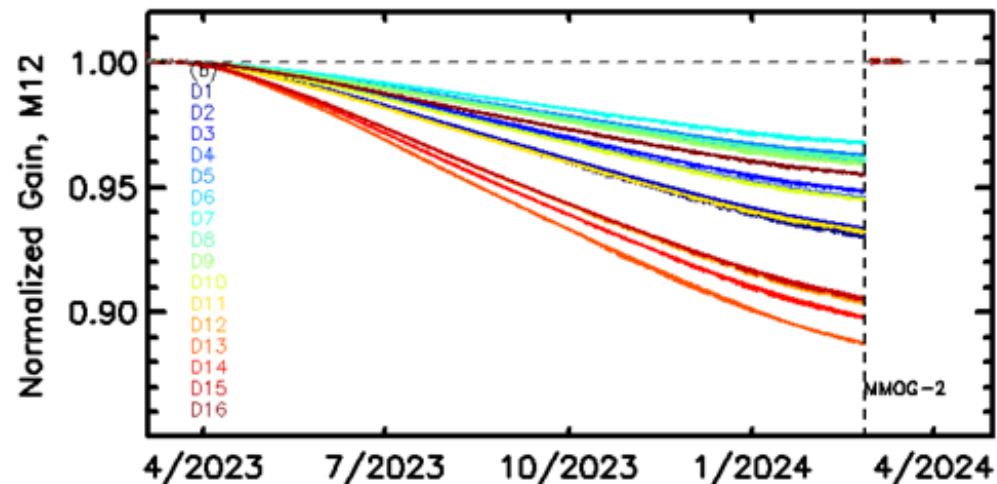
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Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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### Issues/Risks:

J3/J4 VIIRS granule size change

### Highlights:



N21 VIIRS MWIR band M12 radiometric gain recovery after MMOG-2 on Feb. 26-28, 2024: reversal of the detector-dependent degradation shown

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SNPP and NOAA-20 VIIRS intermediate recalibration	Sep-24	Sep-24		
JPSS-3 VIIRS pre-launch characterization report	Apr-24	Apr-24		
JPSS-3 VIIRS SDR initial pre-launch LUTs	Jun-24	Jun-24		
Monthly lunar calibration (predictions and analyses)	Jul-24	Jul-24		
Monthly delivery of VIIRS DNB calibration LUTs	Sep-24	Sep-24		
Monthly delivery of N21 VIIRS DNB straylight LUTs	May-24	May-24		
Geolocation monitoring using CPM (NPP, N20, N21)	Sep-24	Sep-24		
N21 on-orbit calibration LUT development	Sep-24	Sep-24		
Delivery of VIIRS SDR RSB and TEB calibration LUTs to mitigate degradation	Sep-24	Sep-24		



Accomplishments / Events:

- Quality/Oversight Continued to ensure high quality Volcanic Ash retrievals from EDR algorithms and VOLCAT. Routine validation of existing JPSS volcanic ash EDRs from current sensors will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.
- Research is beginning to modify VOLCAT Fortran code to support AVHRR+IASI SO<sub>2</sub> detection and retrievals in the VOLCAT algorithm suite.
- VOLCAT VIIRS volcanic ash plume identification and extraction work is an enhancement to the VOLCAT methodology. Most recent progress toward this goal is the needed VOLCAT modifications have been made to enable output of VOLCAT metrics for missed detections and non-ash clouds. The current focus is now creating images of the auto-generated cases so science team can classify cases as correct detections, correct nulls, false positives, or missed detections. This will enable a full training database to be generated for ash and non-ash clouds for training the AI/ML methodology, including both detected and missed volcanic clouds by the current VOLCAT algorithm. The included figure shows an example of a classified missed detection.

Overall Status:

	Green <sup>1</sup> (Completed)	Blue <sup>2</sup> (On-Schedule)	Yellow <sup>3</sup> (Caution)	Red <sup>4</sup> (Critical)	Reason for Deviation
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Technical / Programmatic		X			
Schedule		x			

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Issues/Risks:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Improve VIIRS volcanic ash plume identification and extraction	Jun-23	Sep-24		

Highlights: In preparation for improving VOLCAT ash plume detection, a database of cases is being created via semi-automated approach with human expert classifications. Below is an example of a volcanic ash plume emitted from the volcano Popocatepetl in Mexico as observed by NOAA-20 VIIRS on February 29, 2020 (magenta plume with label 1712). This plume was currently not detected by VOLCAT and cases like these must be identified so subsequent research can be done toward detection improvement.

