



## NOAA JPSS Monthly Program Office

# AMP/STAR FY25

Lihang Zhou, LEO Satellite Product Manager
Ingrid Guch, Acting JPSS STAR Program Manager

December, 2024

# Highlights from the Science Teams (November 2024)

## STAR Supported the Recovery of the SNPP S/C After a Geolocation Anomaly

On November 2, at about 22:15 UTC, S-NPP started experiencing degradation of geolocation. Recovery activities commenced on November 6. The STAR Cal/Val Teams analyzed instrument data before and after the SNPP spacecraft recovery to enable OSPO to resume science data distribution. Before recovery, it was observed that ATMS and CrIS calibrated data showed degradation, characterized by radiometric biases consistent with increasing geolocation errors. Post-recovery analysis confirmed that all instruments returned to their previous nominal conditions. The SDR Cal/Val teams recommended resuming S-NPP data distribution following the completion of the corresponding data quality assessment activities.

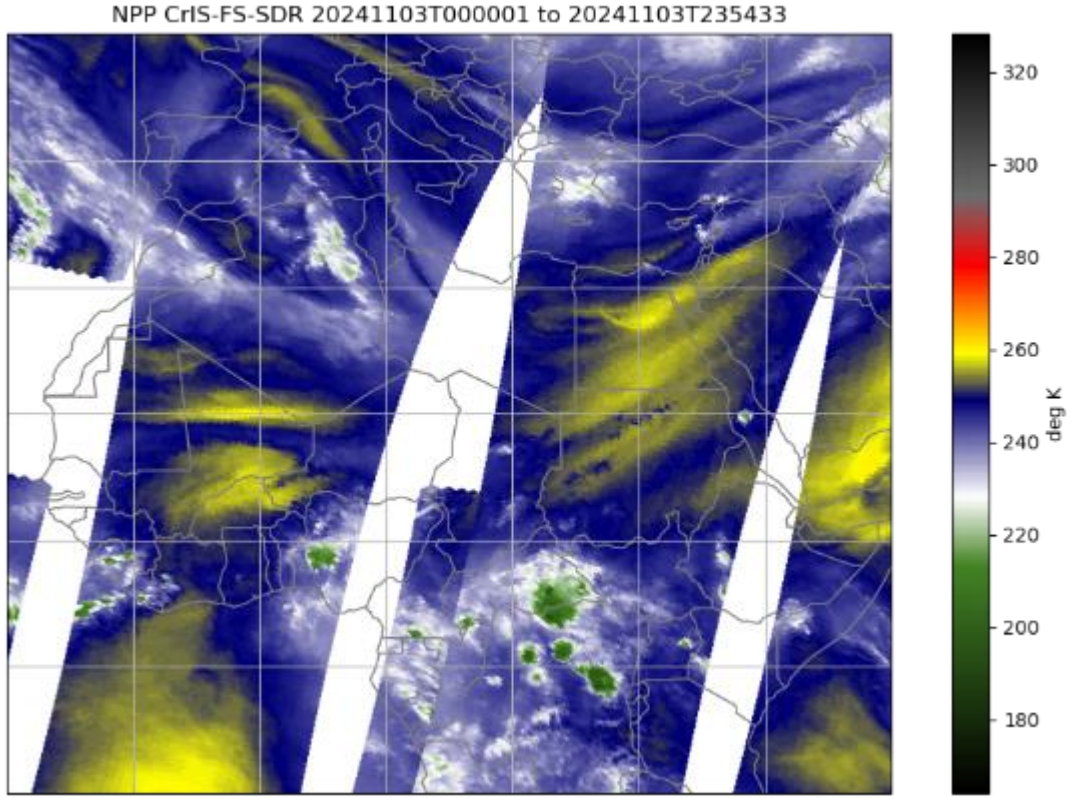



**Figure.** Impact of the SNPP S/C Geolocation Anomaly on the geolocation of the CrIS calibrated data (left-side) and S-NPP CrIS vs GOES ABI radiometric Intercomparison (right-side), showing degraded radiometric fit on November 3, 2024, prior to spacecraft recovery (bottom scatter plot).

# Highlights from the Science Teams (November 2024)

## JPSS VIIRS Aerosol Imagery Captures Wintertime Smog in India

On November 6, 2024, the S-NPP ATMS scan drive compensator motor current significantly increased. This has resulted in a corresponding increase in scan drive mechanism temperature, shelf temperature, and other critical instrument modules.  Because of this, changes in radiometric quality of the operational S-NPP ATMS Sensor Data Record (SDR) have been observed. In order to prevent possible damage to the instrument scan drive compensator motor function, S-NPP ATMS was placed in Safe Hold at 1690Z on November 19, 2024 and will be offline until further notice. The STAR ATMS SDR Calibration/Validation Team is investigating potential calibration updates to mitigate the impact of the scan motor current on the quality of the operational S-NPP ATMS SDR data.

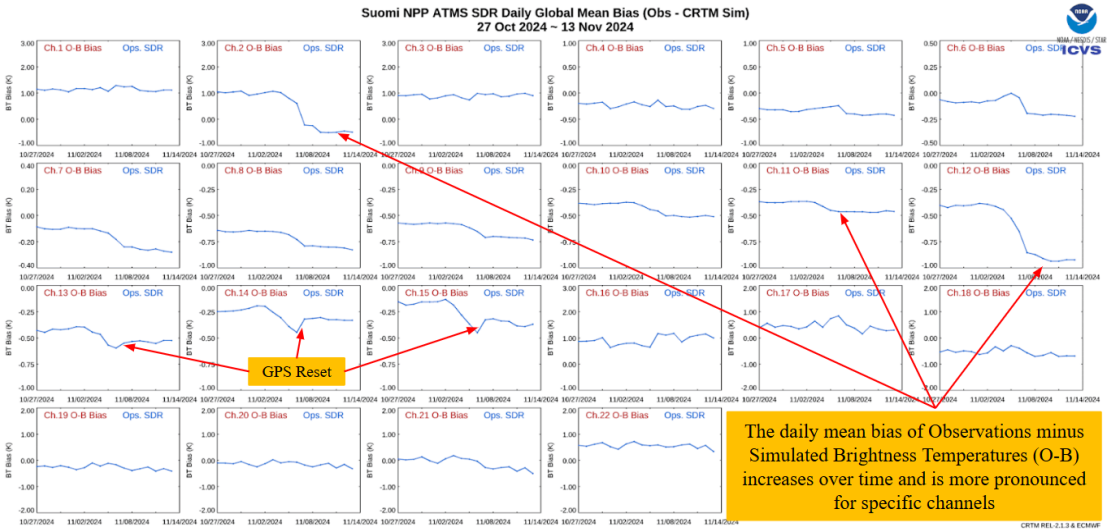
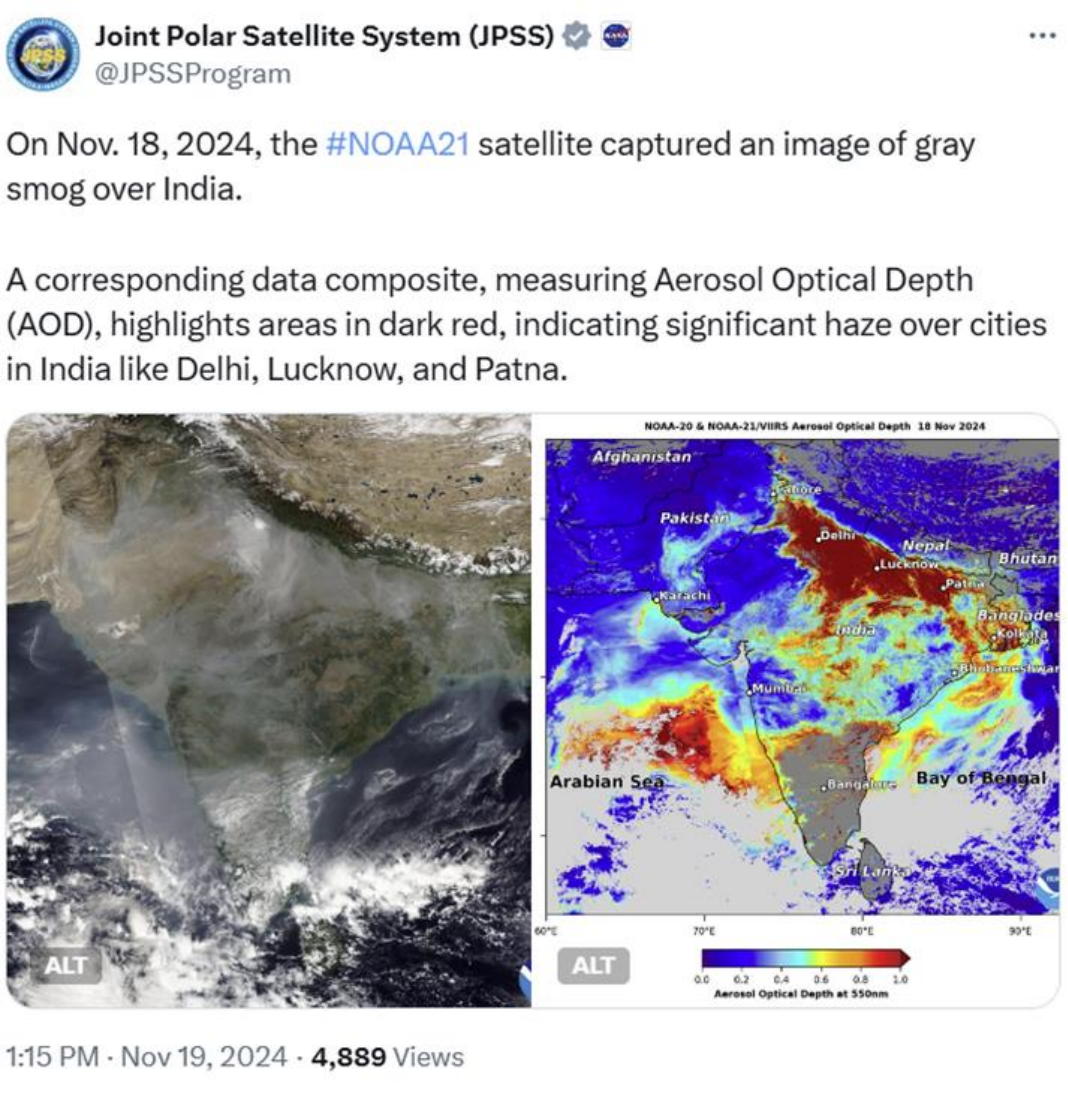



**Figure.** Time series of the radiometric quality of the operational S-NPP ATMS SDR product in the form of Brightness Temperature Bias. An increase in instrument temperature due to a scan drive compensator motor increase has resulted in a measurable increase in brightness temperature biases for multiple S-NPP ATMS channels.

# Highlights from the Science Teams (November 2024)

## STAR is Providing Scientific Support on the S-NPP ATMS Scan Drive Compensator Motor Anomaly

Wintertime smog is an annual air quality event in South Asia, typically occurring during November to January. Comprised of smoke and haze aerosols, it is caused primarily by farmers burning crop residue to clear their fields. Strong surface inversions along the Indo-Gangetic Plain trap the fire emissions near the surface, leading to high concentrations of fine particles ($PM_{2.5}$), which are hazardous for human health. The VIIRS Aerosol Optical Depth (AOD) EDR product captured an episode of thick wintertime smog over India on November 18, 2024 that caused poor air quality in cities along the Indo-Gangetic Plain, including Delhi, Lucknow, and Patna. The JPSS Program social media feeds posted a NOAA-21 & NOAA-20 VIIRS composite AOD image highlighting the areas of thick smog in dark red, along with a corresponding NOAA-21 VIIRS true color image showing the grey-colored smog.



# Highlights from the Science Teams (November 2024)

## California Mountain Fire November 2024

Bill Line published a blog post titled “California Mountain Fire Nov 2024”. The post shares GOES and VIIRS Imagery of the Mountain Fire from Nov 6-7, a wildfire that developed east of Oxnard, CA and quickly grew in the presence of strong and dry Santa Ana winds. See Figure below. The link to the post can be found here.


**Figure.** 6 Nov 2024 NOAA-20 VIIRS 375-m Day Fire RGB Imagery.

# Highlights from the Science Teams (November 2024)

## Report on the Ozone Mapping and Profiler Suite (OMPS) Validated Maturity Review

The validated maturity review briefing for the Version 8 Ozone Profile Retrieval Algorithm (V8Pro) EDRs was successfully held on November 21, 2024. The latest delivery for the soft calibration adjustment table brings the performance of the NOAA-21 V8Pro ozone profile EDRs to within ±5% of the corresponding results for NOAA-20 and S-NPP globally. The presentation and readme memo will be available at:

https://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php

This will be the last maturity review for NOAA-21 products. All products are now declared validated.

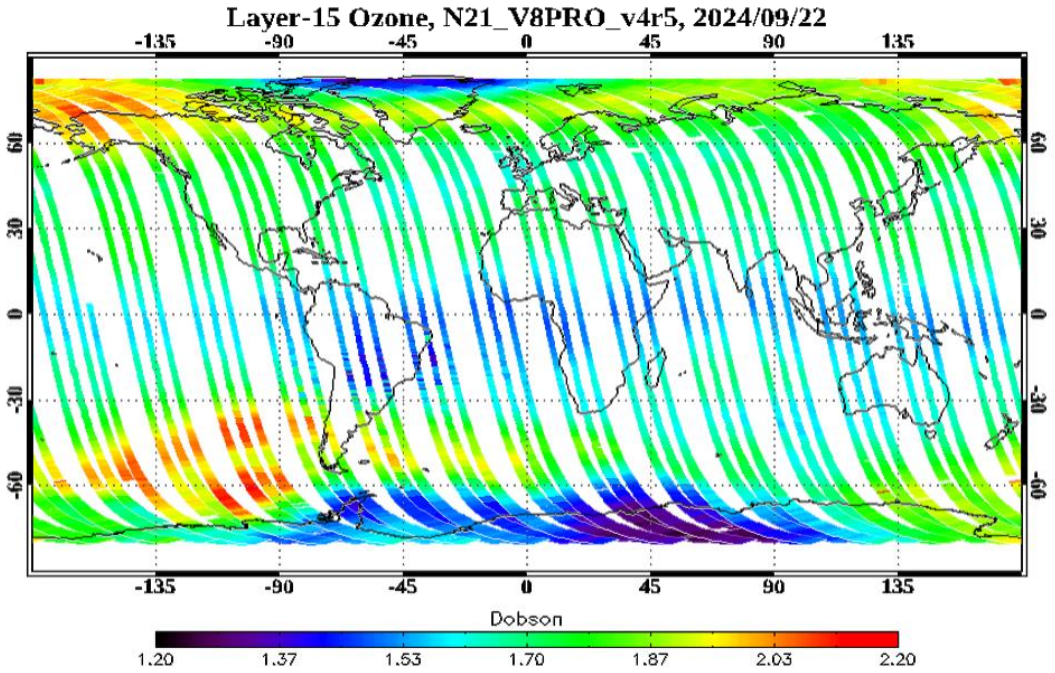



**Figure.** False color image of the ozone profiles for a layer at 1 hPa for the three satellites for September 22, 2024. The NOAA-21 orbital track is the one on the right, NOAA-20 is on the left and S-NPP is in the middle.

# Highlights from the Science Teams (November 2024)

## Tandem JPSS Winds Product Captures Anomalous Strong Jet Steak North of Alaska

On 20 November 2024, a very strong jet streak moving over a positive tilted ridge of high pressure over southwest and north-central Alaska is observed. The strongest anomalies are observed to be northwest of Alaska with sigma of greater than 6 kt over the Chukchi Sea. Anomalies of 5 kt or greater extend over the Beaufort Sea north of Alaska. This is an extremely abnormal jet streak for this region at this time of year, as jet streak winds of this strength are expected to be much farther south over the northern Pacific Ocean or southern Bering Sea. The experimental VIIRS tandem winds product that is running at UW-CIMSS using the Enterprise algorithm with data from NOAA-20 and NOAA-21 was able to make out this feature.

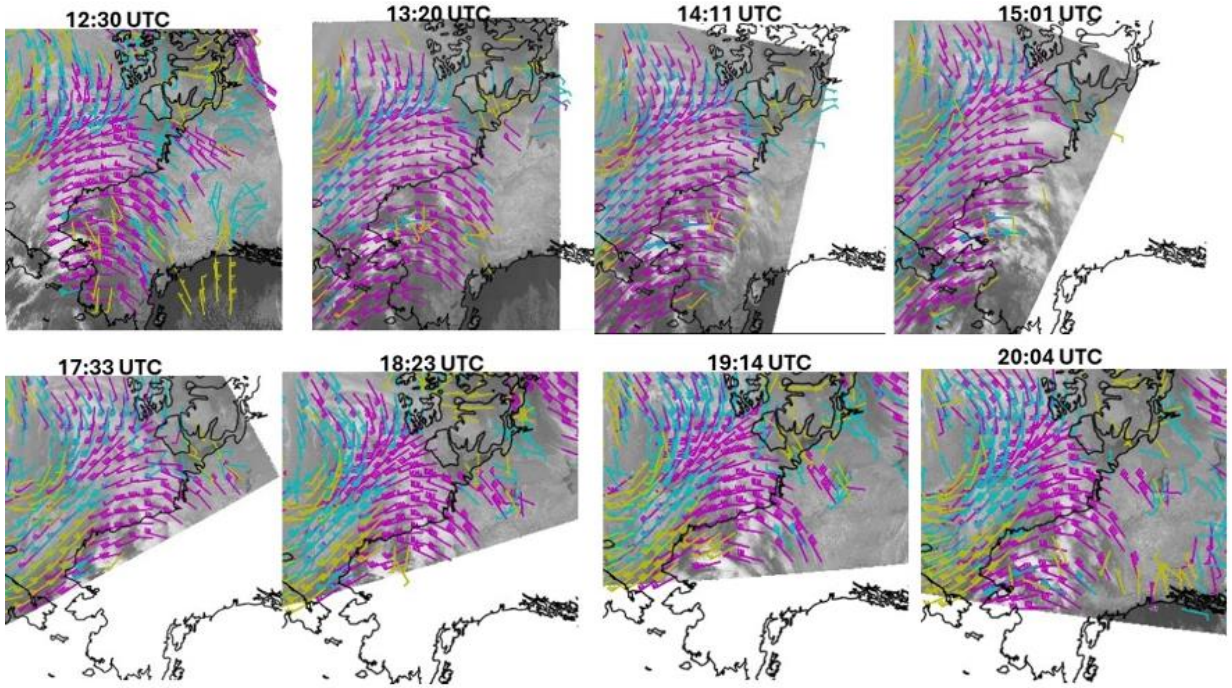



**Figure.** AMV observations on 20 November 2024 from the VIIRS Tandem (NOAA-20/NOAA-21) Wind product starting at 12:30 UTC (upper-left) through 20:40 UTC (lower-right). Two observation times (15:52 and 16:44 UTC) are not shown due to a few missing granules. Times are polar crossings, with time separations between satellites usually 50 to 51 minutes. Yellow barbs are low level winds below 700 hPa, with cyan being mid-level from 700 to below 400 hPa and pink being upper level at or above 400 hPa. Wind speeds are given in $ms^{-1}$.

# Accomplishments

| Delivery Date | Cloud Containerized Algorithm Packages (CCAPs) – Enterprise Products: | Recipient |
|---|---|---|
| 11/01/2024 | Final patch delivery of the JPSS Ice Concentration and Extent v2-1 CCAP to the NCCF S3 bucket to fix the change of year bug encountered in operations. | NCCF |
| 11/13/2024 | This is a patch delivery of the eTRaP (using ATMS microwave sensors) CCAP to NCCF to fix one pixel that is erroneous. | NCCF |
| 11/14/2024 | Final Delivery for MiRS release version 5 which includes the yearly maintenance update to the MiRS algorithm to v11.10. This includes removing the Snow Fall Rate algorithm from this package. | NCCF |
| 11/14/2024 | Delivery of the Snowfall Rate (SFR) v2-0 CCAP to CSPP. The package tarballs have been uploaded to the 'milk' servers. | NCCF |
| 11/15/2024 | ACSPO SST L3S Delivery: This is a patch delivery for integration into the NCCF PG system. This delivery fixes an occasional job failure in the L3S AM unit. | NCCF |
| 11/15/2024 | eTRAP Patch Delivery: This is a patch delivery of just the CODE/package/etrap/utils.py script, to correct a bug in the creation of the tar file. | NCCF |
| 11/25/2024 | Delivery of OMPS V8PRO-v4r5 (STAR Science Team to ASSISTT) | ASSISTT |
| 11/29/2024 | QuickSounder ATMS initial pre-launch PCT (001) delivery (Related to NEON) STAR Science Team to ASSISTT | ASSISTT |
| 12/03/2024 | OMPS: V8TOS (SO2 Corrected V8 Total Ozone): v2 Final CCAP to CSPP. This delivery is for V8TOS Validated Maturity for N21 + error handling code | CSPP |
| 12/06/2024 | Patch delivery of the GAASP-Ocean_v1-1 (GCOM AMSR2) CCAP to the NCCF s3 bucket to fix two bugs found during the testing in operations | NCCF |

# Accomplishments – JPSS Cal Val Support

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

| | | | |
|---|---|---|---|
| S-NPP | Weekly OMPS TC/NP Dark Table Updates | 09/3/24, 09/10/24, 09/17/24, 09/24/24, 10/1/24, 10/8/24, 10/16/24, 10/22/24, 10/29/24, **11/5/24, 11/12/24, 11/19/24, 11/26/24, 12/03/24** | ✓ **Routine, Ongoing** |
| NOAA-20 | Weekly OMPS TC/NP Dark Table Updates | 09/3/24, 09/10/24, 09/17/24, 09/24/24, 10/1/24, 10/8/24, 10/16/24, 10/22/24, 10/29/24, **11/5/24, 11/12/24, 11/19/24, 11/26/24, 12/03/24** | ✓ **Routine, Ongoing** |
| NOAA-21 | Weekly OMPS TC/NP Dark Table Updates | 09/3/24, 09/10/24, 09/17/24, 09/24/24, 10/1/24, 10/8/24, 10/16/24, 10/22/24, 10/29/24, **11/5/24, 11/12/24, 11/19/24, 11/26/24, 12/03/24** | ✓ **Routine, Ongoing** |
| S-NPP | Bi-Weekly OMPS NP Wavelength & Solar Flux Update | 09/10/24, 09/24/24**,** 10/8/24, 10/22/24, **11/5/24, 11/19/24, 12/3/24** | ✓ **Routine, Ongoing** |
| NOAA-20 | Bi-Weekly OMPS NP Wavelength & Solar Flux Update | 09/03/24, 09/17/24, 10/1/24**,** 10/16/24, 10/29/24, **11/12/24, 11/26/24** | ✓ **Routine, Ongoing** |
| NOAA-21 | Bi-Weekly OMPS NP Wavelength & Solar Flux Update | 09/03/24, 09/17/24, 10/1/24**,** 10/16/24, 10/29/24, **11/12/24, 11/26/24** | ✓ **Routine, Ongoing** |
| S-NPP | Monthly VIIRS LUT Update of DNB Offsets and Gains | 9/9/24, 10/9/24, 11/7/24, **12/6/24** | ✓ **Routine, Ongoing** |
| NOAA-20 | Monthly VIIRS LUT Update of DNB Offsets and Gains | 9/9/24, 10/9/24, 11/7/24, **12/6/24** | ✓ **Routine, Ongoing** |
| NOAA-21 | Monthly VIIRS LUT Update of DNB Offsets and Gains | 9/9/24, 10/9/24, 11/7/24, **12/6/24** | ✓ **Routine, Ongoing** |
| NOAA-21 | Monthly VIIRS DNB Straylight correction update | 10/23/23, 11/21/23, 12/18/23, 01/22/24**,** 02/15/24, 03/18/24, 4/15/24**,** 5/14/24**,** 6/11/24, 7/16/24, 8/13/24 (Further updates reuse earlier correction LUTs based on the month) | ✓ **Routine, Ongoing** |

## Maturity Reviews

| Product | Maturity Review | Review Date | Review Panel Recommendations |
|---|---|---|---|
| OMPS NP Ozone EDR (V8Pro) | Validated | 11/21/24 | Attained Validated Maturity. The effective date would be upon implementation of the latest tables. |

All NOAA-21 products attained Validated Maturity !!

# FY25 STAR JPSS Milestones (1 of 2)

| Algorithm Updates DAPs/CCAPs | Original Date | Forecast Date | Actual Completion Date | Variance Explanation | Status |
|---|---|---|---|---|---|
| OPS LP Final CCAP (Continue tracking as FY25 milestone) | Jan-24 | Nov-24 | Delivered **on December 3,2024.** | ASSISTT team incorporated additional updates | ✔ **Good** |
| VOLCAT (Phase 1) NCCF implementation | Dec-23 | May-24 | SCR: August 17, 2023<br>Target CCAP Moved from January 9 to January 30, 2025 (ASSISTT to NCCF) | Updating a new HRIT reader. Also expecting other updates from the science team. Science team 2-3 additional weeks. | Being tracked as part of FY25 |
| Cloud Mask J2 Validated; No code updates needed only maintenance CCAP (we can keep it as FY25 milestone). Tracked as FY25 maintenance releases | Mar-25 | Mar-25 | Target CCAP Moved from Feb 6 to March 18, 2025<br>(ASSISTT to NCCF) | Maintenance updates as well as solving for latency issues | Being tracked as part of FY25 Maintenance release |
| Cloud Base Height (CBH), Cloud Cover Layer (CCL), Cloud Height, Phase and Type: (Different CCAPs for Cloud implementation) J2 Validated: No code updates, only maintenance CCAPS. Tracked as FY25 maintenance release | Mar-25 | Mar-25 | Target CCAP Pushed one month from January to Feb 6, 2025 (possibility of moving into March 2025) | | |
| FY26 Program Management Review (all teams) | Jun-25 | Jun-25 | Continue as part of FY25 milestones | | |
| GOSAT-GW End to End | Aug-24 | Apr-25 | GOSAT launch: April 2025.<br>Will be continued as part of FY25 milestones | Continued from FY24 based on program timelines | Ongoing as part of FY25 |
| AST-2024 (VIIRS Annual Surface Type) | Sep-25 | Sep-25 | | | Ongoing as part of FY25 |
| Reprocessing and transfer of EDRs to CLASS | Sep-24 | May-25 | Continue as part of FY25 milestones | JSTAR Team submitted a request to CLASS to archive reprocessed AOD/ADP. CLASS is working on Engineering Assessment. | Ongoing as part of FY25 |

# FY24/25 STAR JPSS Milestones (2 of 2)

| Milestones (Algorithm Cal/Val and LTM) | Original Date | Forecast Date | Actual Date of Completion | Variance Explanation | Status |
|---|---|---|---|---|---|
| Maintain / Update ICVS (develop ICVS modules to support various activities: monitoring, inter-sensor comparison, …) | Sep-25 | Sep-25 | Follow FY25 PMR schedules | | Ongoing |
| Maintain / Expand (to include JPSS-2 products) JSTAR Mapper, adopting to STEMS | Sep-25 | Sep-25 | Follow FY25 PMR milestones | | Ongoing |
| Images of the Month | Monthly | Monthly | Follow FY25 PMR milestones | | Ongoing |
| JPSS-3/JPSS-4 pre-launch test data review/analysis and activity support (SDR teams); | Sep-25 | Sep-25 | | FY24 milestones for J3 JCT1/JCT2, J3 Spacecraft TVAC, and J4 instrument TVAC completed as part of FY24 milestones. Science team efforts will continue in FY25. | Continuing as part of FY25 milestones |
| J4 Pre-launch characterization reports for all SDRs: December 30, 2024 | Dec-24 | Mar-25 | | | Ongoing |
| SDR and VIIRS Imagery Cal/Val Plans that include finalized J4 schedules: June 30, 2025 | Jun-25 | Jun-25 | | | Ongoing |
| SDR and VIIRS Imagery Look-Up Table Deliveries for J4: June 30, 2025 | Jun-25 | Jun-25 | | | Ongoing |

# FY24/25 STAR JPSS Cal/Val Maturity Reviews

All NOAA-21 products attained Validated Maturity !!

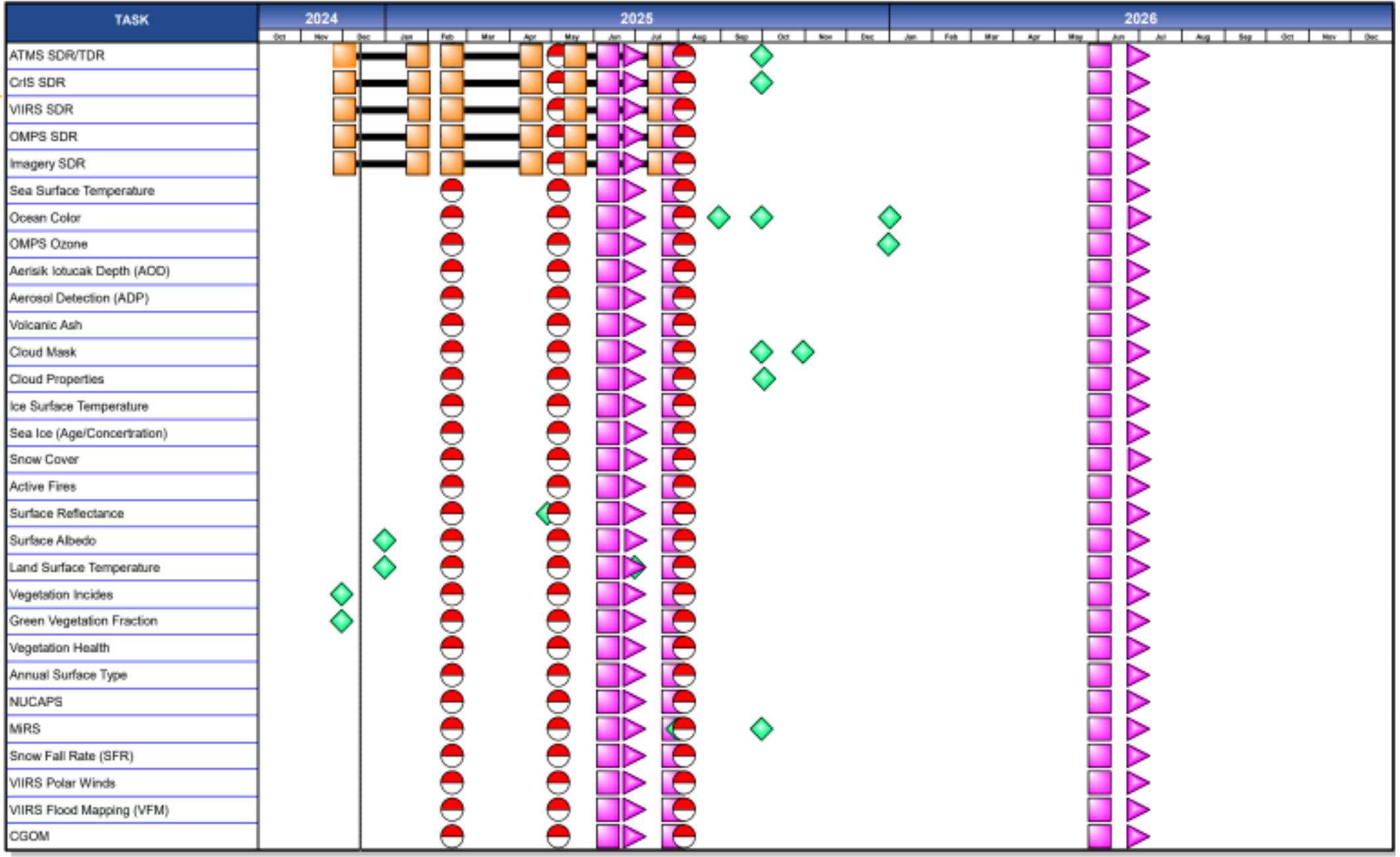
| Milestones | Original Date | Forecast Date | Actual Date | Variance Explanation | Status |
|---|---|---|---|---|---|
| OMPS SDR (NP & TC Validated) | Mar-24 | Mar-24 | **Attained Validated status – effective date depends on ADR10825 Solar Flux implementation planned for April 2024** | | ✔ Good |
| 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. | | ✔ Good |
| Aerosol AOD (V: Jun-24) | Jun-24 | Jun-24 | Attained **Validated** status effective March 30, 2023 | | ✔ Good |
| Aerosol ADP (V: Jun-24) | Jun-24 | Jun-24 | Attained **Validated** status effective March 30, 2023 | | ✔ Good |
| Volcanic Ash (V: Mar-24) | Aug-23 | Aug-23 | Attained **Validated** status effective March 30, 2023 | | ✔ Good |
| 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.<br>Snow Cover & Fraction: Attained **Validated** status effective May 1, 2023.<br>IST and Ice Concentration: Attained **Validated** status effective May 1, 2023. | | ✔ Good |
| Active Fires (V: Jul-24) | Jul-24 | Jul-24 | Attained **Validated** status effective March 30,2023. | | ✔ Good |
| 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.<br>Surface Albedo: Attained **Validated** status effective August 30, 2023.<br>Surface Reflectance: Attained **Validated** status effective Nov. 1, 2023.<br>GVF, VI: Attained **Validated** status effective June 23, 2023. | | ✔ Good |
| Vegetation Health (V: Apr-25 FY-25) | FY-25 | FY-25 | Attained **Validated** status effective March 30, 2023 | | ✔ Good |
| 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 | | ✔ Good |
| SST (V: Aug-24) | Aug-24 | Aug-24 | Attained **Validated** status effective March 20, 2023 | | ✔ Good |
| VPW (B/P: Jan-24; V: Mar-24) | Mar-24 | Mar-24 | **Attained Validated status effective November 16, 2023.** | | ✔ Good |
| VFM (V: Jan-25) | FY-25 | FY-25 | Attained **Validated** status December 14, 2023. | | ✔ Good |
| NUCAPS P: Jan-25; V: Mar-Jun-24) | Jun-24 | Jun-24 | Attained **Validated** status effective September 26, 2023. | | ✔ Good |
| MiRS (V:Oct-24) | Oct-24 | Oct-24 | Attained **Validated** status effective May 12, 2023 | | ✔ Good |
| SFR (P: Feb-24; V: May-24) | May-24 | May-24 | Attained **Provisional status- effective** upon v2r0 algorithm currently planned for July 2024.<br>**Validated maturity** is expected (in May 2025) after collecting more data in the spring. However, based on the material presented and considering the fact that the NOAA-21 SFR already meets the requirement, the JPSS Program is considering approving validated maturity. | | ✔ Good |
| OMPS NP EDR V8Pro & V8TOz & V8TOS (V: Mar-24) | Mar-24 | Mar-24 | Validated review successfully completed for for V8TOz TC and V8TOS on 09/19/24. **Validated Maturity review for NOAA-21 OMPS NP V8Pro held on November 22, 2024. Effective date of validated maturity upon implementation of the latest tables.** | | ✔ Good |
| OMPS LP (B: Jan-24; P: Feb-24; V:Sep-24 | Sep-24 | Sep-24 | **Validated** maturity review successfully completed on 9/19/24.. | | ✔ Good |

# FY25 STAR JPSS Milestones - JPSS Cal Val Support

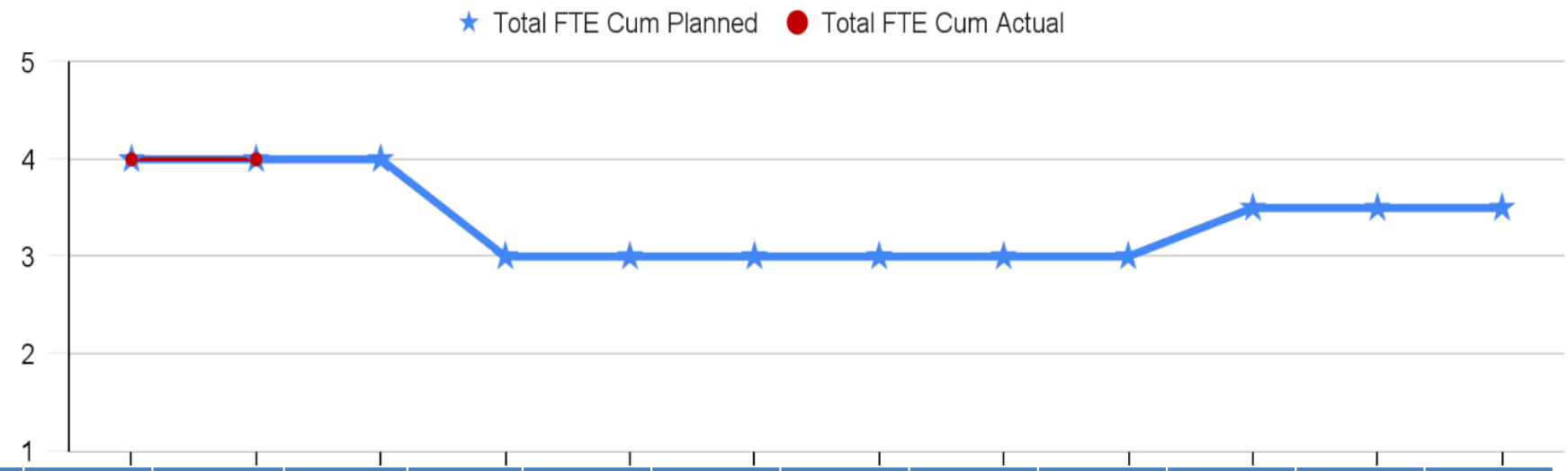
| Operational/Program Support | Original Date | Forecast Date | Actual Completion Date | Status |
|---|---|---|---|---|
| S-NPP: Weekly OMPS TC/NP Dark Table Updates | Weekly | Weekly | 09/3/24, 09/10/24, 09/17/24, 09/24/24, 10/1/24, 10/8/24, 10/16/24, 10/22/24, 10/29/24, **11/5/24, 11/12/24, 11/19/24, 11/26/24, 12/03/24** | ✔ **Routine, Ongoing** |
| S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux | Bi-Weekly | Bi-Weekly | 09/10/24, 09/24/24, 10/8/24, 10/22/24, **11/5/24, 11/19/24, 12/3/24** | ✔ **Routine, Ongoing** |
| S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains | Monthly | Monthly | 9/9/24, 10/9/24, 11/7/24, **12/6/24** | ✔ **Routine, Ongoing** |
| NOAA-20: Weekly OMPS TC/NP Dark Table Updates | Weekly | Weekly | 09/3/24, 09/10/24, 09/17/24, 09/24/24, 10/1/24, 10/8/24, 10/16/24, 10/22/24, 10/29/24, **11/5/24, 11/12/24, 11/19/24, 11/26/24, 12/03/24** | ✔ **Routine, Ongoing** |
| NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux | Bi-Weekly | Bi-Weekly | 09/03/24, 09/17/24, 10/1/24, 10/16/24, 10/29/24, **11/12/24, 11/26/24** | ✔ **Routine, Ongoing** |
| NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains, | Monthly | Monthly | 9/9/24, 10/9/24, 11/7/24, **12/6/24** | ✔ **Routine, Ongoing** |
| NOAA-21: Weekly OMPS TC/NP Dark Table Updates | Weekly | Weekly | 09/3/24, 09/10/24, 09/17/24, 09/24/24, 10/1/24, 10/8/24, 10/16/24, 10/22/24, 10/29/24, **11/5/24, 11/12/24, 11/19/24, 11/26/24, 12/03/24** | ✔ **Routine, Ongoing** |
| NOAA-21: Bi-Weekly OMPS NP Wavelength & Solar Flux | Bi-Weekly | Bi-Weekly | 09/03/24, 09/17/24, 10/1/24, 10/16/24, 10/29/24, **11/12/24, 11/26/24** | ✔ **Routine, Ongoing** |
| NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains | Monthly | Monthly | 9/9/24, 10/9/24, 11/7/24, **12/6/24** | ✔ **Routine, Ongoing** |

# FY 25 IDPS Mx Build Review/Checkout

| IDPS Mx Schedule | Mx12 | Mx13 | Mx14 |
|---|---|---|---|
| SOL (DP_FE) regression test | Nov. 4 – Dec. 9, 2024 | Feb. 18 - Mar. 18, 2025 | May. 15 – Jun. 17, 2025 |
| STAR SOL review/checkout feedback (Go/No-Go & Report) | Offline verification by STAR team for J3/J4 VIIRS granule size change using early look of Mx12 ADL | Mar. 18, 2025 | Jun. 17, 2025 |
| I&T (DP-TE) regression test | Dec. 19, 2024 - Jan. 23, 2025 | Apr. 3 – Apr. 16, 2025 | Jul. 3 – Jul. 18, 2025 |
| STAR I&T review/checkout feedback (Go/No-Go & Report) | Jan. 23, 2025 | Apr. 16, 2025 | Jul. 18, 2025 |
| TTO | Feb. 18, 2025 | May. 6, 2025 | Aug. 5, 2025 |


TASK
2024
2025
2026
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
ATMS SDR/TDR
CrIS SDR
VIIRS SDR
OMPS SDR
Imagery SDR
Sea Surface Temperature
Ocean Color
OMPS Ozone
Aerisik Iotucak Depth (AOD)
Aerosol Detection (ADP)
Volcanic Ash
Cloud Mask
Cloud Properties
Ice Surface Temperature
Sea Ice (Age/Concertration)
Snow Cover
Active Fires
Surface Reflectance
Surface Albedo
Land Surface Temperature
Vegetation Incides
Green Vegetation Fraction
Vegetation Health
Annual Surface Type
NUCAPS
MiRS
Snow Fall Rate (SFR)
VIIRS Polar Winds
VIIRS Flood Mapping (VFM)
CGOM
PMR
MxCk
DAP
JCT

# J-STAR FY25 Planned Program Management Staffing Plan v Actuals




| J-STAR FTEs | Oct'24 | Nov '24 | Dec '24 | Jan '25 | Feb '25 | Mar'25 | Apr'25 | May'25 | Jun'25 | Jul '25 | Aug '25 | Sep '25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cum Planned (CS) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| Cum Actual (CS) | 0.00 | 0.00 | | | | | | | | | | |
| Cum Planned (WYE) | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 2.50 | 2.50 | 2.50 |
| Cum Actual (WYE) | 4.00 | 4.00 | | | | | | | | | | |
| Total FTE Cum Planned | 4.00 | 4.00 | 4.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.50 | 3.50 | 3.50 |
| Total FTE Cum Actual | 4.00 | 4.00 | | | | | | | | | | |

CS: Vacant (prev. Alisa Young)

WYE: Qingyuan Richard Zhang (through Dec), *Prasanjit Dash, Murty Divakarla, Tom Atkins, Jeffrey Weinrich, Wei W. Li , Tess Valenzuela*

**Color code**:

**Green:** **Completed Milestones**

**Gray:** **Ongoing FY24 Milestones**

# Active Fires

*September 2024*

## *Accomplishments / Events:*

- Started analysis of the EFIRE data record to evaluate algorithm performance for a wide range or observing and environmental conditions
- Presented poster “The NOAA Reprocessed VIIRS Active Fire Data Record” at the 2024 EUMETSAT Meteorological Satellite Conference
- Continued work on NGFS vs. EFIRE comparisons based on GINA NGFS data

## *Overall Status:*

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

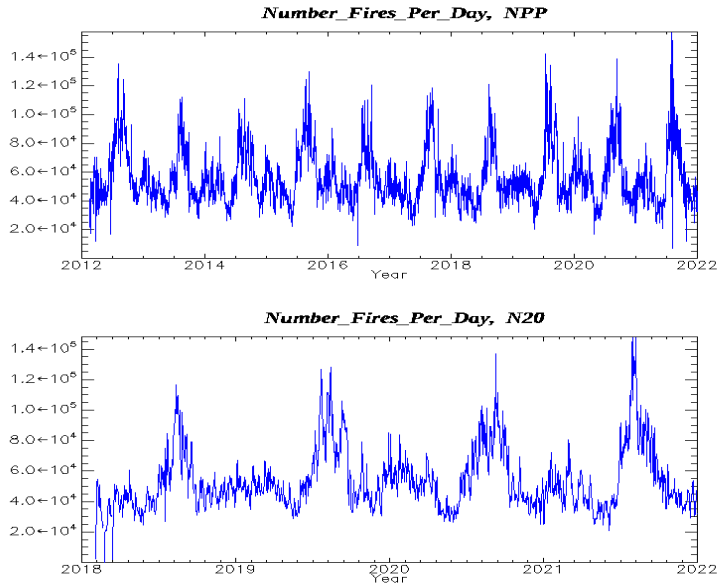
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

***Issues/Risks:***

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## *Highlight: long-term EFIRE VIIRS I-band data record*

*Time series of total daily number of detected VIIRS I-band fire pixels in the reprocessed EFIRE data record*



| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: eFire cal/val* | *September 2025* | | | |
| *Subtask 1.1: Evaluate Suomi NPP and NOAA-20 reprocessed data record* | *March 2025* | | | |
| *Subtask 1.2: Identify environmental and observing conditions with inferior algorithm performance* | *June 2025* | | | |
| *Subtask 1.3: Create science code update for algorithm improvements* | *September 2025* | | | |
| *Task 2: eFire – NGFS cross-verification* | *September 2025* | | | |
| *Subtask 2.1: Generate cross-verification datasets, including opportunistic in-situ reference data* | *December 2024* | | | |
| *Subtask 2.2: Generate / update opportunistic in-situ reference data* | *March 2025* | | | |
| *Subtask 2.3: Generate statistical analysis for eFire – NGFS detection performance* | *September 2025* | | | |
| *Task 3: Direct Broadcast support* | *September 2025* | | | |
| *Subtask 3.1: Feasibility analysis for CSPP update* | *December 2024* | | | |
| *Subtask 3.2: Implementation of science code updates as determined by Task 4.2* | *March 2025* | | | |
| *Subtask 3.3: CSPP user support as needed for transition* | *September 2025* | | | |
| *Task 4: Maintenance, LTM and anomaly resolution* | *September 2025* | | | |
| *Subtask 4.1: Reactive maintenance of Suomi NPP, NOAA-20 and NOAA-21 I-band NCCF products* | *September 2025* | | | |
| *Subtask 4.2: Sensor anomaly resolution support* | *September 2025* | | | |
| *Subtask 4.3: Suomi NPP, NOAA-20 NOAA-21 data analysis and feedback* | *September 2025* | | | |
| | | | | |
| | | | | |

# Aerosol

*February 2024*

## *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.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

## *Overall Status:*

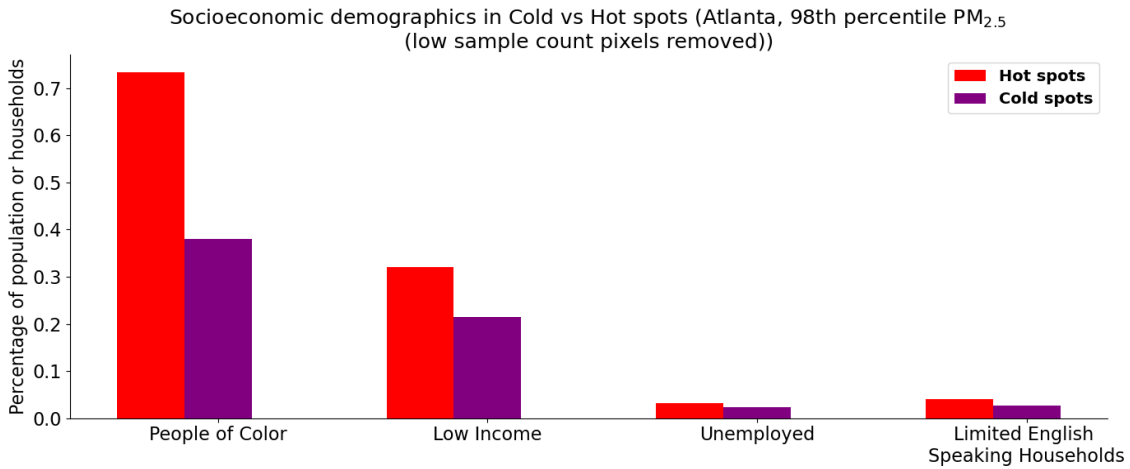
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | X | | | |
| **Schedule** | | X | | | |

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:*




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 |
|---|---|---|---|---|
| *Task 1: Deliver updated bright-land Enterprise AOD algorithm* | *September 2025* | | | |
| *Subtask 1.1: Generate special dataset of satellite reflectances and reference surface AOD over bright land* | *January 2025* | | | |
| *Subtask 1.2: Develop new LUTs and PCTs for over bright-land retrieval* | *June 2025* | | | |
| *Subtask 1.3: Test updated algorithm over bright land and quantify improvement* | *August 2025* | | | |
| *Subtask 1.4: Deliver updated bright-land AOD algorithm to ASSISTT* | *September 2025* | | | |
| *Task 2: Develop an alternative method to AOD retrieval with simultaneous spectral fitting* | *September 2025* | | | |
| *Subtask 2.1: Complete theoretical design of using simultaneous multi-spectral reflectance fitting for AOD retrieval* | *April 2025* | | | |
| *Subtask 2.2: Complete coding and testing of new AOD algorithm* | *August 2025* | | | |
| *Subtask 2.3: Deliver new AOD algorithm to ASSISTT if its performance is superior to the current algorithm* | *September 2025* | | | |
| *Task 3: Deliver evaluation of all enterprise AOD products* | *September 2025* | | | |
| *Subtask 3.1: Complete assessment of a multi-year VIIRS EPS SNPP, NOAA-20 and NOAA-21 AOD* | *August 2025* | | | |
| *Subtask 3.2: Complete evaluation of an extended record of merged/gridded VIIRS global AOD products* | *September 2025* | | | |
| *Task 4: Evaluate merits of TEMPO/PACE aerosol data for improving VIIRS AOD retrievals* | *September 2025* | | | |
| *Subtask 4.1: Understand available TEMPO/PACE aerosol data* | *December 2024* | | | |
| *Subtask 4.2: Develop theoretical framework for using TEMPO/PACE aerosol information* | *June 2025* | | | |
| *Subtask 4.3: Implement, test and evaluate concept* | *August 2025* | | | |
| *Subtask 4.4: Submit assessment report to team lead* | *September 2025* | | | |

# ATMS SDR

*November 2024*

## *Accomplishments / Events:*

- On November 6, 2024, the S-NPP ATMS scan drive compensator motor current significantly increased (from about 200 mA to about 3A) and the ATMS SDR team performed a calibration Assessment.This direct radiometric calibration change can be seen in the daily mean bias of Observations minus Simulated Brightness Temperatures (O-B) (Figure 1). Particularly channels 2 and channels 5 through 12 are clearly affected, with some channels being more pronounced (such as channel 12 being as large as 1.5 K). In addition, this anomaly has created a slight degradation in channel-dependent NEΔT (but still within specifications).
- The NOAA-21, NOAA-20, and S-NPP ATMS PCA BT residuals with decimation factor 4 ( 24 FOR and 1 scan line out of 4, or case3) were examined for channels 3
- Currently Developing ATMS-Tropics Intercomparison using Big Circle Method
- Documenting and Deriving the ATMS SDR nonlinearity calibration equations, for the benefit of improving the ATMS nonlinear calibration capabilities and to enhance the ATBD.

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | X | | | |
| **Schedule** | | X | | | |

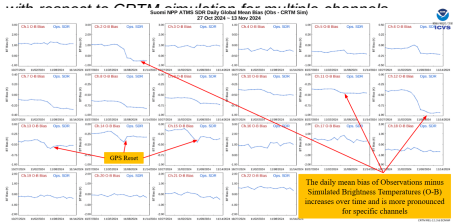
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

## *Issues/Risks:*

| Milestones | Original Date | Forecast Date | Actual Date | Variance Explanation |
|---|---|---|---|---|
| JPSS-3 SN306 ATMS Pre-launch Characterization Report | Dec-24 | Dec-24 | | |
| Update ATMS ATBD | Mar-25 | Mar-25 | | |
| Final Version of the JPSS-4 SN305 ATMS Cal/Val Plan | Jun-25 | Jun-25 | | |
| Review/Checkout of IDPS Mx Builds SOL and I&T Deploy Regression data | Sep-25 | Sep-25 | | |
| Support JPSS-4/JPSS-3 JCT and Test events (J3 Pre-Storage TVAC, IDPS JPSS-3/JPSS-4 Test data Flow, etc.) | Sep-25 | Sep-25 | | |
| Radiometric inter-comparison of S-NPP, NOAA-20 and NOAA-21 ATMS SDR data against other LEO/GEO Microwave observations and GNSS-RO. | Sep-25 | Sep-25 | | |
| NOAA-21 ATMS Spectral Response Function (SRF) analysis/report to allow replacement of simulated NOAA-21 ATMS SRFs with measured values | Sep-25 | Sep-25 | | |
| Evaluate the ATMS Geolocation accuracy assessment tool and determine if the current sliding window can be reduced from 30-day period to a shorter period | Sep-25 | Sep-25 | | |
| Enhance the ATMS Calibration Website with new capabilities for rapid anomaly and SDR data evaluation response | Sep-25 | Sep-25 | | |

## *Highlights:*

*Figure 1:S-NPP ATMS SDR minus Simulated Daily Brightness Temperature Bias (plots by Ninghai Sun). An increase in instrument temperature due to a scan drive compensator motor increase has resulted in a measurable increase in brightness temperature biases*



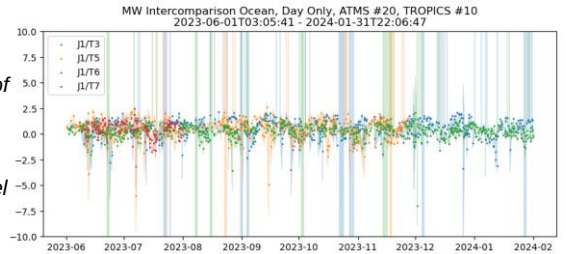




*Figure 3: Intercomparison of NOAA-20 with TROPICS 03, 05, 06, and 07 for TROPICS channel 10 and ATMS channel 20*

Figure 2: Histogram distribution of the residuals for S-NPP channel 3 and 4. This figure shows a bias between these 2 channels.

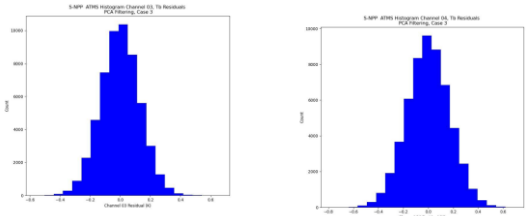
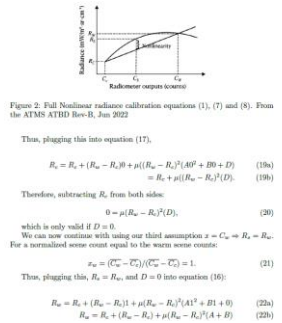


Fig 4: Documentation of ATMS Nonlinearity Derivation



# FY25 Milestones/Deliverables (1/2)

| Task Category | Task/Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | (1) Develop and test calibration algorithm for improvement of SDR data product. | 10/1/2024 | 7/31/2025 | Report | |
| | (2) Review and analysis of JPSS-3 and JPSS-4 ATMS pre-launch data to provide Flight and Ground support. | 10/1/2024 | 9/30/2025 | DAP/Report | |
| | (3) Support ATMS SDR processing system assessment and refinement. | 10/1/2024 | 9/30/2025 | DAP | |
| Integration & Testing (I) | (1) ATMS SDR code integration with ADL | 10/1/2024 | 9/30/2025 | ADL package | |
| | (2) Review/Checkout of IDPS Mx Builds SOL and I&T Deploy Regression data. | 10/1/2024 | 9/30/2025 | Report | |
| Calibration & Validation (C) | (3) Sustain the quality of SNPP, NOAA-20 and NOAA-21 ATMS SDR data products. | 10/1/2024 | 9/30/2025 | Report | |
| | (4) Support J4/J3 JCT and Test events (J3 Pre-Storage TVAC, IDPS J3/J4 Test data Flow, etc.) | 10/1/2024 | 9/30/2025 | Report | |
| | (5) Cal/Val planning of J3/J4 post-launch | 10/1/2024 | 9/30/2025 | Report | |
| | (6) Deliver J4 Pre-launch Characterization Report | 10/1/2024 | 12/31/2025 | Report | |
| | (7) Radiometric inter-comparison of S-NPP, NOAA-20 and NOAA-21 ATMS SDR data against other LEO/GEO Microwave observations and GNSS-RO. | 10/1/2024 | 9/30/2025 | Report | |
| | (8) Support new developments and studies align with NOAA' mission to improve value and usage of present and future satellite data | 10/1/2024 | 9/30/2025 | Report | |

DAP: Delivery Algorithm Package. PCT: Processing Coefficient Table. LUT: Look-Up Table. JCT: Joint Compatibility Test. I&T: Integration and Test

# FY25 Milestones/Deliverables (2/2)

| Task Category | Task/Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Management & Maintenance (M) | (1) ATMS SDR team day-to-day management and coordination. | 10/1/2024 | 9/30/2025 | Report | |
| | (2) Discrepancy and risk reports to inform present or potential departures from specifications due to the presence of anomalies. | 10/1/2024 | 9/30/2025 | Report | |
| | (3) Annual, quarterly, monthly and weekly ATMS SDR performance reports. | 10/1/2024 | 9/30/2025 | Report | |
| | (4) Update ATMS ATBD. | 10/1/2024 | 3/31/2025 | Report | |
| | (5) Support of ATMS SDR JPSS reviews and science meetings. | 10/1/2024 | 9/30/2025 | Report | |
| | (6) Report results in international conferences. | 10/1/2024 | 9/30/2025 | Presentation | |
| | (7) Submit manuscripts. | 10/1/2024 | 9/30/2025 | Manuscript | |
| LTM & Anomaly Resolution (L) | (2) Perform regular RDR and SDR data analysis for instrument and data health. | 10/1/2024 | 9/30/2025 | Reports | |
| | (3) Implement new or improved capabilities for LTM, after properly assessing the methodologies for the validation and monitoring of the ATMS instruments and SDR data. | 10/1/2024 | 9/30/2025 | Reports | |
| | (4) Support anomaly event investigation and resolution of SNPP, NOAA-20 and NOAA-21 ATMS sensors. | 10/1/2024 | 9/30/2025 | Reports and solutions | |

DR: Discrepancy Report. ATBD: Algorithm Theoretical Basis Document. RDR: Raw Data Record. SDR: Raw Data Record. LTM: Long Term Monitoring.

# Clouds

*November 2024*

## *Accomplishments / Events:*

- The Cloud team received the updated SAPF code with the updated ECM and DCOMP code. There is a discussion within the ECM team about whether the current implementation of the scattering angle is correct or a different method, which was previously used, is the correct method that needs to be used. The ECM team will make a decision by early 2025 as to the correct methodology needed for the ECM team.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Develop VIIRS/CALIOP validation tools for JPSS-2 | Dec-22 | TBD | Jun 23 | Code completed but requires N21 data to test |
| Integrate latest Enterprise Cloud Mask (ECM) version within NDE | Dec-22 | Dec-22 | Mar-23 | A future update will be made post Provisional |
| Prepare Cloud Base Height (CBH)/Cloud Cover Layers (CCL) algorithm transition and operation for JPSS-2 | Jan-23 | Apr-23 | | Algorithm is being evaluated for Prov maturity |
| Integrate new ECM lookup table to allow easier threshold changes | Mar-23 | Sept-24 | Sept 24 | Validation of the new LUT is ongoing |
| JPSS-2 Beta Review (ECM) | Apr-23 | Jun-23 | June-23 | Changed due to Transmitter issue |
| Validate CCL that was recently delivered, especially convective/supercooled layers as part of CCL Beta review | Jul-23 | Dec-24 | | Ongoing |
| NOAA-21 Cloud Products Beta Maturity | Jul-23 | Nov-23 | | COMP at end of Nov. Others Prov |
| NOAA-21 Cloud Products Provisional Maturity | Aug-23 | Nov-23 | | COMP at end of Nov. Others Prov |

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:*

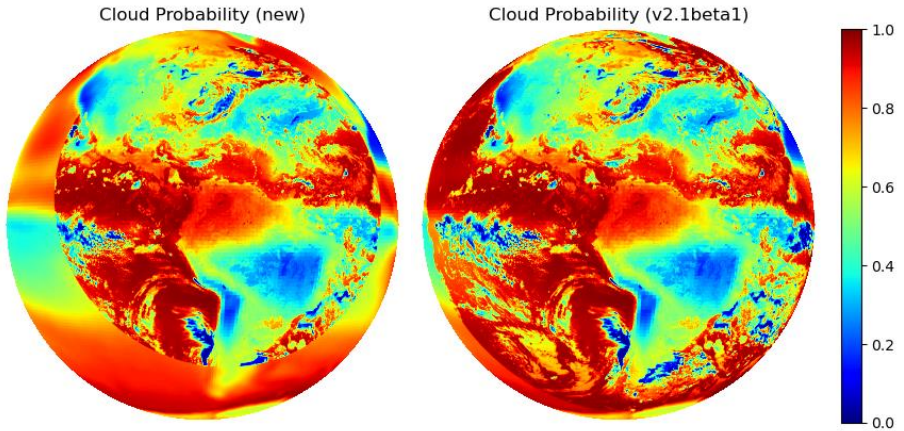



Figure 1.This shows the effect on the refl38 classifier from the ECM demonstrating the effect of the current (left) methodology for the scattering angle vs the previous methodology of the scattering angle (right.

# Cloud Team FY25 Milestones

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| FY25 Program Management Review | Aug-24 | Aug-24 | Aug-24 | |
| FY25 Mid-term Program Management Review | Dec-24 | Dec-24 | | |
| Assist with operational DAP deliveries, updates, and post-delivery product reviews | Sep-25 | 1-4Q | | |
| Conduct long term monitoring of all products | Sep-25 | 1-4Q | | |
| Investigate DCOMP sensitivity to ice crystal habit and channel-set for cirrus clouds | Sep-25 | 1-4Q | | |
| Enhance and maintain websites as a public interface to access product imagery | Sep-25 | 1-4Q | | |
| In collaboration with Polar Winds team, investigate ACHA performance as it relates to Atmospheric Motion Vector (AMV) height assignment | Sep-25 | 1-4Q | | |
| Prepare CLAVRx cloud top phase algorithm to replace current operational cloud phase algorithm | Sep-25 | 1-4Q | | |
| Investigate new AI/ML techniques to improve multiple products (e.g., ECM, DCOMP/NCOMP) | Sep-25 | 1-4Q | | |
| Investigate DCOMP precipitation applications | Sep-25 | 1-4Q | | |
| Prepare tools that leverage new datasets for algorithm development and validation (e.g., EarthCARE) | Sep-25 | 1-4Q | | |

# Cloud Team FY25 Milestones

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Continue evaluating all products using surface and satellite observations | Sep-25 | 1-4Q | | |
| Interact with operational users and obtain user feedback | Sep-25 | 1-4Q | | |
| Develop a test data package to help AWIPS-2 implementation and develop enhanced product displays based on user feedback | Sep-25 | 1-4Q | | |
| Provide algorithm cal/val documents and review materials | Sep-25 | 1-4Q | | |
| Continue product demonstration and public release for general users | Sep-25 | 1-4Q | | |
| Identify limitations of products through continued intensive validation and refine algorithms accordingly | Sep-25 | 1-4Q | | |
| Provide information on prospective algorithm refinements to improve operational algorithm performance | Sep-25 | 1-4Q | | |
| Support JPSS Aviation and Hydrology Initiatives | Sep-25 | 1-4Q | | |
| Update ATBD's as needed | Sep-25 | 1-4Q | | |

**1-4Q** in the above table denotes that the specific milestone listed is ongoing algorithm developmental work that will likely span the entire year. Quarterly updates will be provided as needed.

# CrIS SDR

*November 2024*

## *Accomplishments / Events:*

- Continued investigation into enhanced CrIS Pressure Level Imagery using Radiance Temperature Index (**Fig. 1**)
- Backfilled long-term monitoring to correct for recent data gaps. (**Fig. 2**)
- Supported investigation of S-NPP geolocation errors on 2024-11-06. S-NPP CrIS performed as expected, consistent with past events. (**Fig. 3**)
- Installed CRTM Coefficient Generation Package on STAR servers, and started work to make it work in STAR environment to support CrIS Cal/Val activities.
- Continued monitoring of all CrIS instruments.
- Supported meetings with EUMETSAT in preparation for METOP-SG Cal/Val activities. (**Fig. 4**)
- Performed analysis on radiometric noise using the PCA methodology for comparing NOAA-21 TVAC vs on-orbit. (**Fig. 5**)

| Milestones | Category | Original Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Delivery of the JPSS-4 CrIS PreLaunch Characterization Report | Sustain | Dec-24 | | |
| Delivery of the Final JPSS-4 CrIS Cal/Val Plan | Sustain | Jun-25 | | |
| Delivery of the JPSS-4 CrIS Initial PCT LUT | Sustain | Jun-25 | | |
| Implement and Test Solutions of Calibration Error Reduction for JPSS-4 Launch Risk Mitigation | Sustain | Sep-25 | | |
| Provide support to Metop-SG Joint Cal/Val Activities | Sustain | Sep-25 | | |
| Radiometric Intercomparison of the Operational CrIS SDR data against other LEO/GEO IR observations and GNSS-RO | Sustain | Sep-25 | | |
| Review/Checkout of IDPS Mx Builds SOL and I&T Deploy Regression data | Maintain | Sep-25 | | |
| Perform the transition of Cal/Val activities to the Cloud environment | Maintain | Sep-25 | | |
| Conduct maintenance including investigation and anomaly resolution of on-orbit CrIS sensors | Maintain | Sep-25 | | |

## *Overall Status:*

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

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.*

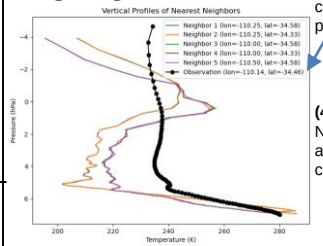
***Issues/Risks:***

**Red:** It has been announced that JPSS-4 TVAC data and documents are now ITAR. STAR IT does not have a secured environment to host or process ITAR data.

**Yellow:** The CrIS Team is still in need of hardware resources. Presently, there is only two servers dedicated to 5 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. Corresponding hardware 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 is currently in progress, in coordination with STAR IT. A new MATLAB license has been delivered and installed properly. There was a SCDR data disruption starting June 30 and ending July 11. Data gaps are unfilled 30 days later. This complicated S/NPP GPS Anomaly investigations. SCDR outages may be increasing.

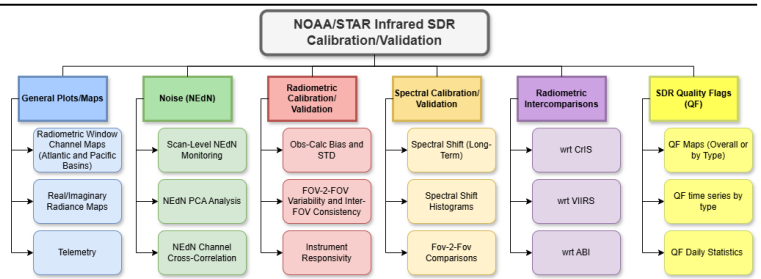
**Blue:** ASSIST Team has agreed to accept ADL code change tested on CentOS 9.

## *Highlights:*

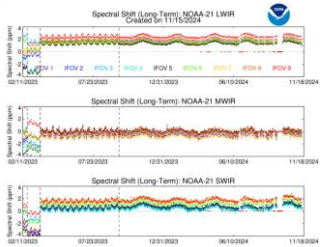



**(1)** Inspection of 5 nearest neighbor profiles (colored) compared to CrIS-T-Idx profile (black).

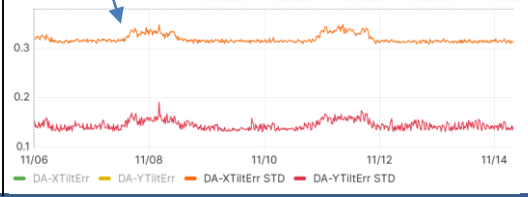
**(4)** Infographic of NOAA/STAR monitoring and analysis capabilities currently being generated.



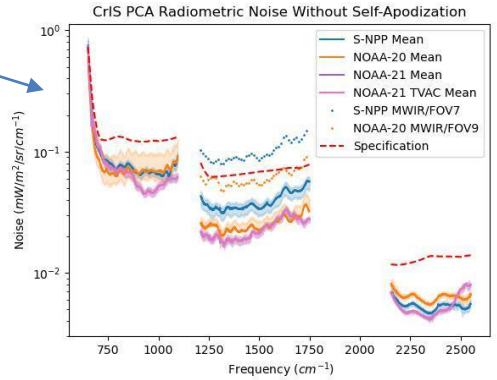

**(2)** Long-term spectral accuracy NOAA-21, showing progress backfilling data




**(3)** Standard Deviation of X/Y DA-TiltErr of S/NPP, consistently increasing after geolocation errors.




**(5)** Comparison of radiometric noise from TVAC using the PCA methodology. This indicates that the NOAA-21 TVAC and on-orbit NEdN is very similar.



# FY25 Milestones/Deliverables (1/2)

| Task Category | Task/Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | (1) Implement and test calibration solutions for imaginary radiance reduction in the NOAA-21 CrIS SDR product. | 10/1/2024 | 6/30/2025 | Report | |
| | (2) Review and analysis of JPSS-3 and JPSS-4 CrIS pre-launch data to provide Flight and Ground support. | 10/1/2024 | 9/30/2025 | DAP/Report | |
| | (3) Support CrIS SDR processing system assessment and refinement. | 10/1/2024 | 9/30/2025 | DAP | |
| Integration & Testing (I) | (1) CrIS SDR code integration with ADL | 10/1/2024 | 9/30/2025 | ADL package | |
| | (2) Review/Checkout of IDPS Mx Builds SOL and I&T Deploy Regression data. | 10/1/2024 | 9/30/2025 | Report | |
| Calibration & Validation (C) | (3) Sustain the quality of SNPP, NOAA-20 and NOAA-21 CrIS SDR data products. | 10/1/2024 | 9/30/2025 | Report | |
| | (4) Support J4/J3 JCT and Test events (J3 Pre-Storage TVAC, IDPS J3/J4 Test data Flow, etc.) | 10/1/2024 | 9/30/2025 | Report | |
| | (5) Cal/Val planning of J3/J4 post-launch | 10/1/2024 | 9/30/2025 | Report | |
| | (6) Deliver J4 Pre-launch Characterization Report | 10/1/2024 | 12/31/2025 | Report | |
| | (7) Radiometric inter-comparison of S-NPP, NOAA-20 and NOAA-21 CrIS SDR data against other LEO/GEP IR observations and GNSS-RO. | 10/1/2024 | 9/30/2025 | Report | |
| | (8) Support new developments and studies align with NOAA' mission to improve value and usage of present and future satellite data | 10/1/2024 | 9/30/2025 | Report | |

DAP: Delivery Algorithm Package. PCT: Processing Coefficient Table. LUT: Look-Up Table. JCT: Joint Compatibility Test. I&T: Integration and Test

# FY25 Milestones/Deliverables (2/2)

| Task Category | Task/Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Management & Maintenance (M) | (1) CrIS SDR team day-to-day management and coordination. | 10/1/2024 | 9/30/2025 | Report | |
| | (2) Discrepancy and risk reports to inform present or potential departures from specifications due to the presence of anomalies. | 10/1/2024 | 9/30/2025 | Report | |
| | (3) Annual, quarterly, monthly and weekly CrIS SDR performance reports. | 10/1/2024 | 9/30/2025 | Report | |
| | (4) Update CrIS ATBD. | 10/1/2024 | 3/31/2025 | Report | |
| | (5) Support of CrIS SDR JPSS reviews and science meetings. | 10/1/2024 | 9/30/2025 | Report | |
| | (6) Report results in international conferences. | 10/1/2024 | 9/30/2025 | Presentation | |
| | (7) Submit manuscripts. | 10/1/2024 | 9/30/2025 | Manuscript | |
| LTM & Anomaly Resolution (L) | (1) Upgrade the JSTAR CrIS Website. | 10/1/2024 | 9/30/2025 | Website | |
| | (2) Perform regular RDR and SDR data analysis for instrument and data health. | 10/1/2024 | 9/30/2025 | Reports | |
| | (3) Implement new or improved capabilities for LTM, after properly assessing the methodologies for the validation and monitoring of the CrIS instruments and SDR data. | 10/1/2024 | 9/30/2025 | Reports | |
| | (4) Support anomaly event investigation and resolution of SNPP, NOAA-20 and NOAA-21 CrIS sensors. | 10/1/2024 | 9/30/2025 | Reports and solutions | |

DR: Discrepancy Report. ATBD: Algorithm Theoretical Basis Document. RDR: Raw Data Record. SDR: Raw Data Record. LTM: Long Term Monitoring.

## Accomplishments / Events:

**Two major improvements to the Enterprise Ice Thickness product:**

The Enterprise JPSS/GOES Ice Thickness/Age algorithm is the product of the One-dimensional Thermodynamic Ice Model (OTIM) that uses the Enterprise Ice Surface Temperature (IST) as a major input. Previously, the IST, which is the skin temperature of the ice or snow, was assumed to be the same as the snow-ice interface temperature if snow is present on the ice. In situ surface and snow-ice interface temperatures from the Surface Heat Budget of the Arctic Ocean (SHEBA) field campaign (1997-1998) are used to infer a relationship between the two through a regression model that has two different equations for day (1) or night (2) conditions.

The second major improvement to the OTIM is the replacement of snow depth climatology lookup tables for estimating snow depth to the use of a snow depth regression model derived from SHEBA observations. Again, two different equations are used depending on day (3) versus night (4) conditions. A comparison between the OTIM before and after the improvements is given in Figure 1. The mean and median differences for this case were observed to be 6 cm, with noticeable lower ice thickness values in the eastern Laptev Sea west of the New Siberian Islands. Similar results are expected to be observed when the improvements are tested with more VIIRS and GOES data.

**Routine assessment of the GOES-19 ABI Binary Snow product accuracy has begun:**

A comparison of GOES-19 snow retrieval with snow retrievals from operational geostationary satellites (GOES-16 and GOES-18) has demonstrated a similar rate of agreement of all satellite products to the IMS. This is illustrated by Figure 2, which presents a time series of the accuracy estimates of GOES-19 and GOES-16 snow products. On some days the products may drop below 90%, but overall, the mean accuracy is generally within 92 to 96%. This may be considered as another indication of a good quality of GOES-19 ABI snow products.

The results presented so far should be considered as preliminary since at this time of the year there is too little snow on the ground to allow a full-scale validation of the GOES-19 snow product. Nevertheless, the available results are encouraging and leave little doubts about the robust and reliable performance of GOES-19 snow products during the winter season.

## Overall Status:

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:

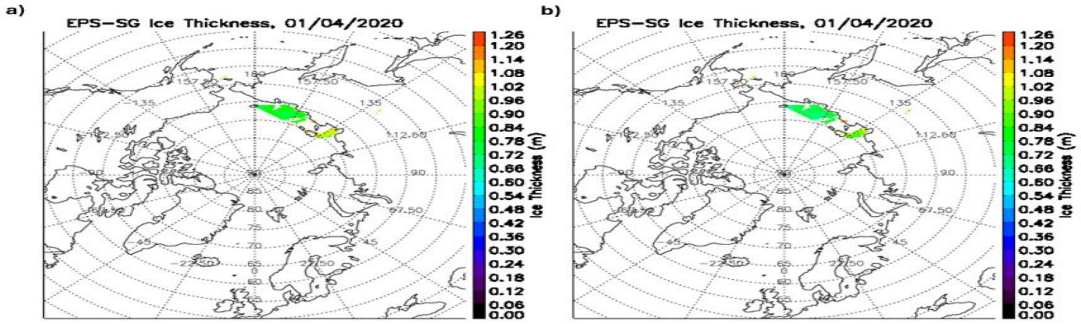
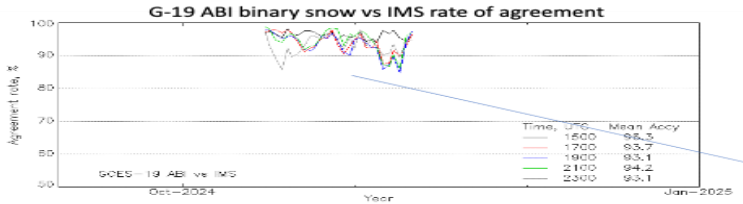



*Figure 1. Sea ice thickness retrieved with EPS-SG proxy data on January 4, 2020, without the improvements implemented (a) and with the improvements implemented (b).*



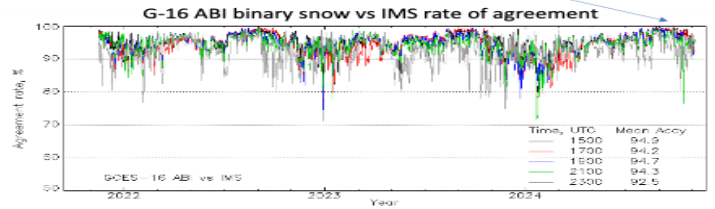




Figure 2. Example of ABI-based snow cover maps (G-16 and G-17) and matching IMS products on the same day and on the day after. ABI snow maps exhibit a better agreement to the IMS product labeled with the next day date. This is explained by a different approach to the time stamping of the two products.

# FY25 Milestones/Deliverables (in general)

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | Blend AMSR2 into the VIIRS binary snow product, finalize the algorithm, Begin routine offline generation. | 10/2024 | 9/2025 | Routinely generated daily blended gap-free snow map based on combined VIIRS and microwave data | Same as snow product EDRs |
| Development (D) | Melting/frozen snow pack discrimination. Algorithm and software development | 10/2024 | 9/2025 | Daily map of the snowpack state (melting/frozen) | Same as snow cover EDR |
| Development (D) | Upgrade web-page displaying VIIRS snow cover products. Enable viewing and analysis of gridded snow product at full (1km) spatial resolution | 10/2024 | 9/2025 | Enhanced web page | N/A |
| Development (D) | Finalize supplemental cloud mask for daily VIIRS snow products: Compensate for weaknesses of the cloud mask | 10/2024 | 9/2025 | Final algorithm and software to generate VIIRS supplemental cloud mask | N/A |
| Development (D) | Melt/freeze discrimination and degrees above melting.(Daytime only) | 10/2024 | 9/2025 | Expansion of IST product | Enhanced usability by analysts and forecasters. |

# FY25 Milestones/Deliverables (in general)

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | Updates on the ice surface temperature, including research on impacts of angular emissivity of snow and ice | 06/2024 | 03/2025 | IST surface temperature algorithm update | Improved accuracy for all users |
| Integration and Testing (I&T) | Improvements to the Sea Ice Concentration product. | 10/2023 | 9/2026 | Algorithm enhancements to improve SIC near sea ice edge | Same as ice concentration EDR |
| Integration and Testing (I&T) | Include Blended SIC and NOAA-21 ice products into RealEarth | 10/2024 | 09/2025 | Graphics | **Streamlined validation** |
| Integration and Testing (I&T) | Improvements to the Ice Thickness and age products. | 10/2024 | 9/2025 | Improved ice thermal and physical dynamic parameterizations (growing and melting processes), using ice-snow interface temperature product | IceAge EDR |
| Maintenance | Additions and Improvements to Blended Sea Ice Concentration product | 10/2024 | 9/2025 | Include observational weights into output Netcdf files. | **Request by users** |

# Polar Winds

*August, 2024*

## *Accomplishments / Events:*

- **Tandem JPSS winds for SWIR band are now generated:** Currently, VIIRS single band Atmospheric Motion Vectors (AMVs) from the shortwave-infrared band (SWIR, M11, 2.2 µm) is being prepared for operational implementation in the near future. The next logical step was to expand the use of SWIR band into the tandem orbit setting, where successive orbits of NOAA-20 and -21 satellites are used to develop AMVs with greater coverage and smaller time differences, which should result in a more accurate winds product. Recent examples of the experiment product are shown in Figure 1.
- The Tandem SWIR product does a good job in covering mid-upper-level wind motions associated with jet stream across northern Russia and mid-lower-level winds associated with polar cyclone over the central Arctic. Initial comparisons to single JPSS SWIR AMVs (either NOAA-20 or -21) show speed (direction) RMS of under 3 $ms^{-1}$ (20 deg).

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:*

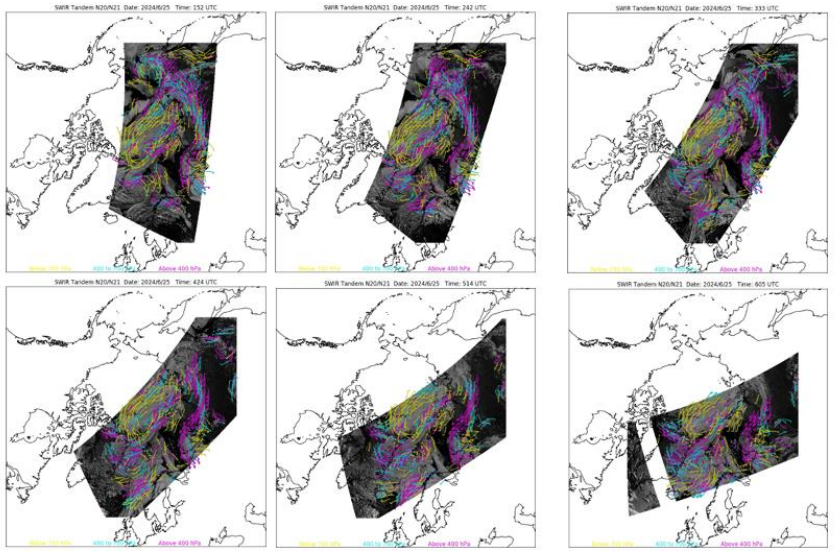


Figure 1: VIIRS JPSS (NOAA20/21) Tandem SWIR AMVs overlaid with 2.2 µm reflectances from 25 June 2024 over the Arctic region in polar stereographic projection. Near polar crossing times starting from upper-left and ending at lower-right: 01:52, 02:42, 03:33, 04:24, 05:14 and 06:05 UTC.

# Status of FY25 Milestones/Deliverables *(1/2)*

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | Demonstration and validation of Polar ***"Tandem-Satellite"*** VIIRS SWIR & LWIR wind datasets over a 4-6 week time period and make them available to NWP Centers | Aug 2024 | Jun 2025 | Polar ***"Tandem-Satellite"*** VIIRS SWIR & LWIR wind BUFR datasets;<br><br>Wind validation results | Refer to IORD/L1RD; NESDIS priorities. |
| Development (D) | Incorporate VIIRS DNB (Near-Constant Contrast) updates from heritage to enterprise winds algorithm in FW2.x | Aug 2024 | Jun 2025 | Updated enterprise winds software. | INNOVATION |
| Development (D) | Develop and validate approaches to generate VIIRS winds from tandem-satellite pairs of images (enables global coverage) | Aug 2024 | Jun 2025 | Updated enterprise winds software<br><br>Validation study reports | INNOVATION |
| Development (D) | Feature tracking QC for VIIRS winds: Investigate scan angle diffs between successive orbits & impact on VIIRS winds quality; account for parallax | Aug 2024 | Jun 2025 | Informal/internal assessment report.<br><br>Updates to enterprise winds software | |
| Development (D) | Development of updated VPW Validation and monitoring system | Oct 2024 | Jun 2025 | Updated validation software<br><br>Updated winds monitoring web pages<br><br>Documentation | |

# Status of FY25 Milestones/Deliverables *(2/2)*

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Integration & Testing (I) | Support transition of ***"Single-Satellite"*** VIIRS SWIR winds into operations | Oct 2024 | Sep 2025 (Est) | Validation reports | Refer to IORD/L1RD; NESDIS priorities |
| Integration & Testing (I) | Begin transition of ***"Tandem-Satellite"*** VIIRS LWIR and SWIR winds to operations *(if funded)* | Oct 2024 | Sep 2025 (Est) | Updated enterprise winds software & enterprise winds ATBD<br><br>Validation reports | Refer to IORD/L1RD; NESDIS priorities |
| Calibration & Validation (C) | | | | | |
| Maintenance | Deliver enterprise winds algorithm updates, as needed | Oct 2024 | Sep 2025 | Updated software, as needed; Updated Enterprise Winds ATBD, as needed | |
| LTM & Anomaly Resolution (L) | Dev and testing of minor algorithm updates as needed.<br><br>Continued monitoring and validation of VPW winds;<br><br>Addition of ERA5 analysis to winds team's validation tool set | *Oct 2024* | *Sep 2025* | Graphics, statistics Webpage product monitoring graphics;<br><br>Updated winds validation/monitoring software, as needed | |

# GCOM-W/AMSR2

*August, 2024*

## *Accomplishments / Events:*

- **Intercomparison of AMSR2 and VIIRS-AMSR2 Blended Sea Ice Concentration Monthly Composites:** An intercomparison of monthly composites of sea ice concentration (SIC) for April, May and June 2024 over the Arctic has been completed. The AMSR2 SIC product uses the NASA Team-2 algorithm, while the VIIRS SIC data that goes into the blend uses the Enterprise algorithm with the blending method discussed further in Dworak et al. 2021.
- Individual monthly composites for each product are shown in Figure 1. Visual comparison of the monthly composites for both AMSR2 and Blended (VIIRS+AMSR2) show little difference between them. A more detailed statistical analysis is shown in Table 1. The comparison (Blend-AMSR2) is only made when either product has an observable SIC greater than 0. Overall, the bias is miniscule; accuracies are within a few percentage points, standard deviations and root mean squared (rms) differences are in between 5-7%. Of note is the average SIC values over the Arctic being around 88% in April, 84% in May and 80% in June for both products, showing a similar decrease in SIC as we move further into the summer melt season. Next, the differences in SIC for each month are plotted in Figure 2 and show in detail, locations of disparities between the two SICs. Most noticeable are that larger differences in general tend to be located near the sea ice edge and coastlines. For example, in April AMSR2 produces larger SIC (as much as 20% higher) values across the northern Barents Sea, in between Novaya Zemlya and Svalbard near the sea ice edge (see Figure 1).
- Another example is across the southern Laptev Sea where the Blended produces larger SIC of about 5-10%. Also, of note is the area across the eastern Beaufort Sea in June, where AMSR2 produces 5-10% higher SIC. This area was observed to have a large break up of sea ice, producing a complex SIC field that was not well captured by the lower resolution AMSR2 data (see Figure 3). Further intercomparisons of the SICs are expected soon, with expanded analysis to include the Antarctic and autumn freeze up season over the Arctic.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| | | | | |
| | | | | |

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:***

## ***Highlights:***

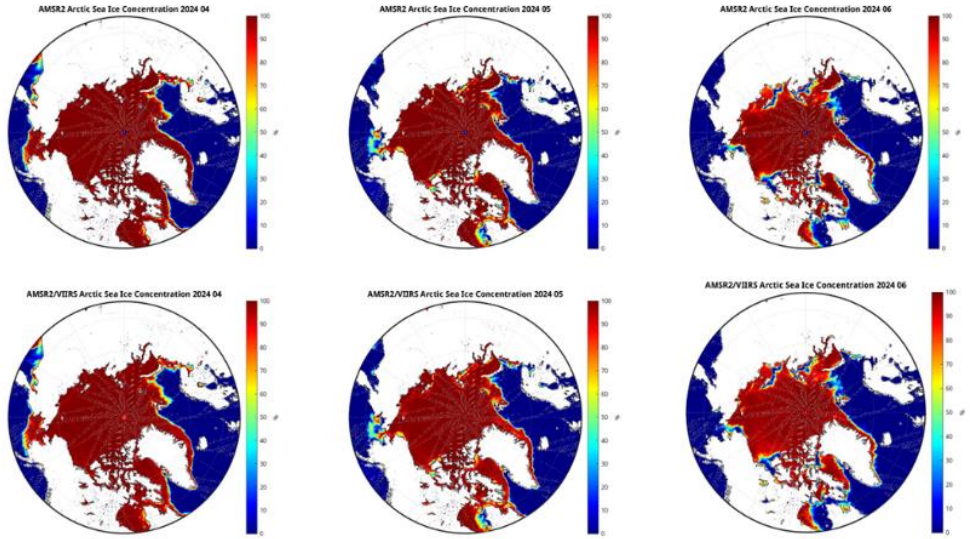



Figure 1. Top row Monthly average Sea Ice Concentration (SIC) from AMSR2 NASA Team-2 algorithm for April (left), May (middle) and June (right) 2024. Bottom is from the AMSR2+VIIRS blended sea ice concentration for the same months.

| Statistic | Apr-2024 | May-2024 | June-2024 |
|---|---|---|---|
| **Bias (Blend-AMSR2)** | +0.091 | -0.0045 | -0.2042 |
| **Accuracy** | 2.2303 | 1.9711 | 2.4211 |
| **Standard Deviation** | 6.5036 | 5.8114 | 5.8537 |
| **RMS** | 6.8754 | 6.1366 | 6.3347 |
| **Avg. Blend** | 88.9123 | 84.4858 | 80.6336 |
| **Avg. AMSR2** | 88.8214 | 84.4903 | 80.8378 |

Table 1: Statistical data comparison of Sea Ice Concentration (SIC) differences between Blended and AMSR2 product for each month. Note that a comparison is only made when either the Blended or AMSR2 have an observed ice pixel (SIC>0%).

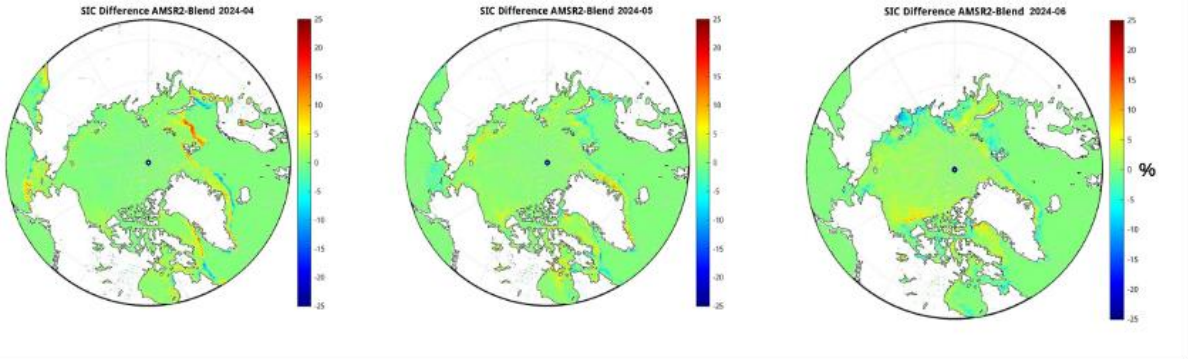



Figure 2. Differences in Monthly average Sea Ice Concentration (SIC) of AMSR2 versus AMSR2+VIIRS blended sea ice concentration for April (left), May (middle) and June (right) 2024.

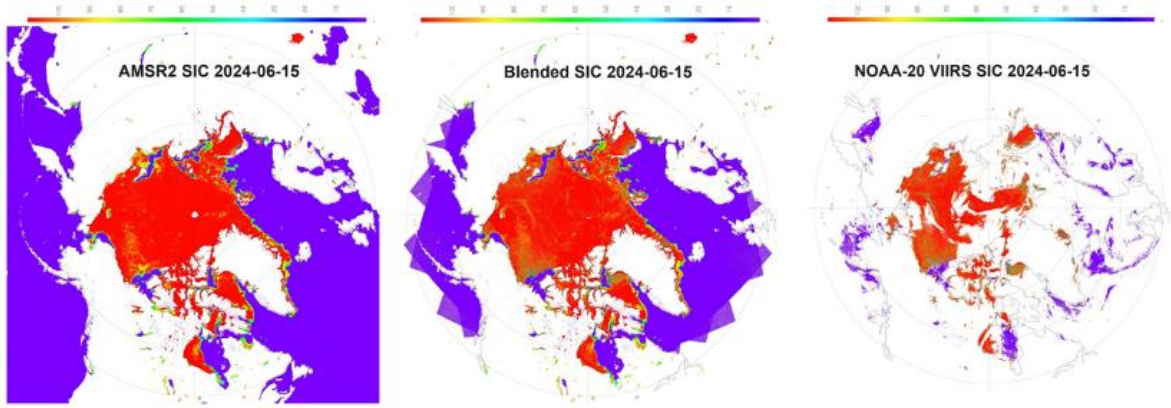



Figure 3. Daily composite SIC for 15 June 2024 from AMSR2 (left), Blend (middle) and NOAA-20 VIIRS (right).

# FY25 Milestones/Deliverables (in general)

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | Assessment of all EDR's for AMSR2, initiate changes for AMSR3 | Oct 2024 | Sept 2025 | Beta versions of Pre-launch algorithms and LUTs | Refer to IORD/L1RD; NESDIS priorities; STAR-National Center User Engagements |
| Integration & Testing (I) | Reprocessing of L2 EDR's | Nov 2024 | July 2025 | Full L2 products from launch through July 2023 | |
| Calibration & Validation (C) | Continue AMSR2 L1 monitoring; develop AMSR3 capabilities | Oct 2024 | Sept 2025 | Annual cal/val report; AMSR3 prototype off-line system | |
| Maintenance | Deliver any algorithm updates | Jan 2025 | May 2025 | Updated code to ASSISTT | |

# ICVS

*November 2024*

## *Accomplishments / Events:*

- Made a big effort for the transition from one member who left on 11/30/2024, to other ICVS members: The transition covers the ICVS VIIRS LTM, CrIS-VIIRS, OMPS-VIIRS geolocation accuracy, OMPS LP LTM, and hurricane 3D warm code animation modules.
- Support the NPP ATMS scan drive motor current anomaly and science data impact discussion. Provided NPP ATMS TDR O-B bias  long term trending figures to demonstrate the systematic change of TDR/SDR data feature during the comp motor anomaly event. It is also recorded that the maximum scan drive mechanism temperature keeps at more than 50 degree for several days. To protect the impact to ATMS units, NPP ATMS was switched to safehold mode from November 19, 2024. ICVS will continue to provide support to OSPO and NASA Flight teams when NPP ATMS is switched to operational mode later.
- Backed processed SNPP OMPS SDR and VIIRS SDR M15 band to fulfill the gaps in the long term trending of DCC reflectance. The result is shown in Figure 2.
- Analyzed N21 CrIS data quality impacted by the propulsive Retro Maneuver (RTO) on 11/13, 2024. The direct impact is the sudden increase of the stage cooler temperatures which triggered the scan-level quality flag of 'invalid instrument temperatures. The Deep space view data was also impacted by this anomaly and most of the DS data during this anomaly was discarded from the calibration window, triggering degraded overall data quality for all three bands

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:*** One key ICVS member left lead to intensive work transitions; likely delay or missed products in ICVS website due to limited resources now; a replacement for the left member is in process.

| Milestone | Original Date | Completion Date | Variance Explanation |
|---|---|---|---|
| Identify ICVS-lite modules for transition to OSPO operational environment in coordination with OSPO | Nov-24 | Nov-24 | |
| Initialize new algorithms/functions to monitor SDR data's quality in terms of requirements using NOAA-21 SDR data as test data sets | Feb-25 | | |
| Develop a new monitoring framework to improve timeliness and performance in preparation of J3/J4 missions | May-25 | | |
| Initialize an algorithm for estimating OMPS NM geolocation errors in the absence of VIIRS data from the same satellite | Aug-25 | | |
| Continue supporting NCCF cloud migration discovery activity: test the ICVS functions in cloud as needed | Sep-25 | | |
| Develop new ICVS algorithms\modules in support of future JPSS-04/03 missions | Sept-25 | | |
| Support JPSS spacecrafts and instruments recovery activities, JPSS data anomaly analysis activities by STAR SDR and EDR teams, JPSS flight , OSPO and NWP | Sep-25 | | |
| Maintain and sustain the LT ICVS product monitoring performance for SNPP, NOAA-20, NOAA-21, including 3D-ATMS-VIIRS SDR hurricane core observations | Sep-25 | | |
| Support STAR SDR calibration/validation activities, including innovation idea test, and LEO program's ad hoc requests (e.g., SDR data impact demonstration) | Sep-25 | | |

## *Highlights:*

**Figure 1 NPP ATMS comp motor current and scan drive mechanism temperature anomaly from November 6, 2024**

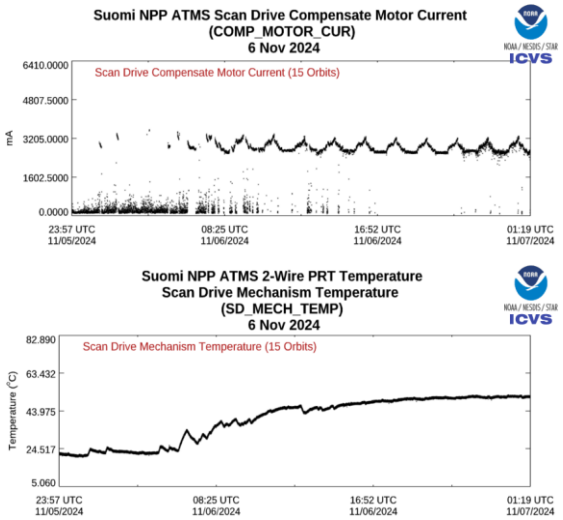
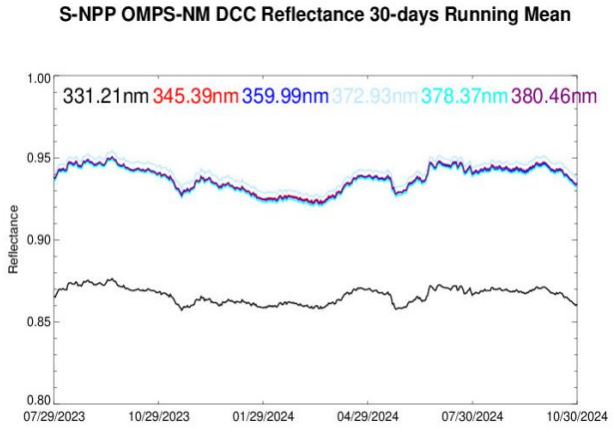



**Figure 2 Back processed S-NPP OMPS NM vs VIIRS M15 DCC reflectance 30-day running mean back to July 2023**



# ICVS FY25 Milestones/Deliverables

| | Milestone | Start | Finish | Deliverable |
|---|---|---|---|---|
| 1 | Identify ICVS-lite modules for transition to OSPO operational environment in coordination with OSPO | Oct-24 | Nov-24 | Deliver a ppt file to introduce basic functions of the ICVS-lite package |
| 2 | Initialize new algorithms/functions to monitor SDR data's quality in terms of requirements using NOAA-21 SDR data as test data sets | Dec-24 | Feb-25 | Provide a dynamically updated color table about NOAA-21 instrument SDR radiance (Tb or reflectance or normalized radiance) per requirement: green, yellow, red |
| 3 | Develop a new monitoring framework to improve timeliness and performance in preparation of J3/J4 missions | Mar-25 | May-25 | A new monitoring framework within the ICVS system |
| 4 | Initialize an algorithm for estimating OMPS NM geolocation errors in the absence of VIIRS data from the same satellite | Apr-25 | Aug-25 | Software and new ICVS products |
| 5 | Continue supporting NCCF cloud migration discovery activity: test the ICVS functions in cloud as needed | Feb-25 | Sep-25 | Software; testing results, updated discovery book |
| 6 | Develop new ICVS algorithms\functions/modules in support of future JPSS-04/03 missions | May-25 | Sept-25 | Module Software and proxy J4 ICVS products |
| 7 | Support JPSS spacecrafts and instruments recovery activities, JPSS data anomaly analysis activities by STAR SDR and EDR teams, JPSS flight team, OSPO and NWP | Oct-24 | Sep-25 | ICVS products; JPSS data anomaly monitoring reports |
| 8 | Maintain and sustain the LT ICVS product monitoring performance for SNPP, NOAA-20, NOAA-21, including 3D-ATMS-VIIRS SDR hurricane core observations | Oct-24 | Sep-25 | ICVS products; module software updates |
| 9 | Support STAR SDR calibration/validation activities, including innovation idea test, and LEO program's ad hoc requests (e.g., SDR data impact demonstration) | Oct-24 | Sep-25 | Software; new ICVS products |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: Maintain the LT consistency of ICVS products in a NRT mode for monitoring of RDR and SDR LT performance spanning 3 spacecrafts and 12 instruments from SNPP, NOAA-20 and NOAA-21 missions* | *October 2024 to September 2025* | | | |
| *Subtask 1.1: Check the availability of ICVS products in case of any missed products or unexpected stopped cron-jobs* | *October 2024 to September 2025* | | | |
| *Subtask 1.2:* Fix the issues to recover *unexpected stopped cron-jobs* | *October 2024 to September 2025* | | | |
| *Subtask 1.3: Reprocess* the data to fill in missed products | *October 2024 to September 2025* | | | |
| *Subtask 1.4: Produce historical (intermediate) ICVS products per ad hoc requests from key users* | *Ad hoc* | | | |
| *Task 2: Monitor LT performance of the JPSS spacecrafts, instruments and SDR data in a NRT mode and report anomalous feature monitoring results in support SDR team and other key users* | *October 2024 to September 2025* | | | |
| *Subtask 2.1: Monitor performance of the JPSS spacecrafts, instruments and SDR data based on current ICVS products* | *October 2024 to September 2025* | | | |
| *Subtask 2.2: Provide monitoring reports with good ICVS images in the presence of newly detected anomalies for spacecraft, instrument and SDR data* | *October 2024 to September 2025* | | | |
| *Task 3: Maintain and upgrade the ICVS severe weather event (radiometric) feature watch portal in a NRT mode* | *October 2024 to September 2025* | | | |
| *Subtask 3.1: Maintain the ICVS ATMS-VIIRS 3D hurricane warm core monitoring system and analysis tools (e.g., Heat Dome) for other severe events* | *October 2024 to September 2025* | | | |
| *Subtask 3.2: Provide briefing report with good images per event in a timely manner* | *October 2024 to September 2025* | | | |
| *Subtask 3.3: Improve AI-based ATMS global high resolution images for Mapper* | *October 2024 to September 2025* | | | |
| *Subtask 3.4: Develop new functions to better demonstrate new values of SDR data in visually observing severe events' radiometric features such as heat wave and atmospheric rivers* | *Ad hoc* | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 4:* Monitor and upgrade the N21 LP EDR products in the ICVS web site in support of OMPS EDR review and other cal./val activities | *October 2024 to September 2025* | | | |
| *Subtask 4.1:* Update the ICVS-LP monitoring functions by adding available N21 LP data from the STAR EDR team. | *September 2024* | | | |
| *Subtask 4.2:* Promote the LP monitoring functions to operational ICVS website | *December 2024* | | | |
| *Subtask 4.3:* : Maintain the ICVS LP product website | *October 2024 to September 2025* | | | |
| *Task 5: Upgrade the ICVS interactive vector tool by adding new products and functions* | *September 2025* | | | |
| *Subtask 5.1: Upgrade the ICVS dynamic interactive tool in the beta ICVS zone by filling in the non-available products in the tables(https://www.star.nesdis.noaa.gov/icvs-beta/metrics_new.php)* | *November 2024* | | | |
| *Subtask 5.2: Upgrade the ICVS dynamic interactive tool with new functions/products towards promotion to operational zone in coordination with the STAR IT team* | *January 2025* | | | |
| *Subtask 5.4: Promote the ICVS dynamic interactive tool with new functions to operational ICVS* | *March 2025* | | | |
| *Subtask 5.3: Maintain and upgrade* the ICVS website framework in operational, beta and development zones | *October 2024 through September 2025* | | | |
| *Task 6: Upgrade the operational ICVS system functions to better monitor/compare LT stability of the spacecrafts/instruments/SDR among 3 JPSS missions* | *March 2025* | | | |
| *Subtask 6.1: Develop new modules to monitor the same parameter in the same figure for 3 spacecrafts (only key parameters)* | *October 2024* | | | |
| *Subtask 6.2: Develop new modules to monitor the same RDR parameter in the same figure for the same instrument among three satellites (only key parameters)* | *November 2024* | | | |
| *Subtask 6.3: Develop new modules to monitor the same statistical parameters (e.g., daily mean and std. over selected sites) in SDR products in the same figure for the same instrument among three satellites* | *February 2025* | | | |
| *Subtask 6.4: Upgrade the ICVS inter-sensor comparison and other advanced capabilities by adding new products to better capture anomalous features in the SDR data* | *March 2025* | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 7: Develop new ICVS algorithms\modules in support of existing and future JPSS-04 missions* | *July 2025* | | | |
| *Subtask 7.1: Develop new ICVS modules about OMPS RTM O-B test cases* | *February 2025* | | | |
| *Subtask 7.2: Update the VIIRS inter-sensor comparison modules by adding NOAA-21 VIIRS* | *March 2025* | | | |
| *Subtask 7.3: Reprocess the ATMS lifetime O-B trending to improve the accuracy by using measured SRF* | *May 2025* | | | |
| *Subtask 7.4: Reprocess JPSS lifetime data with improved quality monitoring algorithms/modules* | *July 2025* | | | |
| *Task 8: Continue supporting NCCF cloud migration discovery activity* | *September 2025* | | | |
| *Subtask 8.1: Reorganize ICVS testing modules that will be migrated into the NCCF environment* | *February 2025* | | | |
| *Subtask 8.2: Convert selected code in Matlab into Python (limit to small efforts)* | *April 2025* | | | |
| *Subtask 8.3: Migrate the ICVS testing modules into the NCCF environment* | *June 2025* | | | |
| *Subtask 8.4: Verify the ICVS testing modules in the NCCF environment with off-line ICVS modules' results* | *September 2025* | | | |
| *Task 9:* Develop the ICVS prototype in support of JPSS-4 prelaunch Cal/Val activities in the STAR internal development zone | *September 2025* | | | |
| *Subtask 9.1: Upgrade the ICVS development website in compliance with IT security requirements* | *March 2025* | | | |
| *Subtask 9.2: Develop the ICVS framework for JPSS-04 by using NOAA-21 RDR as proxy* | *June 2025* | | | |
| *Subtask 9.2: Develop the ICVS framework for JPSS-04 by using NOAA-21 SDR as proxy* | *August 2025* | | | |
| *Subtask 9.3: Develop the ICVS modules in support of SDR teams' J3/J4 JCT test data sets* | *September 2025* | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 10: Explore potential of monitoring geolocation performance upon individual instrument SDR data in preparation of JPSS-04 missions* | *February 2025* | | | |
| *Subtask 10.1: Investigate the feasibility of monitoring geolocation performance by using individual instrument SDR data at window channels: case studies, e.g., OMPS NM at 380nm* | *October 2024* | | | |
| *Subtask 10.2: Initialize testing modules for more case applications* | *January 2025* | | | |
| *Subtask 10.3: Add the testing modules to ICVS website in development zone* | *February 2025* | | | |
| *Task 11: Develop a new monitoring framework within the ICVS system to improve timeliness and performance in preparation of J3/J4 missions* | *April 2025* | | | |
| *Subtask 11.1: Initialize a conceptual region-based ICVS monitoring framework (e.g., divide the whole global coverage into 24 regions)* | *October 2024* | | | |
| *Subtask 11.2: Initialize modules to monitor performance of regional data, including but not limited to daily regional images, daily 'anomaly' images against a multiple-day average, time series of regional data (daily 'anomaly')* | *December 2024* | | | |
| *Subtask 11.3: Improve the framework and algorithms with regional products towards operational transition* | *April 2025* | | | |
| *Task 12: Develop a conceptual PCA-based monitoring framework within the ICVS system to better monitor hyperspectral satellite data quality* | *June 2025* | | | |
| *Subtask 12.1: Initialize a conceptual PCA-based monitoring framework for JPSS hyperspectral instruments (e.g., OMPS NM, OMPS NP, and CrIS)* | *October 2024* | | | |
| *Subtask 12.2: Initialize PCA algorithm developments for OMPS and CrIS over selected regions (see Task 11)* | *March 2025* | | | |
| *Subtask 12.3: Explore potential of PCA-derived products in monitoring and detecting SDR data anomalies* | *June 2025* | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 13: Explore potentials of developing automation monitoring functions for the ICVS system by using innovation techniques in better preparation of J3/J4 missions* | *September 2025* | | | |
| *Subtask 13.1: Investigate feasibility of automatically generating analysis report per event based on the ICVS products from multiple sensors' observations, by taking advantages of task 11 above* | *March 2025* | | | |
| *Subtask 13.2: Develop preliminary innovation-based algorithms to automatically capture large anomaly features, which could be relevant to either radiometric features from severe weather events or spacecraft/instrument/SDR data problems* | *May 2025* | | | |
| *Subtask 13.3: Explore potentials of the new ICVS monitoring functions and innovation algorithms in better capturing impact of JPSS SDR data in better benefit of key users' applications* | *September 2025* | | | |
| *Task 14: Develop an initial algorithm/module to generate OMPS* NM Super-Resolution (NOAA-21 resolution) data using CNN in support of geolocation performance monitoring of JPSS OMPS NM SDR data | *August 2025* | | | |
| *Subtask 14.1: Investigate the feasibility of generating OMPS* NM Super-Resolution data using CNN | *March 2025* | | | |
| *Subtask 14.2: Initialize a testing algorithm for SNPP and NOAA-20* | *June 2025* | | | |
| *Subtask 14.2: Investigate potential of newly generated* super-resolution SNPP/NOAA-20 NM SDR data in the geolocation performance monitoring analysis | *August 2025* | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# VIIRS Imagery

*November 2024*

## *Accomplishments / Events:*

- Began using NODD for some VIIRS Imagery processing
  - Noted absence of M-band Imagery files
- VIIRS Sea Spray RGB recipe updated for CIRA SLIDER and NWS/AK
- Presentations highlighting VIIRS Imagery
  - "The Role of Weather Satellites in Observing the World", Josh Reiter (CIRA), OR&R Lecture Series: You Don't Know What You Don't Know
- Blog Posts with VIIRS Imagery
  - California Mountain Fire Nov 2024
  - Alaska Sea Spray Nov 2024
- 19 VIIRS Imagery Posts on CIRA Social Media (X) this Month. A few posts:
  - VIIRS nighttime NCC Imagery of US west coast cyclone (16.9K views)
  - VIIRS Day Fire RGB of Mountain Fire (12K views)
  - VIIRS Snowmelt RGB of melting Colorado snowpack (2.8K views)

## *Overall Status:*

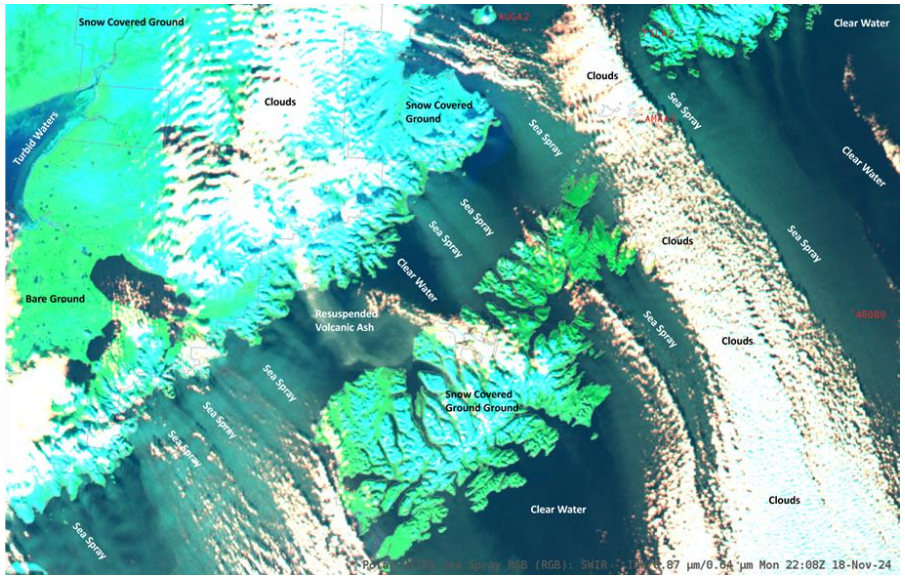
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | x | | | |
| **Technical / Programmatic** | | x | | | |
| **Schedule** | | x | | | |

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:***

## *Highlights: Image of the Month*

Figure: VIIRS Sea Spray RGB captures sea spray across the western Gulf of Alaska. From Alaska Sea Spray Nov 2024



| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: Evaluate/validate VIIRS Imagery EDRs routinely and as part of JPSS ground systems tests.* | Ongoing | | | |
| *Subtask 1.1:* | | | | |
| *Subtask 1.2:* | | | | |
| *Subtask 1.3:* | | | | |
| *Task 2: Continue to pursue the development of new DNB-to-NCC LUTs using recently optimized DNB ASF tool code* | Sep - 25 | | | |
| *Subtask 2.1: Generate DNB-to-NCC LUTs specific to NOAA-20, NOAA-21, and S-NPP using new DNB ASF tool code* | Mar - 25 | | | |
| *Subtask 2.2: Use new DNB-to-NCC LUTs to produce NCC imagery for each VIIRS, and compare imagery to that using the operational LUT* | Jun - 25 | | | |
| *Subtask 2.3: Upon evaluation, if imagery has similar or better quality to that using operational LUT, then pursue operational implementation of new DNB-to-NCC LUTs for each VIIRS.* | Sep - 25 | | | |
| *Task 3: Support JPSS Program outreach efforts through the Image Production subgroup.* | Ongoing | | | |
| *Subtask 3.1: Assist the JPSS Program Office and the JPSS Imagery Cal/Val team lead through the production of VIIRS imagery examples* | Ongoing | | | |
| *Subtask 3.2: Distribute VIIRS Imagery examples for use in public relations materials, scientific presentations given by JPSS Program management, forecaster training materials, social media, and scientific blog posts, among others.* | Ongoing | | | |
| *Subtask 3.3:* | | | | |
| *Task 4: JPSS-3 and JPSS-4 Cal/Val preparation activities, as requested by the JPSS Program Office.* | As Needed | | | |
| *Subtask 4.1: Cal/val plans and maturity schedules* | As Needed | | | |
| *Subtask 4.2: Data systems test events* | As Needed | | | |
| *Subtask 4.3:* | | | | |
| | | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 5: Continue to support development and production of VIIRS-related products for Polar SLIDER (https://rammb-slider.cira.colostate.edu/?sat=jpss), CIRA-produced VIIRS imagery products that are delivered to CIMSS' RealEarth website (https://realearth.ssec.wisc.edu), and similar products that are produced at UAF/GINA for distribution to NWS Alaska Region offices.* | Ongoing | | | |
| *Subtask 5.1:* | | | | |
| *Subtask 5.2:* | | | | |
| *Subtask 5.3:* | | | | |
| *Task 6: Coordinate with NESDIS/STAR/JPSS, NWS representatives, TOWR-S, and the JPSS Satellite Liaison on the delivery, display, and training of VIIRS imagery products to the NWS and solicit user feedback* | Ongoing | | | |
| *Subtask 6.1: Newly developed VIIRS Imagery Multispectral products* | Ongoing | | | |
| *Subtask 6.2: CrIS Imagery* | Ongoing | | | |
| *Subtask 6.3: VIIRS Imagery for CONUS users* | Ongoing | | | |
| *Task 7: Provide interesting VIIRS Imagery and Blogs on a regular basis throughout grant period, as well as provide presentations and publications where appropriate.* | Ongoing | | | |
| *Subtask 7.1:* | | | | |
| *Subtask 7.2:* | | | | |
| *Subtask 7.3:* | | | | |
| *Task 8: Contribute to monthly reports on the VIIRS Imagery EDR Team activities, and participate in Imagery Team meetings and relevant JPSS science meetings.* | Ongoing | | | |
| *Subtask 8.1:* | | | | |
| *Subtask 8.2:* | | | | |
| *Subtask 8.3:* | | | | |
| Task 9: Blowing Dust Climatology Paper submitted (includes VIIRS Imagery) | Sep - 25 | | | |
| Task 9: CrIS Imagery Paper submitted | Mar - 25 | | | |
| Task 9: Blowing Snow Paper submitted | Jun - 25 | | | |

# Leaf Area Index

*November 2024*

## *Accomplishments / Events:*

- Prepared for the upcoming Operational Readiness Review, including the generation of local verification datasets, ground LAI measurements, matched LAI products, and near real-time NASA VIIRS LAI data for inter-comparison.
- Held a meeting with the EMC model team to follow up on user requirements, evaluate LAI performance in the Noah-MP model, and discuss the future test plan.
- At the request of model users, investigated the availability and methodology of the stem area index (SAI) dataset and explored approaches to provide practical SAI for model applications.
- Continued work on improving the LAI algorithm, including summarizing LAI validation results, conducting uncertainty analyses, and enhancing temporal smoothing methods using machine learning techniques.

| 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 | May 30, 2024 | |
| Operational readiness | Jul-24 | Jul-24 | September 2024 | ASSIST team postponed due to verification data preparation |
| Develop LAI routine monitoring and validation tool | Sep-24 | Sep-24 | | |
| Apply the LAI routine monitoring and validation tool on the operational product | Dec-24 | Dec-24 | | |
| LAI operation data verification and adjustment | Mar-25 | Mar-25 | | |

## *Overall Status:*

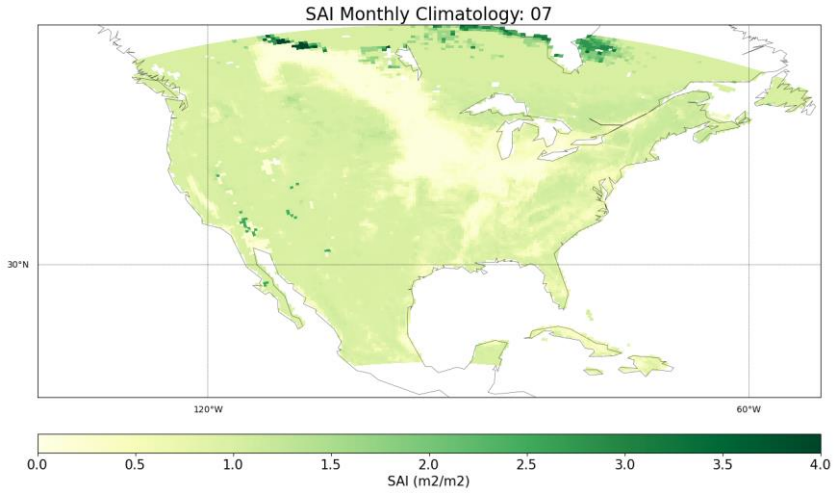
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | X | | | |
| **Schedule** | | X | | | |

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:*



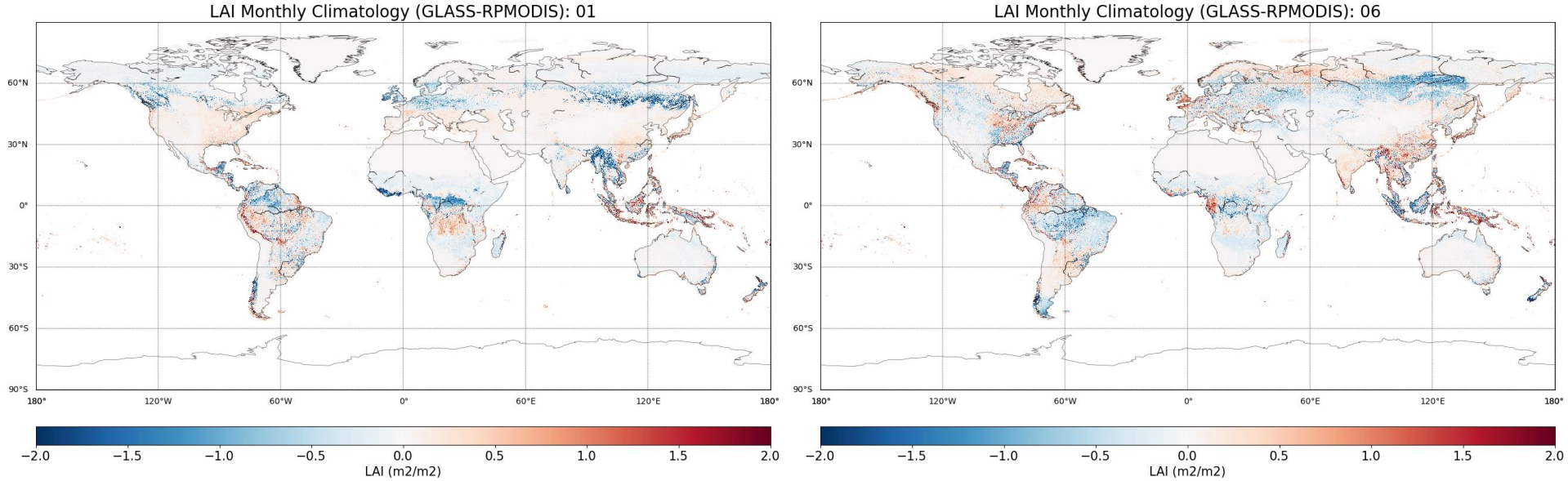

Investigate the Stem Area Index data and practical method (empirical algorithm, Zeng 2002) to provide for the Noah-MP model.

# LAI Monthly Climatology Evaluation

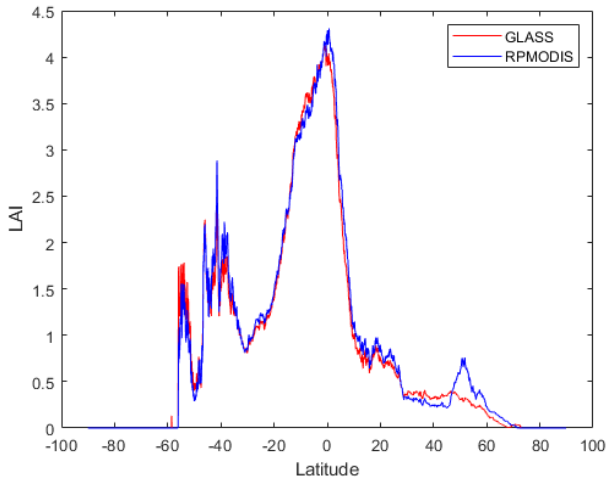
*November 2024*

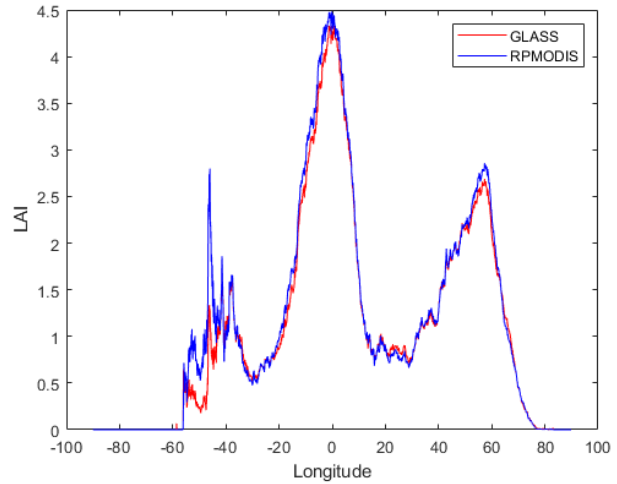
- Datasets
  - NOAA LAI monthly climatology based on 10 years GLASS LAI.
  - Reprocessed MODIS LAI (c6) which is temporal smoothed and gap filled by (Yuan, 2011)

- Results
  - Two datasets are both based on MODIS observations, so the consistency is good.
  - However, there are some difference need attention, such as Siberia southeast Asia and equator area, both datasets will be test in the Noah-MP model.
  - Model test show the positive impact of LAI on surface temperature.




The global LAI climatology difference (January and June) and mean LAI curve comparison over each latitude.



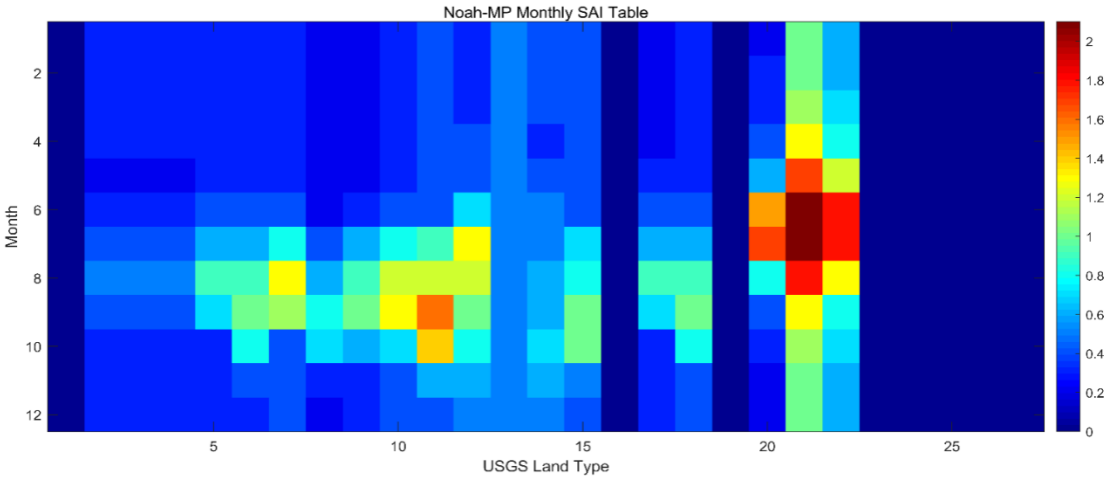
# SAI and LAI in the Model



- **Background:** in the land surface model, LAI is an important parameters for vegetation dynamics, meanwhiles, Stem Area Index (SAI) does not contribute to the photosynthesis but be critical in Energy Exchange, Interception.

- **Current SAI in Noah-MP**
  - Surface type dependent SAI.

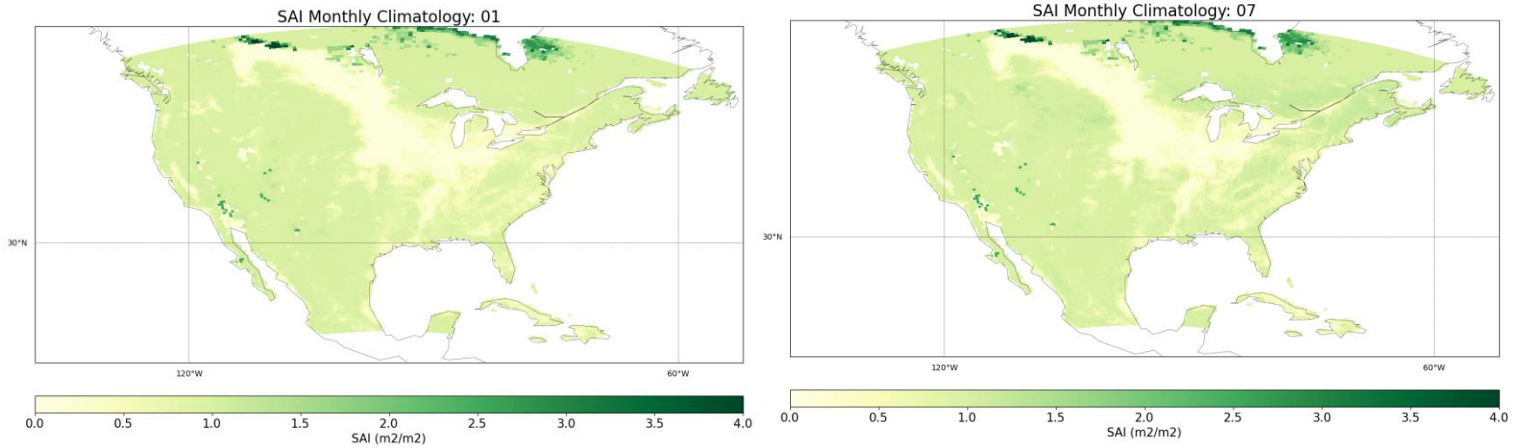
- **SAI derived from satellite observations.**
  - Empirical method based on time series LAI (zeng, 2002)




USGS 27 land types: 1: Urban and Built-Up Land; 2: Dryland Cropland and Pasture 3: Irrigated Cropland and Pasture; 4: Mixed Dryland/Irrigated Cropland and Pasture 5: Cropland/Grassland Mosaic; 6: Cropland/Woodland Mosaic; 7: Grassland; 8: Shrubland; 9: Mixed Shrubland/Grassland; 10: Savanna; 11: Deciduous Broadleaf Forest; 12: Deciduous Needleleaf Forest; 13: Evergreen Broadleaf Forest; 14: Evergreen Needleleaf Forest; 15: Mixed Forest; 16: Water Bodies; 17: Herbaceous Wetland; 18: Wooded Wetland; 19: Barren or Sparsely Vegetated; 20: Herbaceous Tundra; 21: Wooded Tundra; 22: Mixed Tundra; 23: Bare Ground Tundra; 24: Snow or Ice; 25: Playa; 26: Lava; 27: White Sand

$$L_s^n = \max\{[\alpha L_s^{n-1} + \max(L_{gv}^{n-1} - L_{gv}^n, 0)], L_{s,\min}\}$$

- Ls: Plant Area Index (PAI), PAI=SAI+LAI
- Lgv: LAI in vegetated area only
- n: denote the nth month
- 1-α: denote the monthly removal rate (0-0.5), which is provided for each IGBP surface type.



# FY25 Milestones/Deliverables

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | Algorithm & product improvement according to the validation and model test. | 7/1/2025 | 9/30/2025 | Algorithm test report | JPSS LAI product requirements |
| Integration & Testing (I) | LAI operational data verification and adjustment | 1/1/2025 | 3/31/2025 | | |
| Calibration & Validation (C) | LAI product in-situ validation & inter-comparison with other products | 3/1/2025 | 6/30/2025 | Validation report | |
| | Incorporate the LAI test data into the LSM model to evaluate the performance in the model | 1/1/2025 | 9/30/2025 | Model test report | |
| LTM & Anomaly Resolution (L) | Develop and apply LAI routine monitoring and validation tool | 10/1/2024 | 05/31/2025 | Monitoring tool package | |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

# Surface Albedo

*November 2024*

*Accomplishments / Events:*

- Verified the L3 VIIRS albedo from UAT by comparing it with local L3 albedo data in preparation for the ORR of VIIRS L3 albedo.
- Adapted the N21 VIIRS albedo for Long-Term Monitoring (LTM).
- Completed the ground validation of VIIRS blended albedo using data from three operational VIIRS sensors.
- Collaborated on global land surface anomaly monitoring efforts.

*Overall Status:*

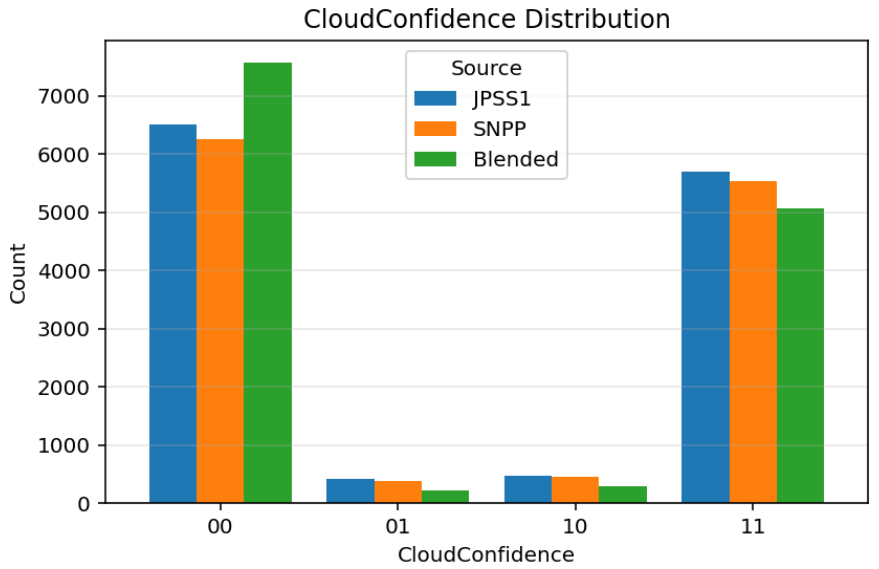
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| Cost / Budget | | X | | | |
| Technical / Programmatic | | x | | | |
| Schedule | | X | | | |

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 | Variance Explanation |
|---|---|---|---|---|
| Share the soil albedo dataset with model users | Dec-2023 | Dec-2023 | Dec-2023 | |
| Multi-parameter anomaly analysis report | Jan-2024 | Jan-2024 | Oct-2023 | |
| Provisional maturity of NOAA-21 Albedo | Feb-2024 | Jan-2024 | Jan-2024 | |
| VIIRS BRDF/Albedo/NBAR Dataset to User | Oct-2023 | May-2024 | Oct-2023 | |
| BRDF evaluation (manuscript) | Dec-2023 | Feb-2025 | | Need some contents of the integrated output |
| Enterprise Cal/Val Plan Initial Updates | Jun-2024 | Jun-2024 | Apr-2024 | |
| *NCCF Integration of BRDF/BSA/WSA/NBAR | May-2024 | Aug-2024 | | |
| Software package ready of blended SURFALB from all VIIRS sensors | Jun-2024 | Dec-2024 | | |
| NOAA-21 validated maturity review | May-24 | Sep-24 | Jan-2024 | |

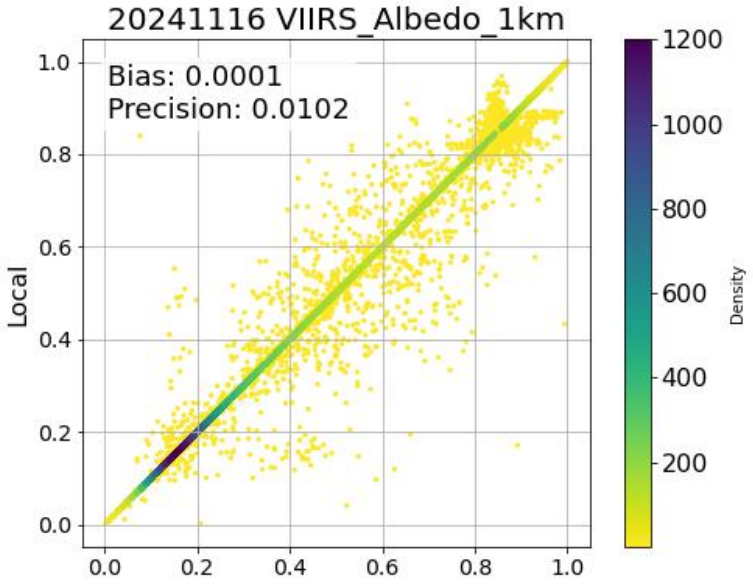
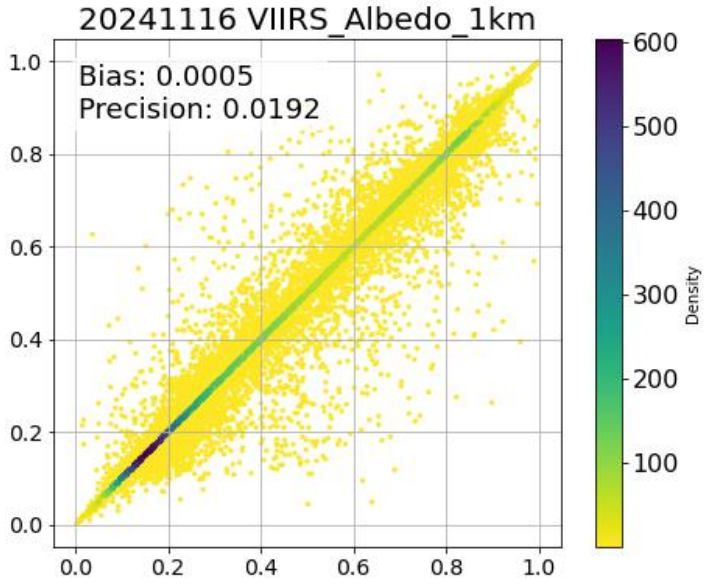
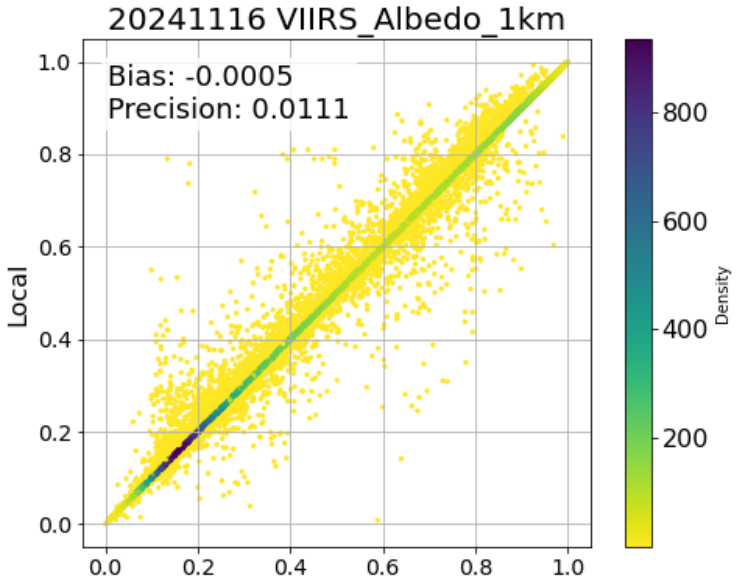
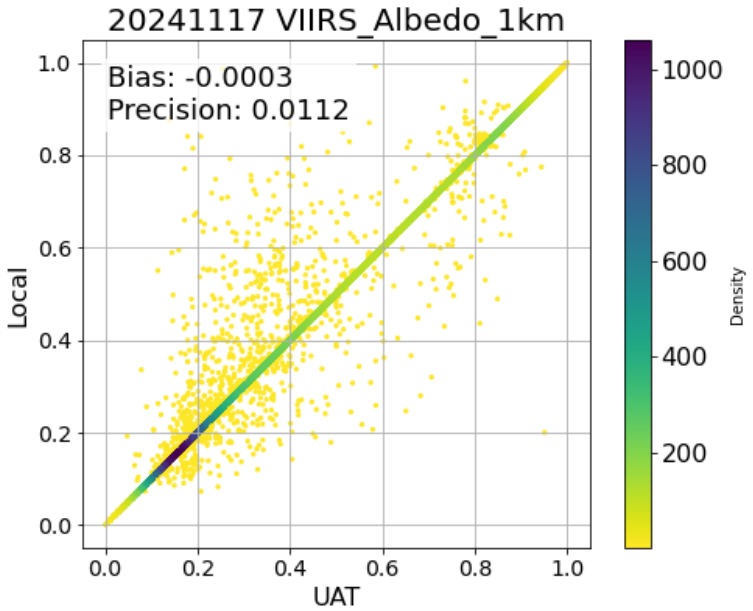
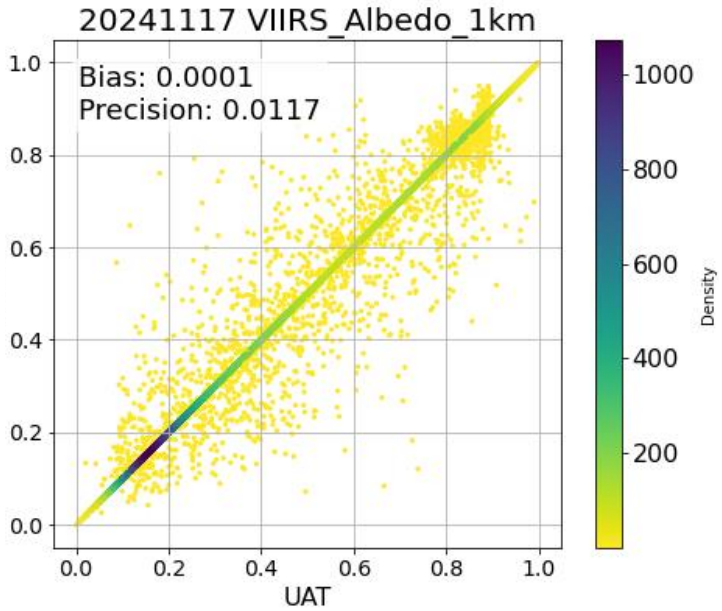
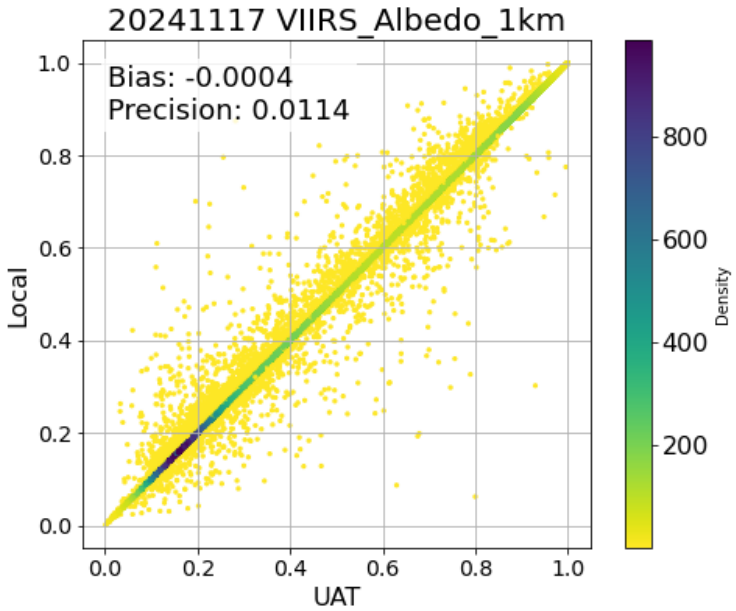
*Highlights:* The blended albedo enhances clear-sky retrievals




**Samples:**
Over SURFRAD

**Period:**
09/17/2019 – 11/10/2024

# Comparison between UAT LSA values and Local LSA values

| | NOAA-21 | NOAA-20 | S-NPP |
|---|---|---|---|
| 20241116 |  |  |  |
| 20241117 |  |  |  |

# Comparison between UAT and Local L3 VIIRS_Albedo_1km

| Satellite-Date | Bias | Precision | Fraction of pixels with abs(difference) > 0.02 |
|---|---|---|---|
| **J01-20241116** | 0.000 | 0.019 | 0.006 |
| **J01-20241117** | 0.000 | 0.012 | 0.002 |
| **J02-20241116** | 0.000 | 0.010 | 0.002 |
| **J02-20241117** | -0.000 | 0.011 | 0.001 |
| **NPP-20241116** | -0.001 | 0.011 | 0.003 |
| **NPP-20241117** | -0.000 | 0.011 | 0.003 |

The table shows strong consistency between UAT and local L3 VIIRS Albedo values, with near-zero bias, high precision (0.010–0.019), and a low fraction of significant differences (< 0.006). These results confirm the reliability of UAT data across satellites and dates.

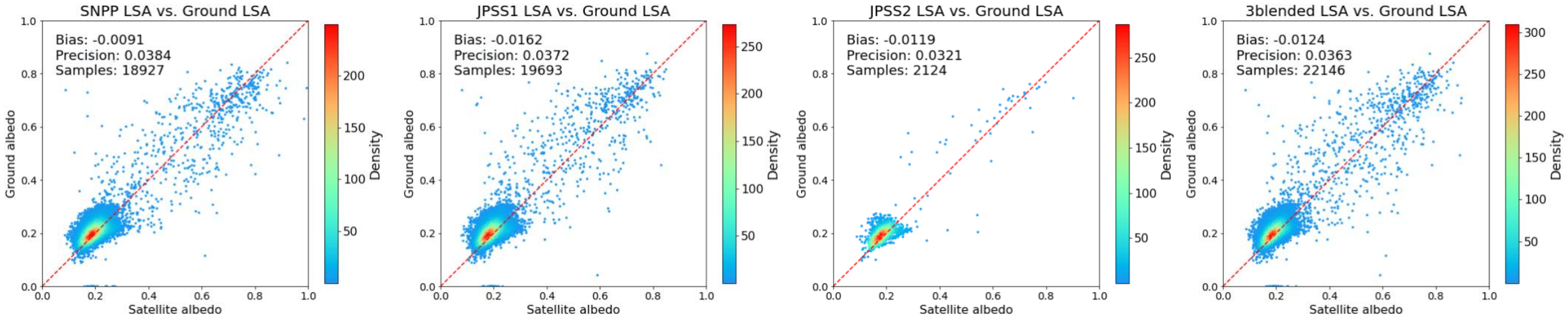
# Comparison between UAT and Local L3 QualityFlag

| Satellite-Date | Same ‘QF’ Fraction | Different ‘QF’ Fraction | Same ‘Overall Quality’ Fraction | Different ‘Overall Quality’ Fraction | Same ‘Cloud Condition’ Fraction | Different ‘Cloud Condition’ Fraction | Same ‘LUT type’ Fraction | Different ‘LUT type’ Fraction |
|---|---|---|---|---|---|---|---|---|
| J01-20241116 | 0.984 | 0.016 | 0.988 | 0.012 | 0.987 | 0.013 | 0.997 | 0.003 |
| J01-20241117 | 0.999 | 0.001 | 1 | 0 | 0.999 | 0.001 | 1 | 0 |
| J02-20241116 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| J02-20241117 | 0.997 | 0.003 | 0.999 | 0.001 | 0.997 | 0.003 | 1 | 0 |
| NPP-20241116 | 0.998 | 0.002 | 0.998 | 0.002 | 0.998 | 0.002 | 1 | 0 |
| NPP-20241117 | 0.998 | 0.002 | 0.998 | 0.002 | 0.998 | 0.002 | 1 | 0 |

This table demonstrates a high level of agreement between UAT and local L3 quality flags across satellites and dates. The ‘Overall Quality,’ ‘Cloud Condition,’ and ‘LUT Type’ are three components of the overall ‘QF’.
Key metrics, such as "Same ‘QF’ Fraction," "Same ‘Overall Quality’ Fraction," and "Same ‘Cloud Condition’ Fraction," consistently approach 1, with minimal differences observed.

# The blended albedo enhances high-quality retrievals

Samples: Over SURFRAD and ARM SGP
Period: 09/17/2019 – 11/30/2024

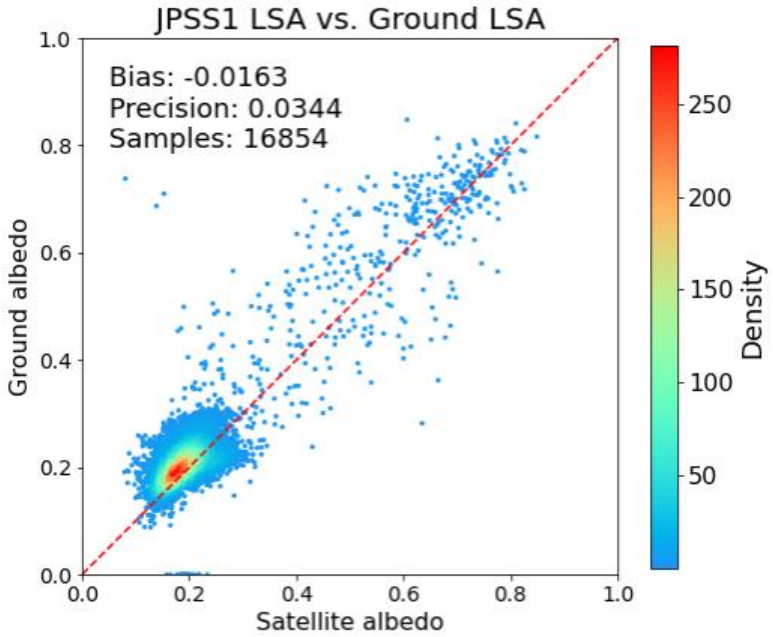


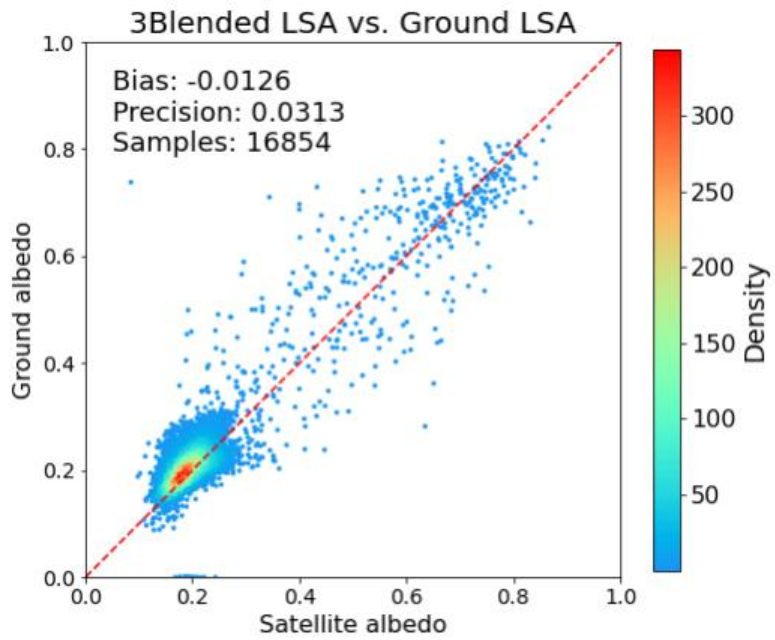

| High-quality match-up number number during this period | | | | |
|---|---|---|---|---|
| Satellite | SNPP | JPSS1 | JPSS2 | **3-blended** |
| Samples | 18,927 | 19,693 | 2,124 | **22,146** |

The **3-Blended Albedo** outperforms individual satellites with the highest number of samples (22,146) and a balanced bias of -0.0124 and precision of 0.0363. These results highlight the advantage of blending data from multiple satellites, enabling more comprehensive and high-quality clear-sky albedo retrievals.

# The blended albedo improves product quality

Content: **Blended Albedo** vs. **JPSS1 Albedo**
Samples: Over SURFRAD and ARM SGP sites
Period: 09/17/2019 – 11/10/2024
(*matched dates only for an apple-to-apple comparison*)



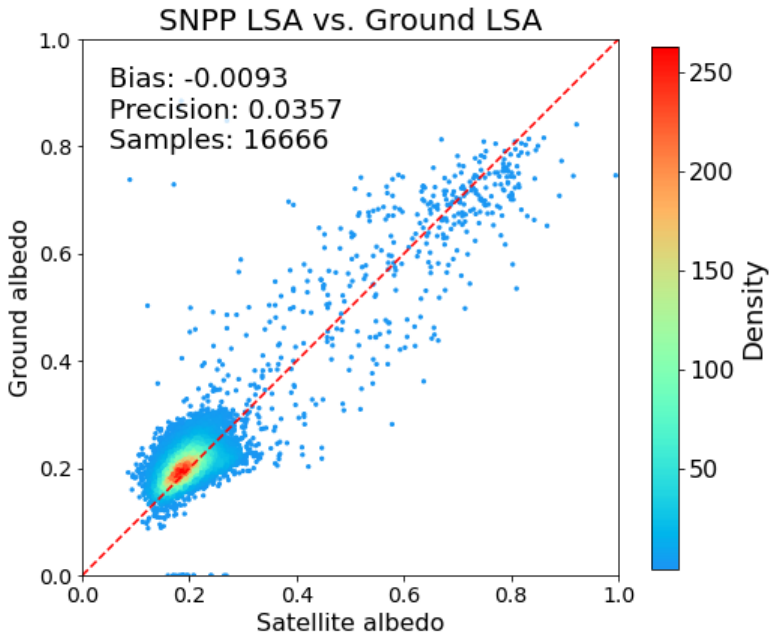



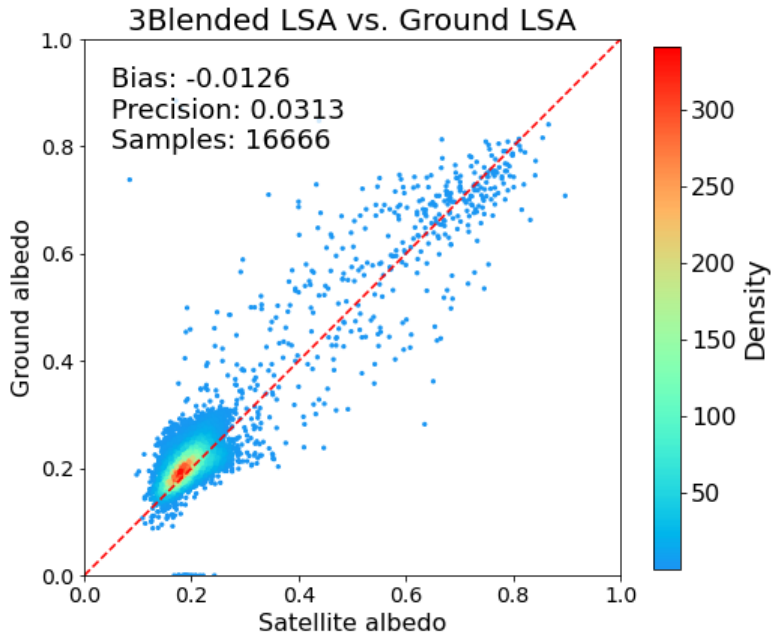

**Blended Albedo vs. JPSS1 Albedo**

- **Lower Bias**: Smaller bias (-0.0126) compared to JPSS1 (-0.0163), closer to ground truth.
- **Higher Precision**: Reduced variability (0.0313 vs. 0.0344), leading to more reliable measurements.
- **Better Consistency**: Closer clustering along the 1:1 line, indicating more consistent measurements.

# The blended albedo improves product quality

Content: **Blended Albedo** vs. **SNPP Albedo**
Samples: Over SURFRAD and ARM SGP sites
Period: 09/17/2019 – 11/10/2024
(*matched dates only for an apple-to-apple comparison*)



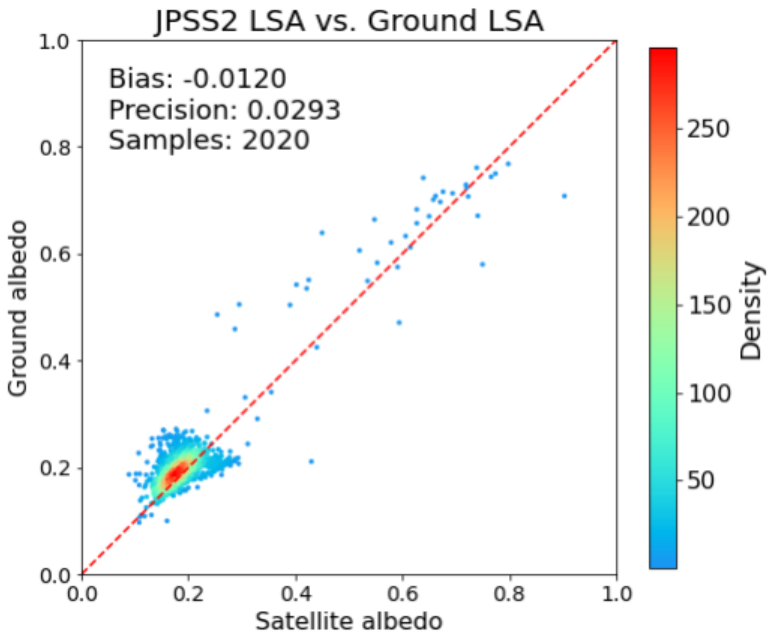



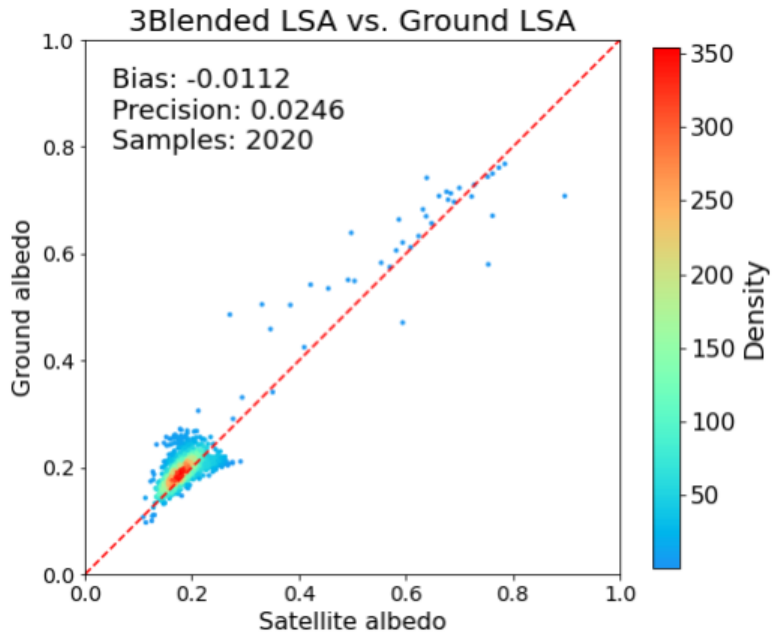

**Blended Albedo vs. SNPP Albedo**

- **Higher Precision**: Reduced variability (0.0313 vs. 0.0357), leading to more reliable measurements.
- **Better Consistency**: Closer clustering along the 1:1 line, indicating more consistent measurements.

# The blended albedo improves product quality

Content: **Blended Albedo** vs. **JPSS2 Albedo**
Samples: Over SURFRAD and ARM SGP sites
Period: 09/17/2019 – 11/10/2024
(*matched dates only for an apple-to-apple comparison*)




**Blended Albedo vs. JPSS2 Albedo**

- **Lower Bias**: Smaller bias (-0.0112) compared to JPSS1 (-0.012), closer to ground truth.
- **Higher Precision**: Reduced variability (0.0246 vs. 0.0293), leading to more reliable measurements.
- **Better Consistency**: Closer clustering along the 1:1 line, and less scattered points.

# FY25 Milestones/Deliverables

| | Milestone | Start | Finish | Deliverable | Requirement (Dev Only) | Project |
|---|---|---|---|---|---|---|
| 1 | Software package for blended SURFALB from all VIIRS sensors | Oct-24 | Dec-24 | L3 code package for using observations from three satellites in generating blended albedo | | JPSS-Albedo |
| 2 | Sea-ice albedo climatology dataset | Mar-25 | Feb-25 | VIIRS albedo climatology being updated over the sea-ice pixels and used in VIIRS albedo algorithm | | JPSS-Albedo |
| 3 | Application of albedo in radiation force report | July-25 | Sep-25 | A manuscript, or a memorandum | | JPSS-Albedo |
| 4 | LSA and other land anomaly monitoring interface | Oct-24 | Jul-25 | An interactive interface to observe the real-time albedo anomaly | | JPSS-Albedo |
| 5 | BRDF algorithm based on the joint of NPP, JPSS-1, and JPSS-2 | Jul-24 | Dec-24 | DAP: Software, documents, and test data | | PPM-BRDF |
| 6 | Scientific report of Albedo/BRDF validation and monitoring | Sep-24 | Jul-25 | A report | | PPM-BRDF |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

# Land Surface Temperature

*November 2024*

## *Accomplishments / Events:*

- For all weather LST, direct mapping without relying on the projection conversion indices has proven effective. Software code issues such as incorrect attributes, incomplete data items, and double scaling of the LST value, have been resolved.
- Further testing of the all weather LST science code has been conducted and LST output has been verified through comparison with operational L3 VIIRS LST. The data layers are complete and all weather LST results are as expected. (highlight & slide 2)
- Three posters have been prepared for AGU 2024 including “Validation and Performance Evaluation of NOAA-21 VIIRS LST Product”, “All-weather Land Surface Temperature (LST): Methodology and Experiment on JPSS/VIIRS LST”, and “A Preliminary Evaluation of SNPP VIIRS LST Product with Landsat 8 Data ” (slide 3-5)
- Conducted the overall ground validation of the all weather LST and the result has been included in the AGU Poster II.(slide 4)
- Ordered the VIIRS LST from CLASS and extended the time series analysis over UrbanNet stations. Summarized the results into slides. (Slide 6-7)
- Conducted latest ground validation for L2 NOAA-21 LST, also the same period for SNPP and NOAA-20 LST for performance comparison.(slide 3)
- Completed the L3 NOAA-21 data verification and summarized the results. Attended the L3 gridded LST ORR kickoff meetings. (slide 8-11)

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | | | | |
| **Schedule** | X | | | | |

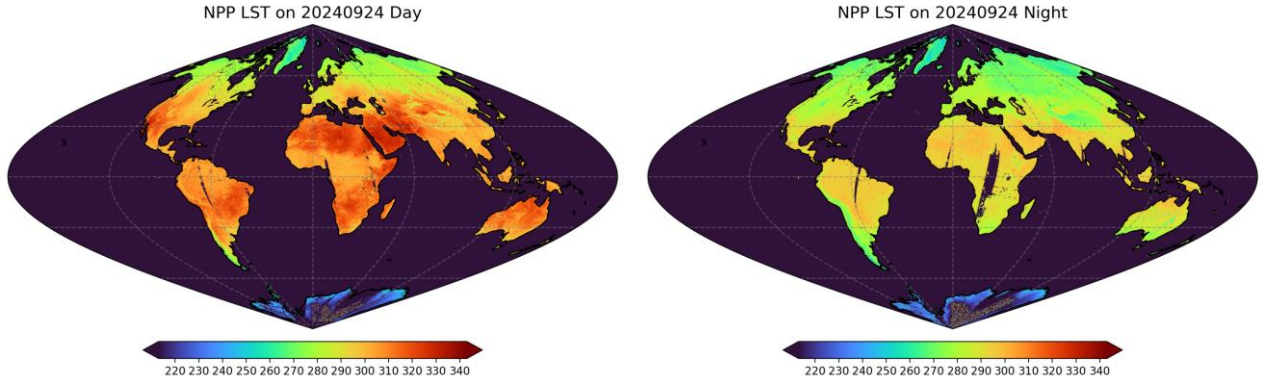
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

## ***Issues/Risks:***

None

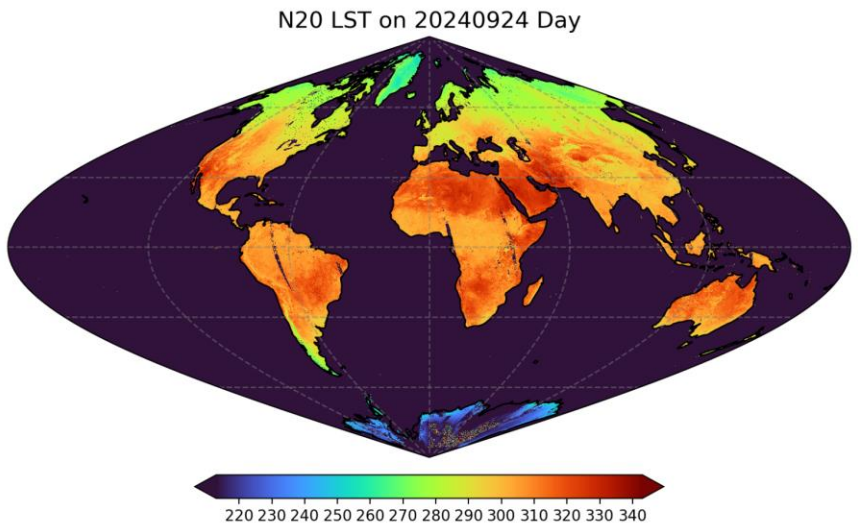
| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| **N-21 LST data monitoring, consistency and performance evaluation** | **Oct-24** | **Dec-24** | | |
| **L2 & L3 SNPP, NOAA-20 annual validation practice** | **Dec-24** | **Jan-25** | | |
| **Support to JPSS-3 Data System Test Event** | **Jan-25** | **Apr-25** | | |
| **I-band LST validation and applications** | **Oct-24** | **May-25** | | |
| **All weather LST validation and improvement** | **Jan-24** | **Aug-25** | | |
| **Monitoring and Anomaly watch, analysis and report** | **Oct-24** | **Sep-25** | | |

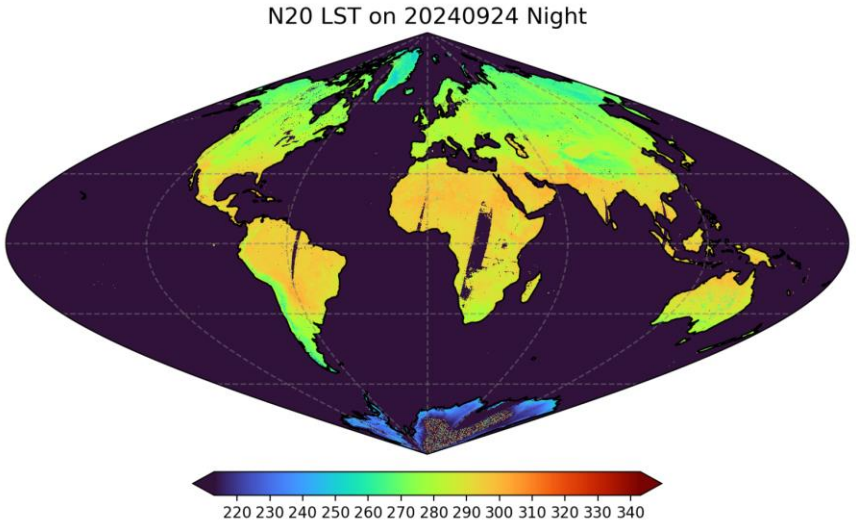
## *Highlights:* All weather SNPP VIIRS LST Sample Image

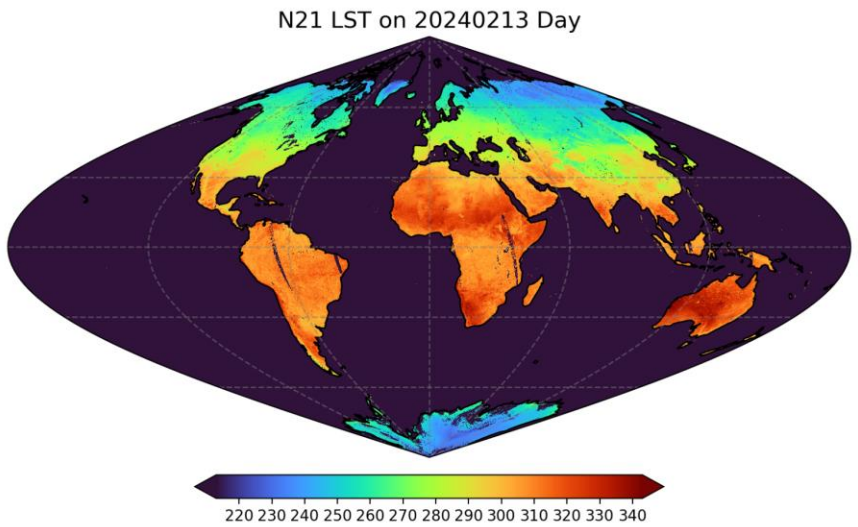


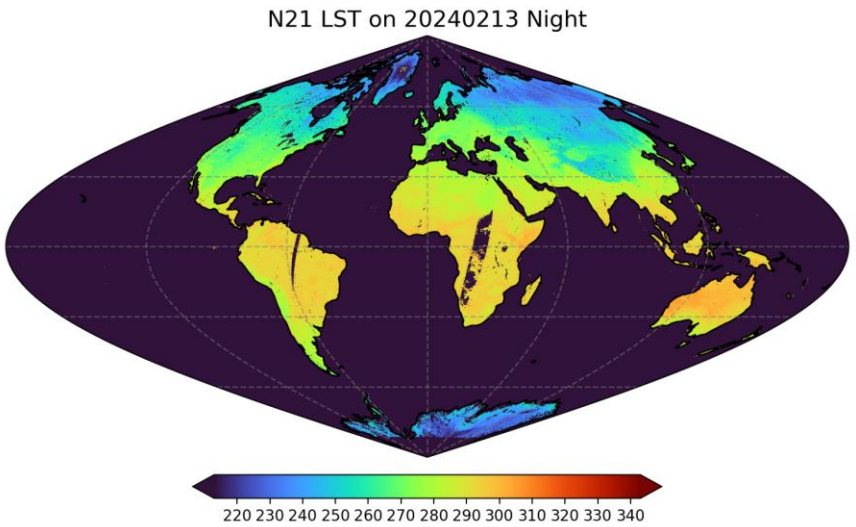

The all weather SNPP VIIRS LST in sinusoidal projection for daytime(left) and nighttime(right)

# All weather LST Latest Test – NOAA-20 and NOAA-21




- All weather LST code has been tested on all three satellites including SNPP, NOAA-20 and NOSS-21, for both daytime and nighttime.
- The all weather LST output is in the same projection as the operational L3 LST.
- The current version used the 1 km NDVI data as input.
- Visualization shows the LST value and distribution are in normal range

# Validation and Performance Evaluation of NOAA-21 VIIRS LST Product

Yuling Liu[1], Yunyue Yu[2], Peng Yu[1], Shuo Xu[3] and Heshun Wang[1]

[1] CISESS/ ESSIC, University of Maryland, College Park, MD; [2] STAR/NESDIS/NOAA, College Park, MD. [3] Department of Geographical Sciences, University of Maryland, College Park

## NOAA-21 LST Product Overview

### Enterprise VIIRS LST algorithm

$$T_s = C_0 + C_1 T_{11} + C_2(T_{11} - T_{12}) + C_3 \varepsilon + C_4 \varepsilon (T_{11} - T_{12}) + C_5 \Delta\varepsilon$$

$T_{11}$ and $T_{12}$ : the TIR split-window channel BTs

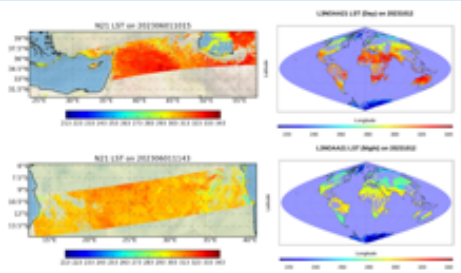
$\varepsilon$ and $\Delta\varepsilon$: mean emissivity at the TIR spectrum, and the emissivity difference

LUT (C) dimension: Day/night, View Zenith Angle, Total Column Water Vapor

The LUT is generated based on the same simulation database under the same procedure

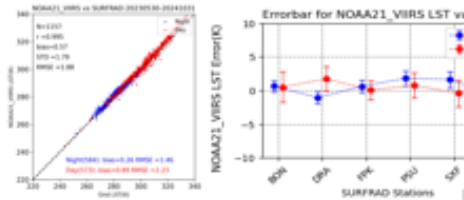
### Data access and status

- The NOAA-21 VIIRS LST achieved validated maturity in June 2023
- NOAA 21 LST data is available at NOAA at https://www.aev.class.noaa.gov/saa/products/search?sub_id=0&datatype_family=JPSS_GRAN
- The transition of LST data to the cloud is currently underway.

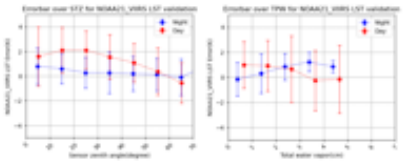


## Temperature Based Validation- SURFRAD

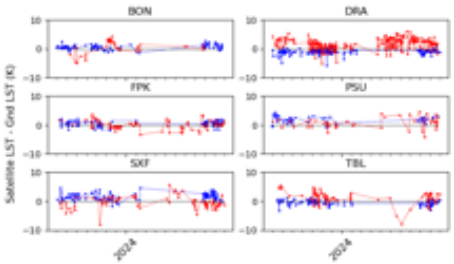
Surface Radiation Budget Network





Top left figure presents the combined validation results from SURFRAD stations; Top middle figure shows the sitewide LST error; the top right figure depicts the error over satellite zenith angle and total precipitation water vapor; and bottom left figure is sitewide LST error time series.

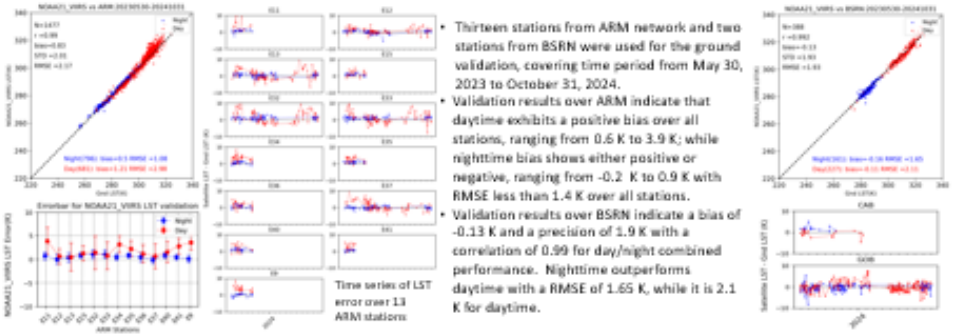



- Six stations from SURFRAD were used for the ground validation, covering time period from May. 29 2023 to Oct. 31, 2024.
- Day/night combined results indicates that the bias is within requirement and precision less than 1.9 K for all stations.
- Daytime exhibits a positive bias over all stations, ranging from 0.38 K to 1.6 K.
- Nighttime bias shows either positive or negative, ranging from -1.1 K to 1.8 K.

## Temperature Based Validation-ARM & BSRN

Atmospheric Radiation Measurement

Baseline Surface Radiation Network

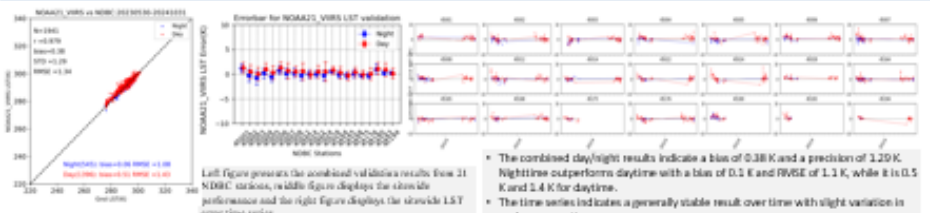


Time series of LST error over 13 ARM stations

- Thirteen stations from ARM network and two stations from BSRN were used for the ground validation, covering time period from May 30, 2023 to October 31, 2024.
- Validation results over ARM indicate that daytime exhibits a positive bias over all stations, ranging from 0.6 K to 3.9 K; while nighttime bias shows either positive or negative, ranging from -0.2 K to 0.9 K with RMSE less than 1.4 K over all stations.
- Validation results over BSRN indicate a bias of -0.13 K and a precision of 1.9 K with a correlation of 0.99 for day/night combined performance. Nighttime outperforms daytime with a RMSE of 1.65 K, while it is 2.1 K for daytime.

## Temperature Based Validation- NDBC

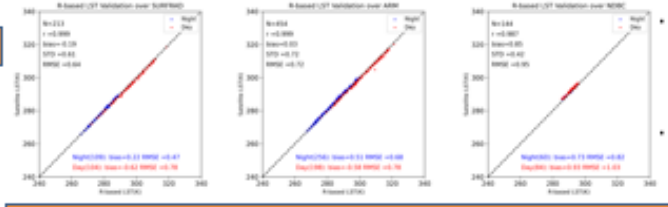
National Data Buoy Center



Left figure presents the combined validation results from 31 NDBC stations, middle figure displays the sitewide performance and the right figure displays the sitewide LST error time series.

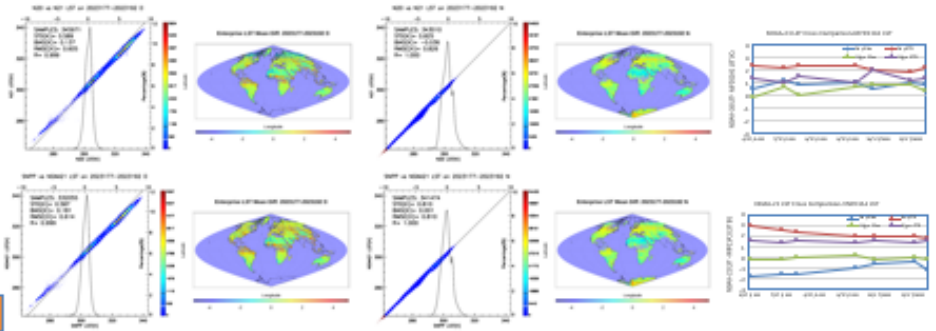
- The combined day/night results indicate a bias of 0.38 K and a precision of 1.29 K. Nighttime outperforms daytime with a bias of 0.1 K and RMSE of 1.1 K, while it is 0.5 K and 1.4 K for daytime.
- The time series indicates a generally stable result over time with slight variation in early summer time.

## Radiance Based Validation



- R-based validation of NOAA-21 VIIRS LST was conducted over SURFRAD and ARM stations for the time period from May 29, 2023 to December 10, 2023; over NDBC stations for the time period from Aug. 22 to Sep. 30, 2023
- Overall the positive bias for nighttime condition while negative bias for daytime conditions.

## Inter/Cross Satellite LST Comparison



- The daytime and nighttime inter-comparison among JPSS VIIRS LSTs is conducted based on the mean LST calculated within consecutive 16-day time periods to mitigate the impact from viewing angle and view time. The time period covers from June 26 to July 11, 2023.
- MYD11A1 and VNP21A1 were used for the cross comparison. One day in each month from June to December, 2023 for both daytime and nighttime

| Attribute Analyzed | On-orbit Performance | | |
|---|---|---|---|
| | NOAA-21 | NOAA-20 | S-NPP |
| Accuracy | SURFRAD:0.57 k<br>ARM:0.83k<br>BSRN: -0.13 K<br>NDBC: 0.38 k | SURFRAD: 0.03 K<br>ARM:0.18 k<br>NDBC: -0.7 K | SURFRAD: -0.01 K<br>ARM: 0.03 k<br>NDBC:-0.72K |
| Precision | SURFRAD: 1.79 k<br>ARM: 2.01 k<br>BSRN: 1.93 k<br>NDBC: 1.29 k | SURFRAD: 1.55 k<br>ARM: 1.72 k<br>NDBC:1.3 K | SURFRAD: 1.57 k<br>ARM: 1.69 k<br>NDBC:1.35 K |

## Summary

- The NOAA-21 LST data has been validated using ground observations from multiple networks including SURFRAD, ARM, BSRN, and NDBC, representing diverse surface types. The statistical results meet the specified requirements.
- Radiance based validation has been performed across multiple stations, revealing a bias ranging from -0.19 K to 0.85 K and a STD ranging from 0.42 K to 0.72 K, well below the requirements.
- The inter-comparison among the three VIIRS LSTs has been conducted, demonstrating overall close statistics for both daytime and nighttime

# Poster-I for AGU 2024

- This poster summarized the latest efforts in evaluating the performance of NOAA-21 LST.
- It includes the validation using ground observations from the SURFRAD, ARM, BSRN, and NDBC networks, with statistical results meeting the specified requirements.
- The radiance based LST validation is also presented
- Inter-satellite LST comparison among SNPP, NOAA-20 and NOAA-21 LST, demonstrates overall consistent statistics for both daytime and nighttime.
- The cross satellite comparison with MODIS and VNP21 indicates very close LST at nighttime and a negative bias during daytime when compared with VNP21 LST

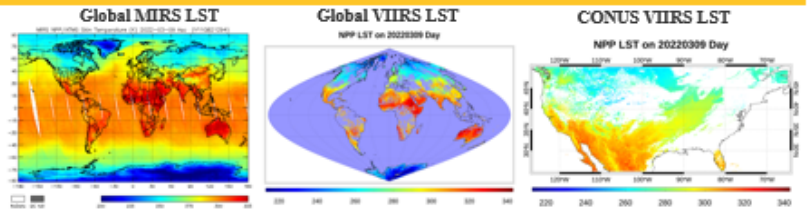
# All-weather Land Surface Temperature (LST): Methodology and Experiment on JPSS/VIIRS LST

Shuo Xu[1], Yuling Liu[2], Yunyue Yu[3], Peng Yu[2]
[1]Department of Geographical Sciences, University of Maryland, College Park, MD, 20742, USA,
[2]Earth System Science Interdisciplinary Center, University of Maryland, College Park, MD 20740, USA,
[3]NOAA/NESDIS/Center for Satellite Applications & Research (STAR), College Park, MD 20740, USA.
E-mail: shuoxu98@terpmail.umd.edu

## Introduction

Land surface temperature (LST), like body temperature for humans, is a vital indicator of Earth's health with diverse applications. Remote sensing provides two main types of LST data: **thermal infrared (TIR) LST**, which offers high spatial resolution and accuracy but can be missing due to cloud cover, and **passive microwave (PMW) LST**, which penetrates clouds but has lower spatial resolution and accuracy.

Both types of satellite-retrieved LST data are highly reliable. This study aims to **fuse TIR and PMW LST data to produce high-quality, all-weather LST products** essential for climate change research and various applications, utilizing daily L2 MIRS and L3 VIIRS LST along with ancillary data including NDVI, SRTM slope, SRTM elevation, and emissivity data.




## Challenges

- The relatively **low accuracy** of the MIRS LST data **constrains the accuracy** of the fused LST data.
- Many **missing values** in the VIIRS LST data, and the **large spatial resolution difference** between VIIRS and MIRS LST data, which can cause **step discontinuities or excessive smoothness** in the fused results.

## Methods

Two fusion strategies are employed. The first method uses Cumulative Distribution Function (CDF) matching and Multiresolution Kalman Filtering (MKF), while the second method is based on Neural Networks (NN) algorithm.

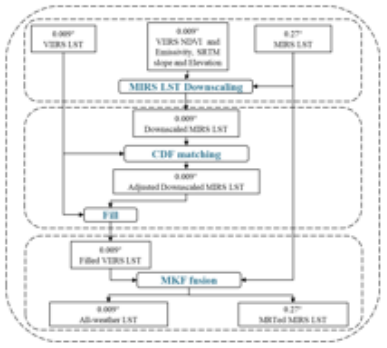



Fig. 1. Overview of the LST fusion strategy combining CDF matching and MKF methods.

The **CDF matching approach** adjusts the downscaled PMW LST data to match TIR LST data, **improving the quality of the PMW LST data**. The **MKF approach** further integrates these datasets to **reduce their inconsistencies** and **improve their spatial completeness**.

The **NN-based approach combines** VIIRS LST, MIRS LST, and **various auxiliary information** to develop a NN model that generates LST data with higher spatial resolution and completeness.

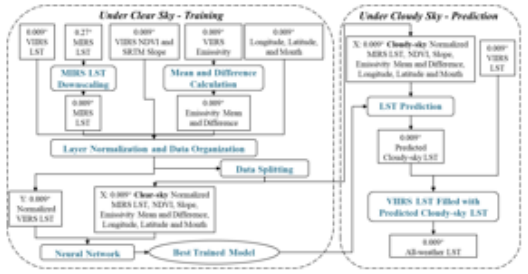



Fig. 2. Overview of the LST fusion strategy based on NN method.

## Results

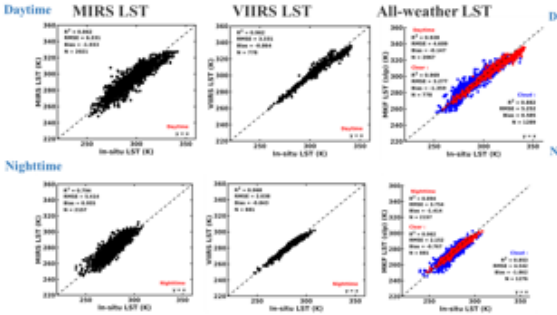



Fig. 3. Validation results of LST generated by the fusion strategy combining CDF matching and MKF methods. The data spans January 1 to December 31, 2020, validated using six SURFRAD stations.

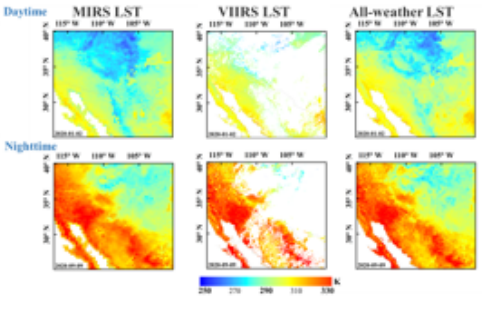



Fig. 4. Spatial distribution of LST generated by the fusion strategy combining CDF matching and MKF methods.

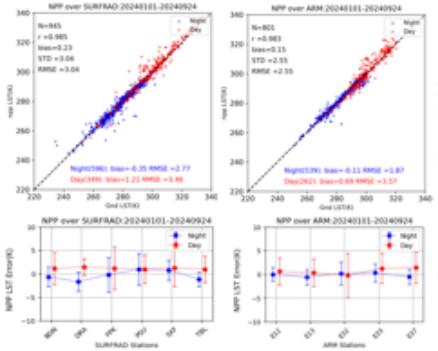


Fig. 5. Validation results of LST generated by NN method. The data spans January 1–April 15 and June 10–September 24, 2024, validated using six SURFRAD and five ARM stations.

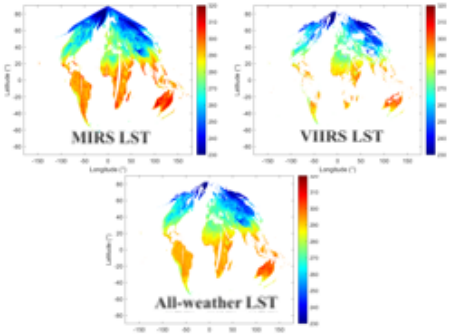



Fig. 6. Spatial distribution of LST generated by NN method.

## Conclusion

The all-weather LST offers high accuracy and complete data coverage, matching the high spatial resolution of VIIRS. It provides more complete data than VIIRS LST and surpasses MIRS LST in accuracy and spatial resolution, avoiding step discontinuities and excessive smoothing. It supports studies on urban heat islands, climate change, evapotranspiration, hydrology, and vegetation monitoring.

## Reference

Xu, Shuo, and Jie Cheng. "A new land surface temperature fusion strategy based on cumulative distribution function matching and multiresolution Kalman filtering." **Remote Sensing of Environment** 254 (2021): 112256.

# Poster-II for AGU 2024

- This study aims to fuse TIR and PMW LST data to produce high-quality, all-weather LST products essential for climate change research and various applications, utilizing daily L2 MIRS and L3 VIIRS LST along with ancillary data including NDVI, SRTM slope, SRTM elevation, and emissivity data.
- Two fusion strategies are presented. The first method uses Cumulative Distribution Function (CDF) matching and Multiresolution Kalman Filtering (MKF), while the second method is based on Neural Networks (NN) algorithm.
- The preliminary validation of the all weather LST generated from above two methods have been presented.
- The all-weather LST offers high accuracy and complete data coverage, matching the high spatial resolution of VIIRS. It provides more complete data than VIIRS LST and surpasses MIRS LST in accuracy and spatial resolution, avoiding step discontinuities and excessive smoothing.

# A Preliminary Evaluation of SNPP VIIRS Land Surface Temperature Product with Landsat 8 Data

Chelsea Sun [1] and Yuling Liu[2]
[1] Atholton High School, Columbia, MD, 21044
[2] CISESS/UMD, College Park, MD 20740

## ABSTRACT

Land surface temperature (LST) measures the Earth's surface temperature. It is a key parameter in controlling surface heat and water exchange with the atmosphere. LST data are also useful for monitoring crop and vegetation health, and urban heat island effects. An LST product is routinely generated at National Oceanic and Atmospheric Administration (NOAA) from Visible Infrared Imager Radiometer Suite (VIIRS), a polar-orbiting operational environmental sensor onboard Suomi National Polar-orbiting Partnership (SNPP) satellite for over a decade. In this study performed during my 2024 summer internship, the objective is to evaluate the VIIRS LST product with independent satellite retrievals from the Landsat-8 Collection 2 surface temperature product.

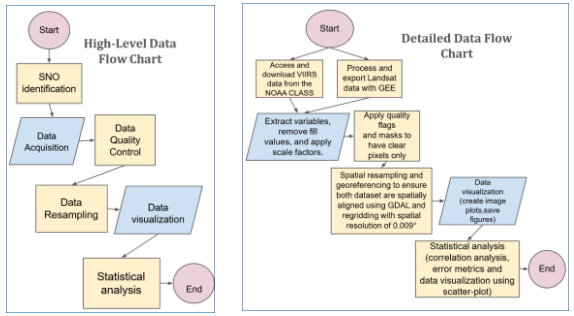
The SNPP VIIRS LST data were accessed and downloaded from the NOAA Comprehensive Large Array-data Stewardship System (CLASS). The Landsat-8 LST product was exported from the Google Earth Engine platform using JavaScript. First, Simultaneous Nadir Overpass (SNO) between SNPP VIIRS and Landsat-8 were identified. SNOs with less cloud cover over land were selected. The associated LSTs were downloaded and quality controlled to include only clear-sky pixels. Next, the VIIRS and Landsat 8 data were resampled to common regular grids with a spatial resolution of 0.009° and matched spatially. Example comparisons were analyzed at 05:15 UTC for VIIRS and 05:18 UTC for Landsat 8 on May 25, 2024; and 06:57 UTC for both VIIRS and Landsat 8 on April 7, 2024. The image plots illustrated similar spatial patterns. The statistical analysis after resampling to common grids indicated a reasonable agreement between VIIRS and LandSat-8 LST.

## DATA and METHODOLOGY

- The SNPP VIIRS LST data is accessed and downloaded from the NOAA (CLASS): https://www.class.noaa.gov
- The Landsat 8 LST product is exported from the Google Earth Engine (GEE) platform using JavaScript: https://code.earthengine.google.com/.
- Apply quality control on both VIIRS and Landsat-8 LSTs to include only clear-sky pixels.
- The Simultaneous Nadir Overpass (SNO) between SNPP VIIRS and Landsat 8 are identified.

| Index | Date (LANDSAT-8) | Time (LANDSAT-8) | LatLon (LANDSAT-8) | SZA (LANDSAT-8) | Date (NPP) | Time (NPP) | LatLon (NPP) | SZA (NPP) | Distance (km) | Time Diff (sec) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4/7/2024 | 6:57:00 | 70.08, 71.73 | 62.99 | 4/7/2024 | 6:57:34 | 70.08, 71.77 | 62.99 | 1.63 | 34 |
| 2 | 5/25/2024 | 5:18:01 | 70.57, 97.26 | 49.45 | 5/25/2024 | 5:16:50 | 70.66, 96.27 | 49.57 | 37.76 | 71 |

## Data Flow Chart

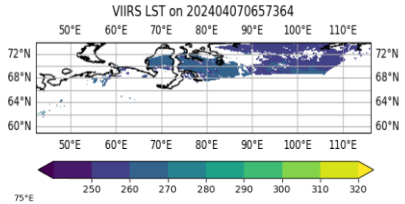


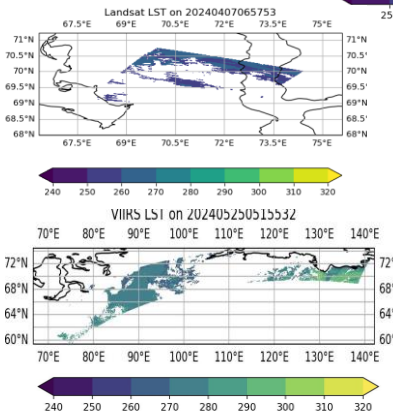

- Re-grid the VIIRS and Landsat-8 LST data to the same grid
  - Spatial resampling and georeferencing were performed to ensure both datasets are spatially aligned using the Geospatial Data Abstraction Library (GDAL).
  - Resample both data using the pyresample package in python to common regular grids with a spatial resolution of 0.009° and matched spatially.
  - The nearest neighbor method is chosen to map the nearest cell value in the source grid to the target grid.
- Perform data visualization, and statistical analysis on common gridded LSTs.

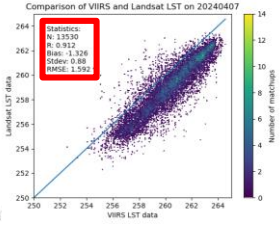
## RESULTS and DISCUSSION

### Case Study on 4/7/2024

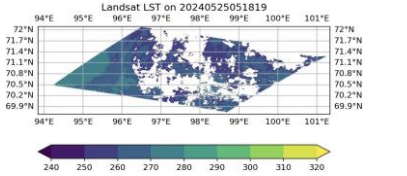
- Mean bias is -1.3 K.
- Standard Deviation is 0.9 K.
- Correlation coefficient is 0.91



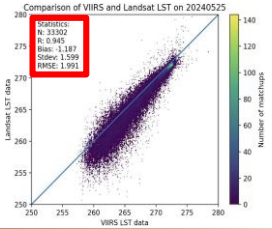




### Case Study on 5/25/2024




- Mean bias is -1.2 K.
- Standard Deviation is 1.6 K.
- Correlation coefficient is 0.95




## SUMMARY

- Evaluated NOAA's operational SNPP VIIRS LST product and compared it with the independent satellite retrievals from Landsat-8 Level 2 LST product.
- The Simultaneous Nadir Overpass between SNPP VIIRS and Landsat-8 was identified for 4/7/2024 and 5/25/2024.
- The VIIRS and Landsat-8 data were downloaded, processed, and regridded to common regular grids and matched spatially.
- Statistical analysis demonstrates a reasonable agreement between VIIRS and Landsat LST, with a mean difference of ~ -1 K, a standard deviation within1.6 K, and a correlation coefficient larger than 0.9, indicating a strong correlation.
- This comparison result reflects the LST differences in high-latitude regions because the SNOs are primarily distributed in the high latitudes of the Northern and Southern Hemispheres, ~70°. The study can continue to compare the LST from more VIIRS and Landsat-8 SNOs to analyze different scenarios, such as different seasons as well as day or night conditions.

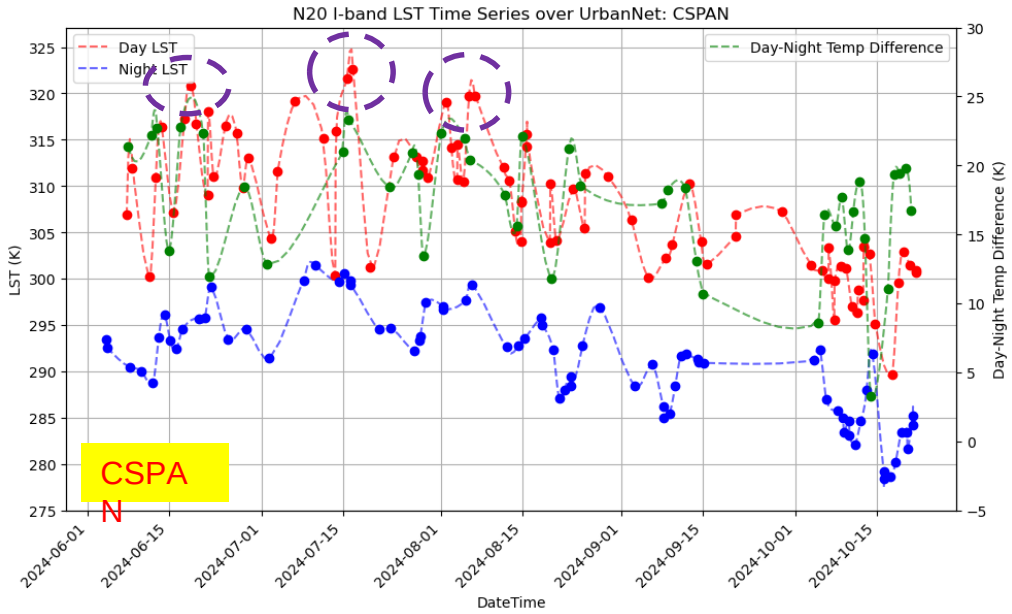
## References

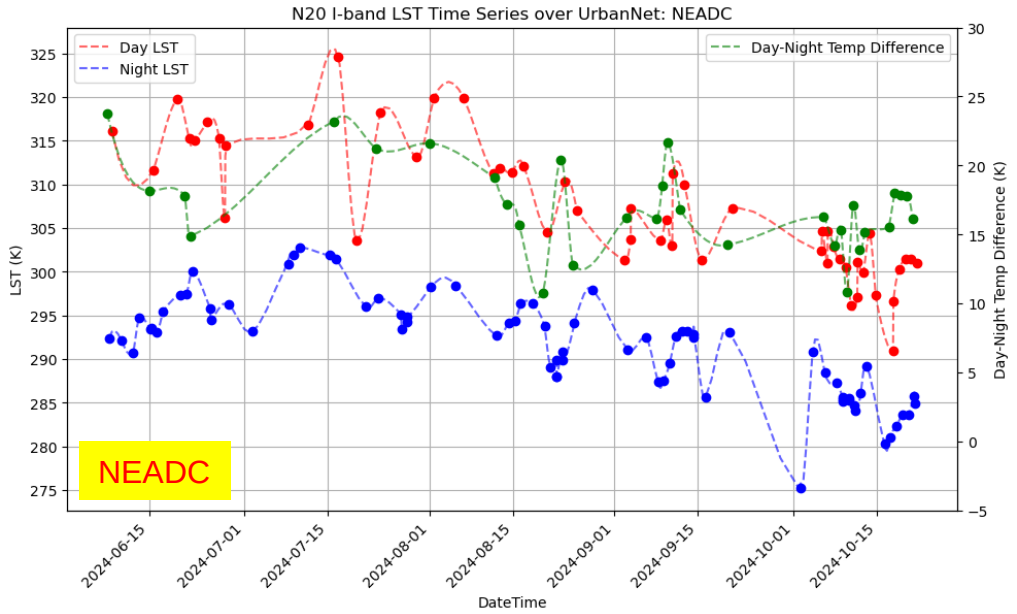
1. Liu, Y. et al., Ten Years of VIIRS Land Surface Temperature Product Validation. Remote Sens. 2022, 14(12), 2863; https://doi.org/10.3390/rs14122863.
2. Liu, Y. et al., Quality Assessment of SNPP VIIRS Land Surface Temperature Product. Remote Sens. 2015, 7, 12215–12241
3. VIIRS Land Surface Temperature Products Documentations (https://www.star.nesdis.noaa.gov/jpss/lst.php)
4. Landsat 8-9 OLI/TIRS Collection 2 Level 2 Data Format Control Book https://www.usgs.gov/media/files/landsat-8-9-olitirs-collection-2-level-2-data-format-control-book

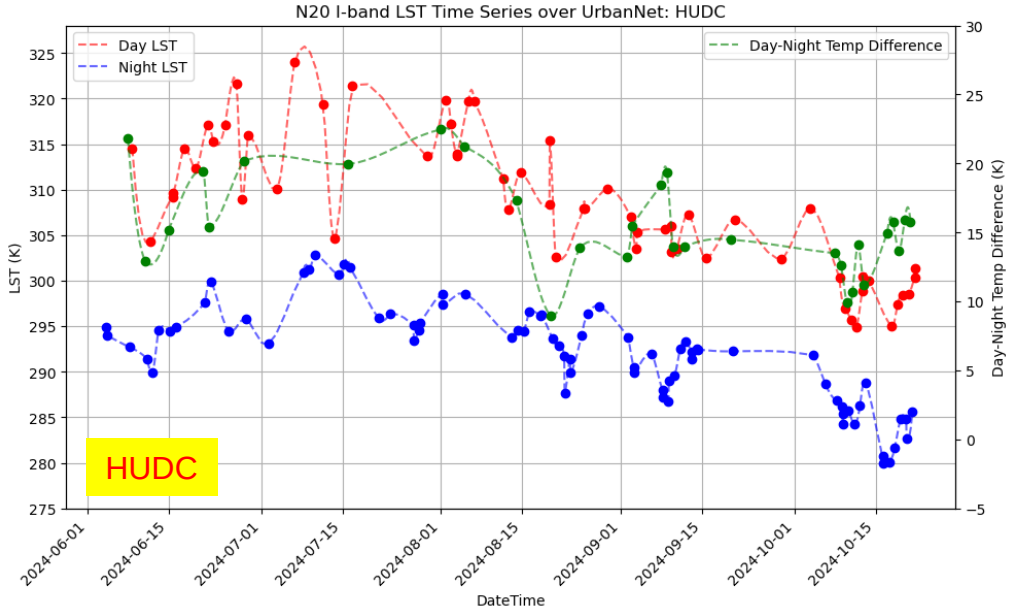
# Poster-III for AGU 2024

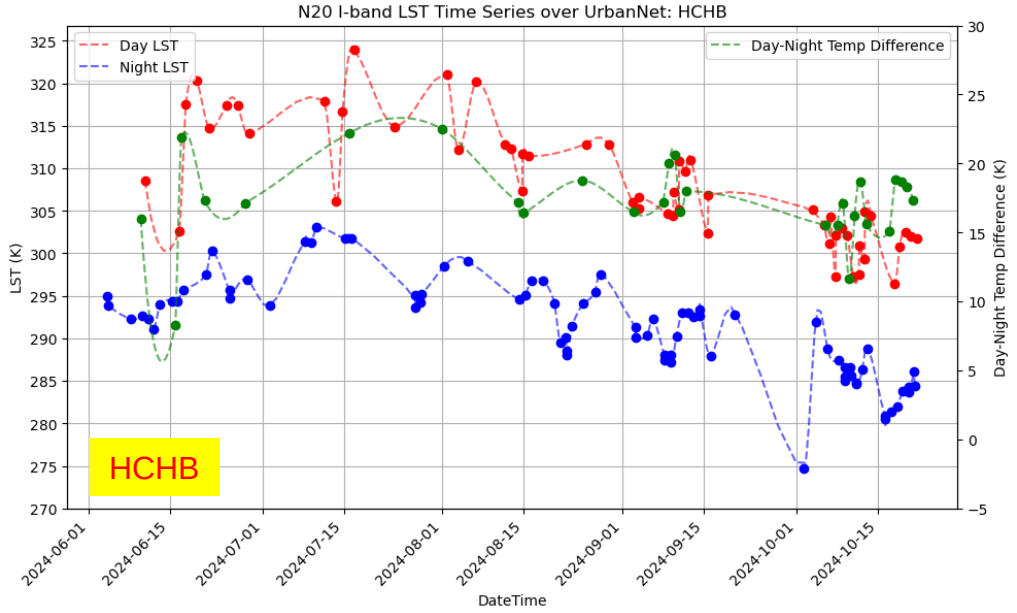
- The SNPP VIIRS LST data were accessed with the independent satellite retrievals from Landsat-8 Level 2 LST product.
- Simultaneous Nadir Overpass (SNO) between SNPP VIIRS and Landsat-8 were identified. SNOs with less cloud cover over land were selected. The associated LSTs were quality controlled to include only clear-sky pixels.
- Statistical analysis demonstrates a reasonable agreement between VIIRS and Landsat LST, with a mean difference of ~ -1 K, a standard deviation within1.6 K, and a correlation coefficient larger than 0.9, indicating a strong correlation

# I-band VIIRS LST Time Series Over UrbanNet Stations



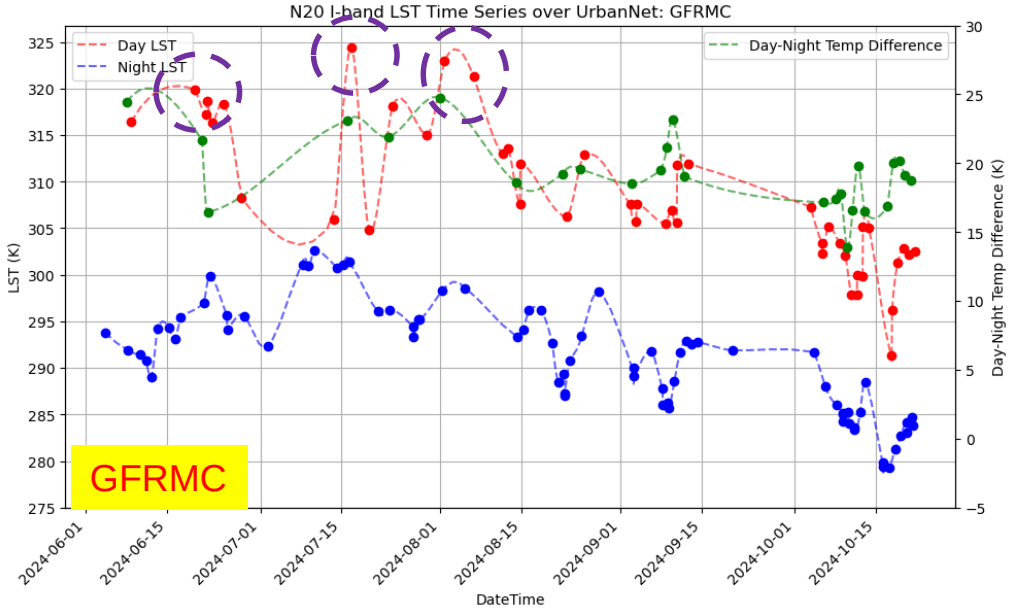



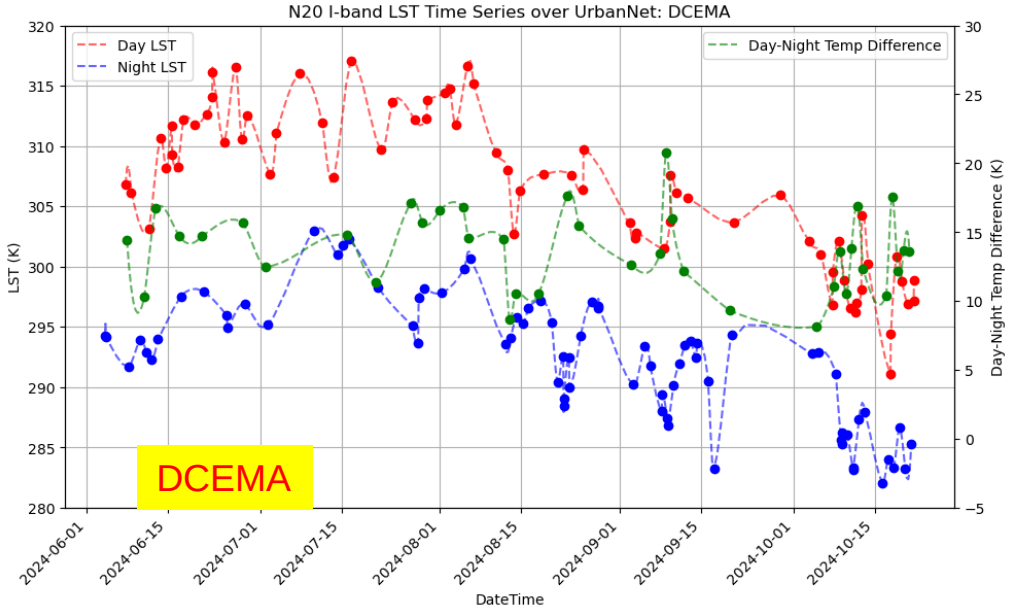



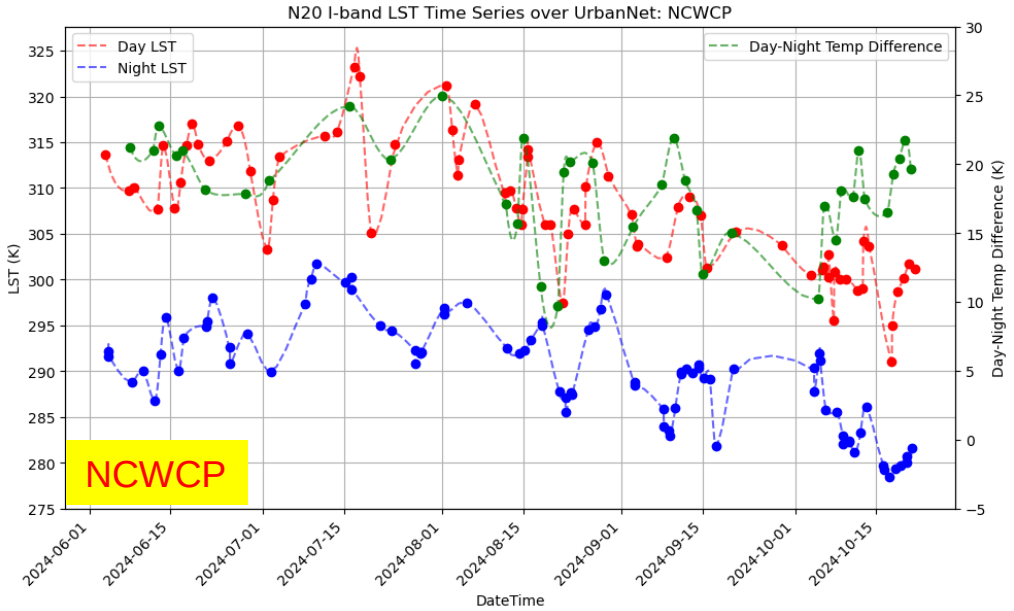

- The time series shows only cloud free LST estimates
- The time series separates the daytime, nighttime and diurnal LST calculated as the difference between maximum daytime and minimum nighttime LST, for urban heat island effect analysis.
- It captures heat events in mid-June, mid-July and early August as marked in the circle, demonstrating the capability of the I-band LST to accurately capture extreme heat events.

- Red color shows the daytime LST time series
- Blue color shows the nighttime LST time series
- Green shows the diurnal temperature difference

# I-band VIIRS LST Time Series Over UrbanNet Stations



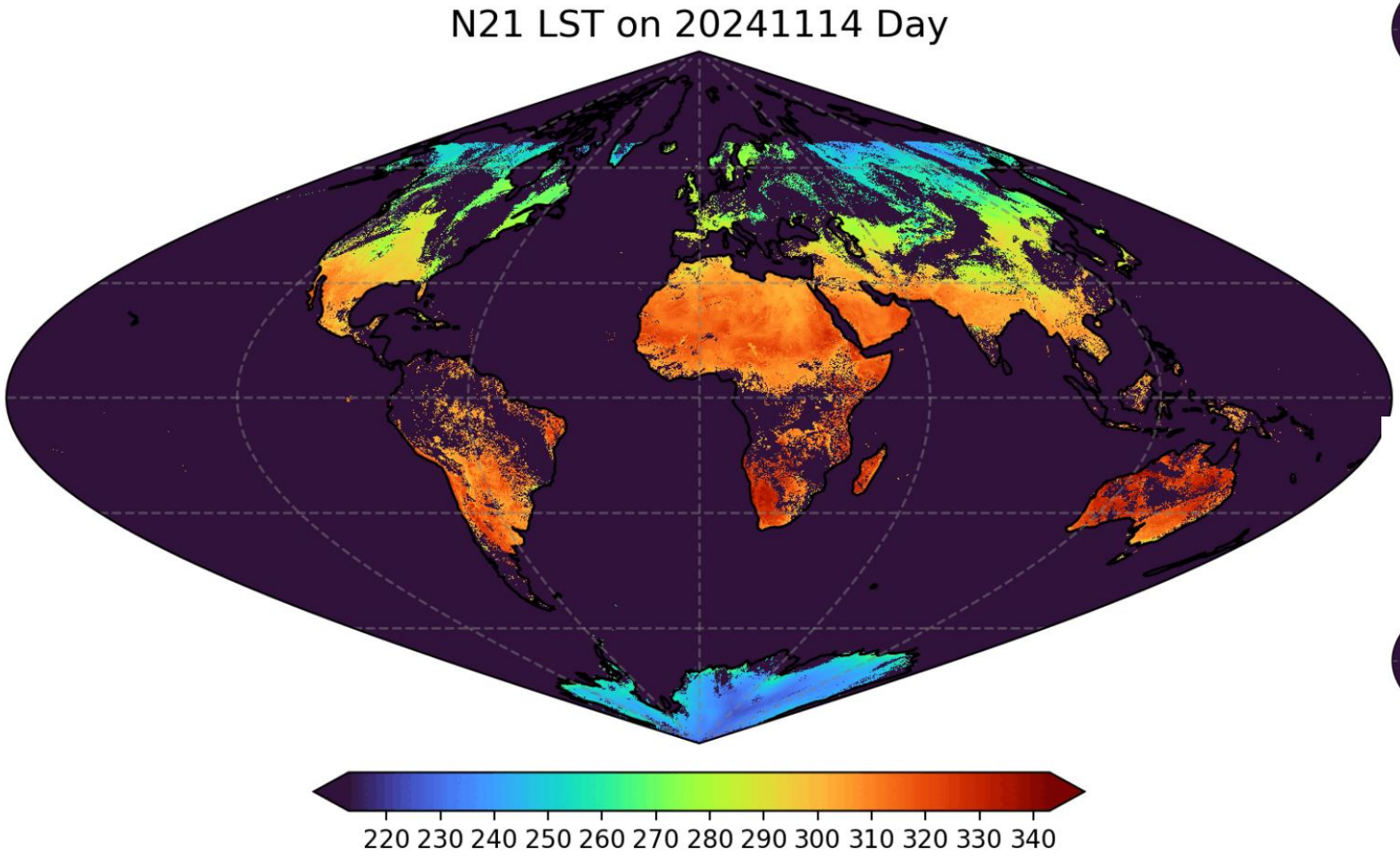



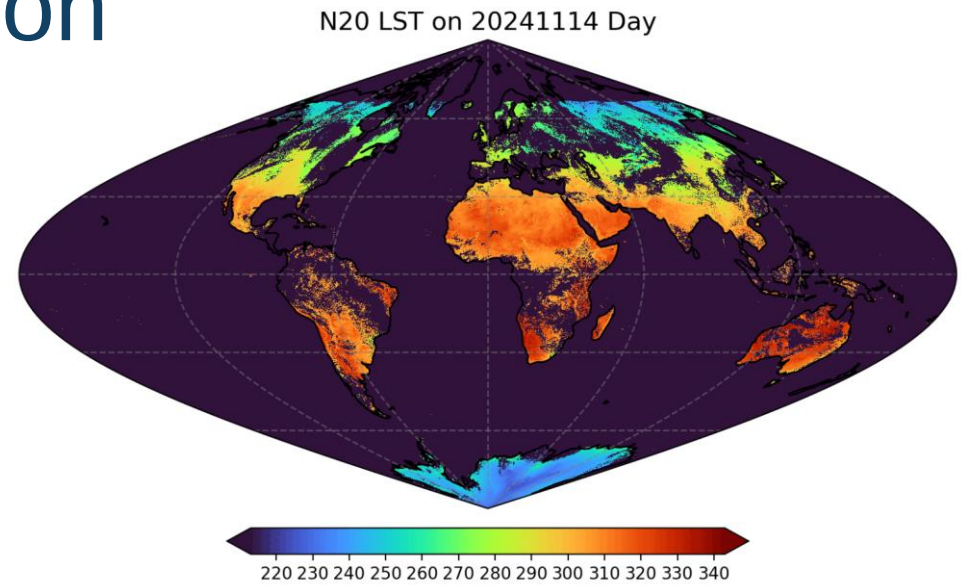



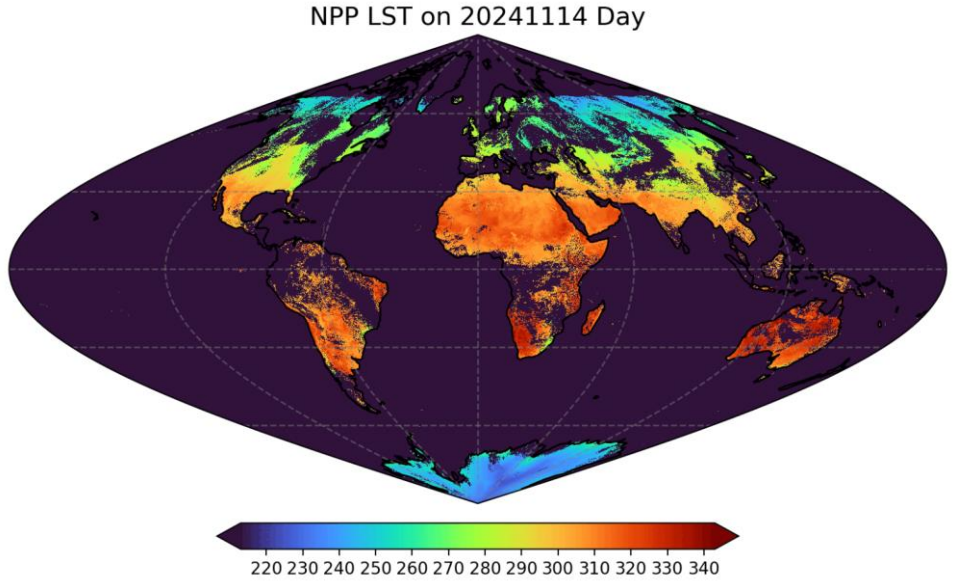

- The I-band VIIRS LST has been applied to monitor heatwave occurrences over UrbanNet stations.
- The higher spatial resolution LST enables the detection of detailed heat features, offering enhanced insight into urban thermal dynamics.
- Time series were generated for seven stations from June 1, 2024 to October 22, 2024, revealing the occurrence of intense heatwaves at mid-June, mid-July and early August, demonstrating the capability of the I-band LST to accurately capture extreme heat events.

- Blue color shows the nighttime LST time series
- Green shows the diurnal temperature difference

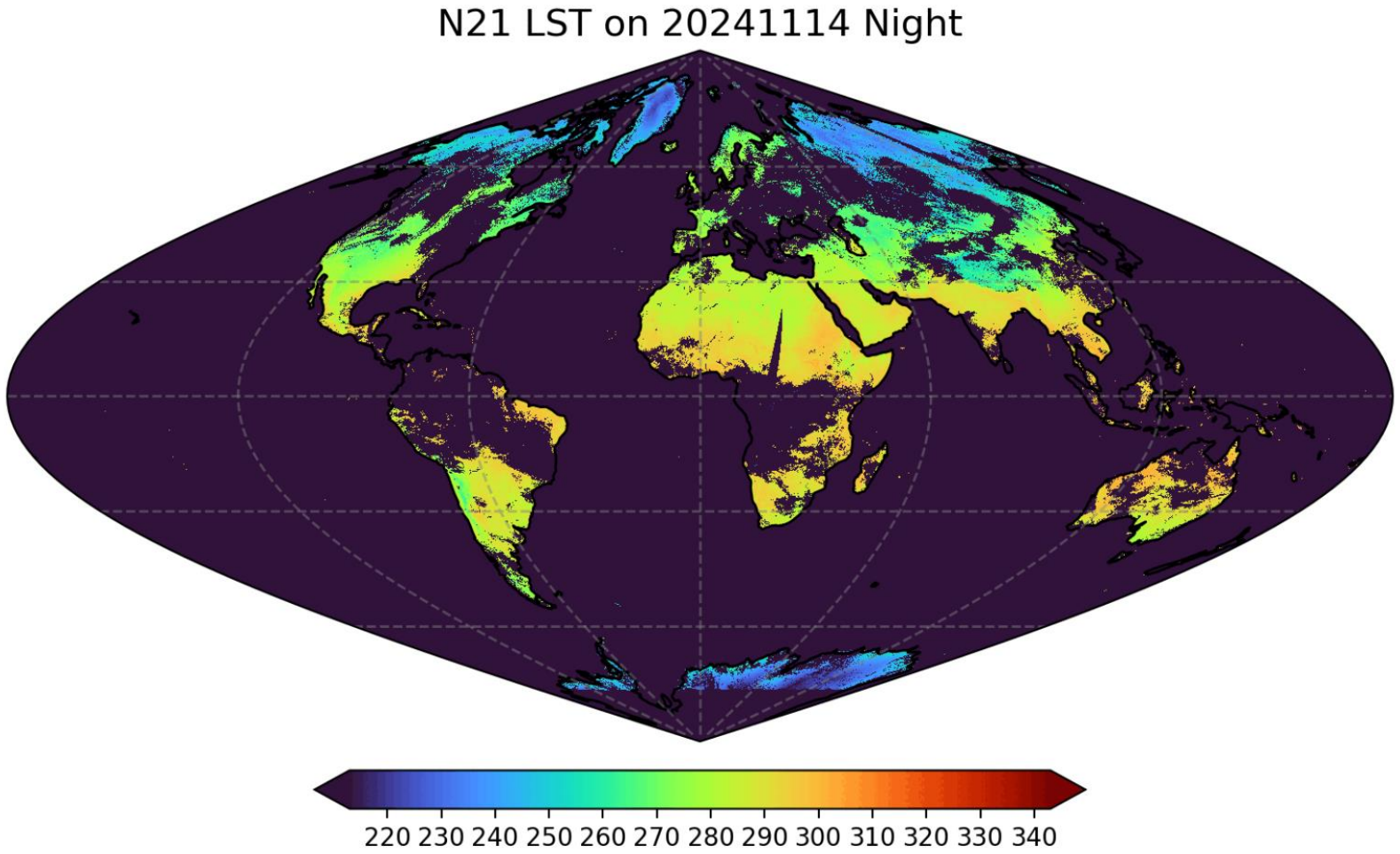
# L3 NOAA-21 Daytime LST Verification -Daytime

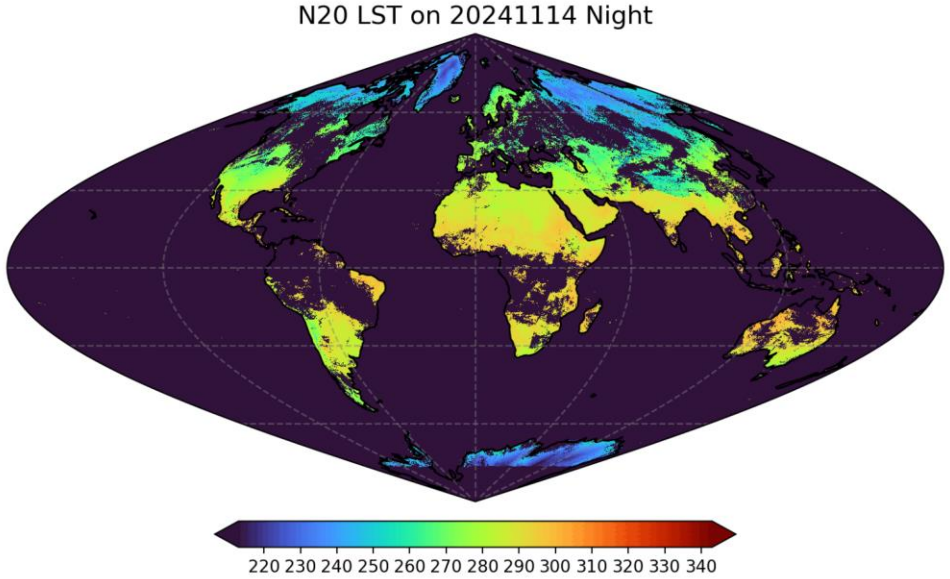


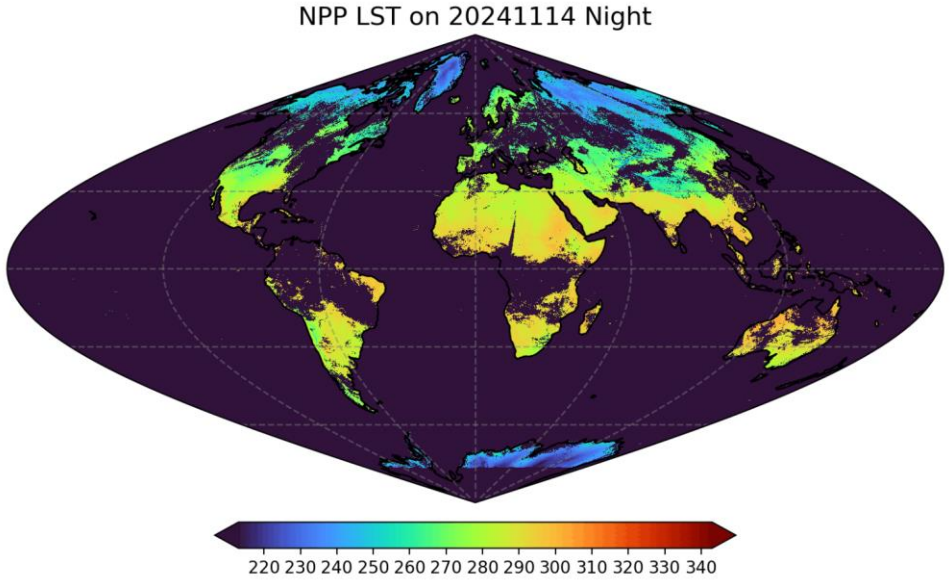



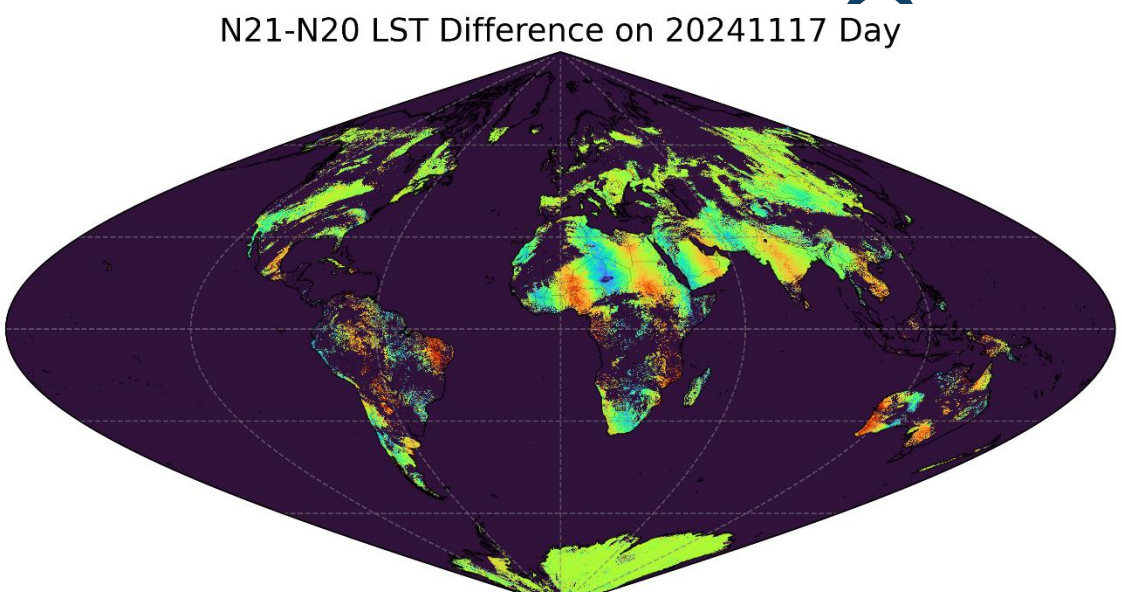
# L3 NOAA-21 Daytime LST Verification -Nighttime

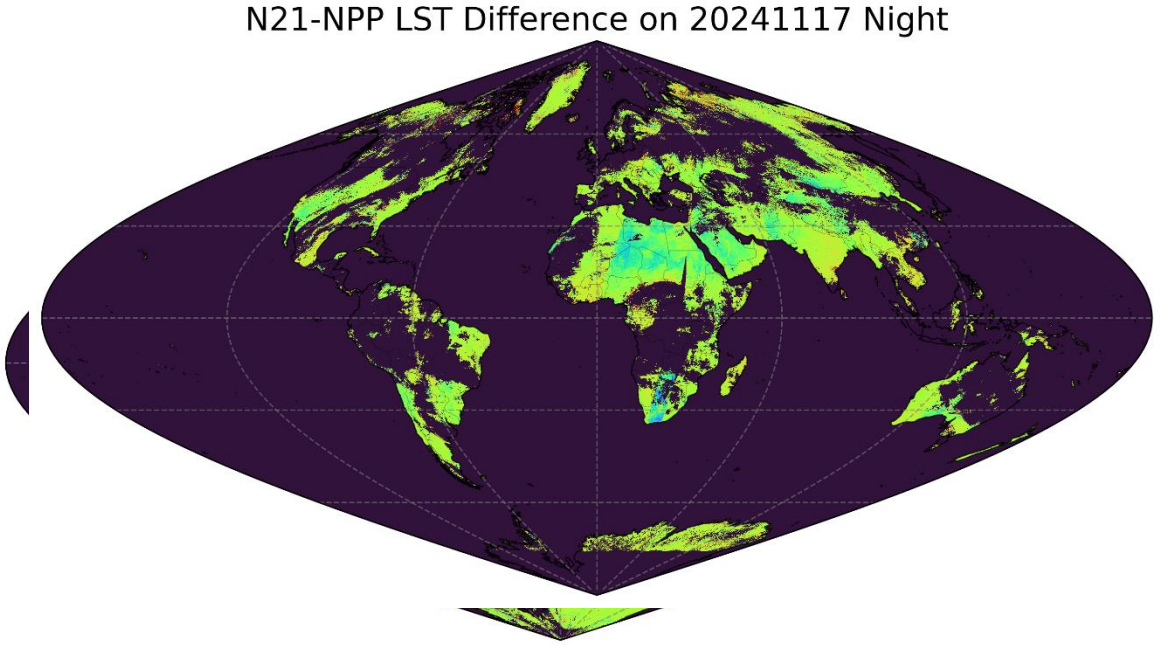


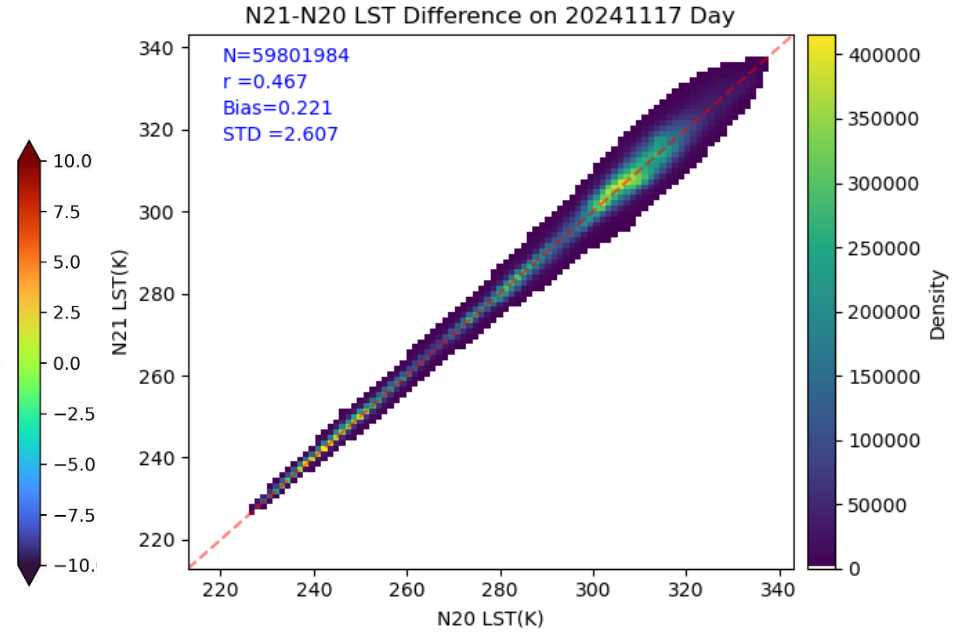



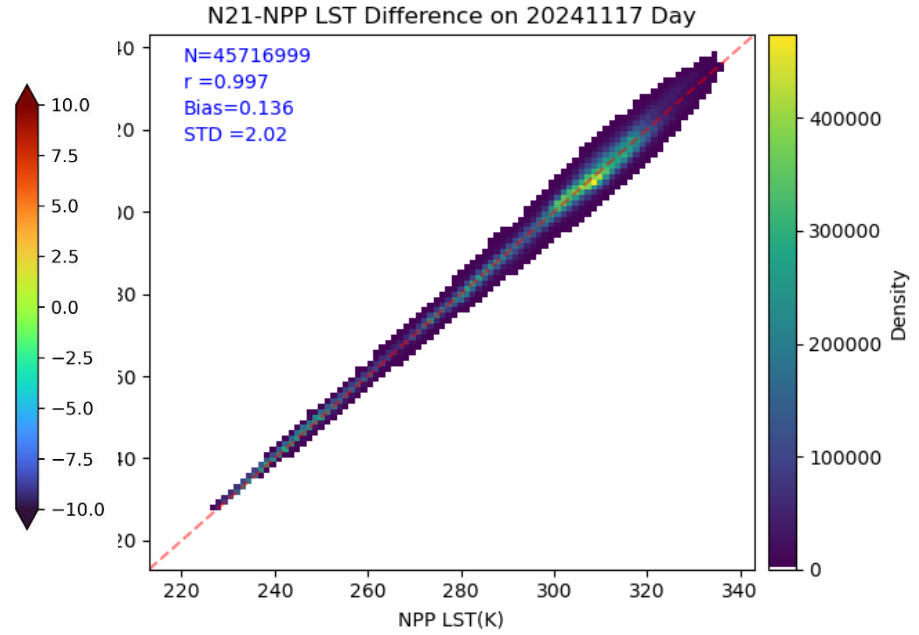



# Inter-comparison for Daytime LST



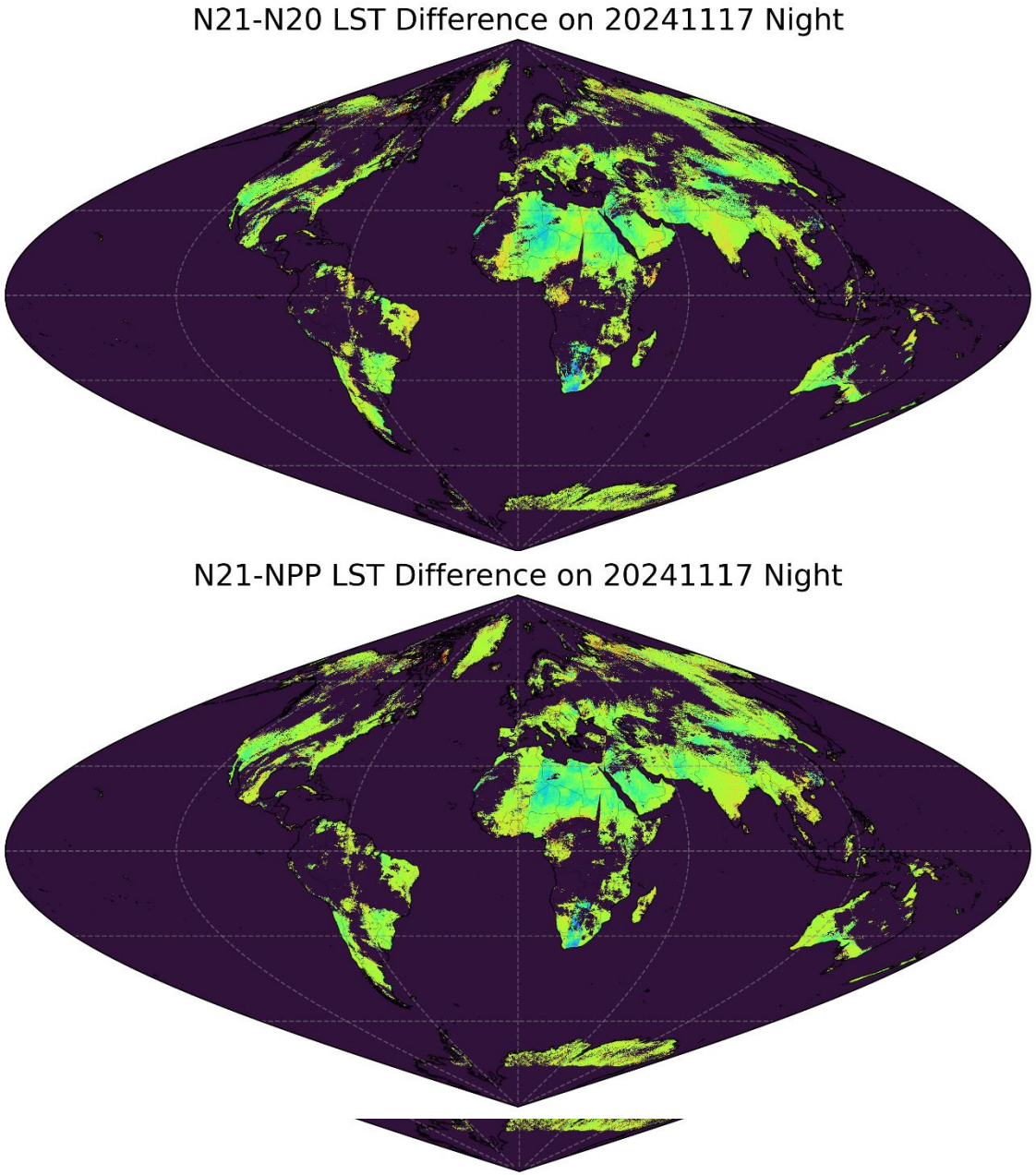



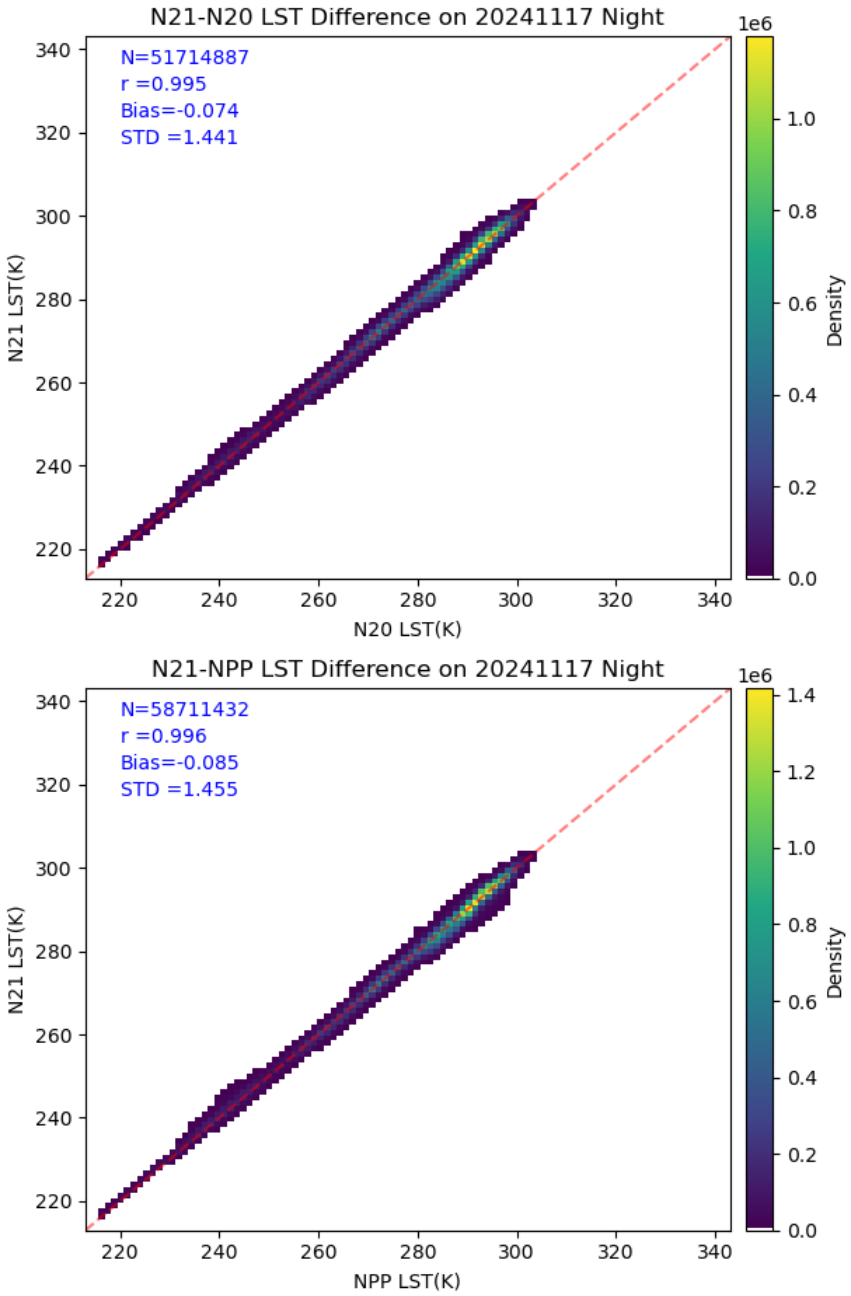




- The data for day Nov. 17,2024 was selected for the global comparison between N21, SNPP, and NOAA-20 LST.
- The left figure shows the LST difference map and the right figure displays the scatter plot of the difference statistics for cloud-clear conditions and observation times within 30 minutes for SNPP and within 60 minutes for NOAA-20.
- Overall, the difference statistics are within expectations

# Inter-comparison for Nighttime LST




- The data for day Nov. 17,2024 was selected for the global comparison between N21, SNPP, and NOAA-20 LST.
- The left figure shows the LST difference map and the right figure displays the scatter plot of the difference statistics for cloud-clear conditions and observation times within 30 minutes for SNPP and within 60 minutes for NOAA-20.
- Overall, the difference statistics are within expectations

# FY25 Milestones/Deliverables

| | Milestone | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| 1 | Annual report of L2 and L3 VIIRS LST validation | Nov-24 | Dec-24 | PowerPoint presentation of the validation results | |
| 2 | I-band LST LUT improvement and validation | Oct-24 | May-25 | Presentation slides of algorithm development and validation results | |
| 3 | LST reprocessing preparation | Ocr-24 | Sep-25 | Progress report | |
| 4 | JPSS-3 pre-launch test and evaluation | Jan-25 | Apr-25 | Presentation slides and LUT (rely on the availability of the sensor response function) | |
| 5 | All weather LST scientific readiness and availability | Oct-24 | Aug-25 | Experimental data and evaluation results | Collaborative works with PPM and EMC |
| 6 | Monitoring and Anomaly watch, analysis and report | Oct-24 | Sep-25 | Report as the cases come up | |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

# MiRS Products

*November 2024*

## *Accomplishments / Events:*

- In a recently published paper "Trends of temperature and total precipitable water, as well as the trend of surface pressure induced by $CO_2$ ", led by NOAA/STAR scientist Quanhua (Mark) Liu, and coauthored by both CISESS scientists Yan Zhou, Chris Grassotti, Yong-Keun Lee, and John Xun Yang, as well as CIRA scientist Shuyan Liu, the researchers analyzed trends in atmospheric water vapor (total precipitable water), surface air temperature, and surface pressure from ERA5 reaanalysis data. The work, published in the Nature open access journal Scientific Reports, analyzed long-term trends in all three variables during the period 2012 – 2024. The analysis yielded several important results: (1) positive trends in total precipitable water and 2-meter air temperature during this period were 0.227 mm and 0.332 K per decade, respectively; (2) an increase in $CO_2$ concentration during the period of analysis contributes to an increase of roughly 0.037 hPa per decade in surface pressure, which represents 57% of the total surface pressure trend; and (3) global trends based on using ERA5 hourly analyses and trends based only on analyses near 1:30 am and 1:30 pm local times are nearly identical. This last result is important as it indicates that well-calibrated satellite observations from a single polar orbiting satellite, such as NOAA-21 ATMS, which observes most locations only twice daily may be sufficient for accurately determining trends in climate-sensitive variables such as water vapor and temperature. DOI: https://doi.org/10.1038/s41598-024-80685-8

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | x | | | | |
| **Technical / Programmatic** | X | | | | |
| **Schedule** | x | | | | |

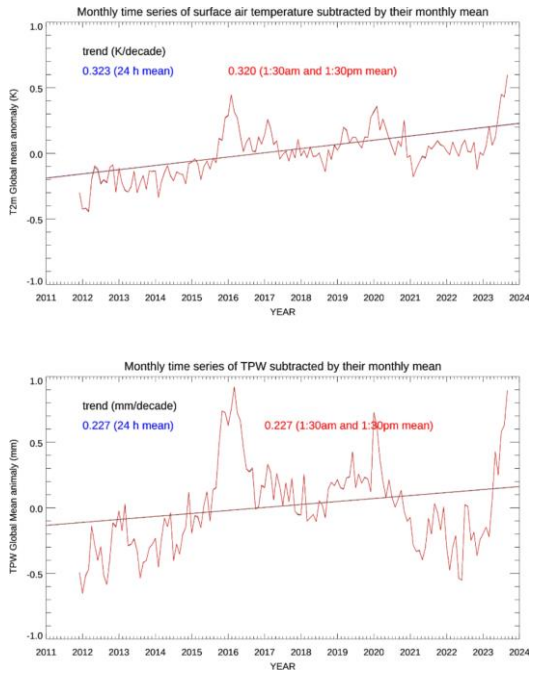
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

### ***Issues/Risks:***

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| MiRS Development Algorithm Package (DAP) version 12.0 delivery | *Oct 2024 to Sep 2025* | | | |
| MiRS EDRs Reprocessing and data analysis | *Oct 2024 to Sep 2025* | | | |
| MiRS EDRs Maintenance and Monitoring | *Oct 2024 to Sep 2025* | | | |
| Implementing new CRTM version into MiRS System | *Sep 2025* | | | |
| Develop and evaluate AI/ML MiRS post-processing for precipitation over CONUS and global SST retrieval improvement | *Sep 2025* | | | |
| Framework for MiRS JPSS-3/4 ATMS | *Sep 2025* | | | |

## *Highlights:*




*Time series of global monthly anomalies of 2-meter air temperature (top) and TPW (bottom) derived from ERA5 analyses. The straight lines are the linear trends derived from the monthly anomalies. Anomalies and trends are shown for global means based on 1:30 am/1:30 pm local time data only (red) and all hourly data (black). The anomalies and trends for both data sets are so similar that the black curves are almost obscured by the red curves. Computed annual trend values for both 24-hour and 1:30 am/pm data are shown in blue and red, respectively.*

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1:* MiRS Development Algorithm Package (DAP) version 12.0 delivery | *October 2024 to September 2025* | | | |
| *Subtask 1.1:* Preparation of the MiRS DAP 12.0<br>*Two key updates: 1) upgrade the CRTM version 2.1.1 to the latest 2.4.0 in the MiRS DAP; The CRTM version 2.1.1 was released 10 years ago. New sciences and new capabilities have been implemented in the version 2.4.0.*<br>*2) Some' values are stored as integer values in the MiRS EDRs files for saving the storage space and users read the files and converted back to floating values. The process caused the loss of numerical precision that affects the trend study in climate change. Today's data storage is much powerful than previous so that we can directly store the floating values.* | *October 2024 to July 2025* | | | |
| *Subtask 1.2: The DAP testing and delivery* | *October 2024 to September 2025* | | | |
| *Task 2:* MiRS EDRs Reprocessing and data analysis | *October 2024 to September 2025* | | | |
| *Subtask 2.1:* Data Reprocessing<br>*SNPP MiRS EDRs data are reprocessed till December 2021 and NOAA-20 MiRS EDRs data are reprocessed till December 2020. The team will reprocess the NOAA-18 MiRS EDRs data..* | *October 2024 to July 2025* | | | |
| *Subtask 2.2: Reprocessed Data Analysis*<br>*The MiRS reprocessed EDRs provided consistent long data records for study climate changes. The MiRS team will analyze the trends of total precipitable water (TPW) and rain rate at the surface.* | *October 2024 to September 2025* | | | |
| *Task 3:* MiRS EDRs Maintenance and Monitoring | *October 2024 to September 2025* | | | |
| *Subtask 3.1:* Maintenance<br>*MiRS team is responsible for debug and upgrades of the MiRS system. The team is response for any issues reported by OSPO, Community Satellite Processing Package (**CSPP**) and other users.* | *October 2024 to September 2025* | | | |
| *Subtask 3.2: Monitoring*<br>*The MiRS team maintains a visualization system to display daily images of global and CONUS distributions of MiRS 11 EDRs. The system also displays time series of statistical errors (biases and standard deviations) those EDRs.* | *October 2024 to September 2025* | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 4: Implementing new CRTM version into MiRS System* | *September 2025* | | | |
| *Subtask 4.1: Implementation*<br>*The MiRS system currently uses the CRTM version 2.1.1 forward operator in its physical retrievals. The CRTM version was released 10 years ago. The newly released CRTM version 2.4.0 includes the new science improvement. However, the CRTM version doesn't have the jacobian for the surface emissity which is specific component for the MiRS. The team will add the specific part to the CRTM for the MiRS.* | *July 2025* | | | |
| *Subtask 4.2: Testing and Assessment of the Performance*<br>*After the implementation of the CRTM new version, the team will test and evaluate the performance of the new implementation in terms of the accuracy and efficiency.* | *September 2025* | | | |
| *Task 5:* Develop and evaluate AI/ML MiRS post-processing for precipitation over CONUS and global SST retrieval improvement | *September 2025* | | | |
| *Subtask 5.1: Develop AI/ML MiRS post-processing*<br>*AI/ML algorithm can greatly improve the accuracy of MiRS EDRs. For a low cost, we first proposed AI/ML post-processing system without changing MiRS. The MiRS EDRs will be inputs to a deep-learning system to improve the accuracy of EDRs.* | *July 2025* | | | |
| *Subtask 5.2: Demonstrate the improvement for precipitation and sea surface temperature*<br>*The AI/ML MiRS post-processing system will be evaluated the improvements for two candidate EDRs: surface rain rates and the sea surface temperatures.* | *September 2025* | | | |
| *Task 6:* Framework for MiRS JPSS-3/4 ATMS<br>MiRS is an enterprise algorithm. However, the bias correction and tuning still exist deficiency. The MiRS applies the bias correction over oceans to both lands and oceans. Over land, snow and ice surfaces, the bias correction is very challenge because of large uncertainties in the surface emissivity models. The new framework *aims to overcome the difficulties.* | *September 2025* | | | |

# NOAA Products Validation System (NPROVS) and JSTAR Mapper/STEMS

*November 2024*

## *Accomplishments / Events:*

.

- JSTAR Mapper / STEMS staff updated the product description file to include NOAA-21 imagery, as well as new debugging image sets and worked with the NUCAPs and MIRS science teams in order to fix existing image production bugs in those product lines.

- NPROVS staff (Reale, Sun) attended (virtual) a 2-day Workshop on EUMETSAT Polar System Second Generation ((EPS-SG) and NOAA collaboration to provide observations for Climate Monitoring and Numerical Weather Prediction; EPS-SG data integration and Cal/Val assessments using NPROVS is planned **(HIGHLIGHT)**

- The field distribution of FY24 radiosondes (320) at four (4) DOE ARM sites in support of the JPSS / DOE Dedicated (satellite synchronized) Radiosonde Program is now underway; plans to pursue FY25 funding request ($35K) to provide dedicated radiosondes in coordination with an upcoming NOAA AEROSE campaign (May-2025) is awaiting final approval from the Financial Management Branch.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| **Restore high-resolution conventional radiosonde observations in NPROVS** | **Q2** | **Q2** | | |
| **JSTAR mapper evolution to STEMS** | **Q4** | **Q4** | | |
| **Dedicated Radiosonde Programs: 1) DOE/ARM and new BNF site in Alabama, 2) AEROSE 2025 campaign support** | **Q3** | **Q3** | | |
| **NUCAPS 1) routine monitoring and 2) severe weather case studies** | **Q4** | **Q4** | | |

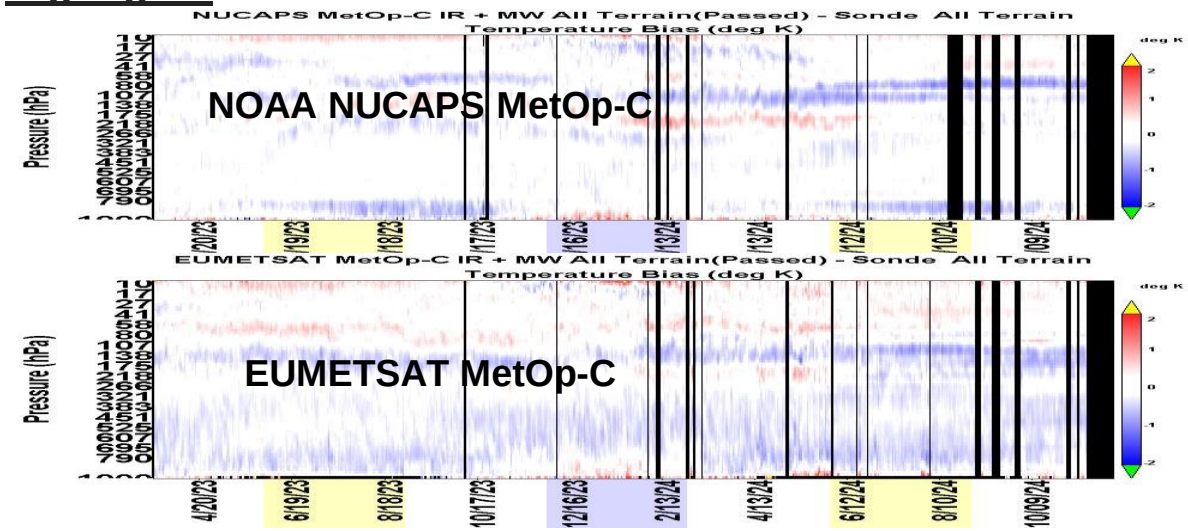
## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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




The above charts show time-series (18 mos) of derived satellite vertical (surface to 10hPa; 30km) temperature bias from Operational NOAA-NUCAPS (top) and EUMETSAT (bottom) product suites for MetOp-C. Shown are daily averaged SAT-Raob differences baselined to collocated conventional radiosonde and satellite observations routinely compiled by NPROVS; the color scales are +/- 2K (white is within 0.5K) and the vertical scale is 32km. Although overall compatible, results show differences and along with the collocation datasets are of interest for tracking the relative performance future MetOp-SG sounding products from each agency.

# NUCAPS Products

Accomplishments / Events

November, 2024

- Performed user assessment studies in support to the NOAA-21 CrIS SDR calibration artifact (ADR-10909). Evaluated NOAA-21 %accepted (yield) retrievals with NOAA-20 for (1) A focus day with CrIS calibration artifact is at its peak, (2) A normal day where there is no CrIS calibration artifact. Observed degradation in the (a) NOAA-21 retrieval yield, (b) AVTP and AVMP retrieval statistics over the Antarctica appeared to be caused by the CrIS calibration error.
- Continued validation and sustainment activities for all the NUCAPS EDR products. These include collection and processing of validation data sets for AVTP, AVMP, O3, OLR, CO, CH4, and CO2.
- Continued the AWS trial of cloud-based NUCAPS product reprocessing. Evaluated NOAA-20/21 AWS NUCAPS retrieval products with the offline focus day datasets as a sanity check in moving forward for S-NPP mission long reprocessing plans.
- Continued the NUCAPS carbon trace gases validations based on the newest TCCON datasets for both NOAA-20/NOAA-21.
- Continued AVTP/AVMP VALAR RAOBs at different GRUAN sites of ENA, NSA, SGP and LIN.
- Progressed on MetOp-B cloudy and clear regression updates removing AMSU-A channels. Results of evaluation show favorable results. Patch delivery plans are in progress.

## *Overall Status:*

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

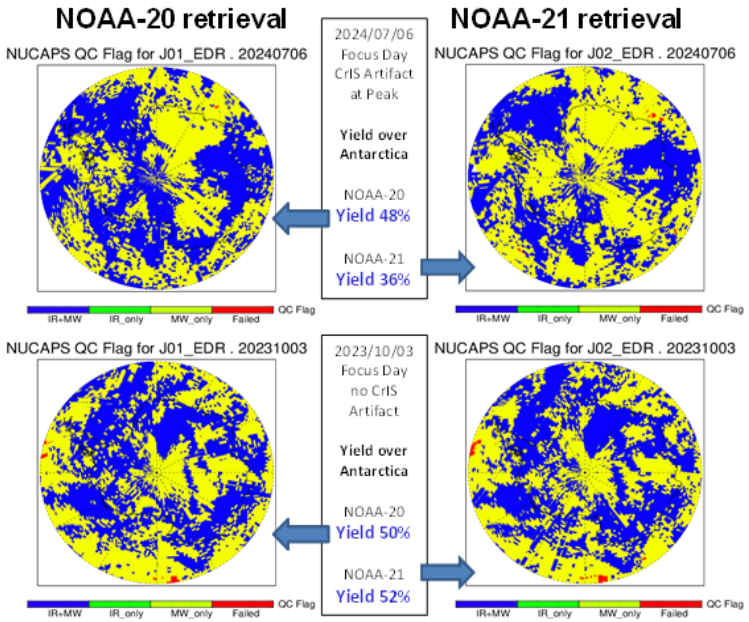
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

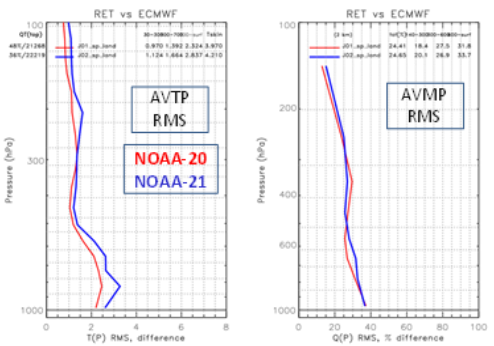
## ***Issues/Risks:***

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| DAP Delivery with updates related damping factor, surface corrections, MetOp-B/C Averaging Kernels | Oct-22 | Oct-22 | 11/04/22 | |
| NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs, and user support for the CrIS Beta Maturity Review | Feb-23 | Feb-23 | 02/23/23 | NOAA-21 K-band transmitter swap |
| NOAA-21 NUCAPS Product Beta Maturity | May-23 | May-23 | 6/1/23 | Beta attained effective 3/23 |
| NOAA-21 NUCAPS T(p), q(p), O3(p), OLR, CO, CH4 and CO2 Provisional Maturity | Nov-23 | Dec-23 | Jan-24 | Attained Validated Maturty |
| 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 | Jul-24 | Delayed Expected in Jan-25 | On-going Delayed due to other operational priorities |
| Mission-long reprocessing of NOAA-21 NUCAPS products: Reprocessing version and evaluation of reprocessed products | Jun-24 | Jul-24 | Delayed Expected Dec-24 | Pilot-Study in Near Completion |

## NOAA-21 CrIS Artifact Error Impact on NUCAPS Retrieval




- NUCAPS NOAA-21 retrieval yield is much lower than that of NOAA-20 by about 12% over the Antarctica (normally we expect NOAA-21 yield to be 4% lower than NOAA-20).
- The NOAA-21 AVTP and AVMP retrieval statistics (RMS/Bias) show slight degradation over the Antarctica compared to NOAA-20 retrievals.
- Observed degradation in the (a) NOAA-21 retrieval yield, (b) AVTP and AVMP retrieval statistics over the Antarctica are probably caused by the CrIS calibration error

# FY25 Milestones/Deliverables
# Path Forward ~ High priority tasks/milestones

| | Milestones | Type | Original Date | Forecast Date | Variance Explanation |
|---|---|---|---|---|---|
| **Task 1** | Routine and reactive maintenance support for the NUCAPS JPSS (NOAA-20/21) and MetOp (C/B) series enterprise version (HEAP4.0)* | R&D, I&T, CV | Sep-25 | | |
| | Subtask 1.1 Generation of MetOp-B cloudy and clear regression updates removing faulty AMSU-A channels | | Oct-24 | Dec-24 | Regression updates appears to work alright. However, requires additional patches for AMSU Brightness temperature adjustments. |
| **Task 2** | Intensive validation activities using a collection of a hierarchy of validation data sets, processing and intensive validation activities are planned for all of the NUCAPS products (AVTP, AVMP, O3, CO, CO2, CH4, and OLR). Validation of algorithm updates and improvements | R&D, I&T, CV | Sep-25 | | **Ongoing and on-time** |
| | Subtask 2.1 Continued generation of matched data sets, NUCAPS product generation and validation with collocated data sets to evaluate product performance over different seasons and regions. | R&D, I&T, CV | Mar-25 | | |
| | Subtask 2.2 Algorithm improvements and operational feasibility/implementation of new products | R&D, I&T, CV | Jun-25 | | |
| | Subtask 2.3 Coordination and collaboration with NOAA – GML (Theme 1 & 2) validation activities; Support for Greenhouse Gases (GHG) initiatives; Environmental events | R&D, I&T, CV | Jun-25 | | |
| | Subtask 2.4: Validation of NUCAPS products with Single Field-of-view Sounding Atmospheric Product (SIFSAP, LaRC) and matched RAOB measurements | R&D, I&T, CV | Sep-25 | | |
| **Task 3** | Mission-long reprocessing of NUCAPS EDR products | R&D, I&T, CV | Mar-25 | | Ongoing |
| | Subtask 3.1 Pilot study on NCIS reprocessing of NUCAPS EDRs | | Oct-24 | Dec-24 | Verified NOAA-20/21 AWS runs with offline runs and found them good. Working on S-NPP focus day evaluations. |
| | Subtask 3.2 Mission-long S-NPP NUCAPS product reprocessing using reprocessed SDRs and with NUCAPS HEAP 4.0 followed by NOAA-20. | R&D, I&T, CV | Mar-25 | | Delays due to AWS team funding, and due to contract discontinuity for a month that has ripple effects |
| | Subtask 3.3 Mini-validation review of reprocessed NUCAPS products | R&D, I&T, CV | Apr-25 | | |

# Ocean Color



## Accomplishments / Events:

- A Scientific Paper Published in Frontiers in Marine Science: Michael Ondrusek, Lide Jiang, and Menghua Wang from the OC team are co-authors of a recent paper published in *Frontiers in Marine Science*, Gilerson et al., "Development of VIIRS-OLCI chlorophyll-a product for the coastal estuaries," *Front. Mar. Sci.*, **11**, 1476425, 2024. https://doi.org/10.3389/fmars.2024.1476425
- Worked on system vicarious calibrations for three VIIRS sensors.
- Continue working on the mission-long VIIRS ocean color data reprocessing using the MSL12 ocean color data processing system.
- Routinely producing VIIRS (SNPP, NOAA-20, and NOAA-21) true color/false color images in OCView.
- Producing global VIIRS (SNPP, NOAA-20, and NOAA-21) ocean color products and showing in OCView routinely : https://www.star.nesdis.noaa.gov/socd/mecb/color/index.php

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| | | | | |

## Overall Status:

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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

# Ocean Color FY25 Milestones/Deliverables

| Task/Milestone | Planned Completion Date | Fiscal Quarter | Comments |
|---|---|---|---|
| **NOAA-21 OC data processing** | | | |
| NOAA-21 OC EDR Cal/Val evaluations using refreshed/new MOBY data | Sep-25 | Q4 FY25 | |
| **VIIRS calibration/validation** | | | |
| Continue VIIRS Cal/Val data analysis (SNPP, NOAA-20, and NOAA-21) (using new MOBY data) | Sep-25 | Q4 FY25 | |
| Cal/Val team complete the 10th VIIRS ocean color dedicated cruise | Aug-25 | Q4 FY25 | |
| In situ data collections from OC Cal/Val team including NOAA dedicated cruise and other opportunities, particularly for NOAA-21 OC validation | Aug-25 | Q4 FY25 | |
| **VIIRS algorithm refinement (Maintenance DAP)** | | | |
| Improvement of the OCView tool for routine global VIIRS true color & OC products monitoring | Aug-25 | Q4 FY25 | |
| Continue working on improvement of the ocean color data processing system (MSL12), particularly over global coastal and inland water regions | Sep-25 | Q4 FY25 | |
| **VIIRS OC data processing/reprocessing** | | | |
| Mission-long OC data reprocessing for VIIRS-SNPP | Sep-25 | Q4 FY25 | |
| Mission-long OC data reprocessing for VIIRS-NOAA-20 | Sep-25 | Q4 FY25 | |
| Mission-long OC data reprocessing for VIIRS-NOAA-21 (depending on evaluation results from refreshed MOBY data) | Sep-25 | Q4 FY25 | |
| Producing consistent VIIRS SNPP, NOAA-20, and NOAA-21 OC products from reprocessed OC data | Sep-25 | Q4 FY25 | |
| Updated DAP (MSL12) to CoastWatch, if needed | Sep-25 | Q4 FY25 | |

# OMPS SDR

*November 2024*

*Accomplishments / Events:*

- Derived and delivered OMPS weekly dark LUTs for 3 NPs and NMs.
- Derived and delivered OMPS solar bi-weekly LUTs for 3 NPs.
- Continued the ADR 10832 for OMPS NP sensor degradation analysis.
- Conducted an intensive analysis for JPSS-04 OMPS NM and NP pre-launch calibration data sets (goniometry coefficients. , bandpass, point spread function stray light feature, dark, etc.)
- Initialized the J3 OMPS NM and NP sensor pre-launch characterization analysis report outline by adding contents.
- Continued the development of a system to quickly update Dark Calibration LUTs following spacecraft anomaly events.
- Updated and extended TROPOMI and OMPS NM inter-sensor comparisons originally in support to the EUMET-STAR workshop.

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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 | Actual Completion Date | Variance Explanation |
|---|---|---|---|
| Update OMPS SDR calibration plan for JPSS-04 OMPS SDR | Oct-24 | Oct-24 | |
| Complete the solar activity adjustment analysis for SNPP, NOAA-20 and NOAA-21 OMPS NP (part of DR10832) | Dec-24 | Dec-24 | |
| Complete beta version of JPSS-04 OMPS nadir sensor pre-launch characterization analysis report | Jan-25 | | |
| Identify impacts of J4 OMPS NM wavelength range change on OMPS calibration/validation analyses | Mar-25 | | |
| Complete the degradation analysis for SNPP, NOAA-20 OMPS NP (part of DR10832) | Apr-25 | | |
| Develop various proxy calibration coefficient LUTs to support JPSS-3/4 OMPS NM SDR processing with a new wavelength range from 380 to 439nm | Jun-25 | | |
| Establish an off-line OMPS SDR processing package in order to meet new requirements from EDR in retrieving NO2 in future JPSS-03 and JPSS-04 missions (NM wavelength range: from 300-380 nm to 300-430nm) | Sept-25 | | |
| Complete beta version of JPSS-03 OMPS nadir sensor pre-launch characterization analysis report | Sep-25 | | |
| Initialize a calibration algorithm structure for solar radiometric calibration in support of JPSS-04 mission | Sept-25 | | |
| Support CRTM-VLIDORT project for OMPS radiance simulations | Sep-25 | | |
| Derive and deliver weekly/bi-weekly updates of OMPS NM/NP dark and solar calibration tables for SNPP, NOAA-20, and NOAA-21 OMPS SDR data | Sep-25 | | |
| SNPP/NOAA-20/NOAA-21 recovery assessment and LUT deliveries | Sep-25 | | |

**NOAA-20 (black), NOAA-21 (red), and JPSS-04 (blue) bandpass comparisons for NP (top row) and NM (bottom row)**

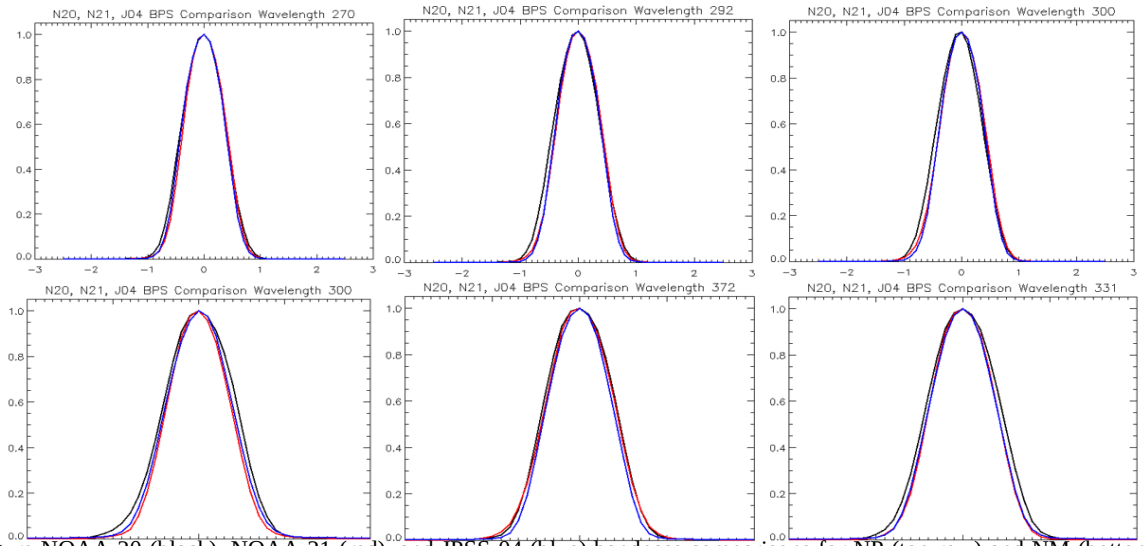



Figure NOAA-20 (black), NOAA-21 (red), and JPSS-04 (blue) bandpass comparisons for NP (top row) and NM (bottom row). Each row shows comparisons at three different wavelength channels. These channels include 270, 292, and 300 nm for NP; and 300, 331, and 372 for NM. In general, it has been seen that the curves for NOAA-21 and JPSS-04 match each other slightly better than those from NOAA-20, which tend to be wider.

Began examination of JPSS-04 OMPS NM PSF data and values. The JPSS-04 NM PSF data was available for 8 wavelengths and 9 azimuthal angles, for a total of 72 images. This is a larger set than what was available for NOAA-21 NM, which contained 6 wavelengths at 9 azimuthal angles. The extra wavelength channels for the JPSS-04 data were at 427 and 435 nm, beyond the range of what was available for NOAA-21. These extended wavelength channels should help when analyzing out-of-range stray light. Examples of the available PSF data can be seen in Figure.

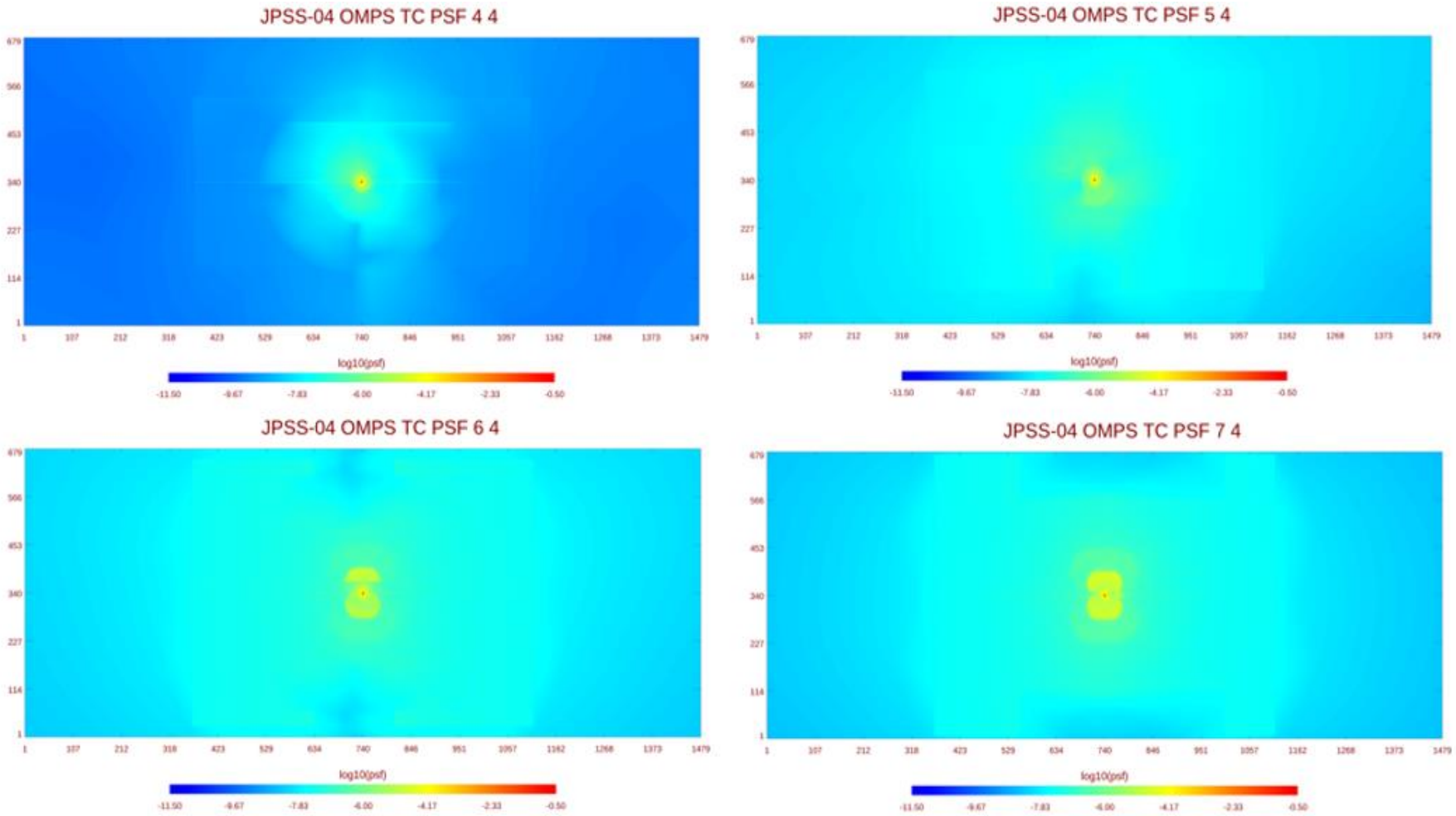



Figure JPSS-04 OMPS NM Point Spread Function (PSF) images for four different wavelength channels at the same azimuthal angle. The images in the bottom row are at wavelengths that are beyond what was available for NOAA-21. These additional wavelengths will help when analyzing out-of-range stray light.

# FY25 OMPS SDR Milestones/Deliverables

| | Milestone | Start | Finish | Deliverable |
|---|---|---|---|---|
| 1 | Complete the JPSS-4 OMPS SDR calibration plan | Sep-24 | Oct-24 | JPSS-4 OMPS SDR calibration plan |
| 2 | Complete the solar activity adjustment analysis for SNPP, NOAA-20 and NOAA-21 OMPS NP (part of DR10832) | Jun-24 | Dec-24 | Software; new OSL tables; reprocessed OMPS NP SDR test data sets; |
| 3 | Complete beta version of JPSS-04 OMPS nadir sensor pre-launch characterization analysis report | Sep-24 | Jan-25 | JPSS-04 OMPS nadir sensor pre-launch characterization analysis report |
| 4 | Identify impacts of J4 OMPS NM wavelength range change on OMPS calibration/validation analyses | Jan-25 | Feb-25 | Provide information to the delta review for J4 OMPS SDR algorithm |
| 5 | Complete the degradation analysis for SNPP, NOAA-20 OMPS NP (part of DR10832) and NM (a new DR is needed) | Dec-24 | Apr-25 | New solar wavelength and flux tables; reprocessed test data sets for OMPS EDR team |
| 6 | Develop various proxy calibration coefficient LUTs to support JPSS-3/4 OMPS NM SDR processing with a new wavelength range from 380 to 439nm | Jan-25 | Jun-25 | Various proxy calibration coefficient LUTs for JPSS-03/04 OMPS NMs; various proxy calibration coefficient LUTs for SNPP, NOAA-20 NMs (code compliance) |
| 7 | Establish an off-line OMPS SDR processing package in order to meet new requirements from EDR in retrieving NO2 in future JPSS-03 and JPSS-04 missions (NM wavelength range: from 300-380 nm to 300-430nm) | Feb-25 | Sept-25 | An off-line OMPS SDR processing package applicable for future JPSS-03 and JPSS-04; ADL code change package for operational processing |
| 8 | Complete beta version of JPSS-03 OMPS nadir sensor pre-launch characterization analysis report | Jun-25 | Sep-25 | JPSS-03 OMPS nadir sensor pre-launch characterization analysis report |
| 9 | Initialize a calibration algorithm structure for solar radiometric calibration in support of JPSS-04 mission | May-25 | Sept-25 | Diagram draft for converting solar radiometric counts to solar flux |
| 10 | Support CRTM-VLIDORT project for OMPS radiance simulations | Oct-24 | Sep-25 | Test results |
| 11 | Derive and deliver weekly/bi-weekly updates of OMPS NM/NP dark and solar calibration tables for SNPP, NOAA-20, and NOAA-21 OMPS SDR data | Oct-24 | Sep-25 | Dark, solar SOL LUTs |
| 12 | SNPP/NOAA-20/NOAA-21 recovery assessment and LUT deliveries | Oct-24 | Sep-25 | Dark, solar SOL LUTs |

# OMPS Ozone (V8Pro, V2Limb & V8TOz)

November 2024

## Accomplishments / Events:

- **Report on the Ozone Mapping and Profiler Suite (OMPS) Validated Maturity Review.**

  The validated maturity review briefing for the Version 8 Ozone Profile Retrieval Algorithm (V8Pro) EDRs was successfully held on November 21, 2024. The latest delivery for the soft calibration adjustment table brings the performance of the NOAA-21 V8Pro ozone profile EDRs to within ±5% of the corresponding results for NOAA-20 and S-NPP globally. The presentation and readme memo will be available at https://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php.

| Milestones | Original / Current Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| | | | | |

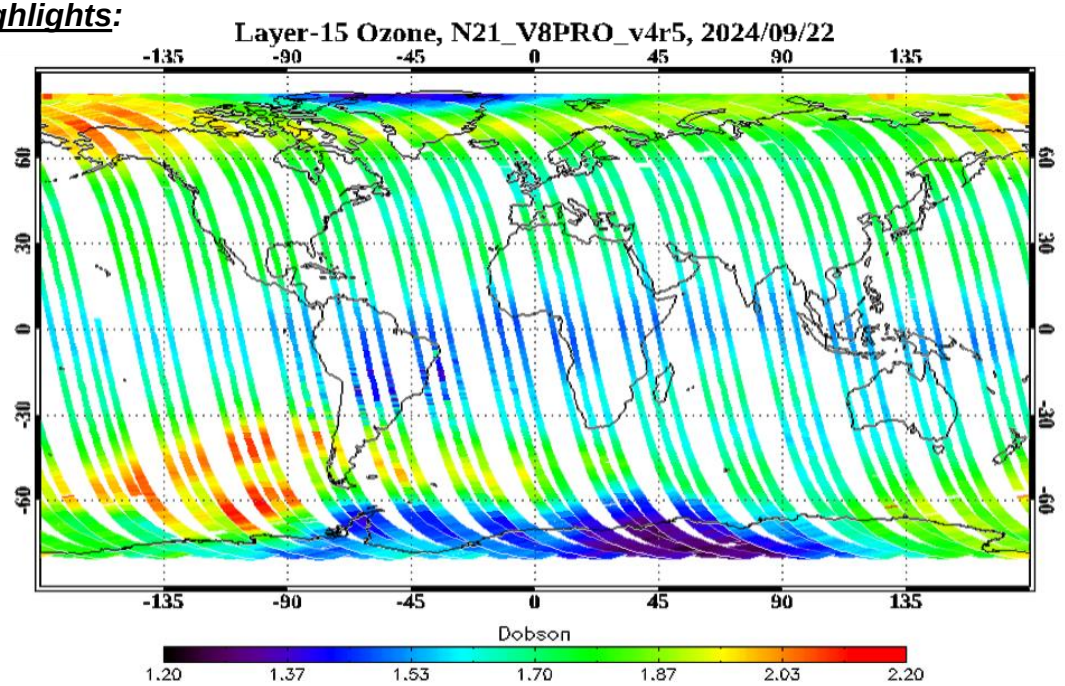
## Overall Status:

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

*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: IMSG ProTech Contract follow-on Is still not in place.***

## Highlights:




**False color image of the ozone profiles for a layer at 1 hPa for the three satellites for September 22, 2024. The NOAA-21 orbital track is the one on the right, NOAA-20 is on the left and S-NPP is in the middle**

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Task 1: ***Construct, improve and deliver tables and codes, and perform validation studies. Provide presentation of results to achieve and demonstrate Ozone EDR Maturity.*** | | | | |
| *Subtask 1.1:* | | | | |
| *Subtask 1.2:* | | | | |
| *Subtask 1.3:* | *September 2025* | | | |
| Task 2: ***Monitor and validate products by using ground-based assets and time series analysis and comparisons,*** | | | | |
| *Subtask 2.1:* | | | | |
| *Subtask 2.2:* | | | | |
| *Subtask 2.3:* | | | | |
| Task 3: ***Maintain, monitor, trouble-shoot all NOAA Nadir Ozone and $SO_2$ products.*** | | | | |
| *Subtask 3.1:* | | | | |
| *Subtask 3.2:* | | | | |
| *Subtask 3.3:* | | | | |
| Task N: ***Update Limb validation, codes, monitoring and tables as needed.*** | | | | |
| Subtask 4.1: ***Provide delta-DAPs as NASA improves Level 1 corrections or makes other tables, corrections or code modifications.*** | | | | |
| Subtask 4.2: ***Provide weekly tables deliveries for Darks, Wavelengths and Orbital Definition files*** | | | | |
| Subtask 4.3: ***Complete NOAA-21 V2Limb validation and move to operations – Support ORR*** | *December 2024* | | | |
| Subtask 4.4: ***Support J3/J4 progress and prepare Limb Cal/Val Plans.*** | | | | |

# Sea Surface Temperature

November 2024

## *Accomplishments / Events:*

- We wrapped up development of ACSPO VIIRS V3.00. We are now doing final checks/validation and working with archival agencies for suggested edits to file metadata. ACSPO V3.00 is schedule for ASSISTT delivery on January 15.
- We reprocessed 1 year of VIIRS SST using ACSPO V3.00 for all three VIIRS instruments (NPP, N20 & N21). The purpose of the exercise was to ensure long term stability of ACSPO V3.00.
- We worked on bringing the ACSPO VIIRS ATBD up to date. The ACSPO clear-sky mask (ACSM) received a complete overhaul in V3.00 and now comprises 14 clear-sky tests. All tests are either new or substantial updates to previous test. As an example, the figure demonstrates the merit of the newly develop Brightness Temperature Difference Texture Test (BTT), which is based on the spatial variability of the channel M12 and M15 brightness temperature (BT) difference. We also generalized the ACSPO ATBD to be applicable to SST products from other sensors (AVHRR, MODIS, ABI & AHI).
- We finished about 50% of work related to the ATBD update in November and we expect the up-to-date ATBD will be ready before the planned January 15 ASSISTT delivery.

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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.*

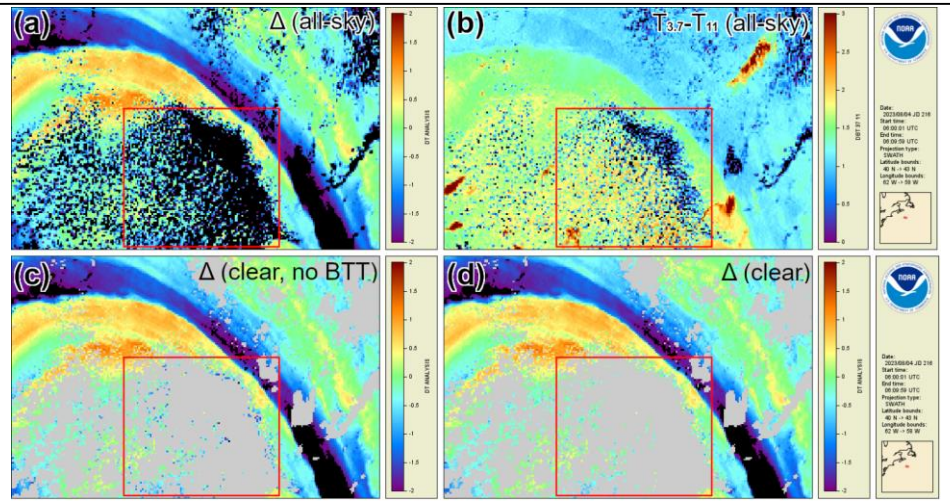
## ***Issues/Risks:***

Due to degraded Stability of STAR IT infrastructure in the last 6 months, our ACSPO code delivery to ASSISTT is a month behind schedule. The situation is exacerbated by our inability to buy new hardware and uncertain future of cloud migration for STAR science teams.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| SST EDR support to SDR team on Warm up - Cool down anomalies | Feb-24 | Feb-24 | Jan-22 | |
| SST EDR Support to JPSS-3 Data System Test Event *(Dependency on JPSS)* | ~~Apr-24~~ | ~~Apr-24~~ | | Delay due to dependency on JPSS test event; new timeline unknown |
| SST EDR Enterprise Cal/Val and ACSPO Algorithm "Agency Report" Presentation to GHRSST science community | Jun-24 | Jun-24 | Jun-24 | |
| SST EDR Enterprise Cal/Val Plan Initial Updates | Jul-24 | Jul-24 | Jul-24 | |
| Promote experimental iQuam updates to live access | Aug-24 | Dec-24 | | Additional QC algorithm updates |
| SST EDR Validated Maturity Review | 22-Aug-24 | 22-Aug-24 | Feb-20 | |

## ***Highlights:***

***New* Brightness Temperature Difference Texture Test (BTT)**




**NPP VIIRS imagery from the Northern Atlantic. This scene contains strong thermal fronts that are challenging for texture-based cloud tests due to potential misclassification of strong SST gradients as clouds. (a) Satellite minus reference SST anomaly (Δ) without any masking applied. (b) M12 and M15 BT difference. (c) Δ with the ACSM applied (BTT omitted). (d) Δ with the full ACSM applied (including BTT).**

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: Deliver L3S-LEO Daily to ASSISTT/OSPO; contingency on non-JPSS and non-NOAA data inputs* | *June 2025 (FY25)* | | | |
| *Subtask 1.1: Created and test Delivered Algorithm Package (DAP), containing L3S Daily code along with required libraries, ancillary data, and sample files* | *May 2025 (FY25)* | | | |
| *Subtask 1.2: Deliver L3S Daily DAP to ASSISTT and work with ASSISTT on troubleshooting and validation* | *June 2025 (FY25)* | | | |
| *Task 2: Full-mission Reanalysis (RAN) of VIIRS SST data from NPP, N20 & N21 using the latest version of ACSPO (Version 3.00)* | *September 2025 (FY25)* | | | |
| *Subtask 2.1: Recruit and familiarize staff* | *October 2024 (FY25)* | | | |
| *Subtask 2.2: Evaluate long term stability of VIIRS SST and compare with stability of VIIRS thermal bands.* | *April 2025 (FY25)* | | | |
| *Subtask 2.3: Investigate stabilization (de-trending) of long-term SST bias drift to create a maximally stable, long-term VIIRS SST dataset.* | *July 2025 (FY25)* | | | |
| *Subtask 2.4: Perform reprocessing using on-premise NOAA STAR compute hardware* | *August 2025 (FY25)* | | | |
| *Subtask 2.5: Deliver RAN data sets to PODAAC, CoastWatch & NCEI* | *September 2025 (FY25)* | | | |
| *Task 3: Continue improvements, validation of thermal fronts; shore up processing to use fronts to improve the ACSPO clear sky mask* | *September 2025 (FY25)* | | | |
| *Subtask 3.1: Support for using position and strength of thermal fronts to improve ACSPO clear-sky mask will be included in the ACSPO VIIRS 3.00 DAP delivery (see Task 5) to ASSISTT.* | December 2024 (FY25) | | | |
| *Subtask 3.2: Investigate viability of validating accuracy of thermal fronts using in situ SST from Sail Drones.* | September 2025 (FY25) | | | |

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 4: Collaborate across NESDIS and NOAA on "next generation SST product suite" , including exploring ACSPO L4* | *September 2025* | | | |
| *Subtask 4.1: Identify best way forward towards creating a STAR L4 SST product that covers the 1981-on era. Two viable approaches are (1) Extend the ACSPO L3S-LEO Daily product to fill in data gaps due to clouds. (2) Use existing Geo-Polar Blended L4 SST algorithm using reprocessed ACSPO SSTs from AVHRR, MODIS, VIIRS, ABI, and AHI sensors.* | September 2025 | | | |
| *Subtask 4.2: Perform full-mission reprocessing of all ACSPO SST datasets to improve SST quality and uniformity* | September 2025 | | | |
| *Task 5: Continue refining ACSPO Clear Sky Mask to reduce over screening and residual cloud leakages. The overarching goal is improving both quantity (number of clear sky pixels) and quality (accuracy/precision).* | *Ongoing; target next update for delivery of ACSPO 3.00 (FY25)* | | | |
| *Subtask 5.1: Create and test Delivered Algorithm Package (DAP) for ACSPO V3.00 VIIRS. ACSPO version 3.00 contains substantial improvements to the VIIRS clear-sky mask in terms of reduced cloud leakages and improved coverage in dynamic regions.* | *November 2024 (FY25)* | | | |
| *Subtask 5.2: Deliver DAP to ASSISTT and work with ASSISTT on troubleshooting and validation* | December 2024 *(FY25)* | | | |

# Snowfall Rate

*November 2024*

## *Accomplishments / Events:*

- The SFR team is preparing for the next delivery in December. Some of the major updates includes coverage extension to over ocean (open ocean, sea ice, and coast) for all six satellites, and inter-calibrated algorithms that improve consistency across satellites.
- The study on microphysics has shown benefits to the SFR products. A total of 24 ice habits from two microwave (MW) scattering databases are examined for their impact on snowfall rate retrievals. The ice habits form under different environmental conditions and have various representations in MW measurements. Preliminary study on a machine learning-based combination of ice habits has led to improved SFR performance. The goal of this study is to update the SFR algorithm with advanced microphysics in the future.
- All members of the SFR team attended the AGU meeting and presented in various format, oral, poster, and NOAA Booth.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *SFR delivery including ocean coverage* | **12/2024** | | | |
| *Development of NPreciSe web-portal and archive* | **12/2024** | | | |
| *Cross calibration for NOAA-21, NOAA-20, S-NPP, Metop-B, Metop-C, and GPM* | **4/2025** | | | |
| *Extending the study to include climatology in NPreciSe* | **6/2025** | | | |
| *Advanced microphysics for NOAA-21, NOAA-20, S-NPP, Metop-B, Metop-C, and GPM* | **6/2025** | | | |
| *2D SFR bias correction for NOAA-21, NOAA-20, S-NPP, Metop-B and Metop-C* | **6/2025** | | | |

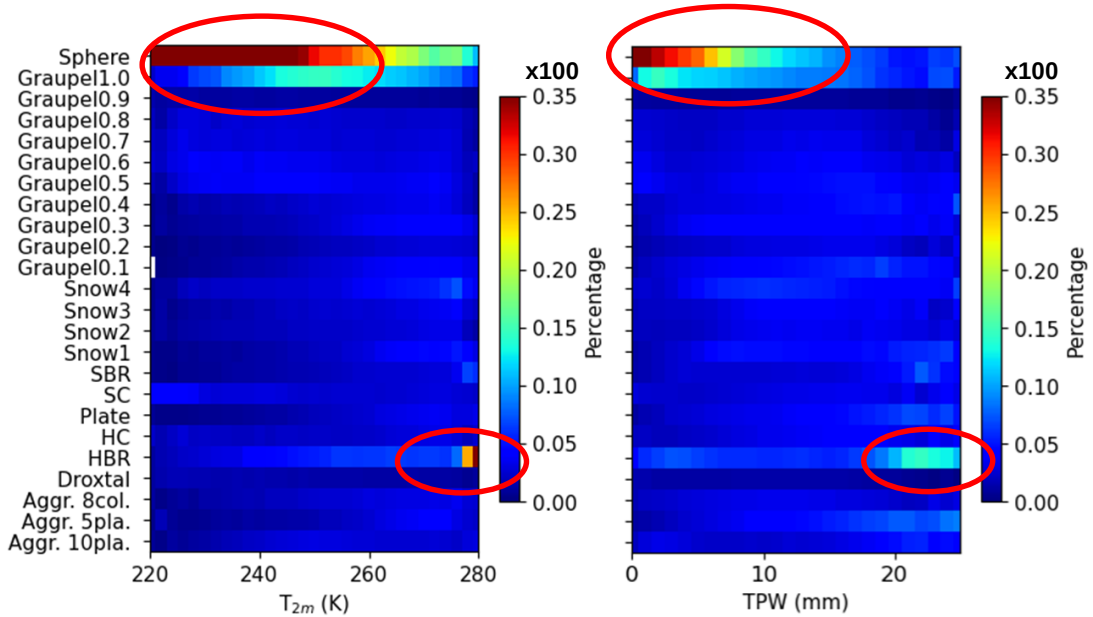
## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:*




Occurrence of the best ice habits based on SFR retrieval and the reference data as a function of 2-m temperature (left) and total precipitable water (right)

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: Advanced microphysics for NOAA-21, NOAA-20, S-NPP, Metop-B, Metop-C, and GPM* | *June 2025* | | | |
| *Subtask 1.1: Study scattering properties of various ice habits and their impact on S-NPP snowfall rate retrieval* | *December 2024* | | | |
| *Subtask 1.2: Develop AI/ML-based optimal combination scheme for multiple ice habits to improve S-NPP SFR 2/2025* | *February 2025* | | | |
| *Subtask 1.3: Develop advanced microphysics for the other satellites* | *June 2025* | | | |
| *Task 2: Cross calibration for NOAA-21, NOAA-20, S-NPP, Metop-B, Metop-C, and GPM* | *April 2025* | | | |
| *Subtask 2.1: Select reference satellite* | *October 2024* | | | |
| *Subtask 2.2: Create collocated datasets for all satellites with the reference satellite* | *January 2025* | | | |
| *Subtask 2.3: Perform cross satellite calibration and derive correction model for each satellite* | *April 2025* | | | |
| *Task 3: 2D SFR bias correction for NOAA-21, NOAA-20, S-NPP, Metop-B and Metop-C* | *June 2025* | | | |
| *Subtask 3.1: Feature analysis and construction of training datasets for 2D ML models* | *March 2025* | | | |
| *Subtask 3.2: Train 2D bias correction models* | *June 2025* | | | |
| *Task 4: Development of NPreciSe web-portal and archive* | *December 2024* | | | |
| *Subtask 4.1: Develop and implement new webpage interface to enable hosting the NPreciSe web portal* | *September 2024* | | | |
| *Subtask 4.2: Migrate the processing and archiving system to a new server* | *December 2024* | | | |
| *Task 5: Extending the study to include climatology* | *June 2025* | | | |
| *Subtask 5.1: Add monthly statistics of detection and estimation errors of the MiRS product to the NPreciSe system* | *June 2025* | | | |

# Surface Reflectance

November 2024

## *Accomplishments / Events:*

- Continue preparing the updated DAP for the next delivery. Verify the new results against current operational data, test the new global statistics for monitoring, and redefine the threshold as needed.
- Using long-term VIIRS SDR/L1B data, compare the NOAA and NASA recalibrated TOA reflectance coefficients. Since significant differences were identified, a verification process will be conducted to evaluate the two datasets and analyze their impact on downstream products such as VI and LAI.
- Maintain routine SR monitoring tools, including the daily global true-color image and weekly AERONET validation.
- Focus on improving SR validation through BRDF correction and explore methods for analyzing surface BRDF characteristics.

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | x | | | |
| **Technical / Programmatic** | | x | | | |
| **Schedule** | | x | | | |

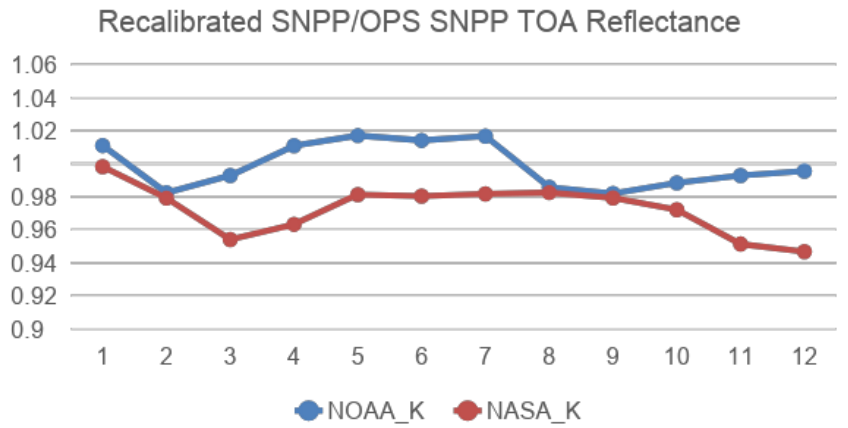
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

***Issues/Risks:***

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Provional 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 | Jun 28, 2024 | |
| Operational Readiness Review (ORR) for NDE Migration to NCCF | Aug-24 | Aug-24 | Nov 13, 2023 | Completed ahead of schedule |
| Develop SR software package using the reprocessed SDR to reduce the inconsistency | Nov-24 | Nov-24 | Nov 25, 2024 | |
| The reprocessed SR consistency evaluation | Dec-24 | Dec-24 | | |

## *Highlights:*

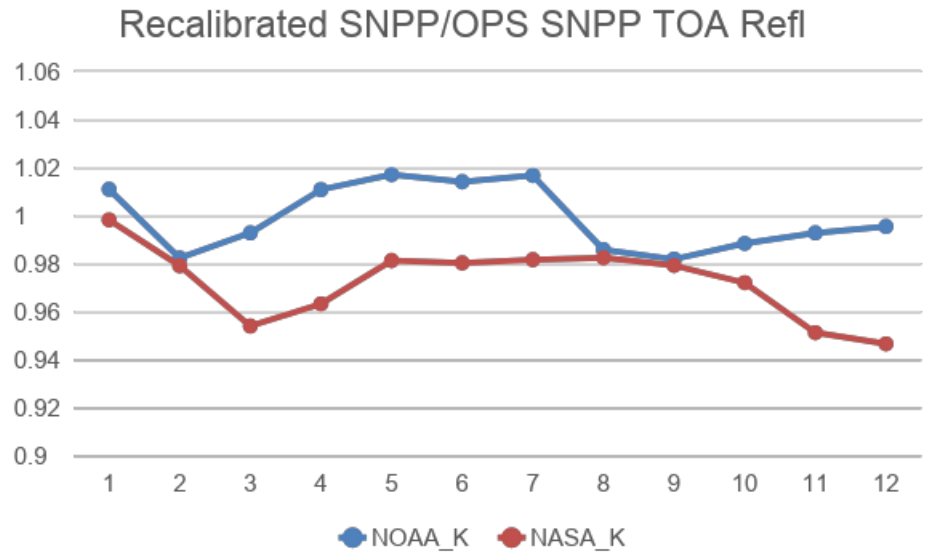


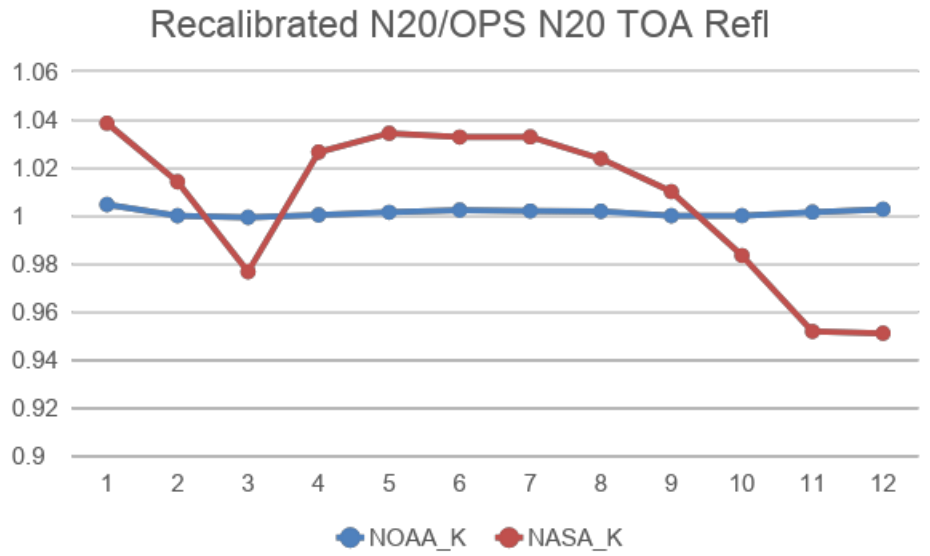

NOAA Reprocessed SDR and NASA recalibration coefficients comparison over VIIRS 12 SR bands (I1-3, M1-5, M7-8, M10-11), the two NDVI bands with close results while others with significant difference up to 4% which need further investigation.

# NOAA and NASA Recalibrated TOA Reflectance Comparison



- Datasets
  - NOAA operational SDR and reprocessed SDR (SNPP: N20: )
  - NASA VNP09 v1 and v2 and VJ109 v2.
- Results
  - Significant difference found between NOAA and NASA recalibrated TOA reflectance. The Red and NIR bands (I1/I2, M5/M7) are very close between NOAA and NASA. (2% lower NIR □ ~3-5% lower LAI)
  - NOAA N20 recalibration is minor change while NASA is significant.
  - NASA with a slight linear change over years while NOAA with similar trend.
  - Further evaluation is needed.

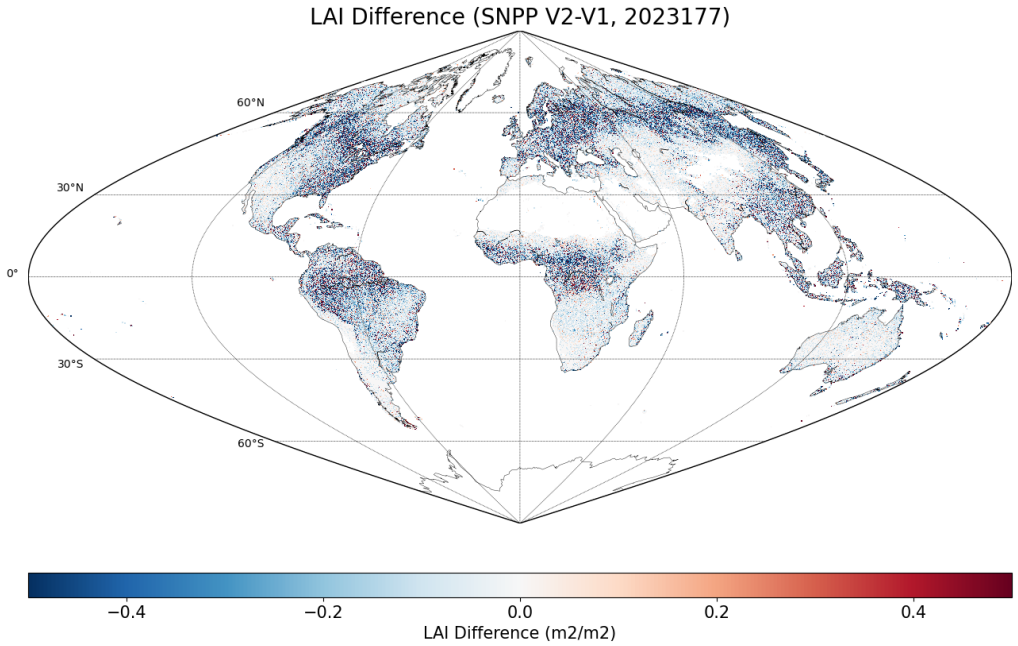


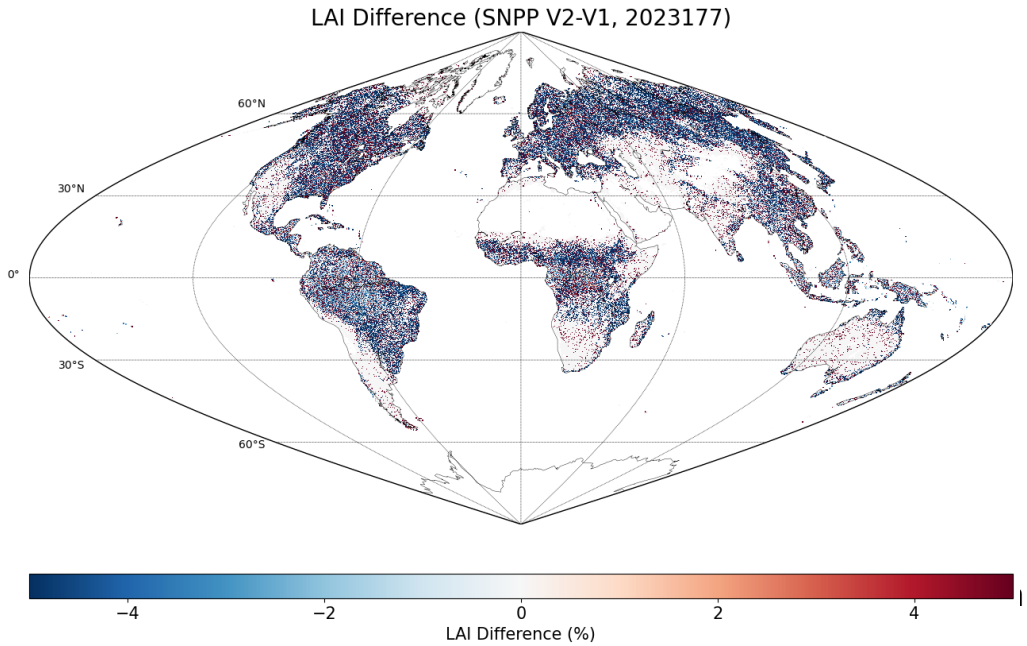




The recalibration coefficients (TOA_New = TOA_Old*k) comparison between NOAA and NASA methods for 12 SR bands (I1-I3, M1-5, 7-8,10-11)

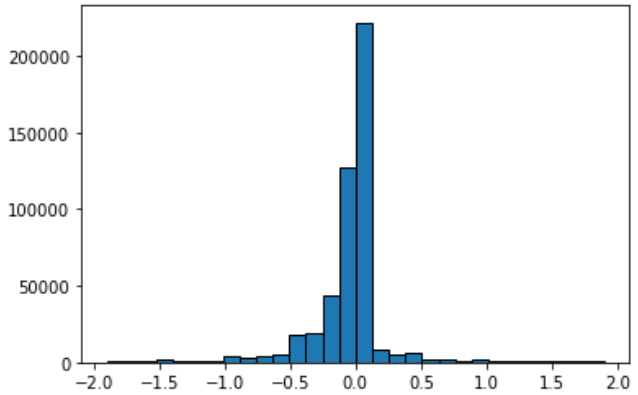
# Recalibrated SDR data impact on LAI

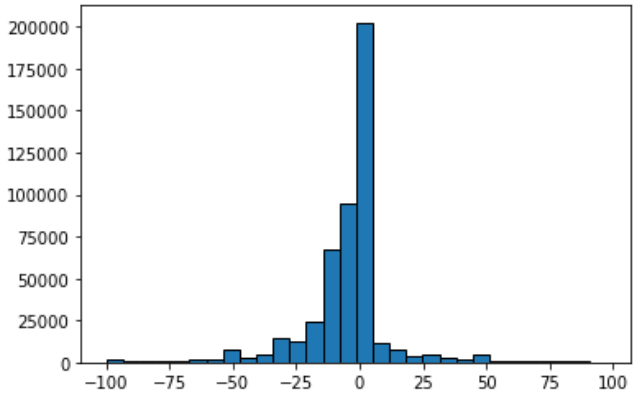
- The SNPP LAI difference using the original SR and recalibrated SR




- For SNPP, the recalibrated SR (v2) with lower NIR value (~2%) and slight lower Red value (~0.1%)
- The v2 LAI with lower LAI compared with v1, histogram in right figure shows.
- The difference could up to 5%.



# FY25 Milestones/Deliverables

| Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|
| Develop SR software package using the reprocessed SDR to reduce the inconsistency. | 10/1/2024 | 12/31/2024 | New test datasets | |
| SR Algorithm improvement to address the issues found in validation. | 04/1/2025 | 06/30/2025 | Algorithm test report. | JPSS L1RD requirement |
| updated DAP delivery (include the mitigation algorithm) | 01/01/2025 | 03/31/2025 | mDAP delivery to ASSIST | |
| The reprocessed SR consistency evaluation | 10/1/2024 | 12/31/2024 | Validation report | |
| SNPP, N20 & N21 monitoring and validation and user feedback & response | 7/1/2025 | 9/30/2025 | Analysis reports | |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

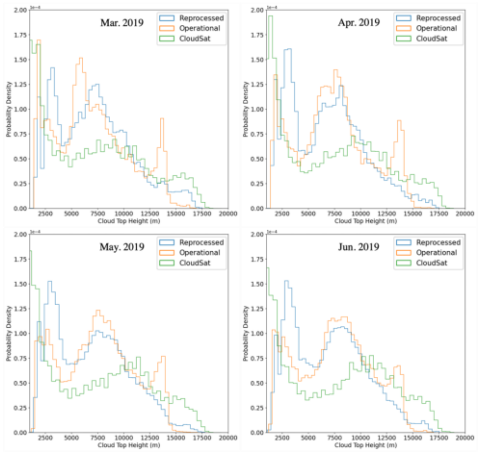
# SNPP VIIRS EDR and Microwave Sounding CDR Reprocessing

*Nov. 2024*

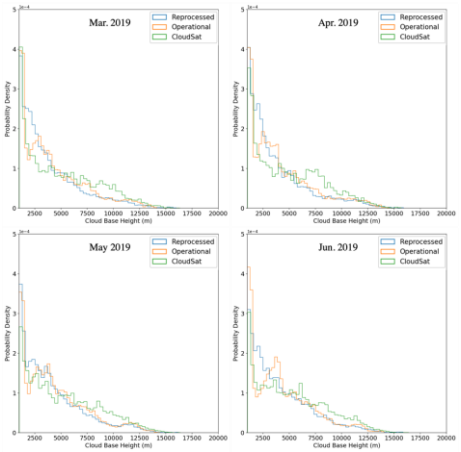
## ***Accomplishments / Events:***

- The RWG completed the initial draft of the quality assessment paper on one year of SNPP VIIRS CTH and CBH EDR reprocessed data sets, which includes various additional computations to verify the accuracy of the reprocessed data sets.
- The Figures below are histograms of probability density for reprocessed VIIRS (blue), operational VIIRS (orange) and CloudSat-CALIPSO (green) CTH (left) and CBH (right) data for Mar. – Jun. 2019.
- Algorithm and software maintenance and quality control to keep the MLT CDR products into operations
- Monthly updates and delivery of CDR Products to NCEI (see figures next slid)

CTH




CBH




| Milestones | Original Date | Forecast Date | Variance Explanation |
|---|---|---|---|
| Monthly updates and delivery of microwave sounding CDR products | Monthly (Oct.24~Sep25) | | |
| Assess the quality and accuracy of one-year reprocessed cloud base height and cloud top height EDRs | Dec-24 | Dec-24 | |
| Making plans for on-demand reprocessing, including setting up server environment for testing, computation efficiency comparison for options, cost comparison, etc. | Mar-25 | | |
| Assess the quality and accuracy of one-year reprocessed other cloud EDRs (e.g., Cloud layers, cloud phase, cloud optical depth) | Apr-25 | | |
| Continue to reprocess SNPP VIIRS EDRs (target: finish ~2.5 years of data if the GMU cluster computing system is ready) | Sep-25 | | |
| Prepare the reprocessed data for transition to CLASS or cloud | Sep-25 | | |
| Technical analysis and reports per ad hoc request from JPSS and STAR management, including monthly report | Oct-24 to Sep-25 | | |

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | | | X | Execution delay is expected due to issues in STAR servers and retirement of UMD computer 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:***

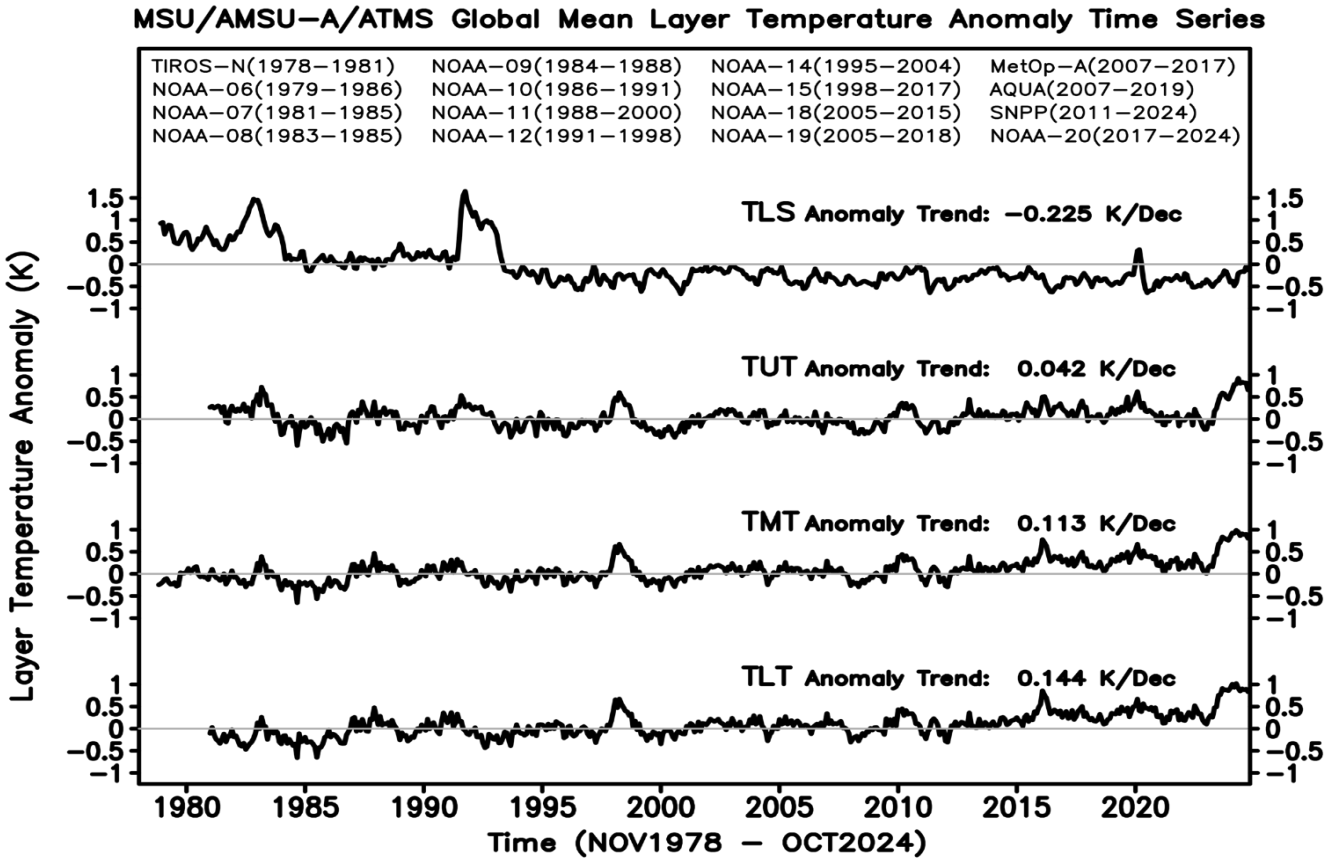
The VIIRS EDR reprocessing was relying on the UMD Bamboo system previously, which had officially retired in July 2024.

- A mitigation plan is being developed by using GMU cluster computer system for continued reprocessing of VIIRS EDRs

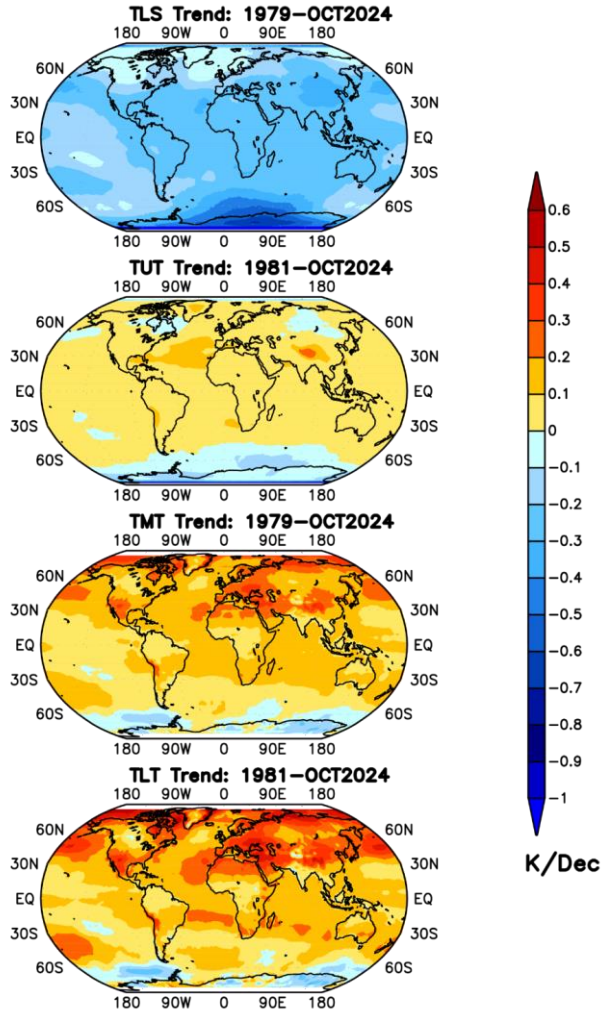
# SNPP ATMS Microwave Sounding CDR Monthly Report in November 2024

- Monthly updates and delivery of CDR Products to NCEI

AMSU-A FCDR L1c data product for October 2024
AMSU-A FCDR_Gridded data product for October 2024
NOAA MLT V5.0 data products from November 1978 to October 2024




Global Mean Time Series of TLT, TMT, TUT and TLS from NOAA MLT V5.0 CDR Products from November 1978 to October 2024




Trend map of TLT, TMT, TUT and TLS from NOAA MLT V5.0 CDR data products

# FY25 VIIRS and Microwave Sounding Reprocessing Milestones/Deliverables

| | Milestone | Start | Finish | Deliverable |
|---|---|---|---|---|
| 1 | Monthly updates and delivery of microwave sounding CDR products | Oct-24 | Sep-25 | Deliver microwave sounding CDR Products to NCEI; CDR website maintenance |
| 2 | Assess the quality and accuracy of one-year reprocessed cloud base height and cloud top height EDRs | Jun-24 | Dec-24 | One year of quality-assured SNPP VIIRS cloud base height and cloud top height EDR products; one manuscript draft about the work |
| 4 | Making plans for on-demand reprocessing, including setting up server environments for testing, computation efficiency comparison for options, cost comparison, etc. | Dec-25 | Mar-25 | Optical reprocessing plan; well-setting up processing package |
| 3 | Assess the quality and accuracy of one-year reprocessed other cloud EDRs (e.g., Cloud layers, cloud phase, cloud optical depth) | Jan-25 | Apr-25 | One year of quality-assured SNPP VIIRS cloud layers, cloud phase, cloud optical depth EDR products |
| 5 | Continue to reprocess SNPP VIIRS EDRs (target: finish ~2.5 years of data) | Mar-25 | Sep-25 | New SNPP VIIRS cloud reprocessed products |
| 6 | Prepare the reprocessed data for transition to CLASS or cloud | Aug-25 | Sep-25 | SNPP reprocessed cloud EDR products (one year or longer) for transition to CLASS |
| 7 | Technical analysis and reports per ad hoc request from JPSS and STAR management, including monthly report | Oct-24 | Sep-25 | Analysis reports |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

# Surface Type

*November 2024*

## *Accomplishments / Events:*

- STAR-UMD VIIRS Surface Type team has downloaded and processed NOAA-21, NOAA-20, and S-NPP VIIRS daily granule surface reflectance data acquired in November of 2024 for the production of AST-2024.
- The team continue to monitor the quality of the global daily mosaics and monthly composites generated based on newly acquired surface reflectance data. The daily mosaics and monthly composites are the intermediate products required by the AST algorithm.
- The team has downloaded all GEDI LiDAR data and used them to create gridded canopy cover and tree height data at the 1km resolution. These gridded products are being used to improve the surface type reference dataset, which will be used to train the surface type classification algorithm and to validate the 2024 AST product.
- The team continue to produce global monthly water surface fraction (WSF) product. The 2024 WSF product suite shows the transcontinental impact of monsoon rainfall over North Central Africa (see highlights).

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:***

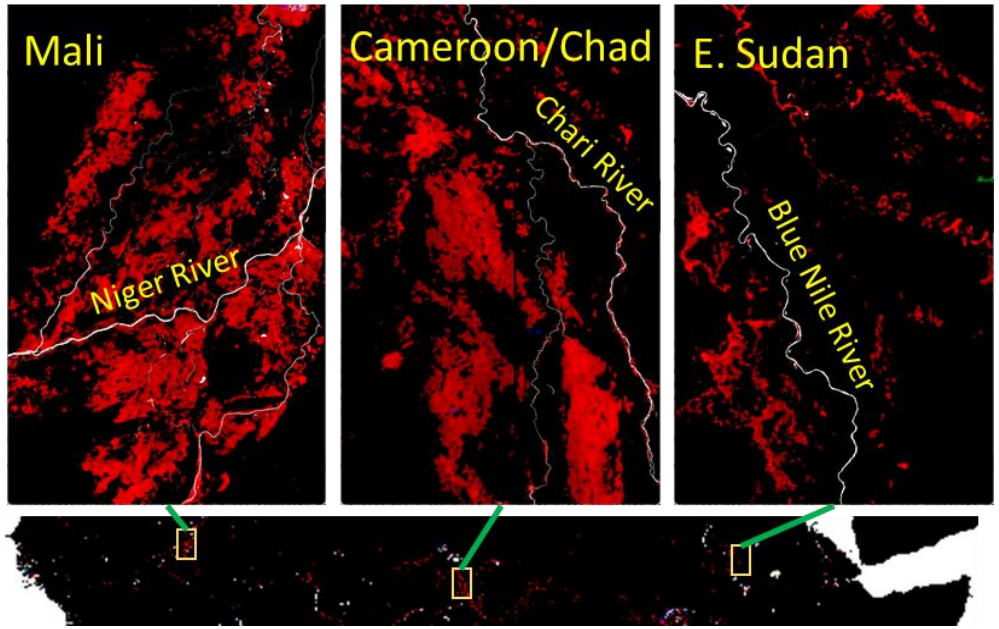
None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Monthly update of the 250m global water surface fraction product | Each M. | Each M. | | |
| Complete global monthly composites for each of 2024 months | Feb-25 | Feb-25 | | |
| Generate global annual classification metrics for 2024 | May-25 | May-25 | | |
| AST24 of IGBP 17 type map | Aug-25 | Aug-25 | | |
| AST24 for EMC 20 type map | Aug-25 | Aug-25 | | |
| AST24 Validation Statistics and delivery to JSTAR and users | Sept-25 | Sept-25 | | |

## *Highlights:*

***Monthly WSF Product Shows Transcontinental Impact of Monsoon Rainfall over North Central Africa***

*Monsoon rainfall over West Africa occurs from June to September, but the 2024 monthly WSF product shows that the impact can reach as far as Sudan in eastern Africa. This figure shows the WSF data for September, June, and March of 2024 in red, green, and blue. The red tones indicate areas flooded in September but not in June/March. The bottom image covers the entire north central Africa continent from Senegal in the west to Somalia in the east. The ground area of each zoom in window is about 120km by 200 km.*



| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: Improving and updating the surface type training and validation polygons* | | | | |
| *Subtask 1.1: Update training polygons where the surface type label has changed* | *Sept-25* | | | |
| *Subtask 1.2: Add new training polygons where existing training data are not enough* | *Sept-25* | | | |
| *Subtask 1.1: Update validation polygons where the surface type label has changed* | *Sept-25* | | | |
| *Task 2: Processing VIIRS surface reflectance data acquired during this funding year for surface type mapping* | | | | |
| *Subtask 2.1: Map VIIRS SR data from satellite swath to the global 1 km grid to create global daily mosaic* | *Each day* | | | |
| *Subtask 2.2: Create cloud free monthly composites from the daily mosaics* | *Each month* | | | |
| *Subtask 2.3: Generate annual classification metrics using the 12 monthly composites of 2024* | *Apr-25* | | | |
| *Task 3: Producing AST24* | | | | |
| *Subtask 3.1: Develop the SVM model and use the model to classify the 2024 VIIRS annual metrics* | *May-25* | | | |
| *Subtask 3.2: Post-process the SVM classification to produce the final AST24 product* | *Aug-25* | | | |
| *Subtask 3.3: Validate AST24 to generate accuracy statistics* | *Sept-25* | | | |
| *Subtask 3.4: Deliver AST24, update ATBD and the surface type webpage* | *Sept-25* | | | |

# Vegetation Health

*November 2024*

## *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.
- Created and reviewed a poster titled “Analysis of Satellite Vegetation Health Indices for Country-Level Wheat Yield Forecasting” for presentation at the AGU 2024 annual meeting. The poster was then reformatted into a new version using templates set by STAR front office for AGU posters.
- Initiated an effort to evaluate the quality of weekly GVI composite data. The plan includes performing a comprehensive sanity check on past VIIRS SDR data for S-NPP, NOAA-20 and NOAA-21 from 2012 to the present. The goal is to provide insights for future updates to VHP climatology based on the quality of the weekly composites. As a first step, updated and analyzed the daily count of VIIRS granules at: https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/npp_granules.php.

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | X | | | |
| **Schedule** | | X | | | |

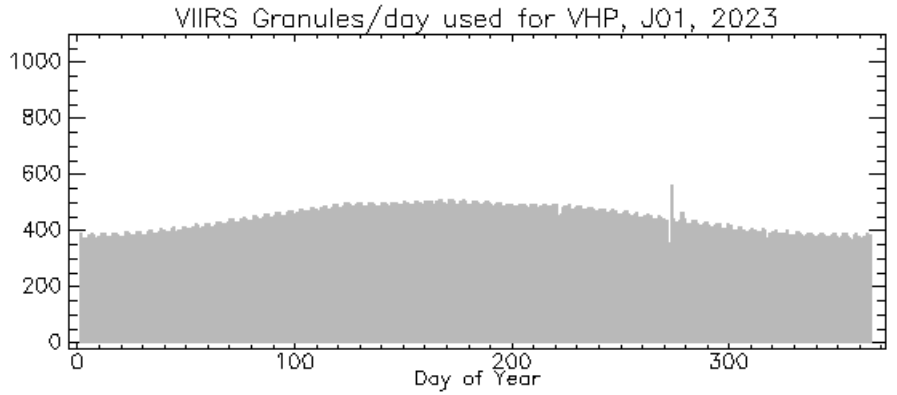
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

***Issues/Risks:***

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| NOAA-21 Vegetation Health Beta Maturity | Sep-23 | Sep-23 | Sept-23 | |
| NOAA-21 Vegetation Health Provisional Maturity | Apr-24 | Apr-24 | Sept-23 | Maturity reached before plan |
| NOAA-21 Vegetation Health Validated Maturity | Apr-24 | Apr-24 | Sept-23 | All VIIRS EDRs declared Validated Maturity |

***Highlight:*** *The number of VIIRS granules per day has been updated to reflect the SDR data availability for VHP production since 2012. Below is an example of the daily granule counts for NOAA-20 in 2023. This basic data availability information can be used to calculate weekly statistics on the number of days with valid CH1 data.*



| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: Deliver CCAP for VIIRS 500m global Vegetation Health Products* | *September 2025* | | | |
| *Subtask 1.1: Hire staff member to lead work* | *March 2025* | | | |
| *Subtask 1.2: Reconfigure computer code for 500m products using NOAA-20/21 I-bands observations* | *June 2025* | | | |
| *Subtask 1.3: Create and validate CCAP and deliver to ASSISTT* | *September 2025* | | | |
| *Task 2: Develop CCAP for value-added and science-enhanced ASCII and Geotiff data files of regional Vegetation Health Products* | *September 2025* | | | |
| *Subtask 2.1: Confirm staff member to lead the task* | *March 2025* | | | |
| *Subtask 2.2: Restructure compute code/scripts and ancillary data base for the VHP tailored for major crop regions* | *June 2025* | | | |
| *Subtask 2.3: Create and validate CCAP and deliver to ASSIST* | *September 2025* | | | |

# Vegetation Index and Green Vegetation Fraction

*November 2024*

## *Accomplishments / Events:*

- Finished 1km NVPS DAP delivery
- In response to new request from EMC for Stem Area Index (SAI), preliminary research and prototype building.
- Finished cal/ val update for SNPP and NOAA-20

## *Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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.*

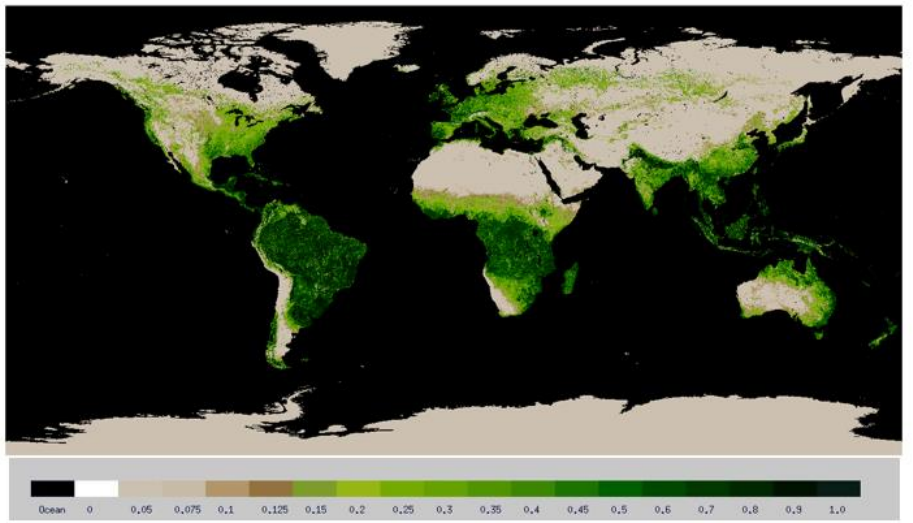
***Issues/Risks:***

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| 1km global VIIRS VI code and documentation ready for delivery | Oct-23 | Nov-23 | Nov-23 | Personnel access to NOAA systems issues |
| NOAA-21 VI and GVF provisional maturity review | Jan-24 | Jan-24 | Jan-24 | |
| Higher-resolution regional VI and GVF domain extended to global | Feb-24 | Apr-24 | Nov-24 | Delayed due to PCR review |
| Experimental data test of blended VI and GVF products | Apr-24 | Jul-24 | Jul-24 | Delays to previous milestone and personnel departure |
| Support to JPSS-3 Data System Test | Apr-24 | Apr-24 | | No J03 test data will be available this year |
| 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 | Oct-24 | Comparison with other data sets necessary |

## *Highlights:*

1km weekly GVF image for the period 10/05/2023 - 10/20/2023



# 1km NVPS DAP delivery (1km global VI and GVF)

| Delivered Items | | Description | Status |
|---|---|---|---|
| Codes | VI_CODE_V4.0 | VI code package v4r0 to produce 1km global VI product and daily SR IP for the use of GVF algorithm | |
| | GVF_CODE_V4.0 | GVF code package v4r0 to produce 1km global GVF product | |
| Docs | VIIRS_VI_ATBD_v4r0_20241205.pdf | ATBD version 4.0 for VI | |
| | VIIRS_GVF_ATBD_v5r0_20241205.pdf | ATBD version 4.0 for GVF | |
| | README_NVPS_DAP_v4r0_20241205.pdf | ReadMe document to describe the use of both the code packages | |
| | Memo_NVPS_DAP_v4r0_20241205.pdf | Provide notations on this current DAP | |
| | VIIRS_NVPS_EUM_v5r0_20241205.pdf | External User Manual | |
| | VIIRS_NVPS_SMM_v5r0_20241205.pdf | Software Maintenance Manual | ASSIST |

# 1km NVPS DAP delivery (1km global VI and GVF)

| Delivered Items | | Description | Status |
|---|---|---|---|
| Data | GITCO, SVI01, SVI02, SurfRefl, JRR-CloudMask, JRR-AOD | Raw input data for VI | |
| | VI-SR | 16 days of daily gridded surface reflectance data covering the test period | |
| | GVF-EVI | 15 weeks of weekly composited EVI data for timeseries smoothing for GVF calculation | |
| | VI-DLY, VI-WKL, VI-BWKL | Final output of daily, weekly, and biweekly VI product for verification | |
| | GVF-WLK | Final output of weekly GVF product for verification | |

- Test period: 11/15/2024 ~ 11/30/2024

# 1km NVPS DAP delivery (1km global VI and GVF)

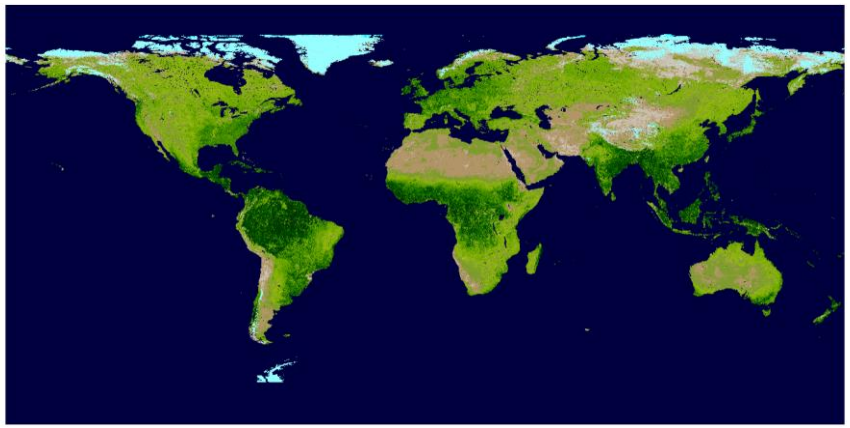
Key changes versus last version

- Extend the regional 1km resolution ouput to be global
- Remove the global 4km resolution output
- Exclude pixels with VZA higher than 65° in the aggregation process
- Add an indicator to the statistics output for NCCF monitoring purposes
- Fix some minor bugs in the attributes of the final NetCDF output files.

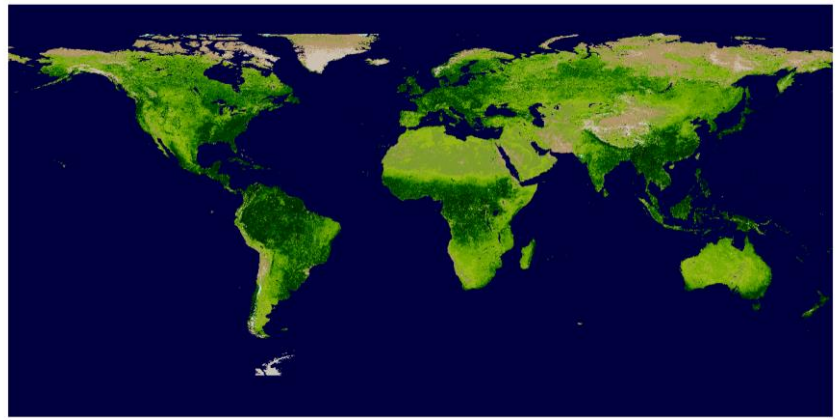
# 1km NVPS DAP delivery (1km global VI and GVF)

Biweekly VI images for the period 10/05/2023 - 10/20/2023

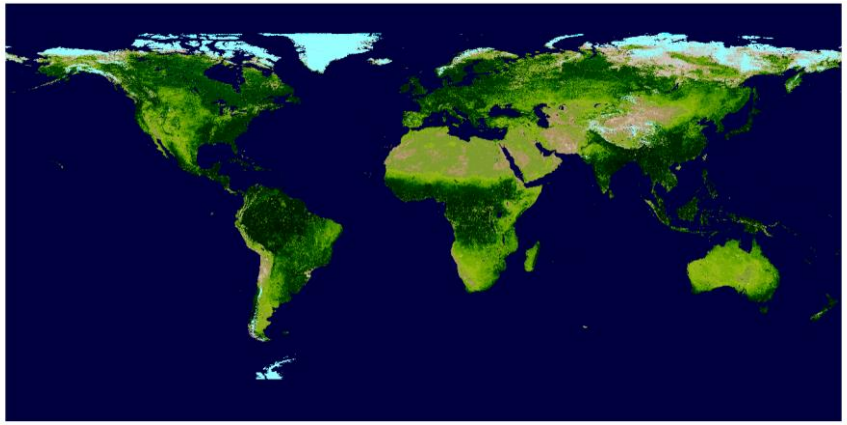
TOC_EVI



TOA_NDVI

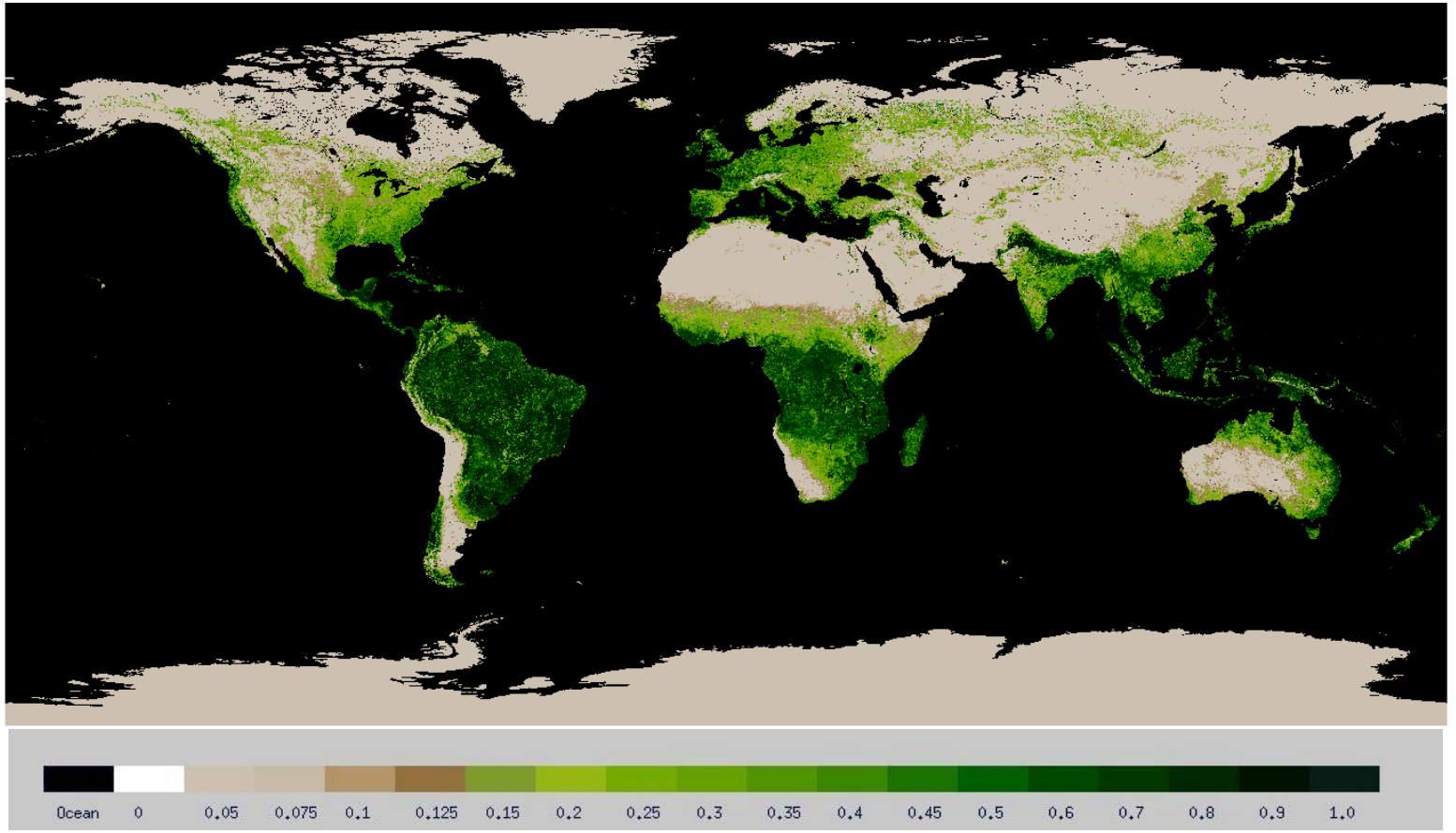


TOC_NDVI



# 1km NVPS DAP delivery

1km weekly GVF image for the period 10/05/2023 - 10/20/2023



# FY25 Milestones/Deliverables

| | Milestone | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| **1** | Final report of blended VI and GVF products; for suitability of operational production | Oct-24 | Jan-25 | Code and test data | |
| **2** | Reprocessing readiness of SNPP and NOAA-20 VI and GVF data records | Jan-25 | May-25 | Software readiness | |
| **3** | Evaluation of methods for handling data gaps in GVF 15 weeks of historical data | Oct-24 | Jan-25 | | GVF requirements |
| **4** | Further development of 20m VI downscaling | Jan-25 | Jun-25 | Code and examples | VI requirements |
| **5** | AI/ML based algorithm development for the vegetation product derivation and validation | Feb-25 | Aug-25 | Experimental code and test data | GVF requirements |
| **6** | Experimental version of VI and GVF production combined with Vegetation Health | Apr-25 | Sep-25 | Experimental code and test data | VI and GVF requirements |

| D | I | C | M | L |
|---|---|---|---|---|
| Development | Integration &Testing | Calibration & Validation | Maintenance | LTM & Anomaly Resolution |

# VIIRS SDR

*November 2024*

## *Accomplishments / Events:*

- Supported the 11/2/2024 Suomi NPP GPS anomaly investigation by using geolocation validation system (CPM), off-line analysis of sample data (coastline images), and modeling using orbital perturbation: confirmed recovery from the anomaly on 11/6/2024 around 17:20 UTC
- Created the half of the initial prelaunch JPSS-4 VIIRS SDR LUTs that did not require processing on NOAA STAR IT systems any export-controlled data
- Downloaded from GRAVITE and examined the first JPSS-4 VIIRS RDR files created by the Flight Project from the satellite testing in October 2024: with the current 85.35-s granule size, every 6th granule includes 49 scans that cannot be processed with IDPS/ADL
- Assisted in scheduling and analyzed data from NOAA-21, NOAA-20, and Suomi NPP VIIRS lunar calibration on 11/12/2024: data aligns well with long-term trends and exhibits consistency
- Generated and delivered for deployment in the IDPS operations the updated NOAA-21, NOAA-20 and Suomi NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired during the new moon on 11/1/2024

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| TSIS-1 solar spectrum application for JPSS-3/-4 VIIRS | Dec-24 | | 11/15/2024 | |
| JPSS-4 VIIRS pre-launch characterization report | Mar-25 | | | |
| JPSS-3/-4 VIIRS granule size change verification | Mar-25 | | | |
| VIIRS cross-calibration with hyperspectral measurements | Jun-25 | | | |
| Suomi NPP and NOAA-20 VIIRS intermediate recalibration | Jun-25 | | | |
| “Monthly” VIIRS lunar calibration predictions and analyses | Jul-25 | | | |
| JPSS-3/-4 VIIRS waiver impact studies report | Sep-25 | | | |
| Cross-calibration and comparison among NOAA-21, NOAA-20, and Suomi NPP VIIRS report | Sep-25 | | | |

## *Overall Status:*

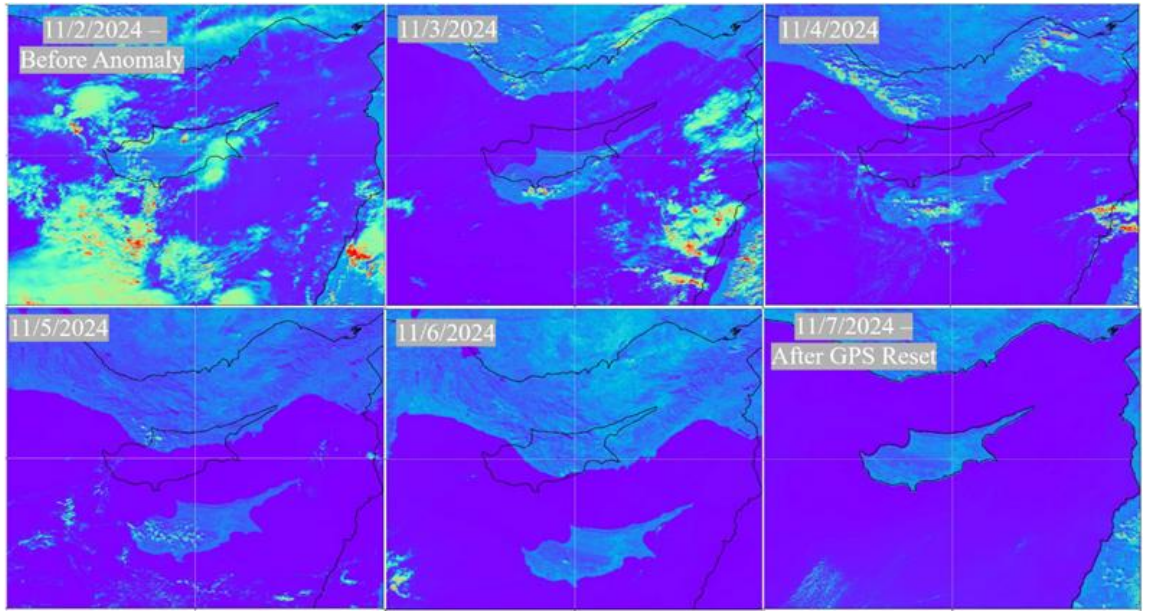
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | x | | | |
| **Technical / Programmatic** | | x | | | |
| **Schedule** | | x | | | |

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:*

## *Highlights:*

Suomi NPP GPS anomaly progression and recovery in early November 2024



# FY25 Milestones/Deliverables (in general)

| Task Category | Task/Description | Start | Finish | Deliverable | Requirement(dev. only) |
|---|---|---|---|---|---|
| Development (D) | • Impact of polarization sensitivity on VIIRS SDR(waiver)<br>• Cross calibration with hyperspectral measurements from PACE OCI and ISS/EMIT using SNOs and PICS<br>• TSIS solar spectrum application for JPSS-3/4<br>• Vicarious calibration over sun glint<br>• Cloud-based geolocation validation tool development<br>• Assessment of space weather impact on VIIRS SD reflectance degradation changes<br>• Simulated J4 VIIRS SDR TEB products to assess impacts of RSR differences (waiver)<br>• J3 scan rate change on DNB/M16A HSI (waiver)<br>• J3/J4 SWIR band Radiometric Response Characterization Uncertainty (RRCU) (waiver) | 10/2024<br>10/2024<br><br><br>10/2024<br>10/2024<br>10/2024<br>10/2024<br><br>10/2024<br><br>10/2024<br>10/2024 | 9/2025<br>9/2025<br><br><br>9/2025<br>9/2025<br>9/2025<br>9/2025<br><br>9/2025<br><br>9/2025<br>9/2025 | • Analysis report<br>• Inter-Cal report<br><br><br>• Application report<br>• Cal. report<br>• Cloud-based tool<br>• Impact report<br><br>• Impact report from Simulation<br>• HSI Impact report<br>• SWIR RRCU Impact report | • JPSS Mission<br>• JPSS Mission<br><br><br>• JPSS mission<br>• JPSS mission<br>• JPSS mission<br>• JPSS mission<br><br>• JPSS mission<br><br>• JPSS mission<br>• JPSS mission |
| Integration & Testing (I) | • Cloud migration of VIIRS Cal/Val tools<br>• Analyze test results for updated versions of IDPS software | 10/2024<br>10/2024 | 9/2025<br>9/2025 | • Cloud migration<br>• Mx checkout reports | |
| Calibration & Validation (C ) | • J4 prelaunch data analysis, processing parameters<br>• Study of J3/J4 waiver impacts on user applications<br>• Global Regional Validation Site (GReVS) improvement<br>• SNPP, NOAA-20 and NOAA-21 VIIRS preliminary and final recalibration<br>• Offline RSB/DNB/TEB Cal/Val analyses and trending<br>• Cross-calibration and comparison among NOAA-21, NOAA-20, and SNPP VIIRS<br>• NOAA-20 VIIRS as GSICS reference support | 10/2024<br>10/2024<br>10/2024<br>10/2024<br><br><br>10/2024<br><br>10/2024<br>10/2024 | 9/2025<br>9/2025<br>9/2025<br>9/2025<br><br><br>09/205<br><br>09/2025<br>09/2025 | • Cal verification report<br>• Impact report<br>• Cloud/Web-based GReVS<br>• Re-calibration coefficients<br><br>• VIIRS RSB/DNB/TEB performance summary<br>• Cross-Cal report<br>• GSICS support report | |

Please document requirements for developmental work.

# FY25 Milestones/Deliverables (in general)

| Task Category | Task/Description | Start | Finish | Deliverable |
|---|---|---|---|---|
| Maintenance | • Monthly lunar calibration (precision prediction delivered to flight operations; analysis on acquired lunar data) | 10/2024 | 7/2025 | • Lunar roll prediction monthly for lunar (to OSPO) |
| | • Monthly delivery of VIIRS DNB calibration LUTs; | 10/2024 | 9/2025 | • Monthly LUT updates (to OSPO) |
| | • Delivery of VIIRS RSB and TEB calibration LUTs to mitigate degradation; | | | • LUT delivery as needed |
| | • Delivery of VIIRS DNB straylight LUTs; | | | • LUT delivery as needed |
| | • Maintain the performance trending at vicarious sites | 10/2024 | 5/2025 | • Sustained validation website for the G20+ vicarious sites |
| | • Geolocation monitoring using CPM (Applicable to SNPP, NOAA-20 and NOAA-21) | | | • CPM geolocation monitoring (report) |
| LTM & Anomaly Resolution (L) | • Instrument parameter performance trending | 10/2024 | 09/2025 | • Report on instrument parameter performance trending (in collaboration with ICVS) |
| | • Participate in anomaly investigations | 10/2024 | 09/2025 | • Anomaly report |

Please document requirements for developmental work.

# VIIRS Flood Mapping

*September 2024*

## ***Accomplishments / Events:***

- JPSS Flood monitoring has captured multiple events this month. One example is the downscaled 30 meter resolution VIIRS flood depth estimates on Sept 17th, 2024 after historic rainfall occurred across the Cape Fear Region of southeastern North Carolina from Potential Tropical Cyclone Eight. Gauges and automated radar estimates showed that 12 to 20 inches of rain fell in only two days.
- NOAA Satellites posted the results from the JPSS downscaled flood depth (https://x.com/NOAASatellites/status/1836474846496330162).
- The downscaled product is currently still in development, but pre-operational estimates can be found at the JPSS Flood Proving Ground (http://floods.ssec.wisc.edu/?products=VIIRS-3Dflood).

*Overall Status:*

| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (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:*

# Volcanic Ash

*November, 2024*

*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.

- VOLCAT VIIRS volcanic ash plume identification and extraction work is an enhancement to the VOLCAT methodology. The most recent research focus has been developing a web-page based tool to manually classify VOLCAT volcanic cloud objects by a science team expert (as yes (containing volcanic ash) or no (not containing volcanic ash)). 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 science team completed identifying and reprocessing scientifically interesting cases (e.g., volcanic clouds, VOLCAT false alarms, etc.) and are currently classifying these reprocessed cases to be included in the AI/ML training dataset. An example of the tool and recent case is shown in the included figure.
- The VOLCAT science team completed research to support VOLCAT imaging that optionally utilizes VIIRS I-bands.

## *Overall Status:*

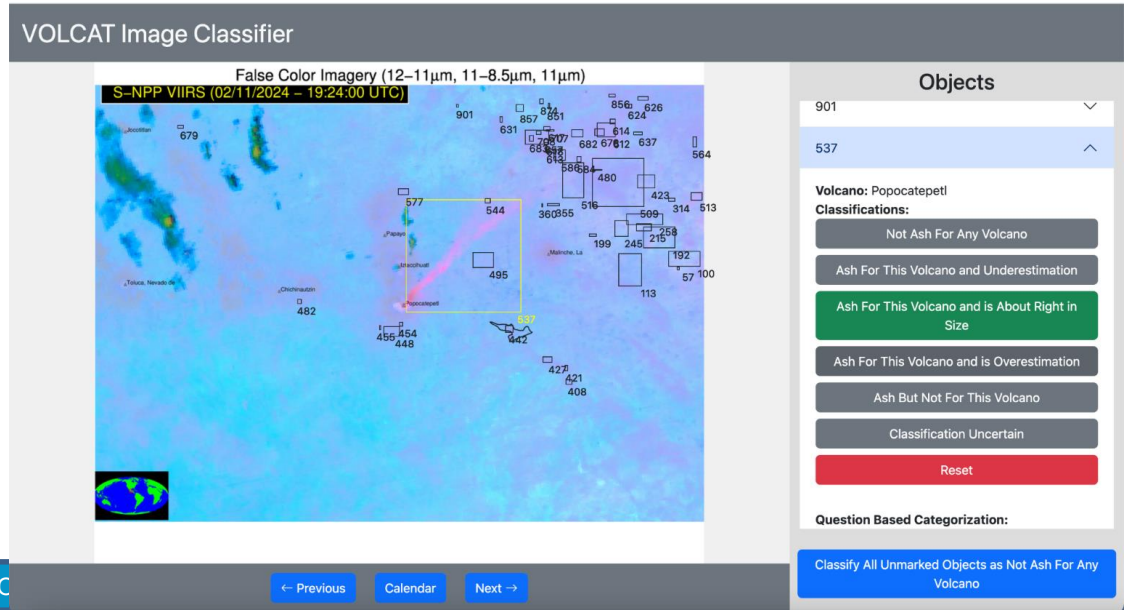
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | X | | | |
| **Schedule** | | x | | | |

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 |
|---|---|---|---|---|
| Develop updated user training material | Jun-25 | Jun-25 | | |
| Improve VIIRS volcanic ash plume identification and extraction | Mar-25 | Mar-25 | | |
| Integration of VIIRS I-bands in VOLCAT workflow | May-25 | May-25 | | |
| Imaging capabilities of VIIRS I-bands in VOLCAT end-user web graphics | Nov-24 | Nov-24 | Nov-24 | |
| Quantify added value of VIIRS I-bands | Sept-25 | Sep-25 | | |
| Update VOLCAT code to ingest any JPSS-3 proxy data if becomes available | Sep-25 | Sep-25 | | |

## *Highlights:* *An example of the reprocessing and classification work done by VOLCAT science team.*



| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| *Task 1: VOLCAT enhancements* | *September 2025* | | | |
| *Subtask 1.1: Fully integrate VIIRS I-band into VOLCAT workflow* | *May 2025* | | | |
| *Subtask 1.2: Assess impact of I-band enhancements* | *Sept 2025* | | | |
| *Subtask 1.3: Implement and test improvements to gridded composites of volcanic cloud properties* | *September 2025* | | | |
| *Task 2: Preparation for JPSS-3/4* | *March 2025* | | | |
| *Subtask 2.1: Initial development for JPSS-3 cal/val plan* | *March 2025* | | | |
| | | | | |
| | | | | |
| | | | | |

# STAR JPSS Schedule: TTA Milestones