



## NOAA JPSS Monthly Program Office

# AMP/STAR FY24 TTA

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March, 2024

# Highlights from the Science Teams (February)

## Ivan Csiszar receives DoC Silver Medal

Ivan Csiszar (SMCD/LVB) was part of the joint NOAA Oceanic and Atmospheric Research (OAR) and NESDIS team to receive a 2023 United States Department of Commerce Silver Medal Award for the development of the High-Resolution Rapid Refresh (HRRR)-Smoke (https://rapidrefresh.noaa.gov/hrrr/HRRRsmoke/) and its operational value during the 2022 wildfire season. The STAR Fire Science Team's primary contribution to this effort was the incorporation of the NOAA VIIRS Active Fire product as key input to characterize sources of fire emissions.

# Highlights from the Science Teams (February)

## NOAA-21 ATMS Geolocation Performance Post-Launch Validation

The ICVS ATMS Geolocation Error Monitoring System (GEMS) has been used for the NOAA-21 ATMS post-launch geolocation performance validation, and comparisons with respect to NOAA-20 and S-NPP ATMS geolocation errors.

The crosstrack error averages are greater than 5 km for ATMS Ch 1, 3 and 16, and less than 5 km otherwise. The intrack error averages are about 5 km or less for all channels and scan positions. These errors are similar to NOAA-20 and SNPP.

Comparing geolocation errors from before and after the Parameter Coefficient Table update on 10 May 2023 revealed only minor impacts, and before and after the Permanent Spacecraft Pitch Adjustment on 15 February 2023 showed no indications of systematic shifts, in geolocation performance.

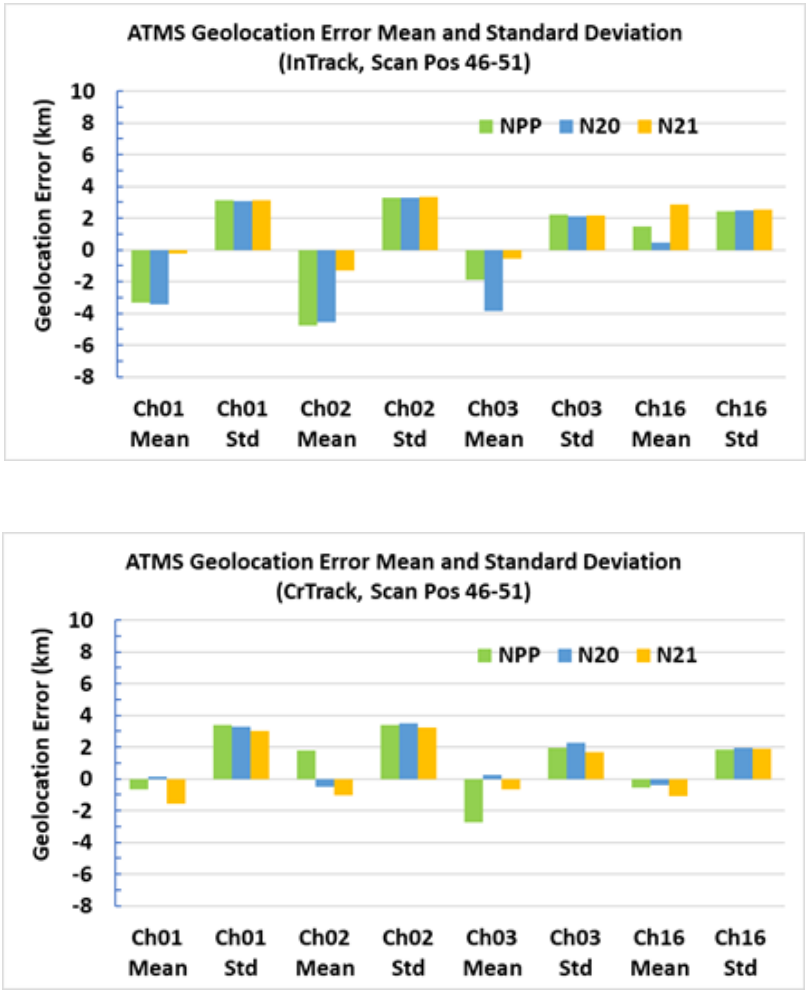



**Figure 1.** InTr (Left) and CrTr (Right) Geolocation Error Comparisons for Scan Position Groups 46-51 (S-NPP, NOAA-20 and NOAA-21)

# Highlights from the Science Teams (February)

## NOAA-20 VIIRS Recovery from Spacecraft Command Processor Reset

The STAR VIIRS Sensor Radiance Science team developed and implemented a solution to address a major anomaly in the NOAA-20 VIIRS recovery from the Spacecraft Command Processor Reset (SCP), working closely with OSPO, Direct Broadcast community, and data users. The initial SCP anomaly occurred on February 3, 2024 when NOAA-20 was passing the South American over the South American Anomaly (SAA) region. While the spacecraft recovered one day after, the VIIRS instrument experienced another unusual anomaly in the engineering telemetry packets in which bitflip occurred, indicating the wrong Cold Focal Plane Array (CFPA) temperature and associated data quality flag in the level 1b (or SDR) data, which prevented the users from using the data. A thorough analysis of the data processing chain suggests that the bitflip is likely caused by a Single Event Upset (SEU) due to high energy particles in the SAA region. The team developed an alternative solution by changing the configuration in the ground processing system to re-enable the production of high quality data, while a permanent solution is being worked on by the instrument vendor which may take weeks. By noon February 9, NOAA-20 VIIRS data distribution resumed together with CrIS and BUFR data for Numerical Weather Prediction and other users.

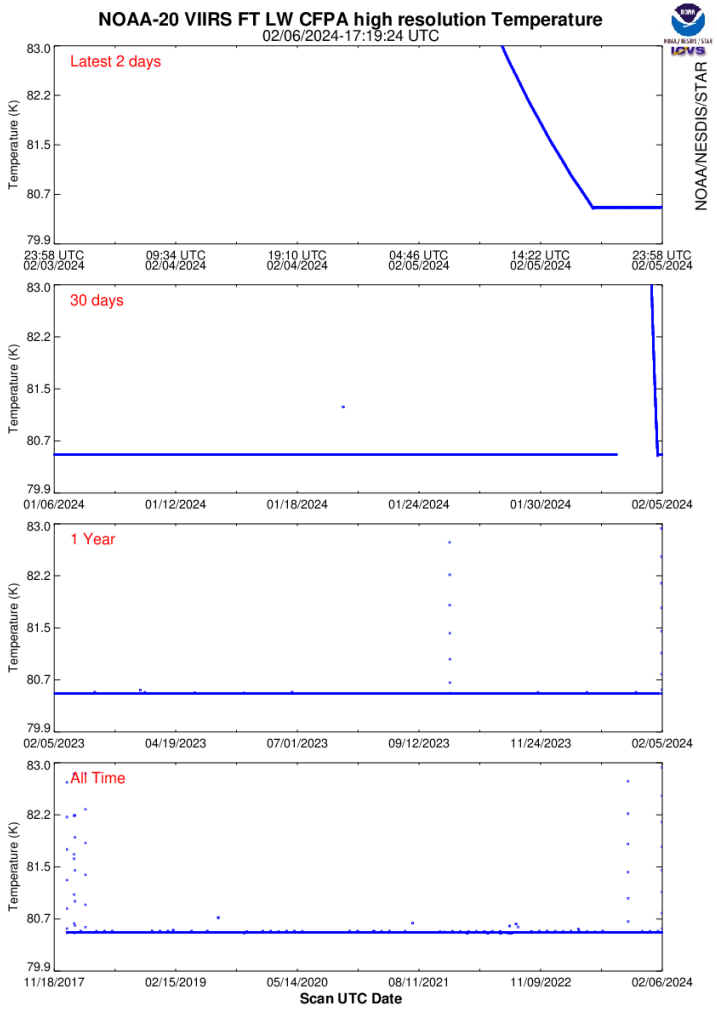



Figure. Cold Focal Plane Temperature for the period surrounding the anomaly.

# Accomplishments (1 of 2)

| Delivery Date | Delivery Algorithm Packages (DAPs) – Enterprise Products: | Recipient |
|---|---|---|
| 1/31/2024 | Preliminary delivery of the GAASP (GCOM) -Preprocessor NDE Migration CCAP for OSPO code review. | NCCF |
| 02/02/2024 | Preliminary delivery of the Blended SST Legacy Migration CCAP for OSPO code review. | NCCF |
| 02/07/2024 | Preliminary delivery of the GAASP-Precipitation CCAP for OSPO Software Code Review by OPSO. | NCCF |
| 02/07/2024 | GAASP-Ocean: NDE Migration Preliminary CCAP was delivered to OSPO | NCCF |
| 02/07/2024 | Preliminary CCAP delivery of GAASP Sea Ice v1 for Software Code Review by OSPO. | NCCF |
| 02/07/2024 | Preliminary CCAP delivery of the GAASP Soil Moisture CCAP v1 for Software Code Review by OSPO. | NCCF |
| 02/07/2024 | Preliminary CCAP delivery of GAASP Snow CCAP v1 for Software Code Review by OSPO. | NCCF |
| 02/08/2024 | PSS CBH CCAP to CSPP Leo machines. | NCCF |
| 02/08/2024 | JPSS CCL CCAP to CSPP Leo machines. | NCCF |
| 02/09/2024 | ASSISTT delivered EUM & SMM for 10/20/2023 SFR final CCAP delivery | NCCF |
| 02/12/2024 | Final delivery of the JPSS LST J2 Provisional CCAP to NCCF. | NCCF |
| 02/13/2024 | V8TOS v2 Final CCAP to NCCF for integration. This delivery is for V8TOS Validated Maturity for N21 and includes error handling code updates. | NCCF |
| 02/14/2024 | This is a patch CCAP delivery of MTCSWA to NCCF for integration | NCCF |

# Accomplishments (2 of 2)

| Delivery Date | Delivery Algorithm Packages (DAPs) – Enterprise Products: | Recipient |
|---|---|---|
| 02/16/2024 | Delivery of the JPSS Clouds Mask and JPSS Clouds Phase CCAP to CSPP. | NCCF |
| 02/15/2024 | EN-Fires: Science team provided a fix on February 15, 2024 for the issue of "bad scans" in granules of 2014. Target date for delivering this patch to NCCF is March 18, 2024. | NCCF |
| 02/16/2024 | Preliminary CCAP for the Blended Flood products (EN-Flood_v3). The Blended Flood Mapping package is an upgrade of the existing Enterprise Flood Mapping package, | NCCF |
| 02/20/2024 | Delivery of the Surface Reflectance CCAP to CSPP | NCCF |
| 03/06/2024 | Delivery of the patch CCAP for JPSS LSA. This patch includes a fix to the scripts to run the units independently. There are also updates made to Production Rules document. | NCCF |
| 03/07/2024 | HEAP (NUCAPS) with updates to NOAA-21 LUTs after attaining validated maturity | NCCF |
| | | |

# Accomplishments – JPSS Cal Val Support

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

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

# NOAA-21 Cal/Val Maturity Reviews

| February 2024 Maturity Reviews | | | |
|---|---|---|---|
| Product | Maturity Review | Review Date | Review Panel Recommendations |
| Ocean Color | Beta/Provisional | 03/07/24 | Attained Validated status. The effective maturity date is March 1, 2024, to coincide with data availability from the NOAA CoastWatch program and MSL12 version 1.61 algorithm and lookup tables. |
| SnowFall Rate (SFR) | Provisional | 03/07/24 | Attained Validated status. The effective maturity date is upon implementation of the latest algorithm and lookup table (v2r0), currently planned for July 2024. |

| March 2024 Maturity Reviews | | | |
|---|---|---|---|
| Product | Maturity Review | Review Date | Review Panel Recommendations |
| OMPS SDR (NP & TC | Validated | 03/28/24 | |
| OMPS TC Ozone EDR (V8TOz) | Validated | 03/28/24 | |

| April 2024 Maturity Reviews | | | |
|---|---|---|---|
| Product | Maturity Review | Review Date | Review Panel Recommendations |
| OMPS LP (SDR & EDR) | Beta/Provisional | 04/25/24 | |
| OMPS NP Ozone EDR (V8Pro) | Validated | 04/25/24 | |

# JSTAR Code/LUT/Product Deliveries

| | |
|---|---|
| 02/07/2024 | N20 VIIRS SDR RADIOMETRIC-PARAM-V4 LUT Emergency Update - ADR 10683 |
| 02/15/2024 | N21 VIIRS WUCD TEB Calibration Correction - ADR 10554 |
| 02/22/2024 | ADR-10685/CCR-6951 N21 OMPS NP Straylight Correction |
| 03/01/2024 | N21 VIIRS SDR CAL-AUTOMATE LUT Update to Disable the SWIR-Band Automation - Fast track - ADR 10689 |
| 3/11/2024 | ADR10687/ CCR-6957 N20 VIIRS SDR RADIOMETRIC-PARAM-V4 LUT Update Reversal - OC |

| Date | Remaining J2-Ready DAPs to NCCF |
|---|---|
| March, 2023<br>(Delayed to January 2024) | Ancillary data preprocessing<br>• ASSISTT delivered LP preliminary pre-processor CCAP for SCR (Delivered to OSPO) on 9/29.<br>• NDE Migration & J2 Provisional final CCAP for Ancillary Data Preprocessor (miniDAP) is scheduled for February 20, 2024. However, pushed to May 16, 2024 to align with RDR to L2 final CCAP.<br>RDR to L2 CCAP<br>• Science Team Deliveries<br>○ Science team V2.7LIMB for SNPP was delivered to ASSISTT on December 19, 2023<br>○ Science team delivery for NOAA-21 (2.7LIMB N21 delivery to ASSISTT) is expected by the mid to late January 2024. However, changed the delivery to middle of March 2024.<br>• ASSISTT Deliveries<br>○ NDE Migration & J2 Provisional RDR to L2 CCAP Preliminary CCAP target date has been pushed to April 1, 2024.<br>○ Final CCAP target date is set for June 25, 2024 |

# FY24 STAR JPSS TTA Milestones

| Algorithm Updates DAPs/CCAPs | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| OMPS-NP (J2 LUT Delivery) | Jan-24 | Jan-24 | Delivered on January 4, 2024. | |
| ACSPO SST_v2 release version + patch to CCAP for MetOP | Jan-24 | Jan-24 | Delivered on January 16, 2024 | |
| GBBEPx (Enterprise Fires I-Band update) | Jan-24 | Jan-24 | Delivered on January 19, 2024 | |
| RAVE (Science bug fix) | Jan-24 | Jan-24 | Delivered on January 29, 2024 | |
| Vegetation Health | Jan-24 | Jan-24 | Delivered on January 30, 2024 | |
| GCOM RDR to ASD Converter (GRAC) - includes JAXA executable (AMSR-3) | Feb-24 | Feb-24 | Delivered February 02, 2024 | |
| LST EDR J2 Provisional (updates to LSE) | Dec-23 | Feb-24 | Delivered on February 12, 2024. | |
| Ozone Mapping and Profiler Suite (OMPS) - V8TOs | Mar-24 | Feb-24 | Delivered on February 13, 2024. | |
| Multi-platform Tropical Cyclone Surface Winds Algorithm (MTCSWA) | Feb-24 | Feb-24 | Delivered on February 16, 2024. | |
| Land Surface Albedo | Mar-24 | Mar-24 | Delivered on March 6, 2024. | |
| Hyperspectral Enterprise Algorithm Package (HEAP) updated to NOAA-21 | Mar-24 | Mar-24 | Delivered on March 11, 2024. | |
| LAI Initial Delivery | Feb-24 | Apr-24 | Moved to **April 1**, 2024 | |
| Cloud Mask (LUT update for J2) | Jan-24 | May-24 | Moved to **May 17,** 2024 | |
| VOLCAT (Phase 1) NCCF implementation | Dec-23 | May-24 | Moved to **May 30,** 2024 | |

# FY24 STAR JPSS Milestones

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

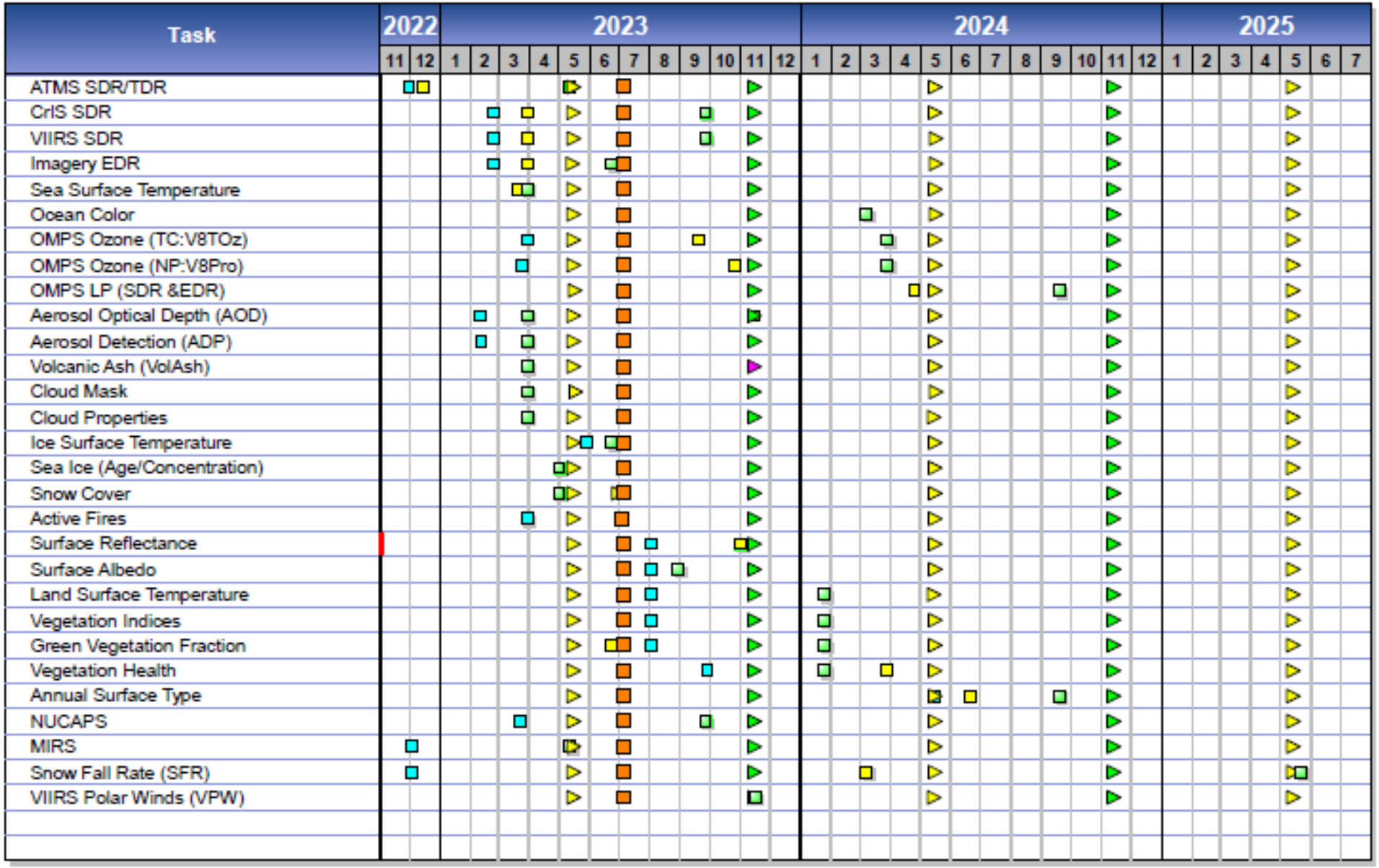
# FY24 STAR JPSS Cal/Val Maturity Reviews

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

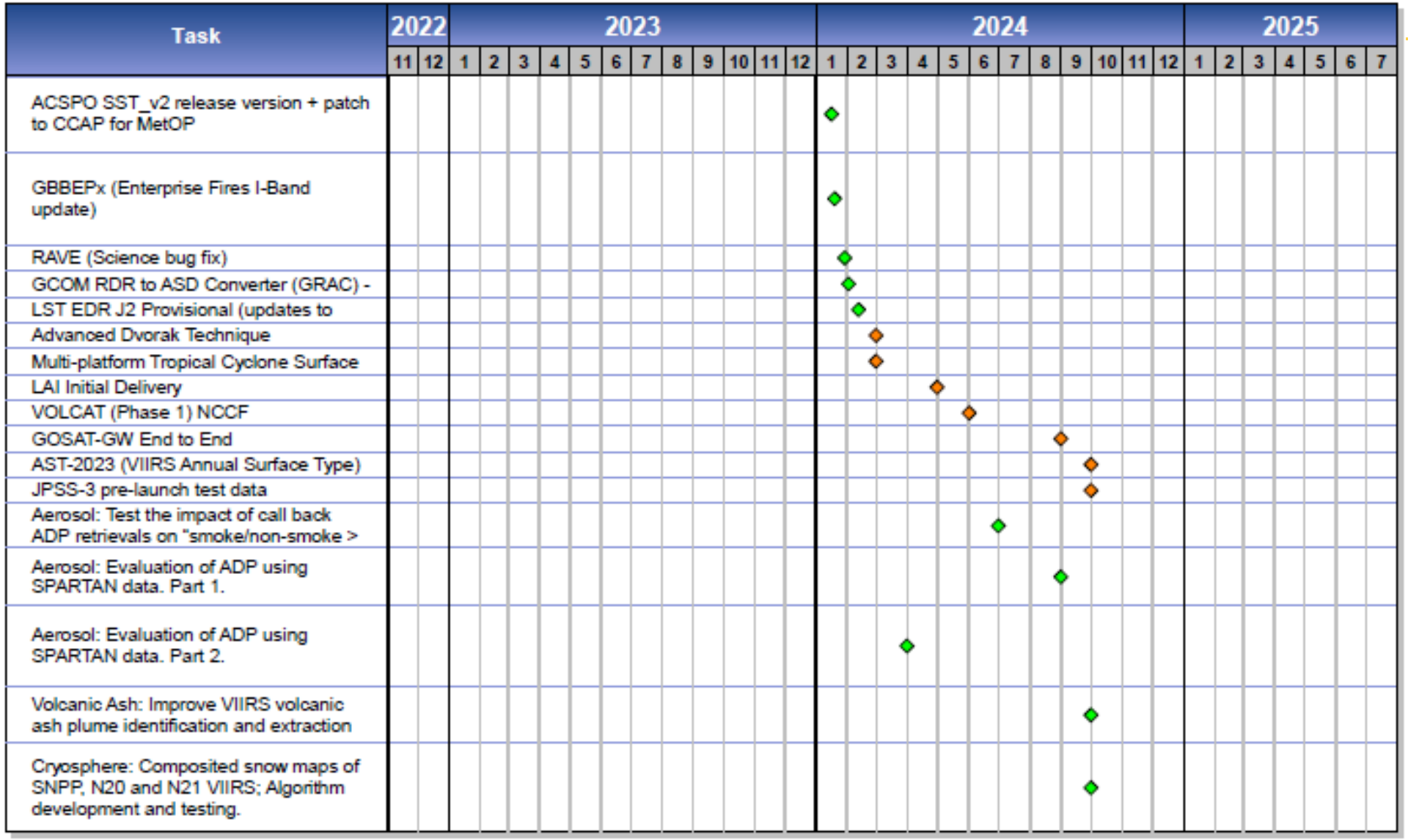
# FY24 STAR JPSS Milestones

| Operational/Program Support | Original Date | Forecast Date | Actual Completion Date |
|---|---|---|---|
| S-NPP: Weekly OMPS TC/NP Dark Table Updates | Weekly | Weekly | 12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, **02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24** |
| S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux | Bi-Weekly | Bi-Weekly | 12/05/23, 12/19/23, 01/03/24, 01/17/24, 01/30/24, **02/13/24, 02/27/24, 03/05/24** |
| S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains | Monthly | Monthly | 12/18/23, 01/22/24**, 02/15/24** |
| NOAA-20: Weekly OMPS TC/NP Dark Table Updates | Weekly | Weekly | 12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, **02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24** |
| NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux | Bi-Weekly | Bi-Weekly | 11/28/23, 12/12/23, 01/03/24, 01/10/24, 01/23/24, **02/06/24, 02/21/24** |
| NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains, | Monthly | Monthly | 12/18/23, **01/22/24, 02/15/24** |
| NOAA-21: Weekly OMPS TC/NP Dark Table Updates | Weekly | Weekly | 12/5/23, 12/12/23, 12/19/23, **01/03/24, 01/10/24, 01/23/24, 02/06/24** |
| NOAA-21: Bi-Weekly OMPS NP Wavelength & Solar Flux | Bi-Weekly | Bi-Weekly | 11/28/23, 12/12/23, **01/04/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24** |
| NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains | Monthly | Monthly | 12/18/23, **01/22/24, 02/15/24** |
| Mx builds deploy regression review/checkout (Mx9/MX10) | | | ✔ MX9: STAR submitted I&T Report (1/18); **TTO: 2/8/2024**<br>· Mx10: TTO Expected on **May 23**, 2024 |

# STAR JPSS Schedule: TTA Milestones



# STAR JPSS Schedule: TTA Milestones

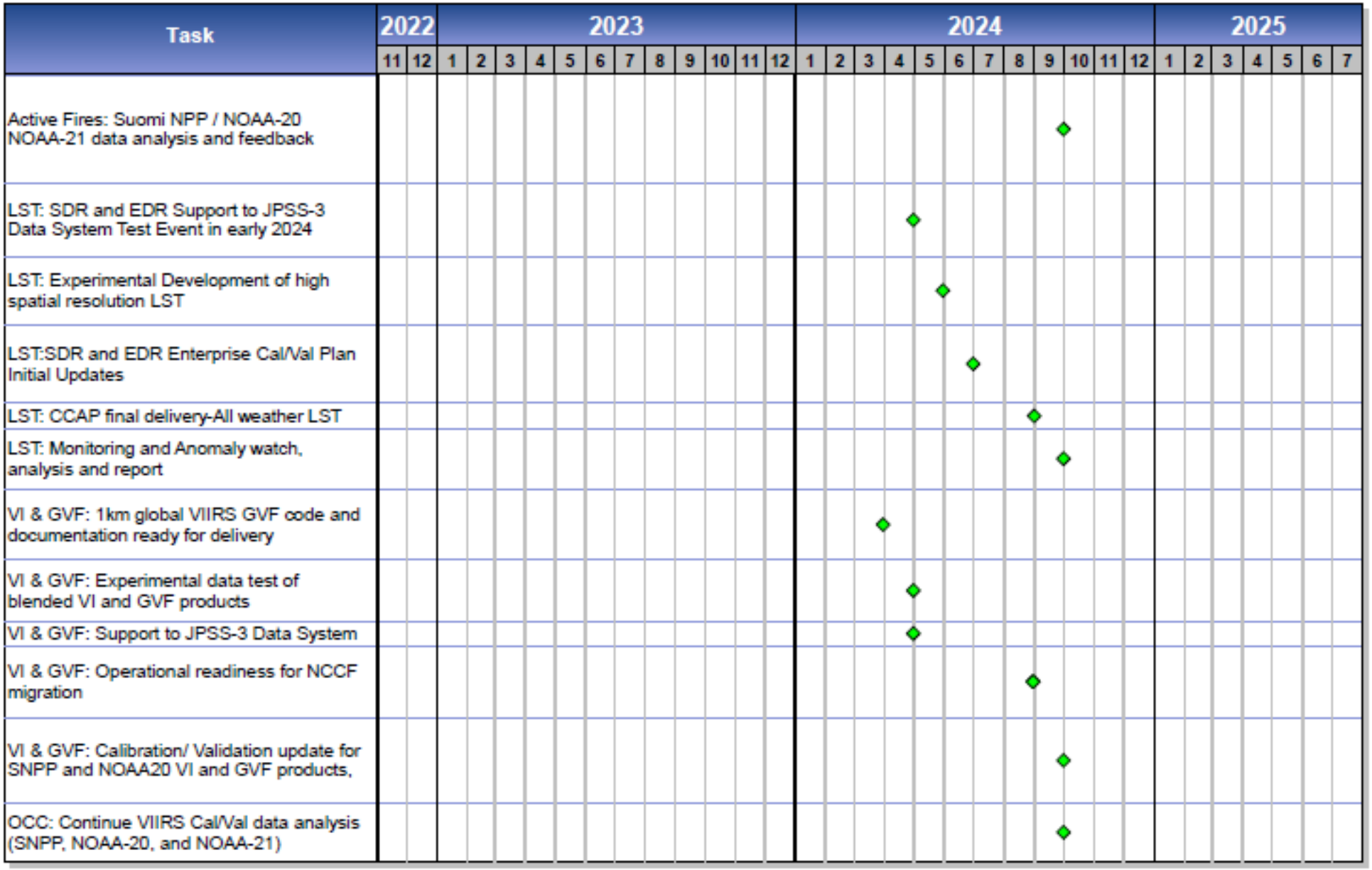


# STAR JPSS Schedule: TTA Milestones

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

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

# STAR JPSS Schedule: TTA Milestones



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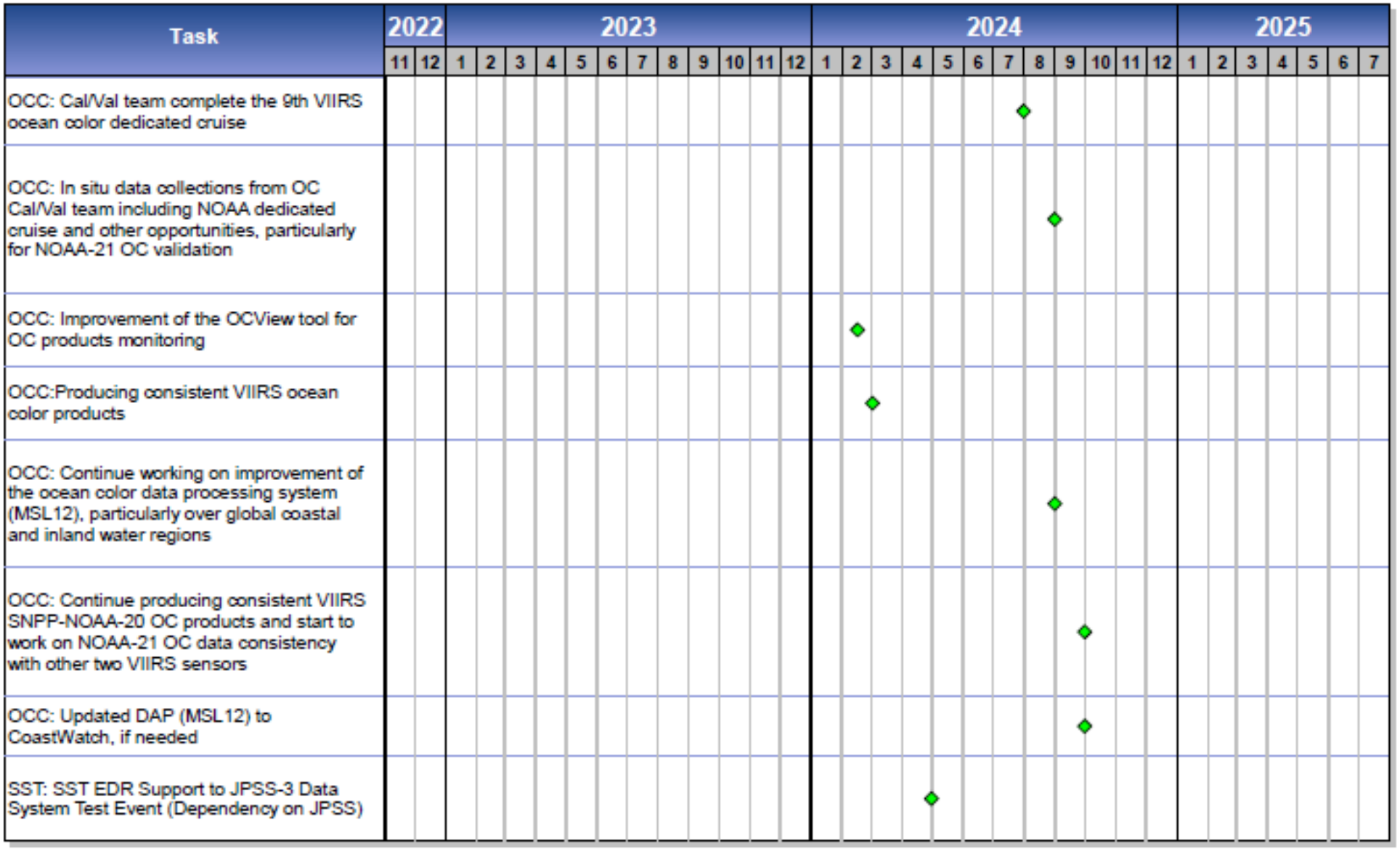
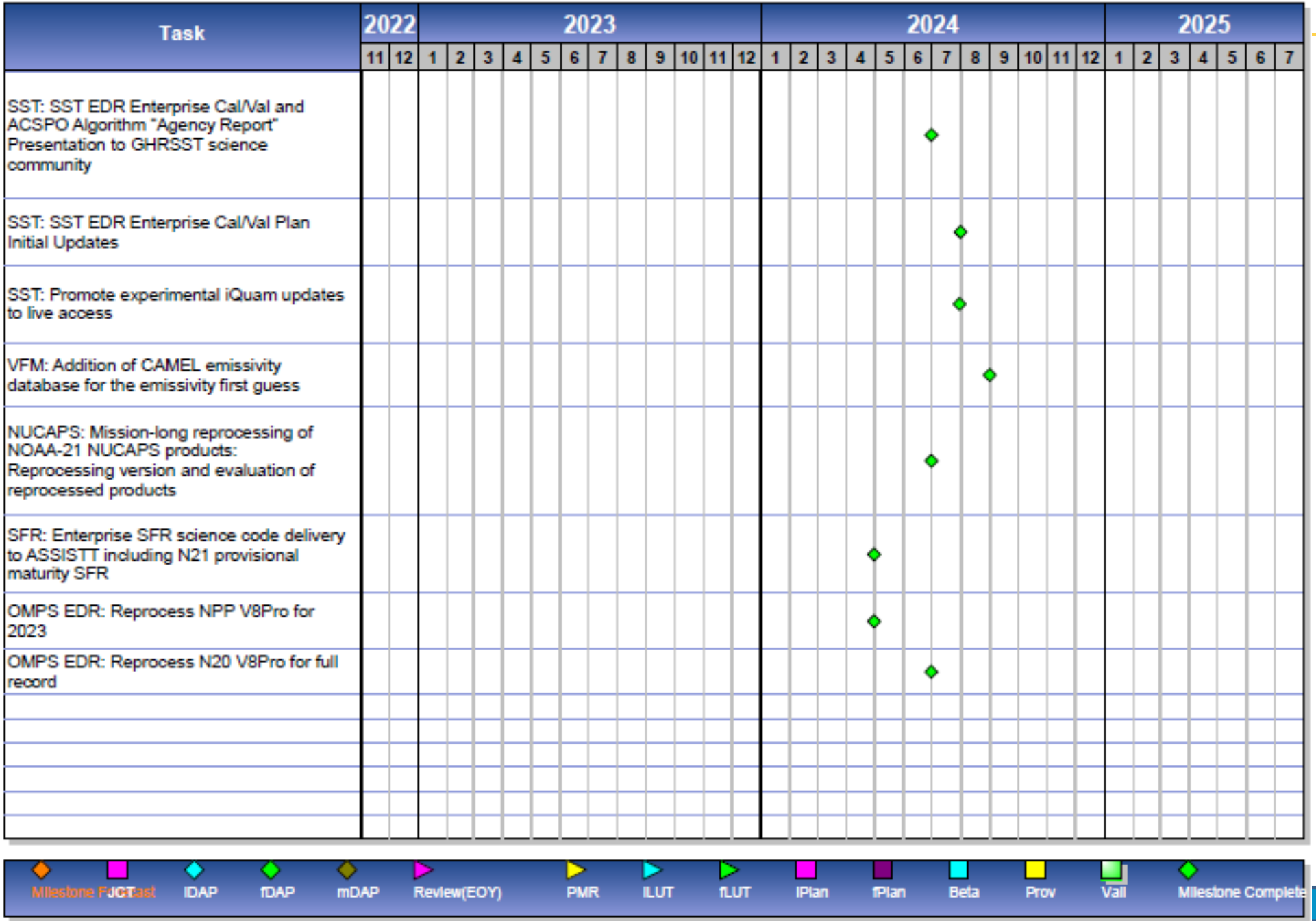


# STAR JPSS Schedule: TTA Milestones



**Color code**:

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

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

# Active Fires

*February 2024*

*Accomplishments / Events:*

- Ivan Csiszar was part of the OAR-nominated team to receive a DOC Silver Medal for the development of HRRR-smoke and its operational value during the 2022 wildfire season, especially in Alaska
  - The primary NESDIS contribution was the integration of the VIIRS Fire Radiative Power product into HRRR-smoke. This work was supported by JPSS PGRR projects, also leveraging JSTAR cal/val and product development efforts.
- Ivan Csiszar participated remotely in bilateral discussions with Meteorological Service Singapore and gave a presentation on fire detection and characterization at the Association of Southeast Nations Hotspot and Haze workshop
  - One of the foci of the discussions was the operational VIIRS active fire product
- The team delivered eFire DAP v1r3.2, which addresses issues related to corrupt input SDR data
- The team worked with OSPO to clarify product output during a recent NOAA-20 VIIRS diagnostic test, during which no VIIRS science data were available
- The team performed product verification during the recent NOAA-20 and NOAA-21 events

*Overall Status:*

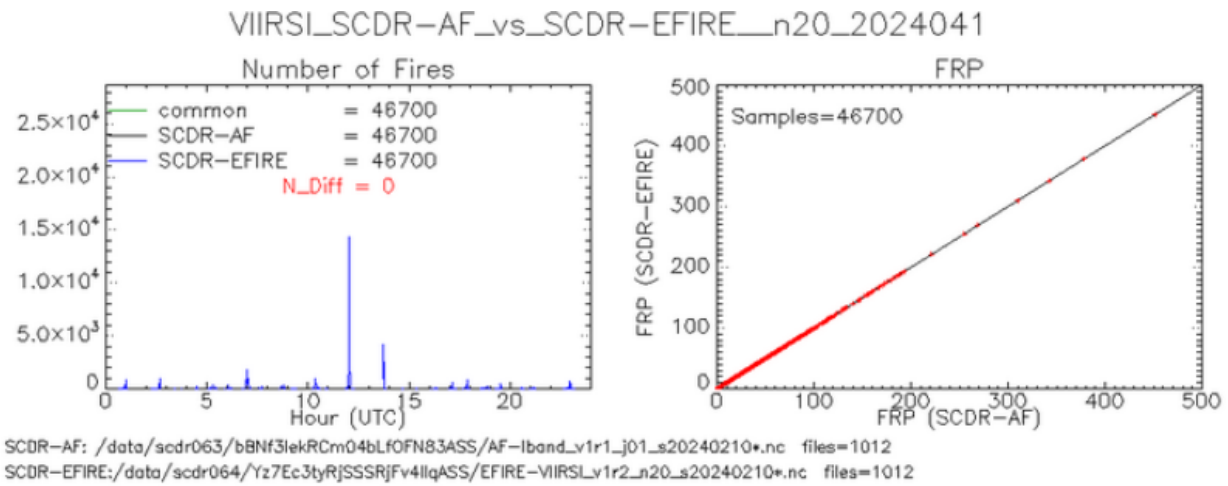
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | x | | | |
| **Technical / Programmatic** | | x | | | |
| **Schedule** | | x | | | |

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 |
|---|---|---|---|---|
| Baseline / eFire / NGFS cross verification and cal/val | Sep-24 | Sep-24 | | |
| eFire NOAA-21 validated maturity analysis | Jul-24 | Jul-24 | | |
| ASSIST, NCCF and DB I&T support | Dec-23 | Dec-23 | Dec-23 | |
| Reactive maintenance of Suomi NPP, NOAA-20 and NOAA-21 I-band NDE and NCCF products | Sep-24 | Sep-24 | | |
| Suomi NPP / NOAA-20 NOAA-21 data analysis and feedback | Sep-24 | Sep-24 | | |

*Highlight: NOAA-20 product verification*




*Comparison of NOAA-20 NDE Active Fire (left) and NCCF eFire (right) VIIRS I-band active fire products on February 10, 2024*

# 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 |
|---|---|---|---|---|
| Test the impact of call back ADP retrievals on “smoke/non-smoke PM2.5” product - publication | June 2024 | June 2024 | | |
| Evaluation of ADP using SPARTAN data | August 2024 | August 2024 | | |
| Modifications to EPS ADP cal/val plan | March 2024 | March 2024 | | |
| Develop next iteration of AI-based surface-reflectance-relationship algorithm (ML-SFRA) | July 2024 | July 2024 | | |
| Develop new regional/seasonal aerosol and surface reflectance models | August 2024 | August 2024 | | |
| Identify source of high latitude false dust detections, especially clouds mis-identified as smoke | July 2024 | July 2024 | | |

## *Overall Status:*

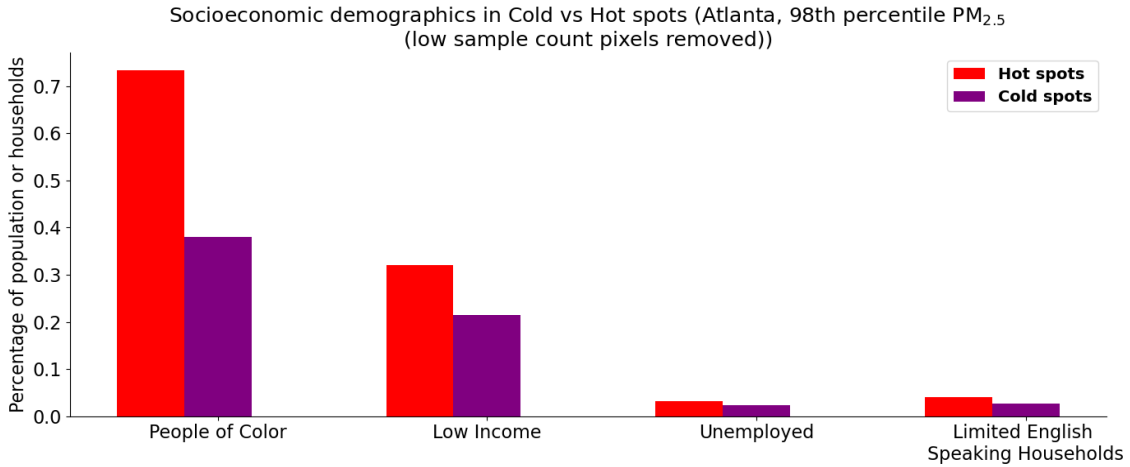
| | Green[1] (Completed) | Blue[2] (On-Schedule) | Yellow[3] (Caution) | Red[4] (Critical) | Reason for Deviation |
|---|---|---|---|---|---|
| **Cost / Budget** | | X | | | |
| **Technical / Programmatic** | | X | | | |
| **Schedule** | | X | | | |

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

# ATMS SDR

*February 2024*

## Accomplishments / Events:

- Created the JPSS-3 ATMS S/N 305 Processing Coefficient Table (PCT) for IDPS. Update the satellite dependent coefficients obtained from the JPSS-3 ATMS S/N 305 Calibration Data Book - Rev. B
- Processed JPSS-3 ATMS S/N 305 instrument delta TVAC data to generate full radiance based non-linearity correction coefficients for PCT update.
- Discussed the NOAA-20 and NOAA-21 spectral response function (SRF) reprocessing scientific rationale and improvements. Clarified the raw measurements procedure and defect from NG.
- Started preparing JPSS-3 ATMS S/N 305 pre-launch characterization report.
- Produce S-NPP/JPSS all ATMS builds striping index comparison histogram chart to support JPSS-3 ATMS S/N 305 delta pre-ship review science team inputs, as shown in Figure. 1. It is found that JPSS-3 S/N 305 (green bar) has lower string effect compared to NOAA-21 (S/N 304) at lower V-band temperature sounding channels.
- Continued working on developing a procedure for reporting monthly NEDT for NOAA-21 ATMS. Identified that the ATMS OAD is not up to date with the latest algorithm used to report NEDT in the SDR

## 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.*

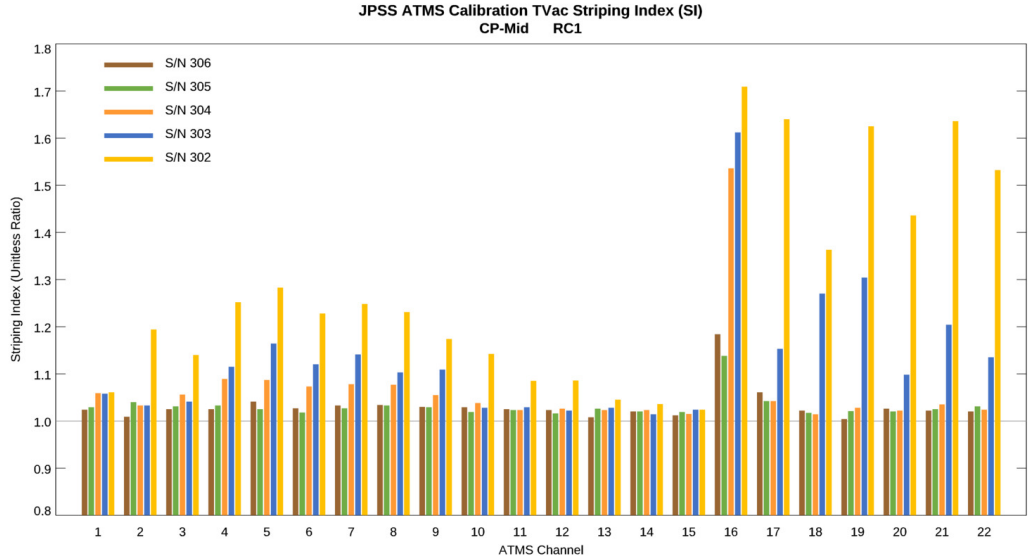
## Issues/Risks:

None

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

## Highlights:

**Figure 1. S-NPP/JPSS ATMS Calibration TVAC Striping Index Comparison**



# Clouds

*February 2024*

## *Accomplishments / Events:*

- The Cloud team is now working on the Readmes for the products for the fully validated algorithms. Full validation was not done with any review, but it is expected that there will be a validation run with downstream algorithms one the new LUT and code is provided..
- Work is ongoing with the replacement of NCOMP with the ACHA Cloud optical depths. Also expecting a new ECM LUT in Early 2024
- * NOAA-21 Cloud EDRs (previously declared provisional) have been declared at validated maturity due to the high-quality products since the provisional declaration and the consistency of these EDRs with the NOAA-20 EDRs that are at validated maturity. Effective date for validated maturity is March 30, 2023.
- Prepared information for Office of Common Services FY24 planned activities related to sustainment in preparation for STAR/PPM TTA.

| 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 | Apr-24 | | Current LUT works good, but developing new LUT and waiting for integration date. |
| 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:*

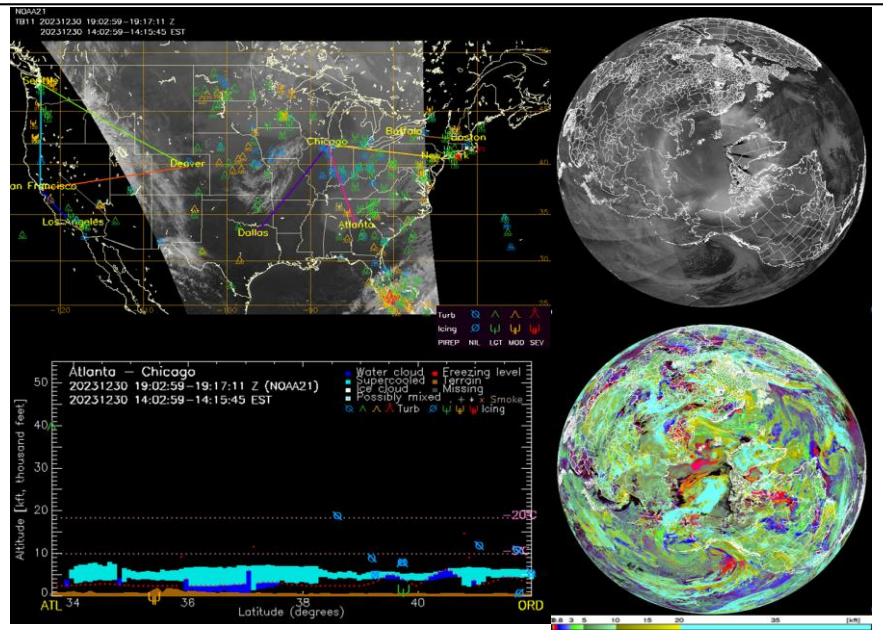



Figure 1.Example of a cloud cross-section from NOAA-21 VIIRS along a flight path between Atlanta and Chicago with 10.7-µm image over CONUS (left: 19:02 UTC - 20:19 UTC on 30 Dec 2023) and Cloud Base Altitude with DNB (right) on CIRA's SLIDER which has been updated with the addition of NOAA-21 VIIRS data

# CrIS SDR

*February 2024*

## *Accomplishments / Events:*

- The return of NOAA-21 CrIS elevated imaginary radiances was observed from mid-January 2024 onwards. A high design data flow diagram was created to describe a mitigation plan (**Fig. 1**). The assessment of NOAA-21 CrIS beamsplitter temperature as a proxy of monitoring the CrIS elevated imaginary radiances was updated.
- Performed a Fourier analysis of the change in ICT temperatures over time, and results suggest that that it is dependent on earth scene (**Fig. 2**)
- NOAA-20 experienced Spacecraft Command Processor (SCP) reset on 2/3/2024 1756 UTC. CrIS SDR data became available on 2/4 19:30:45 UTC and was rigorously assessed over the following days (**Fig. 3**) for geolocation accuracy, noise, radiometric and spectral performance, and telemetry, all of which indicated an eventual return to nominal status.
- Investigated various comparison methods and orders of applying radiance to BT conversions for the improvements in CrIS-IASI SNO intercomparison methodology (**Fig. 4**). Also implemented double-difference calculations to compare NOAA-20 CrIS/IASI intercomparison results with those of NOAA-21 (**Fig. 5**).
- CrIS geolocation assessment software was modified to also account for VIIRS terrain-corrected (TC) data, and has been delivered and placed under configuration management (GitLab).
- Produced year-long surveys of the eclipse-exit imaginary part radiances and estimates of the real-part radiance calibration errors, for all nine FOVs and for both NOAA-20 and NOAA-21 (**Fig. 6**). For NOAA-21 CrIS there is a distinct FOV pattern of the calibration anomaly which may be useful for further diagnosis of the root cause.
- The NOAA-20 CrIS instrument had a reset on 2/21/2024 in order to re-synchronize the CrIS measurements with ATMS (planned resynchronization effort). The data loss was about 3 hours. The CrIS instrument has since returned to nominal operation after a rigorous assessment (**Fig. 7**)
- Continued working on the task of the JPSS CrIS Spectral Calibration Methodology and Tool Development, and focused on the fitting of $a{\cdot}\tau_5 + b - \tau_{calc}$. The spectral shift was made to determine min RMS of the fit, and determined coefficients a,b. Compared rms $a{\cdot}\tau_5 + b - \tau_{calc}$ of observed and calculated ones with that of HITRAN online tool and LBLRTM (**Fig. 8**). The comparison of rms of the fit between HITRAN online tool and LBLRTM in Fig. 8 shows no relative spectral difference between the two models.
- Continue to monitor the NOAA-21 CrIS instrument (quality flags, CrIS-ABI intercomparisons, NEdN noise monitoring, geolocation accuracy, instrument responsivity, telemetry), along with the other two sensors (NOAA-20 and S-NPP)

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

## *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 | See Issues/Risks |
| Schedule | | | X | X | See Issues/Risks |

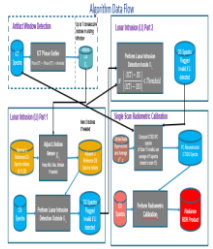
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

## *Issues/Risks:*

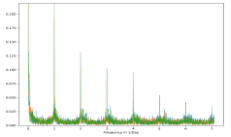
**Red:** There is a misalignment between the IDPS ground processing environment and NOAA-STAR. The IDPS ground processing will be based on RHEL Centos version 8 (RHEL8) starting with MX9 (TTO Feb 8, 2024). NOAA-STAR currently has RHEL7 (Centos version 7) and will migrate to RHEL9. **The risk is that NOAA-STAR will not be able to run or deliver the ADL code updates based on the IDPS Operational Processing.** Attempts to run the ADL Mx9 on RHEL CENTOS version 9 are in progress.
**Yellow:** The CrIS Team is still in need of hardware/software resources. Presently, there is only two server dedicated to 6 CrIS Team members. Access to additional servers is still desirable. There is a risk for the CrIS SDR Team to continue on such a single server environment for the operational CrIS Cal/Val activities that include 5 CrIS sensors (SNPP, JPSS-1 to -4). This may affect the timely completion of deliverables and program milestones. The recommendation is to have one additional server as soon as possible (< 2 months) and add another server in the next months. A new MATLAB license is also required. Corresponding hardware/software quotations and SNO have been submitted. Corresponding JSTAR CrIS Risk/Issue on Hardware and Software have been submitted for JSTAR interval review on Jan. 6, 2023. UPDATE: The purchasing of the corresponding hardware and software is currently in progress, in coordination with STAR IT.

## *Highlights:*

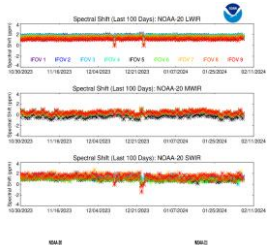
**(1)** Figure CrIS-A1: NOAA-21 CrIS proposed high level design for the elevated noise artifact mitigation.



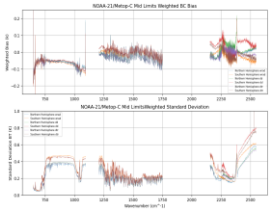
**(2)** FFT of local min/max of slope of ICT temperature near earth shadow exit, showing very strong daily frequency. These results imply that the temperature change phenomena are related to the earth scene.



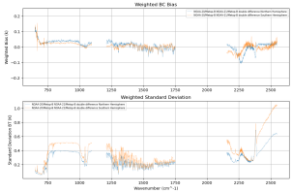
**(3)** NOAA-20 CrIS absolute spectral accuracy trend before and after the anomaly.



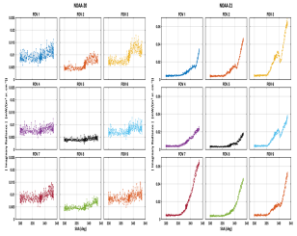
**(4)** A comparison of calculating all differences and weighted averages in radiance, and then converting to temperature bias ("wrad"), calulating the difference in radiance for each big circle, converting to temperature bias, and then calculating the weighted mean ('dtr'), vs the immediate conversion to brightness temperature before calculating bias.



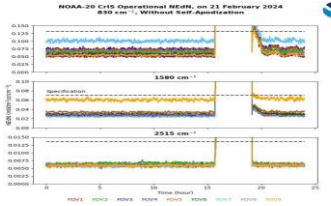
**(5)** Comparison of NOAA-20 and NOAA-21 via double difference from MetOpB.



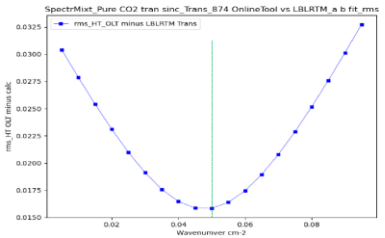
**(6)** Maximum Imaginary Part <2313-2326 cm-1> Radiances per day as a function of [Solar Azimuth Angle with respect to Spacecraft heading] for NOAA-20 and NOAA-21. Note the y-axis scale change from NOAA-20 to NOAA-21..



**(7)** NOAA-20 CrIS NEdN at scan level on 2/21/2024 showing the CrIS reset (data gap).



**(8)** Comparison of rms $a{\cdot}\tau_{HT\_OLT} + b - \tau_{calc}$ between HITRAN online tool and LBLRTM



# Cryosphere and Polar Winds

*February, 2024*

## *Accomplishments / Events:*

- **Operational VIIRS Polar Winds Generated in the Cloud**: The NESDIS Office of Satellite and Product Operations (OSPO) has implemented the SNPP, NOAA-20, and NOAA-21 VIIRS Polar Winds (VPW) Products in the NESDIS Common Cloud Framework (NCCF) User Acceptance Testing (UAT) environment. The products are now available via the Product Distribution and Access (PDA) system. The VPW products will transition to the NCCF Production (PROD) environment by March 6, 2024.

- **VIIRS Tandem Winds Show Greater Coverage of Wind Flow over Eastern Alaska and Western Yukon:** On 14 February 2024, a high-pressure ridge was building over eastern Alaska/western Yukon into the Beaufort Sea (Figure 1). The Tandem (SNPP plus NOAA-20) Atmospheric Motion Vector (AMV) product does well in covering the wind motions around the high-pressure circulation by tracking the cloud motion. Zoomed-in images over the region in Figure 1 show the increased latitudinal coverage of the Tandem AMVs (further south than the single-satellite winds), with increased high-level wind coverage over the Beaufort Sea into the Yukon Territory on the downstream side of the ridge, west to east flow captured in the Gulf of Alaska and southerly flow on the upstream side of the ridge over eastern Alaska. Also of note is the strong divergent flow over the eastern Chukchi Sea, indicating strong upward vertical motion.

| Task Category | Task/ Description | Start | Finish | Deliverable | Requirement (Dev Only) |
|---|---|---|---|---|---|
| Development (D) | Investigate the value added in including I-band product. | 10/2023 | 9/2024 | I-band ice products in ops | |
| Development (D) | Make improvements to blended VIIRS + AMSR2 SIC product in Marginal Ice Zone. | 10/2023 | 9/2024 | Daily blended Sea Ice Concentration Product | Same as VIIRS SIC EDR |

## *Highlights:*

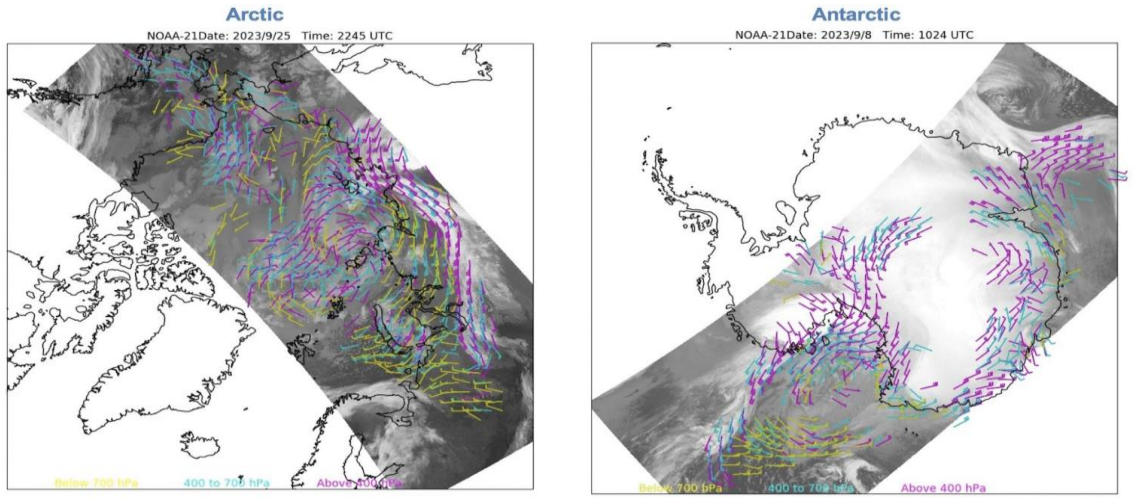



Figure 1: An example of VIIRS polar winds from NOAA-21 over the Arctic and Antarctic in September 2023.

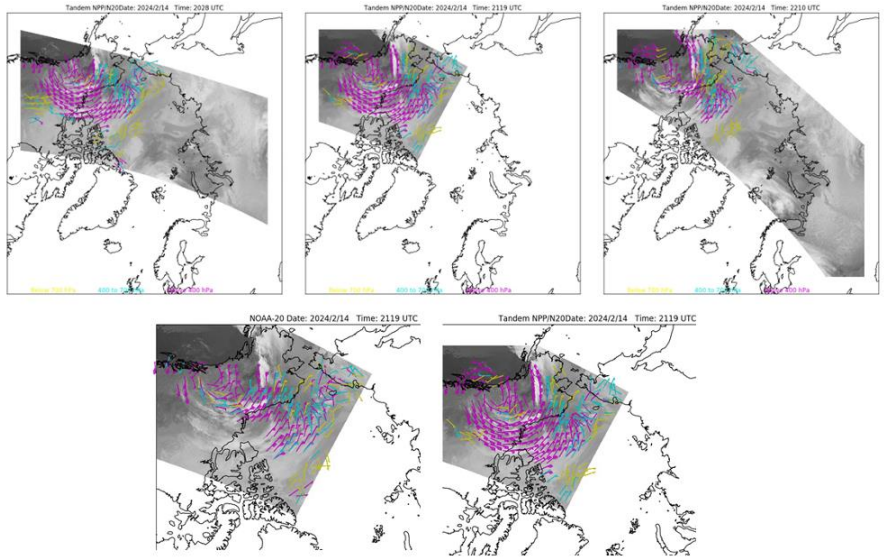


Figure 2: Top is a polar stereographic view over the Arctic of Tandem (NPP + NOAA-20) VIIRS AMVs for 2024-02-14 from 20:28 (left), 21:19 (middle), and 22:10 (right) UTC. Bottom is zoomed in images of 21:19 UTC observations from single NOAA-20 (left) and Tandem (right).

# EDR Reprocessing

*February 2024*

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

- The RWG is working with UMD IT department on server access problems, RWG members outside UMD couldn't login the Bamboo cluster because of UMD firewall changes. Currently, the RWG members outside of UMD can access Bamboo clusters from the NOAA network, but the data transfer between ESSIC servers and STAR servers still has problems at the time of this report. The reprocessing procedure will be resumed after the firewall issue is resolved by UMD IT department.

- The RWG is developing software tools for reprocessing results analysis in different spatial and temporal scales. Currently, the reprocessed cloud products such as cloud mask, cloud base height and cloud height are being compared with operational data for single granules, granule groups and total granules over the same day.

- For quantitative assessment, the confusion matrix, histogram and spatial distribution of differences between reprocessed and operational EDR data are calculated and analyzed.

- The RWG will further assess the reprocessing results over longer period when more data are produced. The sensitivity of the reprocessing programs on input data will also be tested by changing reprocessed VIIRS SDR to operational SDR as input.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Complete VIIRS EDR reprocessing for Clouds, polar wind, Ice Concentration; Ice Thickness; Snow Cover; and Ice Surface Temperature | 02/2023 | 06/2024 | | 1 month |
| | | | | |
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| | | | | |

*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 UMD Bamboo system |
| **Schedule** | | | X | | |

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

***Issues/Risks:***

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

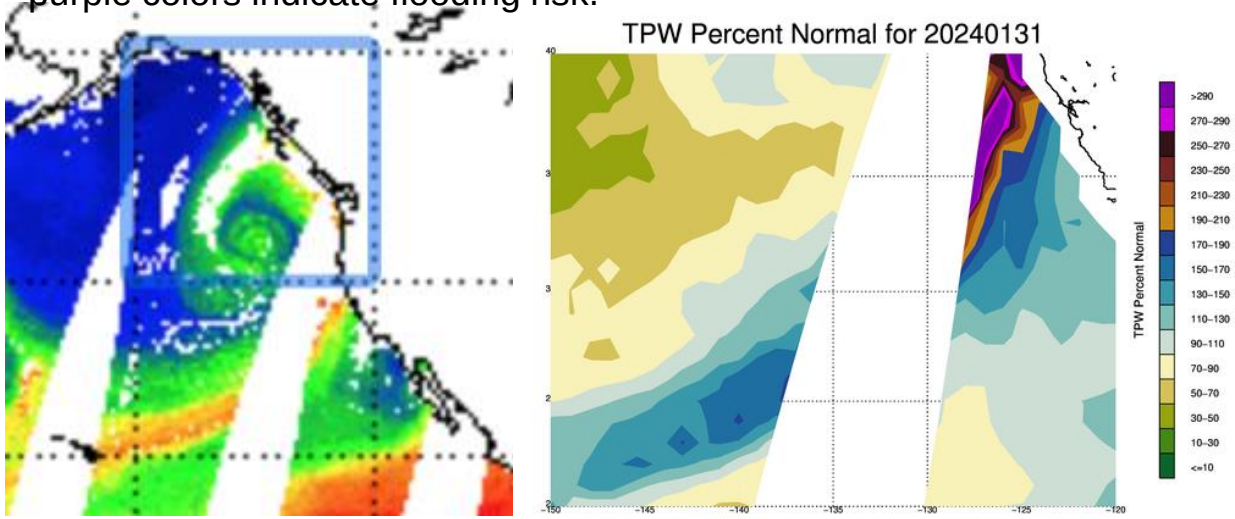
# GCOM-W/AMSR2



## *Accomplishments / Events:*

- Completed AMSR2/AMSR3 project detail plans for OCS
- AMSR2 all-weather SST abstract to the AMS Tropical meeting was accepted
- Continued working with ASSISTT on transitioning the AMSR2 all-weather wind speed algorithm, which is currently running in the AMSR2 NRT R&D processing system.

AMSR2 captures atmospheric river event that brought significant flooding to California. The left image shows the total precipitable water image and the right image depicts the TPW percent normal, where the purple colors indicate flooding risk.




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

## *Overall Status:*

| | Green[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:***

# ICVS

*February 2024*

*Accomplishments / Events:*

- Developed the processing code for NOAA-21 NM DCC and inter-sensor comparison with VIIRS M1.
- Updated JPSS OMPS NM & NP inter-sensor comparison web pages in ICVS-beta site to include NOAA-21 NM vs. VIIRS M1 inter-sensor comparison trending plot. Fixed NOAA-21/NOAA-20/S-NPP OMPS NM 32-day running mean inter-sensor bias trending processing bugs due to the data delay. Reprocess the NOAA-21 OMPS NM data to re-build the 32-day inter-sensor comparison time series against S-NPP and NOAA-20.
- Support NOAA-21 VIIRS SDR team mid-mission outgassing activities by providing near real time NOAA-21 VIIRS instrument health status and data quality monitoring figures. Updated the satellite dependent processing coefficients and fixed long term trending bugs.
- Updated VIIRS vs. ABI inter-sensor comparison package processing package to improve the VIIRS SDR data quality inter-sensor bias vs. ABI monitoring reliability.
- Conducted AWS Cloud environment configuration evaluation. Estimated the impact and benefit of different settings to ICVS modules to prepare for the upcoming ICVS to Cloud transition activities.
- Finished reprocessing NOAA-21 lifetime spacecraft telemetry RDR data to build new solar panel status monitoring products according to JPSS program and NASA flight team recommendations.

| Milestones | Original Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|
| Upgrade the 3D ATMS hurricane animation imagery package from Matlab to Python; initialize modules about NOAA21 NM DCC and comparison with VIIRS M1; Update the ICVS for N21 LP SDR monitoring (SNPP proxy data); fix the VIIRS-ABI inter-sensor processing package | Dec-23 | Dec-23 | |
| Promote the new ATMS inter-sensor web page to operational ICVS; Develop the processing code about NOAA21 NM DCC and NOAA-21 NM against VIIRS M1; support to the OMPS SDR team for verification of the OMPS-CRTM; Update the ICVS for N21 LP SDR monitoring to support the LP EDR review. | Feb-24 | Feb-24 | |
| Develop the new ICVS web page about NOAA21 NM DCC and NOAA-21 NM against VIIRS M1 and promote it to operational ICVS in support of N21 OMPS final review | Feb-24 | Mar-24 | Low priority |
| Initialize STAR2Cloud Initiative ICVS package transition discovery and assessment activities (preparation for JPSS ICVS website migration into the cloud environment) | Apr-24 | | |
| Develop new modules for monitoring of JPSS SDR data anomaly upon region or latitude | May-24 | | |
| Update ICVS vector modules (e.g., NOAA-21 dynamic visualization , data volume to support the cloud transition) and promote the web page to the operational ICVS; develop new modules in support to the J3/J4 testing by using N21 data as proxy data sets | Jun-24 | | |
| Promote the new ICVS CrIS and OMPS inter-sensor web page to public-accessible ICVS;<br>Upgrade the ICVS ATMS inter-sensor CRTM double difference modules | Jul-24 | | |
| Upgrade ICVS user-friendly anomaly alert modules for more key parameters; update ICVS user manual | Aug-24 | | |
| Upgrade the ICVS Anomaly Watch portal with more monitoring analysis results to support OSPO and other users | Sep-24 | | |
| Initialize an ICVS core-function prototype in cloud environment | Sep-24 | | |
| Develop new ICVS modules to support J3/J4 pre launch testing | Sep-24 | | |
| ICVS maintenance for SNPP/NOAA-20/NOAA-21 (including 3D-ATMD hurricane tool) | Sep-24 | | |

## *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.*

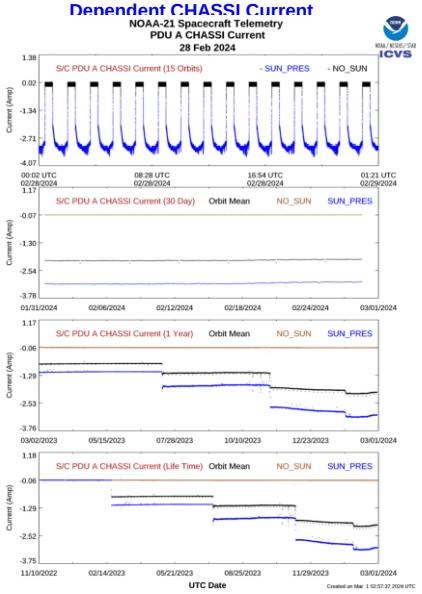
***Issues/Risks:***

None

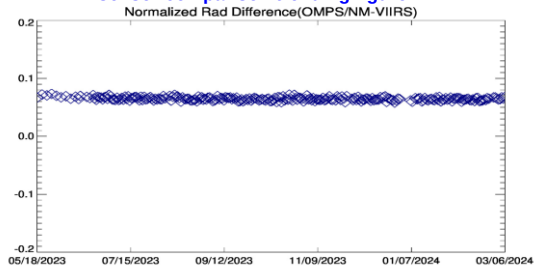
## *Highlights:*

***Significantly contribute to STAR SDR Teams***

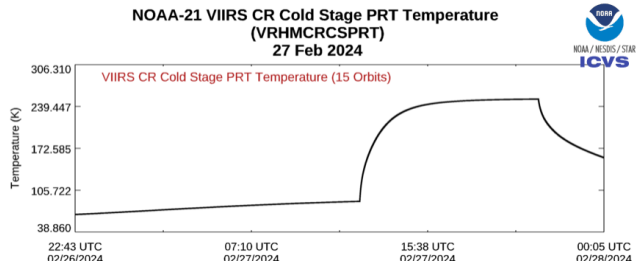
**(a) New NOAA-21 S/C Solar Illumination Dependent CHASSI Current**




**(b) NOAA-21 OMPS NM vs. VIIRS M1 inter-sensor comparison trending figure**




**(c) NOAA-21 VIIRS CR cold stage PRT temperature during the mid-mission outgassing**



# Leaf Area Index

*February 2024*

## *Accomplishments / Events:*

- Finalized the LAI Algorithm Theoretical Basis Document (ATBD) for the LAI product final delivery.
- Work with ASSIST on the LAI verification datasets preparation, compared science team data with the ASSIST test data and diagnose the differences.
- Working on understanding the LAI role in Noah-MP land surface model, conduct research on how to effectively fit the LAI product into the model.
- Provided the LAI monthly climatology for the Noah-MP model test, working on the boreal forest questions brought up by the users.
- Keep working on the LAI algorithm improvement by update the training dataset, working on the SR reprocess to keep training data consistent with current SR.

## *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 | | | |

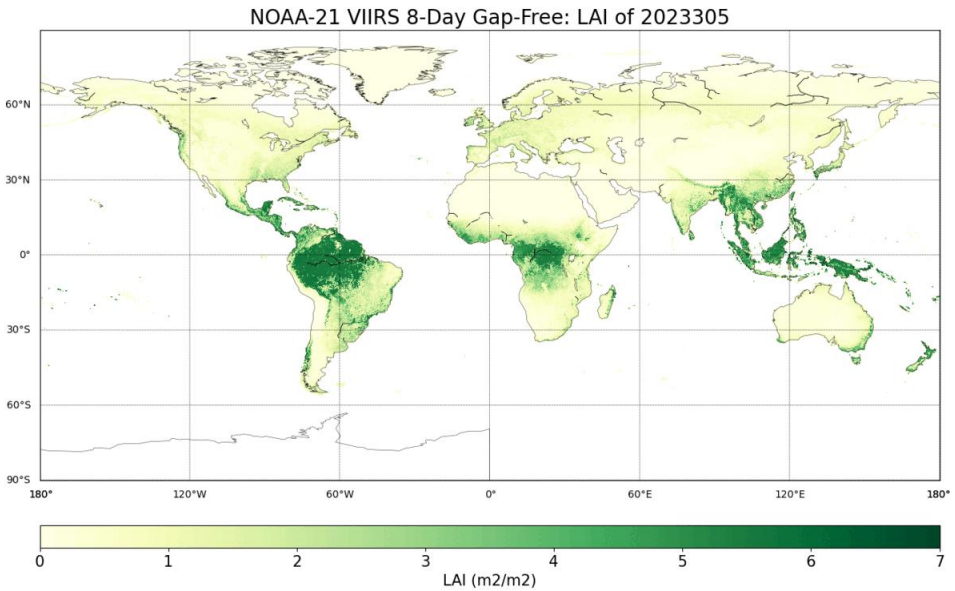
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

***Issues/Risks:***

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| CCAP Initial Delivery | Sep-23 | Sep-23 | Sep 26, 2023 | |
| LAI product preliminary in-situ validation and inter-comparison | Nov-23 | Nov-23 | Nov 25, 2023 | |
| CCAP final Delivery | Feb-24 | Feb-24 | | ASSISTT request more time to prepare verification data |
| Incorporate the LAI test data into the LSM model to evaluate the performance in the model | May-24 | May-24 | | |
| Operational readiness | Jul-24 | Jul-24 | | |
| Develop LAI routine monitoring and validation tool | Sep-24 | Sep-24 | | |

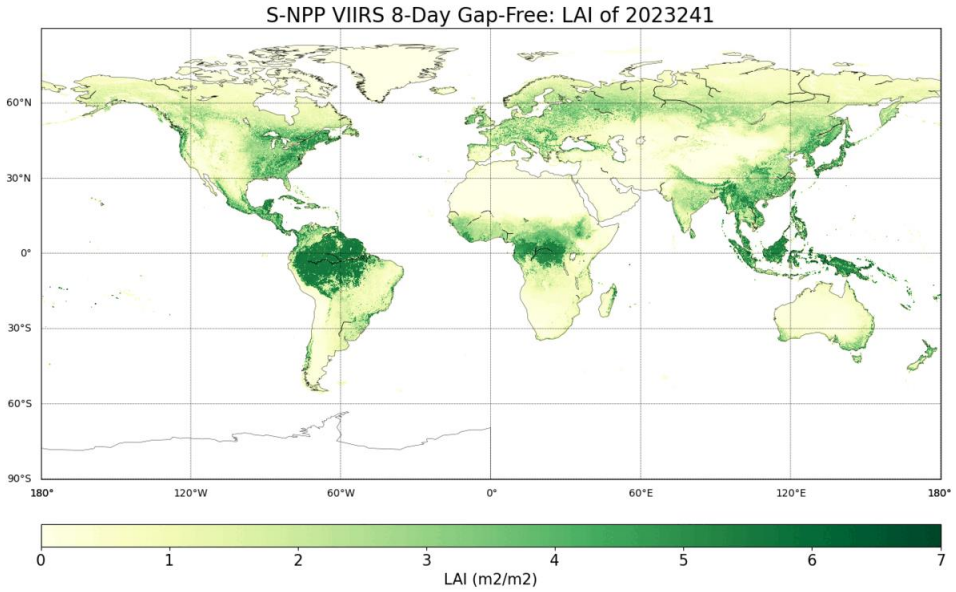
## *Highlights:*




LAI 8-Day LAI products used for verification. (NOAA21, Nov 1st 2023 to Feb 1st, 2024)

# LAI datasets Verification



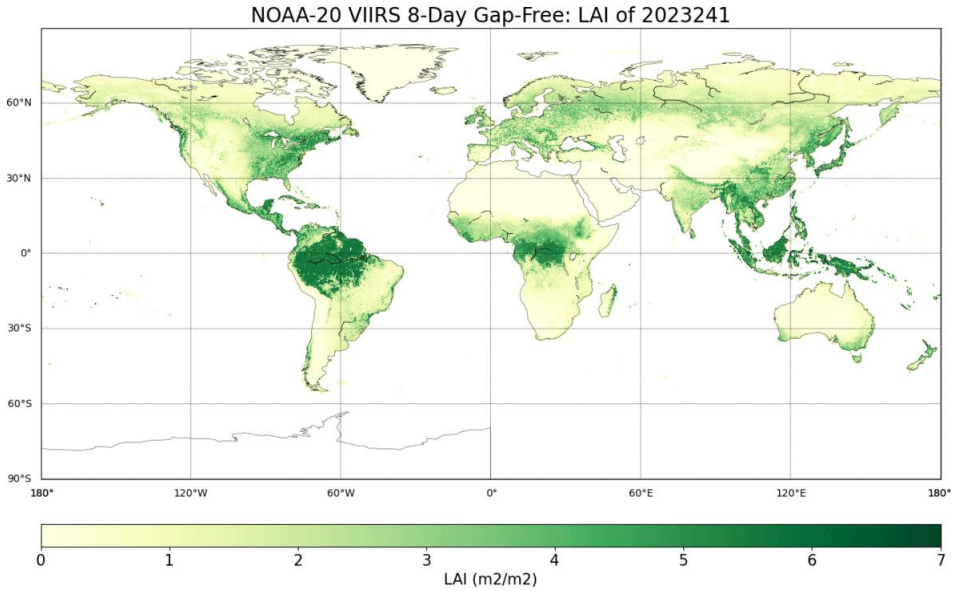


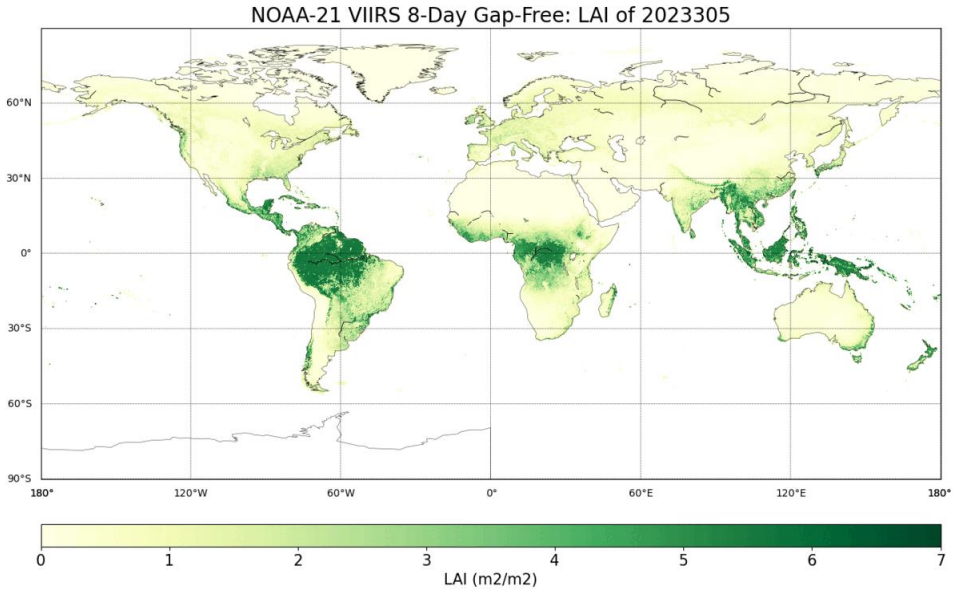

Datasets

- SNPP: 20230829-20231218
- N20: 20230829-20231210
- N21: 20231101-20240201

Verification summary:

- The ASSIST dataset agree well with science team LAI data, for both SNPP, N20 and N21.
- Issue found when generate the last 8-day LAI in a year, (the week of the end of a year), code has been updated, further test will be performed.



# Boreal Forest LAI Investigation

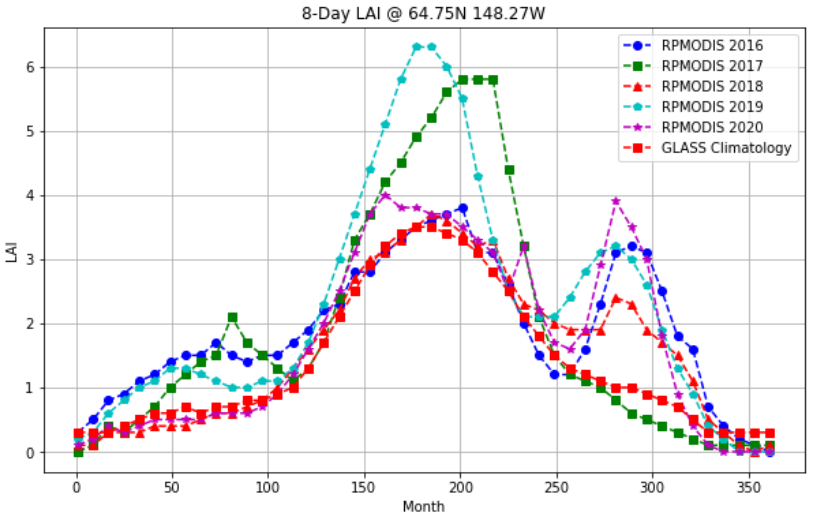
*February 2024*

## Background

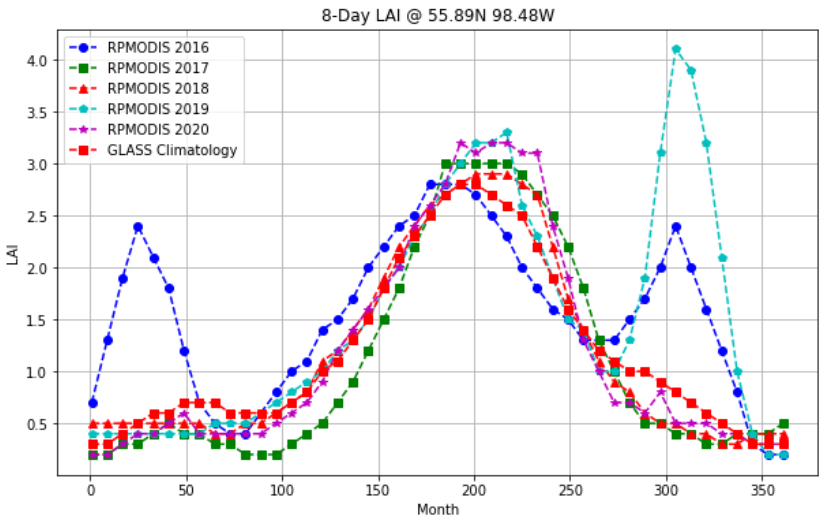
- Model scientists reported the evergreen needle forest with issue of overestimated LAI.
- Under the polar night condition, how the LAI is derived in each product and climatology dataset are investigated.

## Summary:

- Generally, the missing data during the polar night will be filled by temporal smoothing procedure.
- Some reprocess might caused incorrect LAI, for instance, the reprocessed LAI during wintertime (right figure shows).
- The climatology we derived from GLASS LAI are with better performance, which is based on time-series data using deep learning method.
- The LAI overestimated issue will be further evaluated using ground measurements and other LAI data source.






Two boreal forest cases (Upper: Alaska, Bottom: Canada) for the LAI climatology verification for our LAI climatology and the one derived from reprocessed MODIS LAI

# Surface Albedo

*February 2024*

## *Accomplishments / Events:*

- Finished new year's project plan and proposal.
- Participated in the discussion about the VIIRS albedo production rule and provided solutions.
- Updated the Enterprise Algorithm Project Plan (EPP) for L2 and L3 projects
- Drafted the EPP for VIIRS BRDF
- Finished new version of heatwave/coldwave detection ML algorithm in research team with intern students.

## *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 | | | |

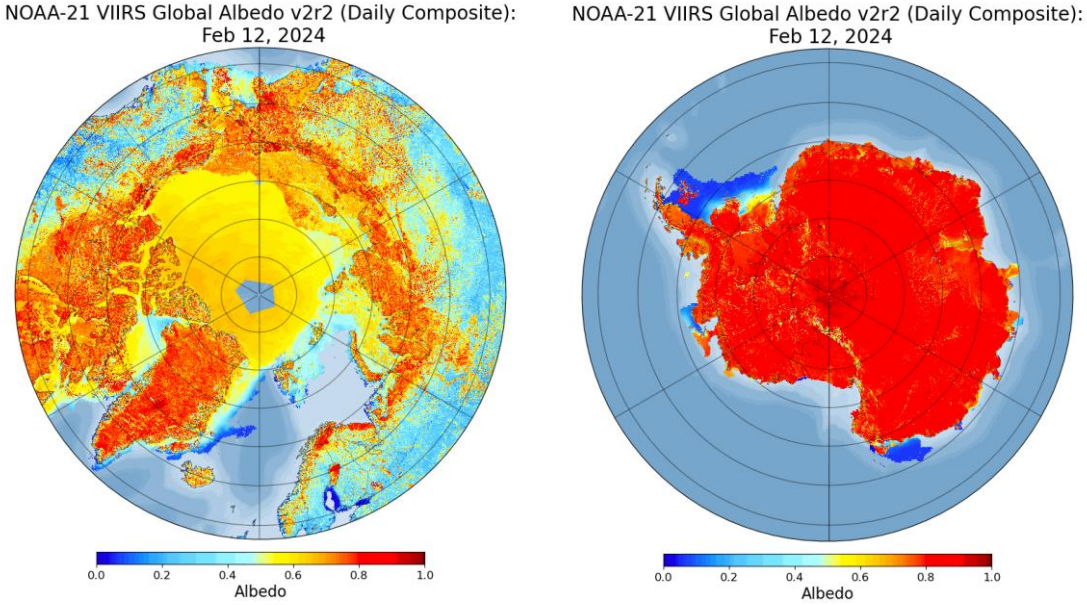
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

***Issues/Risks:***

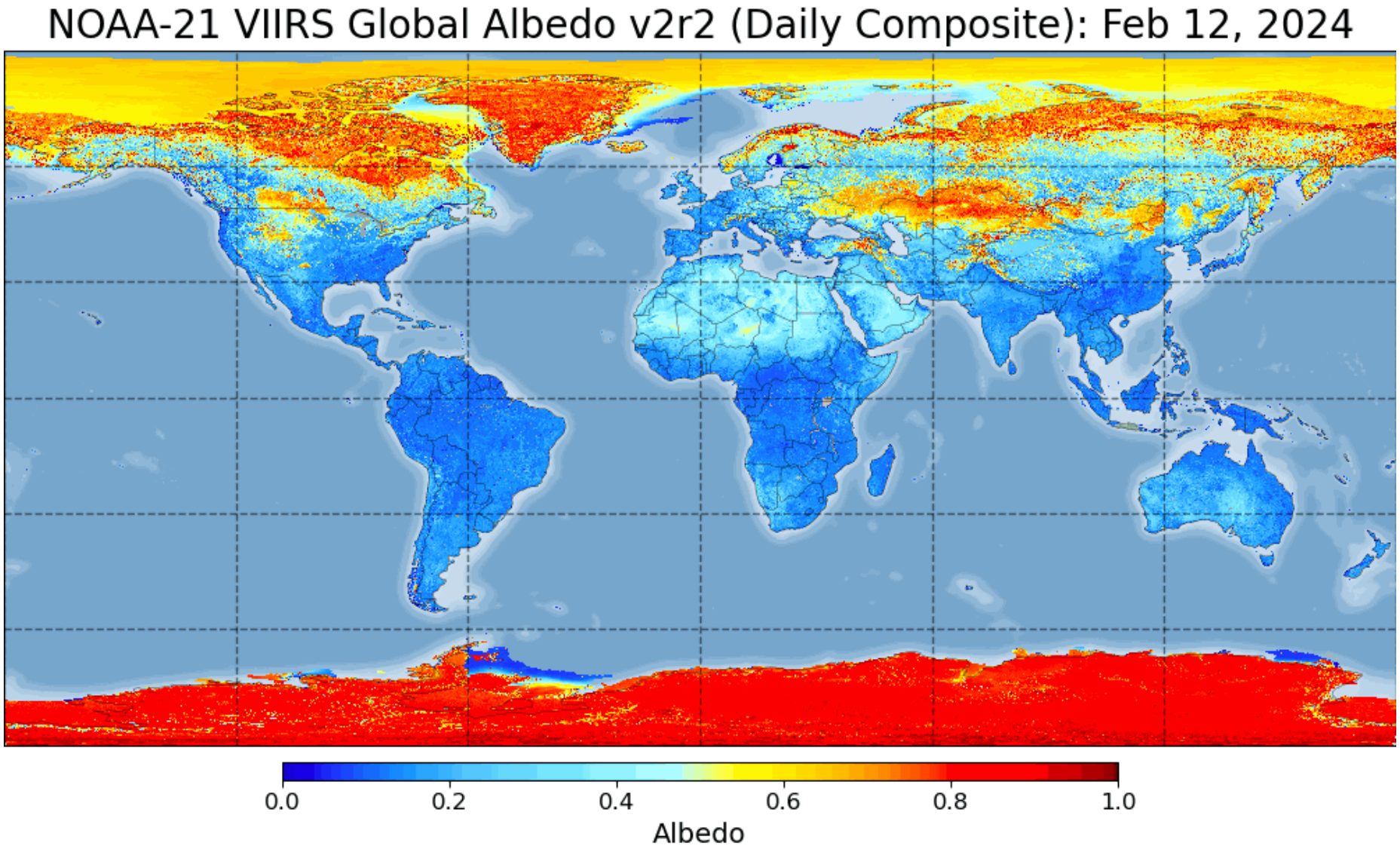
| Milestones | Original Date | Forecast Date | Actual Completion | Variance Explanation |
|---|---|---|---|---|
| Share the soil albedo dataset with model users | Dec-2023 | Dec-2023 | Dec-2023 | |
| Multi-parameter anomaly analysis report | Jan-2024 | Jan-2024 | Oct-2023 | |
| Provisional maturity of NOAA-21 Albedo | Feb-2024 | Jan-2024 | Jan-2024 | |
| Support to JPSS-3 Data System Test Event in early 2024 | Apr-2024 | Apr-2024 | | |
| VIIRS BRDF/Albedo/NBAR Dataset to User | Oct-2023 | May-2024 | Oct-2023 | |
| BRDF evaluation (manuscript) | Dec-2023 | Jun-2024 | | |
| Enterprise Cal/Val Plan Initial Updates | Jun-2024 | Jun-2024 | | |
| *NCCF Integration of BRDF/BSA/WSA/NBAR | May-2024 | Jun-2024 | | |
| Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting | Aug-2028 | Aug-2028 | | |
| Software package ready of blended SURFALB from all VIIRS sensors | Jun-2024 | Aug-2024 | | |
| NOAA-21 validated maturity review | May-24 | Sep-24 | Jan-2024 | |

## *Highlights:*

NOAA-21 VIIRS albedo v2r2 performs well

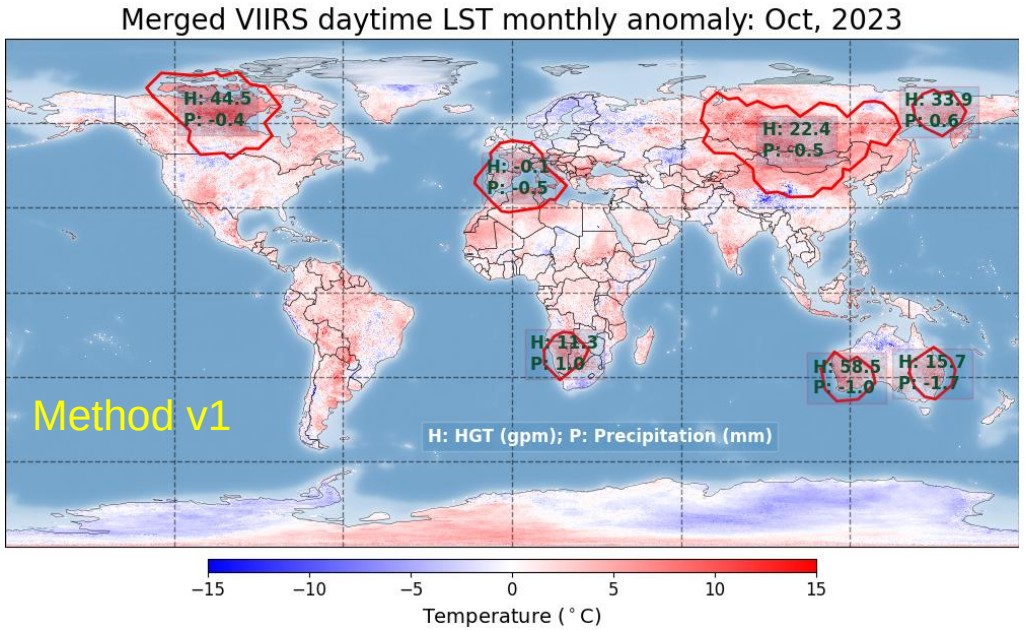


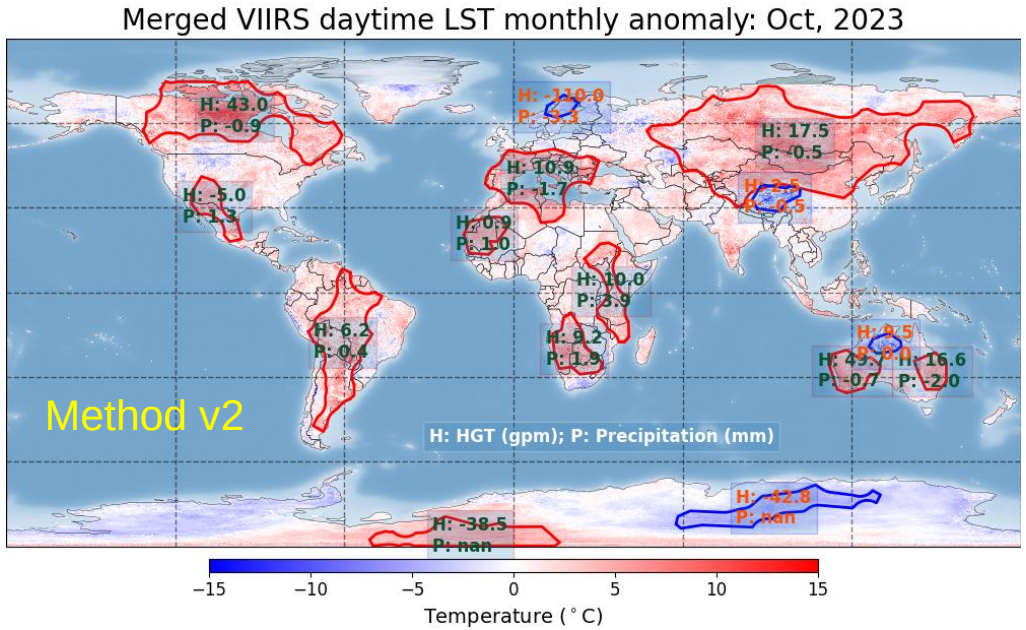
# NOAA-21 PDA-IT albedo monitoring

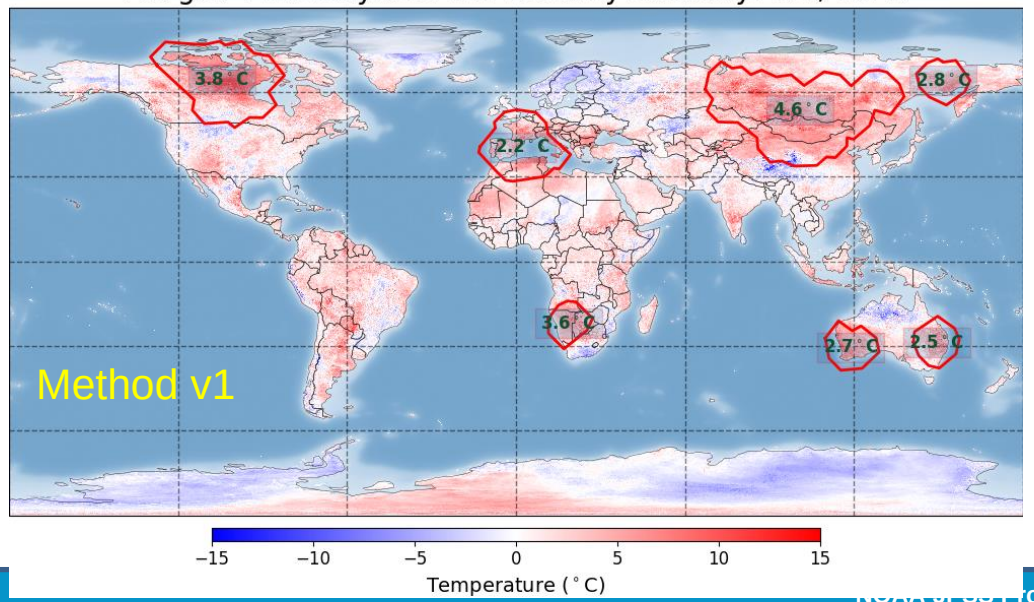


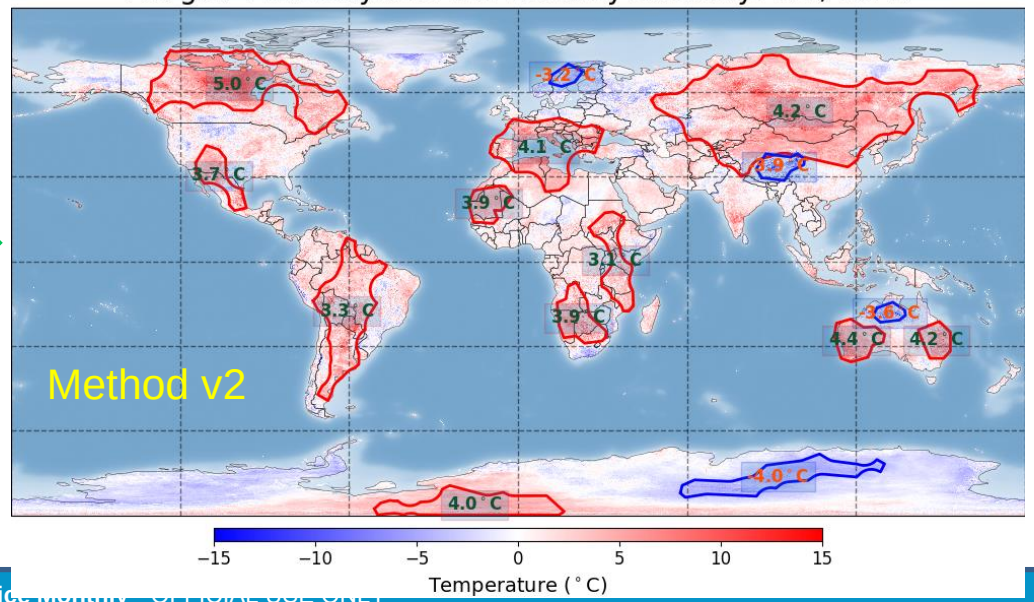

The albedo data from NOAA-21 VIIRS, as obtained from the PDA-IT system, is under continuous monitoring. Observations indicate a high degree of continuity. The algorithm version v2r2 was implemented on NOAA-21, leading to an observable improvement in the algorithm's performance following the update.

# Heat/cold events detection Algorithm Improvement




We have made significant progress in the algorithm for anomaly area detection. The new algorithm can detect temperature anomaly areas more comprehensively and accurately, obtain precise statistical results, and reflect the monthly average temperature of the anomaly areas as well as the related anomalies in atmospheric pressure and precipitation.

# Land Surface Temperature

*February 2024*

## *Accomplishments / Events:*

- Presented a poster titled “Towards Routine Radiance-Based Validation of VIIRS LST Using GDAS Profiles” at AMS 2024 and NCWCP-UMD Mini-Conference.
- Completed the CISESS FY24 proposal narrative and budget plan.
- Conducted software testing and update for all weather LST. A significant issue was observed with running efficiency, which results in the impossible daily operational run. Therefore, the CCAP delivery has to be deferred due to the R2O challenges. We are working on the code improvement and have made some progress on CDF matching and MKF fusion.(slide 2-4)
- Prepared the FY24 plan for the LST project.
- Attended the LST production rules demo and reviewed the draft and revised version of the “JPSS Land Surface Temperature Production Rules” document and provided comments on them.
- Had a meeting with OSPO regarding the LST variable name change and LSE filename and variable name change. Also discussed the impact of global 1 km GVF update on the LSE product. The LSE code needs to be updated once 1 km global GVF is replacing the 4 km global GVF.
- Obtained the experimental 1 km NDVI data and tested it in all weather LST code. It works as expected.
- Reviewed the enterprise project plan for L2 and L3 LST and provided revisions to it.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| LSE update DAP delivery | Aug-23 | Oct-23 | Oct-23 | |
| NOAA-21 data monitoring, evaluation and provisional maturity review | Oct-23 | Jan-24 | Jan-24 | |
| CCAP Initial Delivery - All weather LST | Oct-23 | Feb-24 | | deferred due to scientific R2O challenges |
| SDR and EDR Support to JPSS-3 Data System Test Event in early 2024 | Feb-24 | Apr-24 | | |
| Experimental Development of high spatial resolution LST | Oct-23 | May-24 | | |
| SDR and EDR Enterprise Cal/Val Plan Initial Updates | Apr-24 | Jun 28-24 | | |
| CCAP final delivery-All weather LST | Jan-24 | Jul-24 | | |
| SDR and EDR Enterprise Cal/Val Plan and Algorithm Update Peer Review Meeting | Apr-24 | Aug 30-24 | | |
| Monitoring and Anomaly watch, analysis and report | Oct-23 | Sep-24 | | |

## *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 issue of NOAA-21 LST data missing remains significant. The L2 LST data has been missing since Feb. 14th, 2024, while the L3 VIIRS LST only has one day’s worth data available.

```
drwdrwxr-sr-x. 2 yuling.liu landveglst 28 Jan 24 08:00 01
drwdrwxr-sr-x. 2 yuling.liu landveglst  4 Feb 18 08:04 02
```

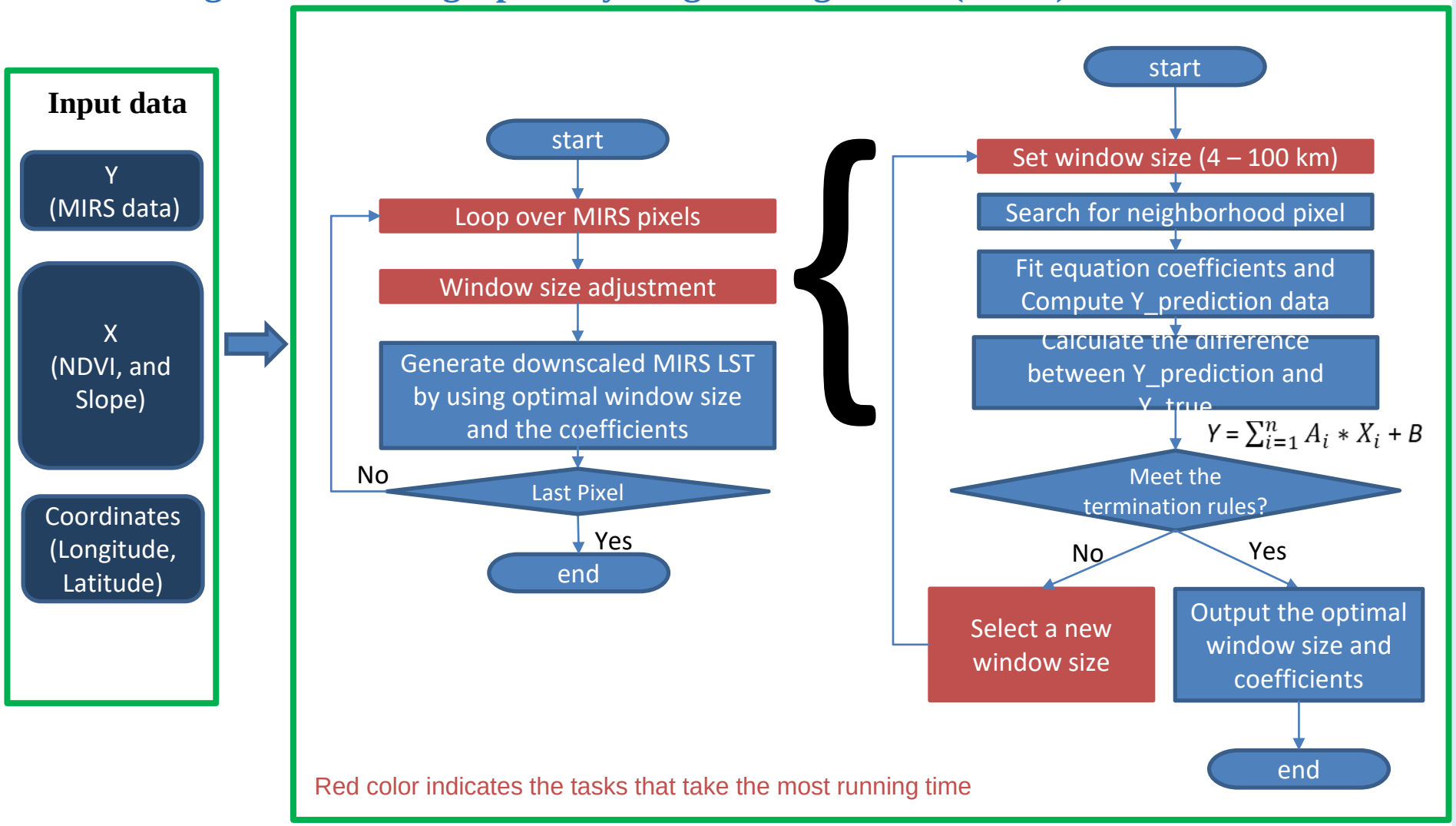
L3 NOAA-21 LST availability in Feb. 2024

```
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1013 Feb  6 06:35 20240201
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1012 Feb  7 06:35 20240202
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star  808 Feb  8 06:35 20240203
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1013 Feb  9 06:35 20240204
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1010 Feb 10 06:35 20240205
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1014 Feb 11 06:35 20240206
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1012 Feb 12 06:35 20240207
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star  631 Feb 13 06:35 20240208
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star  718 Feb 10 00:45 20240209
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1011 Feb 15 06:35 20240210
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star  965 Feb 16 06:35 20240211
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1012 Feb 17 06:35 20240212
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star 1001 Feb 18 06:35 20240213
drwxr-xr-xdrwxr-xr-x. 2 yuling.liu star  873 Feb 19 06:35 20240214
```

L2 NOAA-21 LST availability
The data is also incomplete on certain days such as Feb. 3rd, Feb. 8th ,9th ,11th , and 14th.

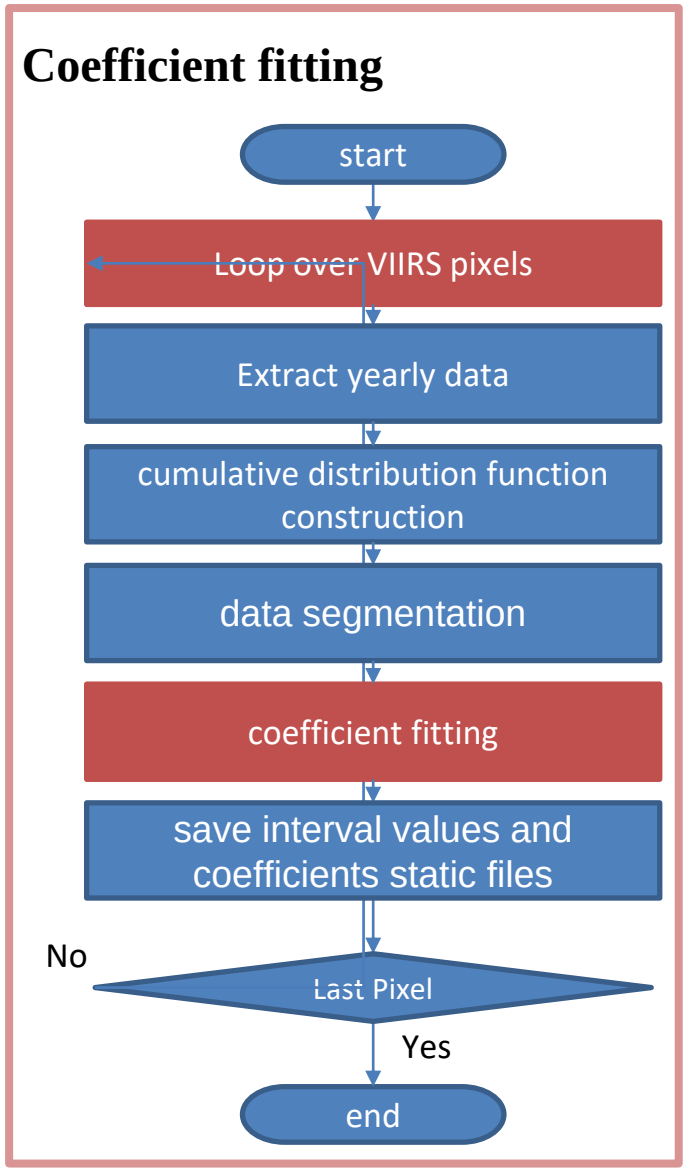
# All weather LST- GWR method Implementation

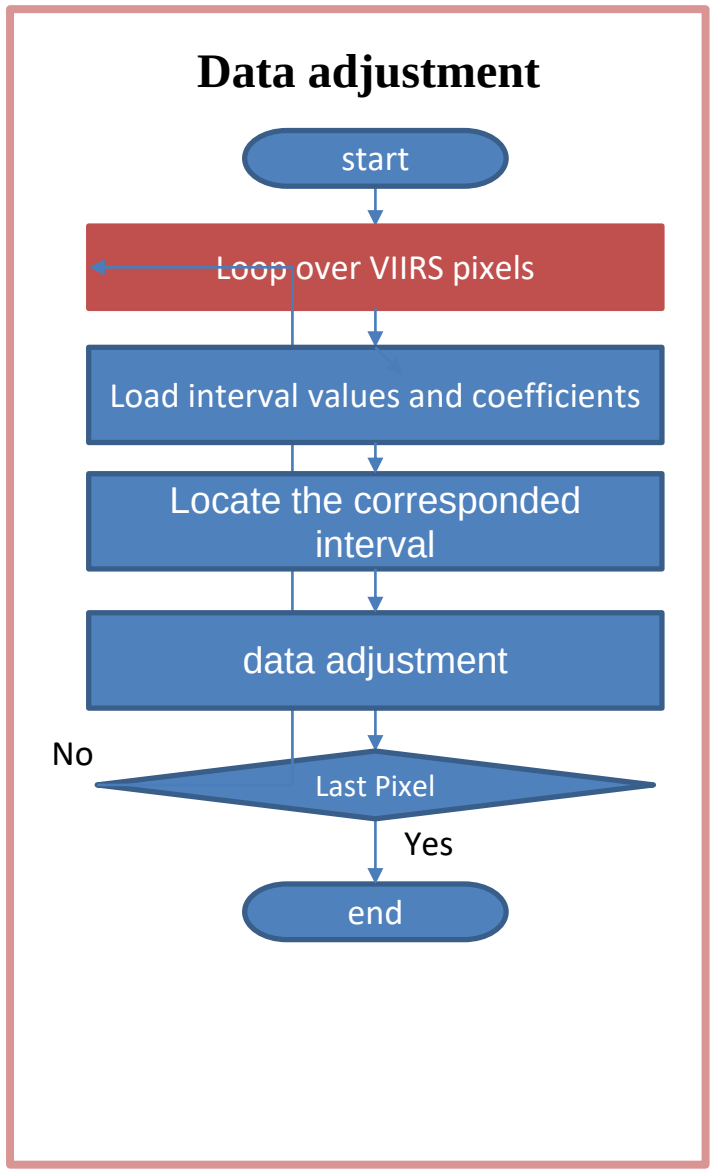
## Downscaling based on Geographically weighted regression (GWR)




- The left figure shows the flow chart of MIRS LST downscaling using the GWR method. The minimization of the fitting error at the pixel level through adjusting window size is very time consuming.
- We held a discussion within the team to find solutions.
- We will try to establish the relationship between VIIRS LST and MIRS LST, as well as other factors such as NDVI, slope, etc., using historical data.

# All weather LST- CDF Matching method Implementation




- Challenge 1: coefficient fitting.

**Resolution: Output CDF coefficients to static files.**

- Challenge 2: Loop over pixels.

**Resolution: Convert for-loop structure to a vectorized calculation.**

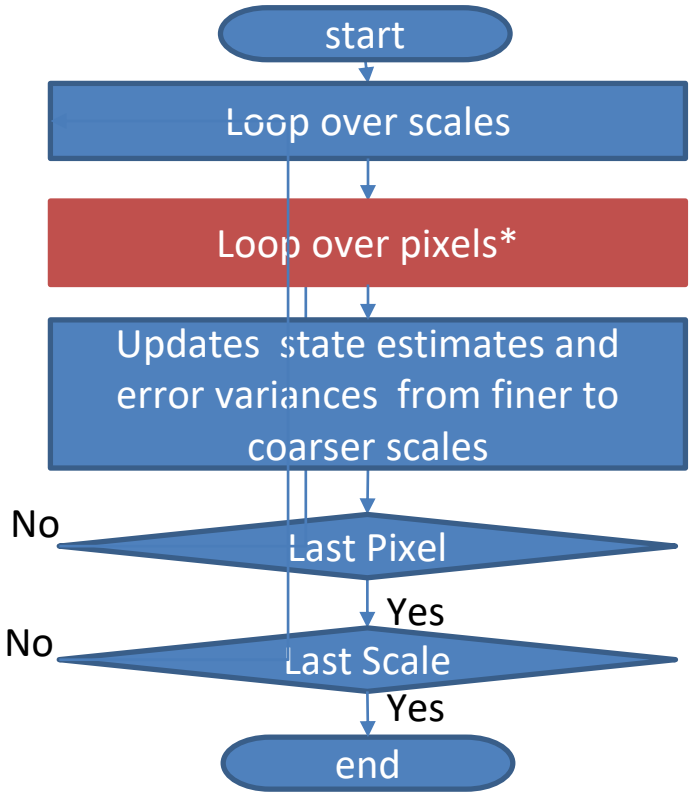
**Improvement:**

**Global daily (Day/ Night)**

- **3 hours to 8 minutes**
- **(Tested at UMD server)**

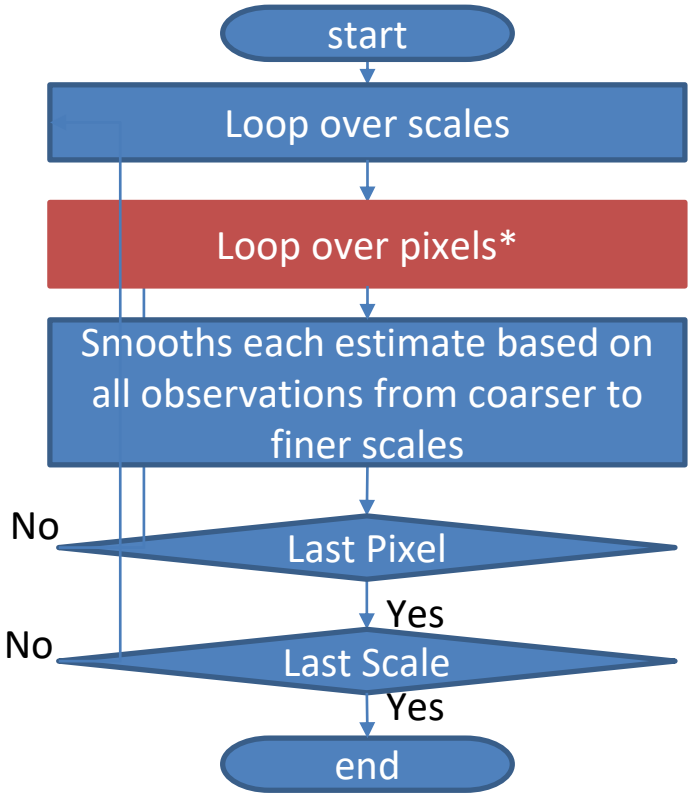
# All weather LST- MKF Fusion method Implementation

## Kalman Filtering (Loop over pixels)




*Pixel level loop for data at each scale

## Kalman Smoothing (Loop over pixels)




## Multiresolution Kalman Filtering (MKF)

- Challenge: Kalman Filtering and Smoothing (Loop over pixels).
- **Resolution: Convert for-loop structure to a vectorized calculation.**

- **Improvement**

**Global daily (Day/ Night)**

- **3 hours to 12 minutes**
- **(Tested at UMD server)**

# MiRS Products

*February 2024*

## *Accomplishments / Events:*

- Under JPSS Proving Ground Risk Reduction funding, ATMS data from both the SNPP and NOAA-20 satellites is being reprocessed with a more up to date version of the MiRS algorithm (v11.8). SNPP data from the period 2011-2020 has now been reprocessed and NOAA-20 data reprocessing is underway. To assess the applicability of the reprocessed data to monitor longer-term trends, total precipitable water (TPW) retrievals from the reprocessed data are being analyzed. The highlight figure shows the MiRS reprocessed SNPP/ATMS and ERA5 TPW trend (2012-2020) spatial distribution. Results are shown for absolute TPW trend in the upper panels and relative TPW trend in the lower panels. Left column is for SNPP/ATMS and right column for ERA5. The results to date show fairly strong agreement between the MiRS and ERA5 TPW trends. Mid-latitude trends are generally positive. Tropics shows both strong negative and positive trends with local values while polar regions show significant positive trends. The results suggest that the current polar orbital satellite observation is sufficient to characterize longer-term TPW trends.
- Note: Snowfall rate (SFR) will not be included in DAP v11.10 delivery as per agreement with SFR algorithm team and JSTAR program. Going forward, SFR will be a stand-alone algorithm.

## *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

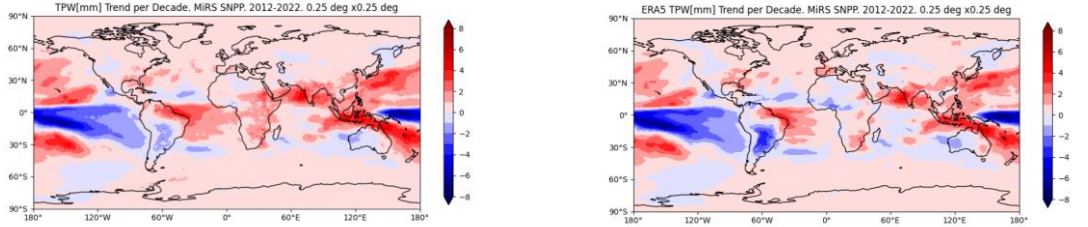
| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| NOAA-21 MiRS products from J2-Ready MiRS algorithm in support of ATMS TDR/SDR Beta Maturity | Nov-22 | Nov-22 | Nov-22 | |
| NOAA-21 MiRS products from J2-Ready MiRS algorithm in support of ATMS TDR/SDR Provisional Maturity | Dec-22 | Dec-22 | Dec-22 | |
| NOAA-21 MiRS product validations, Beta Maturity | Mar-23 | May-23 | Apr-23 | Accelerated following JSTAR management request |
| NOAA-21 MiRS product validations, Provisional Maturity | Aug-23 | Jun-23 | Jun-23 | Accelerated following JSTAR management request |
| MiRS DAP (v11.10): integrate SFR algorithm updates, code/science improvements, final J2 launch delivery | Feb-24 | Feb-24 | Mar-24 | To be delivered as per ASSISTT schedule. |

## *Highlights:*

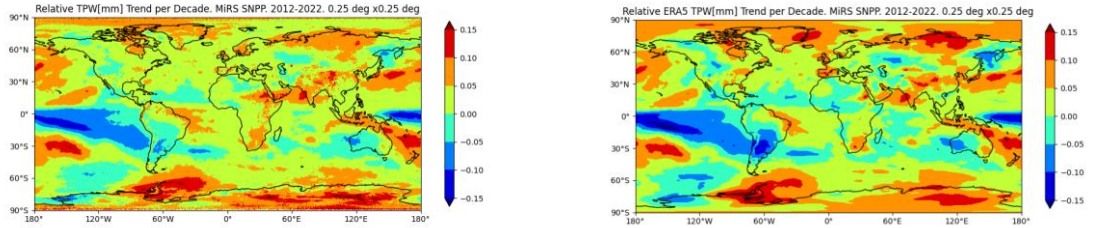
SNPP/ATMS

ERA5

Absolute (mm/decade)




Relative (Percent/100/decade)



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

*February 2024*

## *Accomplishments / Events:*.

- The JSTAR Mapper/STAR Environmental Monitoring System (STEMS) Team successfully reviewed and upgraded the Mapper tile set in support of an ASEAN Specialized Meteorological Centre (ASMC) Hotspot and Haze Assessment (H2A) Workshop held in Singapore (Feb 27-29), leading to a very successful workshop outcome for the Aerosol Team (Amy Huff & Shobha Kondragunta).

- The NPROVS team attended the NCWCP / UMD Mini-Conference (Feb 27-29) and presented two posters summarizing NPROVS and an oral presentation entitled "*NUCAPS Sounding Observations and Typhoon Mawar".*

- The latest NUCAPS v3.2 for NOAA-20 was operationally implemented on February 1 and initial results verified expected performance impacts. **(HIGHLIGHT).**

- The NPROVS team successfully transferred gridded fields of "*NUCAPS / Forecast*" profiles to NPROVS in support of NWS effort to produce expanded hourly *NUCAPS* coverage; these fields will be used for extensive validation against radiosondes and NWS HRRR regional analysis

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

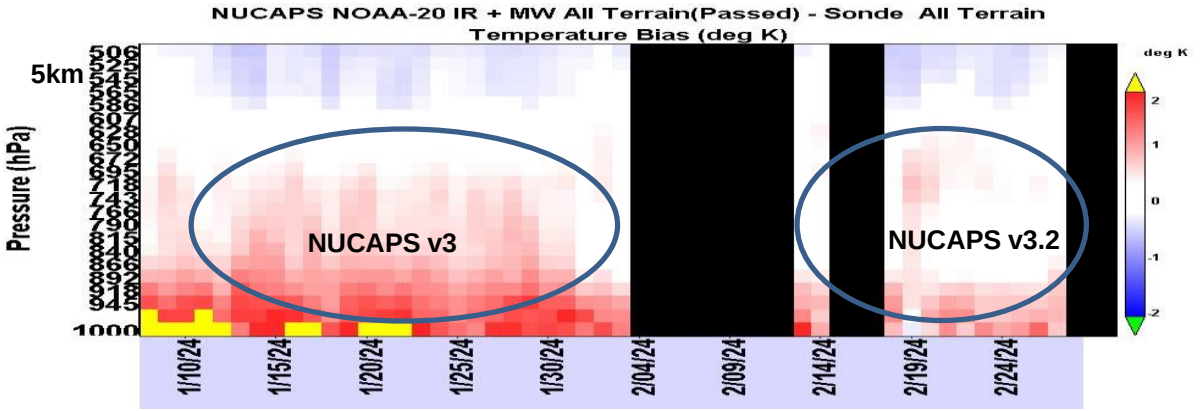
## *Overall Status:*

| | 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 panel illustrates vertical time series of NUCAPS Temperature bias spanning a time period from before and after the implementation of NUCAPS v3.2 which replaced the original NUCAPS v3 on January 31, 2024. The time series covers the lower to middle troposphere from the surface to 500 hPa (5.5km) and are constructed from daily averages (sample size about 500) of the NUCAPS-Conventional Radiosonde temperature differences at each of approximately 20 vertical pressure levels. The temperature difference color scale ranging from +/- 2K is shown on the right; black indicates missing data. As can be seen from the circled portions, a persistent warm bias in the original v3 is reduced on the order of 1K in the lower/middle troposphere (below 600 hpa). Monitoring continues.

# NUCAPS Products

*February, 2024*

## *Accomplishments / Events*

- As required for the OCS NUCAPS project portfolio, the NUCAPS team prepared deliverables and milestone schedules for the maintenance and sustainment of NUCAPS sounding EDR products. These include:
  - The continuation of collection and processing of validation data sets for the AVTP, AVMP, O3, OLR, CO, CH4, and CO2.
  - The Ammonia retrievals and development of necessary wrapper scripts for the UMBC SARTA code to include parameters necessary for the NH3 operational implementation.
  - Implementation of CAMEL V3 emissivity LUTs for land surface spectral emissivity first guess improvements, and addition of snow/ice physical emissivity retrievals.
  - Reprocessing of the mission-long S-NPP/NOAA-20 NUCAPS products using the NUCAPS v3.2 that includes the addition of averaging kernels.
- One of the NUCAPS team members (Margarita Kulko) participated in the AEROSE-2024 campaign. Collected eight RAOB observations off the west coast of Africa. Supported the students with the RAOB balloon launches. Collected aerosol particle count and size distribution using a Portable Optical Particle Spectrometer in the tropical Atlantic.
- Processed 2022 and 2023 NOAA-20 data using the latest NUCAPS algorithm and NASA L1 radiances. These runs will be used to compare against the version with CAMEL-V3 implementation and the snow and ice surface emissivity physical retrieval algorithm.
- Processed monthly mean OLR for April through December by performing descriptive statistics and visual analysis.

## *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 | | | |

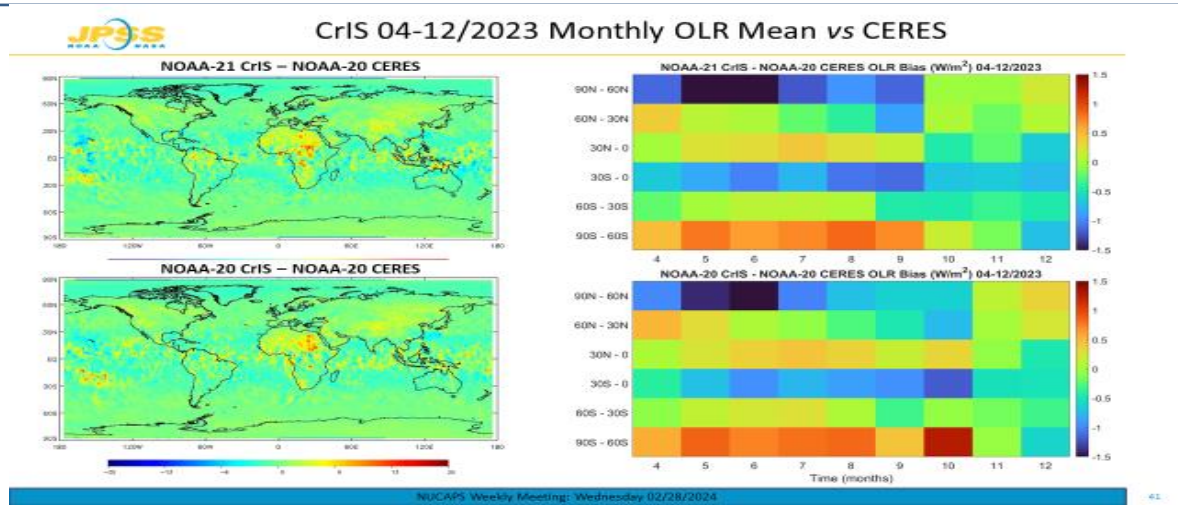
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

### ***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 Maturity |
| Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations | May-23 | May-23 | Mar-24 | Continued updates to the data set |
| Addition of CAMEL emissivity database for the emissivity first guess | Mar-24 | Apr-24 | On-schedule | |
| Mission-long reprocessing of NOAA-21 NUCAPS products: Reprocessing version and evaluation of reprocessed products | Jun-24 | Jun-24 | On-schedule | |

Monthly mean NOAA-21/20 CrIS OLR validations with NOAA-20 CERES: Figures show that during northern hemisphere colder months, CrIS is slightly overestimating in the Antarctic region and underestimating in the Arctic. Later in the year, the pattern is reversed. The overall bias characteristics are within the requirements for the NOAA-21/20 OLR product.



# OMPS SDR

*February 2024*

*Accomplishments / Events:*

- Derived and delivered OMPS NM/NP weekly dark LUTs for SNPP, NOAA-20 and NOAA-21.
- Derived and delivered SNPP/NOAA-20/NOAA-21 OMPS NP solar bi-weekly LUTs.
- Derived the NOAA-21 OMPS NM Stray-Light LUT that handles Out-of-Range (OOR) values.
- Conducted the recovery assessment for the NOAA-20 OMPS data quality after the SCP reset on February 4, 2024.
- Continued analyzing Day-1 and synthetic solar spectra differences among 3 NMs and 3 NPs.
- Continued solar activity analysis for 3 NPs by using SNPP, NOAA-20 and NOAA-21 solar data.
- Validated the new N21 NP SL table performance by analyzing each of the OMPS NPs to see how each channel correlates with the channels at longer wavelengths.
- Analyzed OMPS NM and NP comparisons in the overlap region using reprocessed OOR-corrected NM datasets
- Explored the feasibility of modeling the change of OMPS NM and NP dark rate during the instrument warm-up period.
- Conducted inter-Comparisons of OMPS SDR Earth-View Radiance Values with TROPOMI.
- Continued comparing the NOAA and NASA versions of OMPS SDR data.
- Extended the TomRad code for NOAA-21 OMPS simulations.

## *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 |
|---|---|---|---|---|
| Solar intrusion impact correction on NOAA-21 OMPS NP; OMPS solar activity impact analysis Note: The solar intrusion correction work is completed as far as deliveries and code changes go | Nov-23 | | Nov-23 | |
| Investigation of the dark over-correction problem and an initial analysis of OMPS out-of-range of SL correction | Dec-23 | | Dec-23 | |
| NOAA-21 solar day-1 improvement with solar activity impact correction; develop the out-of-range of SL table for N21 NM SDR; update the N21 NP ST LUT; compare with NASA datasets for NOAA-21 OMPS NM and NP SDR data (code is ready) | Jan-24 | Feb-24 | | Day-1 improvement is on-going analysis |
| Improve latitude dependency of inter-sensor biases; reprocess (limited) N21 OMPS NM/NP SDR data sets (new dark LUTs); assess the consistency of N21 OMPS NM and NP at the dichroic range; conduct the inter-sensor comparison with Tropomi | Feb-24 | Feb-24 | | |
| Finalize the NOAA-21 solar day-1 towards validated maturity; validate NOAA-21 OMPS SDR data quality using multiple ways (e.g., RTM, DCC, inter-sensor comparison with VIIRS); prepare NOAA-21 OMPS NM/NP SDR validated maturity review | Mar-24 | | | |
| Reprocess the (SNPP, NOAA-20 and NOAA-21) OMPS NP SDR data by using the new dark, OSOL and SL tables; Initialize the OMPS and GEMS inter-sensor comparison analysis | May-24 | | | |
| Document the technical reports (e.g., SL correction, solar intrusion correction, solar activity impact correction, NM along-track wavelength shift correction; update OMPS NM/NP SDR ATBD | Jul-24 | | | |
| Develop new algorithm or code to support J3/J4 pre launch testing and verification; analyze the pre-launch test data sets for J3 or J4 upon the availability of the data sets | Aug-24 | | | |
| Pre-launch sensor characterization report upon available pre-launch instrument test data sets; reprocess SNPP, N20, and N21 OMPS NM SDR data using the updated LUTs; OMPS SDR enterprise Cal/Val plan updates | Sep-24 | | | |
| Develop and deliver dark and OSOL LUTs for SNPP/NOAA-20/NOAA-21 | Sep-24 | | | |
| Maintain SNPP/NOAA-20/NOAA-21 OMPS SDR data quality | Sep-24 | | | |

**New OOR SL Calibration Improving Consistency of NM and NP in wavelengths from 300 to 310 nm**

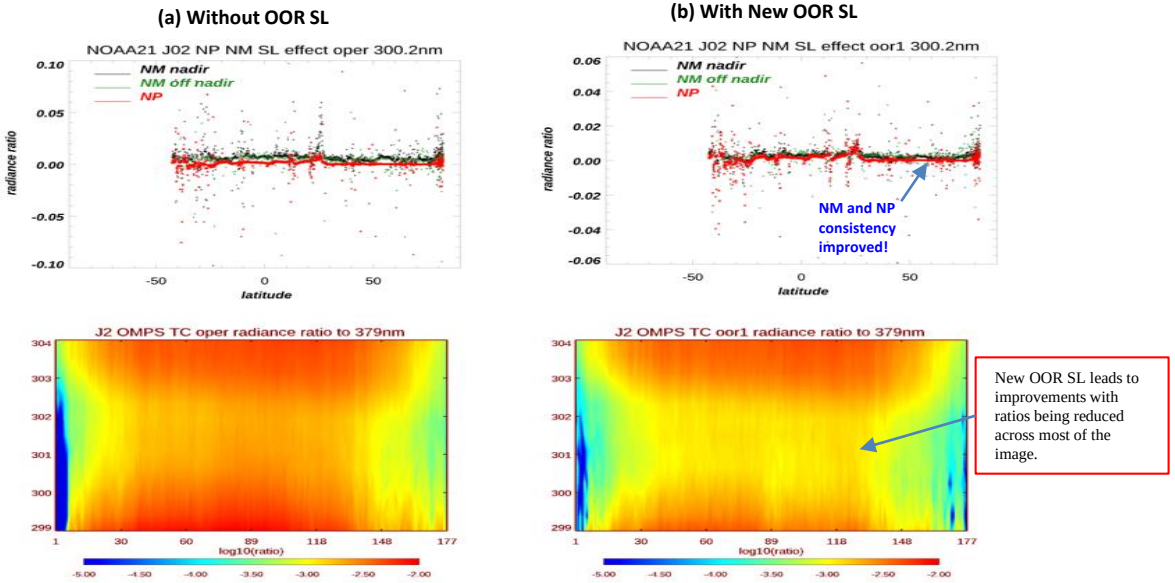



Figure: Radiance ratios relative to latitude for NM nadir (black), NM off-nadir (green), and NP (red) for the 300.2 nm channel. The top-left image shows the ratios with no OOR SL correction, while the top-right plot shows the values after the correction has been applied. The bottom row of images extends this to include more wavelength channels and the full CCD micro-pixel plane.

# OMPS Ozone (V8Pro, V2Limb & V8TOz)

*February 2024*

## *Accomplishments / Events:*

- Prepared information for Office of Common Services FY24 planned activities related to sustainment in preparation for STAR/PPM TTA.
- Worked closely with OSPO, ASSIST and STAR OMPS SDR Team to ensure the latest provisional algorithms are implemented into NCCF and to move closer to validated status for Ozone EDRs.
- Working to achieve Beta status for OMPS-LP SDR and EDR.

| 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 | | CAC Badge renewals, 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.*

## *Risks:*

## *Highlights:*

# Snowfall Rate

*February 2024*

## Accomplishments / Events:

- Prepared information for Office of Common Services FY24 planned activities related to sustainment in preparation for STAR/PPM TTA.
- Prepared for upcoming Provisional Maturity Review.

- The standalone SFR system successfully passed Algorithm Readiness Review and Operational Readiness Review. The system will start operational production within NCCF in early March.
- The SFR science team continues to support NWS users with their winter precipitation forecasts and collect user feedback on SFR performance.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Enhance the machine learning snowfall detection model using N21 observations | Jan-24 | Jan-24 | Jan-24 | |
| Enhance the machine learning models for 1DVAR initialization and SFR bias correction using N21 observations | Jan-24 | Jan-24 | Jan-24 | |
| Validation of NOAA-21 snowfall detection and rate estimation algorithms | Feb-24 | Feb-24 | | |
| NOAA-21 SFR provisional maturity review | Feb-24 | Feb-24 | | |
| Enterprise SFR science code delivery to ASSISTT including N21 provisional maturity SFR | Feb-24 | Feb-24 | | |
| Cross validation among NOAA-21, NOAA-20, and S-NPP SFR products | April-24 | April-24 | | |

## 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:

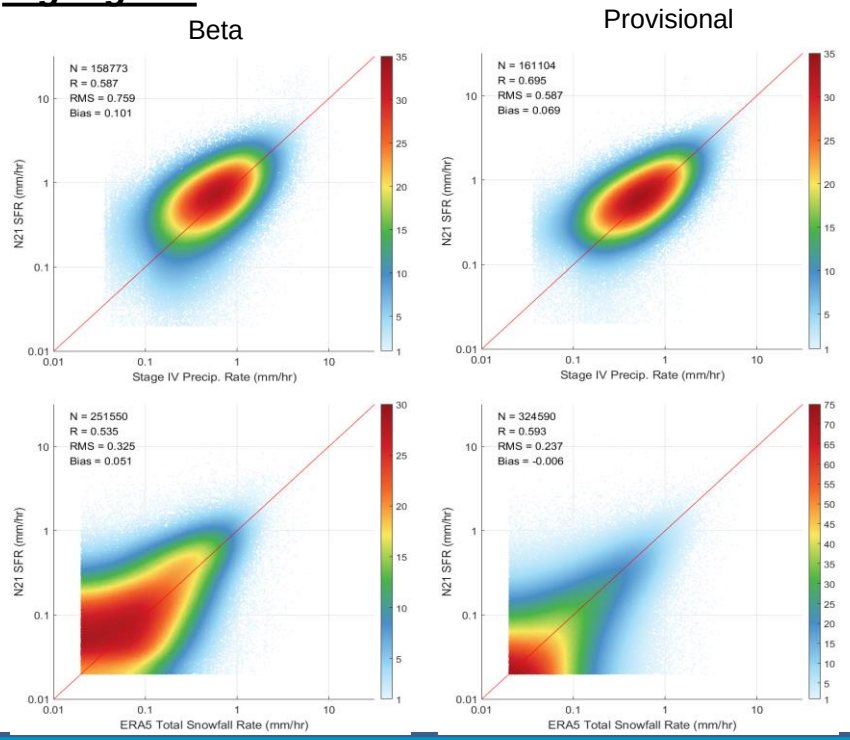



Figure 1. NOAA-21 Snowfall Rate Validation.

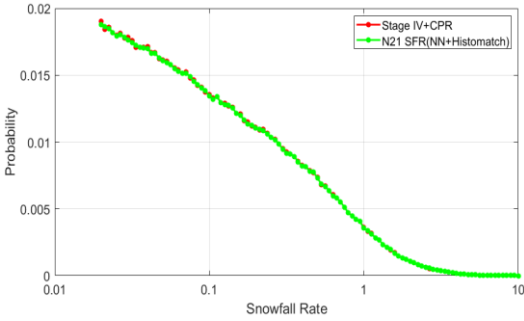



Figure 2. Probability Distribution.

# Sea Surface Temperature

*February 2024*

## *Accomplishments / Events:*

- Operational production of ACSPO VIIRS SST is being transitioned from NDE to NCCF. We worked with OSPO to validate ACSPO SST files produced at NCCF prior to promotion of the SST dataflow from the NCCF test environment (UAT) to operations. Operational production of ACSPO VIIRS SST data at NCCF is on track to be completed in March 2024 for NPP and N20.
- We delivered updated N21 VIIRS SST lookup tables (LUTs) to ASSISTT and provided instructions on how to update the LUTs in the ACSPO V2.80 software. Operational production of N21 VIIRS ACSPO SST at NCCF is planned after an updated ACSPO software package with new LUTs is delivered to OSPO by ASSISTT.
- Validated Maturity Status was declared for ACSPO N21 VIIRS SST on 20 February with an effective validated Date of March 30. Note that this applies to N21 VIIRS SST with updated LUTs. A complete archive of ACSPO N21 VIIRS SST has been produced at NOAA STAR and is available at CoastWatch, NCEI and PO.DAAC, with new data added in near-real-time. ACSPO N21 VIIRS SST is comparable in quality to established NPP and N20 SST products (see Figure).

## *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.*

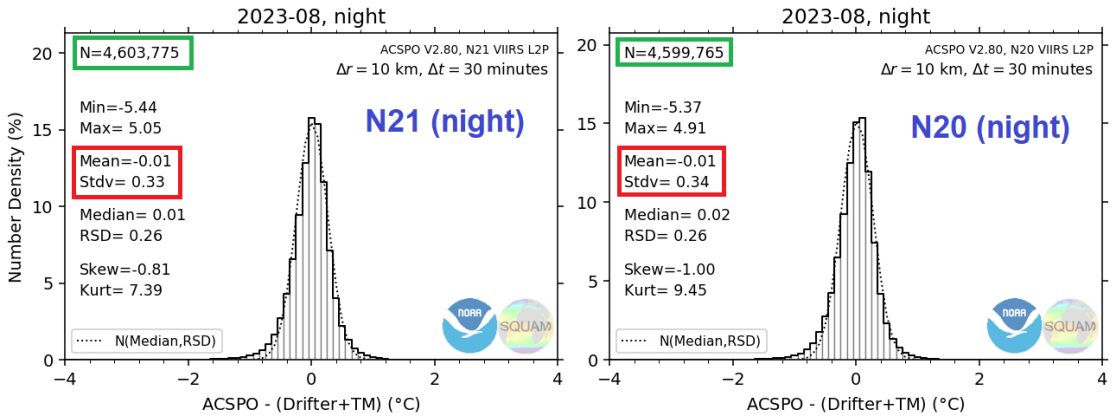
## ***Issues/Risks:***

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

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

| 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 | | |
| SST EDR Enterprise Cal/Val and ACSPO Algorithm "Agency Report" Presentation to GHRSST science community | Jun-24 | Jun-24 | | |
| SST EDR Enterprise Cal/Val Plan Initial Updates | Jul-24 | Jul-24 | | |
| Promote experimental iQuam updates to live access | Aug-24 | Aug-24 | | |
| SST EDR Validated Maturity Review | 22-Aug-24 | 22-Aug-24 | Feb-20 | |

## ***Highlights*: *N21 VIIRS SST Quality is comparable to N20***




**Histograms show monthly aggregated (Aug 2023) bias of ACSPO VIIRS nighttime SST vs in situ SST from drifting buoys and tropical moorings. Matchups include all in situ SST measurements within 10km and 30 minutes of a satellite pixel. Results are shown for N21 (left) and N20 (right). Mean bias and standard deviations (red rectangles) are within 0.01 K and the number of matchups (green rectangle) are very close.**

# Surface Reflectance

*February 2024*

## *Accomplishments / Events:*

- Analyzed the out-of-range issue found in M1 band for the updated LUT, and work on the improvement.
- Generated 0.05 degree daily gridded SR dataset for the BRDF correction, then evaluate the inconsistency issue between SNPP and N20.
- Keep working on the AERONET validation for all of SNPP, N20 and N21.
- Explore the approach for the SR historical data reprocessing, which is important for keep the historical data consistent with newly updated version (v1r3
- Collect the independent surface reflectance measurement for the validation, RadCalNet site data and NEON airborne data are investigated.
- Monitoring the SR product status, and response to the surface type users about the data missing issue they encountered.

## *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 | | | |

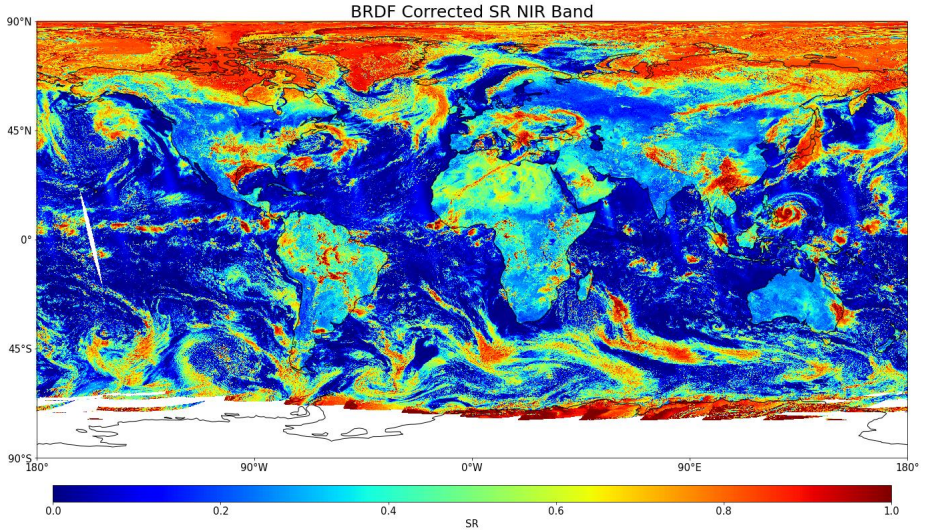
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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

None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| NCCF SR DAP redelivery and verification | Sep-23 | Sep-23 | Sep 20, 2023 | |
| Mitigation algorithm development for the dust aerosol model | Dec-23 | Dec-23 | Dec 19, 2023 | |
| 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 | | |
| GOES-R enterprise SR algorithm development and experimental product | Jun-24 | Jun-24 | | |
| Operational Readiness Review (ORR) for NDE Migration to NCCF | Aug-24 | Aug-24 | | |

## *Highlights:*



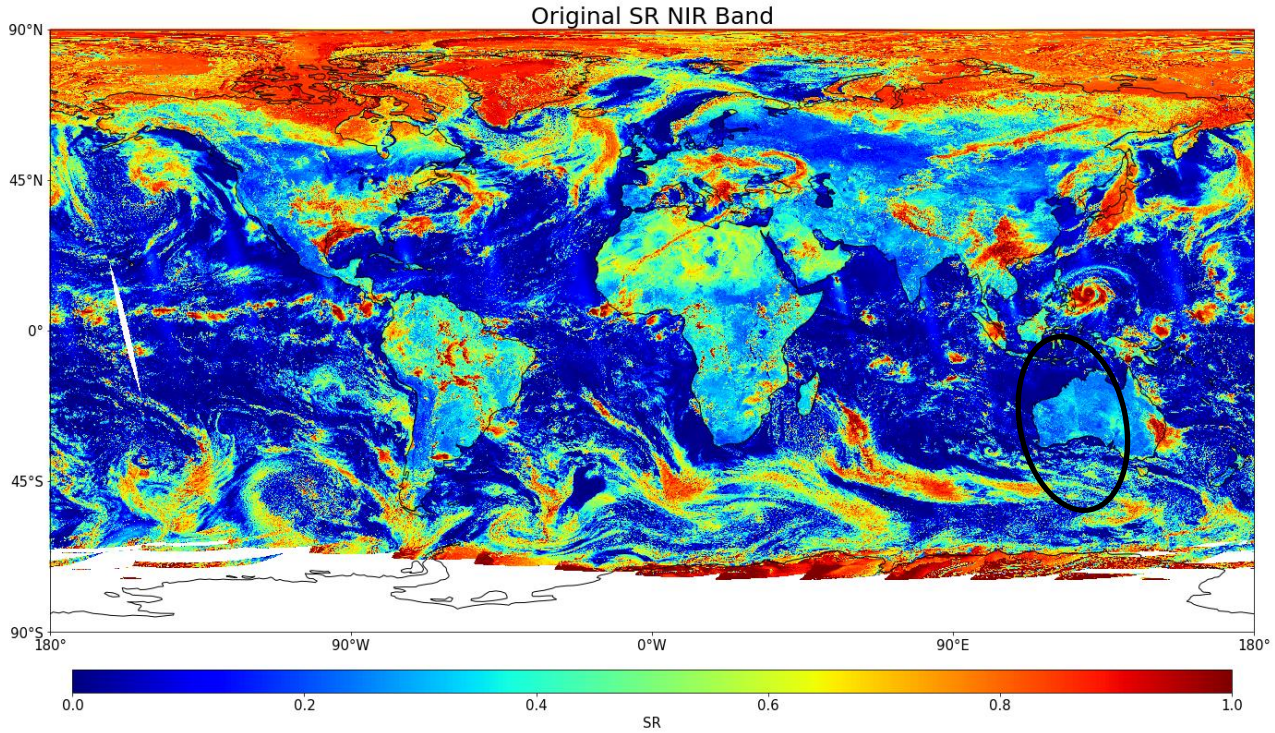

BRDF corrected surface reflectance for the inter-comparison

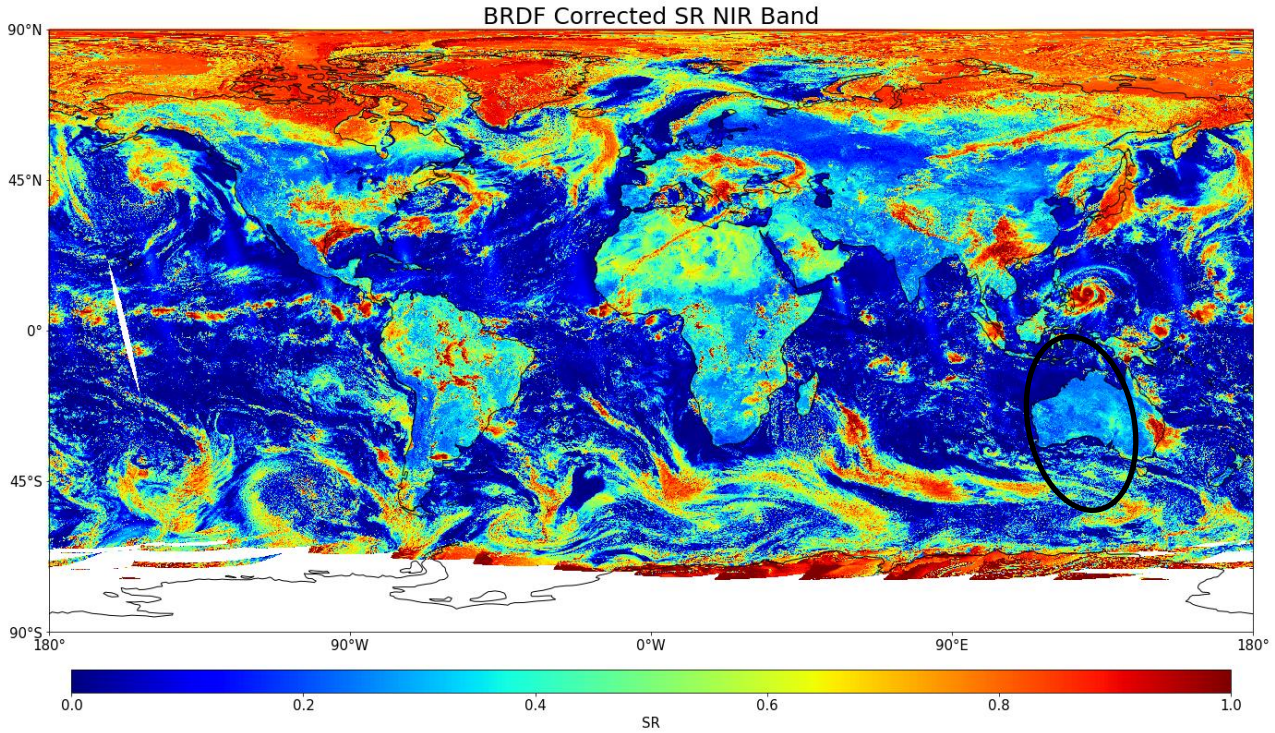
# 5km Daily gridded SR and BRDF Correction



- The granule SR will be mapped into 0.05*0.05 degree grid
  - To keep more information, aggregate the granule SR and angles into 5km resolution for both Image band and M band. Average value for the good quality data will used as the coarse resolution value.
  - Mapping the 5km granule SR into 0.05 degree grid, compositing strategy using the L3 SR used.

- Using the MODIS BRDF coefficients to perform the BRDF correction



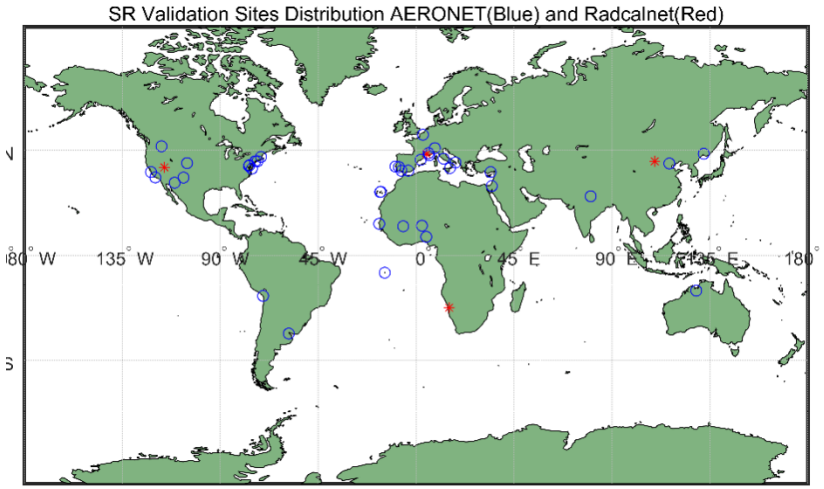



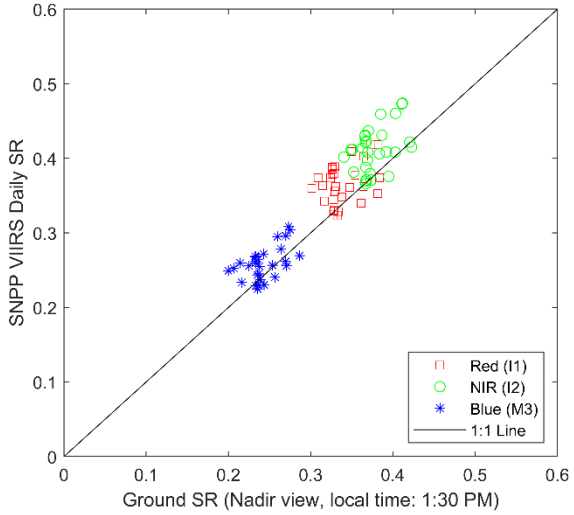

A BRDF Correction case for the global data, NIR band, the correction significantly improved the discontinuity due to the view geometry difference from two tracks (e.g. Australia area)

# Surface Reflectance Measurement for Validation

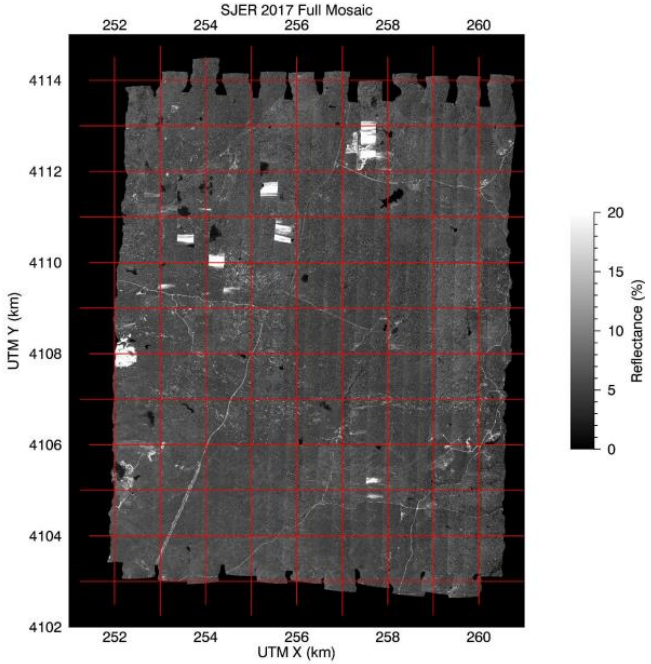


- RadCalNet
  - Four sites located in Nevada, US, Namibia, France and China.
  - Homogeneous sites, three are barren surface and one is grassland (France)
  - Well maintained and distributed.
  - Have been widely used in Cal/Val.
  - Latest update: July, 2023




- NEON
  - In total 59 sites located in US.
  - Airborne Observation Platform (1000m altitude), imaging spectrometer covering 0.38-2.5um.
  - Atmospheric corrected (Adjacent, BRDF corrected as well) and converted to surface reflectance.
  - From 2013 to 2021 (latest update).




# Surface Type

*February 2024*

## *Accomplishments / Events:*

- STAR-UMD VIIRS Surface Type team has downloaded and processed S-NPP, NOAA-20, and NOAA-21 VIIRS daily granule surface reflectance data acquired in February of 2024 for the production of AST-2024.
- The team continues to improve the surface type label for training pixels located in areas where land cover changes occurred in recent years according to Google Earth and other available high resolution data sources (see highlights).
- The team is on track with the production and assessment of monthly and annual composites for VIIRS observations acquired in 2023, which are key inputs to classification algorithms for producing the 2023 Annual Surface Type (AST2023) product.
- The team has generated a monthly update to the 250 m global water surface fraction (WSF) product for February 2024.

## *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:***

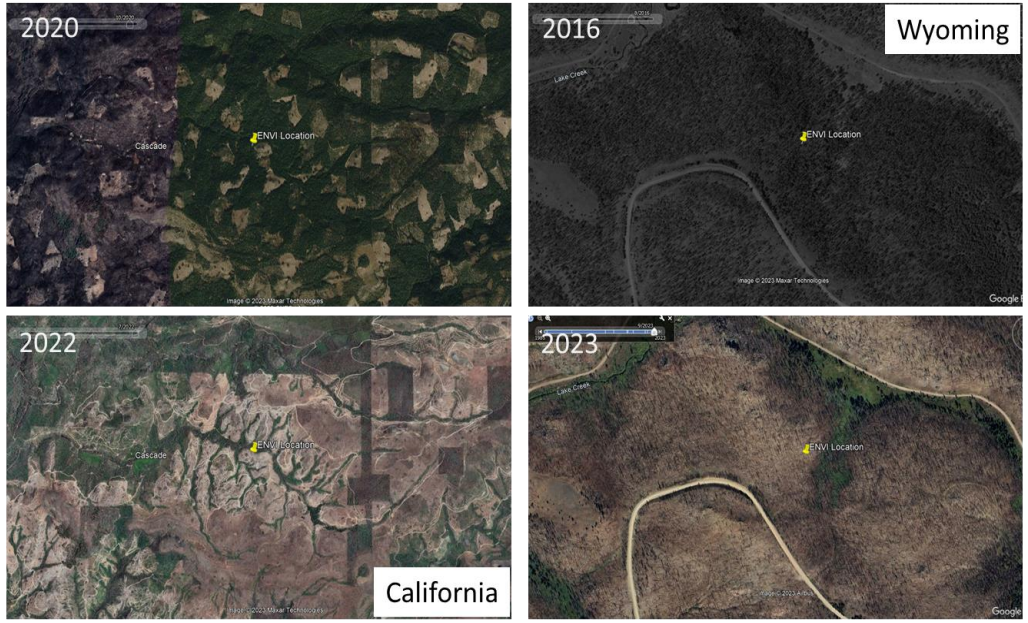
None

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Develop a 250m global water surface fraction product | Feb-23 | Feb-23 | Feb-23 | |
| Complete global monthly composites for each of 2022 months | Each M. | Each M. | Each M. | |
| Generate global annual classification metrics | May-23 | May-23 | May-23 | |
| AST22 of IGBP 17 type map | Aug-23 | Aug-23 | Aug-23 | |
| AST22 for EMC 20 type map | Aug-23 | Aug-23 | Aug023 | |
| AST22 Validation Statistics and delivery to JSTAR and users | Sept-23 | Sept-23 | Sept-23 | |

## *Highlights:*

***Correction of the Surface Type Label of Training Pixels Based on Recent Google Earth Images***

*Training data accuracy is crucial for producing high quality AST maps. If a training pixel is located over an area where surface type change occurred in recent years, its surface type label needs to be corrected. This figure shows large scale forest loss due to fire and other disturbance events in California (left) and Wyoming (right). The yellow pins represents the center location of two training pixels located in these areas. The surface type labels of these pixels need to be corrected before they can be used to produce the AST2023 product.*



# Vegetation Health

*February 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
- Continued the development of the new code for 500m NOAA-20/21 VIIRS VHPs production/operation;
- Continued to explore innovative approaches to enhancing the vegetation health products toward better utilities for agricultural productivity prediction. Preliminary results show that the weight coefficient alpha of the VHI formula (VHI= alpha * VCI + (1-alpha)* TCI) may be optimized for different crops in different regions as indicated in the plots in the low-right quad.

## *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 | | | |

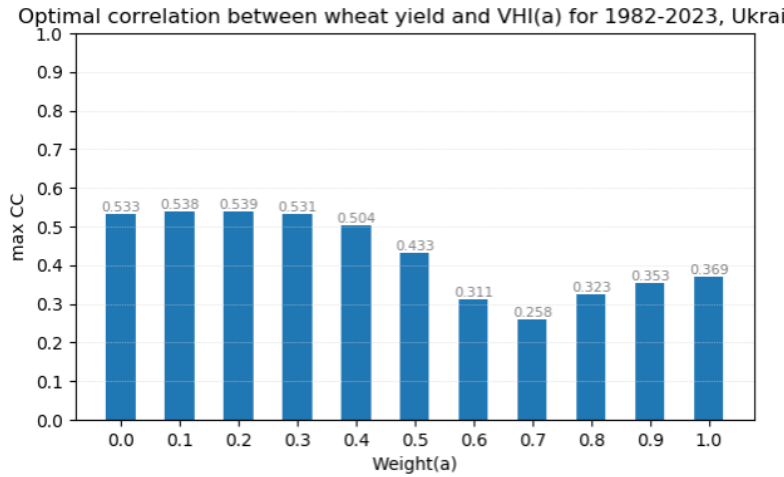
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

***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:*** Optimal correlation between wheat yield and VHI using different weight coefficient alpha of the VHI formula



# Vegetation Index and Green Vegetation Fraction

***February 2024***

## *Accomplishments / Events:*

- Investigated the percentage of valid retrievals in global GVF maps as a metric to monitor the GVF production
- Produced and verified five months of the global 1-km GVF testing dataset and found consistency between the new and previous versions.
- Provided sample 1km global GVF data to EMC
- Found an appropriate indicator and thresholds of the VI product for NCCF operational monitoring
- Started working on the blended (SNPP, J01, J02) VI/GVF development project
- Developed and submitted FY2024 project plan
- Documentation of 1km global VI and GVF

## *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.*

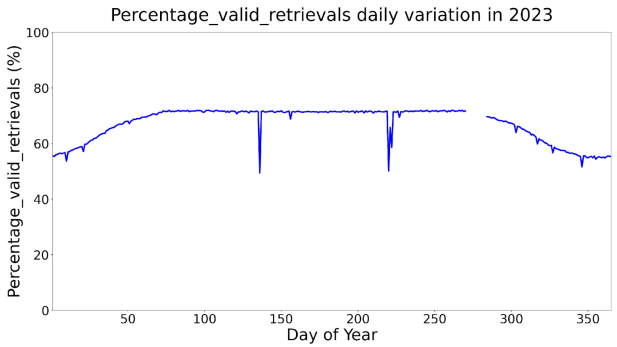
***Issues/Risks:***

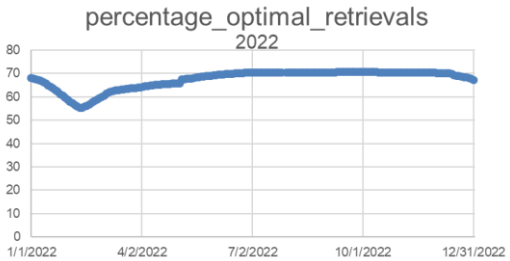
None

| 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 | | Working with PPM for the product update |
| Experimental data test of blended VI and GVF products | Apr-24 | May-24 | | Delays to previous milestone |
| Support to JPSS-3 Data System Test | Apr-24 | Apr-24 | | |
| Operational readiness for NCCF migration | Aug-24 | Aug-24 | | |
| Annual algorithms/ products performance report | Aug-24 | Aug-24 | | |
| Calibration/ Validation update for SNPP and NOAA20 VI and GVF products, | Sep-24 | Sep-24 | | |

## *Highlights:*

- Time series of percentage of valid retrievals for VI (on left) or percentage of optimal retrievals for GVF (on right) were made for 2023.
- Based on these time series, a threshold of 55% valid retrievals for VI and a range of optimal retrievals between 50% and 75% for GVF were determined for NCCF monitoring purposes.



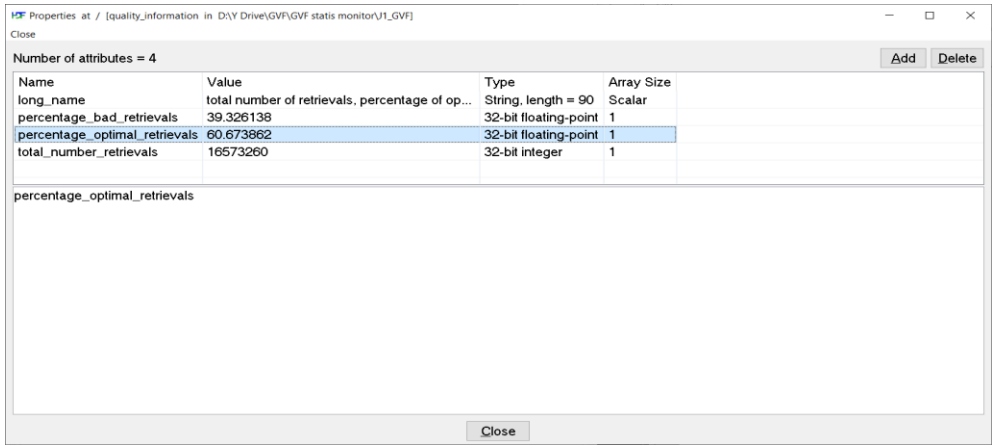



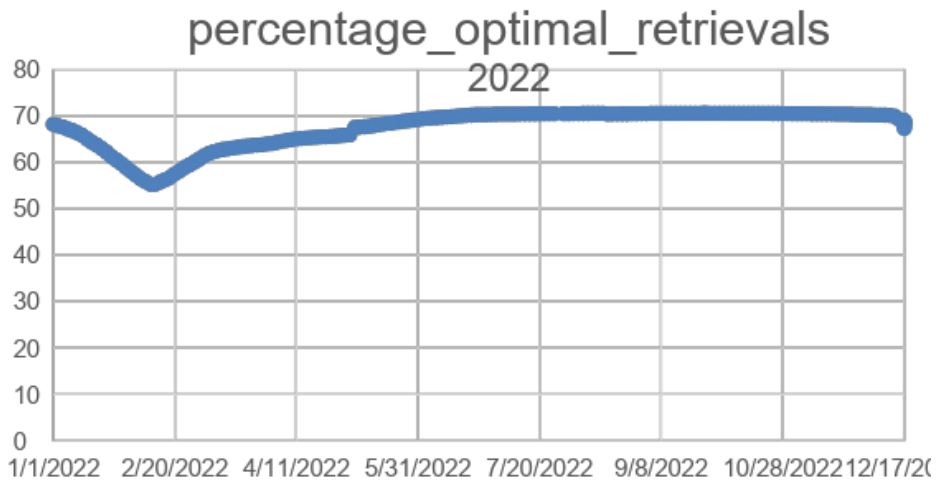
# Percentage of retrieval threshold values for monitoring GVF

Investigated the percentage of valid retrievals in global GVF maps as a metric for monitoring the operational GVF in NCCF production monitoring system

- The GVF/VI are in the process to be implemented in NCCF. OSPO needs suggestions from us on determining the threshold values of the GVF in the NCCF production monitoring system.
- The percentage of valid retrievals in a global GVF map is a meta data in GVF files that measures the percentage of valid retrieval pixels over all land pixels in a global GVF map in the equal lat/lon projection.
- A year of the percentages of valid retrievals were extracted and plotted
- The normal values of the percentages of valid retrievals varied between 54% and 71% if we ignore the first week when no historical data are available.
- We suggest when the global mean GVF value is less than 50% or greater than 75% the red alert will occur

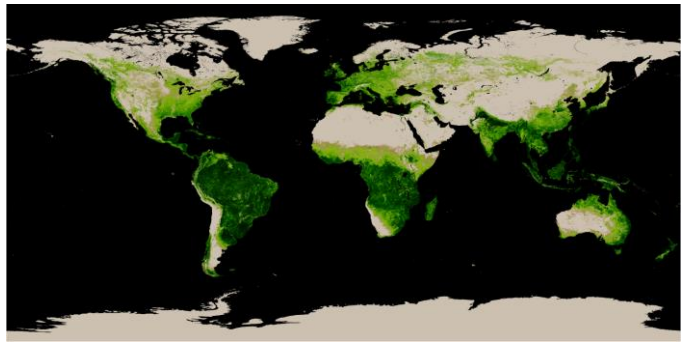
GVF meta data in quality information



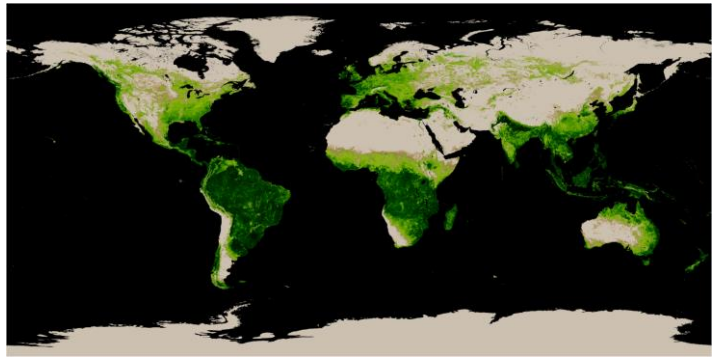



# Verification of the global 1-km GVF testing dataset

Global 1-km GVF (V4R0)



Global 4-km GVF (V3R0)



- Five months of the global 1-km GVF dataset were generated by the new version of the GVF code V4r0 for testing and verification.
- The new global 1-km GVF map showed consistency with the 4-km version of the map.

1-km GVF statistics (V4R0)

| Area | Ecosystem | lon_W | lon_E | lat_S | lat_N | num_pixels | min_gvf | max_gvf | mean_gvf | std_gvf | perc_opt_ret |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Global | global | -180.0 | 180.0 | -40.0 | 40.0 | 92968331 | 1.0 | 100.0 | 26.2 | 36.9 | 55.7 |
| E-Sahara(LYBIA) | desert | 23.0 | 24.0 | 28.0 | 29.0 | 12544 | 1.0 | 6.0 | 2.4 | 0.8 | * |
| Great-Sandy(AUS) | semi-desert | 125.0 | 126.0 | -21.0 | -20.0 | 12656 | 1.0 | 26.0 | 8.4 | 3.6 | * |
| Colorado(USA) | steppe | -103.0 | -102.0 | 36.0 | 37.0 | 12656 | 1.0 | 98.0 | 13.0 | 15.8 | * |
| Illinois(USA) | crops | -89.0 | -88.0 | 39.0 | 40.0 | 12544 | 1.0 | 62.0 | 14.8 | 6.5 | * |
| Kentucky(USA) | broad_leaf_forest | -85.0 | -84.0 | 36.0 | 37.0 | 12656 | 1.0 | 59.0 | 23.7 | 6.1 | * |
| Oregon(USA) | coniferous_forest | -123.0 | -122.0 | 43.0 | 44.0 | 12531 | 1.0 | 100.0 | 32.6 | 15.7 | * |
| Amazon(BRAZIL) | tropical_forest | -63.0 | -62.0 | -3.0 | -2.0 | 12544 | 34.0 | 100.0 | 76.0 | 10.1 | * |

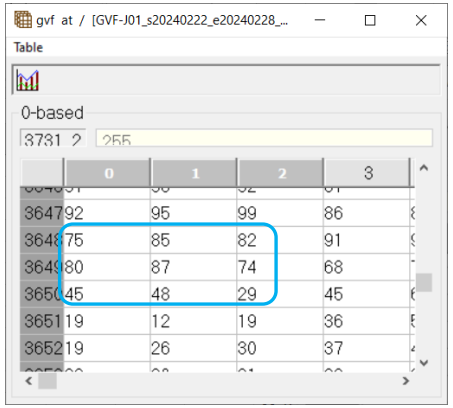
4-km GVF statistics (V3R0)

| Area | Ecosystem | lon_W | lon_E | lat_S | lat_N | num_pixels | min_gvf | max_gvf | mean_gvf | std_gvf |
|---|---|---|---|---|---|---|---|---|---|---|
| Global | global | -180.0 | 180.0 | -40.0 | 40.0 | 5876384 | 1.0 | 100.0 | 31.7 | 28.1 |
| E-Sahara(LYBIA) | desert | 23.0 | 24.0 | 28.0 | 29.0 | 841 | 1.0 | 4.0 | 2.3 | 0.7 |
| Great-Sandy(AUS) | semi-desert | 125.0 | 126.0 | -21.0 | -20.0 | 841 | 1.0 | 21.0 | 8.4 | 2.9 |
| Colorado(USA) | steppe | -103.0 | -102.0 | 36.0 | 37.0 | 841 | 1.0 | 79.0 | 13.0 | 11.4 |
| Illinois(USA) | crops | -89.0 | -88.0 | 39.0 | 40.0 | 841 | 6.0 | 29.0 | 14.4 | 4.7 |
| Kentucky(USA) | broad_leaf_forest | -85.0 | -84.0 | 36.0 | 37.0 | 841 | 13.0 | 44.0 | 24.7 | 4.8 |
| Oregon(USA) | coniferous_forest | -123.0 | -122.0 | 43.0 | 44.0 | 841 | 1.0 | 83.0 | 33.3 | 13.6 |
| Amazon(BRAZIL) | tropical_forest | -63.0 | -62.0 | -3.0 | -2.0 | 812 | 53.0 | 95.0 | 74.3 | 7.0 |

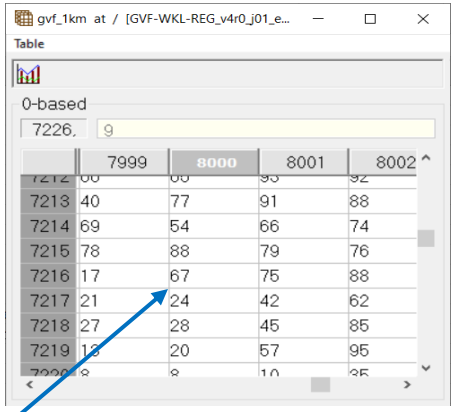
- The maximum GVF values of the global 1-km GVF is higher than those of the 4-km version due to higher spatial resolution
- The mean GVF values of the two version are comparable
- The value of the percentage of valid retrieval pixels was added into the GVF statistical text file as output for future use of a method to monitor GVF production in the NCCF production monitoring system.

Pixel level verification

Before aggregation (0.003-degree) GVF



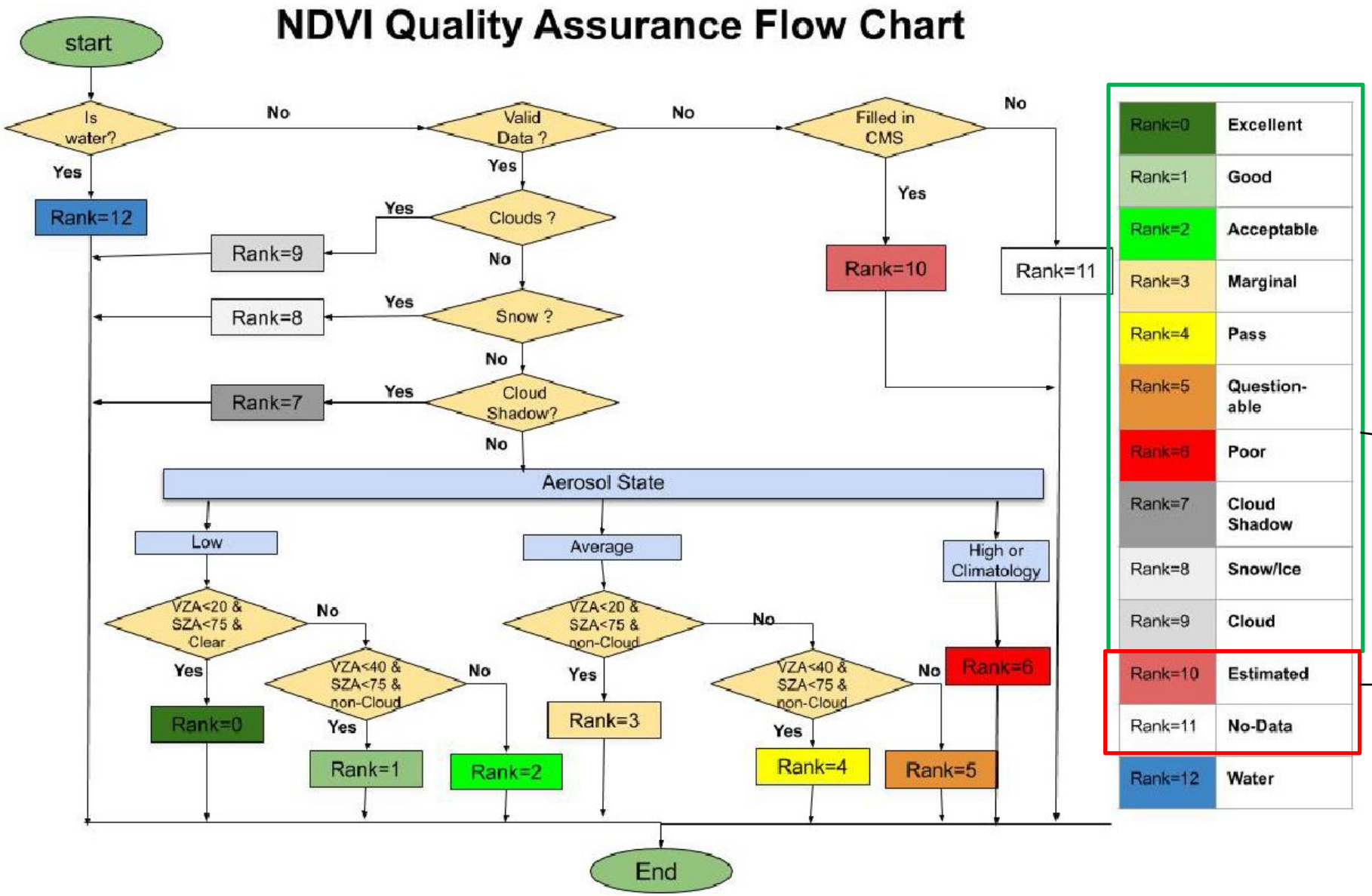

After aggregation (0.009-degree) GVF




Average GVF over the 3*3 window is 67

- The values of the new global 1-km GVF were verified and found no problem over land
- A small difference in the GVF aggregation method was found between the new and the previous version of code, which will be corrected.

# Valid retrieval categorization by VI quality flag value



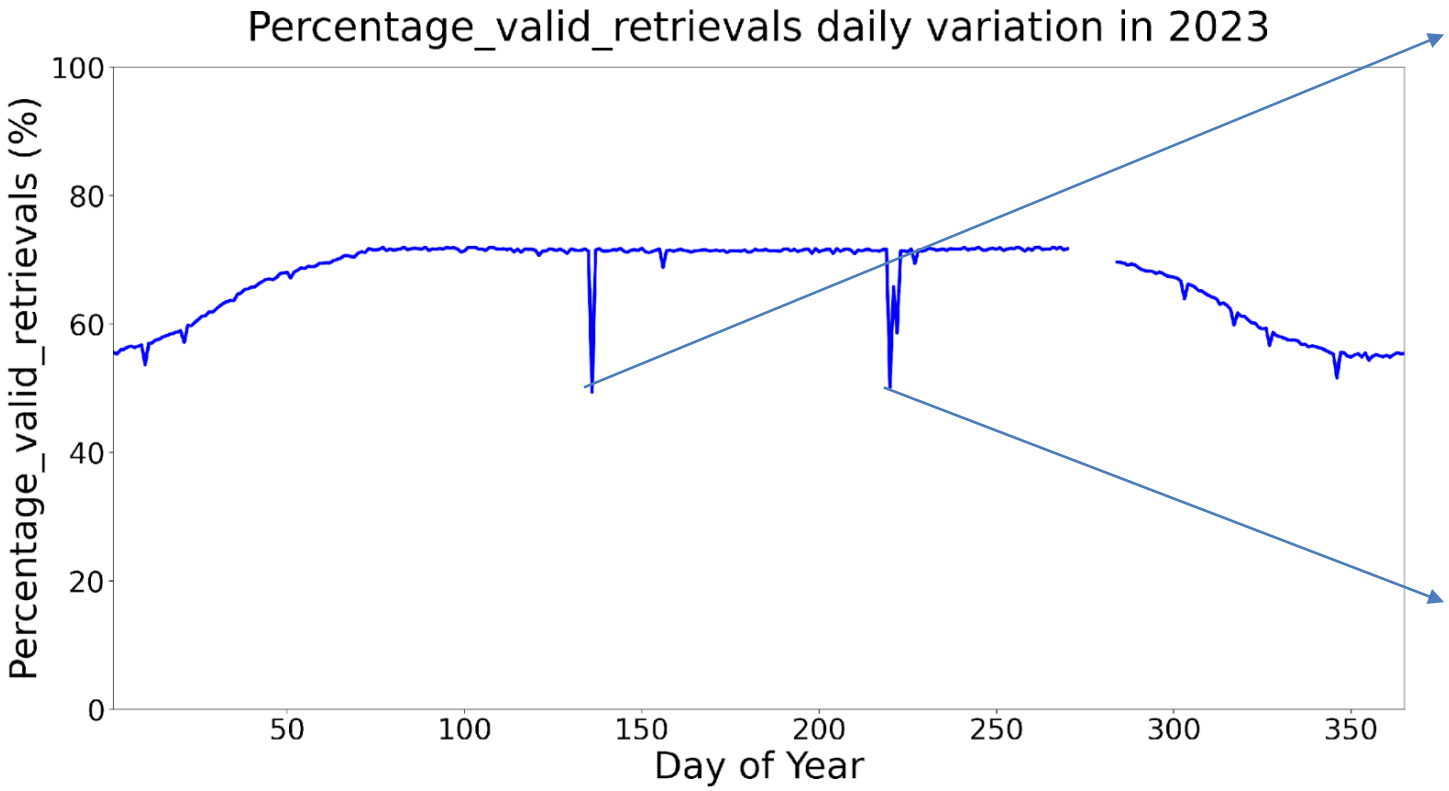

For NCCF production, a fraction of valid retrievals below a threshold will set off a data quality alert.

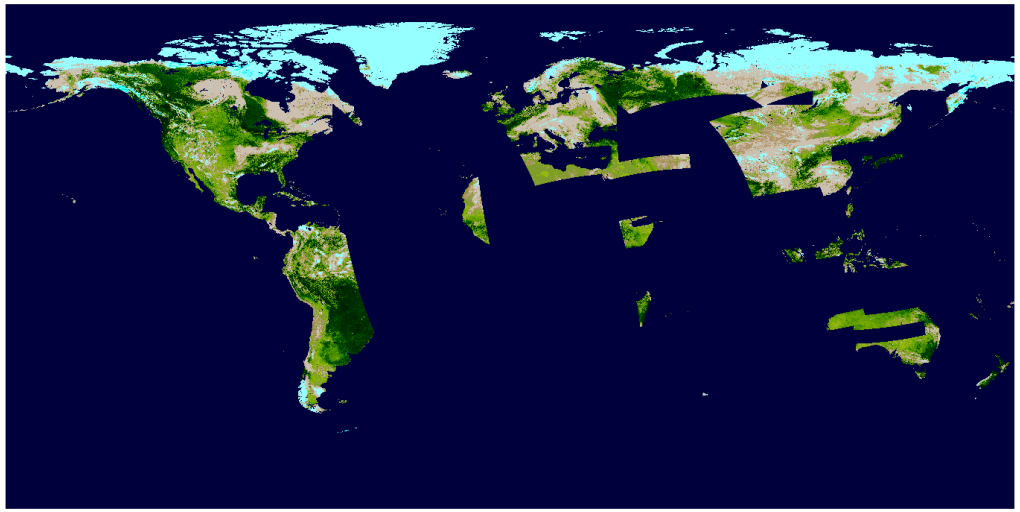
Valid retrieval

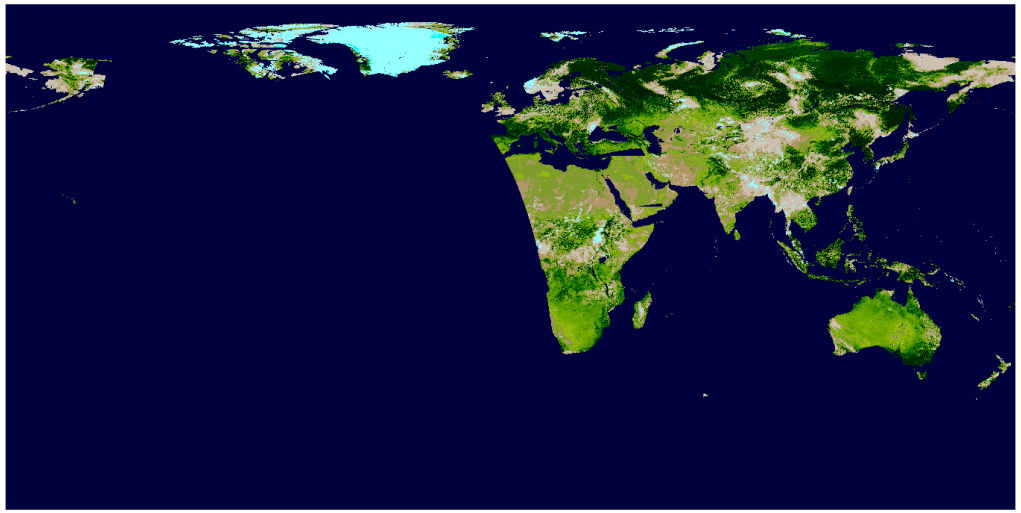
Invalid retrieval

# VI valid retrieval fraction for NCCF monitoring

- 55% will be taken as the threshold for NCCF monitoring.
- The only dates in 2023 with valid retrievals below this threshold had quality issues (missing data).





# VIIRS Imagery

*February 2024*

## *Accomplishments / Events:*

- Reviewed NOAA-21 VIIRS Imagery EDR following Mid-Mission Outgassing
- Team members visited NWS Cheyenne and discussed satellite applications in NWS operations, including uses of VIIRS Imagery
- Bill Line presented the 2/22 Satellite Book Club
  - "Tracking Low Clouds and Fog in NOAA Satellite Imagery"
- Blog Posts with VIIRS Imagery
  - 27 Feb 2024 Satellite Imagery of Fires, Thunderstorms, and Dust
- 29 VIIRS Imagery Posts on CIRA Social Media this Month. A few posts:
  - NCC Imagery of large Texas wildfires– 18.2K views
  - NCC Imagery of North America Aurora– 10K views
  - I1 Imagery of sea ice movement in the Ross Sea – 2.1K 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:***

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

## *Highlights: Image of the Month*

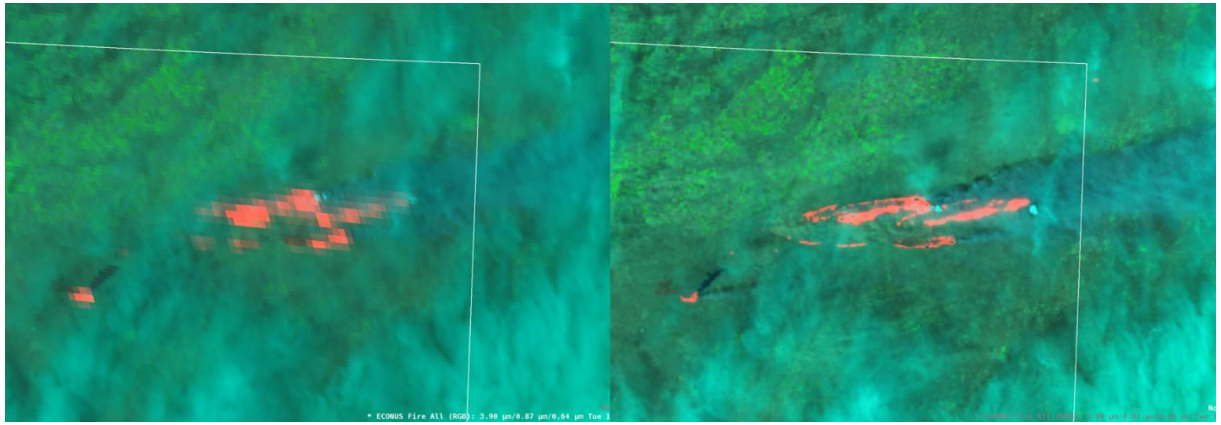


Figure: 27 Feb 2024 GOES-East (left) and VIIRS (right) Day Fire RGB highlighting the benefits of leveraging VIIRS alongside GOES during wildfire situations. From blog post here.

# VIIRS SDR

Feb 2024

## Accomplishments / Events:

- Supported VIIRS SDR recovery from the NOAA-20 (N20) SCP Reset anomaly on 2/3/2024: detected VIIRS engineering telemetry issue that caused incorrect quality flagging for LWIR bands; created, tested, and delivered for deployment in the IDPS operations an updated RADIOMETRIC-PARAM-V4 LUT that provided a quick fix until the VIIRS CP reset conducted on 2/20/2024 resulted in a more permanent solution
- NOAA-21 (N21) VIIRS 2nd mid-mission outgassing (MMOG-2) successfully conducted on Feb. 26-28, 2024: S/MWIR degradation stopped with the radiometric gains reversed to the initial values; confirmed full recovery of VIIRS SDR products after the solar calibration automated analysis in IDPS was disabled by creating, testing, and delivering for deployment in the IDPS operations an updated CAL-AUTOMATE LUT
- Delivered for deployment in the IDPS operations the 12th (out of 12) N21 VIIRS SDR DNB STRAY-LIGHT-CORRECTION LUT as well as the updated N21, N20 and NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired around the new moon on 2/9/2024
- Assisted in scheduling and analyzed data from N20, N21, and NPP VIIRS lunar calibration on 2/19/2024: data aligns well with long-term trends and exhibits consistency

## 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.*

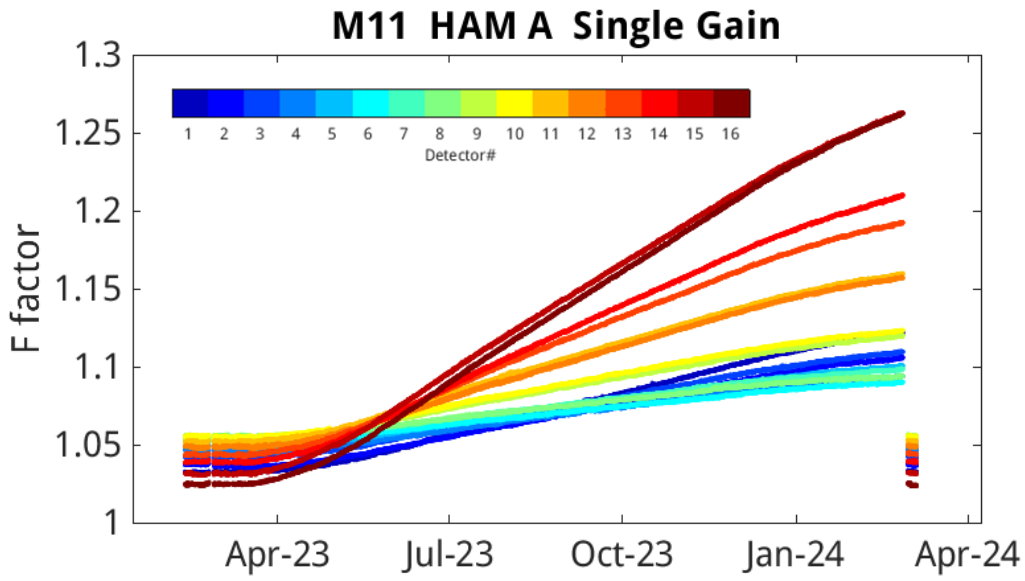
## Issues/Risks:

J3/J4 VIIRS granule size change

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Complete SNPP VIIRS SDR 2012-2020 reprocessing delivery to CLASS | Dec-23 | Dec-23 | Oct-23 | |
| SNPP and NOAA-20 VIIRS intermediate recalibration | Sep-24 | Sep-24 | | |
| JPSS-3 VIIRS pre-launch characterization report | Apr-24 | Apr-24 | | |
| JPSS-3 VIIRS SDR initial pre-launch LUTs | Jun-24 | Jun-24 | | |
| Monthly lunar calibration (predictions and analyses) | Jul-24 | Jul-24 | | |
| Monthly delivery of VIIRS DNB calibration LUTs | Sep-24 | Sep-24 | | |
| Monthly delivery of N21 VIIRS DNB straylight LUTs | May-24 | May-24 | | |
| Geolocation monitoring using CPM (NPP, N20, N21) | Sep-24 | Sep-24 | | |
| N21 on-orbit calibration LUT development | Sep-24 | Sep-24 | | |
| Delivery of VIIRS SDR RSB and TEB calibration LUTs to mitigate degradation | Sep-24 | Sep-24 | | |

## Highlights:

N21 VIIRS SDR RSB calibration scaling (F) factors before and after the MMOG-2 on Feb. 26-28, 2024: band M11 is shown as an example of the gain (1/F) recovery



# Volcanic Ash

*February, 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 and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.
- The Volcanic Ash science team concluded NOAA-21 volcanic ash validation efforts and the NOAA-21 Volcanic Ash EDR was declared at Full Maturity in February, retroactive to March 2023.
- The science team leveraged the selection of SO2-free days for the VIIRS+CrIS background spectra generation and utilized IASI data for the same SO2-free days to calculate IASI SO2-free background spectra. The included figure shows a new comparison of CrIS and IASI VOLCAT SO2 retrievals for the Hunga Tonga SO2 cloud from January 16, 2022. Given the favorable comparisons, the work will now begin on including the AVHRR+IASI capability into the VOLCAT Fortran code.
- VOLCAT VIIRS volcanic ash plume identification and extraction work is an enhancement to the VOLCAT methodology. This work will continue through much of FY24. Most recent progress toward this goal is the needed VOLCAT modifications have been made to enable output of VOLCAT metrics for missed detections and non-ash clouds. 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.

## *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 | | VOLCAT enhancement (improved detection was deprioritized for validation work) will continue into much of FY24) |

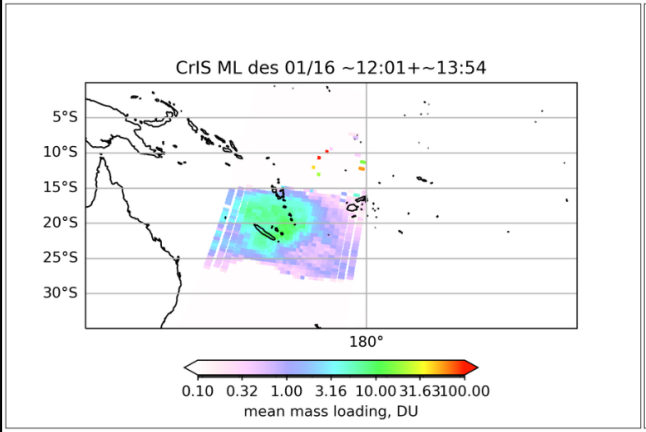
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

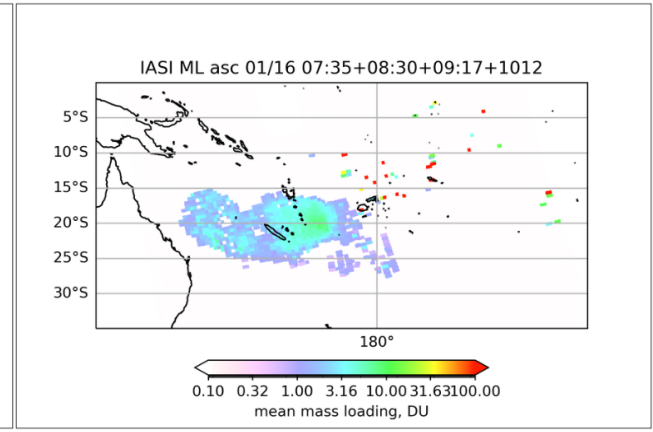
***Issues/Risks:***

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Develop updated user training material | May-23 | May-23 | May-23 | |
| Improve VIIRS volcanic ash plume identification and extraction | Jun-23 | Sep-24 | | |
| Improve near source VIIRS volcanic ash height information | Jul-23 | Jul-23 | Jul-23 | |
| NOAA-21 Volcanic Ash Beta Maturity | Sept-23 | Aug-23 | Aug-23 | |
| NOAA-21 Volcanic Ash Provisional Maturity | Oct-23 | Aug-23 | Aug-23 | |
| Maintain and monitor quality of volcanic ash EDR and JPSS-based products in VOLCAT | Sep-23 | Sep-23 | Sep-23 | |
| NOAA-21 Volcanic Ash Full Maturity | Mar-24 | Mar-24 | Feb-24 | |

## *Highlights:*

*VOLCAT SO2 mass retrievals using CrIS (left) and IASI (right) for January 16 2022 Honga Tunga eruption. The IASI results are using the newly created IASI-based background spectra. The IASI results compare very favorably with the CrIS results and lend confidence in the quality of the newly created background data.*



# Ocean Color

*February 2024*

## *Accomplishments / Events:*

- Prepared information for Office of Common Services FY24 planned activities related to sustainment in preparation for STAR/PPM TTA.
- Finalized Look-Up Tables needed to achieve provisional status for NOAA-21 EDR and prepared for the related provisional maturity review presentation.

| Milestones | Original Date | Forecast Date | Actual Completion Date | Variance Explanation |
|---|---|---|---|---|
| Ocean Color J2 Provisional Code delivery to ASSIST | Apr-2024 | Apr-2024 | | |
| Ocean Color Beta Maturity | Nov-2023 | Mar-2023 | | |
| Ocean Color Provisional Maturity | Mar-2024 | Mar-2024 | | |
| Ocean Color Validated Maturity | Jul-2025 | Jul-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***