NOAA JPSS Monthly Program Office

AMP/STAR FY24 TTA

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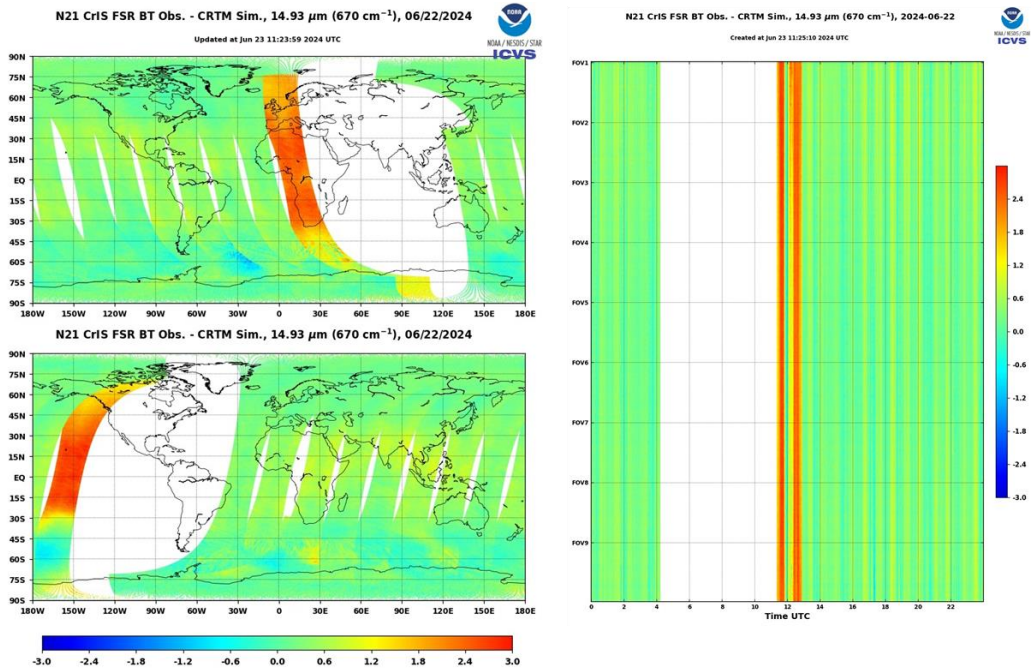
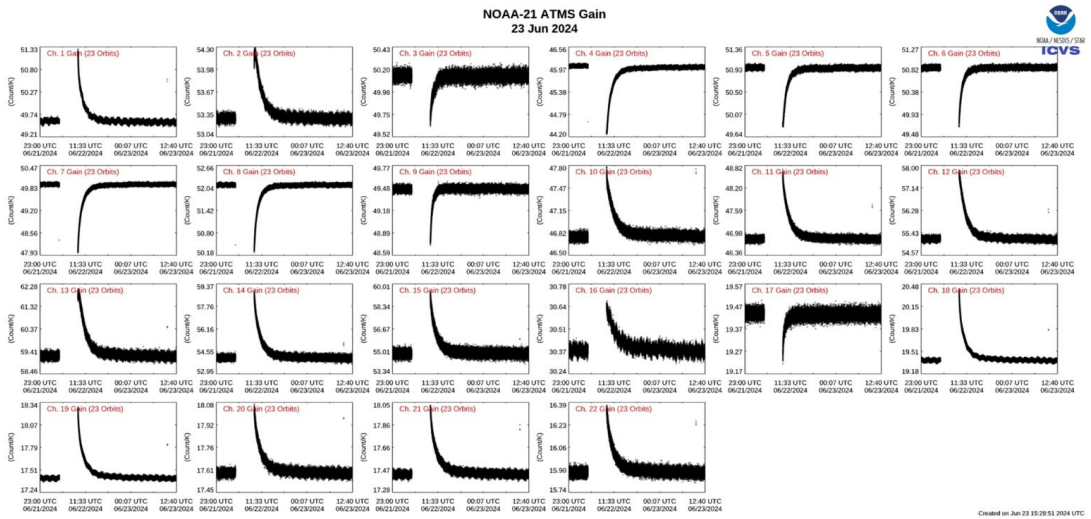
Ingrid Guch, Acting JPSS STAR Program Manager

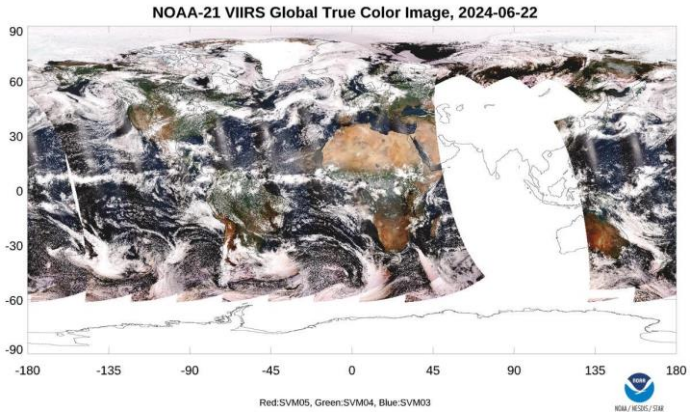
July 22, 2024

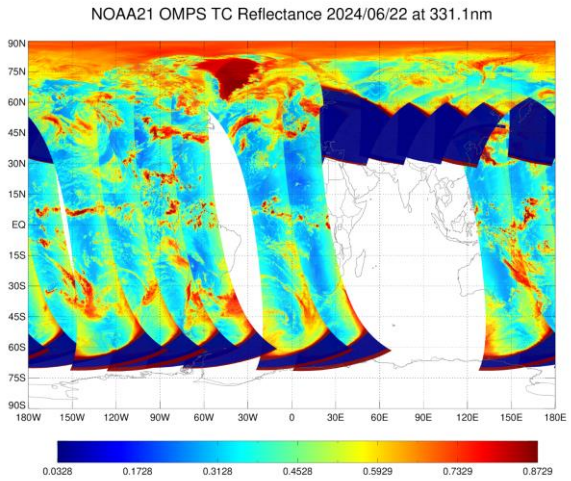
Highlights from the Science Teams (June 2024)

Science teams analyzed NOAA-21 Safe Mode and recovery with OSPO and LEO



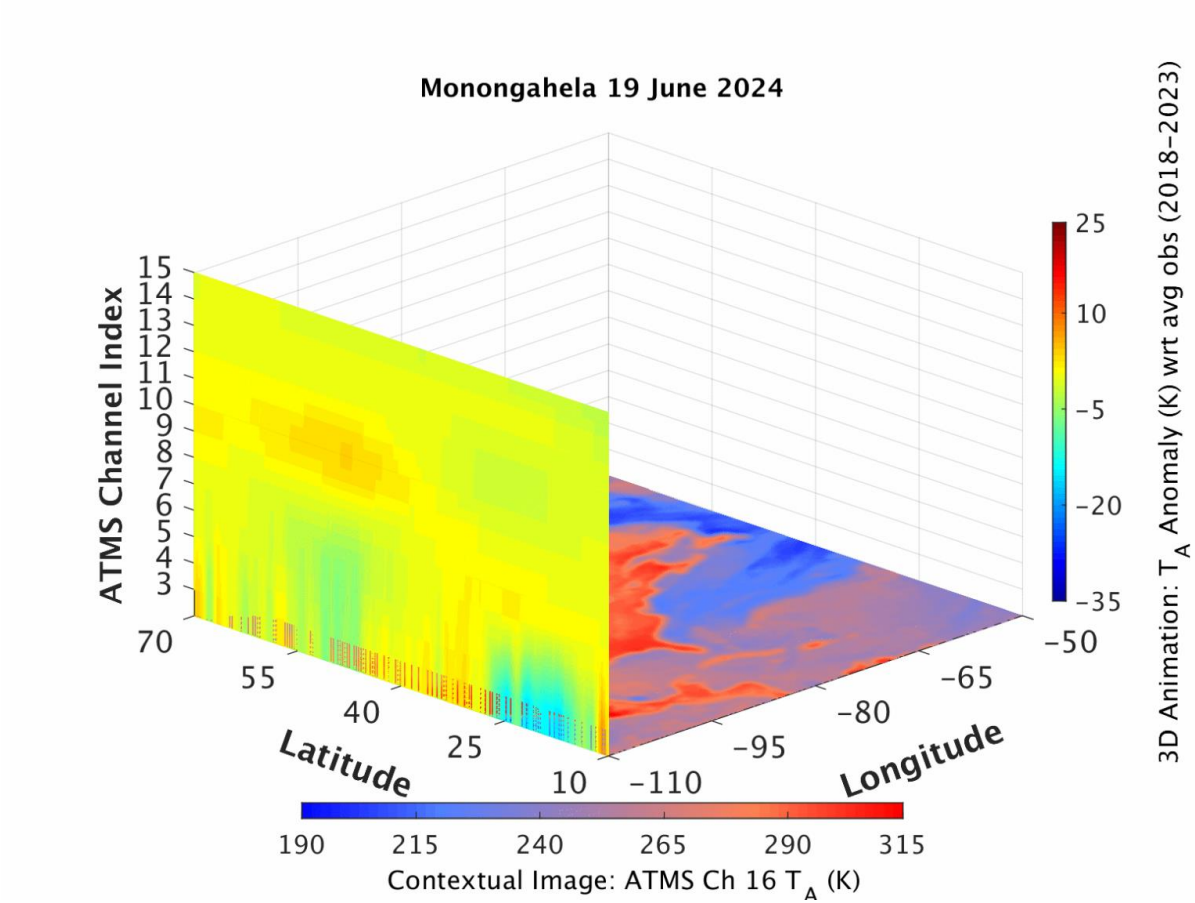






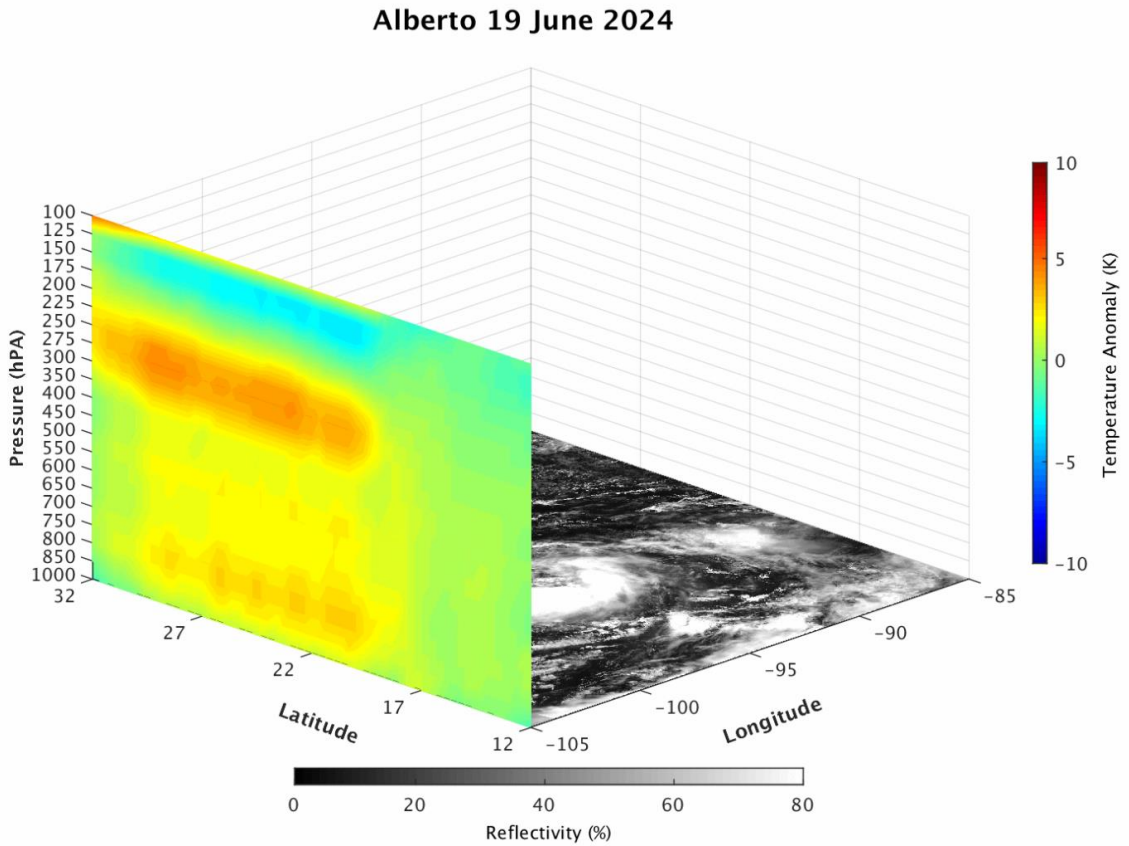
Highlights from the Science Teams (June 2024)

ICVS Monitored Extreme Events - Heat Dome over Eastern US
Anomalously high temperatures extend into upper troposphere



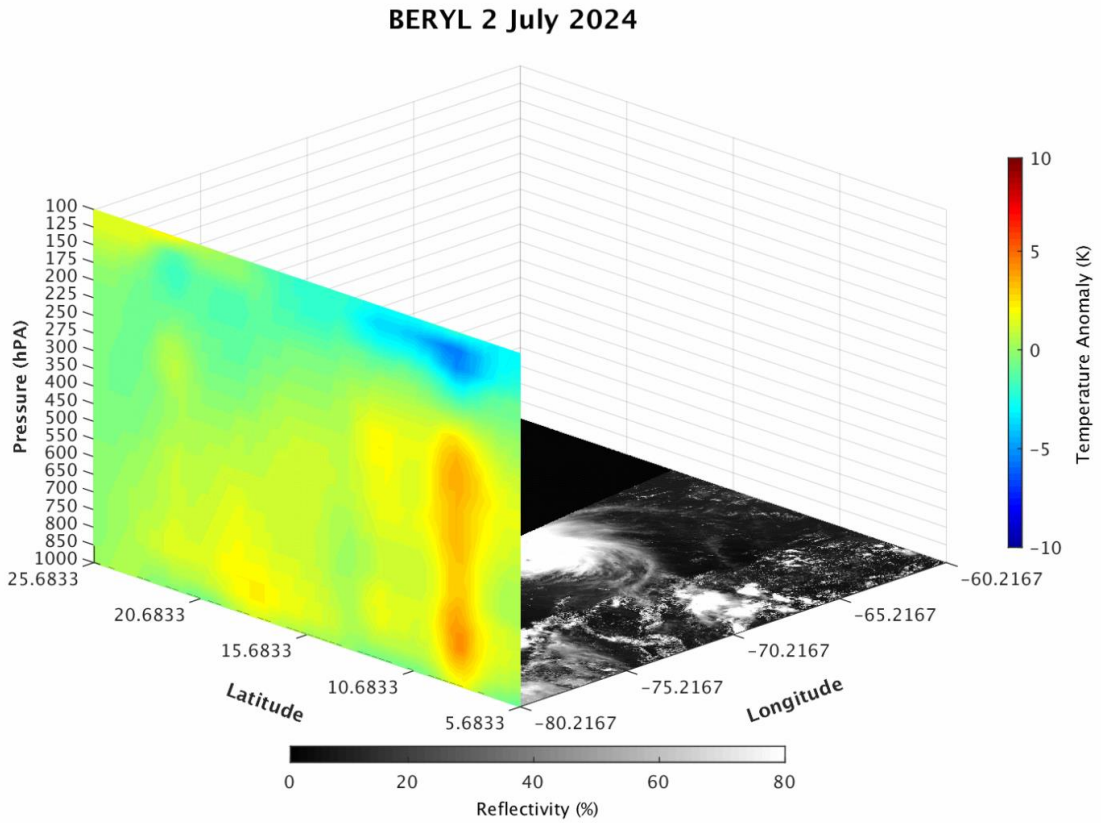
Highlights from the Science Teams (June 2024)

ICVS Monitored Extreme Events - Tropical Storms
Tropical Storm Alberto makes landfall in Mexico



Highlights from the Science Teams (June 2024)

ICVS Monitored Extreme Events - Hurricanes
Hurricane Beryl as category 5 storm just off northern shore of South America



Highlights from the Science Teams (June 2024)

Record warmth seen in STAR Mean Layer Temperature CDR

Record global warming found from onset of 23/24 El Nino (July 2023) to May 2024: Such excessive warming has stimulated extensive investigation from the national/international climate community on its underlying causes.

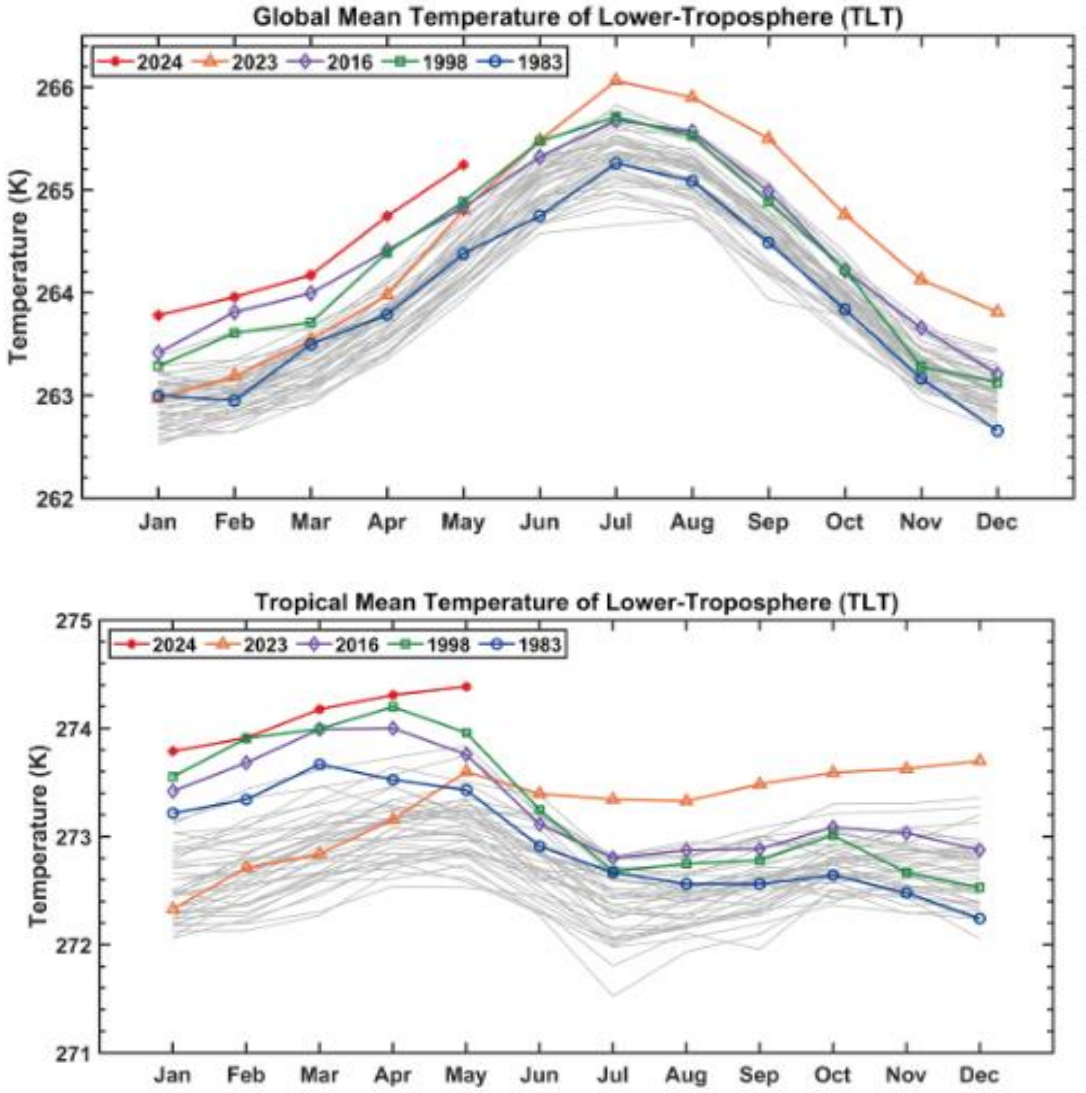


Figure 1. Seasonal cycles of the Temperature of Lower-Troposphere (TLT, roughly peaking at 3 km above the earth's surface) for the time period from 1981 to present. Each curve in grey color represents one year during this period, and the colored curves represent El Niño years as a reference for the 2023-2024 El Niño years. Upper figure is Global average; Lower figure is Tropical average (20°S- 20°N). July 2023 was the onset month for the 2023-2024 El Niño year. Data source: STAR V5.0 Mean Layer Temperature climate data record (CDR).

Highlights from the Science Teams (June 2024)

Investigating methodology to provide Polar Winds with greater coverage and smaller time differences

Tandem JPSS winds for SWIR band are now generated: Currently, VIIRS single band Atmospheric Motion Vectors (AMVs) from the shortwave-infrared band (SWIR, M11, 2.2 µm) is being prepared for operational implementation in the near future. The next logical step was to expand the use of SWIR band into the tandem orbit setting, where successive orbits of NOAA-20 and -21 satellites are used to develop AMVs with greater coverage and smaller time differences, which should result in a more accurate winds product. Recent examples of the experiment product are shown in Figure 1.

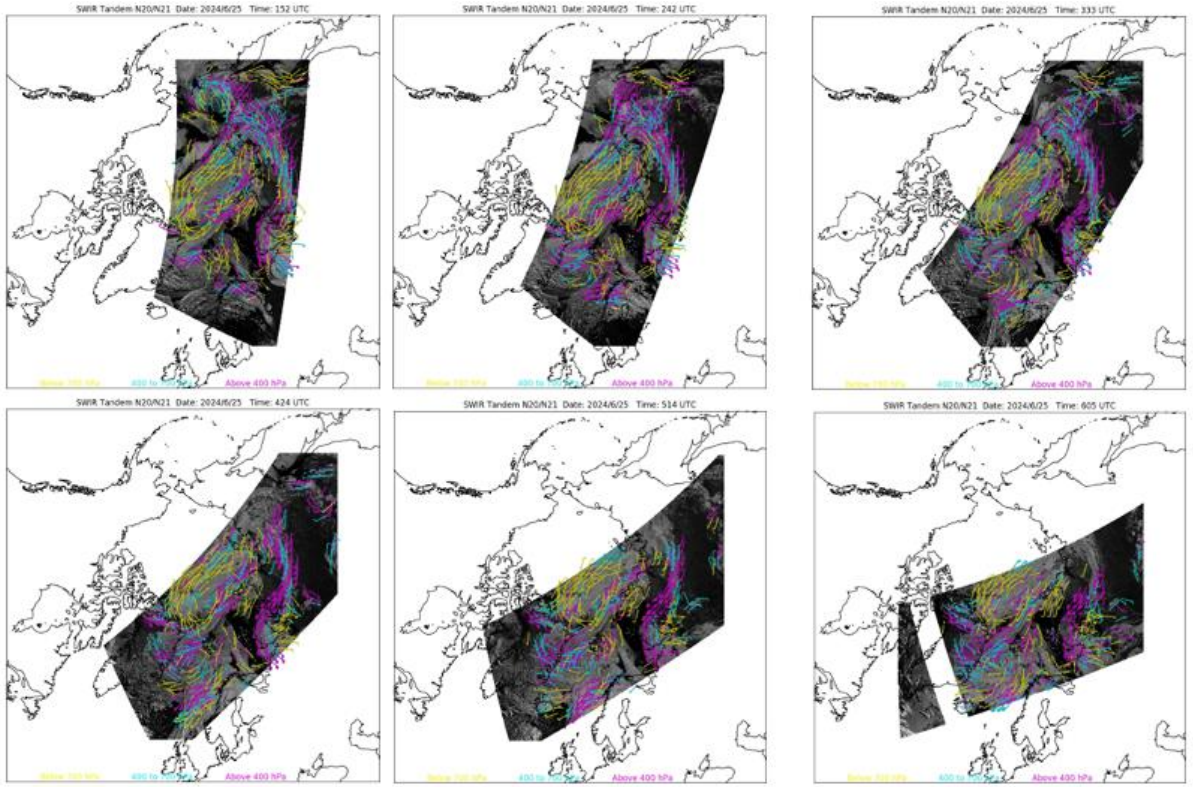
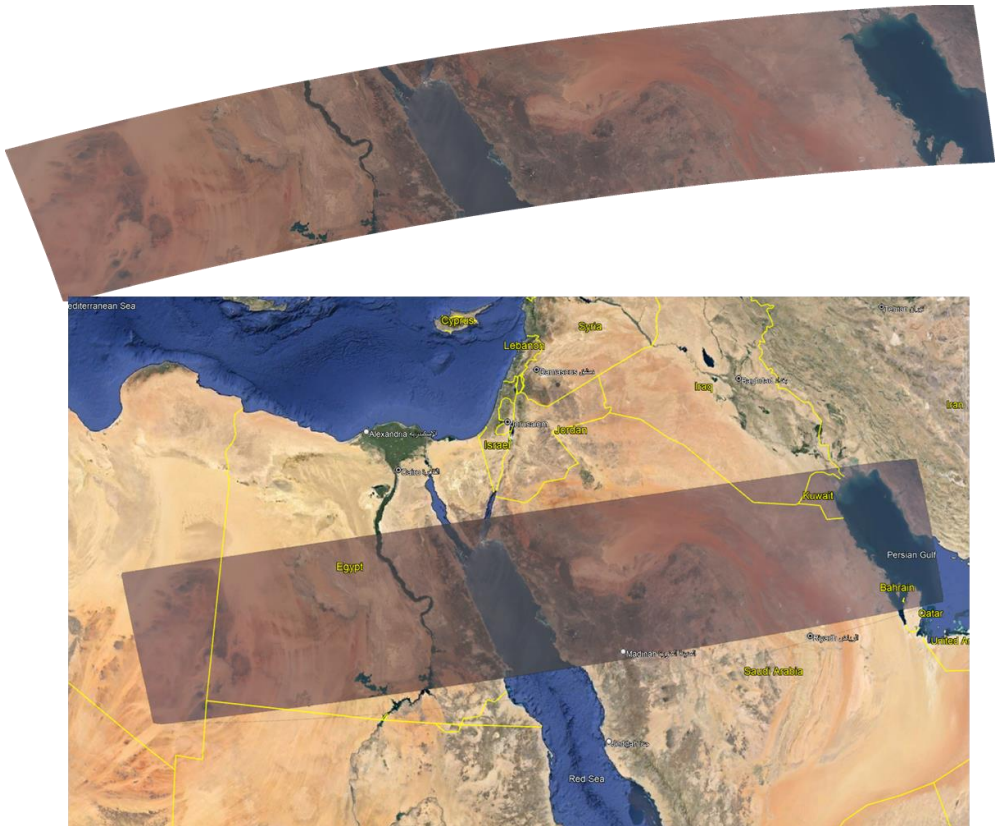


Figure 1: VIIRS JPSS (NOAA20/21) Tandem SWIR AMVs overlaid with 2.2 µm reflectances from 25 June 2024 over the Arctic region in polar stereographic projection. Near polar crossing times starting from upper-left and ending at lower-right: 01:52, 02:42, 03:33, 04:24, 05:14 and 06:05 UTC.

Highlights from the Science Teams (June 2024)

Investigating methodology to improve visualizations related to navigation anomalies

- ICVS-VIIRS worked to establish the capability of visualizing high resolution VIIRS RGBs that could be potentially very useful for future anomaly assessment such as the recent NPP VIIRS GPS reset issue and the geolocation displacement assessment. The following figure shows the high resolution NPP VIIRS RGB (top) taking a granule on 06/03 for example, and the overlaid image on Google Earth that can be used more interactively for visualization of any potential geolocation deviations by zooming in very closely at the coastlines.



The high resolution VIIRS RGB for NPP on 06/03/2024 (top) and the corresponding RGB overlay in the Google Earth Pro (bottom) showing the comparison of the NPP VIIRS images and the underneath coastline and terrain maps from Google Earth itself.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
06/04/2024	GAASP Snow v1-0 Final CCAP to NCCF for integration.	NCCF
06/04/2024	Veg Health v1-1 Patch CCAP to NCCF for integration. Update was to version/revision numbers of the file names from v2r01 to v2r02.	NCCF

Post 6/4/2024 will be added in August monthly report

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, 03/12/24, 03/19/24, 03/26/24, 04/02/24, 04/09/24, 04/16/24, 04/23/24**, 04/30/24, 05/07/24, 05/14/24, 05/21/24, 05/28/24, 06/04/24**
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, 03/12/24, 03/19/24, 03/26/24, 04/02/24, 04/09/24, 04/16/24, 04/23/24, 04/30/24, **05/07/24, 05/14/24, 05/21/24, 05/28/24, 06/04/24**
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, 03/12/24, 03/19/24, 03/26/24, **04/02/24, 04/09/24, 04/16/24, 04/23/24, 04/30/24 05/07/24, 05/14/24, 05/21/24, 05/28/24, 06/04/24**
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**,** 03/12/24, 03/26/24**,** 04/08/24, 04/23/24, **05/07/24, 05/21/24, 06/04/24**
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**,** 03/05/24, 03/19/24, 04/02/24, 04/16/24, 04/30/24, **05/14/24, 05/28/24**
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**,** 03/05/24, 03/19/24, 04/02/24, 04/16/24, 04/30/24, **05/14/24, 05/28/24**
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, 03/18/24, 4/15/24, **5/13/24**
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, 03/18/24, 4/15/24, **5/13/24**
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, 03/18/24, 4/15/24, **5/13/24**
NOAA-21	Monthly VIIRS DNB Straylight correction update	10/23/23, 11/21/23, 12/18/23, 01/22/24**,** 02/15/24, 03/18/24, 4/15/24**, 5/14/24**

Post 6/4/2024 will be added in August monthly report

NOAA-21 Cal/Val Maturity Reviews

June 2024 Maturity Reviews			
Product	Maturity Review	Review Date	Review Panel Recommendations
VIIRS Annual Surface Type	Beta/Provisional	06/13/24	Validated
Snowfall Rate			Validated based upon continued strong performance since declared Provisional

All JSTAR Products at Provisional or Validated Maturity level, completing FY24 Q3 milestone

September 2024 Maturity Reviews			
Product	Maturity Review	Review Date	Review Panel Recommendations
OMPS TC Ozone EDR (V8TOz)	Validated	09/26/24	
OMPS NP Ozone EDR (V8Pro)	Validated	09/26/24	
OMPS Limb SDR and EDR	Validated	09/26/24	

JSTAR Code/LUT/Product Deliveries

5/08/2024	NOAA -21 OMPS NP stray light LUT correction for MX10 format - ADR 10827 - fast track

Date	Remaining J2-Ready DAPs to NCCF
March, 2023 (Delayed to Q4 2024)	Ancillary data preprocessing • ASSISTT delivered LP preliminary pre-processor CCAP for SCR (Delivered to OSPO) on 9/29. • 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. As of June 2024 pIPT meeting notes, the ASSISTT team intends to combine science algorithm and ancillary data processor deliveries, and include GFS to binary processing into the final CCAP (**set for August 1, 2024**). • Science Team Deliveries ○ Science team V2.7LIMB for SNPP was delivered to ASSISTT on December 19, 2023 ○ Science team delivered for NOAA-21 (2.7LIMB N21 delivery to ASSISTT) **March 18, 2024.** • ASSISTT Deliveries ○ NDE Migration & J2 Provisional RDR to L2 CCAP Preliminary CCAP target date has been pushed to June 14, 2024 (software code review). ○ Final CCAP target date is set for **August 1**, 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	Delivered on March 28, 2024	
VOLCAT (Phase 1) NCCF implementation	Dec-23	Sep-24	Moved to **Sept 12,** 2024	
Cloud Mask J2 Validated; Separate unit for Ancillary files to be included	Jan-24	Sep-24	Moved to **September 20,** 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	July-24	**On-going**	**PMRs completed for SDR teams and have started for EDR teams**
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	TBD		Project descoped due to cloud readiness
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	Delayed due to contract laps	Currently NOAA-21 AF (EFIRE), MiRS, VIIRS I5 and True Color images are in JSTAR Mapper.
Images of the Month	Monthly	Monthly		

FY24 STAR JPSS Cal/Val Maturity Reviews

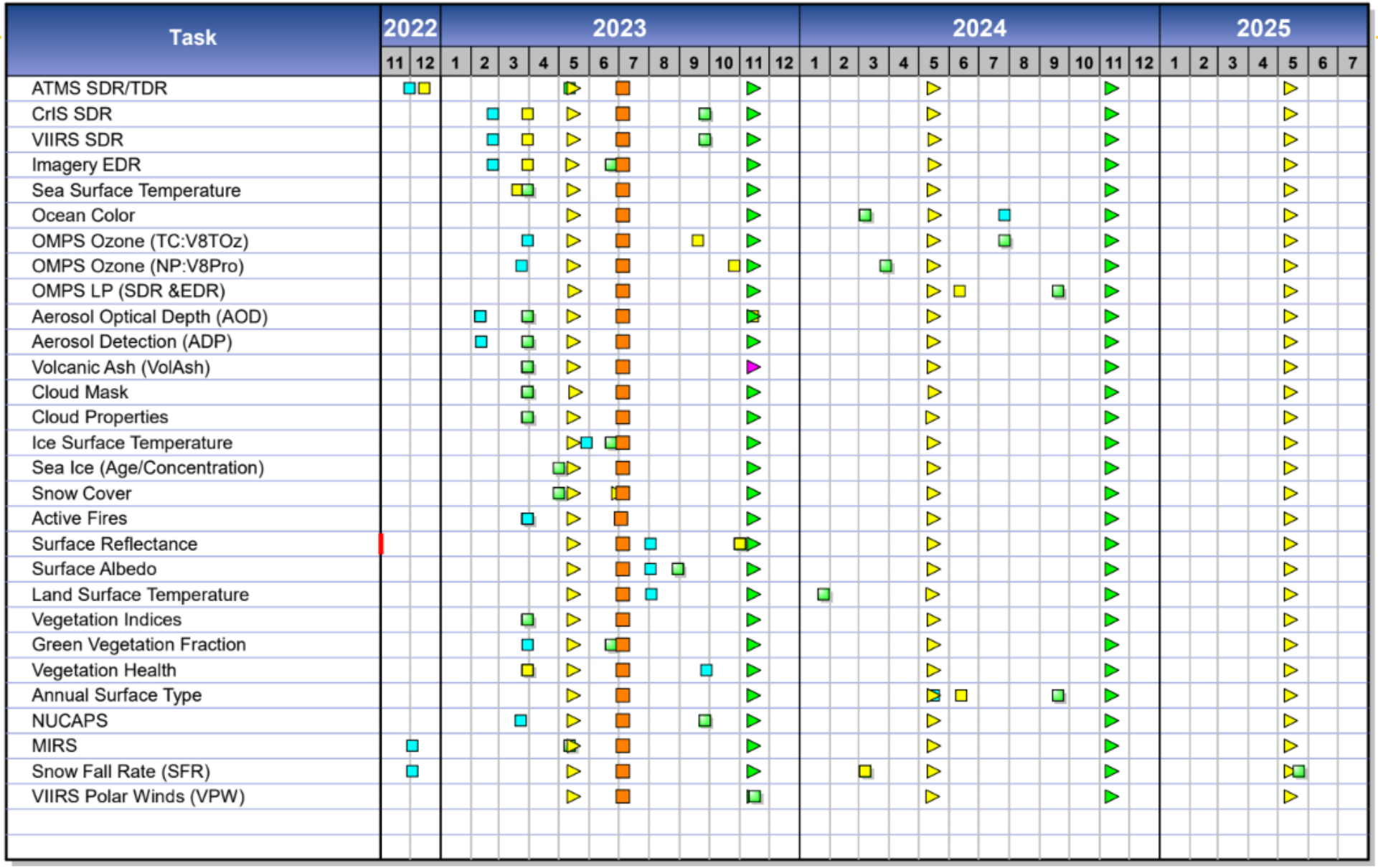
Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
OMPS SDR (NP & TC Validated)	Mar-24	Mar-24	**Attained Validated status – effective date depends on ADR10825 Solar Flux implementation planned for April 2024**	
Clouds (V: Mar-24)	Mar-24	Mar-24	Provisional Review held (except for DCOMP and NCOMP): October 26, 2023; Attained Provisional effective March 30. **DCOMP and NCOMP Provisional Review occurred virtually on December 4, 2023,** and attained **Validated status** effective March 30.	
Aerosol AOD (V: Jun-24)	Jun-24	Jun-24	Attained **Validated** status effective March 30, 2023	
Aerosol ADP (V: Jun-24)	Jun-24	Jun-24	Attained **Validated** status effective March 30, 2023	
Volcanic Ash (V: Mar-24)	Aug-23	Aug-23	Attained **Validated** status effective March 30, 2023	
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow; V: Feb-24 (SI & Binary Snow); V (other) :Jul-24	Jul-24	Jul-24	Ice Thickness/Age: Attained **Validated** status effective May 1, 2023. Snow Cover & Fraction: Attained **Validated** status effective May 1, 2023. IST and Ice Concentration: Attained **Validated** status effective May 1, 2023.	
Active Fires (V: Jul-24)	Jul-24	Jul-24	Attained **Validated** status effective March 30,2023.	
LST/LSA/SR/GVF/VI (P: Jan-24; V: Jul-24 to Jan-25 FY25)	Sep-24	Sep-24	LST: Attained **Validated** status effective June 23, 2023. Surface Albedo: Attained **Validated** status effective August 30, 2023. Surface Reflectance: Attained **Validated** status effective Nov. 1, 2023. GVF, VI: Attained **Validated** status effective June 23, 2023.	
Vegetation Health (V: Apr-25 FY-25)	FY-25	FY-25	Attained **Validated** status effective March 30, 2023	
Ocean Color (B/P: Jan-24; V:Jul-25 FY25)	Jan-24	Sep-23	Attained **Validated** status effective March 1, 2024, to coincide with data availability from the NOAA CoastWatch program and MSL12 version 1.61 algorithm LUTs	
SST (V: Aug-24)	Aug-24	Aug-24	Attained **Validated** status effective March 20, 2023	
VPW (B/P: Jan-24; V: Mar-24)	Mar-24	Mar-24	**Attained Validated status effective November 16, 2023.**	
VFM (V: Jan-25)	FY-25	FY-25	Attained **Validated** status December 14, 2023.	
NUCAPS P: Jan-25; V: Mar-Jun-24)	Jun-24	Jun-24	Attained **Validated** status effective September 26, 2023.	
MiRS (V:Oct-24)	Oct-24	Oct-24	Attained **Validated** status effective May 12, 2023	
SFR (P: Feb-24; V: May-24)	May-24	May-24	Attained **Validated status- effective** upon v2r0 algorithm currently planned for PI17.	
OMPS NP EDR V8Pro & V8TOz & V8TOS (V: Mar-24)	Mar-24	Sep-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 is planned in Sept 2024. Validated review for OMPS NP V8Pro is planned for Sept 2024.**	
OMPS LP (B: Jan-24; P: Feb-24; V:Sep-24	Sep-24	Sep-24	**Beta and Provisional Review held on 04/25/2024.** The effective Provisional maturity date is upon implementation of the improved ephemeris handling software	

FY24 STAR JPSS Milestones

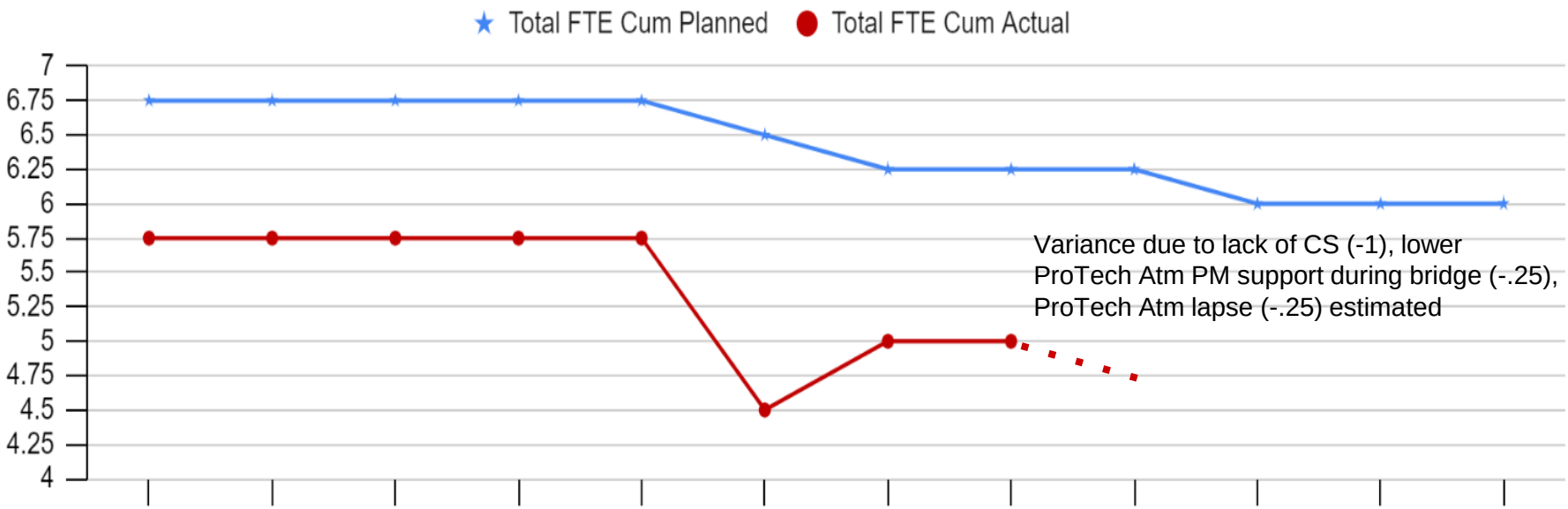
Operational/Program Support	Original Date	Forecast Date	Actual Completion Date
S-NPP: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	12/5/23, 12/12/23, 12/19/23, 01/03/24, 01/10/24, 01/17/24, 01/23/24, 01/30/24, 02/06/24, 02/13/24, 02/21/24, 02/27/24, 03/05/24, 03/12/24, 03/19/24, 03/26/24, 04/02/24, 04/09/24, 04/16/24, 04/23/24, 04/30/24, **05/07/24, 05/14/24, 05/21/24, 05/28/24, 06/04/24**
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, 03/12/24, 03/26/24, 04/0[illegible]/23/24, **05/07/24, 05/21/24, 06/04/24**
S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	[illegible]22/24, 02/15/24, 03/18/24, 4/15/24, **5/13/24**
NOAA-20: Weekly OMPS TC/NP Dark Table Updates	Weekly		[illegible]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, 03/12/24, 03/19/24, 03/26/24, 04/02/24, 04/09/24, 04/16/24, 04/23/24, 04/30/24, **05/07/24, 05/14/24, 05/21/24, 05/28/24, 06/04/24**
NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Wee[illegible]	[illegible]i-Weekly	11/28/23, 12/12/23, 01/03/24, 01/10/24, 01/23/24, 02/06/24, 02/21/24, 03/05/24, 03/19/24, 04/02/24, 04/16/24, 04/30/24, **05/14/24, 05/28/24**
NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains,	Monthly	Monthly	12/18/23, 01/22/24, 02/15/24, 03/18/24, **4/15/24, 5/13/24**
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, 02/13/24, 02/21/24, 02/27/24, 03/05/24, 03/12/24, 03/19/24, 03/26/24, 04/02/24, 04/09/24, 04/16/24, 04/23/24, 04/30/24, **05/07/24, 05/14/24, 05/21/24, 05/28/24, 06/04/24**
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, 03/19/24, 04/02/24, 04/16/24, 04/30/24, **05/14/24, 05/28/24**
NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	12/18/23, 01/22/24, 02/15/24, 03/18/24, 4/15/24, **5/13/24**
Mx builds deploy regression review/checkout (Mx9/MX10)			**Mx10: TTO Successfully Executed: May 23, 2024** MX11: STAR SOL Report Due: August, 2024 MX11: STAR Reviews: for I&T (August) ; OPS (September) (before TTO) MX11: TTO (September 19)

Post 6/4/2024 will be added in August monthly report

STAR JPSS Schedule: TTA Milestones



J-STAR FY24 Planned Program Management Staffing Plan v Actuals



J-STAR FTEs	Oct'23	Nov '23	Dec '23	Jan '24	Feb '24	Mar'24	Apr'24	May'24	Jun'24	Jul '24	Aug '24	Sep '24
Cum Planned (CS)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Cum Actual (CS)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cum Planned (WYE)	5.75	5.75	5.75	5.75	5.75	5.50	5.25	5.25	5.25	4.00	4.00	4.00
Cum Actual (WYE)	5.75	5.75	5.75	5.75	5.75	4.50	5.00	5.00	4.75			
Total FTE Cum Planned	6.75	6.75	6.75	6.75	6.75	6.50	6.25	6.25	6.25	6.00	6.00	6.00
Total FTE Cum Actual	5.75	5.75	5.75	5.75	5.75	4.50	5.00	5.00	4.75			

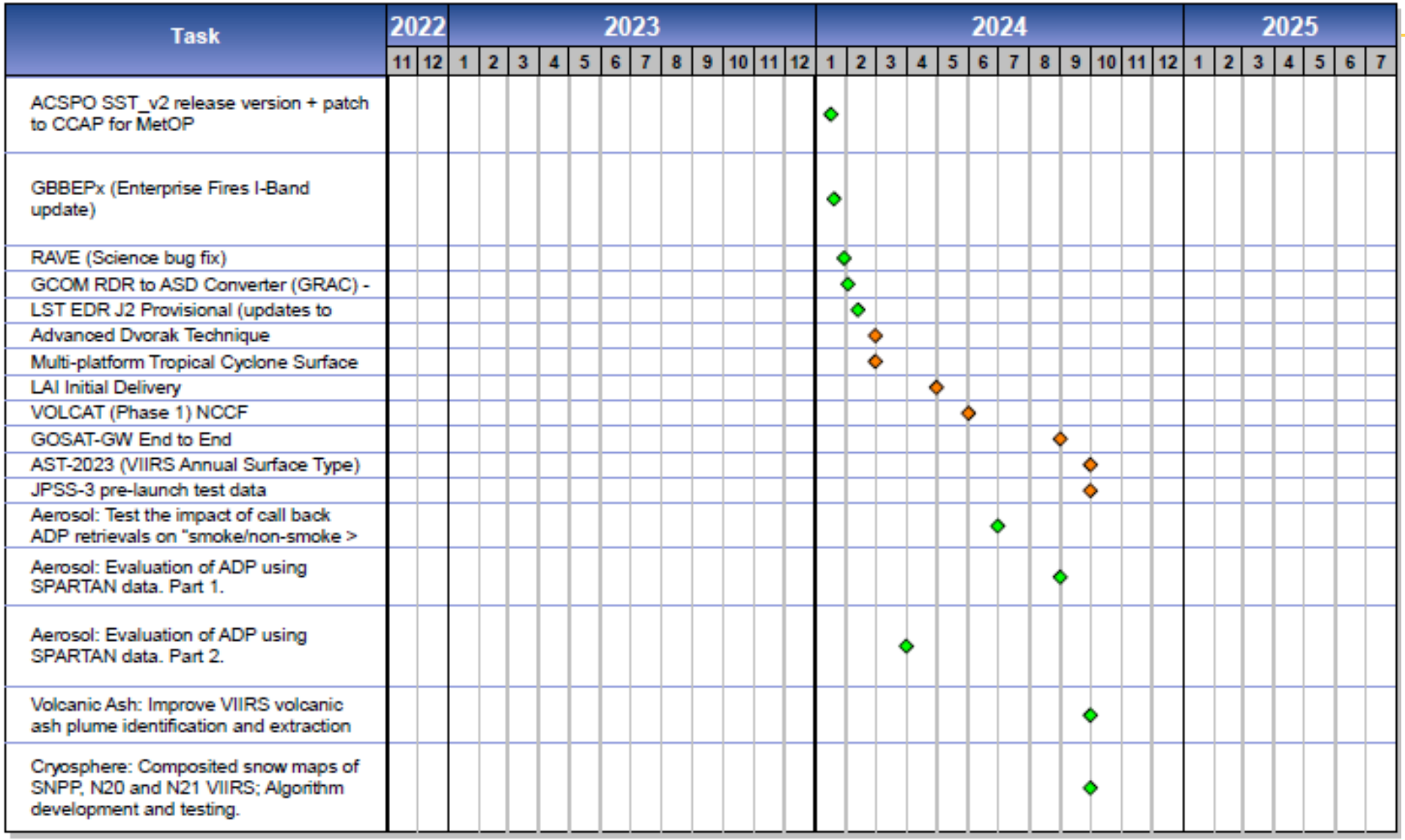
CS: Vacant (prev. Alisa Young)
WYE: Qingyuan Richard Zhang, Prasanjit Dash, Linden Wolf, *Murty Divakarla, Tom Atkins, Jeffrey Weinrich, Wei W. Li, Tess Valenzuela*

Administrative

Due to financial system issues, we do not have charts for expenditures.

Backup/Additional milestones

STAR JPSS Schedule: TTA Milestones

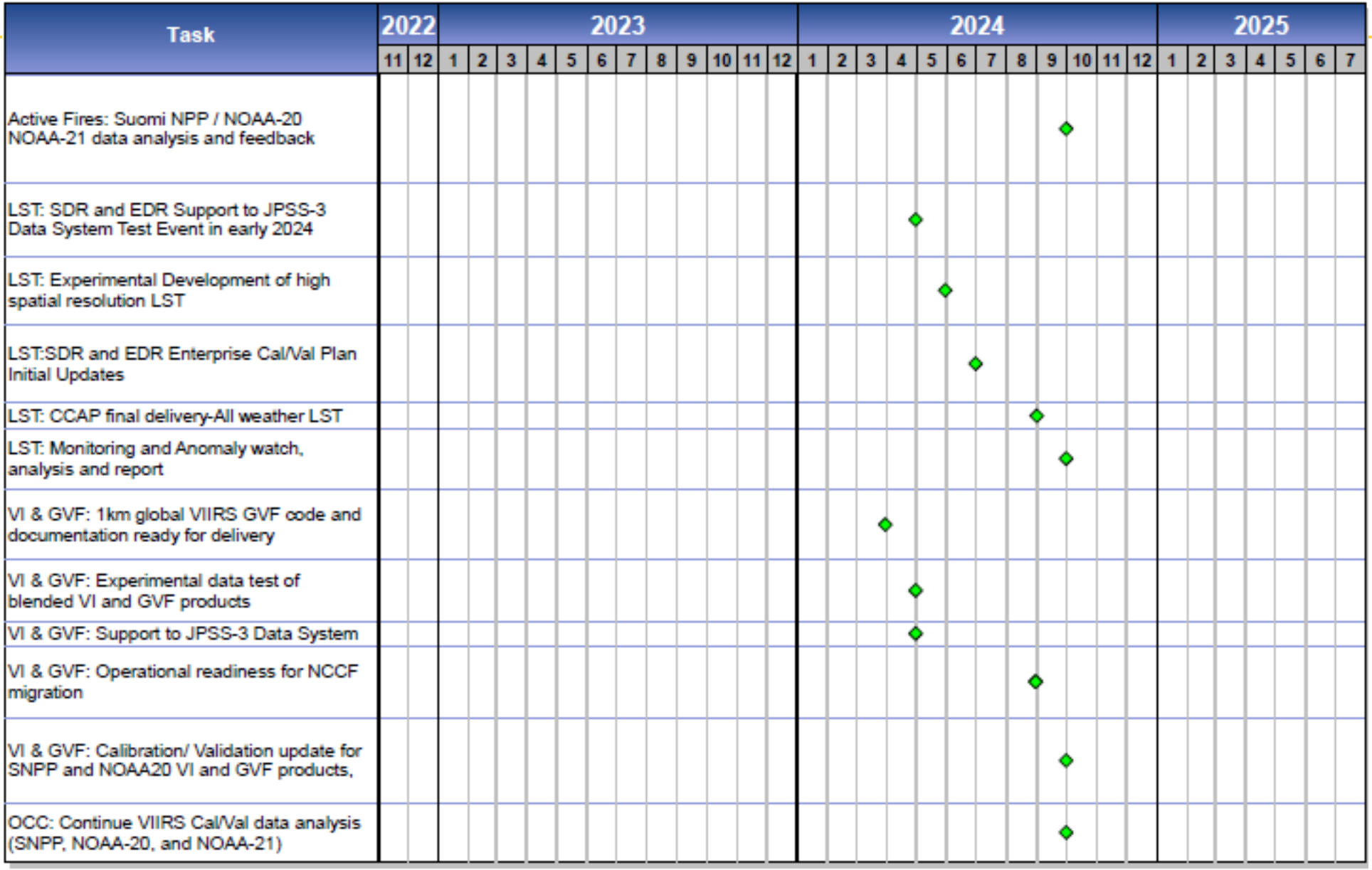


STAR JPSS Schedule: TTA Milestones

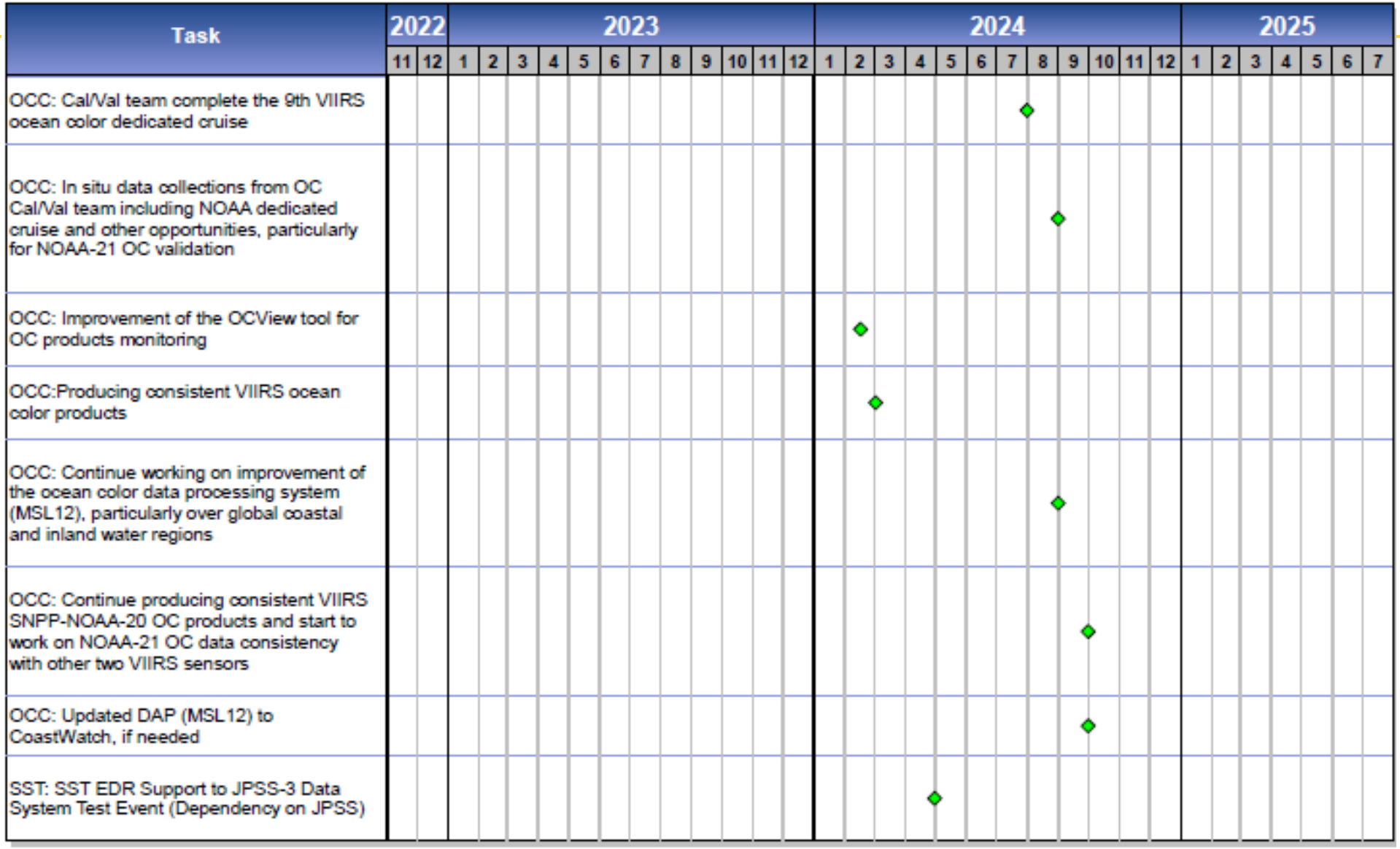
Task	2022		2023												2024												2025						
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
Cryosphere: Blended VIIRS + microwave snow product: Add AMSR2 and GMI to the set of microwave sensors used												◆												◆									
Cryosphere: Physically-based snow 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 ▶ Review(EOY) ◆ mDAP ▶ PMR ▶ ILUT ▶ fLUT ■ IPlan ■ fPlan ■ Beta ■ Prov ■ Vail ◆ Milestone Complete

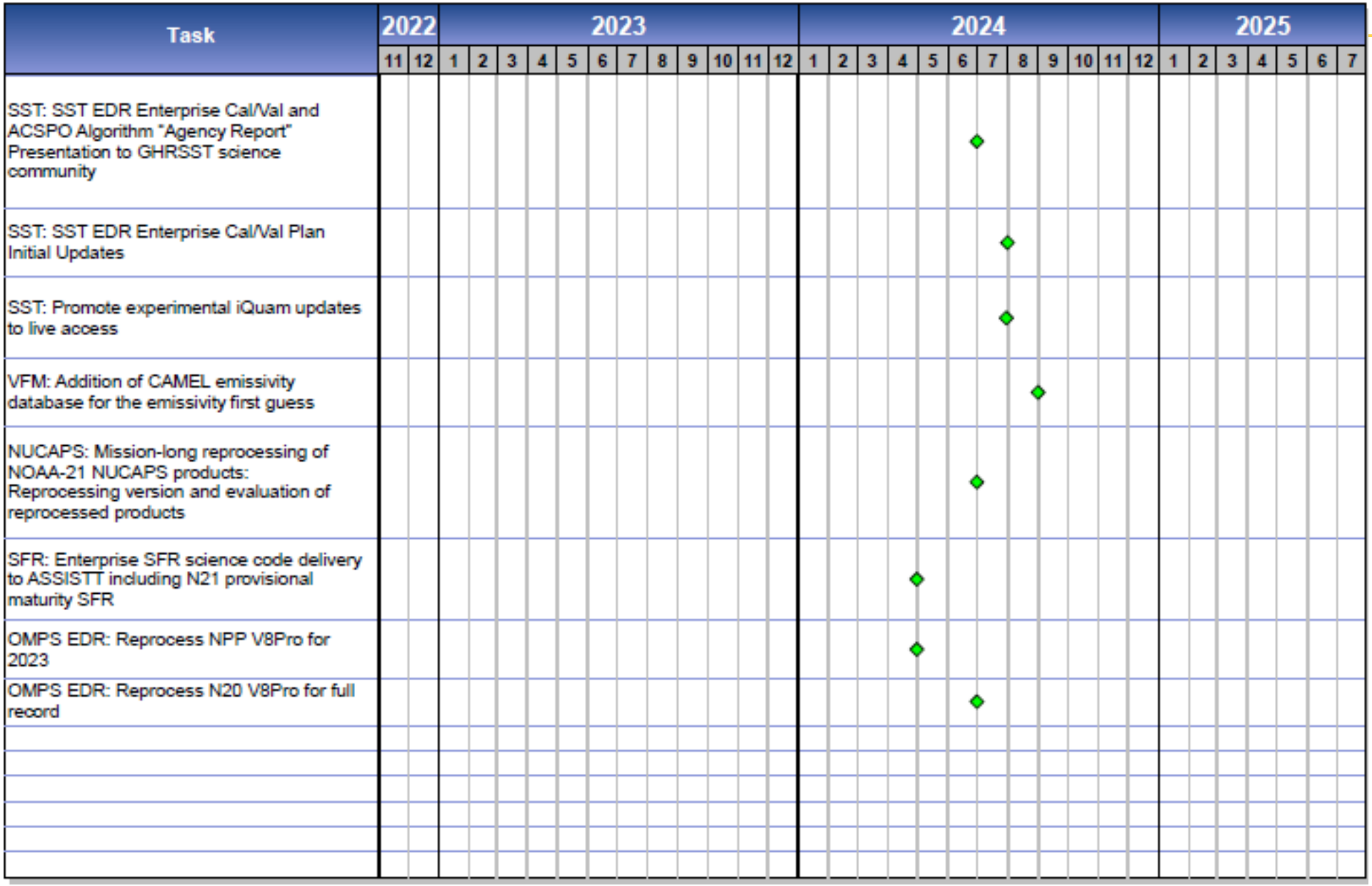
STAR JPSS Schedule: TTA Milestones



STAR JPSS Schedule: TTA Milestones



STAR JPSS Schedule: TTA Milestones



Backup/quad charts

Color code:

Green: **Completed Milestones**

Gray: **Ongoing FY24 Milestones**

Active Fires

May 2024

Accomplishments / Events:

- Worked on an experimental update to the eFire product file to include geolocation information in the output to make it easier for users to calculate the geolocation of each pixel in the granule
  - Geolocation is provided for a thinned sample of pixels and additional pixel locations are calculated
  - Performance of the approach is evaluated
  - Eliminates the need to read large SDR geolocation files
- Worked with the GINA, CIMMS and OSPO SAB teams on updates of the persistent anomaly database as baseline vs. NGFS VIIRS I-band evaluation
- The team monitored the Suomi NPP geolocation anomaly (see highlight)

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: Suomi NPP geolocation anomaly

Suomi NPP true color image and Enterprise Fire VIIRS I-band detections in Australia on May 27, 2024.

JSTAR Mapper (https://www.star.nesdis.noaa.gov/mapper/)

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	6/30/2024	6/30/2024		
Evaluation of ADP using SPARTAN data	8/31/2024	8/31/2024		
Evaluation of ADP using SPARTAN data	3/31/2024	3/31/2024		

Overall Status:

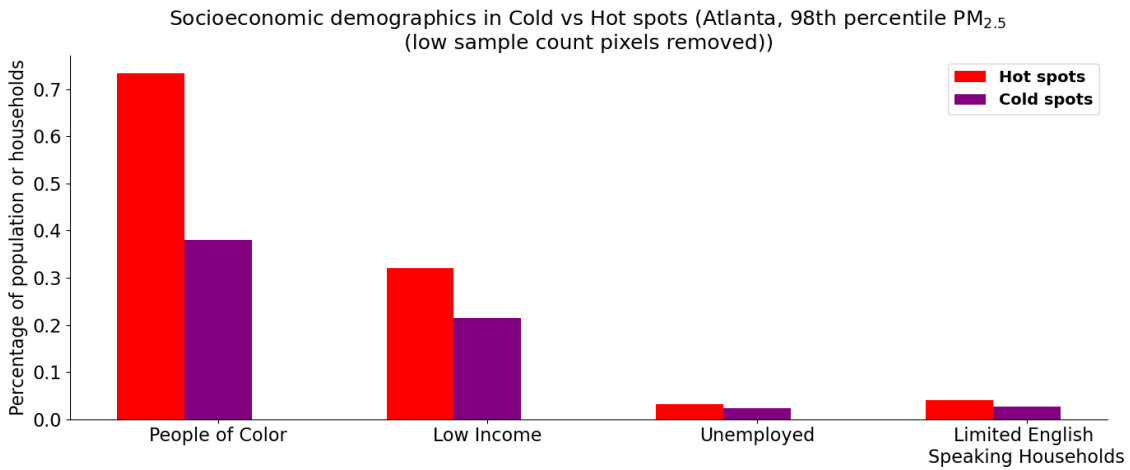
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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

May 2024

Accomplishments / Events:

- Updated NEdT calculation algorithm and implementation description in OAD to reflect the updated NEdT calculation code update transitioned to operations in IDPS in Mx8. The comments and questions are answered and incorporated from several rounds of reviews. The last revision has been submitted to DPMS for broader review. The questions raised by DRAT reviewer are answered with additional comments. It is also recommended by STAR ATMS SDR team that a major revision, besides the NEdT algorithm update, is needed to include several key updates implemented in previous IDPS versions, particularly when transiting to Block MX2.0 build. Those updated include full radiance calibration, lunar intrusion mitigation, and reflector emissivity correction.
- Tested IDPS Mx9 and Mx10 ADL packages in CentOS9 servers to ensure the latest official ADL package can be used by ATMS SDR team for potential code or PCT updates. The testing is still ongoing. Will continue to communicate with ASSISTT for technical questions.
- Host ATMS SDR team meeting to discuss the S-NPP ATMS End Of Life (EOL) test recommendations following the NOAA-21 post-launch test (PLT) items. The S-NPP ATMS EOL test items will continue to be updated.
- Continue on the development of JPSS-3 ATMS SN305 Calibration/Validation Plan based on JPSS-2 ATMS cal/val plan and ATMS SN305 pre-launch characterization report.
- Perform the NOAA-20 ATMS and TROPICS Pathfinder data inter-comparison task to evaluate the NOAA-20 ATMS data quality as shown in Figure 1

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			

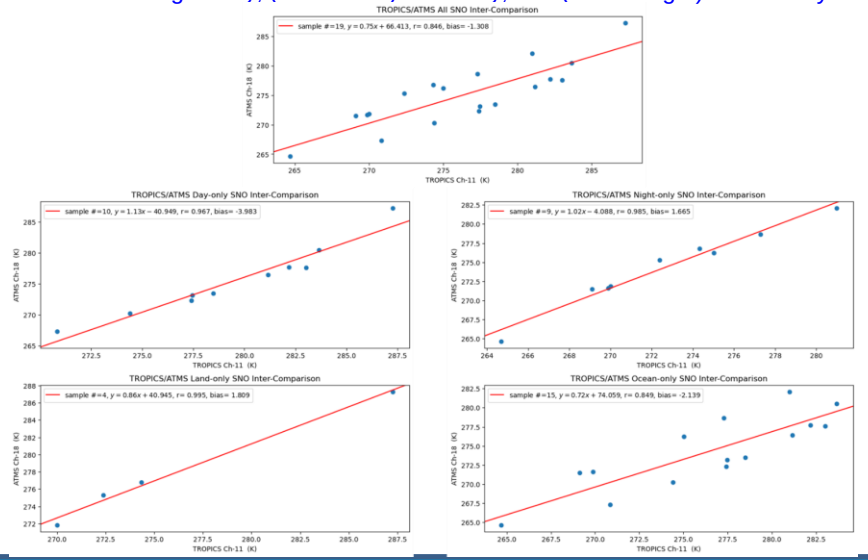
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
JPSS-3 ATMS preliminary analysis of calibration coefficients	Feb-24	Mar-24	Mar-24	
ATMS Spectral Response Function (SRF) evaluation report and dataset	Mar-24	Jun-24		QS TVAC
ATMS geolocation correction algorithm assessment	May-24	Jul-24		QS TVAC
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. ATMS Ch 18 versus TROPICS Ch 11 brightness temperatures for Simultaneous Nadir Overpasses (SNOs) occurring August 8-9, 2021 for the (top) globe, (middle left) day-only, (middle right) night-only, (bottom left) land-only, and (bottom right) ocean-only.



Clouds

May 2024

Accomplishments / Events:

- The Cloud team continues to investigate the usage of the ACHA cloud optical depths as a replacement for NCOMP.
- The new ECM LUT for NPP/NOAA-20 and NOAA-21 as well as updated DCOMP LUTs for all sensors will be provided to ASSISTT by end of June

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

Highlights:

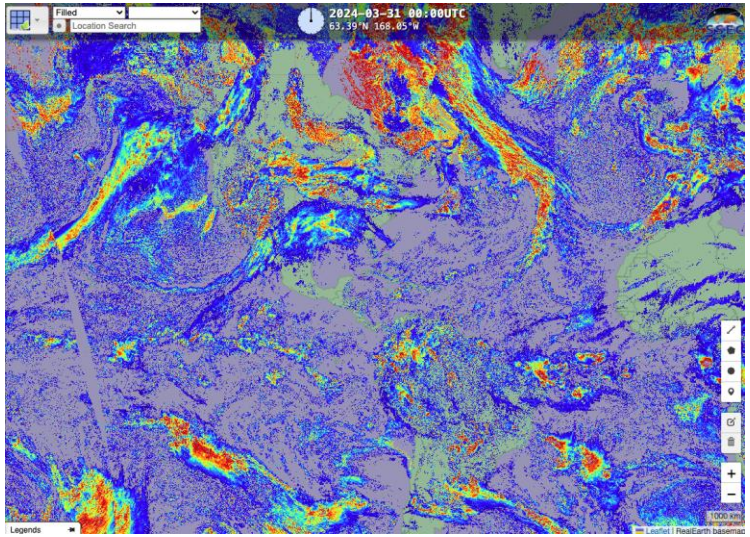


Figure 1.Example of the LTM of the NOAA-20 DCOMP product. Visualization in RealEarth allows for the team to see how the algorithm is performing in different regions.

CrIS SDR

May 2024

Accomplishments / Events:

- Participated in the JPSS-4 CrIS Pre-Ship Review (PSR). It was determined during the review that the radiometric, spectral, noise, and other metrics are comparable to the previous CrIS instruments, and that all waivers and risks were accounted for and approved.
- Quantified the radiometric differences between the single scan calibration and the operational calibration method. Preliminary results show the mean bias is about 0.2 K for NOAA-21 CrIS LWIR band, about 1.0 K for MWIR band over out-of-eclipse regions. (**Fig. 1**)
- Investigated potential impacts of GPS failure on S/NPP. None were noted. It is theorized that it could be related to time synchronization errors.
- Continued making progress on CrIS Science manuscripts on spike detection and neon mitigation (**Fig. 2**).
- Continued JPSS CrIS Spectral Calibration Methodology and Tool Development. (**Fig. 3**)
- Monitored NOAA-21 eclipse exit imaginary radiance increase. (**Fig. 4**)
- Continued identification and assessment of spectral artifacts in Earth view spectra associated with spatially non-uniform scenes. (**Fig. 5**)
- Continued the development of the TVAC spectral analysis, including making the self-apodization inverse matrices, and applying them to the J2 CrIS TVAC gas cell transmittance. (**Fig. 6**)
- Completed application to create simulated IASI-NG SNOs for intercomparison software development. (**Fig. 7**)
- Investigated S/NPP GPS outage and increased solar activity for possible correlation. (**Fig. 8**)

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	May-24	
Evaluate the long-tern NOAA-21 CrIS spectral reference performance after increasing the calibration interval	Sustain	Jun-24		
Delivery of the JPSS-3 CrIS Prelaunch Characterization Report	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:

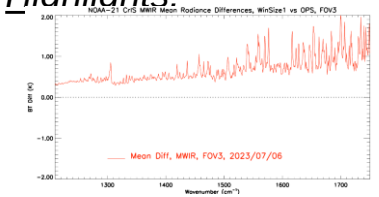
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic			X		See Issues/Risks
Schedule			X		See Issues/Risks

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

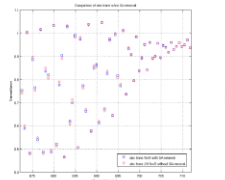
Issues/Risks:

Yellow: There is a misalignment between the IDPS ground processing environment and NOAA-STAR. The IDPS ground processing is based on RHEL Centos version 8 (RHEL8) starting with Mx9 (TTO Feb 8, 2024). NOAA-STAR has migrated to RHEL Centos version 9. **There remains risks in delays to deliver ADL code updates depending on the need to make patch fixes to NOAA-STAR testing needed for future Mx builds to match the IDPS Processing System.** The ADL Mx9 with code modifications for compilation purposes can run on RHEL CENTOS version 9. The CrIS Team is still in need of hardware resources. Presently, there is only two servers dedicated to 6 CrIS Team members. Access to additional servers is still desirable. There is a risk for the CrIS SDR Team to continue on such a dual-server environment for the operational CrIS Cal/Val activities that include 5 CrIS sensors (SNPP, JPSS-1 to -4). This may affect the timely completion of deliverables and program milestones. The recommendation is to have one additional server as soon as possible (< 2 months) and add another server in the next months. Corresponding hardware quotations and SNO have been submitted. Corresponding JSTAR CrIS Risk/Issue on Hardware and Software have been submitted for JSTAR interval review on Jan. 6, 2023. UPDATE: The purchasing of the corresponding hardware is currently in progress, in coordination with STAR IT. A new MATLAB license has been delivered and installed properly.

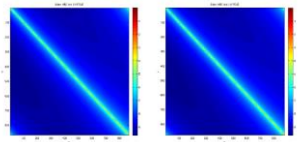
Highlights:



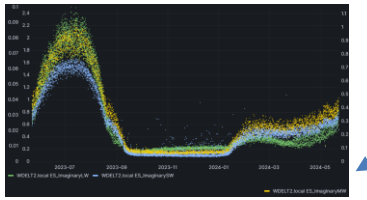
(1) Mean BT differences between the single scan and the operational calibration method for NOAA-21 CrIS MWIR band FOV3.



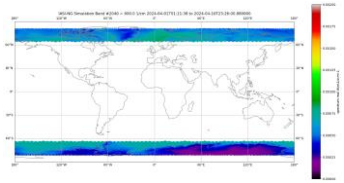
(3) Comparison of the J2 CrIS TVAC gas cell transmittance changes w/wo SA removal



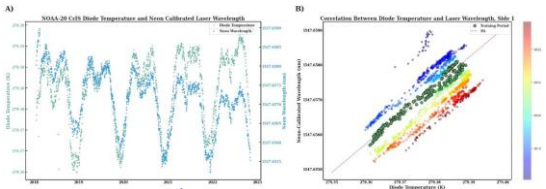
(6) Comparison of SA inverse matrix values between different spectral resolutions



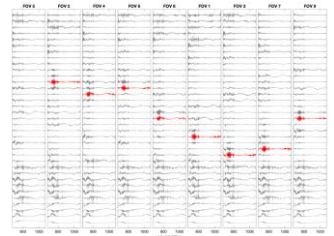
(4) NOAA-21 Delta RMS Imaginary Radiance by band across eclipse exit. Shows CrIS is on track to repeat cycle.



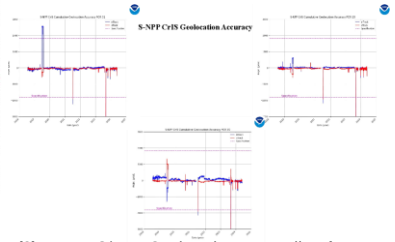
(7) Simulated IASI-NG data for 200 SNOs with NOAA-21 for intercomparison development.



(2) NOAA-20 CrIS Diode Temperature and Laser Wavelength Analysis; time series and correlation



(6) PCs computed from data for each FOV. PCs shown in red are indicative of spectral shift variability due to spatially non-uniform scenes.



(8) Recent S/NPP Geolocation error spikes for solar activity error analysis.

Cryosphere and Polar Winds

May, 2024

Accomplishments / Events:

- **Replacement of NOAA-21 for S-NPP in the VIIRS tandem winds product produces similar validation results**: Over a 14-day period starting on 20 March and finishing on 4 April 2024, the JPSS satellite train went through a rephasing where NOAA-20 was moved in a sequence of propulsive maneuvers so that at the end of the period it is separated by 180° to NOAA-21 and 90° to S-NPP. This required swapping NOAA-21 for S-NPP in the VIIRS tandem winds product that uses a triplet of orbits at equal times between them. Visually, the results from the switch look good (Figure 1). The example of the updated tandem winds product shows expansive coverage with strong cyclone over the eastern central Arctic north of Franz Josef Land with southerly flow over north-central Russia into the Laptev Sea pushing into the central Arctic. Also of note is the strong ridge over the Norwegian sea with strong flow around it over the Denmark Strait, east-central Greenland, and the Greenland Sea into northern Scandinavia.

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

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:

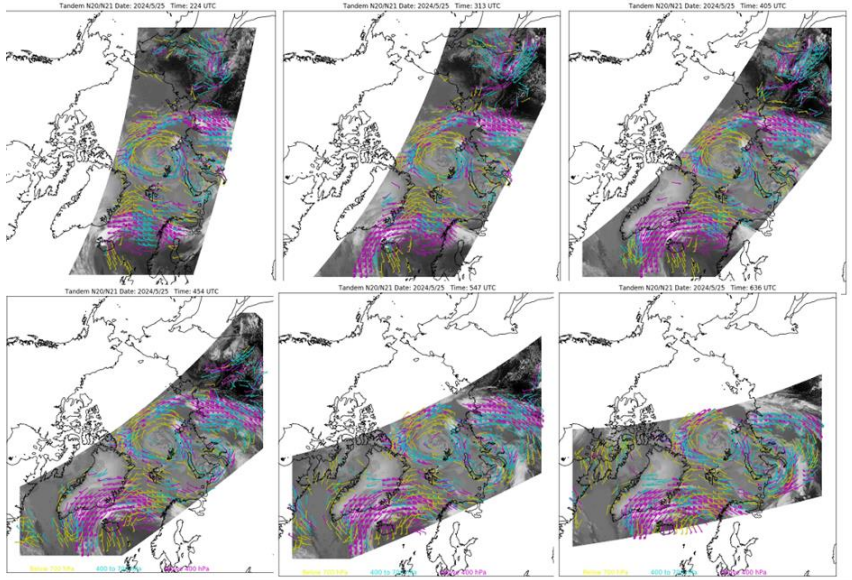


Figure 1: 11 µm cloud Atmospheric Motion Vectors (AMVs) from the JPSS Tandem winds product on 25 May 2024 over the Arctic. Starting from upper-left at 02:24 UTC to lower-right ending at 06:36 UTC.

EDR Reprocessing

May 2024

Accomplishments / Events:

- The data transfer between ESSIC servers and STAR servers is resumed and the cloud EDR products of Aug. 20, 2018~Jul. 10, 2019 are being reprocessed. The first 20 days' data of each month were completed (239 days in total) as of the end of this reporting period (May 31st , 2024)

- The RWG continue develop collocation, comparison and analysis programs to assess the quality of reprocessed and operational cloud EDR products against corresponding combined CloudSat-CPR and CALIPSO-Lidar data

- The following table shows the quantitative comparison of Cloud Base Height (CBH) accuracy between reprocessed and operational data against top-layer CBH derived from combined CloudSat-CPR and CALIPSO-Lidar data over May of 2019. Further quality control is applied to all dataset: if cloud optical thickness>1, CBH difference between VIIRS and CPR data should be<1km.

Top layer height (May of 2019)	All		Single-layer		Multi-layer	
	Repro	Opera	Repro	Opera	Repro	Opera
Valid pixel	295	295	159	159	136	136
Accurate pixel percentage (%)	13.22	18.64	16.35	22.64	9.56	13.97
R-square:	0.78	0.80	0.82	0.81	0.78	0.80

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		4 month

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		UMD Bamboo will retire in July 2024. Delay is expected

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 will retire in July 2024.

Accomplishments / Events:

- **AMSR2 vs Landsat sea ice concentration**: Comparison of Landsat sea ice concentration with AMSR2 concentration for spring and early summer scenes in 2014 shows a fair amount of scatter with AMSR2 generally overestimating concentration compared to Landsat. This appears to be due the proximity of the scenes to the ice edge where Landsat is detecting more open water due to its higher spatial resolution. Also, AMSR2 concentrations tend to saturate at or near 100% concentration while Landsat shows more variability of lower concentrations. Still, the AMSR2 performance is reasonable with a correlation of ~0.8.

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:

Highlights:

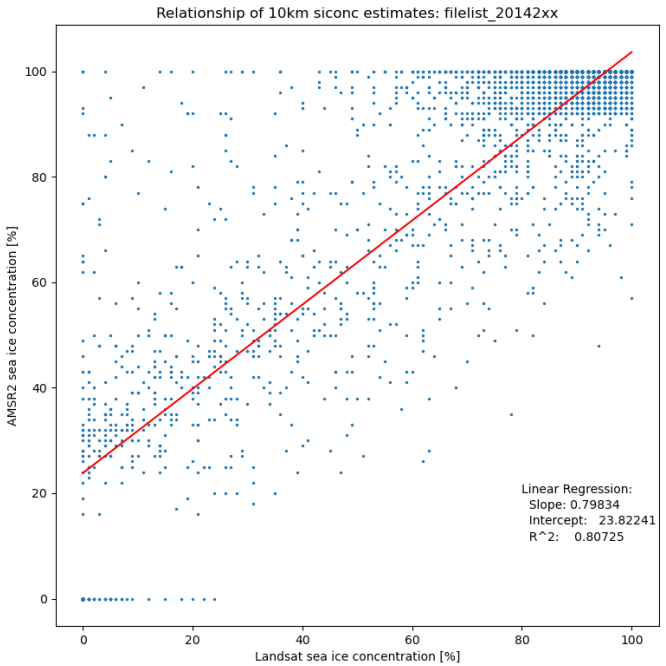


Figure: Scatterplot of Landsat (x-axis) and AMSR2 (y-axis) sea ice concentration (%) for Landsat scenes from April through June 2014. The red line is the linear regression fit and the regression coefficients (slope, intercept, and R^2) are annotated in the image.

ICVS

May 2024

Accomplishments / Events:

- Held multiple meetings with OCS NCCF cloud transition management team to exchange the information about NCCF struction, ICVS team status, and proposal about the testing modules based on the data available in NCCF. The next step is to provide a list of modules and associated IT related requirements to OCS for transition planning.
- Continue to update the CrIS inter-sensor comparison web page in ICVS-beta and add new CrIS vs. IASI/ABI long term bias trending figures to provide advanced CrIS science data quality monitoring. Finished the preview version of new CrIS inter-sensor bias web page in ICVS-beta internal site, which significantly improve the users' experience by listing all monitoring figures in the same web page.
- Add new NOAA-20 OMPS NP solar intrusion detection monitoring figures to ICVS, as shown in Figure 1.
- Transition Matlab based CrIS monitoring package to Python to mitigate the dependence of commercial software on ICVS module development.
- Continue to provide close monitoring of NOAA-21 CrIS annual variation of degraded/invalid quality flag due to the contamination of deep space calibration targets, as shown in Figure 2.

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

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.*

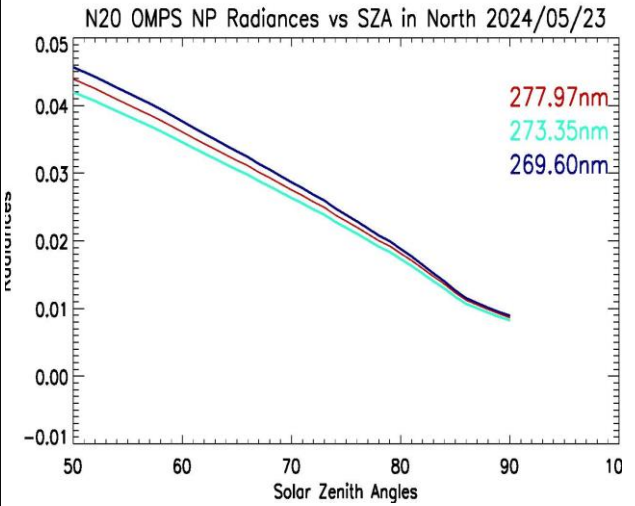
Issues/Risks:

Retirement of three ICVS operational processing servers affects the refreshing rate

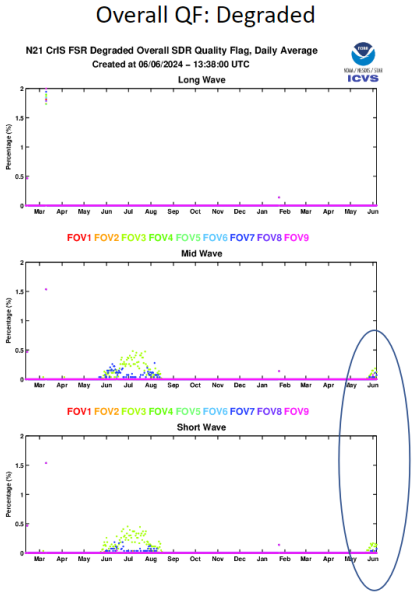
Highlights:

Significantly contribute to STAR SDR Teams

(a) NOAA-20 OMPS NP Radiance vs. satellite zenith angle



(b) NOAA-21 CrIS overall quality flag degraded



Leaf Area Index

May 2024

Accomplishments / Events:

- Supply the LAI monthly climatology for the Noah-MP test, marking the first attempt at incorporating LAI.
- Enhance the current gridding tool to support parallel computing, significantly reducing LAI product latency. The new version of the gridding tool will be tested and prepared for delivery.
- Continue working on LAI validation, performing site-by-site analysis to address validation issues, including site heterogeneity, biome type, and validation against other products.
- Develop methods for deriving the annual vegetation fraction to extract canopy-part LAI from the general LAI product using machine learning techniques, ensuring consistency with the LAI product.

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			

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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	Apr 1, 2024	
Incorporate the LAI test data into the LSM model to evaluate the performance in the model	May-24	May-24	May 30, 2024	
Operational readiness	Jul-24	Jul-24		
Develop LAI routine monitoring and validation tool	Sep-24	Sep-24		

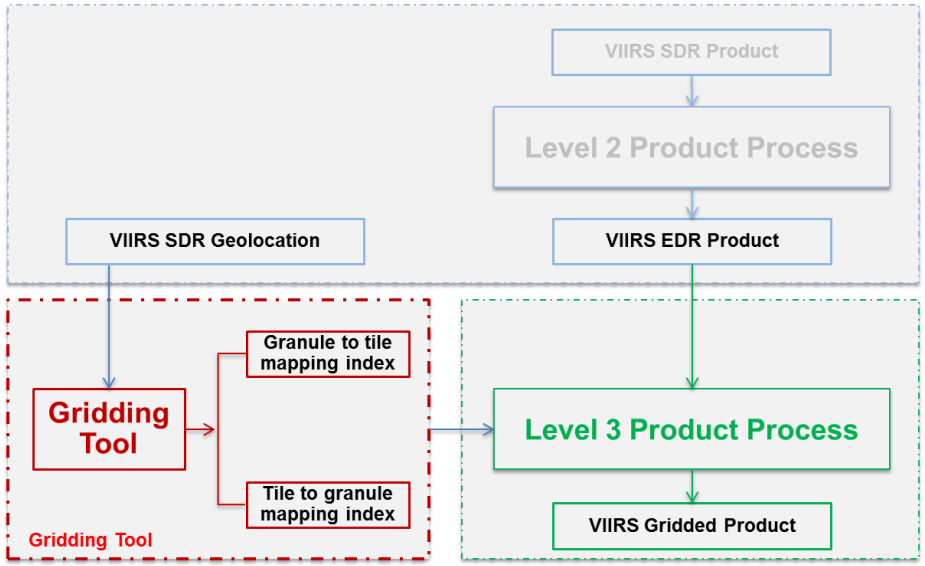
Highlights:

The existing gridding tool process for image band data is very time-consuming, especially when processing entire granules in batch mode, which can take more than 3 hours. The new version of the tool supports parallel computing. This enhancement significantly reduces the processing time and the latency in producing LAI products.

	Single	4 thread	8 threads
1km (M band)	~50 min	~18 min	~20 min
500m (I Band)	~103 min	~26 min	~34 min

VIIRS Gridding Tool Improvement

- Gridding tool introduction
  - Generic tool to mapping VIIRS granule data into regular grids (support Equal Lat/Lon, Sinusoidal)
  - Current operationally run for Level 3 product LST and Albedo at 1km global sinusoidal grid.
  - Applied on Image Band product such as LAI at 500m sinusoidal grid.
  - Keep detailed mapping indices both “Tile to Granule” info. and “Granule to Tile” info,
  - Fill the gap due to pixel size at the edge of the swath using nearest neighbor.
- Improvement
  - Add exceptional handling to deal with duplicated granules
  - Make the tool support parallel computing.



Gridding tool in VIIRS level 3 product processing

	Single	4 thread	8 threads
1km (M band)	~50 min	~18 min	~20 min
500m (I Band)	~103 min	~26 min	~34 min

- Each thread process one granule, optimize the process order to reduce the writing conflict to some tile.
- 4 threads would be the best for current version, since there are lots of I/O, more thread cause more writing conflict.
- The parallel version significantly improved the computing efficiency.

Derive Vegetation Fraction Consistent with LAI

- Noah-MP model need LAI of canopy part:

$$LAI = gLAI_0$$

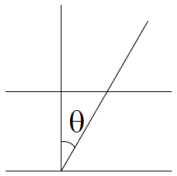
LAI_0: mean LAI of vegetation covered area. g is vegetation cover.

To make the FCOVER consistent with LAI, two approaches are investigated:

- Derive FCOVER from LAI via gap fraction theory.

$$FCOVER = a[1 - T(0)] = a\left[1 - e^{-bG(0)\Omega LAI}\right]$$

The modified Beer's Law:



$$P(\theta) = e^{-G(\theta)\Omega L/\cos\theta}$$

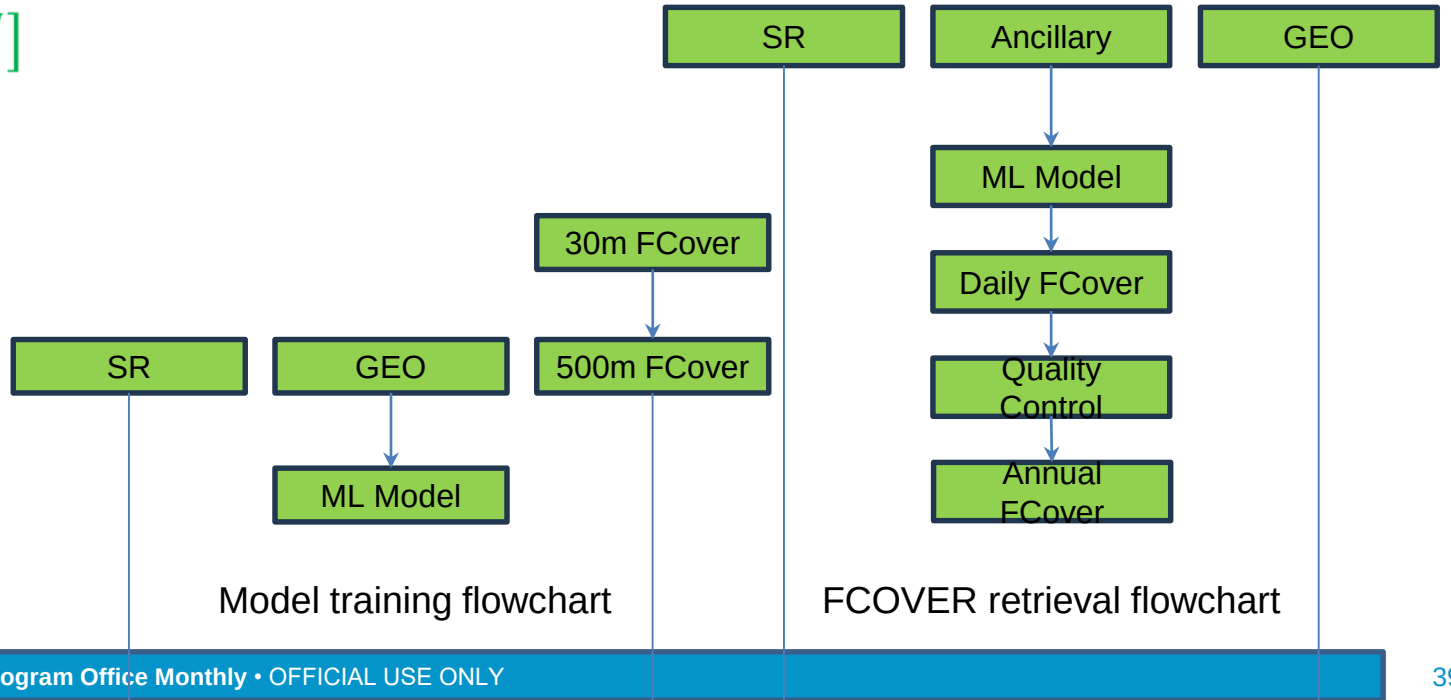
where θ is the zenith angle,
Ω is the clumping index
G(θ) is the project coefficient
L is the leaf area index

Leaf spatial distribution

Leaf angular distribution

$L_e = \Omega L$, effective LAI

- Derive FCOVER from some SR dataset as LAI.
- Model training & FCOVER estimation.
  - Test variables importance (SWIR, Biome, angles)
  - Training data presentiveness. (ground data is limited, expand using Landsat instead)
  - Choose models (Random forest, SVM, cubist et.al)
  - Use same input data (SR, GEO) as LAI
  - Derive annual vegetation fractional coverage.



Land Surface Temperature

May 2024

Accomplishments / Events:

- Integrated the VIIRS mending tool into I-band LST generation to remove the bowtie effect. It has been tested and implemented for the generation of I-band subset LST. (slide 2)
- Observed and fixed a software issue in the cron job for I-band LST subset generation.
- Completed the revision and review of Land surface emissivity ATBD update and submitted it to the ASSISTT team
- Continued work on a direct regression method for all weather LST generation. The initial results are not promising, particularly over some surface types. Normalized data, adding more parameters into the regression, were also tested and the results showed slight improvement (slide 3 & 4
- Modified the code for plotting I-band LST to improve the image quality. Discontinuity was observed in the granule I-band LST and investigation is ongoing.
- Conducted NCCF data verification and cross comparison among NPP, N20 and N21 LST in v2r2 version. One scenario over Australia is shown in slide 5 & 6.
- Investigated the LST values during wildfire occurrence for saturation. Two wildfires including the 2023 Canada wildfire and 2020 California wildfire have been checked. (slide 7 & 8)
- Identified an overflow issue with the surface temperature in MIRS data. Confirmed the problem with MIRS team. The issue will be solved in the new version.
- Investigated the impact of GVF migration to NCCF on LSE/LST upon the request from opera national team

Overall Status:

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

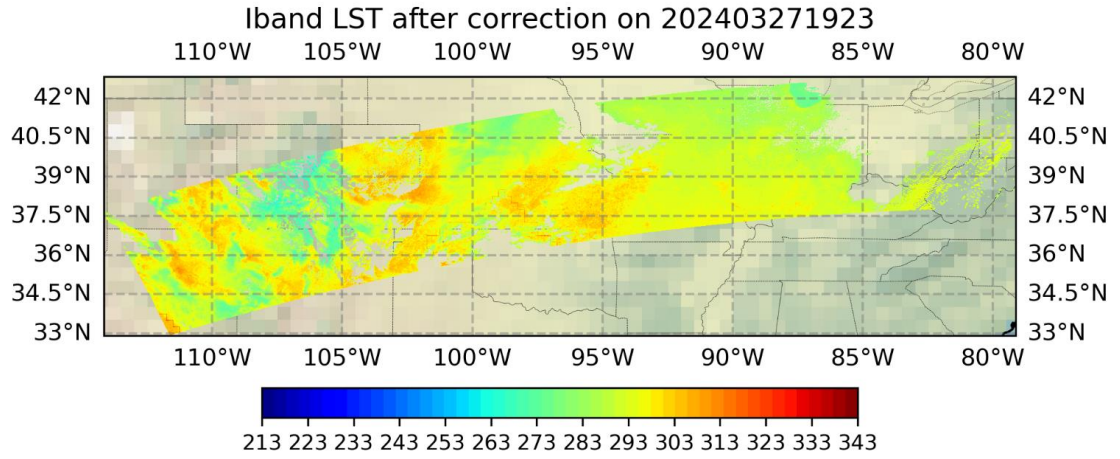
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

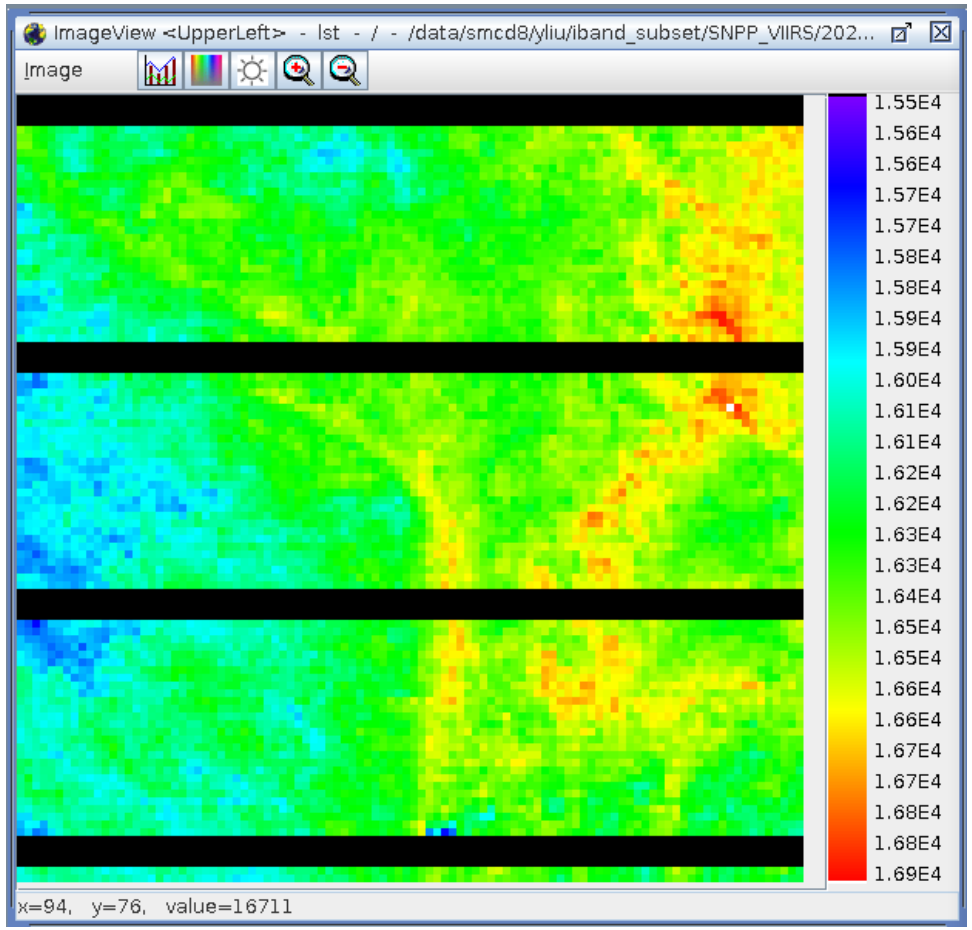
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
LSE update DAP delivery	**Aug-23**	**Oct-23**	**Oct-23**	
NOAA-21 data monitoring, evaluation and provisional maturity review	**Oct-23**	**Jan-24**	**Jan-24**	
CCAP Initial Delivery - All weather LST	**Oct-23**	**Feb-24**		deferred due to scientific R2O challenges
SDR and EDR Support to JPSS-3 Data System Test Event in early 2024	**Feb-24**	**Apr-24**		No testing is required this year. The JCT events for J3 don't start until next year.
Experimental Development of high spatial resolution LST	**Oct-23**	**May-24**	**May-24**	
SDR and EDR Enterprise Cal/Val Plan Initial Updates	**Apr-24**	**Jun-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-24**		
Monitoring and Anomaly watch, analysis and report	**Oct-23**	**Sep-24**		

Highlights:

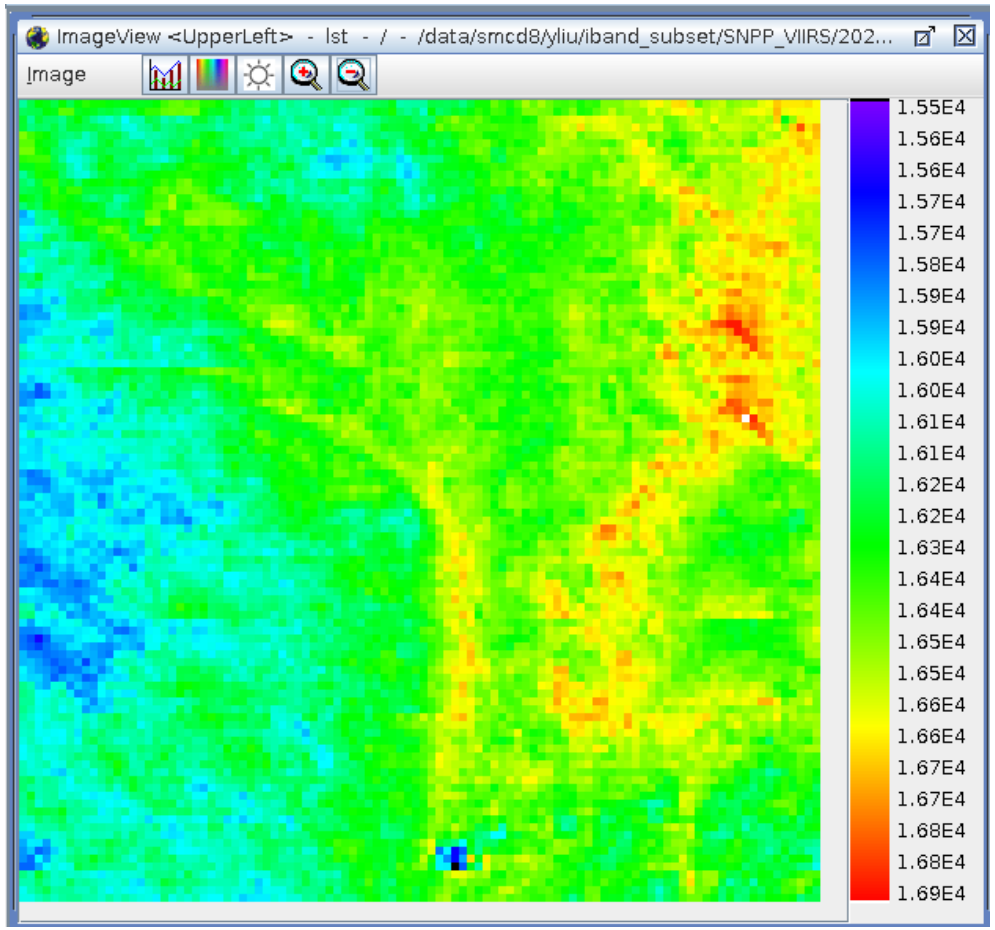


I-band granule LST Image

VIIRS SDR Mending



Before mending



After mending

- Obtained mending tool from ASSISTT team and integrated into subset LST generation
- The figure shows before and after mending, indicating a successful implementation.

Linear regression analysis for all weather LST

							Normalize	
LC types	a-MIRS LST	b-NDVI	constant		LC types	a-MIRS LST	b-NDVI	constant
1	0.6327	0.0000	109.4627		1	0.8465	-0.0062	0.0892
2	0.0140	0.0001	299.2372		2	0.0700	0.0240	0.6029
3	0.9296	0.0000	16.8760		3	0.9393	-0.0105	0.0425
4	0.7767	0.0000	60.9830		4	0.9270	-0.0092	0.0544
5	0.1954	0.0002	235.8741		5	0.6333	0.0098	0.2287
6	0.8732	0.0001	37.9535		6	0.8732	0.0214	0.0607
7	0.0373	0.0012	294.5226		7	0.9211	-0.4140	0.4725
8	0.6509	0.0003	109.8635		8	0.8717	-0.1545	0.2370
9	0.0246	0.0004	302.0061		9	0.8889	-0.0421	0.1213
10	0.1948	0.0005	237.0168		10	0.9815	-0.0157	0.0336
11	0.9806	0.0000	6.4862		11	0.9806	-0.0015	0.0174
12	0.0795	0.0002	273.7527		12	0.9440	0.1477	-0.1049
13	0.8736	0.0001	41.6834		13	0.8741	0.0198	0.0817
14	0.1915	0.0002	248.5463		14	0.6655	0.0260	0.2318
15	0.1604	0.0008	228.3774		15	0.6394	0.0227	0.1747
16	0.0062	0.0012	314.5898		16	0.9019	-0.5336	0.6189
17	0.7436	0.0001	78.5214		17	0.7633	0.0087	0.1421

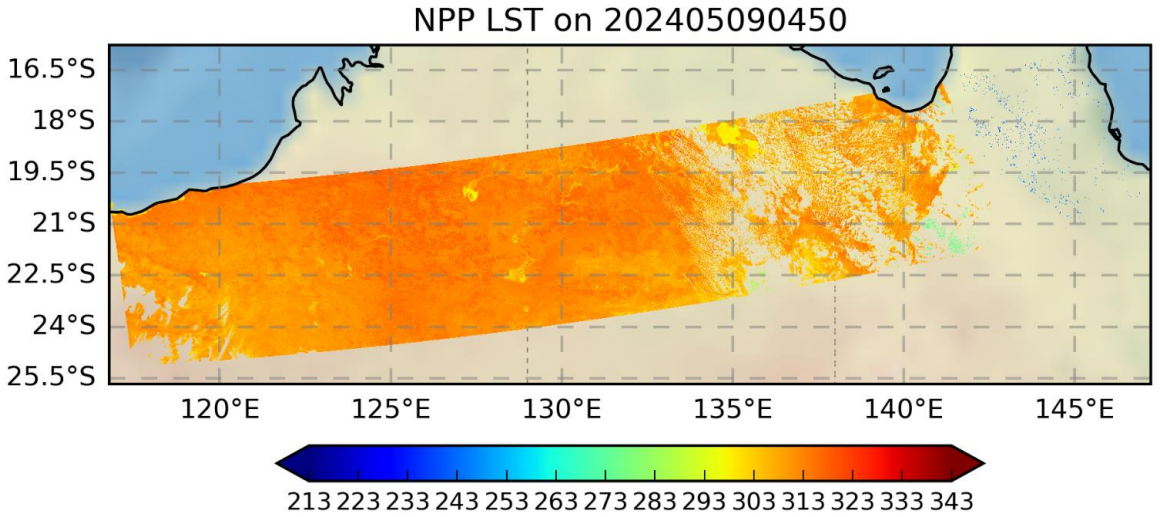
- The linear regression method is tested to build up the relationship between VIIRS LST and MIRS LST with NDVI as downscaling parameters over 17 IGBP types. The left figure shows the regression coefficients over each surface type.
- It is observed that the NDVI data contribution is negligible when using the actual value, so the normalization of data is tested for the regression. The results indicate improvement over some surface types such as IGBP 4, 7,8,9,10,12,14,15, and 16.

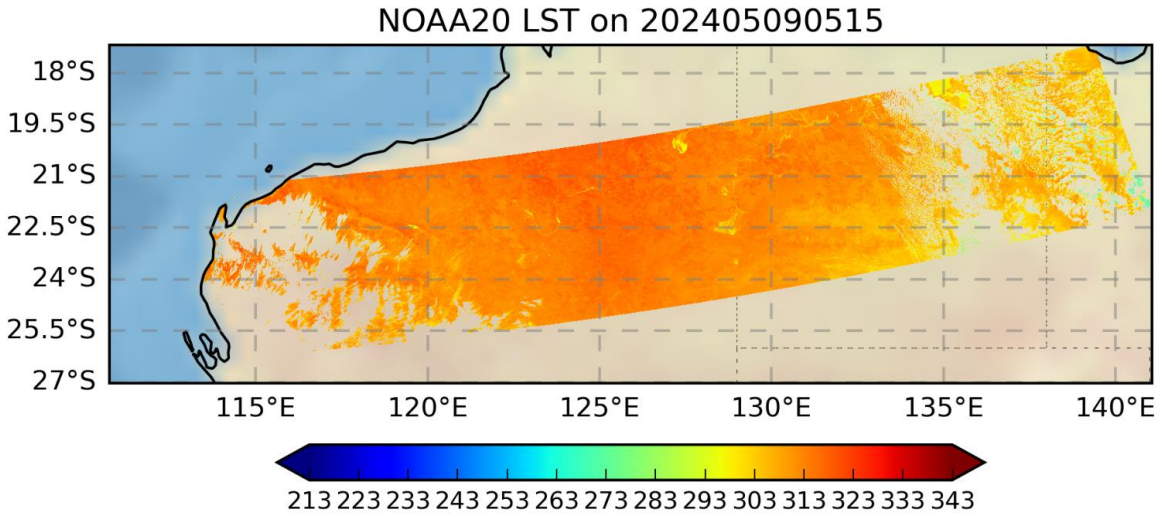
Linear regression analysis for all weather LST

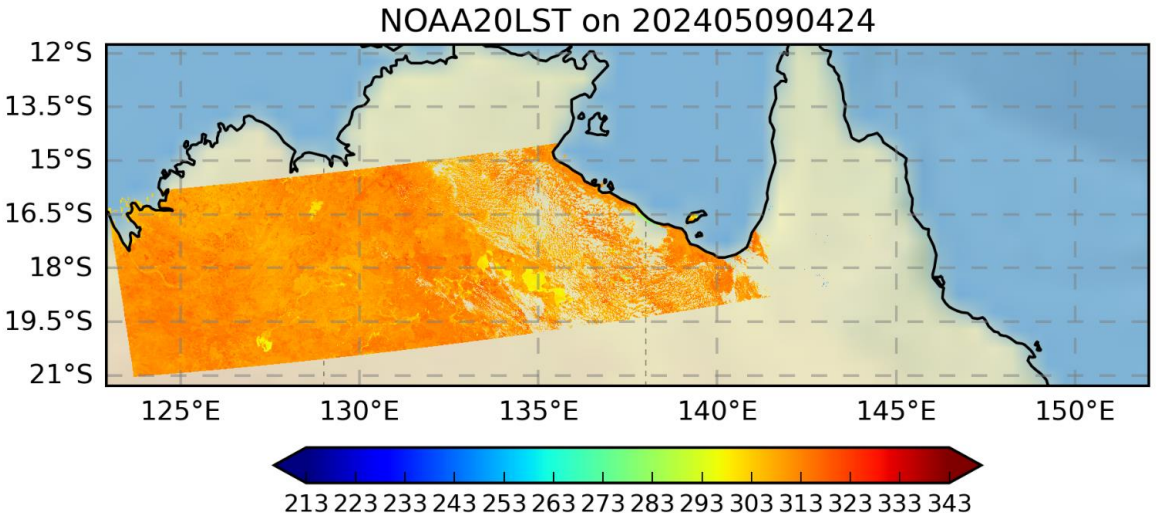
LC types	a-MIRS LST	Normalize b-NDVI	constant	LC types	a-MIRS LST	Normalize b-NDVI	c-SLOPE	constant
1	0.8465	-0.0062	0.0892	1	0.8487	-0.0055	-0.0209	0.0885
2	0.0700	0.0240	0.6029	2	0.0727	0.0262	-0.1244	0.6035
3	0.9393	-0.0105	0.0425	3	0.9392	-0.0098	-0.0476	0.0434
4	0.9270	-0.0092	0.0544	4	0.9165	-0.0068	-0.0812	0.0615
5	0.6333	0.0098	0.2287	5	0.6339	0.0103	-0.0154	0.2287
6	0.8732	0.0214	0.0607	6	0.8491	0.0250	-0.0791	0.0772
7	0.9211	-0.4140	0.4725	7	0.9136	-0.4098	-0.1344	0.4771
8	0.8717	-0.1545	0.2370	8	0.8702	-0.1525	-0.0611	0.2385
9	0.8889	-0.0421	0.1213	9	0.8827	-0.0414	-0.1156	0.1271
10	0.9815	-0.0157	0.0336	10	0.9744	-0.0151	-0.0673	0.0401
11	0.9806	-0.0015	0.0174	11	0.9800	-0.0013	-0.0468	0.0181
12	0.9440	0.1477	-0.1049	12	0.9438	0.1480	-0.0830	-0.1039
13	0.8741	0.0198	0.0817	13	0.8740	0.0208	-0.1111	0.0825
14	0.6655	0.0260	0.2318	14	0.6652	0.0276	-0.1228	0.2325
15	0.6394	0.0227	0.1747	15	0.6370	0.0220	0.0426	0.1749
16	0.9019	-0.5336	0.6189	16	0.8928	-0.5277	-0.1390	0.6217
17	0.7633	0.0087	0.1421	17	0.7629	0.0089	-0.0135	0.1424

- The linear regression method is tested to build up the relationship between VIIRS LST and MIRS LST with NDVI and slope as downscaling parameters over 17 IGBP types.
- The left plot shows the regression coefficients for over each surface type using normalized data: NDVI parameter only and NDVI and slope parameters.
- It is observed that the coefficients do not change much between with and without slope parameter.

Inter-comparison among v2r2 NPP, N20 and N21

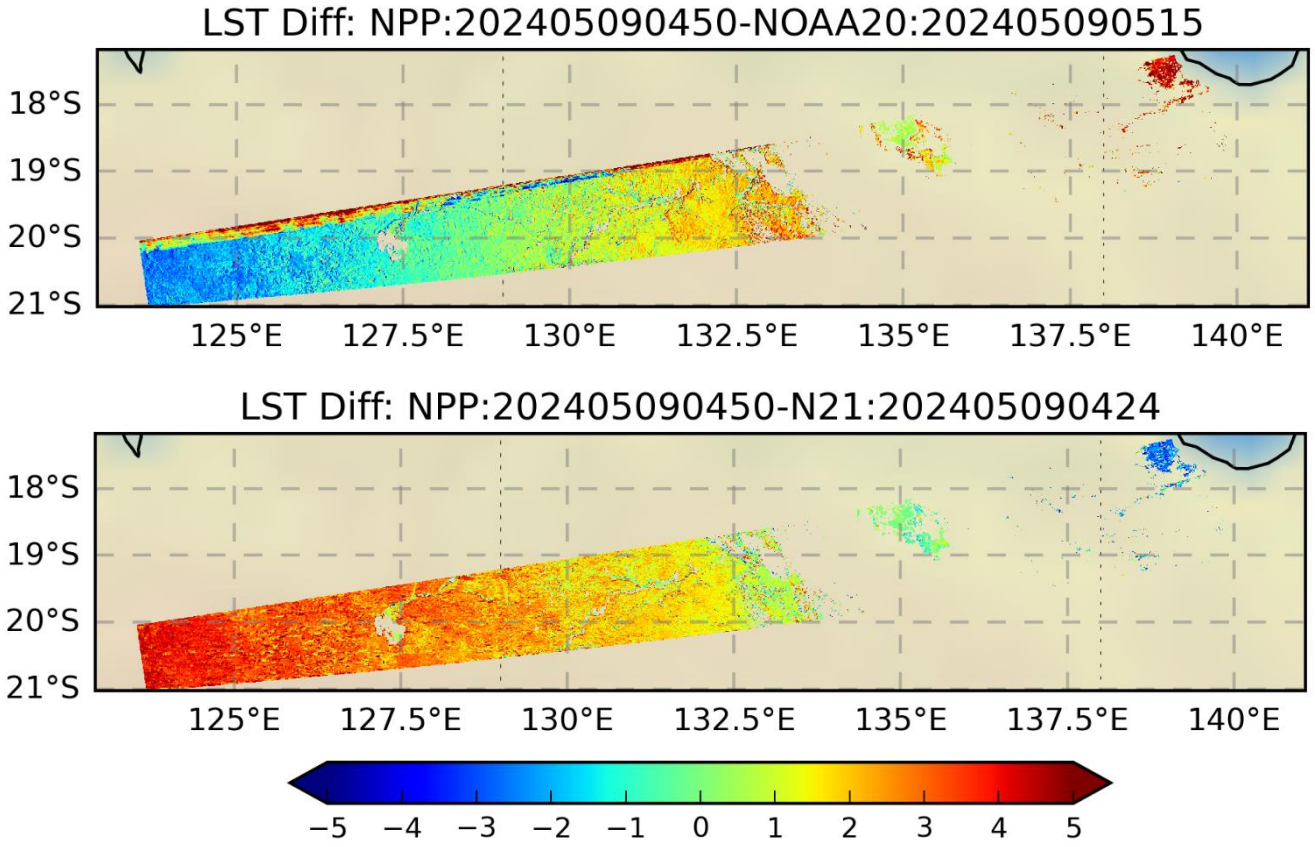


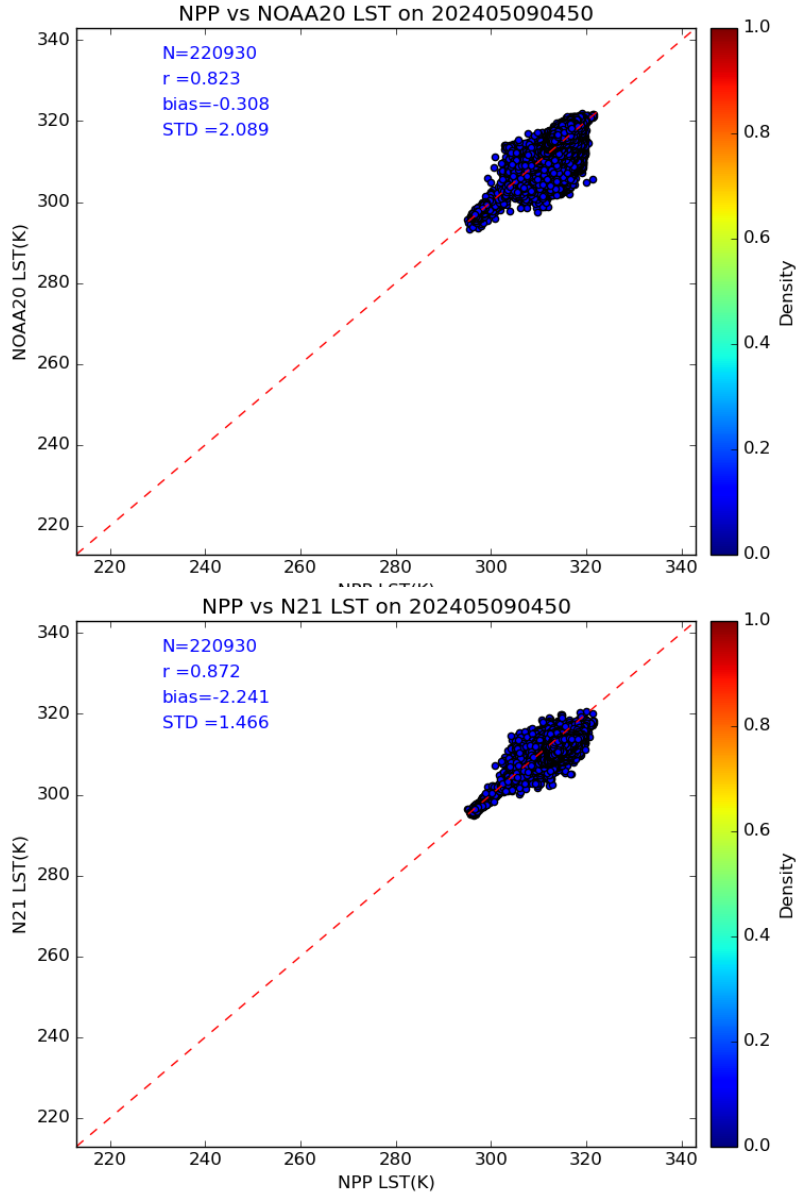




- The data source is from NCCF platform. All three VIIRS LSTs are in v2r2 version
- The inter-comparisons are conducted at granule level with the temporal difference of 25 minutes between each. A case scenario on May, 9 2024 was selected for demonstration.

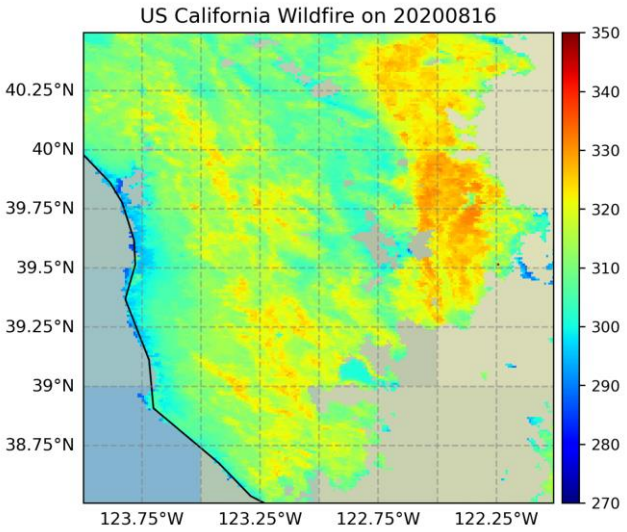
LST Difference statistical analysis

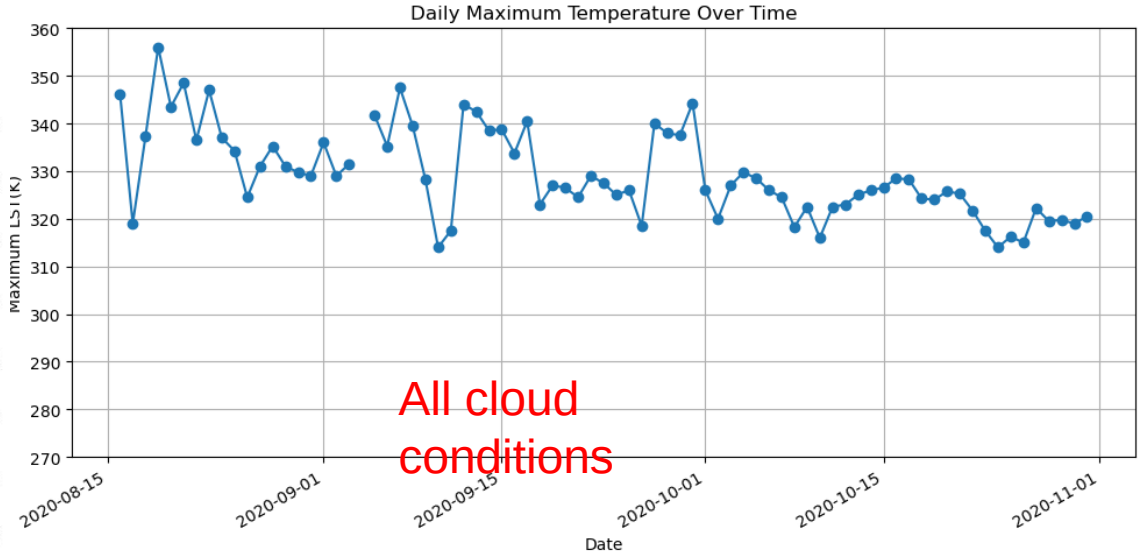


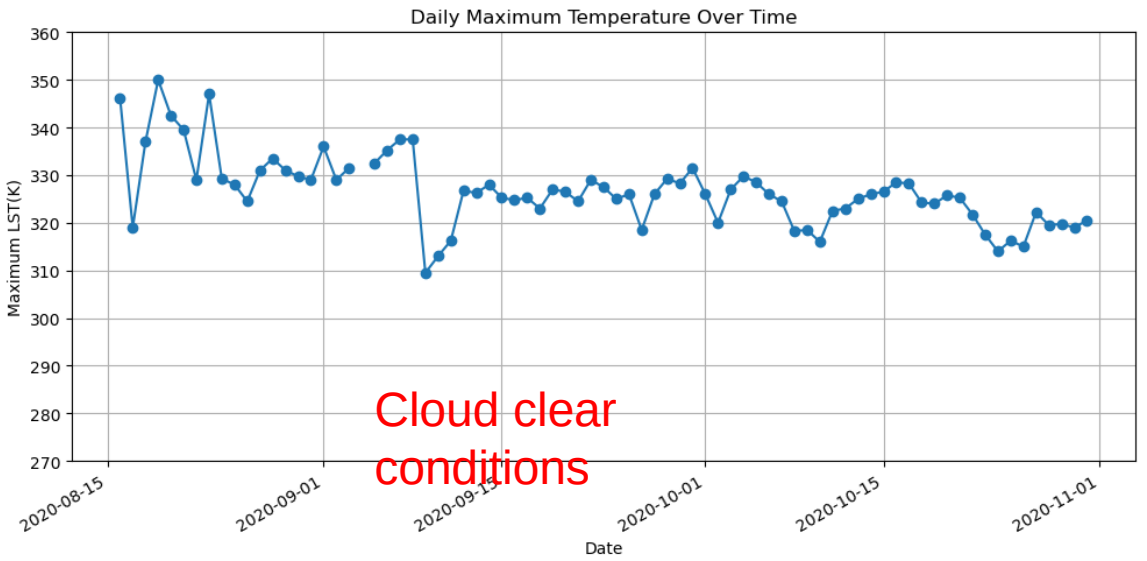


- The left figures present the LST difference between NPP and NOAA20 (top left); NPP and NOAA21(bottom left), and right figures show the scatter plot with statistics.
- The results indicate a smaller bias and relatively large STD for NPP and NOAA21 comparing to that between NPP and NOAA21.
- The software issue was observed in the granule edge likely caused by the griddata in python package. Further investigation will ne conducted.

California wildfire in 2020





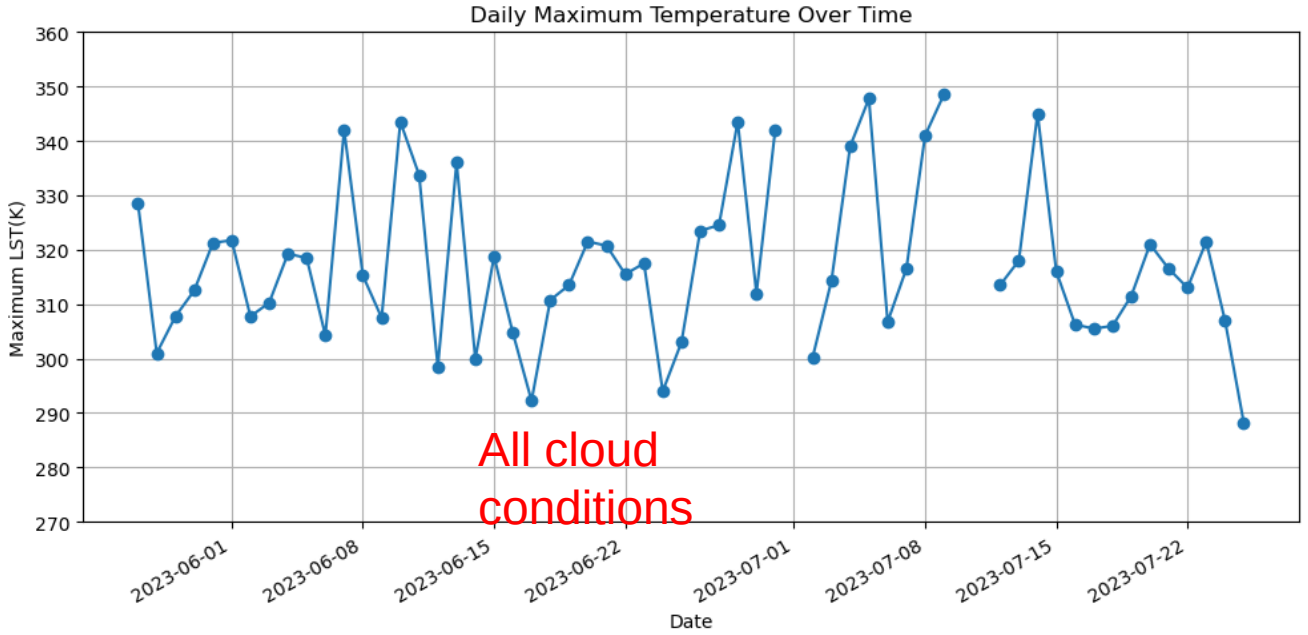


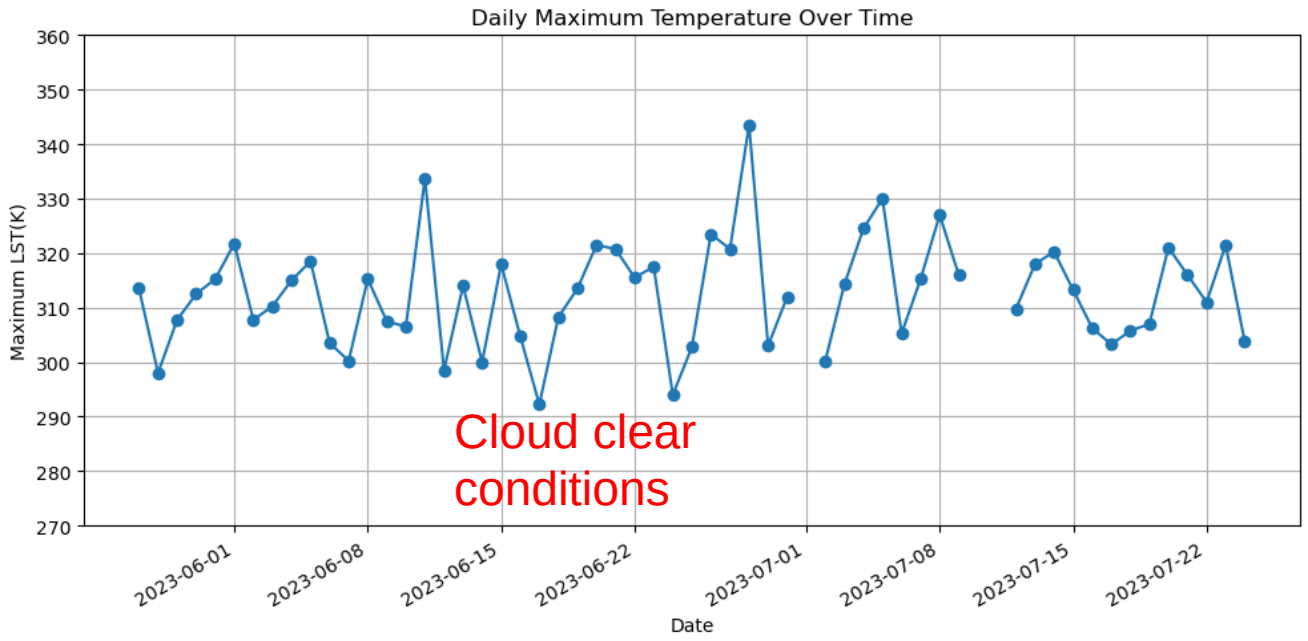
The **August Complex** was a massive wildfire that burned in the Coast Range of Northern California, in Glenn, Lake, Mendocino, Tehama, Trinity, and Shasta Counties.

- The VIIRS L3 daytime LST from NOAA20 was used to check the maximum LST during the wildfire occurrence. The data covers the spatial area of [-124,-122,38.5, 40.5] for the time period from Aug. 16 to Oct. 31, 2020
- Generally the maximum LST under cloud clear condition is lower than that under all cloud condition, which indicates that the LST is affected by the smoke in the upper air. It is mostly less than 350 K. From LST product itself, it can represent the temperature up to 363 K.

Fires are shown burning across Canada in this June 28, 2023 map created by NASA and the Fire Information for Resource Management System US/Canada. *NASA / Screenshot*

https://www.indystar.com/story/news/2023/06/28/canada-wildfire-map-indianapolis-indiana-air-quality/70364007007/





- The VIIRS L3 daytime LST from NOAA20 was used to check the maximum LST during the Canada wildfire occurrence. The data covers the spatial area of [-125,-120,59,60] for the time period from May 27 to July 27, 2023. The maximum LST is checked under both conditions: cloud clear condition and all cloud conditions(confidently clear, probably clear and probably cloudy)
- Generally the maximum LST under cloud clear condition is lower than that under all cloud condition, which indicates that the LST is affected by the smoke in the upper air. It is mostly less than 350 K. From LST product itself, it can represent the temperature up to 363 K.
- The affect from the sensor saturation is not investigated. For M-band 15 and M-band 16, the saturation temperature is around 340 K.

MiRS Products

May 2024

Accomplishments / Events:

- The MiRS science team recently published a paper in the IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS). The study compared the performance of five selected machine learning models regarding precipitation climatology during the warm season in 2022 and 2023 over the Continental U.S. Input features included retrieved products from the Microwave Integrated Retrieval System (MiRS) based on NOAA-20 ATMS data. Among the models, three used a U-Net architecture and two used a Deep Neural Network (DNN) architecture. The U-Net models all significantly outperformed DNN models for the evaluated metrics. Of the five experiments, that which used the MiRS retrieved column-integrated hydrometeors of graupel water path, rain water path, cloud liquid water, total precipitable water and geolocation information demonstrated the best performance, improving the MiRS spatial correlation coefficient from 0.75 to 0.89 and reducing the mean bias percentage from 11.95% to -6.33% for 2022 accumulated precipitation. This suggests that applying an appropriate architecture and input features provides an opportunity to determine more accurate physical and statistical relationships which can include spatial and regional dependence, leading to improved microwave-based precipitation estimates**.** See highlights for example.
- **Reference:** Liu S., Grassotti, C. & Liu, Q. (2024) Warm-Season Microwave Integrated Retrieval System (MiRS) Precipitation Improvement Using Machine Learning Methods, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Early access publication, doi: 10.1109/JSTARS.2024.3405651.

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				

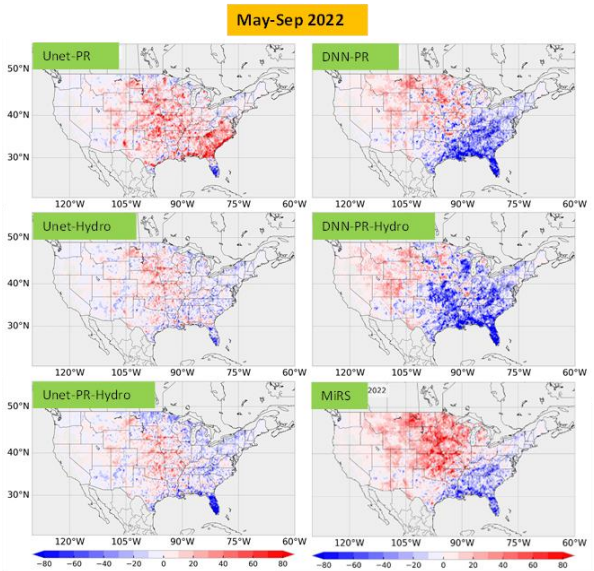
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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	Delivered as per ASSISTT schedule.

Highlights:



Biases of accumulated precipitation (mm) relative to the MRMS ground-based analysis of the five machine learning models studied during the period of 1 May to 30 September, 2022. Biases of the operational MiRS algorithm are also shown in the bottom right panel..

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

May 2024

Accomplishments / Events:

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- The JSTAR / STEMS team development effort continues to incorporate polar projection (and other projection specifications) views into the STEMS interface, an important new feature for visualizing products that have geographic or satellite source specificity.
- NUCAPS HEAP v4 for NOAA-21 (J02) was implemented into Operations on May 7 and the NPROVS was reconfigured (working with the NUCAPS and OSPO teams) switch access of the J02 NUCAPS EDR files from PDA I&T (STAR) to NCCF UAT (OSPO) (**HIGHLIGHT)**
- The JPSS / DOE InterAgency Agreement (IAA) in support of the JPSS Dedicated Radiosonde Program was forwarded (Joel Perlroth) to NOAA Legal and approved; a project for the formal transfer of funds from JPSS to DOE to purchase radiosondes has begun
- The NPROVS team supporting NWS/NASA/JPL efforts to create hourly "*NUCAPS / Forecast*" profiles completed critical re-configuration to provide routine validation baselined to (versus) hourly "HRRR regional forecast 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	Q2	

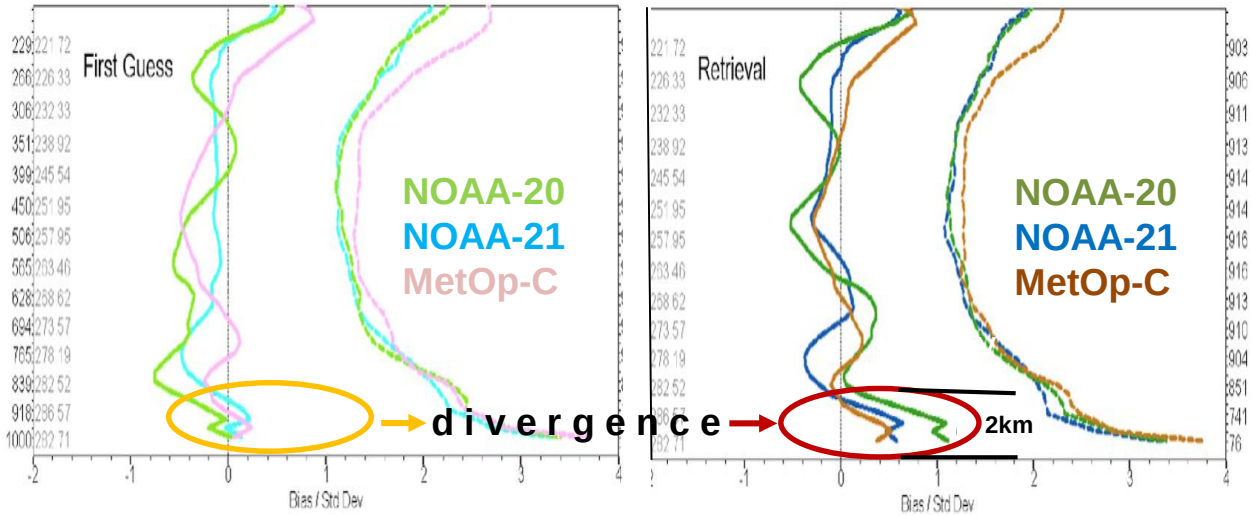
Overall Status:

	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



Bias (solid) and standard deviation (dashed) vertical statistics for the newly implemented (May 7) NUCAPS HEAP v4 are shown for the first guess (left) and final retrieval (right) color-coded for NOAA-20, NOAA-21 and MetOp-C. The baseline radiosonde sample is identical (NPROVS enterprise assessment) for all plots with the satellite and radiosonde profiles within 6hr and 100km. Typically, differences from the radiosonde decrease for the final retrieval compared to the first guess (convergence), however, near the surface (2km) the bias for the final retrieval appears to increase (divergence) up to 1.0K for NOAA-20; standard deviations are similar. Monitoring continues.

NUCAPS Products

May, 2024

Accomplishments / Events

- NUCAPS team evaluated the heatwave over the Indian subcontinent in the month of May 2024. The NUCAPS retrievals clearly show the heatwave (May 29, 2024) with warmer temperatures in comparison to the last year (May 29, 2023). Contrary to the NUCAPS retrieved heatwave temperatures, the JSTAR Mapper depicted retrievals inaccurately due to a changed color scale. The JSTAR Mapper requires a fix of the color scheme to this effect.
- Completed a one-year evaluation between NOAA-20 CERES (reference) and NOAA-21 CrIS OLR, NOAA-20 CERES and NOAA-20 CrIS OLR, and Terra CERES and MetOp-C IASI OLR. Results of evaluation show that the NUCAPS OLR products from both JPSS and MetOp series show very good agreement and meet the requirements.
- Continued validation and sustainment activities for the NUCAPS EDR products. These include:
  - Collection of validation data sets for the AVTP, AVMP, O3, OLR, CO, CH_4, and CO_2.
  - OLR product processing and continuation of validation exercises with NOAA-20 CERES
  - AEROSE-2024 data analysis adding the ECMWF analysis fields.
  - VALAR data processing and extending the VALAR data to April 2024.
  - TCCON measurements of CO, CH_4, and CO_2

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
DAP Delivery with updates related damping factor, surface corrections, MetOp-B/C Averaging Kernels	Oct-22	Oct-22	11/04/22	
NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs, and user support for the CrIS Beta Maturity Review	Feb-23	Feb-23	02/23/23	NOAA-21 K-band transmitter swap
NOAA-21 NUCAPS Product Beta Maturity	May-23	May-23	6/1/23	Beta attained effective 3/23
NOAA-21 NUCAPS T(p), q(p), O3(p), OLR, CO, CH4 and CO2 Provisional Maturity	Nov-23	Dec-23	Jan-24	Attained Validated Maturty
Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations	May-23	May-23	Mar-24	Continued updates to the data set
Addition of CAMEL emissivity database for the emissivity first guess	Mar-24	Jul-24	Minor Delays	Due to additional investigations
Mission-long reprocessing of NOAA-21 NUCAPS products: Reprocessing version and evaluation of reprocessed products	Jun-24	Jul-24	Minor Delays	NCIS infrastructure delays due to budgeting

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			

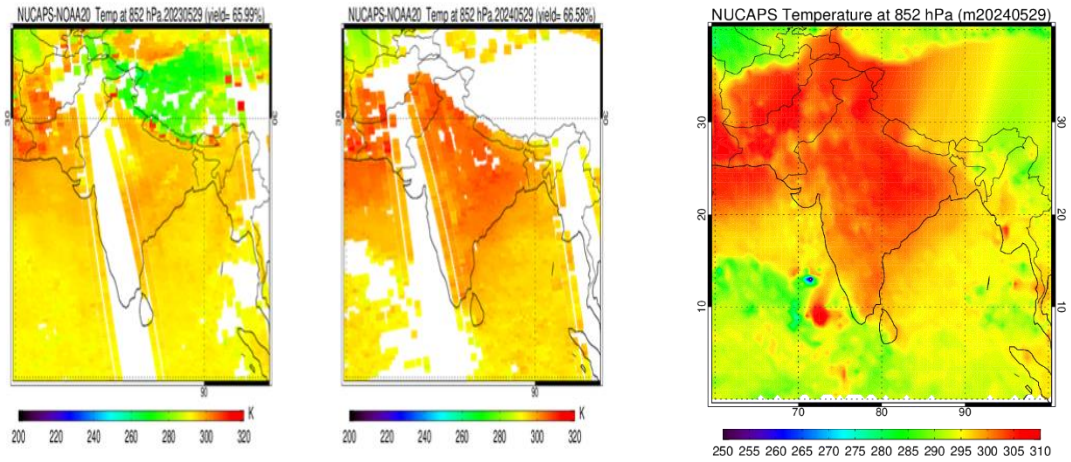
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Heatwave over the Indian subcontinent as depicted by the NUCAPS retrieval: Comparison of 850 hPa temperatures (a) May 29, 2023 ***vs*** (b) May 29, 2024, and (c) 3-day composite of NUCAPS 850 hPa temperature retrievals – May 2024.

(a) (b) (c)



Ocean Color

May 2024

Accomplishments / Events:

- The ocean color Cal/Val team has successfully completed the 9th dedicated cruise (May 20-June 2, 2024), covering ocean regions of FL coasts, the Gulf of Mexico, southeast Atlantic coast, and SC coast.
- Continue working with the STAR IT team for the upgrade Linux to CenOS 9 for VIIRS global ocean color data processing.
- Routinely producing VIIRS (SNPP, NOAA-20, and NOAA-21) true color/false color images in OCView.
- Routinely producing global VIIRS-NOAA-21 ocean color products, as well as those from VIIRS-SNPP and VIIRS-NOAA-20.

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

OMPS SDR

May 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.
- Continued the SNPP OMPS NP instrument degradation analysis to refine the degradation rate.
- Work continues on comparing OMPS SDR and GEMS data. The analysis was expanded to compare GEMS data with data from NOAA-20 NM
- Assessed differences between door-open and door-closed dark rates.
- Impacted impacts of macropixel bandpass files on synthetic irradiance spectrum and RTM simulation accuracy

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 an ongoing process
Improve latitude dependency of inter-sensor biases; reprocess (limited) N21 OMPS NM/NP SDR data set (new dark LUT); assess the consistency of N21 across NM and NP at the dark/soil orange; 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		Mar-24	
Reprocess the (SNPP, NOAA-20 and NOAA-21) OMPS NP SDR data by using the new dark, DSOL and SL tables; Initialize the OMPS and GEMS inter-sensor comparison analysis	May-24			
Document the technical reports (e.g., SL correction, solar intrusion correction, solar activity impact correction, NM along-track wavelength shift correction; update OMPS NM/NP SDR ATBD	Jul-24			
Develop new algorithm or code to support J3/J4 prelaunch testing and verification; analyze the pre-launch test datasets for J3 or J4 upon the availability of the datasets	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 DSOL LUTs for SNPP/NOAA-20/NOAA-21	Sep-24			
Maintain SNPP/NOAA-20/NOAA-21 OMPS SDR data quality	Sep-24			

Preliminary radiance percent differences between GEMS and NOAA-20/-21 OMPS NM SDR

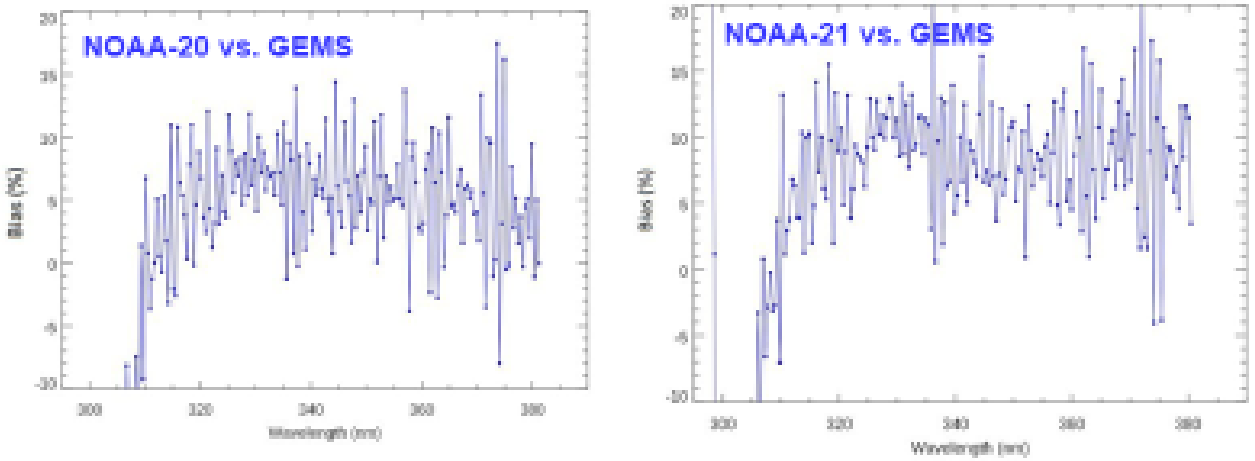
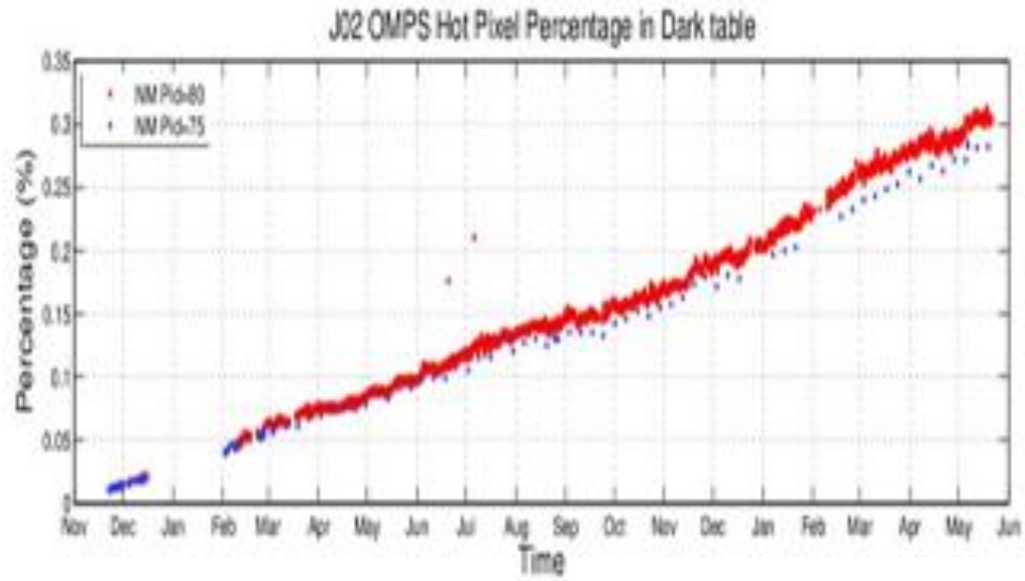
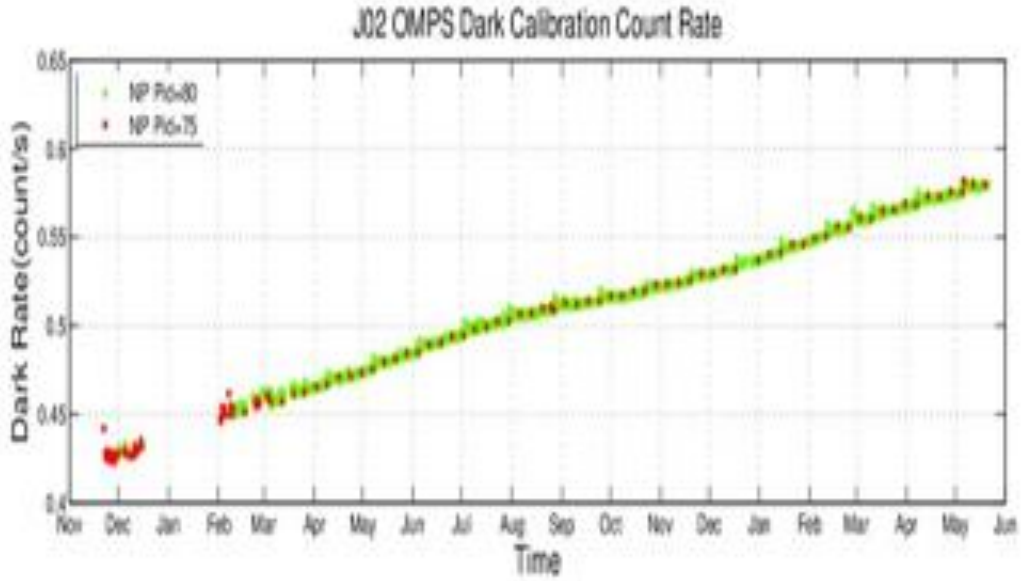
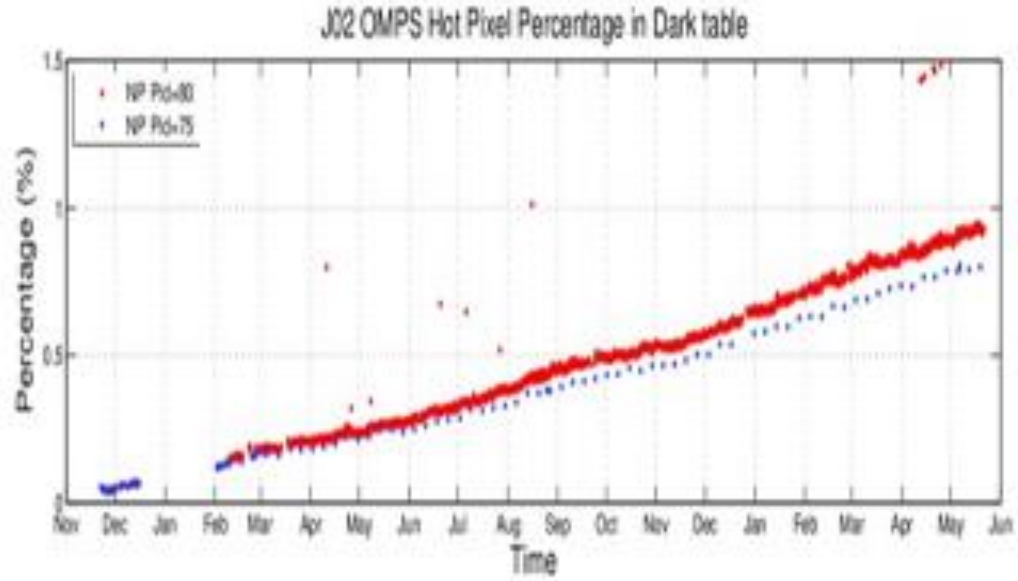


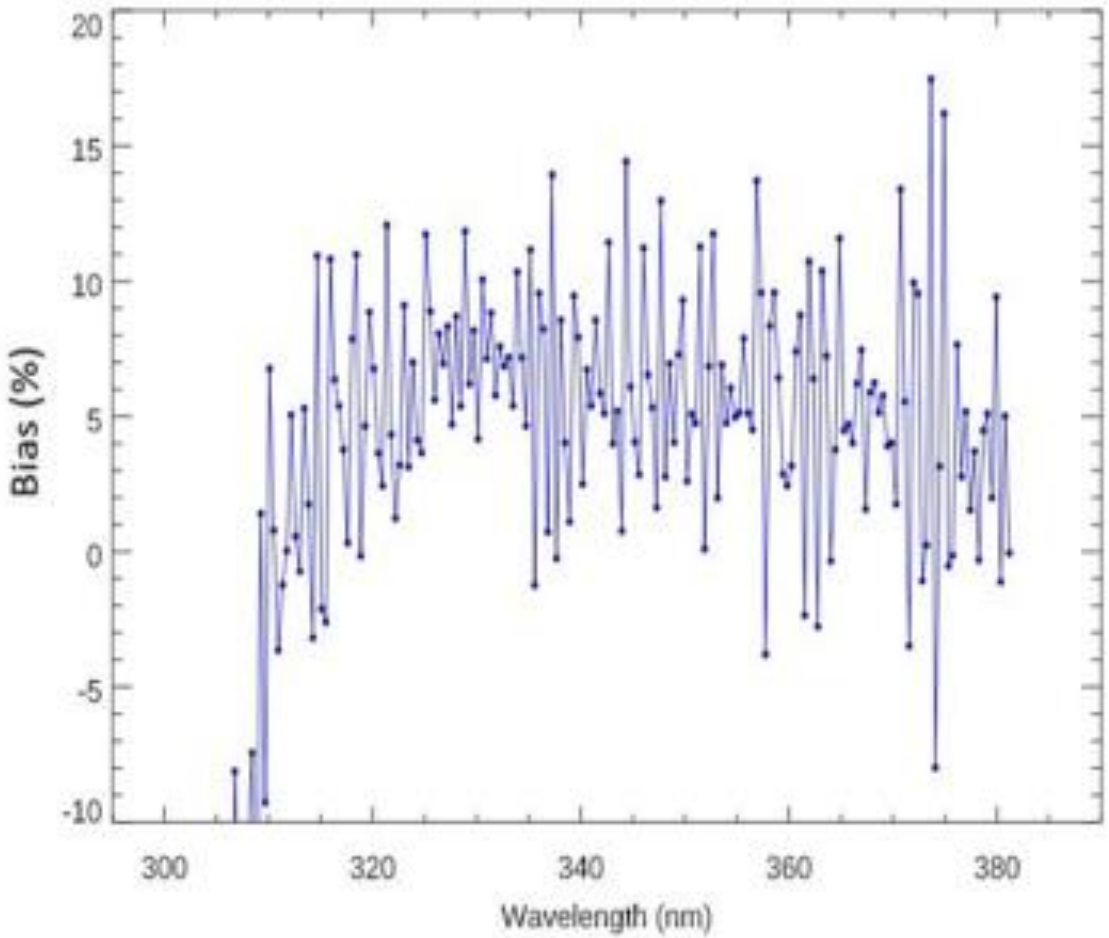
Figure 7: Preliminary radiance percent differences between GEMS and NOAA-20 (left) and NOAA-21 (right) OMPS, where GMES SDR data version is not their optimal version. Further analysis is still in progress to reduce impact of instrument spectral and spatial resolution discrepancies between two instruments.

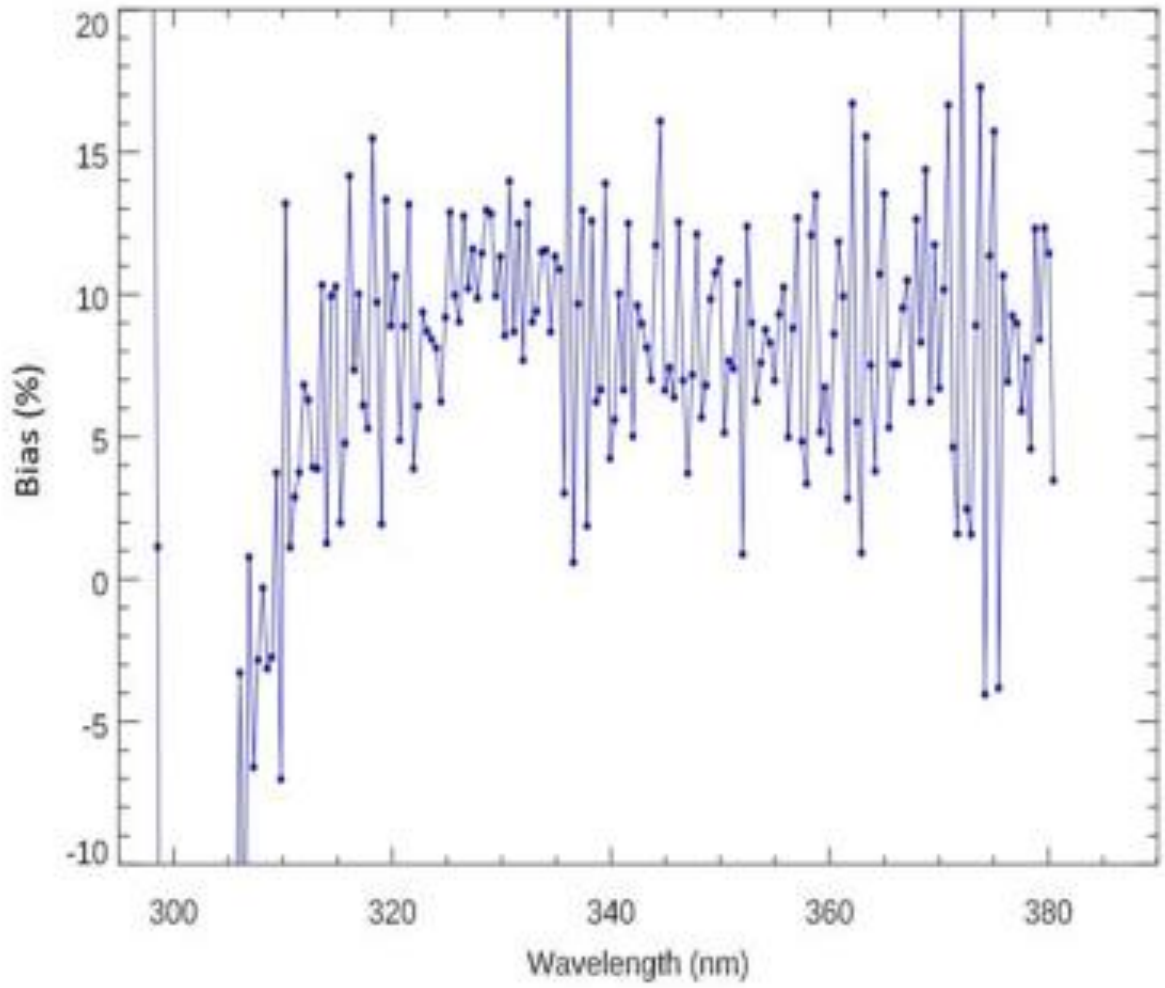

J02 OMPS Dark Calibration Count Rate
NM Pix=80
NM Pix=75
Dark Rate(count/s)
Time


J02 OMPS Hot Pixel Percentage in Dark table
NM Pix=80
NM Pix=75
Percentage (%)
Time


J02 OMPS Dark Calibration Count Rate
NP Pix=80
NP Pix=75
Dark Rate(count/s)
Time


J02 OMPS Hot Pixel Percentage in Dark table
NP Pix=80
NP Pix=75
Percentage (%)
Time


Bias (%)
Wavelength (nm)
20
15
10
5
0
-5
-10
300
320
340
360
380


Bias (%)
Wavelength (nm)
20
15
10
5
0
-5
-10
300
320
340
360
380

OMPS Ozone (V8Pro, V2Limb & V8TOz)

March 2024

Accomplishments / Events:

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

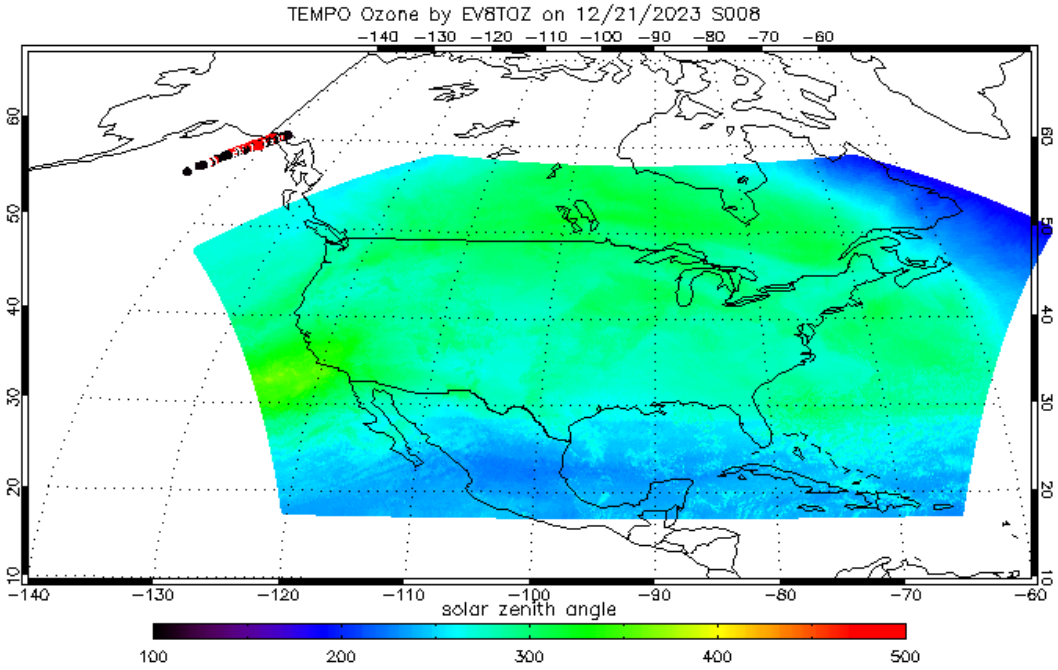
Milestones	Original / Current Date	Forecast Date	Actual Completion Date	Variance Explanation
Successfully complete GOME-2 NCCF ORR	Aug-23		Nov-23	
Provide new Level 1a, 1b & 1g for S-NPP OMPS V2Limb	Dec-22		Dec-23	NASA R&D
Provide Level 1a, 1b, 1g & 2 (aerosol and ozone) for NOAA-21 OMPS V2Limb to ASSISTT	Jan-23		Mar-24	NASA R&D
Update V8TOz and V8Pro tables for NOAA-21 Provisional	Feb-23 Mar-23		Aug-23 Dec-23	SDR Instability
Update V8TOz tables for Metop-B & -C	Apr-24	May-24		
N21 V2.7Limb to Beta	Jan-24	Apr-24		Timing Pattern
N21 V2.7Limb to Provisional	Feb-24	May-24		
N21 V2.7Limb to Fully Validated	Sep-24	Aug-24		
V8Pro to Fully Validated	Mar-24	Apr-24		SDR Progress
V8TOz & V8TOS to Fully Validated	Mar-24	Apr-24		SDR Progress
Reprocess NPP V8Pro for 2023	Apr-24		Mar-24	Dark Table
Reprocess N20 V8Pro for full record	Jun-24	TBD		SDR
J4 / N22 Revised Cal/Val Plan	Sep-24			

Overall Status:

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

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

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



Enterprise V8TOz Applied to TEMPO

Sea Surface Temperature

May 2024

Accomplishments / Events:

- We worked on migration of our SST code and routine processing systems from CentOS 7 to CentOS 9 Stream. CentOS 7 is end of life (EOL) after June 30, 2024. After this date, any machines remaining on CentOS 7 will be turned off by STAR IT.
- The build system and library versions for almost all SST software had to be updated to run on CentOS 9. This process is ongoing.
- Our current workflow manager (Apache Airflow 1; using python 3.7) is not compatible with CentOS 9. We are in the process of migrating all our routine processing tasks to Airflow 2 (using Python 3.11). It is about 200 tasks in total. There are several backward compatibility breaking changes so tasks must be migrated one at a time and tested. As of May 31, we have migrated about 10% of tasks. We are on track to finish migration before CentOS 7 EOL.
- The SST team had a presentation at the CoastWatch Annual Meeting in College Park. The subject was an overview of ACSPO SST products available at CoastWatch. VIIRS SST products played a pivotal role (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.*

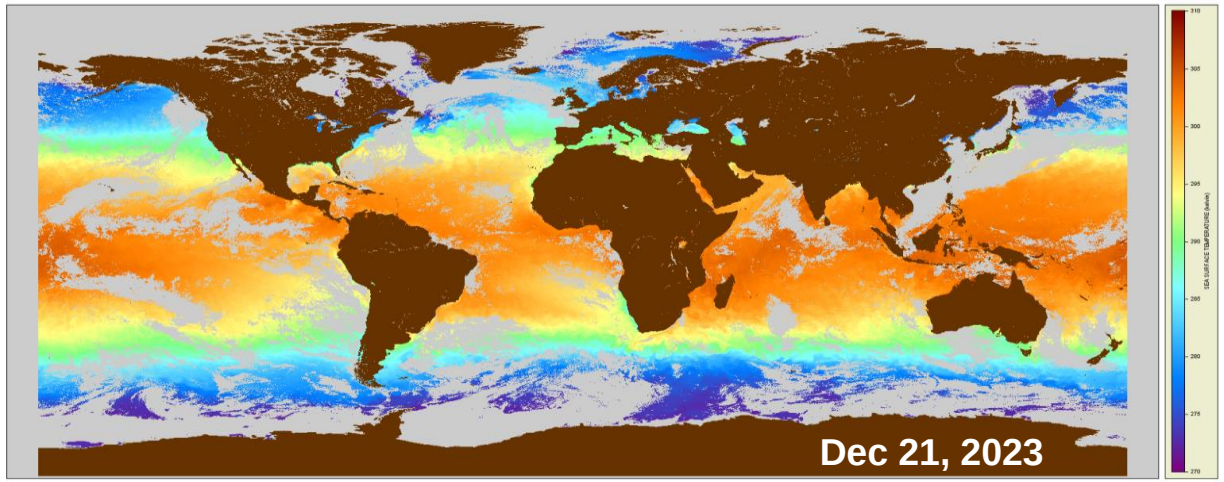
Issues/Risks:

NOAA STAR migration to the CentOS 9 operating system is causing reduction in our capability to do full-mission VIIRS SST reprocessing. We are attempting mitigate the issue by purchasing Red Had Enterprise licenses.

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

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SST EDR support to SDR team on Warm up - Cool down anomalies	Feb-24	Feb-24	Jan-22	
SST EDR Support to JPSS-3 Data System Test Event *(Dependency on JPSS)*	~~Apr-24~~	~~Apr-24~~		Delay due to dependency on JPSS test event; new timeline unknown
SST EDR Enterprise Cal/Val and ACSPO Algorithm "Agency Report" Presentation to GHRSST science community	Jun-24	Jun-24		
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*: VIIRS SST Products at The 2024 CoastWatch Annual Meeting**



Example slide from presentation by the SST team at the 2024 CoastWatch Annual Meeting at College Park. Figure shows L3S-LEO-Daily imagery (VIIRS + AVHRR; day + night) with impressive ~65% global coverage.

Snowfall Rate

May 2024

Accomplishments / Events:

- The SFR team has started the task to cross calibrate SFR for all operational satellites. This task will improve the inter-satellite consistency. The planned approach is to perform histogram matching with ground- and space-based radar snowfall rate estimates for each satellite.
- ASSISTT delivered the SFR update final CCAP to NCCF on May 13. This package includes the Provisional NOAA-21 and GPM.

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	Feb-24	
NOAA-21 SFR provisional maturity review	Feb-24	Feb-24	Feb-24	
Enterprise SFR science code delivery to ASSISTT including N21 provisional maturity SFR	Feb-24	Feb-24	Feb-24	
Cross validation among NOAA-21, NOAA-20, and S-NPP SFR products	April-24	April-24	April-24	

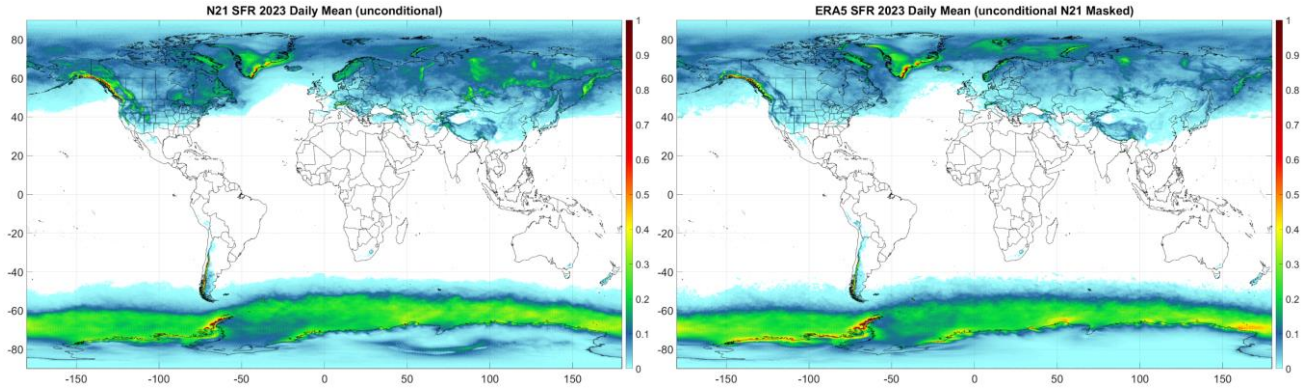
Overall Status:

	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:



Comparison of snowfall rate daily mean between NOAA-21 (left) and ECMWF reanalysis ERA5 (right). The two products agree well with each other in most regions of the globe.

Surface Albedo

May 2024

Accomplishments / Events:

- Prepared VIIRS Albedo PMR slides
- Discussed the SNPP VIIRS LSA reprocessing plan
- Monitored the cessation of S-NPP albedo data while the NOAA-20 albedo is normal
- Completed initial review of NOAA-21 surface reflectance data for VIIRS BRDF retrieval
  - Pending update on calibration among S-NPP, NOAA-20, and NOAA-21 surface reflectance
- Developed a preliminary method to estimate potential heat-caused death count (Slides #**2-#5**)

Overall Status:

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

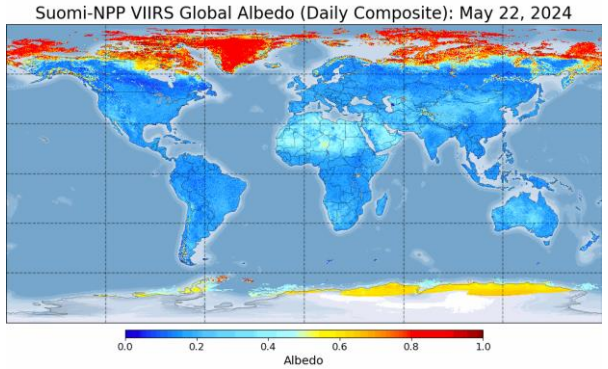
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

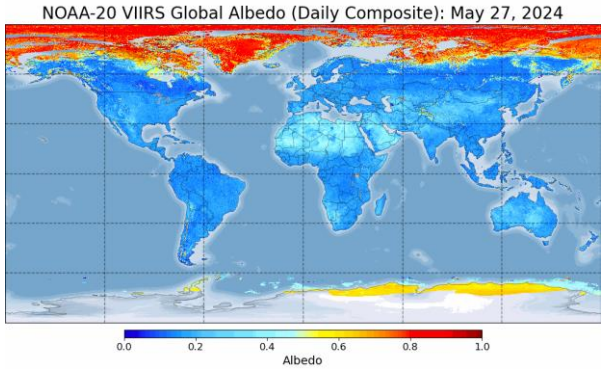
Issues/Risks:

Milestones	Original Date	Forecast Date	Actual Completion	Variance Explanation
Share the soil albedo dataset with model users	Dec-2023	Dec-2023	Dec-2023	
Multi-parameter anomaly analysis report	Jan-2024	Jan-2024	Oct-2023	
Provisional maturity of NOAA-21 Albedo	Feb-2024	Jan-2024	Jan-2024	
VIIRS BRDF/Albedo/NBAR Dataset to User	Oct-2023	May-2024	Oct-2023	
BRDF evaluation (manuscript)	Dec-2023	Feb-2025		Product pending support to integrate
Enterprise Cal/Val Plan Initial Updates	Jun-2024	Jun-2024	Apr-2024	
*NCCF Integration of BRDF/BSA/WSA/NBAR	May-2024	Aug-2024		Product pending support to integrate
Software package ready of blended SURFALB from all VIIRS sensors	Jun-2024	Sep-2024		Team member change
NOAA-21 validated maturity review	May-24	Sep-24	Jan-2024	

Highlights:

Daily Albedo monitoring about the latest 7-day data map





S-NPP albedo has been disabled since May 28th due to issues with the GPS unit.
The NOAA-20 albedo data remains normal.

Heat-associated death data (extracted from CDC statistics)

- Heat-associated death data, obtained from the CDC's WONDER database (wonder.cdc.gov), provides comprehensive mortality statistics across the United States.
- This dataset includes cause-specific mortality, allowing for the identification of deaths directly attributable to heatwaves.
- However, the data include only heatwave-related deaths and are aggregated on a monthly scale and presented in tabular format for each state.
- To facilitate a more detailed analysis that correlates with geographical LST data, we have projected the tabular state-level data onto maps.

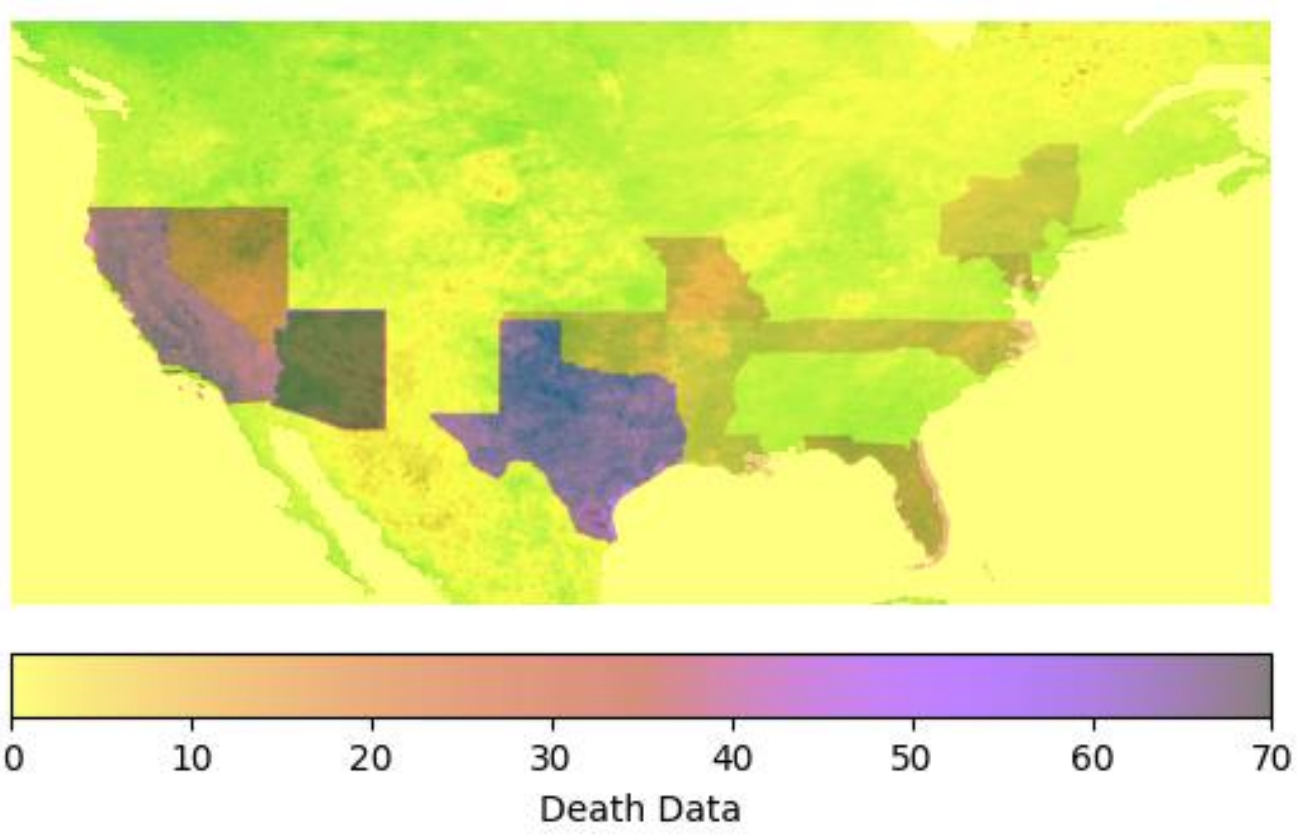


Figure 1. Distribution of death due to heat conditions in year 2005 from May to September

Our goal is to predict the death count from the anomaly of land surface temperature and population distribution.

Detected heat and cold events from monthly LST anomaly

- The right figure shows an example of heat/cold event detection using monthly LST data from July 2020. The detected areas are those with significant deviation from multi-year average and relatively large area coverage were detected.
- Borders of each of the detections were used to calculate statistics of areas embodied in each of the shapes, including LST, LST anomaly, population count, and number of venerable groups. These statistics are used as input features for random forest model training.

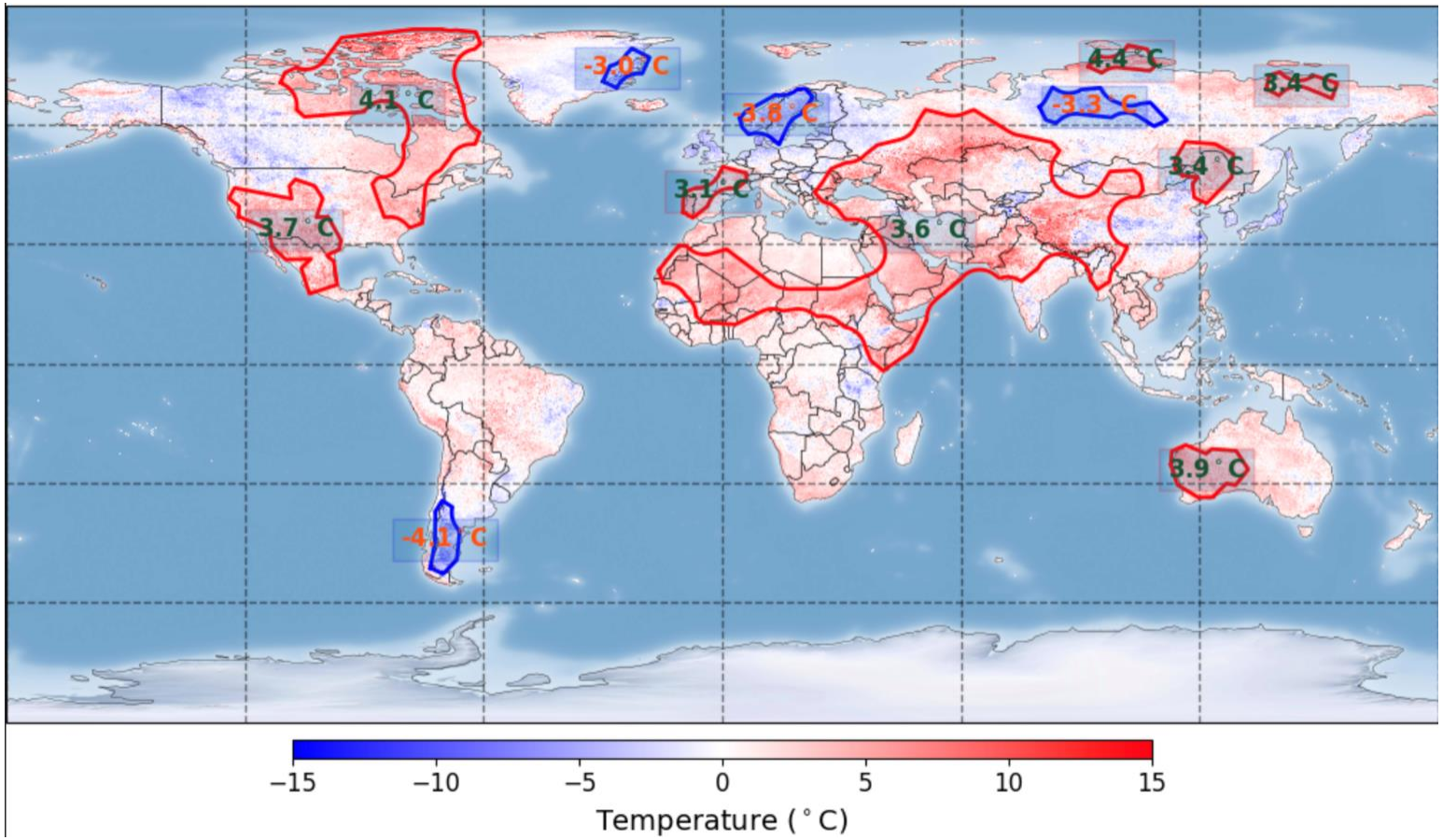


Figure. Anomalous temperature detection for July 2020. Shapes with red/blue color borders indicate heatwave/cold wave detected by the algorithm.

The data features (in 70% training dataset) over the detected events

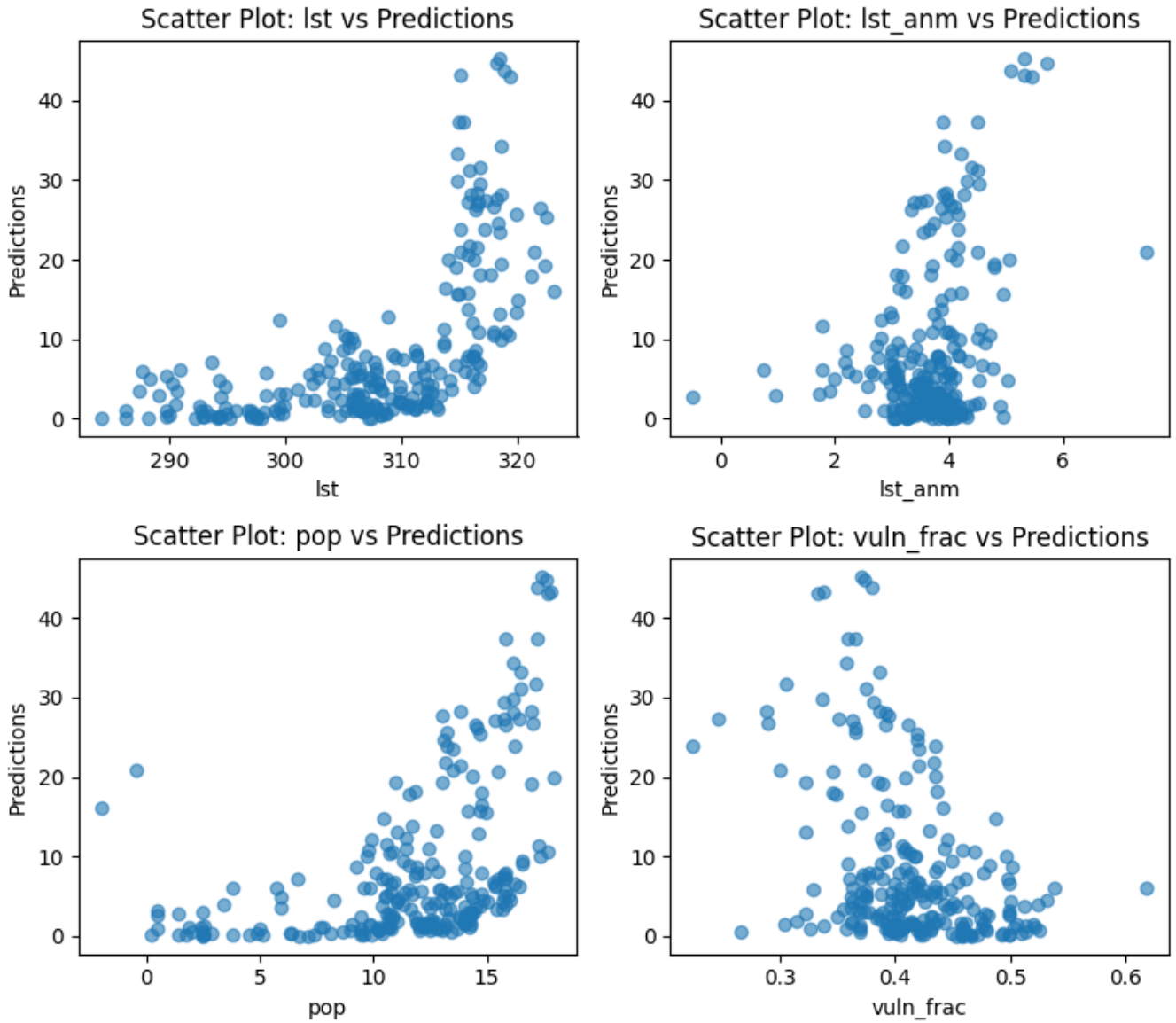


Figure The scatterplots between the input features and the predictions in the training dataset. up left: LST; up right: LST_anomaly; lower left: log(Population); lower right: Fraction of vulnerable age population.

The scatter plot of LST and predictions shows a clear positive relationship, indicating that higher temperatures are strongly associated with higher predictions. Similarly, the log of population also exhibits a positive relationship with predictions. The scatter plot of LST anomaly and predictions displays a weaker but still notable relationship, with higher anomalies occasionally corresponding to higher predictions. In contrast, the scatter plot of the log of population and predictions shows a weak relationship, with most points clustered at lower population values. The vulnerable population fraction shows a poor correlation. Overall, the scatter plots suggest similar distributions with the training and validation datasets.

Estimating the mortality based on heatwave events features

- Variable: LST (T), Importance: 0.42
- Variable: Population (P), Importance: 0.24
- Variable: LST_anomaly (Ta),Importance: 0.18
- Variable: Vulnerable_Population_Fraction (Pv), Importance: 0.16

The figure shows a comparison between the actual and predicted mortality numbers for various heatwave events. Red contours mark the regions impacted by heatwaves, with each region labeled with the actual and predicted mortality numbers. The performance appears fairly good.

It is important to note that the plot is based on a specific period, and it is unclear whether these cases are part of the training dataset or the validation dataset.

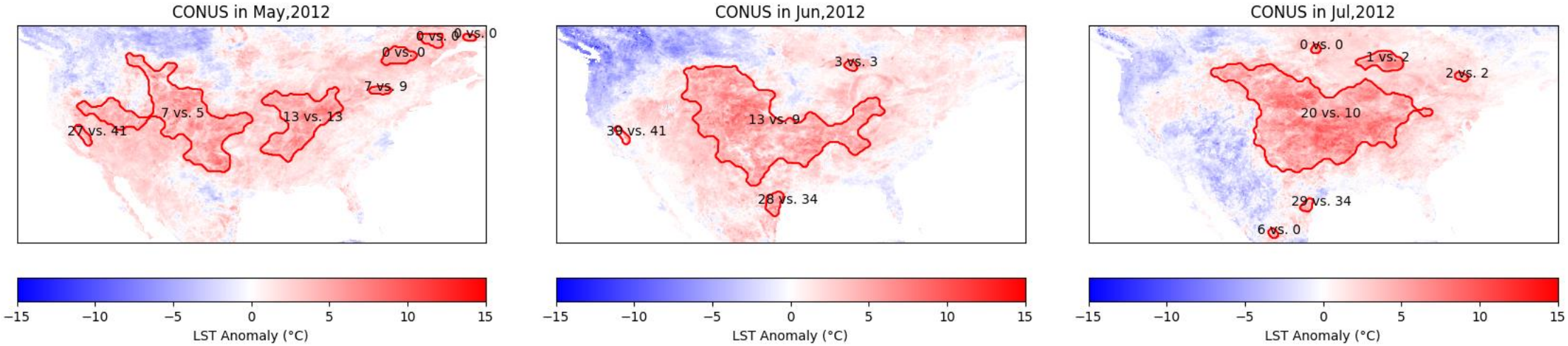


Figure. The Estimated mortality number of heatwave events cases in CONUS. The actual number and predicted number (true vs. prediction) are demonstrated over each event.

Surface Reflectance

May 2024

Accomplishments / Events:

- Update the BRDF correction coefficients and the 5km SR aggregation algorithm to be consistent with the NASA MODIS algorithm. Generate the new SNPP and NOAA20 NBAR dataset for consistency evaluation.
- Generate the SR test dataset using the reprocessed SDR, along with other input data such as AOD and Cloud mask. Evaluate the consistency of the BRDF-adjusted SR and the downstream products like LAI.
- Prepare the mitigation algorithm software package, which is developed to address the uncertainty due to a misclassified dust aerosol model. Prepare the test datasets and validation results.
- Continue working on the SR monitoring and validation, diagnose suspicious issues, and respond to users' questions.

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			

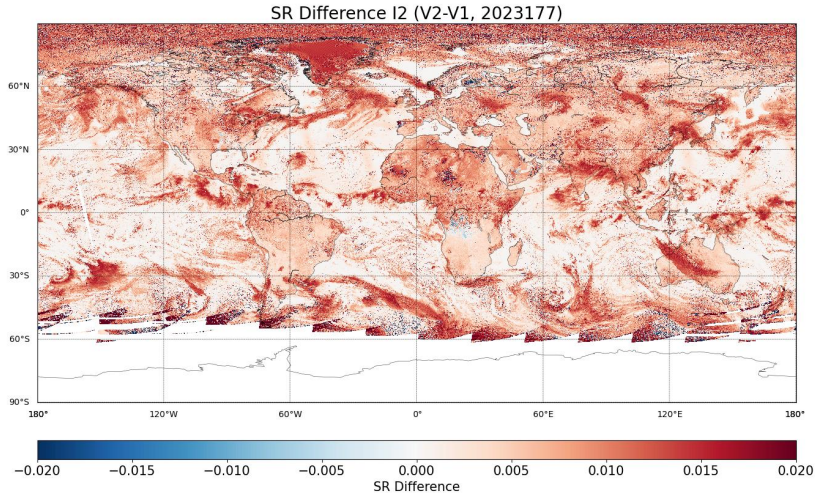
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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	Mar 28, 2024	
GOES-R enterprise SR algorithm development and experimental product	Jun-24	Jun-24		
Operational Readiness Review (ORR) for NDE Migration to NCCF	Aug-24	Aug-24		

Highlights:



The recalibrated SNPP SR compared with current SR of VIIRS I2 band, the results show significant difference.

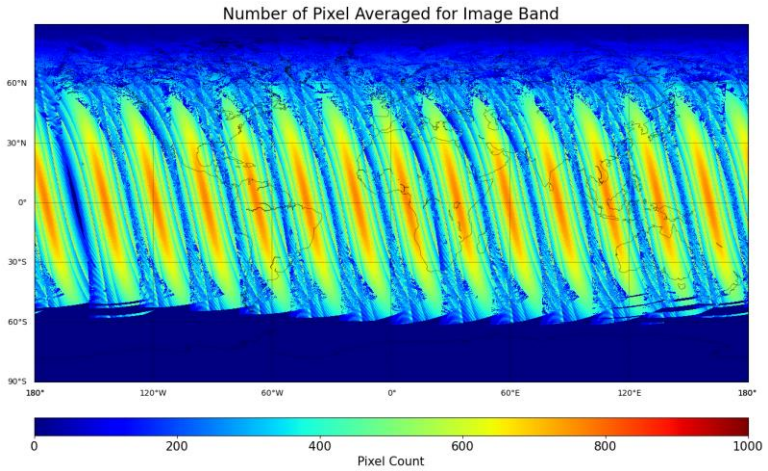
BRDF Correction using 5km resolution SR

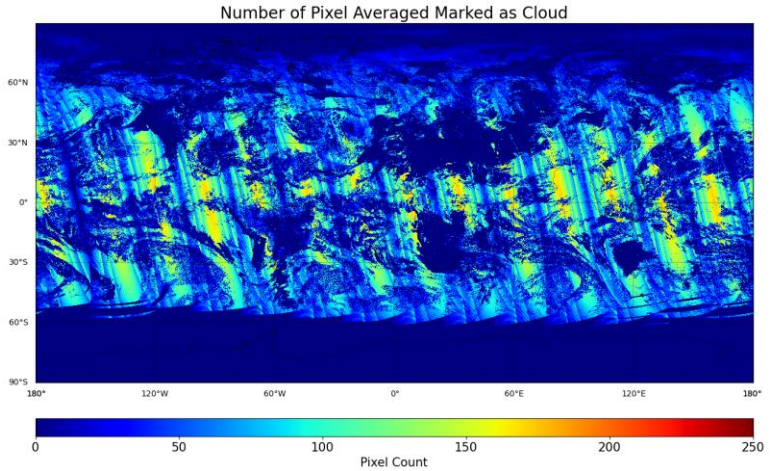
- Climate Modeling Grid (CMG) SR Dataset.
  - The BRDF correction coefficients are derived based on MODIS CMG data, so the correction work best on same format data.
  - Based on level 2 SR, use all pixels in a single granule to mapping to fix CMG grid, the pixel count along with the cloudy/snow pixel count are saved for quality flag.
- BRDF Correction
  - A new coefficients derived from multiple year SR data are applied for the correction.
  - The BRDF coefficients is calculated by regression coefficients (Rs, Ri, Vs, Vi) along with the real time NDVI.
  - The NBAR (ρ^N) is calculated by the following equations.

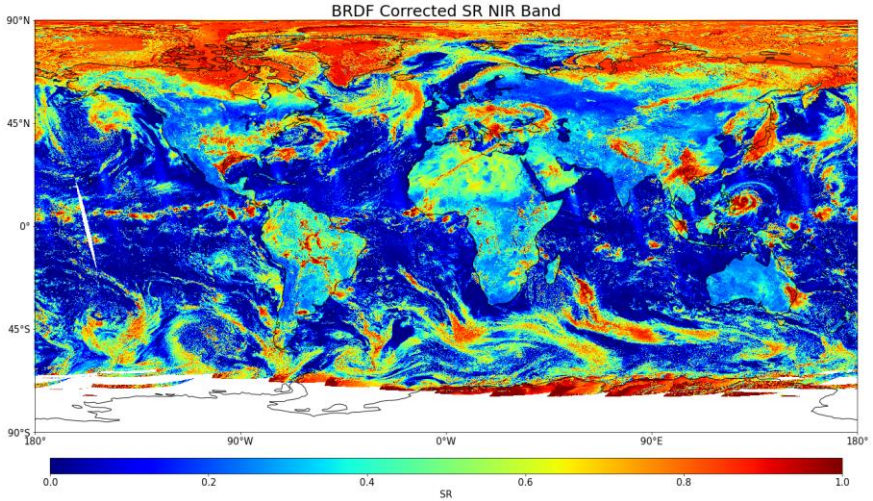
$$\rho^N = \rho \frac{1 + VF_1^N + RF_2^N}{1 + VF_1 + RF_2}.$$

$$R = R_{slope}\, NDVI + R_{intercept}$$

$$V = V_{slope}\, NDVI + V_{intercept}$$

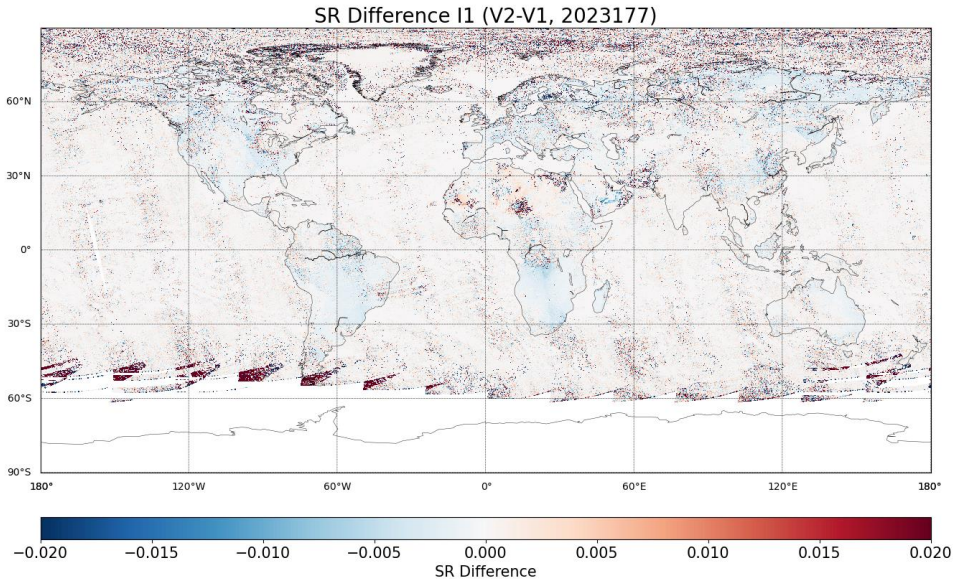


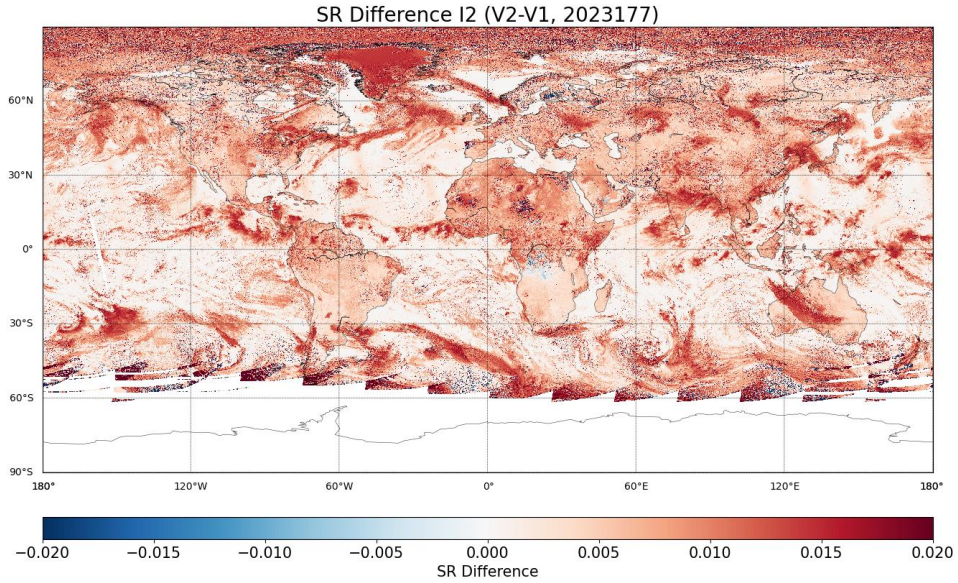




Reprocessed SR Dataset

- Reprocessed SR Dataset.
  - The reprocessed SR is based on the reprocessed SDR from NOAA SDR team, all other inputs data are keeping the same.
  - The SR algorithm used the latest v1r3 version, which use updated LUT and quality flags.
  - The comparison shows the reprocessed SR with significant difference in I2 (NIR) bands, while I1 band with slight difference.
  - The reprocessed SR will have a significant impact on vegetation product which is highly dependent on NIR band





Surface Type

May 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 Map of 2024 for the production of AST-2024.
- The team is evaluating the maturity of NOAA-21 and its synergy with NOAA-20 and S-NPP for surface type monitoring.
  - Use of NOAA-21 together with NOAA-20 and S-NPP can substantially reduce the cloud cover in global composites, especially over short compositing periods (see the Highlights).
- The team continues to improve the SVM classification derived based on VIIRS surface reflectance data acquired in 2023 through post-processing, which will result in a final AST product for 2023.

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			

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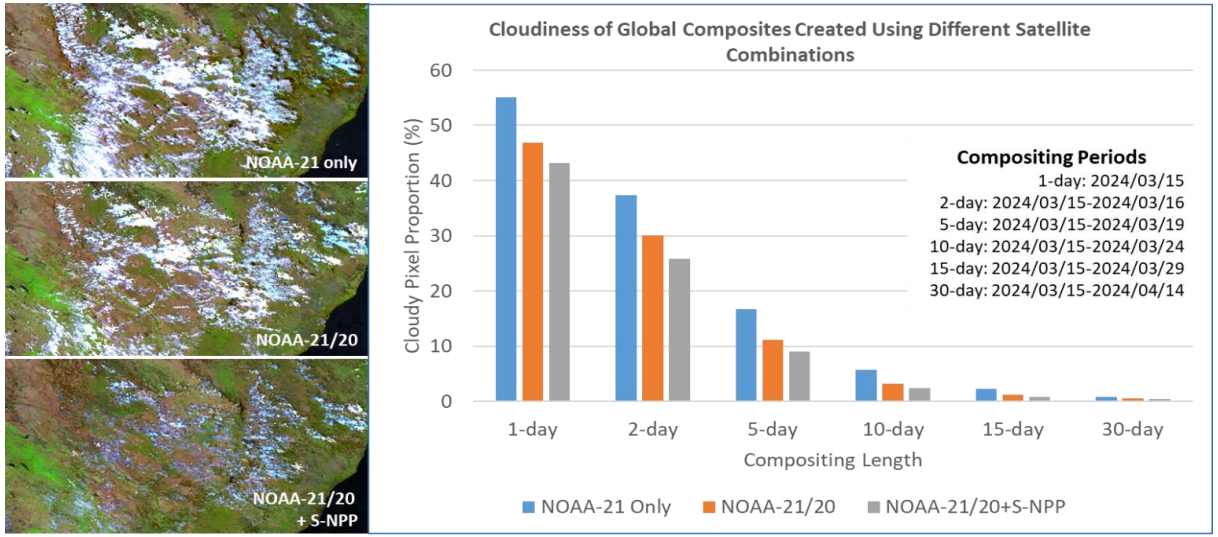
Issues/Risks:

None

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

Highlights:

Multi-Satellite Reduces Cloudy Observations in Global Composites



Daily composites created using two and three satellites have substantially less cloud cover over eastern India than that created using one satellite (left). Globally, multiple satellites are more effective in reducing cloud cover over shorter compositing periods than longer periods (right). The images on the left show VIIRS M10/7/5 bands in red, green, and blue. Cloud pixels have while or cyan color tones.

Vegetation Health

May 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 monitoring the heat wave development in southern Asia using VIIRS Vegetation Health Indices data products and found the regions suffering severe heat wave have shifted from Southeast Asian countries (e.g. Vietnam, Thailand, Cambodia, Laos and Myanmar) to India and Pakistan within the past month from early May to early June as shown in the maps of Thermal Stress derived from Temperature Condition Index (TCI). The severe heat wave in northwestern India has caused more than 50 deaths as reported by many major media news (e.g. https://www.eastmojo.com/features/2024/06/04/map-record-breaking-heat-in-india).

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

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			

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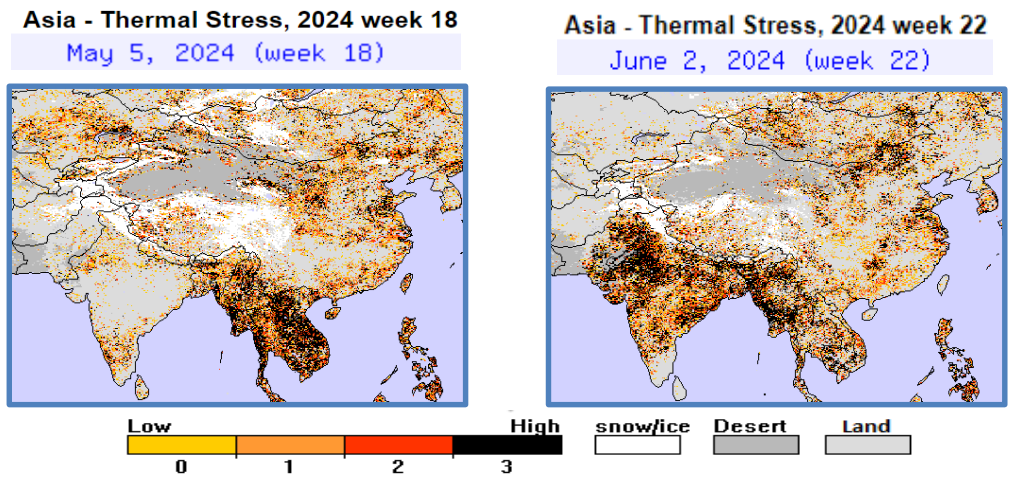
Issues/Risks:

None

Highlight: Southern Asia heat wave regions have shifted from southeastern Asian countries in early May to India and Pakistan in early June. More than 50 deaths caused by the heat waves in India in early June, 2024.



Vegetation Index and Green Vegetation Fraction

May 2024

Accomplishments / Events:

- Generated additional case studies of VI downscaling.
- Finished draft manuscript on VI downscaling.
- Transferred Sentinel 2 and moderate-resolution subset code (part of high-resolution VI downscaling) in preparation for summer intern.
- Selected sites for intern to analyze and found corresponding data granules/ tiles
- Initial code redesign and one-month test run for producing combined VI, GVF, Vegetation Health

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			

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3. *Project has deviated slightly from the plan but should recover.*
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Issues/Risks:

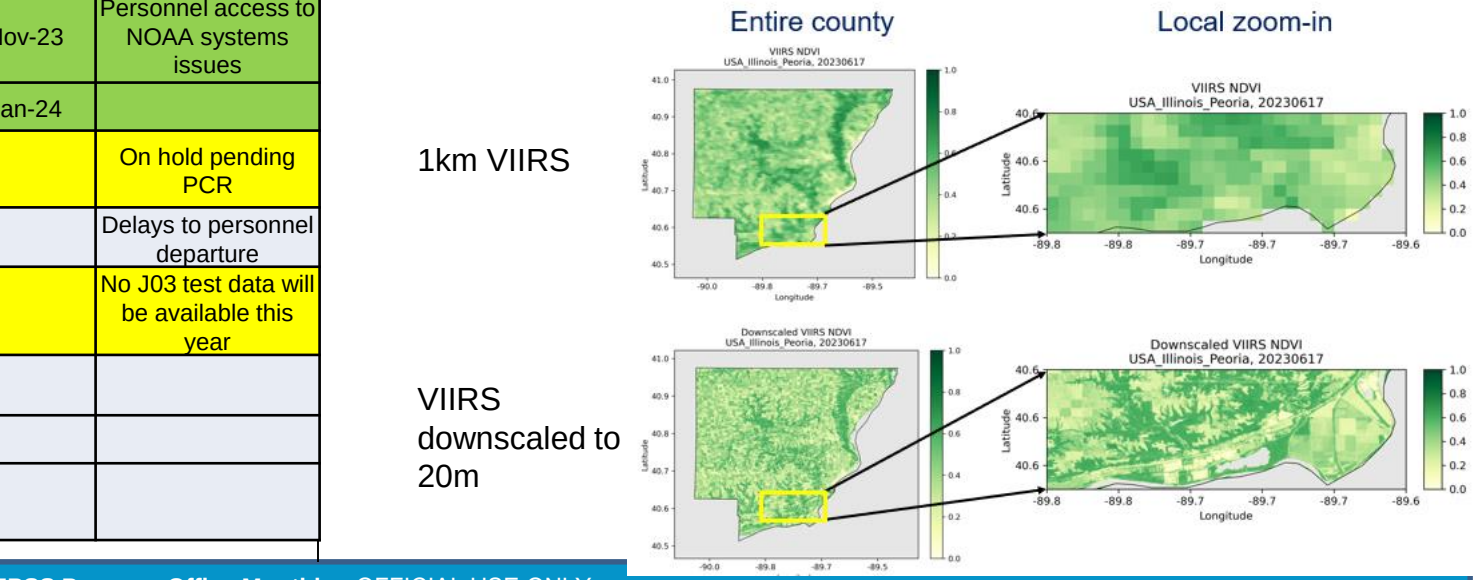
None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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		On hold pending PCR
Experimental data test of blended VI and GVF products	Apr-24	Jun-24		Delays to personnel departure
Support to JPSS-3 Data System Test	Apr-24	Apr-24		No J03 test data will be available this year
Readiness for NCCF migration	Aug-24	Aug-24		
Annual algorithms/ products performance report	Aug-24	Aug-24		
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-24	Sep-24		

Highlights:

Additional case study of high-resolution VI

NDVI at Peoria county, IL, 20230617



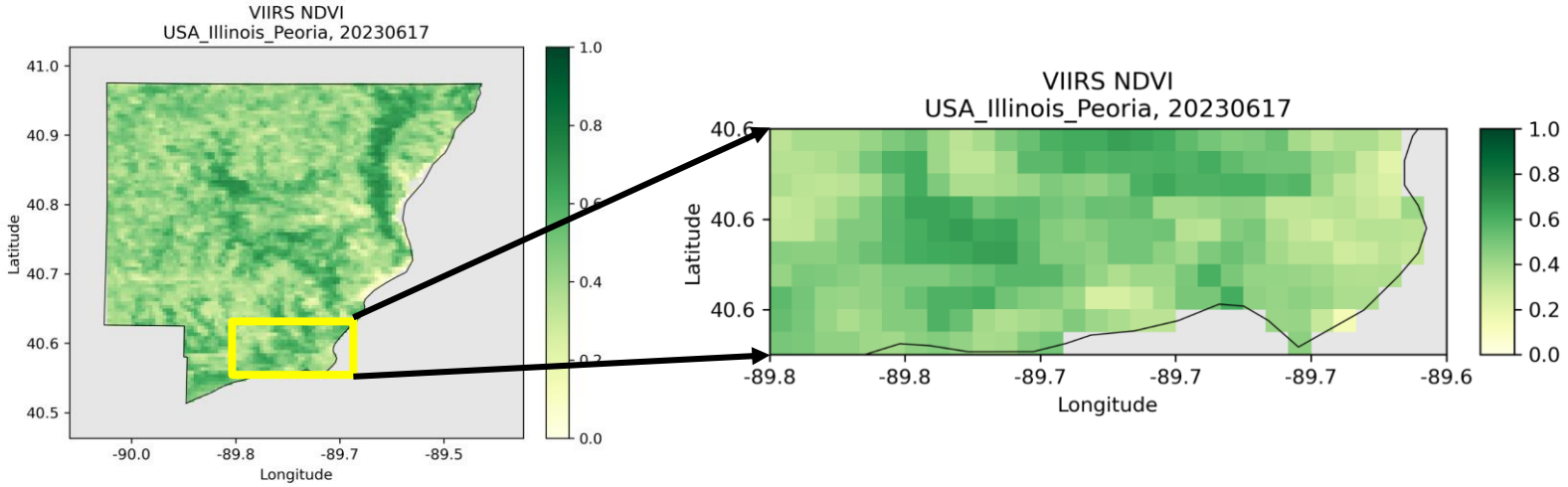
Additional case study of high-resolution VI

NDVI at Peoria county, IL, 20230617

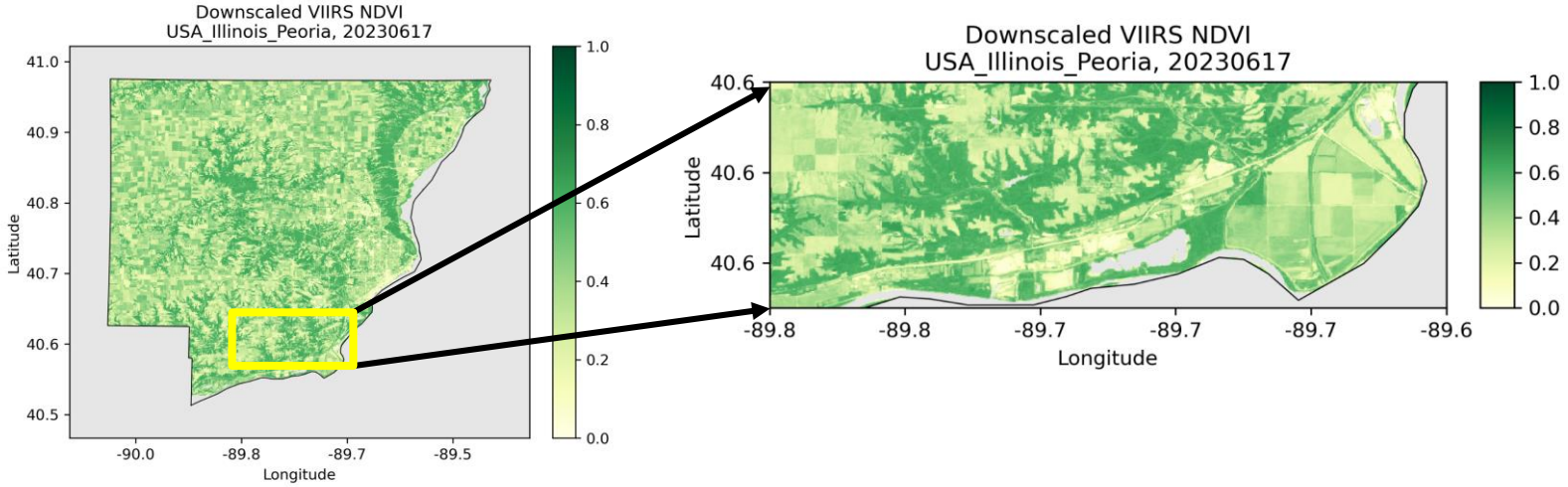
Entire county

Local zoom-in

VIIRS 1km NDVI product



VIIRS downscaled 20m NDVI



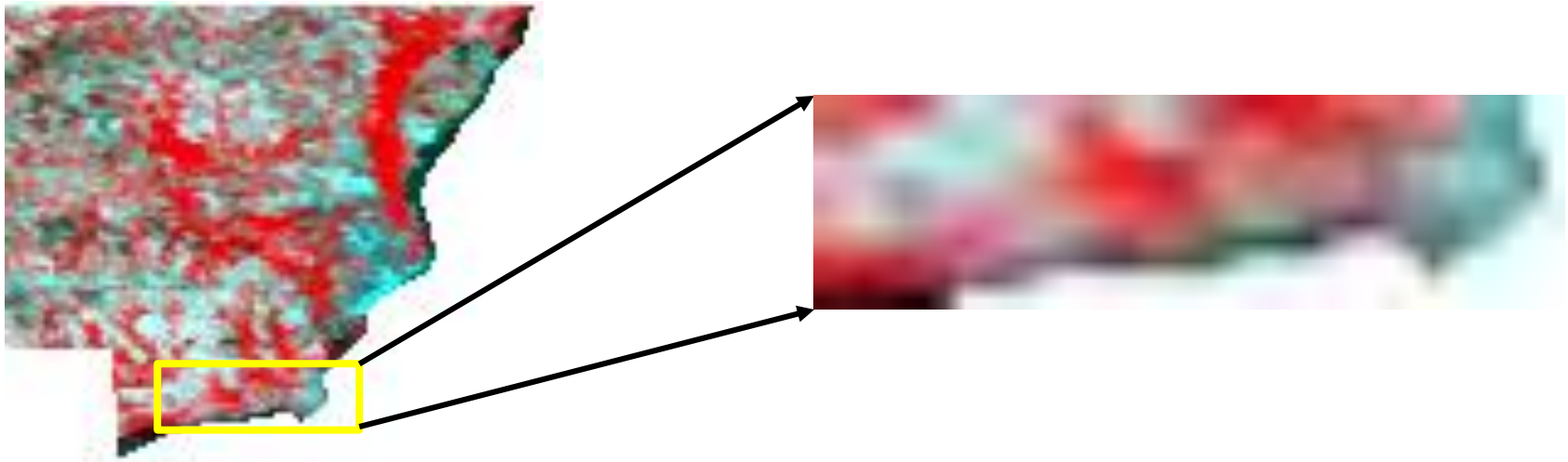
Additional case study of high resolution VI

Image at Peoria county, IL, 20230617

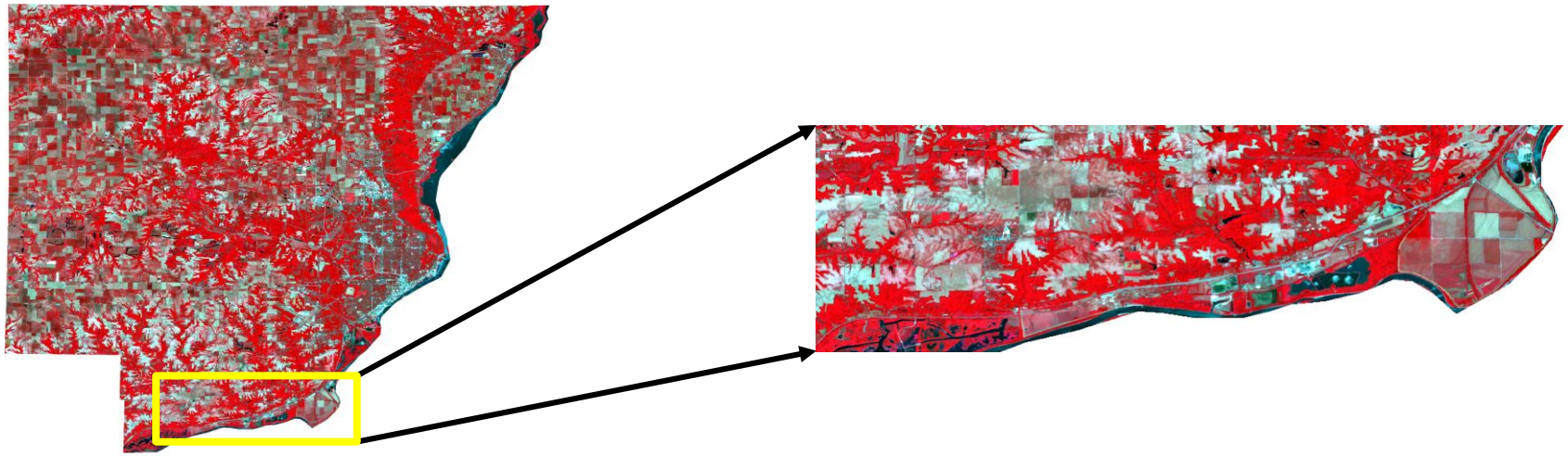
Entire county

Local zoom-in

VIIRS original 750m image (NIR-R-G composited)



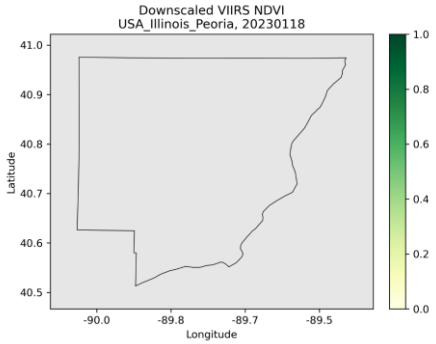
VIIRS downscaled 20m image (NIR-R-G composited)



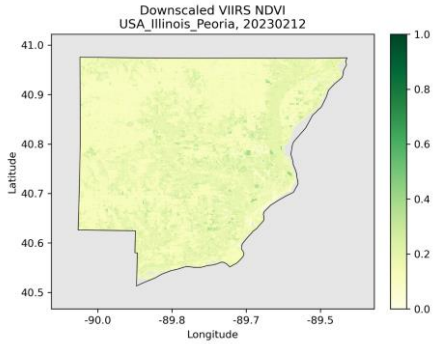
Additional case study of high-resolution VI

NDVI timeseries at Peoria County, IL

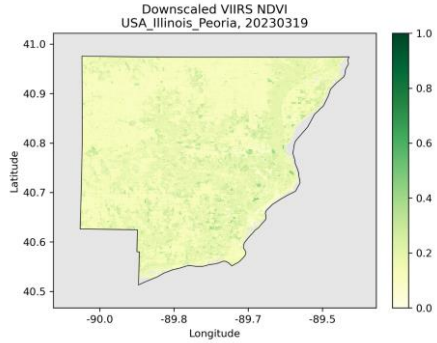
VIIRS downscaled 20m NDVI timeseries (approximately one for each month for example in 2023)



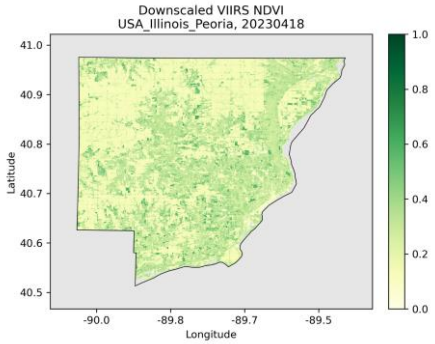
Jan



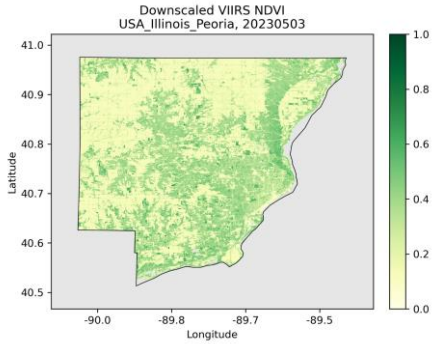
Feb



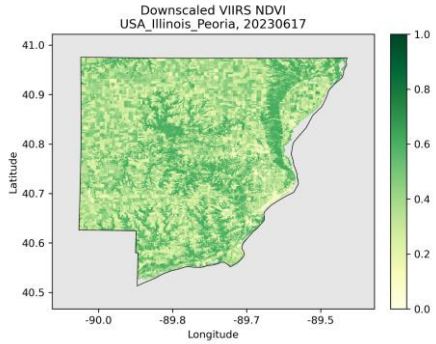
Mar



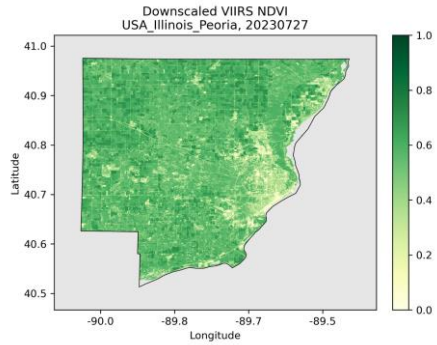
Apr



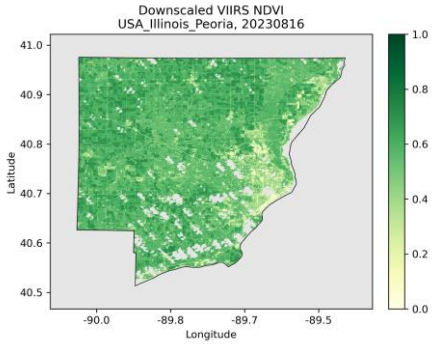
May



Jun



Jul



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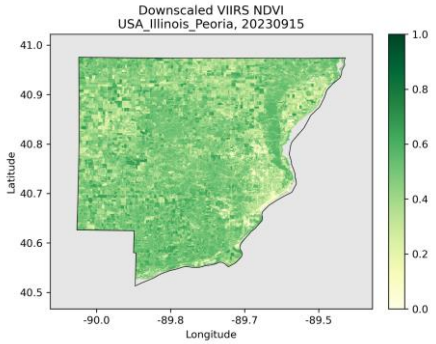
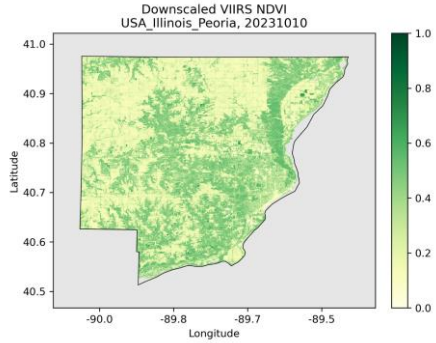
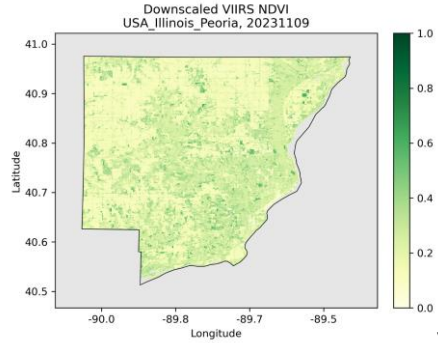


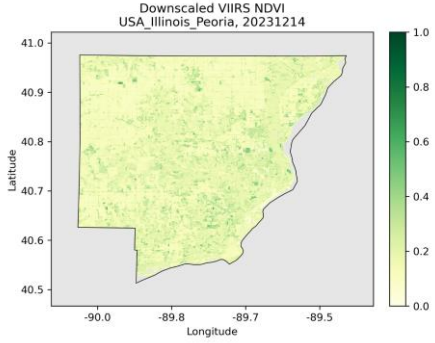
Sep



Oct

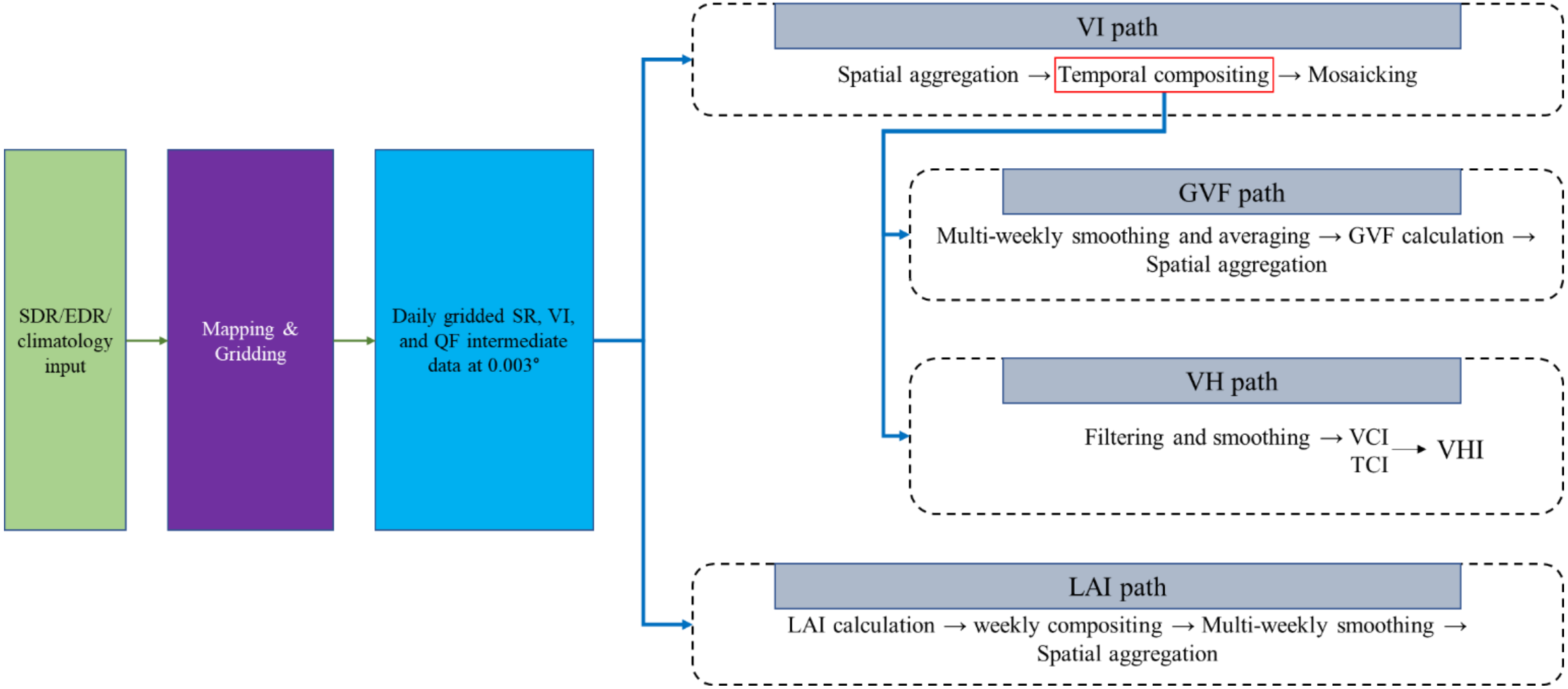


Nov



Dec

Integrated framework for Vegetation Index (VI)/ Green Vegetation Fraction (GVF)/ Vegetation Health (VH) and Leaf Area Index (LAI) processing



Data granules for selected Ameriflux sites

Data for these sites will be obtained by summer intern for 2023 and downscaled

	Site name	Latitude	Longitude	MODIS tile	S2
DBF	Morgan Monroe	39.3232	-86.4131	h10v05	N0509_R083_T16SEJ
WET	Lost Creek	46.0827	-89.9792	h11v04	N0509_R026_T15TYM
MF	Sylvania Wilderness	46.242	-89.3477	h11v04	N0509_R026_T16TCS
ENF	Valles Caldera Ponderosa Pine	35.8642	-106.5967	h08v05	N0509_R141_T13SCV
GRA	Seviletta grassland	34.3623	-106.702	h08v05	N0509_R141_T13SCU
OSH	Walnut Gulch Lucky Hills Shrub	31.7438	-110.0522	h08v05	N0509_R041_T12SWA
CRO	Bouldin Island Alfalfa	38.0992	-121.4993	h07v05	N0509_R113_T10SFH
CRO	Bouldin Island Corn	38.1091	-121.5351	h07v05	N0509_R113_T10SFH
CRO	Mead irrigated maize	41.1651	-96.4766	h10v04	N0509_R012_T15TTF
CRO	Mead irrigated maize/ soybean	41.1649	-96.4701	h10v04	N0509_R012_T15TTF
CRO	Mead rainfed maize/ soybean	41.1797	-96.4397	h10v04	N0509_R012_T15TTF

VIIRS Imagery

May 2024

Accomplishments / Events:

- Presented Imagery EDR FY25 PMR
- New VIIRS Blowing Snow RGB installed in operations at NWS AK offices per their request
- VIIRS NCC Imagery of Aurora Borealis Used by NOAA and News Organizations
  - Newsweek, Bloomberg, NOAA Satellites, NESDIS News, …
- Presentations with VIIRS Imagery:
  - Applications of Satellite Products During Convective Weather Scenarios
- Blog Posts with VIIRS Imagery
  - Flooding in the UAE and Oman
  - NOAA-21 Designated as the Primary Satellite of the JPSS Constellation
  - 25 May 2024 Severe
  - Intermountain West Holding Onto Winter
  - Bering Sea Storm-Force Low
  - Subtle Northern Alaska Low
- 22 VIIRS Imagery Posts on CIRA Social Media this Month. A few posts:
  - VIIRS NCC Imagery of NA Aurora (124.3K views)
  - VIIRS Day Land Cloud RGB Imagery of Brazil Flooding (24.2K views)
  - VIIRS IR Imagery of Texas Severe Thunderstorms (10K 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	May-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, Mx10: Apr-2024	

Highlights: Image of the Month

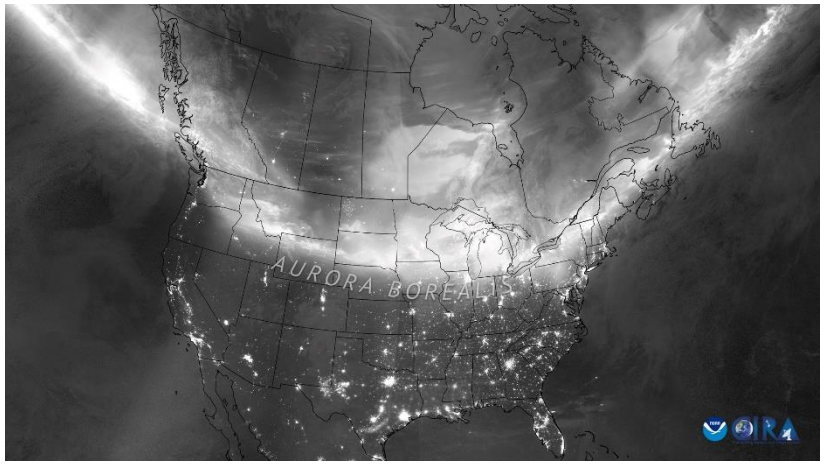


Figure: 11 May 2024 VIIRS NCC Imagery composite over North America captures the aurora.

VIIRS SDR

May 2024

Accomplishments / Events:

- Supported S-NPP GPS anomaly investigation by using geolocation validation system (CPM), off-line analysis of sample data (coastline and ground target images), and modeling using orbital perturbation
- Began creating initial prelaunch LUTs for JPSS-3 VIIRS SDR: implemented the TSIS-1 ver.2 solar irradiance spectrum, used for PACE OCI, instead of the Thuillier one applied for NOAA-20 and NOAA-21 VIIRS
- Generated and delivered for deployment in the IDPS operations the updated N21 VIIRS SDR DNB STRAY-LIGHT-CORRECTION LUT for May 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 5/8/2024: the NPP update removed the additional striping present on the scan edges after the SBC Lockup anomaly on 4/24/2024
- Assisted in scheduling and analyzed data from N21, N20, and NPP VIIRS lunar calibration on 5/19/2024 and 5/18/2024: data aligns well with long-term trends and exhibits consistency
- Started preparations for VIIRS SDR Cal/Val tools migration to NCCF Cloud

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			

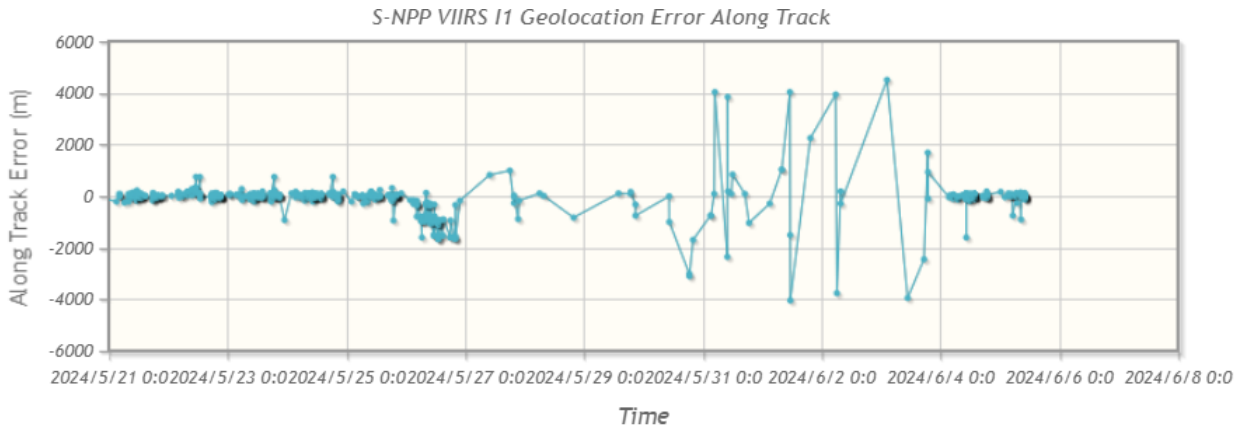
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

J3/J4 VIIRS granule size change test data for IDPS

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	TBD		more anomalies
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	5/16/2024	
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:



Suomi NPP VIIRS along-track geolocation errors before and after the GPS reset