NOAA JPSS Monthly Program Office

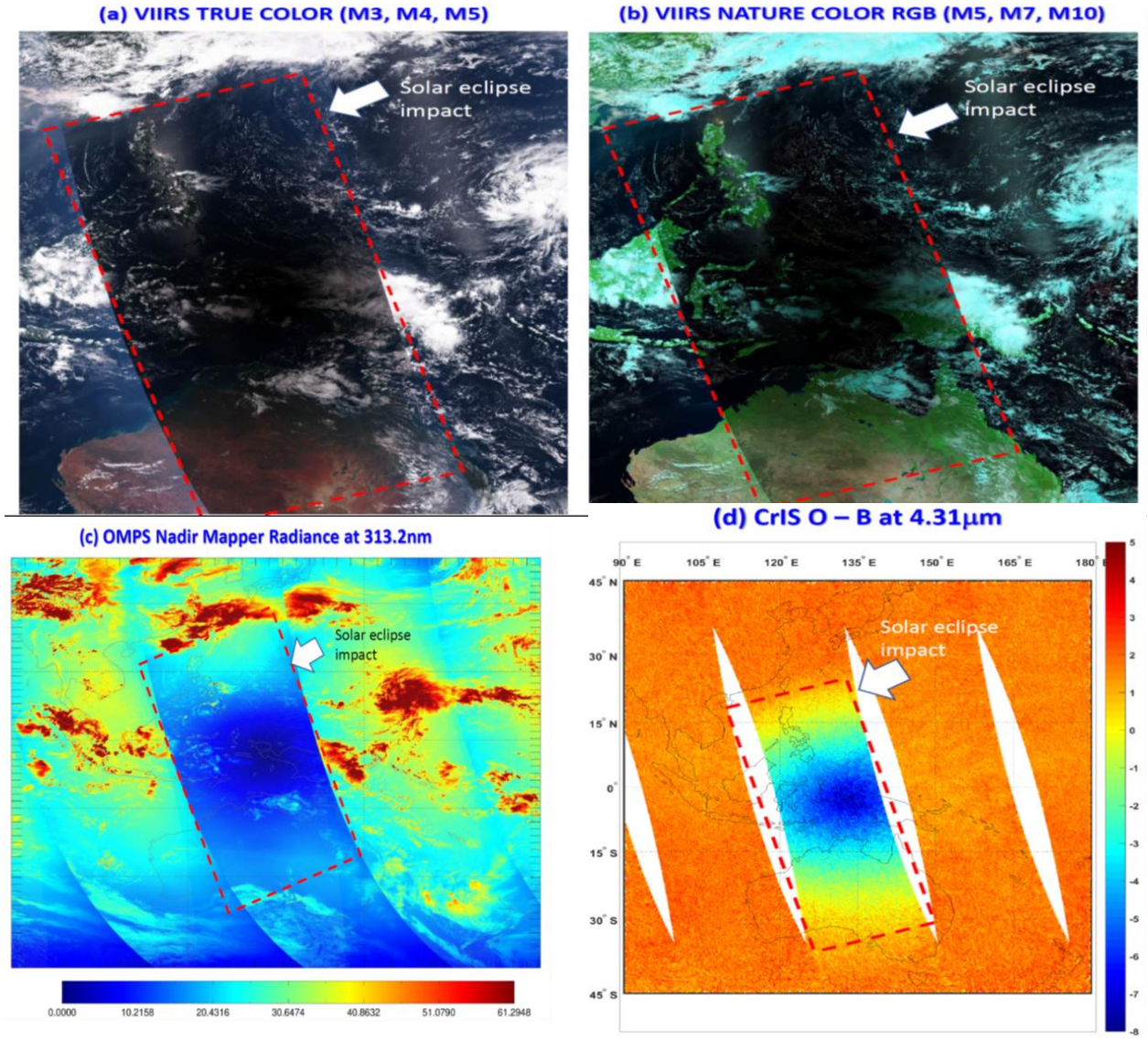
AMP/STAR FY23 TTA

Lihang Zhou, DPMS Deputy
Ingrid Guch, Acting JPSS STAR Program Manager

May, 2023

Highlights from the Science Teams (April)

JPSS observes hybrid solar eclipse



On April 20, 2023, a hybrid solar eclipse darkened skies in Australia and Indonesia. This rare astrometric phenomenon was also seen by observations from a few instruments onboard JPSS satellites including VIIRS, OMPS, and CrIS.

The images show the VIIRS True Color, VIIRS Natural Color RGB, OMPS Nadir Mapper Radiance at 313.2 nm, and CrIS O-B at 4.31 um from NOAA-21.

Highlights from the Science Teams (April)

Field Measurements of Sea Ice in Nome, Alaska

Figure. Clockwise from the upper left: A map showing the location of Nome; an overhead view of Nome and nearby sea ice; STAR scientists on the sea ice taking measurements; and the UAS used in these experiments.

Four STAR scientists participated in the second phase of the UAS Sea Ice Retrieval for Calibration/Validation Experiment (USIR-CV EX) on the sea ice at Nome, Alaska, March 27 – March 31, 2023: Jeff Key, Yinghui Liu, Sean Helfrich, and Larry Connor. For the STAR scientists, the goal was to collect a robust dataset for validation of AMSR2 sea ice thickness and VIIRS sea ice products. This fieldwork was a follow-on to similar work done in the Straits of Mackinac, Michigan, in February 2022.

At Nome, surface measurements of sea ice thickness, snow properties (depth, weight/volume, and grain size), and basic meteorology were made while the UAS and satellites were overhead

On March 31, Key, Helfrich, and Liu traveled to Anchorage to meet with Scott Lindsey, Director of NWS Alaska Region. The following day the team visited the NWS Alaska Sea Ice Program (ASIP) ice analysts at their Sand Lake office and had in-depth discussions on their operations and use of satellite imagery and products.

Highlights from the Science Teams (April)

Multispectral Satellite Imagery Products for Fire Weather Applications

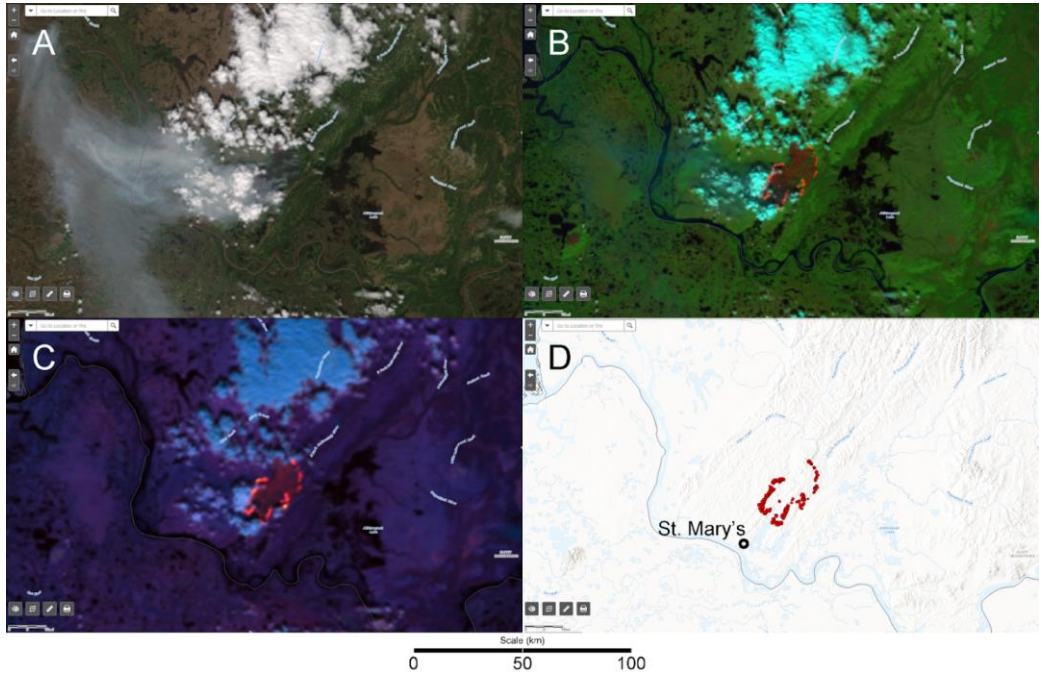


Figure. a) VIIRS True Color RGB, b) Day Fire RGB, c) Fire Temperature RGB, and d) Active Fire product displayed in the Alaska Fire Service web mapping service for the East Fork Fire (9 June 2022).

A new publication by the STAR JPSS Imagery team details the use of RGB imagery for fire weather observation. The current generation of operational polar-orbiting weather satellites that began with the launch of Suomi NPP offers new capabilities with regard to fire detection and monitoring. In particular, false color red-green-blue composite imagery is now being used by fire managers, incident meteorologists and others in the fire management community to visualize a fire's behavior and the context in which it occurs. This paper outlines two of these red-green-blue composites that have gained widespread use throughout the U.S. National Weather Service and the Alaska Fire Service. These red-green-blue composites have been applied to the current generation of geostationary and polar-orbiting satellites to great effect and have changed how incident management teams respond to wildland fires.

Highlights from the Science Teams (April)

April 10 Volcanic Eruption in Russia

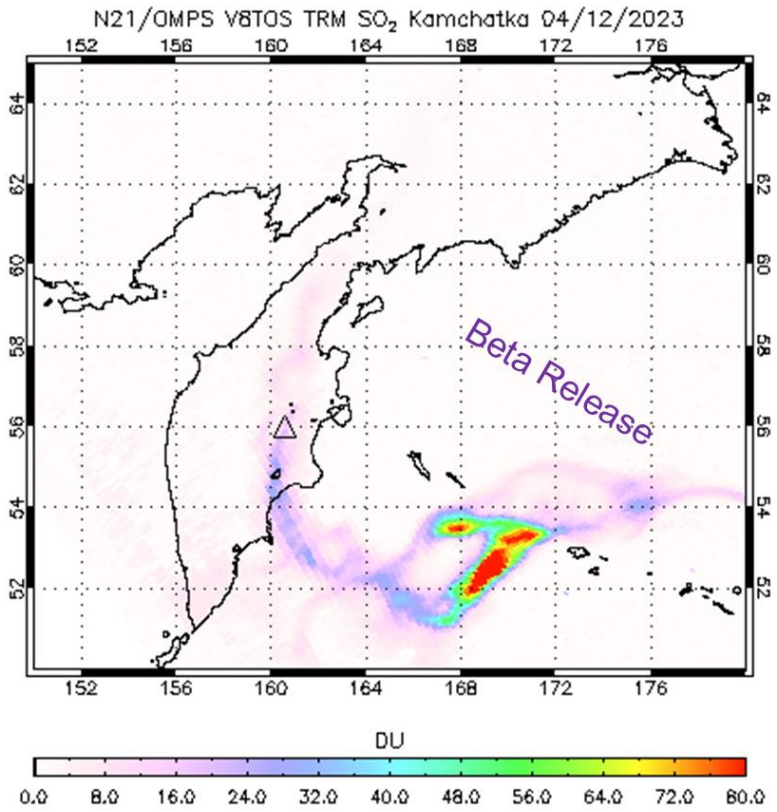


Figure. False Color Map of SO_2 Dispersion for April 12, 2023 from the V8TOS EDR Algorithm.

Shiveluch Volcano on Russia's Kamchatka Peninsula erupted on April 10. Ash from this eruption was severe enough to cancel flights in the nearby Alaska region.

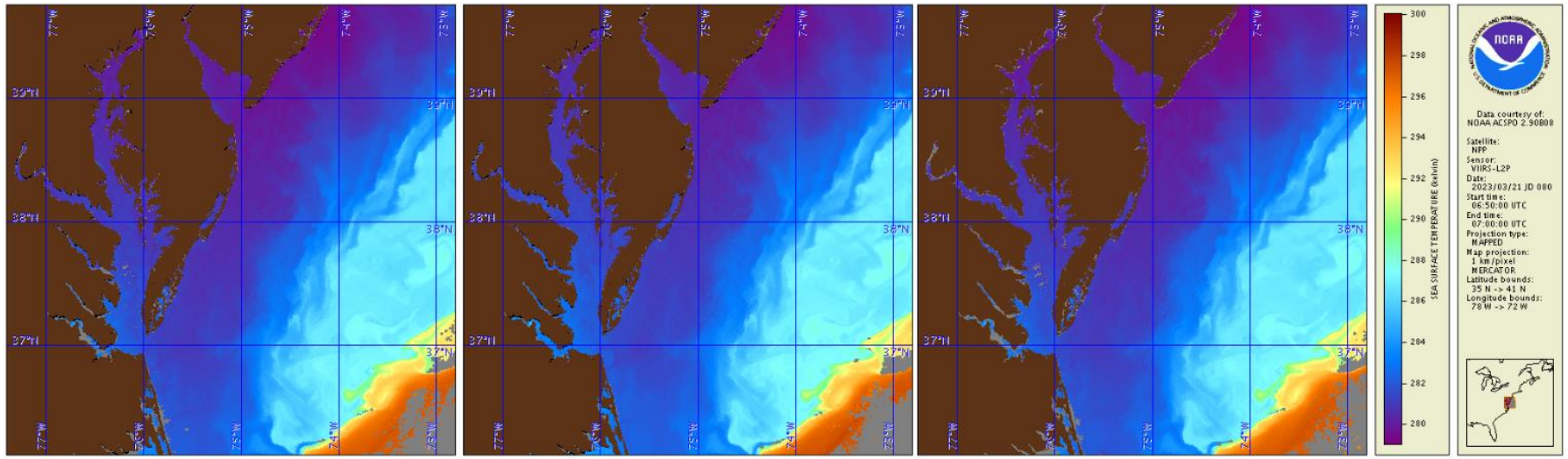
STAR JPSS Imagery Team lead Bill Line published a blog post titled, "April 10 Volcanic Eruption in Russia". The post shares imagery from VIIRS, Himawari-9, and GOES-18 of the recent volcanic eruption in eastern Russia. In particular, the DNB/NCC product provided excellent overnight imagery of the eruption. The link to the post can be found here.

The event was also tracked by the OMPS Ozone team, using their SO_2 product.

The link to the post can be found here.

Highlights from the Science Teams (April)

NOAA-21 SST reaches Beta Maturity



The JPSS Calibration/Validation Maturity Review Team finds that VIIRS SST EDR data are at Beta Maturity level. The data observed to date is promising, including:

- NOAA-21 VIIRS SST imagery quality is comparable to NOAA-20 and Suomi-NPP
- Improved coverage is noticeable when collating SST from Suomi-NPP, NOAA-20 and NOAA-21 as clouds move between satellite overpasses

The review team notes that the effects of Warm-Up Cool-Downs on daytime SST is up to ~0.25K and that work is ongoing with the VIIRS SDR team to mitigate future issues to the extent possible. The effective date for Beta maturity is March 20, 2023 00:00 UTC (after impact of Mar 16-17 WUCD). Thank-you and congratulations to the JSTAR VIIRS SST EDR science team for the extensive analyses and detailed documentation. As a reminder for Beta Maturity level any posting of images/plots must contain the caveat: “NOAA-21 Preliminary, Non-Operational Data” and no public sharing of the underlying data files.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
4/3/23	VIIRS Surface Reflectance Preliminary CCAP Delivery to OSPO for SCR	Google Drive
4/7/23	Patch that fixes outputs for the JPSS CCAPs with a creation timestamp of 60.0 seconds. This update can be applied to the CCAPs for Clouds, CBH/CCL, Cloud COMP, Aerosols, VolAsh, Ice, and Snow, and the online units of LSA and LST.	NCCF
4/14/23	Veg Health Preliminary CCAP delivery to OSPO for SCR	Google Drive
4/19/23	EN-Fires Final CCAP delivery to NCCF	NCCF
4/19/23	Blended-Hydro (RR and TPW) Preliminary CCAP for software code review by OSPO.	NCCF
4/21/23	V8TOz J2 Provisional Final CCAP to NCCF	NCCF
4/26/23	Patch delivery to NCCF for corrected algorithm code that will provide a fix for the negative Tskin and missing polar granule issues found in the MiRS v11.9 Final CCAP delivery.	NCCF
4/27/23	Patch delivery of the SMOPS to the NCCF S3 bucket. This bug fix should address the errors in processing SMOPS using GVF files from the previous day(s) experienced by the NCCF.	NCCF
4/28/23	Final delivery of the Regional hourly Advanced Baseline Imager and Visible Imaging Radiometer Suite Emissions (RAVE) North America Final CCAP to NCCF for integration.	NCCF
5/2/23	ASSISTT delivered to NCCF the updated V8TOz lookup tables which had been delivered to ASSISTT and integrated into the code package.	NCCF
5/3/23	Preliminary delivery of the V8TOS algorithm CCAP for OSPO review.	Google Drive

Accomplishments – JPSS Cal Val Support

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	4/4/23, 4/11/23, 4/17/23, 4/25/23
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	4/4/23, 4/11/23, 4/17/23, 4/25/23
NOAA-21	Weekly OMPS TC/NP Dark Table Updates	4/4/23, 4/11/23, 4/17/23, 4/25/23
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	4/11/23, 4/25/23
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	4/4/23, 4/18/23
NOAA-21	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	4/6/23, 4/18/23
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	4/24/23
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	4/24/23
NOAA-21	Monthly VIIRS LUT Update of DNB Offsets and Gains	4/26/23
NOAA-21	Monthly VIIRS DNB Straylight correction update	4/26/23

NOAA-21 Cal/Val Maturity Reviews

April, 2023 Maturity Reviews		
MiRS EDR	Beta	Successfully Completed (4/27); Effective Date: December 3, 2022 23:49:55 UTC
SST EDR	Beta	Successfully Completed (4/27); Effective Date: March 20, 2023 00:00 UTC
SFR EDR	Beta	Successfully Completed (4/27); Effective Date: December 3, 2022 23:49:55 UTC

May, 2023 Maturity Reviews		
Active Fires (NDE), eFire	Beta	6/1 (live presentation via Google Meets)
OMPS Ozone (V8TOz & V8TOs)	Provisional	6/1 (live presentation via Google Meets)
NUCAPS EDRs	Beta	6/1 (live presentation via Google Meets)

June, 2023 Maturity Reviews		
ATMS SDR/TDR	Validated	TBC: 6/22
MiRS EDRs	Provisional	TBC: 6/22
OMPS Ozone (V8Pro) EDR	Provisional	TBC: 6/22
OMPS LP (SDR & EDR)	Beta	TBC: 6/22
Cloud Mask EDR	Beta	TBC: 6/22
AOD/ADP EDRs	Beta	TBC: 6/22

JSTAR Code/LUT/Product Deliveries

Date	DAPs to DPMS
4/6/2023	ADR-10308/CCR-6475 NOAA-21 OMPS NM OSOL and wavelength LUT update - fast track
5/04/23	N21 ATMS LUT update for Validate Maturity (ADR 10302)
5/09/23	ADR-10357/CCR-6536 N21 VIIRS SDR LUT Update F-PREDICTED #5
5/11/23	ADR-10356/CCR-6533 N21 VIIRS SDR RVF LUT Update

Date	Remaining J2-Ready DAPs to NCCF
4/13/23	MiRS team delivered a combined patch to ASSISTT
4/14/23	OMPS team the full processing code for OMPS LP L1 and L2 SNPP to ASSISTT
4/17/23	OMPS team delivered V8TOz updates to the Instrument Table and Soft Calibration Table
March, 2023 (delayed to October)	CCAP in October J2-ready OMPS LP DAP to NCCF (ASSISTT □ NCCF) Science team plan: Delivery to the ASSISTT by the end of April (delivered for SNPP, but not for J2-Ready) ASSISTT team plan: SCR delivery to OSPO in June, and final CCAP delivery in October.
March, 2023 (Delayed to August)	J2-ready (J2-Beta) Ocean Color DAP to NCCF (ASSISTT □ NCCF) ASSISTT team plan: SCR delivery to OSPO in June, and final CCAP delivery in August

FY23 STAR JPSS Milestones

Milestones	Original Date (column I)	Forecast Date	Actual Completion Date	Variance Explanation
Algorithm Updates DAPs/CCAPs				
ATMS J2 PCT updates (as needed)	Jan-23	Jan-23	Delivered	
CrIS J2 Eng Pkg update delivery	Jan-23	02/09	Delivered on 02/09 for Beta	
VIIRS J2 LUTs update delivery	Jan-23	Jan-23	Delivered (January 26)	
OMPS J2 LUTs update delivery	Jan-23	Jan-23	Delivered	
OMPS LP J2 ready DAP (to NCCF)	Mar-23	June-23	**Delivered for S-NPP on April 14.**	
Ocean Color J2 ready DAP (to NCCF)	Mar-23	**Aug-23**	Moved from June to August 2023	
CCAP to NCCF (Aerosol AOD & ADP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (CM, Phase, Height, CBH, CCL, COMP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (VPW, Cryosphere, Volcanic Ash)	Nov-22	Nov-22	11/15/2022, 11/18/2022, **VPW: 01/06/2023**	
CCAP to NCCF (LST, LSA)	Nov-22	Nov-22	Delayed to 12/15/2022 **Delayed: 01/20/2023**	
CCAP to NCCF (VI, GVF)	Nov-22	Nov-22	11/15/2022, **1/11/2023**	
CCAP to NCCF (MiRS, OMPS NP V8Pro)	Jan-23	Jan-23	MiRS:12/31(separate delivery) **MiRS: v11.9 Final CCAP Delivered:1/26/2023** **Delivered: OMPS 12/23** **V8TOz Delivered: 3/17/23**	
CCAP to NCCF (HEAP, N4RT)	Mar-23	Mar-23	**Code delivered for SCR 2/6**	
CCAP to NCCF (ACSPO SST)	Apr-23	Aug-23	**Science team provided updated code to use VIIRS TC GEO on March 7, and preliminary CCAP to OSPO moved from June to August)**	
Enterprise Fires	Apr-23	Apr-23	ASSISTT Delivered to NCCF on 4/19	
CCAP to NCCF (VH, VOLCAT Phase 1, OMPS V8TOz)	May-23	May-23	**Delivered V8TOz (4/23), VH (4/14) ASSISTT to** NCCF, VOLCAT (June 5)	
CCAP to NCCF (Gridded Land)	Jul-23	Jul-23		
CCAP to NCCF (Cloud Provisional)	Jul-23	Jul-23		

FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
Algorithm Cal/Val/LTM				
JPSS-2 First Light Images (Nov-22: ATMS; Dec-22: VIIRS VIS/NR, Feb-2023 VIIRS TEB, Feb-2023 VIIRS DNB, Feb-2023 OMPS, Feb-2023 CrIS)	Dec-22	Dec-22	11/22/2022 ATMS 12/05/2022 VIIRS VIS/NIR 02/09/2023 VIIRS TEB 02/09/2023 VIIRS DNB 02/12/2023 CrIS SDR 02/18/2023 OMPS	
FY22 End of Year Science Team Presentations (all teams)	Nov-22	Nov-22	As Needed	
FY24 Program Management Review (all teams)	Jun-23	Jun-23		
AST-2022 (VIIRS Annual Surface Type)	Sep-23	Sep-23		
Transfer reprocessed S-NPP SDR data to CLASS (finish by Oct-2023); Start EDR reprocessing for some products	Sep-23	Sep-23		
JPSS-3 pre-launch test data review/analyze (SDR teams); JPSS-3/JPSS-4 activities/reviews support	Sep-23	Sep-23		
Maintain / Update ICVS (develop ICVS JPSS-2 modules to support varies activities: monitoring, inter-sensor comparison, …)	Sep-23	Sep-23		
Maintain / Expand (to include JPSS-2 products) JSTAR Mappers	Sep-23	Sep-23		
Images of the Month	Monthly	Monthly		

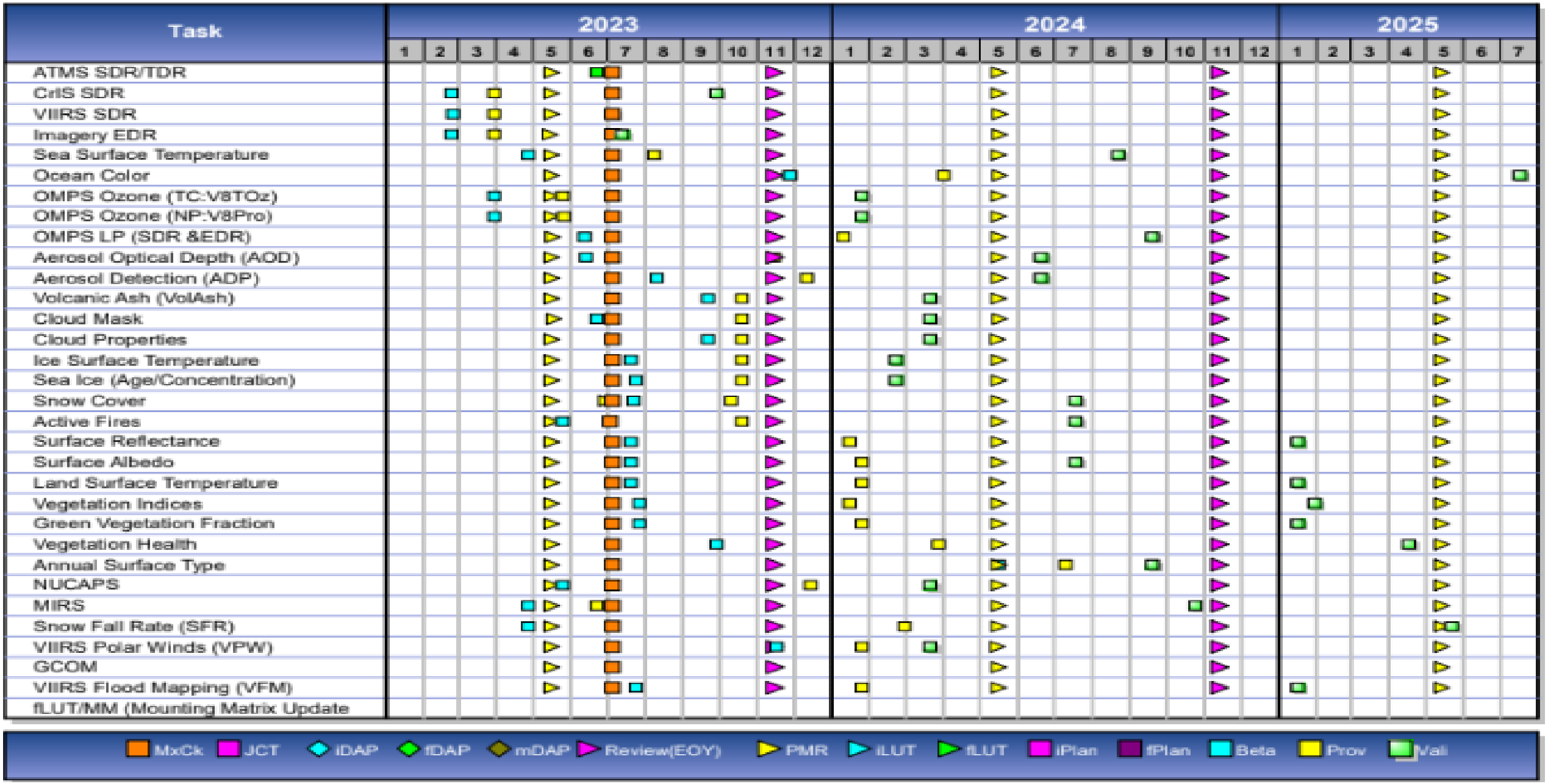
FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
NOAA-21 Cal/Val Maturity Reviews				
ATMS TDR/SDR (B/P: Dec-2022; V: May-2023)	**May-23**	**May-23**	Provisional Achieved: 12/15; **Validated Planned: 06/22**	
CrIS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	**Aug-23**	**Aug-23**	Provisional Achieved: 03/30; Validated Planned: 09/28	**K-band Transmitter anomaly**
VIIRS SDR (B: Dec-22; P: Feb-23; V: May-23)	**May-23**	**May-23**	Provisional Achieved: 03/30; Validated Planned: 07/13	**K-band Transmitter anomaly**
OMPS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	**Aug-23**	**Aug-23**	Provisional Achieved: 03/30; Validated Planned: 12/22	**K-band Transmitter anomaly**
KPP VIIRS Imagery (B: Jan-23; P: Feb-23; V: May-23)	**May-23**	**May-23**	Provisional Achieved: 03/30; Validated Planned: 07/13	**K-band Transmitter anomaly**
Non-KPP VIIRS Imagery (B: Feb-23; P: Mar-23; V: Jul-23)	**Jul-23**	**Jul-23**	Provisional Achieved: 03/30; Validated Planned: 07/13	**K-band Transmitter anomaly**
Clouds (B: CM: Apr-23; Others: Jul-23; P: Aug-23)	**Aug-23**	**Aug-23**	**Beta Planned: 6/22**	**K-band Transmitter anomaly**
Aerosol AOD (B: Apr-23; P: Sep-23)	**Sep-23**	**Sep-23**	**Beta Planned: 6/22**	**K-band Transmitter anomaly**
Aerosol ADP (B: Mar-23; P: Aug-23)	**Aug-23**	**Aug-23**	**Beta Planned:6/22**	**K-band Transmitter anomaly**
Volcanic Ash (B: Jul-23; P: Aug-23)	**Aug-23**	**Aug-23**	**TBC**	**K-band Transmitter anomaly**
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow)	**Aug-23**	**Aug-23**	**TBC**	**K-band Transmitter anomaly**
Active Fires (B: May-23; P: Aug-23)	**Aug-23**	**Aug-23**	**Beta Planned: 6/1**	**K-band Transmitter anomaly**
LST/LSA/SR/GVF/VI (B: May-23)	**May-23**	**May-23**	**TBC**	**K-band Transmitter anomaly**
Vegetation Health (B: Jul-23)	**Jul-23**	**Jul-23**	**TBC**	**K-band Transmitter anomaly**
Ocean Color (B: Sep-23)	**Sep-23**	**Sep-23**	**TBC**	**K-band Transmitter anomaly**
SST (B: Mar-23; P: Jun-23)	**Jun-23**	**Jun-23**	Beta Achieved: 4/27	**K-band Transmitter anomaly**
VPW (B: Sep-23)	**Sep-23**	**Sep-23**	**TBC**	**K-band Transmitter anomaly**
VFM (B: May-23)	**May-23**	**May-23**	**TBC**	**K-band Transmitter anomaly**
NUCAPS (B: May-23)	**May-23**	**May-23**	**Beta Planned:6/1**	**K-band Transmitter anomaly**
MiRS (B: Mar-23; P: Aug-23)	**Aug-23**	**Aug-23**	Beta Achieved: 4/27**; Provisional Planned: 6/22**	**K-band Transmitter anomaly**
SFR (B: May-23)	**May-23**	**May-23**	Beta Achieved: 4/27	**K-band Transmitter anomaly**
OMPS NP EDR V8Pro & V8TOz (B: Feb-23; P: Mar-23)	**Mar-23**	**Mar-23**	Beta Achieved: 03/30**; Provisional Planned:6/1, 6/22 (V8Pro)**	**K-band Transmitter anomaly**
OMPS LP (B: Mar-23)	**Mar-23**	**Mar-23**	**Beta Planned:6/22**	**K-band Transmitter anomaly**

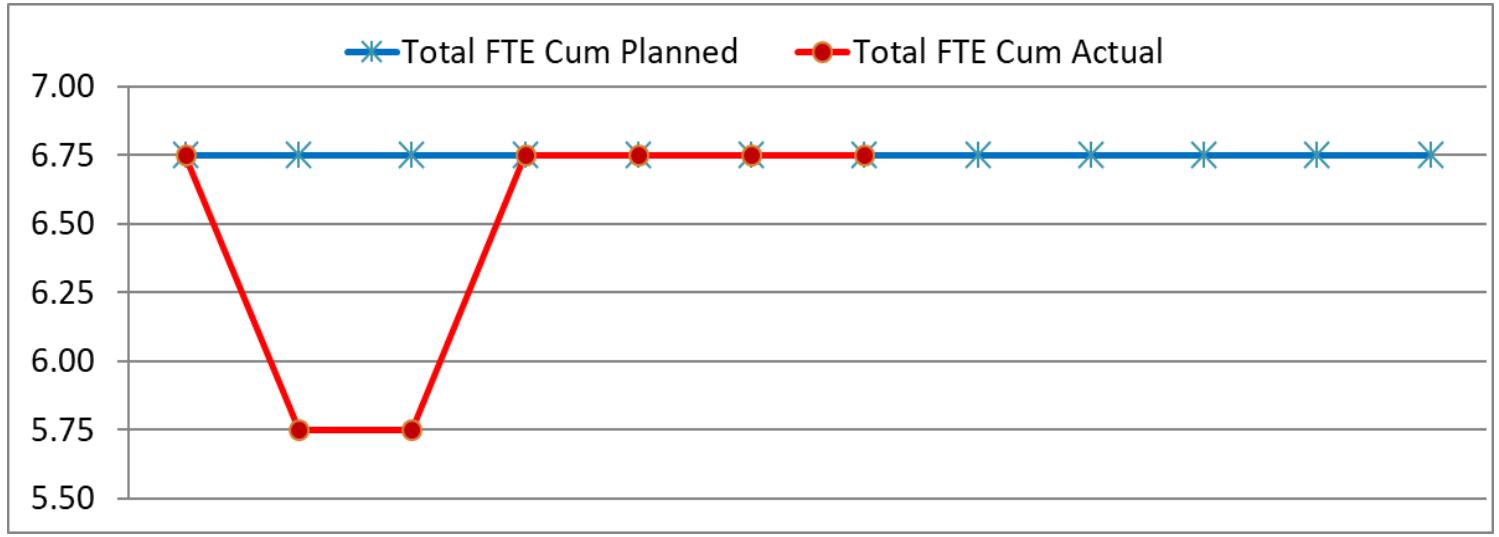
FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Completion Date
Operational/Program Support			
S-NPP: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	10/04/22, 10/12/22, 10/19/22, 10/26/22, 11/01/22, 11/08/22, 11/15/22, 11/22/22, 11/28/22, 12/06/22, 12/13/22, 12/19/22, 01/03/23, 01/10/23, 01/17/23, 01/23/23, 0131/23, 02/07/23, 02/14/23, 02/21/23, 02/28/23, 03/07/23, 03/14/23, 3/21/23, 3/28/23, **4/4/23, 4/11/23, 4/17/23, 4/25/23**
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/12/22, 10/26/22, 11/08/22, 11/22/22, 12/06/22, 12/19/22, 01/03/23, 01/17/23, 1/31/23, 02/14/23, 02/28/23, 03/14/23, 3/28/23, 4/4/23, **4/11/23, 4/25/23**
S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	10/04/22, 11/01/22, 11/28/22, 01/03/23, 01/30/23, 02/27/23, 3/28/23, **4/24/23**
NOAA-20: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	10/04/22, 10/12/22, 10/19/22, 10/26/22, 11/01/22, 11/08/22, 11/08/22, 11/15/22, 11/22/22, 11/28/22, 12/06/22, 12/13/22, 12/19/22, **01/03/23,** 01/03/23, 01/10/23, 01/17/23, 01/23/23, 0131/23, 02/07/23, 02/14/23, 02/21/23, 02/28/23, 03/07/23, 03/14/23, 3/21/23, 3/28/23, **4/4/23, 4/11/23, 4/17/23, 4/25/23**
NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/04/22, 10/19/22, 11/02/22, 11/15/22, 11/29/22, 12/13/22, 01/03/23, 01/10/23, 01/24/23, 02/07/23, 02/21/23, 03/07/23, 3/21/23, **4/4/23, 4/18/23**
NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	10/04/22, 11/01/22, 11/28/22, **01/03/23,** 01/30/23, 02/27/23, 3/28/23, **4/24/23**
NOAA-21: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	01/31/23, 02/14/23, 02/21/23, 03/07/23, 03/14/23, 3/21/23, 3/28/23, **4/4/23, 4/11/23, 4/18/23, 4/25/23**
NOAA-21: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	03/07/23, 03/22/23, **4/6/23, 4/18/23**
NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	03/6/23, 3/28/23, **4/26/23**
Mx builds deploy regression review/checkout (Mar-23 Mx8; Jun-23 Mx9; Sep-23 Mx10; SDRs and VIIRS Imagery teams)			✔ **MX8 SOL STAR 'Go/No GO' Report Delivered:4/14** • MX8 I &T STAR 'Go/NOGO' Delayed TBD

STAR JPSS Schedule: TTA Milestones



J-STAR FY23 Planned v Actual Staffing Plan



J-STAR FTEs	Oct '22	Nov '22	Dec '22	Jan '23	Feb '23	Mar '23	Apr '23	May '23	Jun '23	Jul '23	Aug '23	Sep '23
Cum Planned (CS)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cum Actual (CS)	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Cum Planned (WYE)	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Cum Actual (WYE)	5.75	4.75	4.75	5.75	5.75	5.75	5.75					
Total FTE Cum Planned	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Total FTE Cum Actual	6.75	5.75	5.75	6.75	6.75	6.75	6.75					

CS: Alisa Young (on detail)
WYE: Qingyuan Richard Zhang (Corp)
Prasanjit Dash (SOCD)
Michael Cheeseman (SMCD)
Murty Divakarla (25%)
Tom Atkins (50%)
Jeffrey Weinrich
Tess Valenzuela (RMD)

Color code:

Green: **Completed Milestones**

Gray: **Ongoing FY23 Milestones**

Active Fires

April 2023

Accomplishments / Events:

- Performed analysis of NOAA-21 Active Fire data in support of the VIIRS SDR Provisional Review. Found an increase in NOAA-21 M13 measurements compared to Suomi NPP and NOAA-20 due to the shift in the NOAA-21 M13 band placement
- Gave a Spanish-language presentation “Detección y Caracterización de Incendios y Humo del ABI y VIIRS” (“Detection and Characterization of Fires and Smoke from ABI and VIIRS”) as part of the NOAA/WMO Regional Association IV Virtual Satellite Applications Training Workshop, hosted by the Ministry of Environment and Natural Resources (MARN) of El Salvador
- Continued working with NCEP EMC and OAR on the transition of the operational HRRR-smoke model to using the VIIRS I-band product as input

Overall Status:

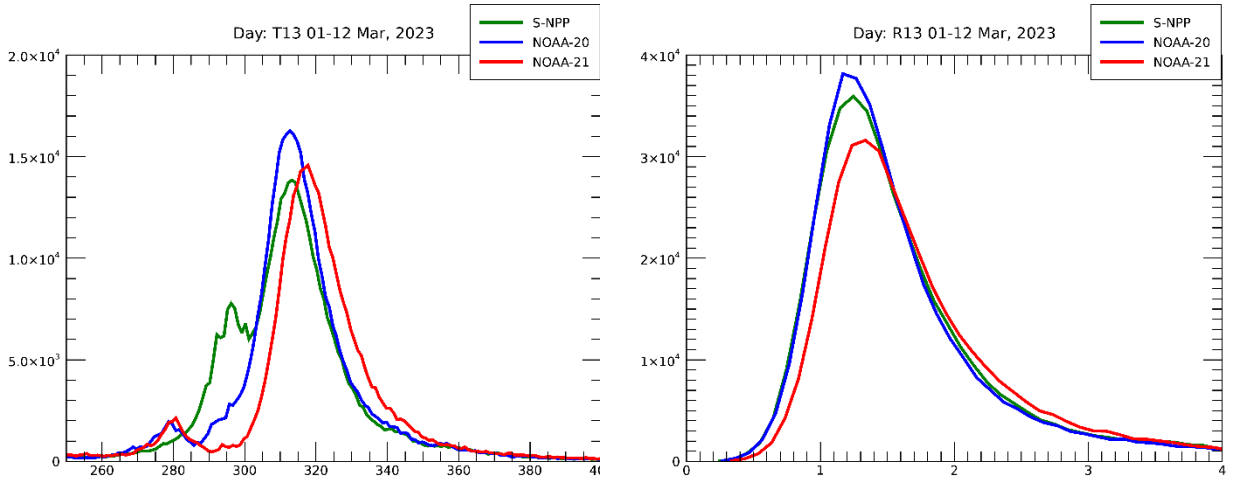
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

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
NOAA-21 Beta Maturity	May-23	Jun-23		
NOAA-21 Provisional Maturity	Aug-23	Aug-23		
NOAA-21 post-launch testing towards Provisional Maturity	Mar-23	Mar-23		
I-band algorithm improvements for non-optimal conditions and ATBD updates	Sep-23	Sep-23		
Science code updates to ASSIST/CSPP for eFire for NDE/NCCF	Sep-23	Sep-23		
Reactive maintenance of Suomi NPP and NOAA-20 M-band and I-band NDE products	Sep-23	Sep-23		
LTM & Anomaly Resolution (L) with Suomi NPP / NOAA-20 data analysis and feedback	Sep-23	Sep-23		

Highlight: NOAA-21 VIIRS M13 measurements for I-band fire detections



Frequency distributions of VIIRS M13 brightness temperatures (K; left) and radiances (W/m^2-sr-µm; right) corresponding to I-band fire detections in the 375m NDE products). NOAA-21 preliminary, non-operational data

Aerosol

April 2023

Accomplishments / Events:

- Ongoing monitoring of NOAA-21 ADP product showing that the product is looking good and no noticeable issues. Product ready for beta maturity review
- Results from JPSS VIIRS reprocessed aerosol products will be presented at the STAR external review
- Many members of STAR aerosol team participated in the GeoXO/TEMPO joint science team meeting. Team member Pubu Ciren presented work related to adapting VIIRS ADP algorithm to TROPOMI to derive smoke and dust mask. This will be useful when TROPOMI like instrument (UVN) will fly on Metop-SG in the morning orbit. We will have full global smoke and dust product from mid-morning and mid-afternoon orbits. Team lead Shobha Kondragunta gave a presentation on VIIRS surface PM2.5 work.
- STAR aerosol team will be working with OAR in testing the assimilation of VIIRS AOD and TROPOMI aerosol layer height products in improving aerosol predictions in a regional air quality model.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Aerosol Products (ADP, AOD) Beta Maturity	Mar-23 Apr-23	Mar-23 Jun-23		
NOAA-21 Aerosol Products (ADP, AOD) Provisional Maturity	Aug-23 Sep-23	Aug-23 Nov-23		
Update to a faster version AI-based surface-reflectance-relationship algorithm (ML-SFRA)	Jun-23	Sep-23		developer left the team
Develop “smoke AOD and smoke concentration” product for health impact studies	Jul-23	Jul-23		
Maintain and continue reprocessed AOD and ADP product	Jul-23	Jul-23		
Work with ASSIST team in delivering DAPs associated with algorithm updates	Sep-23	Sep-23		

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			

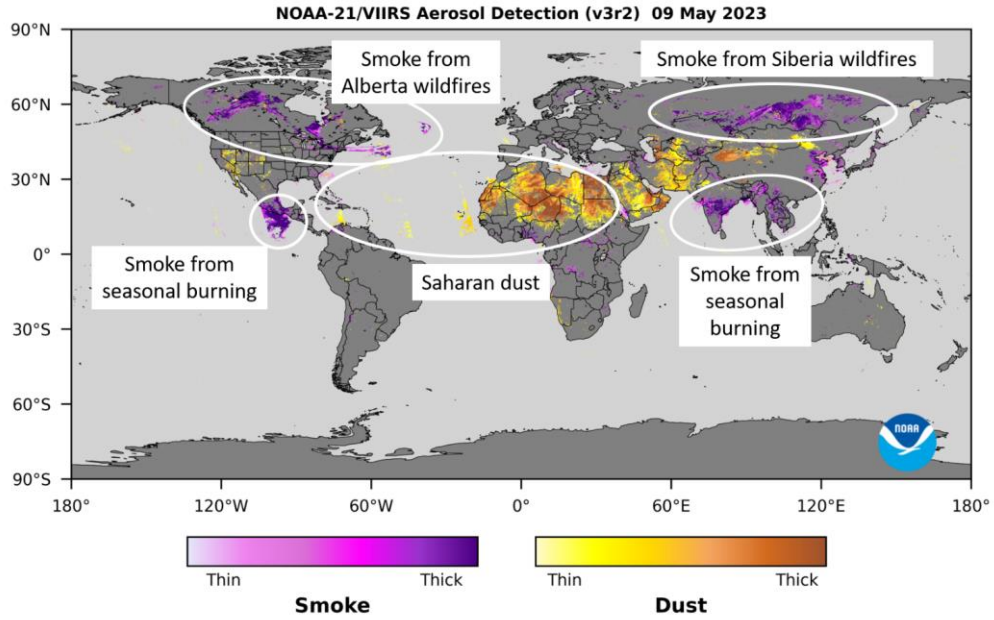
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight:

NOAA-21 showing smoke and dust in different parts of the globe. Transported smoke of Canadian fires have impacted visibility in the eastern US



Clouds

April 2023

Accomplishments / Events:

- The Cloud team has continues to look at the algorithms from the NDE-IT string for evaluation after the Imagery SDR and EDRs have become Provisional. Data is being collected for the Cloud Mask provisional review in June 2023.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop VIIRS/CALIOP validation tools for JPSS-2	Dec-22	TBD		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		Data had been turn
Integrate new ECM lookup table to allow easier threshold changes	Mar-23	Dec-23		Current LUT works good, but developing new LUT and waiting for integration date.
JPSS-2 Beta Review (ECM)	Apr-23	Jun-23		Changed due to Transmitter issue
Validate CCL that was recently delivered, especially convective/supercooled layers as part of CCL Beta review	Jul-23	Sept-23		Changed due to Transmitter issue
NOAA-21 Cloud Products Beta Maturity	Jul-23	Aug-23		Changed due to Transmitter issue
NOAA-21 Cloud Products Provisional Maturity	Aug-23	Sept-23		Changed due to Transmitter issue

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:

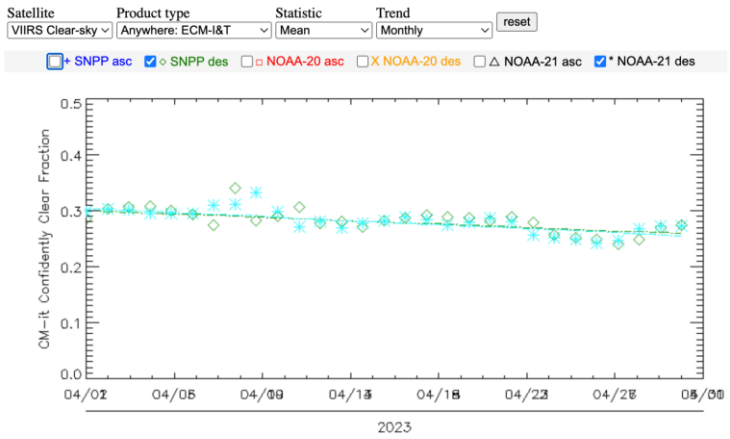


Figure 1. The cloud maske mean cloud fraction from the Integration and testing (IT) string for all three sensors. Note that the data from the NDE IT string is occasionally spotty in nature .

ATMS SDR

April 2023

Accomplishments / Events:

- Finished the generation of new N21 ATMS PCT by the coefficients derived from multiple PLT test and antenna pattern measurement data sets. It is found that NOAA-20 antenna pattern measurements, particularly in high V-band channels from channel 10 to 15, can provide the best angular dependent bias correction among all ATMS antenna measurements from S-NPP to JPSS-4.
- Generated 30-day N21 ATMS TDR/SDR/GEO data from March 20 to April 19, 2023 using newly generated PCT. Converted TDR/SDR/GEO single granule from HDF5 format to NOAA/NCEP BUFR format and shared preview datasets with major NWP centers including NOAA/EMC, NASA/GMAO, NRL, ECMWF, and UKMO. Feedback from UKMO indicates that preview datasets can provide high quality data for NWP applications.
- Prepared N21 ATMS PCT update package and update report for DRAT AERB approval and ASSISTT pre-operational verification.
- Continued to update ATMS SDR User's Guide document to provide the latest instrument and dataset information for ATMS data general users.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 ATMS TDR/SDR First light and Beta Maturity	Nov-23	Nov-23	11/30/22	
NOAA-21 ATMS TDR/SDR Provisional Maturity	Dec-23	Dec-23	12/15/22	
NOAA-21 ATMS TDR/SDR Validated Maturity	May-23	May-23		
Evaluate new NEDT algorithm performance	Sep-23	Sep-23		
LTM and Anomaly Resolution (S-NPP, NOAA-20, NOAA-21)	Aug-23	Aug-23		

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			

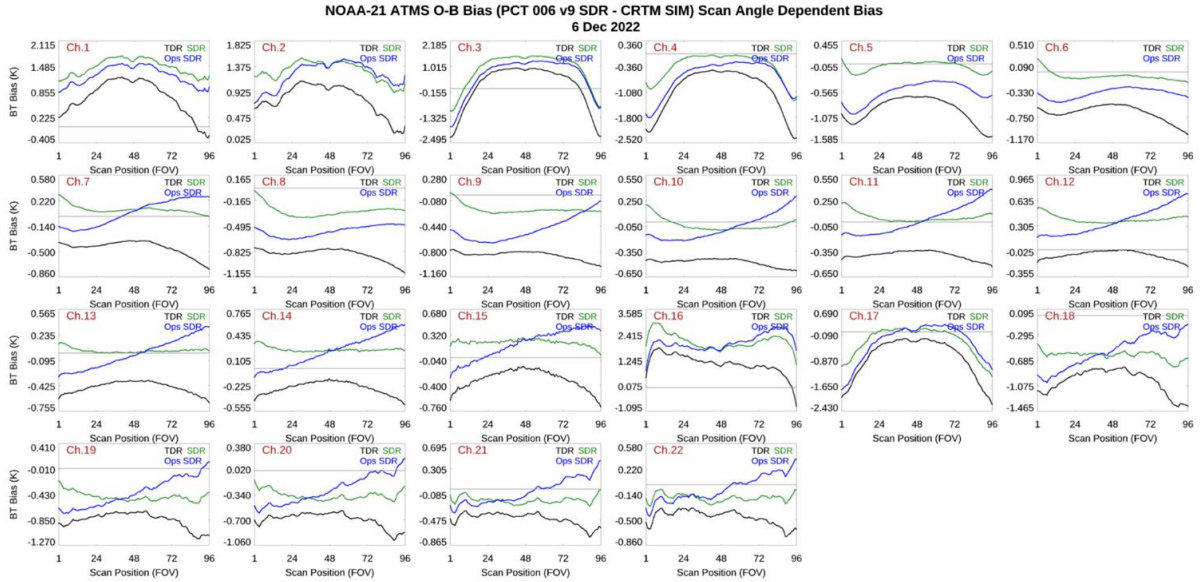
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Highlights:

N21 ATMS all channel O-B angular dependent bias comparison between preview and operational datasets



CrIS SDR

April 2023

Accomplishments / Events:

- Continue to monitor the NOAA-21 CrIS instrument (quality flags, CrIS-ABI intercomparisons, NEdN noise monitoring, geolocation accuracy, instrument responsivity, telemetry), along with the other two sensors (NOAA-20 and S-NPP)
- NOAA-21 CrIS instrument noise cross-correlation between bands was calculated using EP v211 and shows no low cross-correlation (**Fig.1)**.
- Tools for assessing the impact of the lunar intrusion (LI) algorithm on NOAA-21 CrIS SDR data quality are being developed, which is also a tool to quantify the impact of elevated imaginary radiances on CrIS data quality (**Fig. 2, Fig. 3, Fig. 4**). Preliminary results show that the on/off state of the lunar intrusion algorithm has negligible effect on the CrIS calibration.
- Developed tools for monitoring the strength and location of NOAA-21 CrIS increased imaginary radiances over time (**Fig. 5, Fig. 6**)
- The impact of the increased deep space (DS) imaginary values for NOAA-21 CrIS, coming out of Earth eclipse, on NEdN noise was found to be insignificant (**Fig. 7**)
- Prepared the SOL regression data and completed radiometric comparisons between the SOL and operational SDR granules for the block 2.3 Mx8 build. There were no issues found for the CrIS algorithm update in the Mx8 build and the checkout results was reported with a GO recommendation.
- Making progress on the preparation of several journal articles, including for the commissioning of NOAA-21 CrIS, the Neon Mitigation plan, and one on the CrIS Spike Anomaly Algorithm.
- Continued to refine the new STAR CrIS SDR Cal/Val website, including creating the daily brightness temperature maps for NOAA-21 CrIS over the Atlantic basin and making these maps accessible on the CrIS website.
- Continuing to advance and progress the CrIS PC score efforts
- The NOAA-21 neon bulb calibration criteria is now undergoing important discussions towards obtaining optimal results
- A proof-of-concept for the PC noise filtering approach for a low-noise single scan line calibration view of complex spectra has been performed and looks promising (**Fig. 8**)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Transition the J2 CrIS SDR data product to the Beta Maturity Level by Launch+57 days	Jan-23	Jan-23	Feb-23	Delayed to Feb due to J2 KA transmitter anomaly and switch to side-2 KA transmitter
Transition the J2 CrIS SDR data product to the Provisional Maturity Level by Launch+82	Feb-23	Feb-23	Mar-23	" "
Transition the J2 CrIS SDR data product Validated Maturity Level by Launch+8 months	Aug-23	Aug-23		
Participate in commissioning of NOAA-21 CrIS, requiring at least 6 months of intensive calibration and validation activities.	Sep-23	Sep-23		
Maintain 3 CrIS sensors (SNPP, NOAA-20 and NOAA-21) in orbit providing Key Performance Parameter (KPP) products.	Sep-23	Sep-23		

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

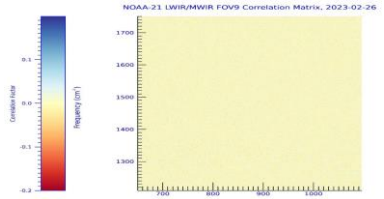
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

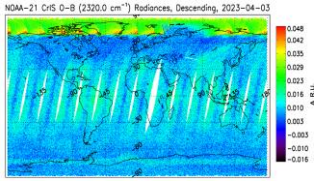
- The CrIS Team got a 100TB storage on STAR servers (data638 and data645) in May 2022. However, the CrIS Team is still in need of hardware/software resources. Presently, there is only one server dedicated to 6 CrIS Team members. We have received access to new servers, but these are shared with other STAR teams, and additional dedicated servers is still desirable. There is a risk for the CrIS SDR Team to continue on such a single server environment for the operational CrIS Cal/Val activities that include 5 CrIS sensors (SNPP, JPSS-1 to -4). This may affect the timely completion of deliverables and program milestones. The recommendation is to have one additional server/storage as soon as possible (< 2 months) and add another server/storage in the next months. A new MATLAB license is also required. Corresponding hardware/software quotations and SNO have been submitted. Corresponding JSTAR CrIS Risk/Issue on Hardware and Software have been submitted for JSTAR interval review on Jan. 6, 2023. Finally, a member of our team, Lin Lin, has left the group on 2/24/2023, and the team is currently working to find a suitable replacement.

Highlights:

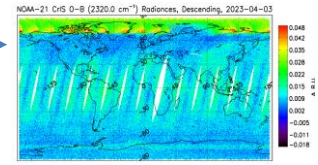
(1) NOAA-21 cross-correlation factor between LWIR and MWIR bands for FOV9. No correlation signal is found.



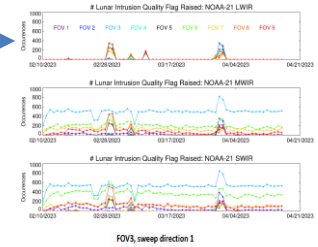
(2) NOAA-21 CrIS O-B map of the 2320 cm^{-1} channel for April 3, 2023 with lunar intrusion ON in the operational SDR product.



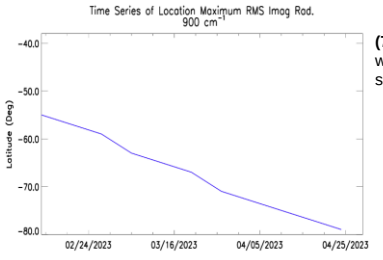
(3) NOAA-21 CrIS O-B map of the 2320 cm^{-1} channel for 4/3/23 with lunar intrusion OFF in offline ADL-generated SDR product



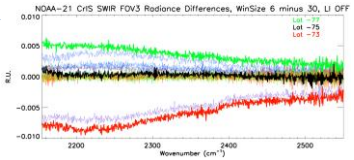
(4) The number of LI events identified since the first light of NOAA-21 CrIS. FOV3 is the most impacted FOV for MWIR and SWIR.



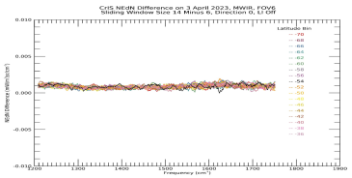
(5) The location shift of the maximum RMS imaginary radiances for NOAA-21 CrIS in the past two months



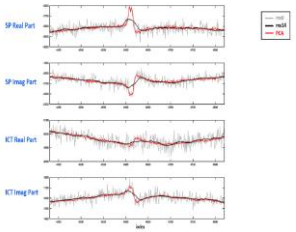
(6) Mean radiance differences between calibration window size 6 and 30 within 2-degree latitude bins (-80 to -38 latitude)



(7) NOAA-21 CrIS NEdN difference between the sliding window of 14 scans with respect to a sliding window of 6 scans for MWIR/FOV6 with LI OFF on 4/3/23



(8) Time series of SW complex spectra index 241 at 2250 cm^{-1} for FOV 3, sweep direction 1. PC-filtered cal views capture the coming-out-of eclipse behavior with low noise



Cryosphere

April 2023

Accomplishments / Events:

[Apr 28] **Update on S-NPP/NOAA-20 VIIRS tandem triplet AMV validation.** An updated validation of the JPSS (NPP/NOAA20) VIIRS tandem triplet Atmospheric Motion Vector (AMV) product compared to rawinsondes has been completed for the period starting 1 October 2022 through 31 March 2023. The same observation time (middle orbit time) for tandem and single satellite (NOAA-20) winds are compared to one another, with any AMV pair within 0.1 km being compared to rawinsondes within 100 km. The rawinsonde observation is vertically interpolated in pressure space (hPa) to the AMV height assignment. Results are shown in Figure 1, with scatterplots of the u component and speed. The u-component results are similar for the tandem and single-satellite winds, with single-satellite winds NOAA-20 having a slight negative bias and tandem NOAA-20 having slight positive bias. The v-component (not shown) has a slight negative bias for both. The most significant differences were observed in the speed component, with the tandem winds having a lower root-mean-square (RMS) difference of by 0.5 m/s and a lower bias by 0.05 m/s. One notable observation in the speed scatterplot is the increase in scatter density along the y=x line for higher wind speeds. This confirms that the tandem AMV product is better at observing higher winds speeds. These results expand on earlier validation studies over the spring into summer season of 2022.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Cryosphere Products – Beta Maturity	May-23	Jul-23		
NOAA-21 Cryosphere Products – Provisional Maturity	Aug-23	Oct-23		
Weekly and monthly snow products composite and statistics	Sep-23	Sep-23		
Prepare to implement blended VIIRS + AMSR2 SIC product	Sep-23	Sep-23		
Physically-based snow and snow-free land BRDF models, algorithm to infer the snow fraction	Sep-23	Sep-23		
Calibration/validation of NOAA-20 and S-NPP products with MOSAiC data	Sep-23	May-23		

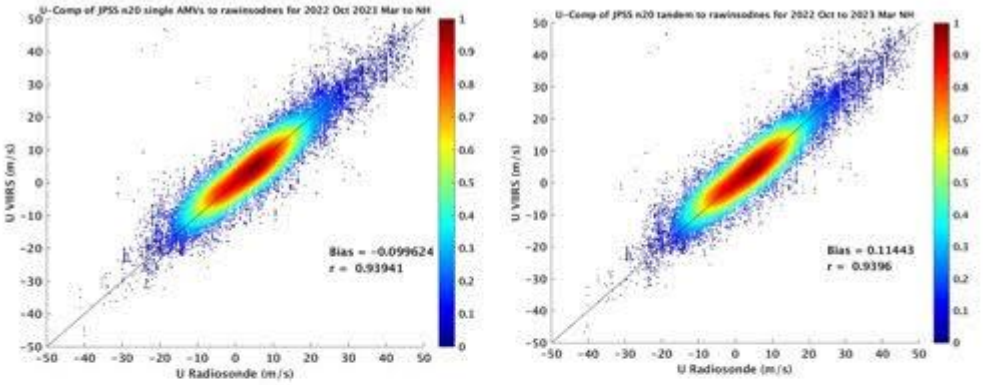
Overall Status:

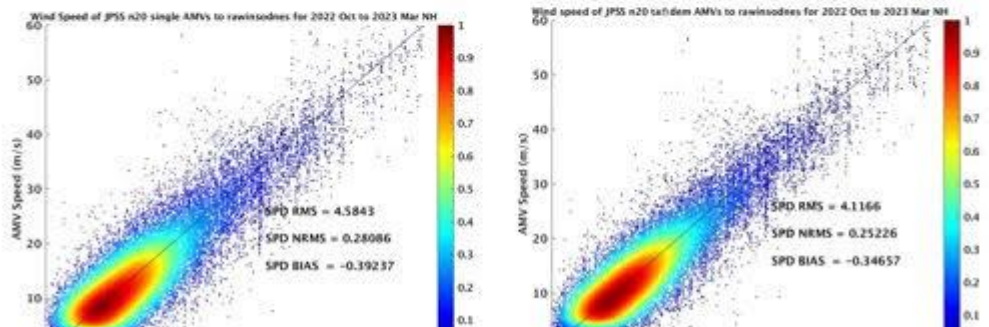
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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





NOAA Products Validation System (NPROVS) and JSTAR Mapper

April, 2023

Accomplishments / Events:

- The JSTAR Mapper team added the Ozone Mixing Ratio product to the site using output from the N20 and SNPP Nadir Profilers to plot atmospheric ozone profiles at 15 levels from 50 to 0.5hPa. **(Highlight)**
- The NPROVS team provided briefings at the NUCAPS All-Hands and JPSS User Initiative meetings which included preliminary results for the NOAA-21 provisional NUCAPS sounding product for v3 and pending v3.1 **and recent NUCAPS case studies in winter environments.**
- Work continues to reprocess the NPROVS Special datasets comprised of the GCOS Reference Upper Air Network (GRUAN) Data Products (GDP) for Vaisala RS41 and Mesei IMS-100 radiosondes.
- Work was initiated (Bomin Sun and Yong Chen) to bring NESDIS GPSRO provisional soundings and the STAR Community Radiative Transfer Model (CRTM) into the NPROVS processing environment

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
JSTAR Mapper: Maintain / expand operational JSTAR Mapper Site, STEMS	Sep-23	Sep-23		
NPROVS: Maintain /expand NPROVS Sounding Product/Sensor Monitoring/Assessment	Sep-23	Sep-23		
JPSS Dedicated Radiosonde Programs: Maintain programs for polar satellite synchronized radiosondes, convert to NOAA-21	Sep-23	Sep-23		
User Support:: Coordinate with JPSS User (NUCAPS) and Hydrological (MiRS) Initiatives	Sep-23	Sep-23		

Highlights

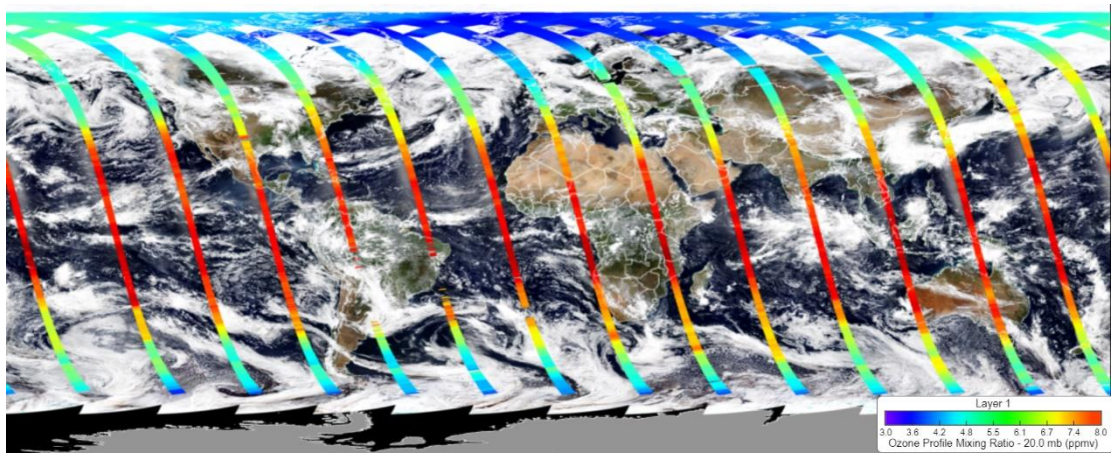


Figure 1 The above image shows JSTAR Mapper imagery of Ozone mixing ratio at 20 hPa. The OMPS team had requested that their Ozone Mixing Ratio product be added to the JSTAR Mapper site at 15 levels from 50 to 0.5 hPa. This product is derived from the OMPS Profiler which produces a single Ozone profile at the nadir field-of view (fov). The mapping procedure uses the latitude / longitude corners stored in the NetCDF file and a unique feature of IDL which can color in the polygon from those corner values; the ozone mixing ratio color scale (3-8ppmv) is shown in the lower right corner.

GCOM-W

April 2023

Accomplishments / Events:

– [Apr 7] **UAS and Surface Measurements Over Sea Ice at Nome, Alaska**: Four STAR scientists participated in the second phase of the UAS (Uncrewed Aircraft System) Sea Ice Retrieval for Calibration/Validation Experiment (USIR-CV EX) on the sea ice at Nome, Alaska, March 27 – March 31, 2023: Jeff Key, Yinghui Liu, Sean Helfrich, and Larry Connor. For the STAR scientists, the goal was to collect a robust dataset for validation of AMSR2 sea ice thickness and VIIRS sea ice products. This fieldwork was a follow-on to similar work done in the Straits of Mackinac, Michigan, in February 2022. The Michigan experiment was a pilot study to test UAS cold-weather capabilities and coordinate surface, UAS, and satellite observations. At Nome, surface measurements of sea ice thickness, snow properties (depth, weight/volume, and grain size), and basic meteorology were made while the UAS and satellites were overhead. Most of the surface observations were made over relatively level shore-fast ice, with some of the measurements taken over the more dynamically formed ice further from the shore that was characterized by rubble and ridges. The UAS used at Nome (Harris H6) was a larger and more capable vehicle than the one used in Mackinaw (M600 Matrix Pro). Both vehicles carried a Tetracam Macaw+Tau six-band visible/near-IR plus one thermal IR band imager and multiple GoPro cameras for context. The Nome aircraft also carried a Thermal Imager (FLIR Vue PRO) and Atmospheric Sensor (InterMet Systems). Integration, testing, data collection, planning/execution, and piloting of the platform and payload were supported by GeoThinkTank LLC and the University of Maryland UAS Research and Operations Center (UROC). On March 31, Key, Helfrich, and Liu traveled to Anchorage to meet with Scott Lindsey, Director of NWS Alaska Region. The following day the team visited the NWS Alaska Sea Ice Program (ASIP) ice analysts at their Sand Lake office and had in-depth discussions on their operations and use of satellite imagery and products. (J. Key, E/RA2, 608-263-2605, jeff.key@noaa.gov; Y. Liu, E/RA2, 608-890-1893, yinghui.liu@noaa.gov; S. Helfrich, sean.helfrich@noaa.gov; L. Connor, laurence.connor@noaa.gov)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Assessment of all EDR's for AMSR2, initiate changes for AMSR3	Sep-23	Sep-23		
Continue AMSR2 L1 monitoring; develop AMSR3 capabilities	Sep-23	Sep-23		
Deliver algorithm updates, as appropriate	May-23	May-23		

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

ICVS

April 2023

Accomplishments / Events:

- Transitioned NOAA-21 ICVS-LTM web pages from protected mode to public domain after the Provisional Maturity declaration of all NOAA-21 instrument science data except for OMPS Limb Profiler, whose monitoring is subject to NASA OMPS group and STAR OMPS EDR schedules.
- Updated ICVS-LTM event log web pages to add NCCF EDR transition to operation status to provide more JPSS operational status information
- Developed new CrIS vs. GOES intersensor comparison quality control method to improve the CrIS long term science data quality trending accuracy.
- Reported S-NPP ATMS a major scan drive anomaly event and impact in science data quality during the event.
- Updated OMPS-NP and NM inter-sensor comparison web page to make all comparison product options visible to users instead of hidden in drop-down manual of current web page.
- Recovered the OMPS ICVS lost data due to the failure of a data disk. Worked with STAR JPSS management and IT support group to prepare for the acquisition of processing and data storage servers to support ICVS-LTM NRT monitoring tasks.
- Developed ICVS beta internal web site missing figure checking script to ensure all experimental ICVS LTM products are produced properly before transitioning to public domain.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop ICVS JPSS-2 modules to support J2 RDR/SDR PLT activities	Jan-23 (L+60)		Jan-23	
Develop ICVS modules to support the J2 SDR Beta and Provisional Reviews for the five sensors (e.g., update the SNPP/NOAA-20 SDR image/RGB/QC flags and other basic functions to J2)	Mar-23 (L+90D)		Mar-23	
Develop ICVS modules to support the J2 SDR Validated Review for the five sensors (e.g., the SNPP/NOAA-20 SDR O-B/JPSS inter-sensor functions to J2 if applicable)	May-23 (L+6m)			
Extend the existing OMPS-NM 380nm-VIIRS M1 monitoring to J2	Jun-23			
Develop the ICVS geolocation accuracy operational monitoring module for J2 OMPS (and CrIS if applicable) in coordination with the SDR teams	Jun-23			
Develop J2 ICVS LP monitoring modules	Jul-23			
Develop an ICVS DCC module for the OMPS-NM SDR quality stability monitoring	Aug-23			
Improve the existing ICVS inter-sensor modules by extending them to J2 (e.g., ATMS vs. AMUS-A, OMPS-TC vs. GOME-2, etc.)	Sep-23			
Maintain and sustain the ICVS monitoring functions for SNPP and NOAA-20 spacecraft and five sensors, including report major anomaly events as needed	Sep-23			
Maintain the ICVS ATMS 3D hurricane tool and produce an event report as needed	Sep-23			
Develop new ICVS modules per ad hoc requests from JPSS/key SDR/EDR users	Sep-23			

Overall Status:

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

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

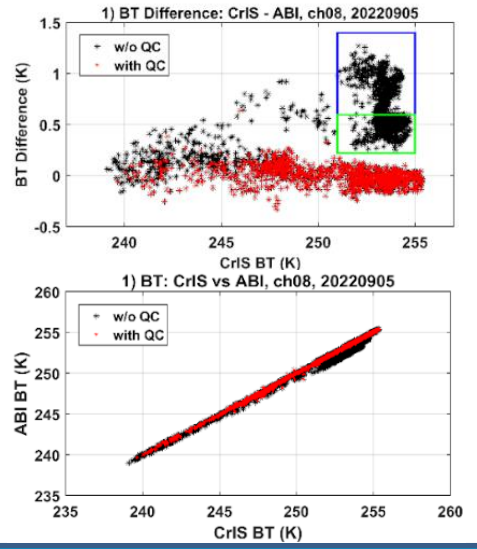
Issues/Risks:

None

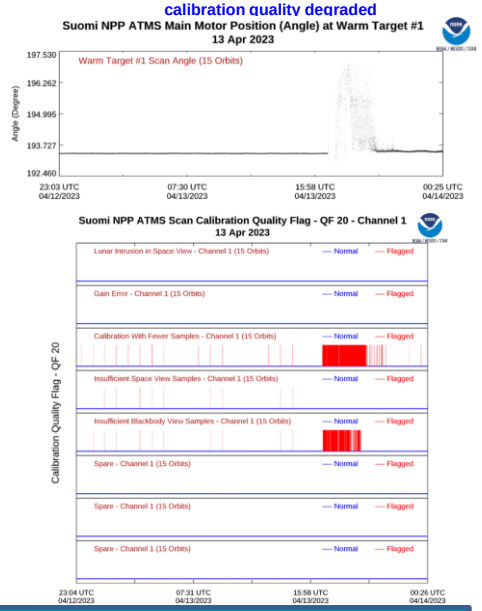
Highlights:

Significantly contribute to STAR SDR Teams

(a) Comparison of CrIS vs. ABI intersensor comparison result before and after applying the updated QC method



(b) NPP ATMS scan drive anomaly caused pointing angle error makes the calibration quality degraded



VIIRS Imagery

April 2023

Accomplishments / Events:

- Continued collection and analysis of NOAA-21 VIIRS Imagery, including comparisons with NOAA-20 and S-NPP, communicating findings with the SDR team
- A daily-updating NOAA-21 VIIRS DNB NCC Global Imagery Composite at night is now available on the VIIRS Imagery team website homepage, here.
- Recent VIIRS Imagery Presentations
  - Bill Line gave a guest lecture titled, “Operational Applications of Satellite Data” for a CSU, Atmo Sci graduate-level class. The presentation provided many examples of how GOES and JPSS satellite imagery and products are used in NWS operations
- Recent VIIRS Imagery Blog Posts
  - NOAA-21 VIIRS Imagery Reaches Provisional Maturity
  - April 10 Volcanic Eruption in Russia
- Recent VIIRS Imagery Social Media Posts
  - VIIRS Day Land Cloud RGB of New Mexico Blowing Dust
  - VIIRS Day Cloud Phase Distinction RGB of South Dakota River Ice
  - VIIRS Day Snow Fog RGB of Snow and Clouds over the Black Hills
  - VIIRS Snow Cloud Layers product of sea ice movement in the Bering Sea

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:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Deliver NOAA-21 VIIRS “First Light” EDR Imagery	Dec-22	Dec-22	Dec-22	
Participate in N-21 VIIRS EDR Imagery Maturity Reviews (B:Feb-23, P:Mar-23, V:Jul-23)				
FY23 Program Management Review	Jun-23	Jun-23		
NCC LUT Development Capability	Sep-23	Sep-23		
New Imagery products or product enhancements (display on SLIDER)	Sep-23	Sep-23	continuing	
Realtime Imagery monitoring and display systems (SLIDER, etc.)	Sep-23	Sep-23	continuing	
Interesting VIIRS Imagery to Social Media and Blogs	Sep-23	Sep-23	continuing	
McIDAS-X/V Enhancements for processing/display of VIIRS Imagery	Sep-23	Sep-23	continuing	
Block 2.3 Mx builds deploy regression review/checkout (Mx8/9:May-23, …)				

Highlights: Image of the Month

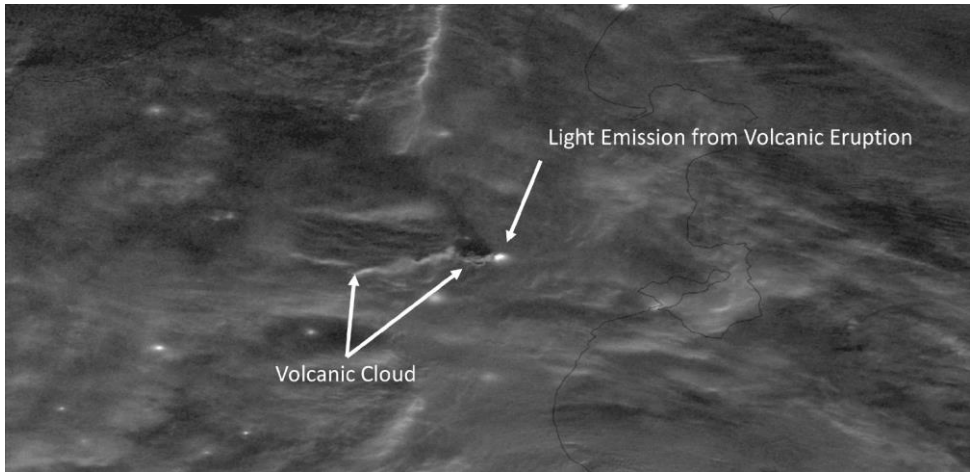

Figure: 1517 UTC (overnight) 10 April 2023 NOAA-21 VIIRS DNB/NCC Product over the Kamchatka Peninsula of Russia, capturing the eruption of the Shiveluch Volcano.

Leaf Area Index

April 2023

Accomplishments / Events:

- Update the LAI code to make it configurable and more flexible, add wrap up script to manage the code running.
- Develop exception handling modules for the LAI code and did unit tests for the possible exceptions.
- Verified the temporal smoothing performance for the near-real-time mode, and improve the algorithm for a better smoothed LAI.
- Prepare the LAI DAP package which include the source code, scripts, test data cases and documents.
- Investigated the post process algorithm for the best quality LAI generation and as an completement for the real-time 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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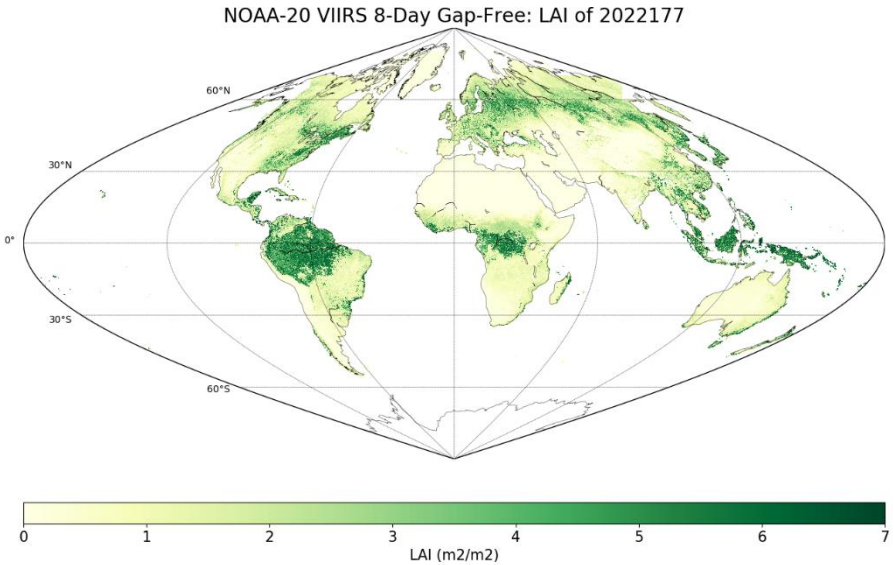
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Quality Monitoring Concept and Long-term Maintenance Concept defined	Oct-22	Oct-22	Oct-22	
Experimental dataset produced for model test	Oct-22	Nov-22	Dec-22	
Development processing system and Initial Information Technology (IT) Security concept defined	Nov-22	Dec-22	Dec-22	
Critical Design Review (CDR)	Feb-23	Feb-23		Waived
Code is prepared for implementation	Apr-23	Apr-23	Apr-23	
CCAP Initial Delivery	Jul-23	Aug-23		

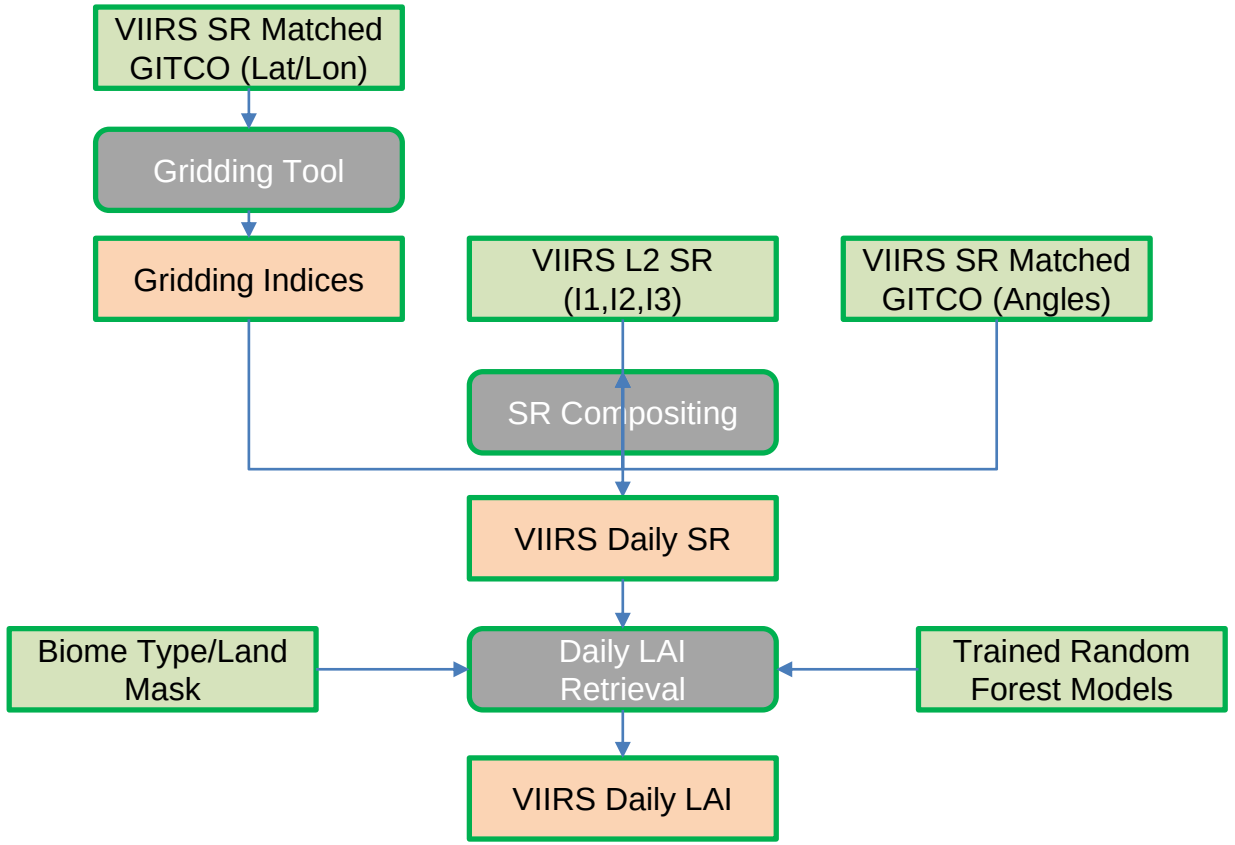
Highlights:



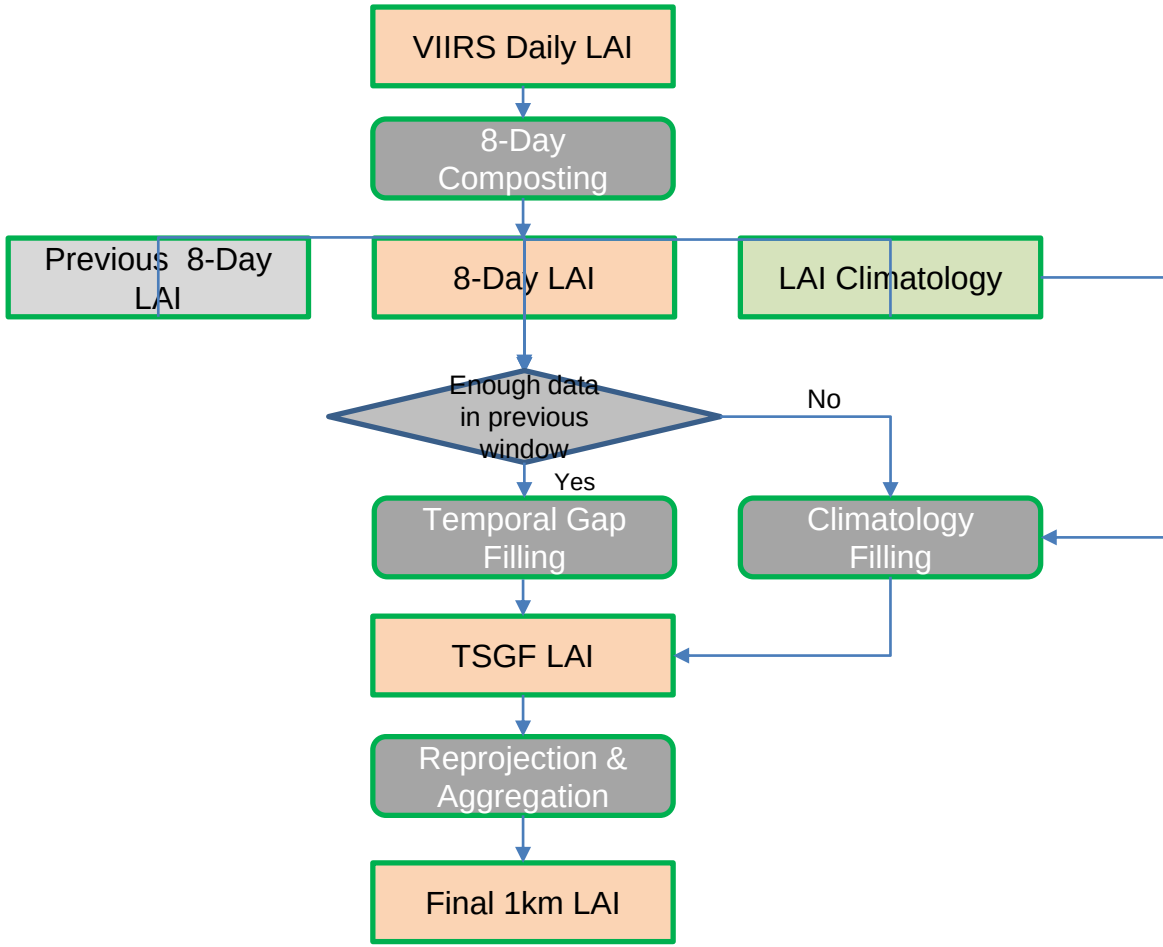
NOAA20 VIIRS 8-Day gap-free LAI

LAI Process Flowchart

- LAI daily process

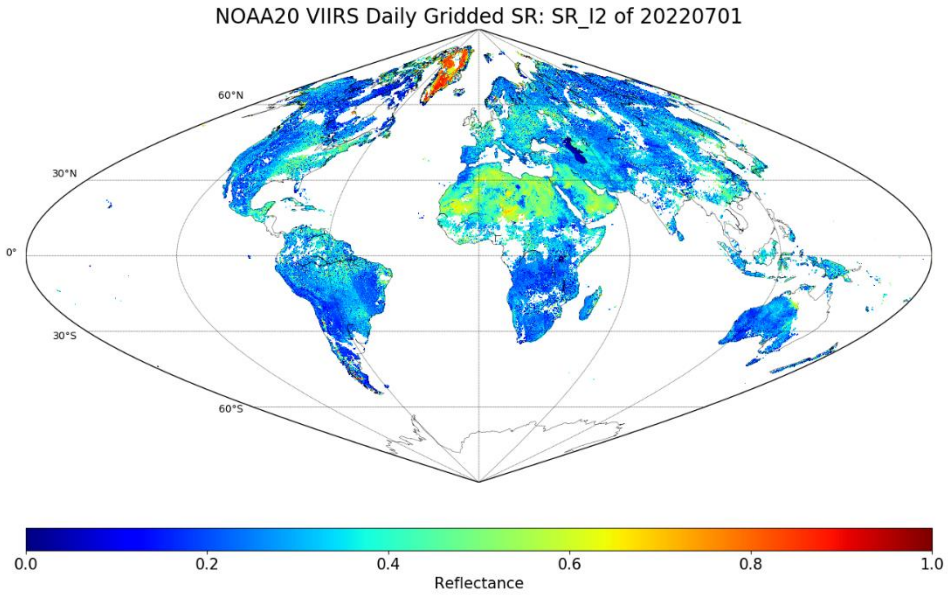


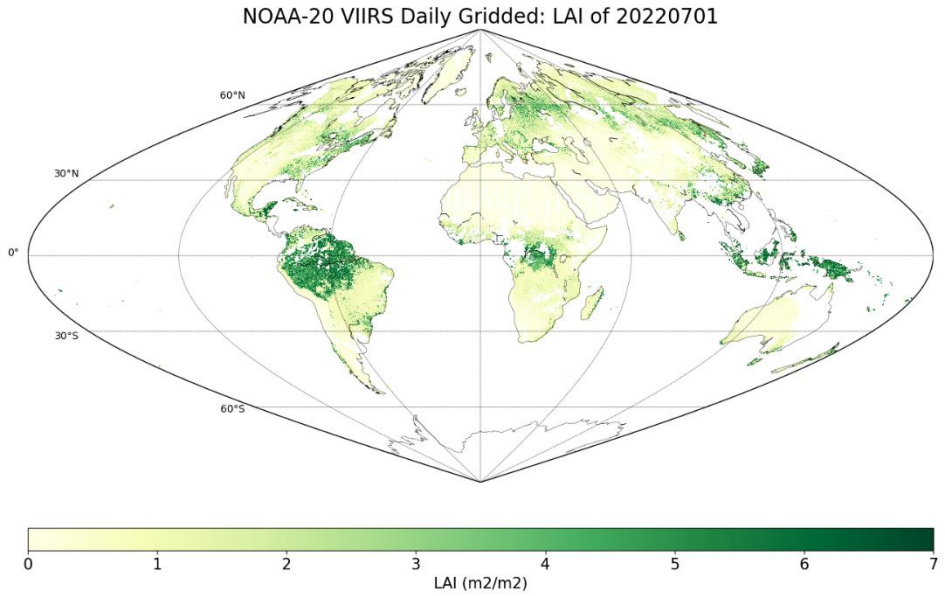
- LAI 8-Day process



LAI Process IP data flow

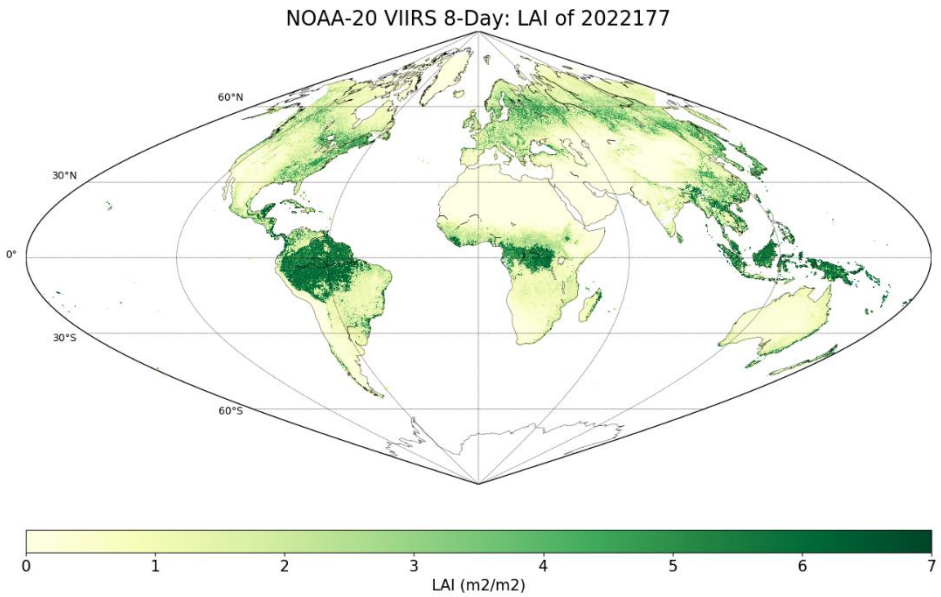
Daily SR

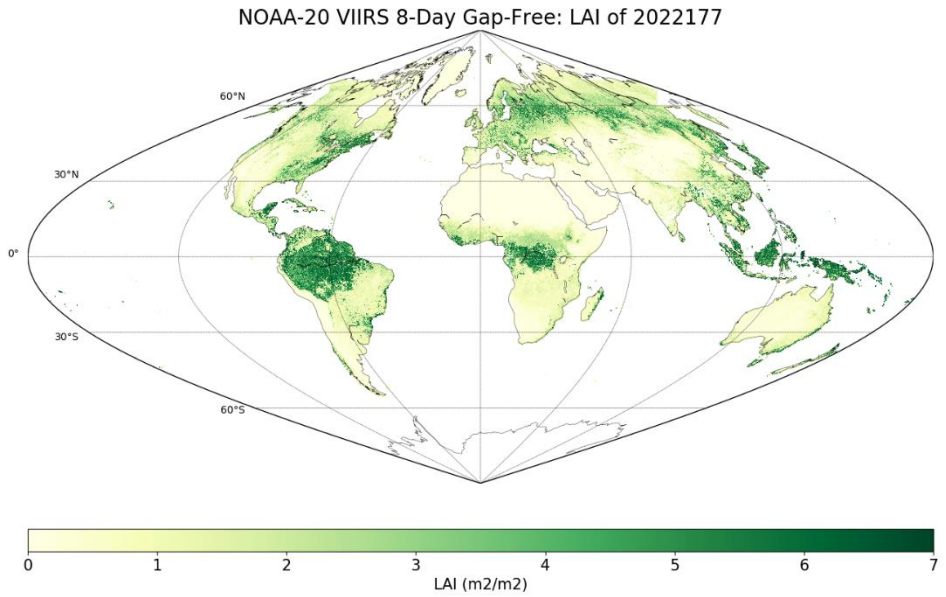




Daily LAI

8-Day LAI





Smoothed & Gap-Free LAI

Vegetation Index and Green Vegetation Fraction

April 2023

Accomplishments / Events:

- Made March and April climatology and March 2023 and April 2023 mean VIs and VI anomalies.
- Made time series of NBAR and operational VIs
- Diagnose and solve issues with operational weekly and biweekly VI. Weekly VI issue is resolved. Biweekly issue should be resolved once sufficient data are available.
- Set up local VI run to supply valid data for time period of issues and to provide a check on operational run going forward
- 95 days of GVF-EVI files were found in the GVF pcf of 3/10/2023, which is not right and should be 104. After discussion with NDE, this was corrected
- Evaluated the operational GVF data and verified the GVF EVI phase-1 and phase-2 smoothing; and the GVF calculation and aggregation and found no issue.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
1km global VIIRS VI and GVF code ready for delivery	Dec-22	Juy-22		Personnel not available for task
Report on methods for improving consistency between ABI and VIIRS VI	Feb-23	Mar-23	Mar-23	Delayed due to personnel sick leave
FY24 Program Management Review	Jun-23	Jun-23		
Annual algorithms/ products performance report	Aug-23	Aug-23		
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-23	Sep-23		
Ongoing support for JPSS-2 pre- and post-launch testing	Sep-23	Sep-23		

Overall Status:

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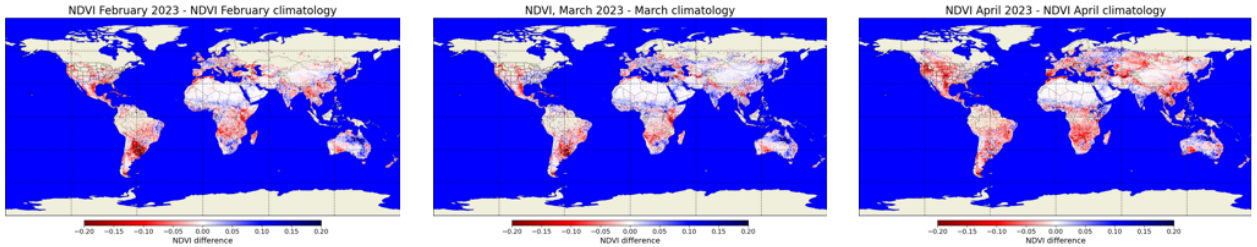
Issues/Risks:

None

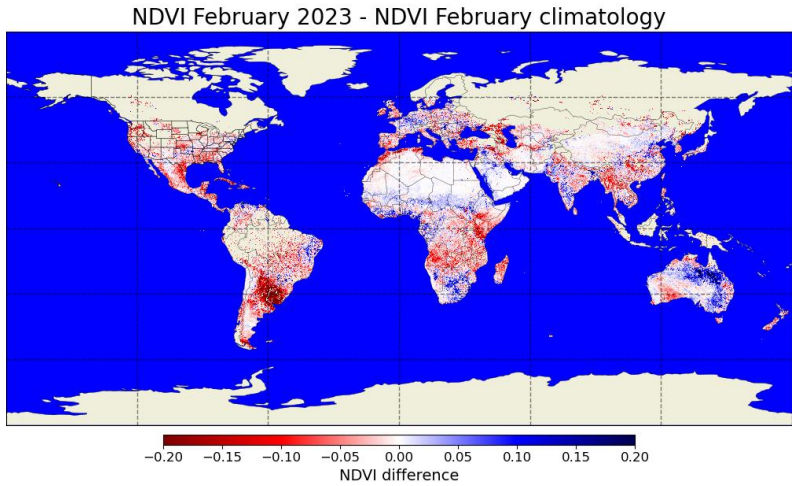
Highlights:

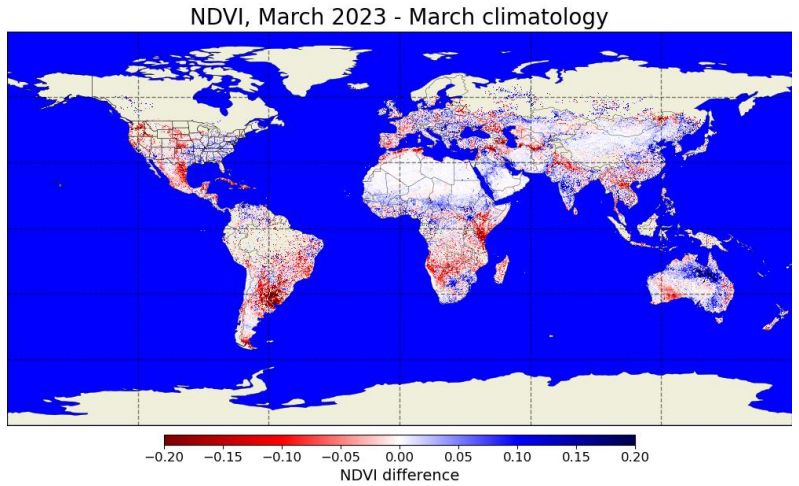
NDVI anomaly trend

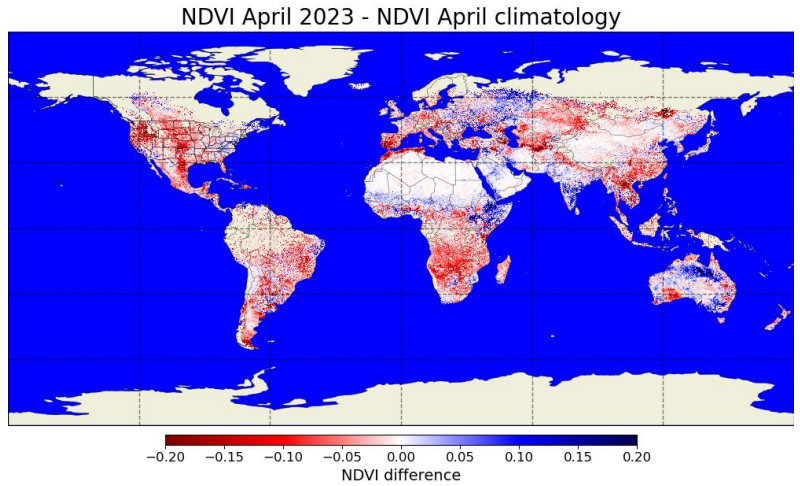


- Overall, NDVI anomaly is trending more negative
- Negative NDVI anomalies over North America, sub-Saharan Africa, and eastern Asia are getting more pronounced
- Negative NDVI anomalies over South America are becoming less intense but more widespread. (Positive LST anomalies occurred in the region in February and March.)
- Persistent positive NDVI anomaly over northern Australia (Negative LST anomalies occurred in February and March.)

NDVI anomaly trend

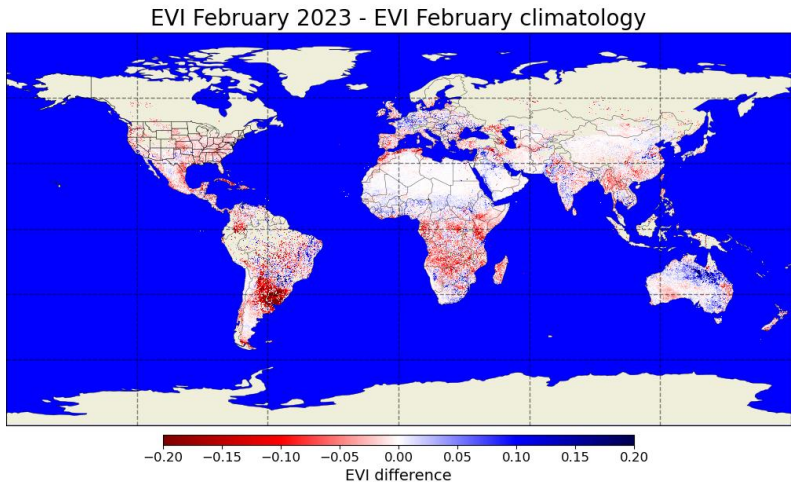


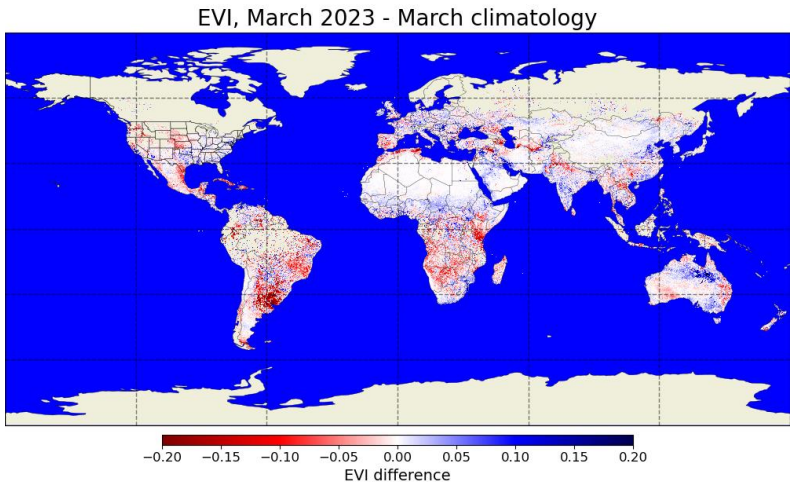


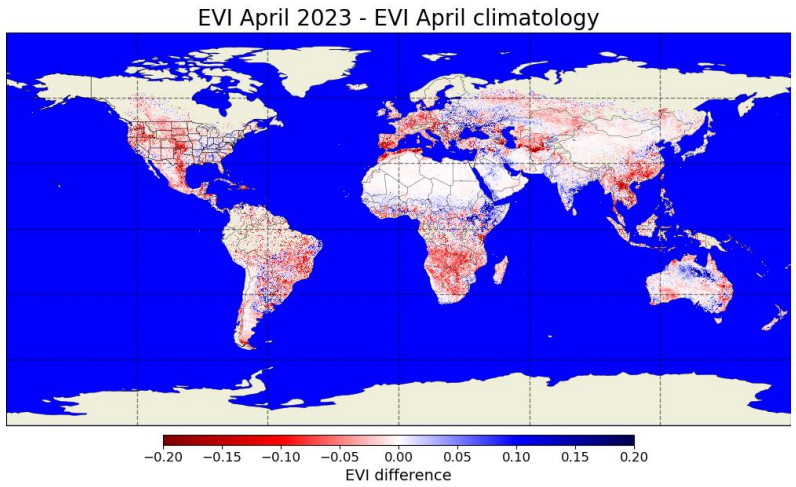


- Overall, NDVI anomaly is trending more negative
- Negative NDVI anomalies over North America, sub-Saharan Africa, and eastern Asia are getting more pronounced
- Negative NDVI anomalies over South America are becoming less intense but more widespread. (Positive LST anomalies occurred in the region in February and March.)
- Persistent positive NDVI anomaly over northern Australia (Negative LST anomalies occurred in February and March.)

EVI anomaly trend



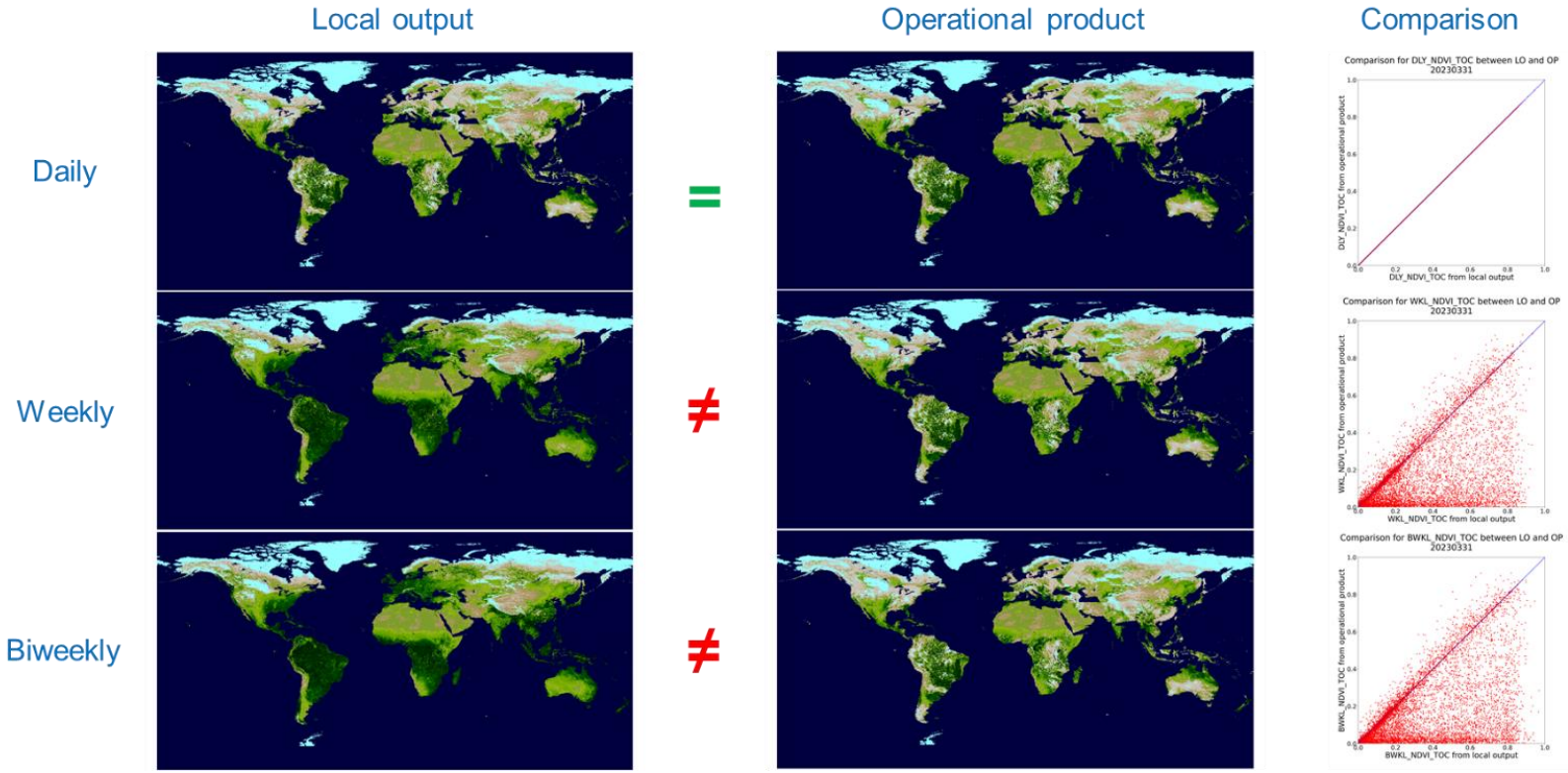




- Negative EVI anomalies over North America, sub-Saharan Africa, and eastern Asia are getting more pronounced
- Negative EVI anomalies over South America are becoming less intense but more widespread. (Positive LST anomalies occurred in the region in February and March.)
- Persistent positive EVI anomaly over northern Australia (Negative LST anomalies occurred in February and March.)
- Negative EVI anomaly over western Europe and positive EVI anomaly over eastern Europe are emerging.

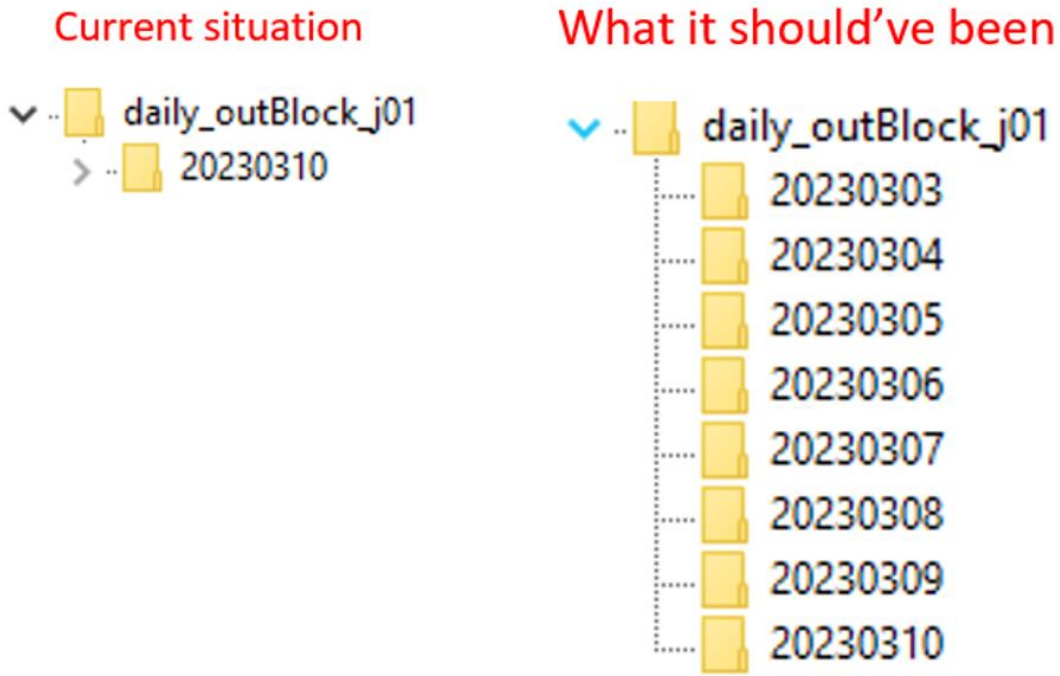
VI weekly/biweekly composite issue

- **Problem observed**
  - ✔ The weekly and biweekly composite modules lost their functions, leading to the operational weekly/biweekly VI output exactly the same as the daily VI output, and don't match with the local weekly/biweekly VI output.



VI weekly/biweekly composite issue

- **Diagnosis**
  - ✔ Weekly composite module only reads **today's** daily VI, instead of (**today + 7 previous days**)'s daily VI as inputs, as shown below, indicating that the **collection of 7 previous days' data failed**.



VI weekly/biweekly composite issue

- **Solution**
  - ✔ Modify the production rule handle, making PCF file match with the bash scripts

```
<PRInputSpec
      prisNeed="OPTIONAL"
      prisFileHandle="INPUT"
      prisFileHandleNumbering='N'
      prisTest="null"
      prisLeftOffsetInterval="interval '-8' day"
      prisRightOffsetInterval="interval '-1' day"
      prisFileAccumulationThreshold="0">
      <PRInputProduct
            platformName="JPSS1"
            productShortName="VI_DLY_GLB_tile"
            prInputPreference="1" />
</PRInputSpec>
<PRInputSpec
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      prisFileHandle="INPUT"
      prisFileHandleNumbering='N'
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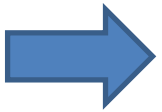

```
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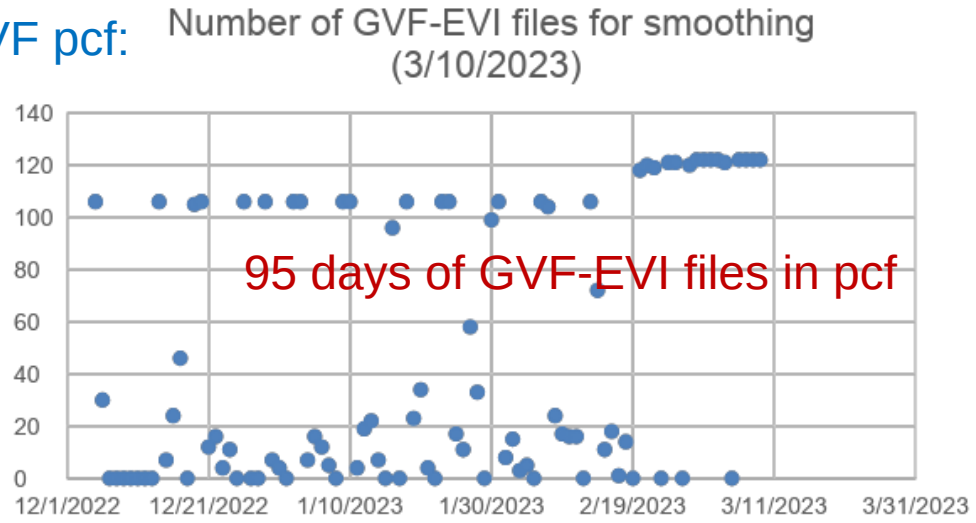
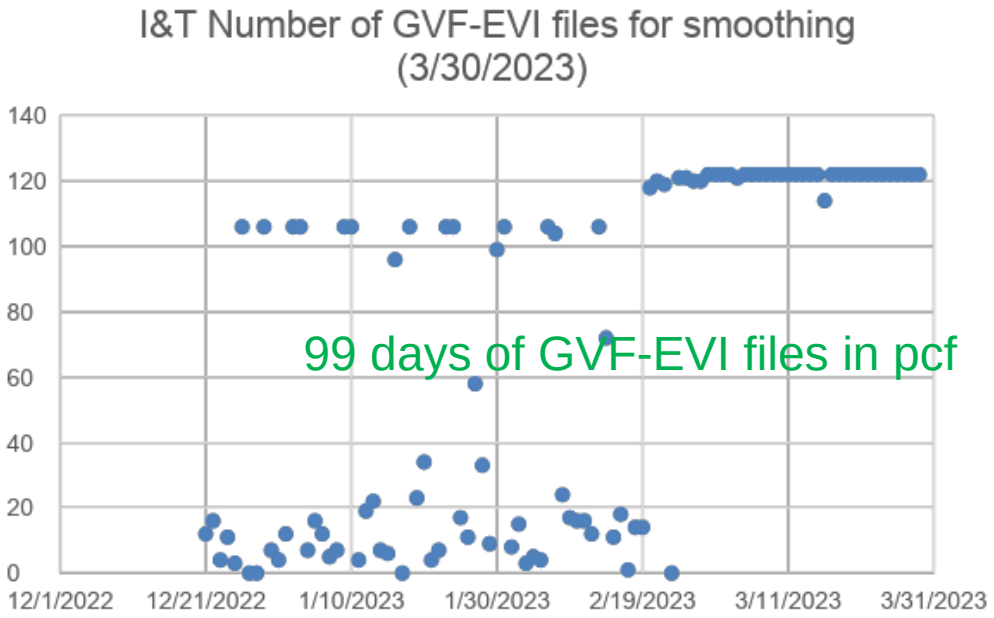
</PRInputSpec>
```

Correction of GVF-EVI input data in I&T GVF pcf file

GVF pcf:





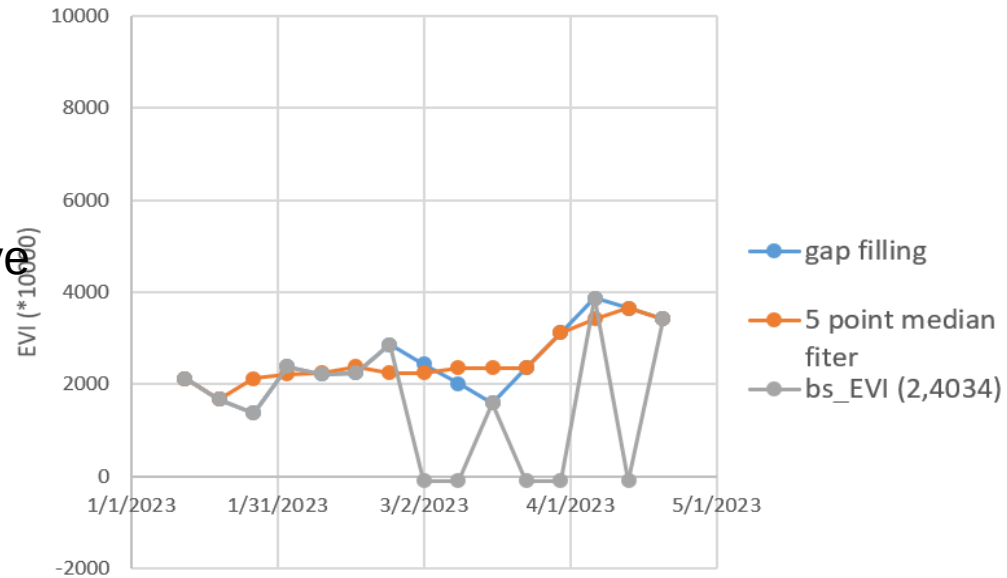
- 95 days of GVF-EVI files were found in the pcf of 3/10/2023, which should be 104.
- Had a group meeting with OSPO and NDE teams discussing the correct number of GVF-EVI data in pcf files (95 days to 104 days)

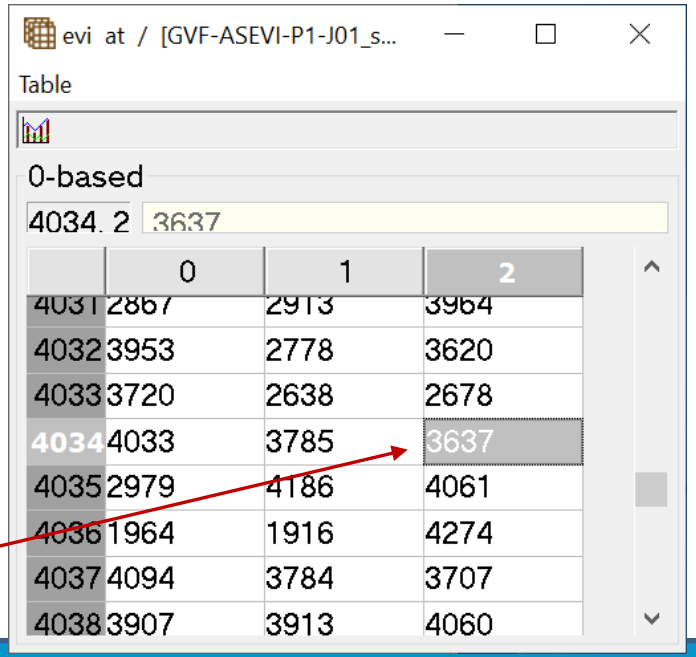
- After discussion last Thursday, NDE increased the PRODUCTRETENTIONPERIODHR for the GVF_EVI files (both satellites) from 2376 (i.e 99 days) to 2568 (i.e. 107 days) in I&T
- We found there were 99 days of GVF-EVI data in the pcf on 3/30/2023 after correction
- The number of days of GVF-EVI data will increase to 104 in a week

Verification of the GVF phase-1 smoothing

1. Extracted 15 weeks of bs_EVI intermediate data (provided by OSPO from operational run)
2. Run Gap filling on the 15 weeks of EVI time series to remove filled values
3. Run median filter on the 15 weeks of EVI time series to remove outliers
4. Run the Gorry filter to smooth the current EVI data and got exactly the same smoothed EVI value as the operational run

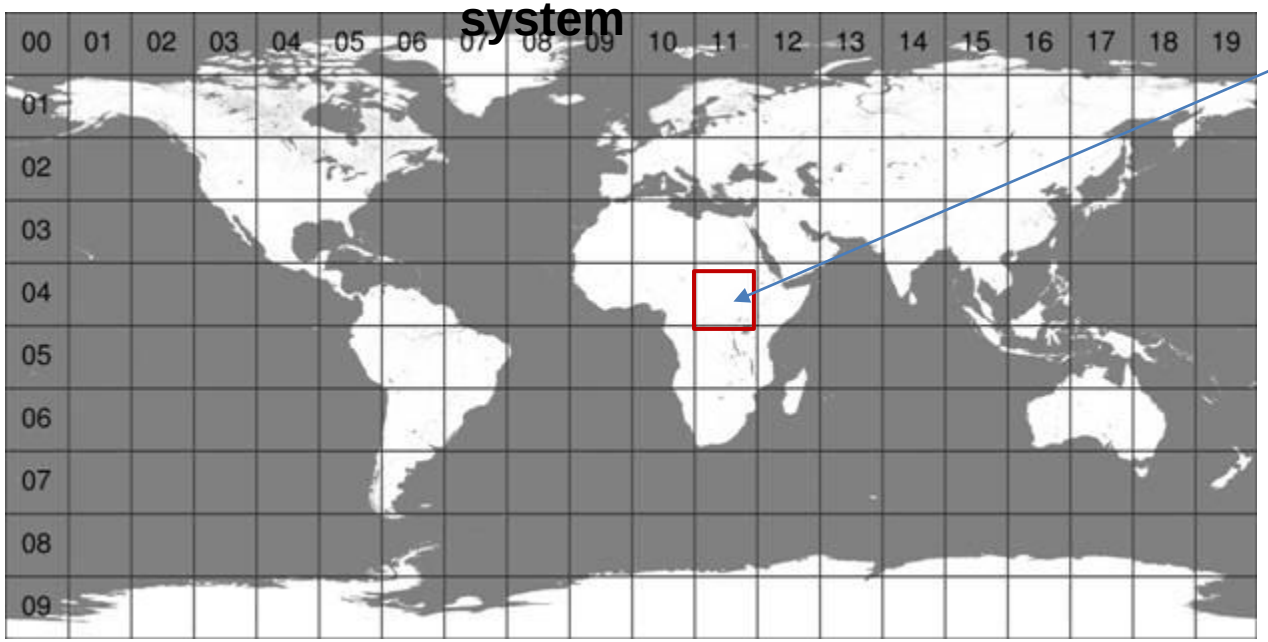
	Gorry filter		Date	bs_EVI (2,4034)	gap filling	5 point medial	convolution
g_filter2(0)	0.114706	1	1/12/2023	2126	2126	2126	243.865
g_filter2(1)	0.044118	2	1/19/2023	1672	1672	1672	73.76463
g_filter2(2)	-0.01176	3	1/26/2023	1375	1375	2126	-25.01175
g_filter2(3)	-0.05294	4	2/2/2023	2385	2385	2219	-117.4765
g_filter2(4)	-0.07941	5	2/9/2023	2219	2219	2243	-178.1207
g_filter2(5)	-0.09118	6	2/16/2023	2243	2243	2385	-217.456
g_filter2(6)	-0.08824	7	2/23/2023	2861	2861	2243	-197.9118
g_filter2(7)	-0.07059	8	3/2/2023	-99	2439.667	2243	-158.3293
g_filter2(8)	-0.03824	9	3/9/2023	-99	2018.333	2356.333333	-90.09511
g_filter2(9)	0.008824	10	3/16/2023	1597	1597	2356.333333	20.7912
g_filter2(10	0.070588	11	3/23/2023	-99	2356.333	2356.333333	166.3296
g_filter2(11	0.147059	12	3/30/2023	-99	3115.667	3115.666667	458.1868
g_filter2(12	0.238235	13	4/6/2023	3875	3875	3420	814.7637
g_filter2(13	0.344118	14	4/13/2023	-99	3647.5	3647.5	1255.17
g_filter2(14	0.464706	15	4/20/2023	3420	3420	3420	1589.295
						Smoothed EVI	3637.765





Verification of GVF phase-2 smoothing

GVF tile system



- There are 20*10 tiles globally
- Each tile contains 6000*6000 0.003° grids, covering a 18° *18° area

1. A land tile at H11V04 is selected for testing

2. A week of NPP and J01 GVF intermediate data (after smoothing EVI) were obtained from OSPO

Name	Date modified
GVF-ASEVI-P1-J01_s20230408_e20230414_h11v04_c202304150852030	4/21/2023 10:22 AM
GVF-ASEVI-P1-J01_s20230409_e20230415_h11v04_c202304160905110	4/21/2023 10:22 AM
GVF-ASEVI-P1-J01_s20230410_e20230416_h11v04_c202304170901560	4/21/2023 10:22 AM
GVF-ASEVI-P1-J01_s20230411_e20230417_h11v04_c202304180912520	4/21/2023 10:22 AM
GVF-ASEVI-P1-J01_s20230412_e20230418_h11v04_c202304190900080	4/21/2023 10:23 AM
GVF-ASEVI-P1-J01_s20230413_e20230419_h11v04_c202304200903040	4/21/2023 10:23 AM
GVF-ASEVI-P1-J01_s20230414_e20230420_h11v04_c202304210912480	4/21/2023 10:23 AM

3. Selected a 12*12 box at h11v04 corresponds to the 0.036° GVF in the global map at (5500, 2499)

4 .Read in a week of GVF-ASEVI-P1 data and do the phase-2 smoothing

Verification of GVF phase-2 smoothing and GVF calculation

(1) Before aggregation GVF (ba_GVF) calculation

Ba_GVF = (EVI-0.09)/(0.6406-0.09)

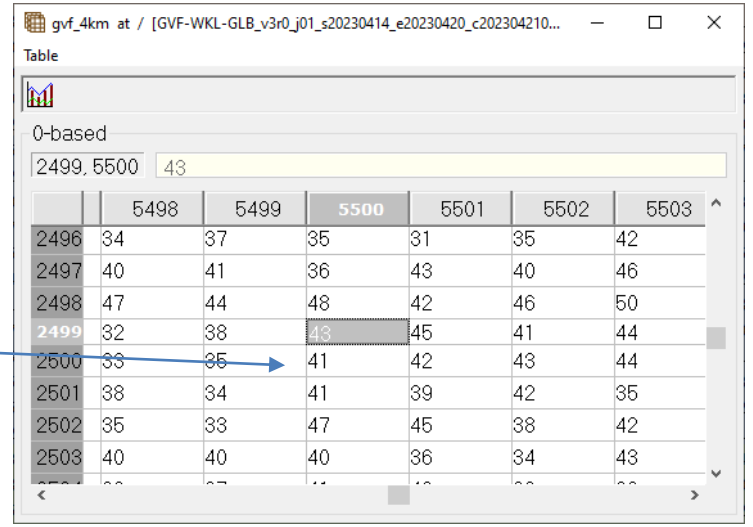
0.003° before aggregation GVF over a 12*12 box

0.529	0.475	0.577	0.492	0.450	0.472	0.483	0.506	0.512	0.443	0.308	0.318
0.555	0.607	0.625	0.502	0.323	0.237	0.444	0.448	0.465	0.436	0.356	0.208
0.466	0.545	0.446	0.378	0.311	0.505	0.573	0.355	0.392	0.441	0.453	0.308
0.348	0.371	0.403	0.395	0.331	0.313	0.453	0.389	0.542	0.540	0.491	0.507
0.453	0.464	0.449	0.340	0.419	0.391	0.323	0.540	0.405	0.446	0.476	0.524
0.455	0.394	0.481	0.448	0.412	0.387	0.487	0.440	0.511	0.381	0.444	0.618
0.475	0.394	0.365	0.490	0.447	0.449	0.502	0.351	0.491	0.410	0.451	0.586
0.474	0.464	0.361	0.478	0.488	0.476	0.567	0.575	0.381	0.407	0.342	0.488
0.420	0.422	0.389	0.341	0.435	0.357	0.561	0.598	0.656	0.525	0.503	0.587
0.484	0.332	0.391	0.404	0.468	0.446	0.513	0.363	0.439	0.391	0.443	0.366
0.449	0.275	0.319	0.331	0.451	0.421	0.424	0.387	0.304	0.320	0.322	0.289
0.467	0.442	0.415	0.410	0.540	0.635	0.423	0.471	0.401	0.425	0.302	0.374

(2) GVF aggregation

0.036° After aggregation GVF = Averaging ba_GVF over 12*12 box

Aggregated GVF=0.43



	5498	5499	5500	5501	5502	5503
2496	34	37	35	31	35	42
2497	40	41	36	43	40	46
2498	47	44	48	42	46	50
2499	32	38	43	45	41	44
2500	33	35	41	42	43	44
2501	38	34	41	39	42	35
2502	35	33	47	45	38	42
2503	40	40	40	36	34	43

It verified

1. The phase 2 smoothing was implemented in the operational run
2. The GVF value was calculated corrected in the operational run

Land Surface Temperature

April, 2023

Accomplishments / Events:

- Revised the proposal on the LST transition to cloud.
- Prepared the user's guide for L2 and L3 VIIRS LST product.
- Reach out to ASSISTT and NDE regarding the unavailable JPSS-2 LST data. It turns out that the LST unavailability is due to the data dependency, i.e. Land surface emissivity depends on Green vegetation fraction which depends on vegetation index. VI operational run has some issues recently. Investigated the impact of problematic GVF on the LST validation particularly the impact on the land surface emissivity and LST error. (highlight and slide 2)
- Summarize the monthly anomaly study for land surface temperature. The daytime LST anomaly, nighttime LST anomaly as well as the diurnal LST anomaly were analyzed. Related factors are explored.(slide 3)
- Extend the L3 LST data back to 2019 and early 2020 and generated the L3 LST data in latlon projection for both NPP and N20.
- Updated the L3 LST validation with longer time period of data over SURFRAD, BSRN, and ARM. (slide 4-6)
- Updated the software code related to NDBF including automatic download of NDBC data from a URL and standardize of the L3 validation output. In addition, modify the software code with PROMICE data validation to standardize the L3 validation output and updated the validation results. (slide 7-8)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Annual products performance report for L2 and L3 VIIRS LST	Dec-22	Dec-22	Dec-22	
Beta review of the NOAA-21 LST	**Mar-23**	**Mar-23**		**Postponed. Data is not available yet.**
All weather LST update	May-23	May-23		
FY24 Program Management Review	Jun-23	Jun-23		
Routine monitoring tool and its update	Jul-23	Jul-23		
DAP for NOAA-21 if needed	Aug-23	Aug-23		
Provisional review of the NOAA-21 LST	Sep-23	Sep-23		

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.*

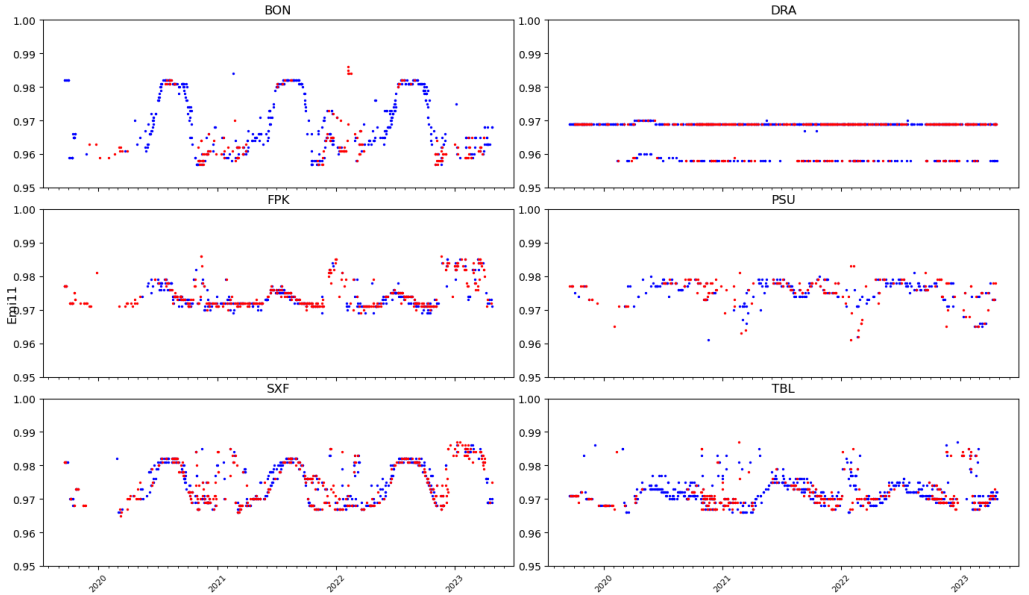
Issues/Risks:

None

Highlights:

Impact of problematic GVF on downstream LSE

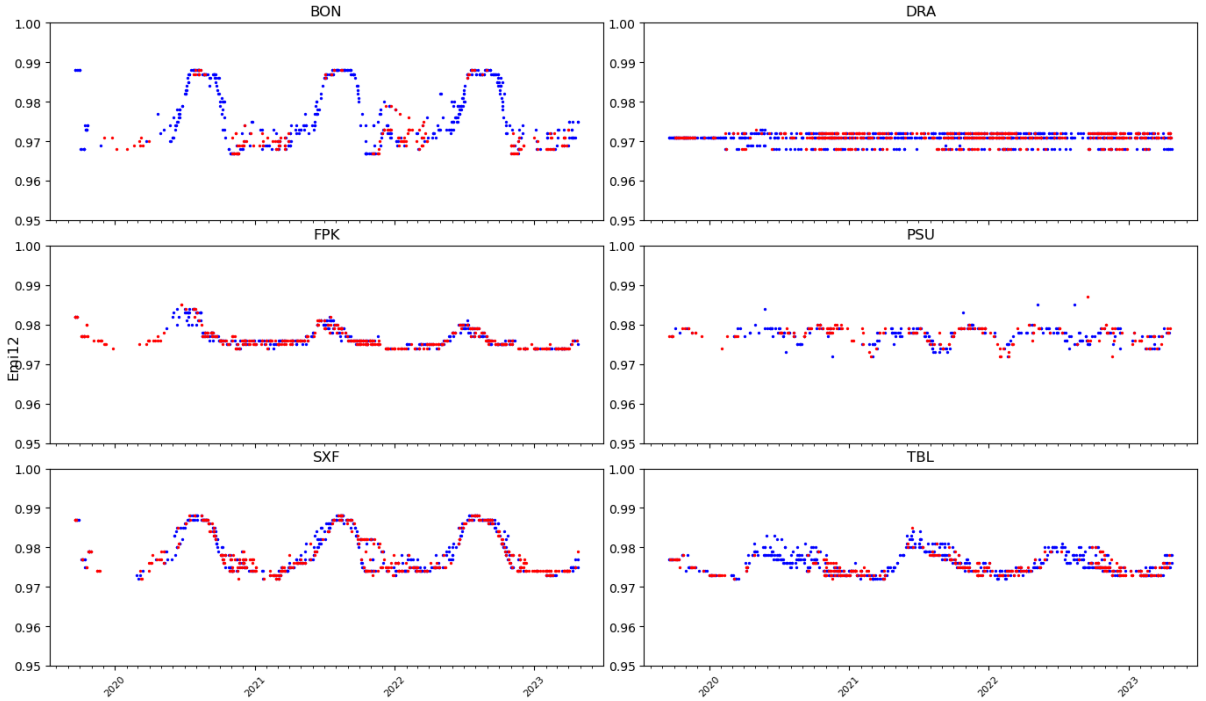
Time series of LSE for 11micron over SURFRAD stations



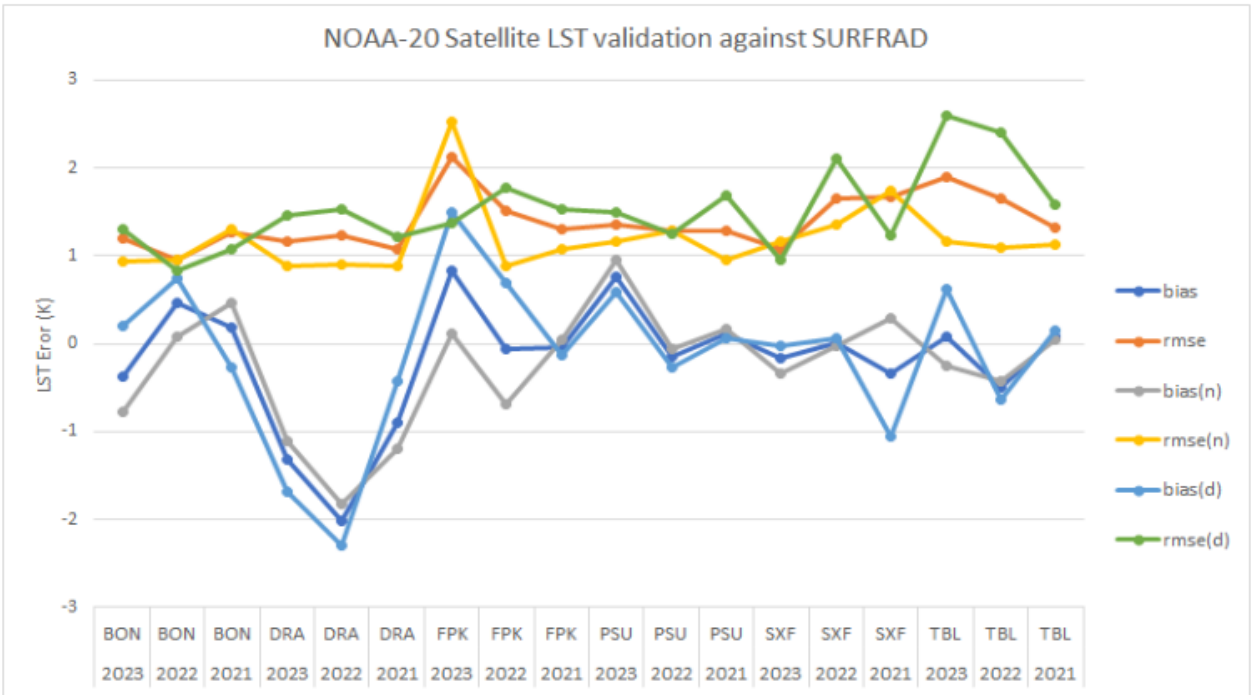
Operational GVF has some issues for both SNPP and NOAA-20 since early 2023. To investigate the impact on downstream LSE, ground LST validation was performed and abnormal variations in LSE over FPK and SXF were observed.

Impact of problematic GVF on downstream LSE and LST

Emissivity for band 16 over SURFRAD stations

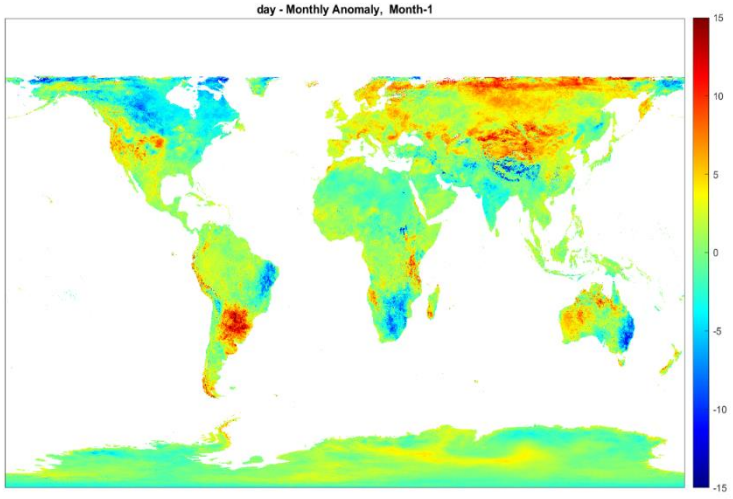


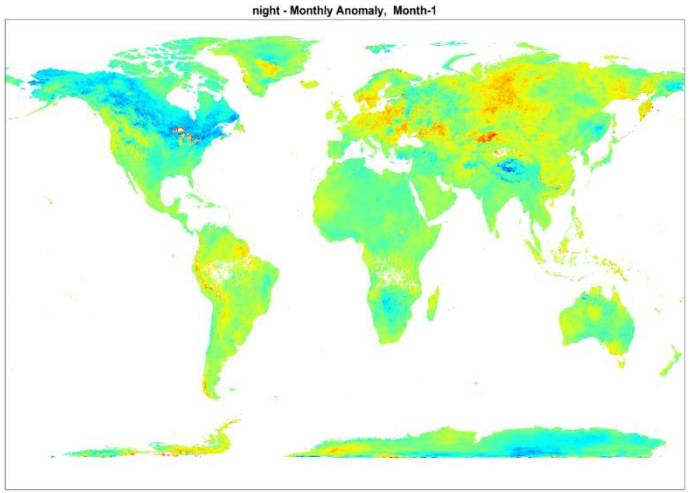
Sitewide LST error comparison

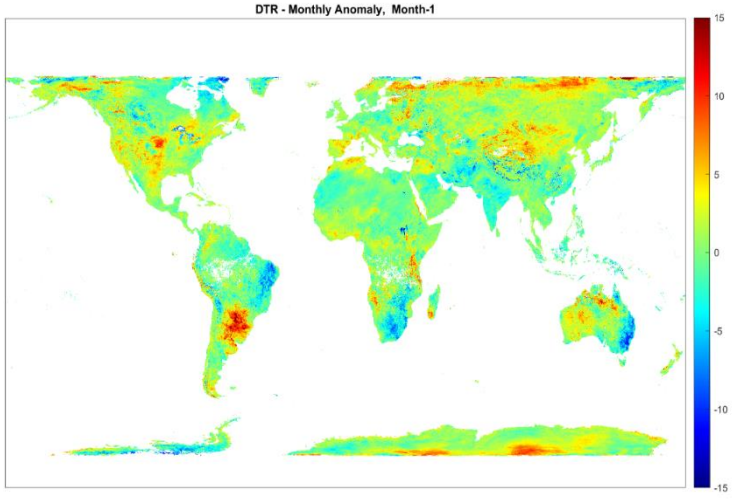


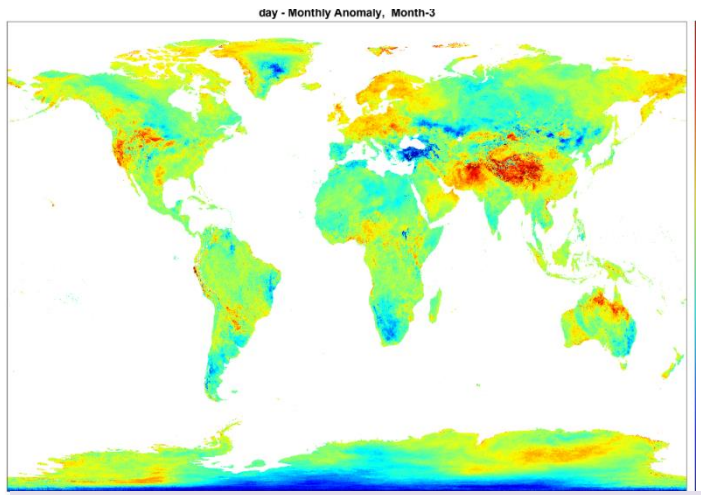
- The left figure (red color-daytime; blue color-nighttime) indicate that the emissivity at the 12-micron wavelength appears to be unaffected across all stations.
- LST error were compared for the period from January 1st to April 25 over the past three years for six stations in the SURFRAD network. The results indicate no clear impact, except for FPK site, which shows a more significant discrepancy, and SXF site, which shows slightly better statistics, as shown in the right figure. The colors in the right figure represent statistics of bias and RMSE for the combined results (day+night), with "n" representing nighttime and "d" representing daytime.

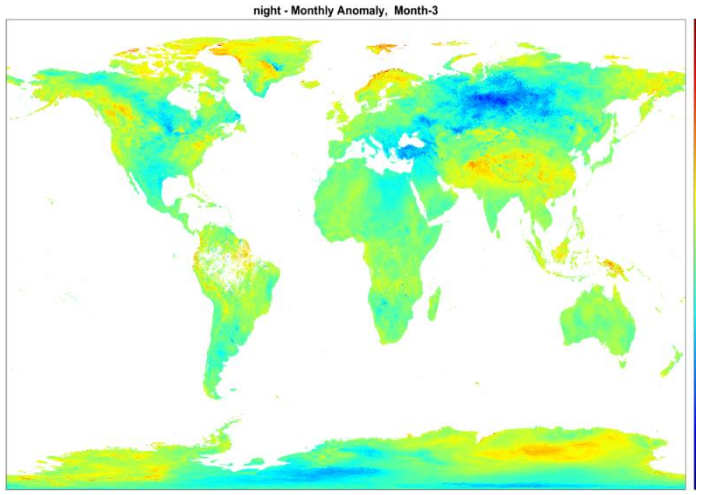
LST Anomaly Analysis

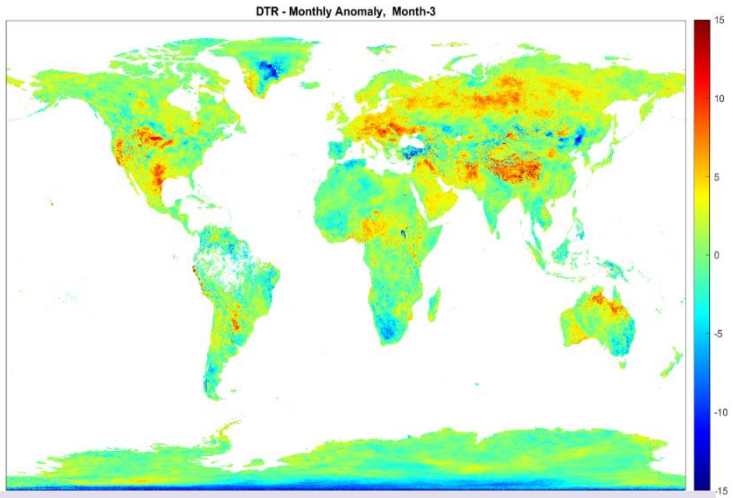






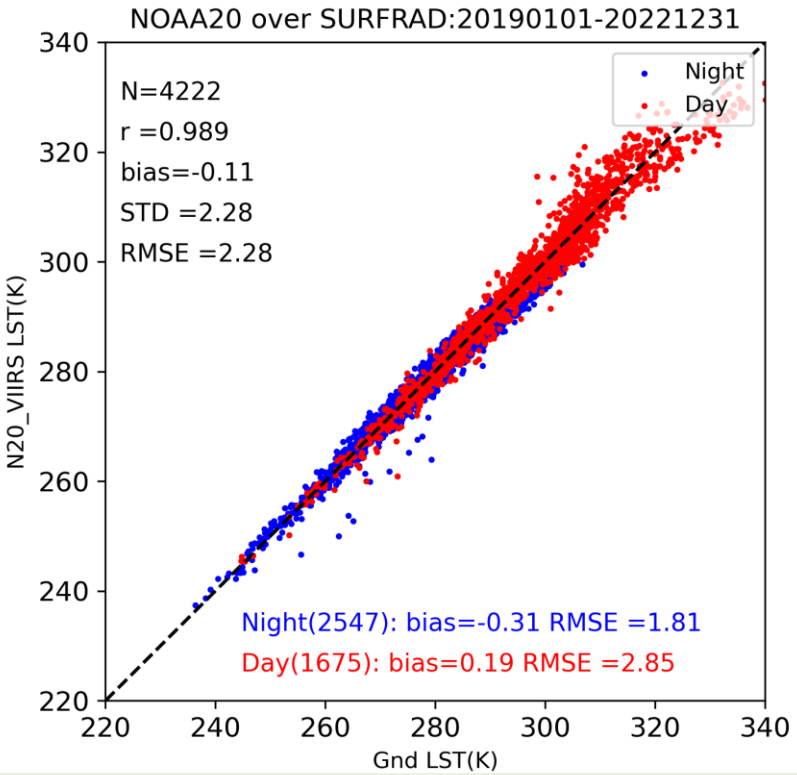


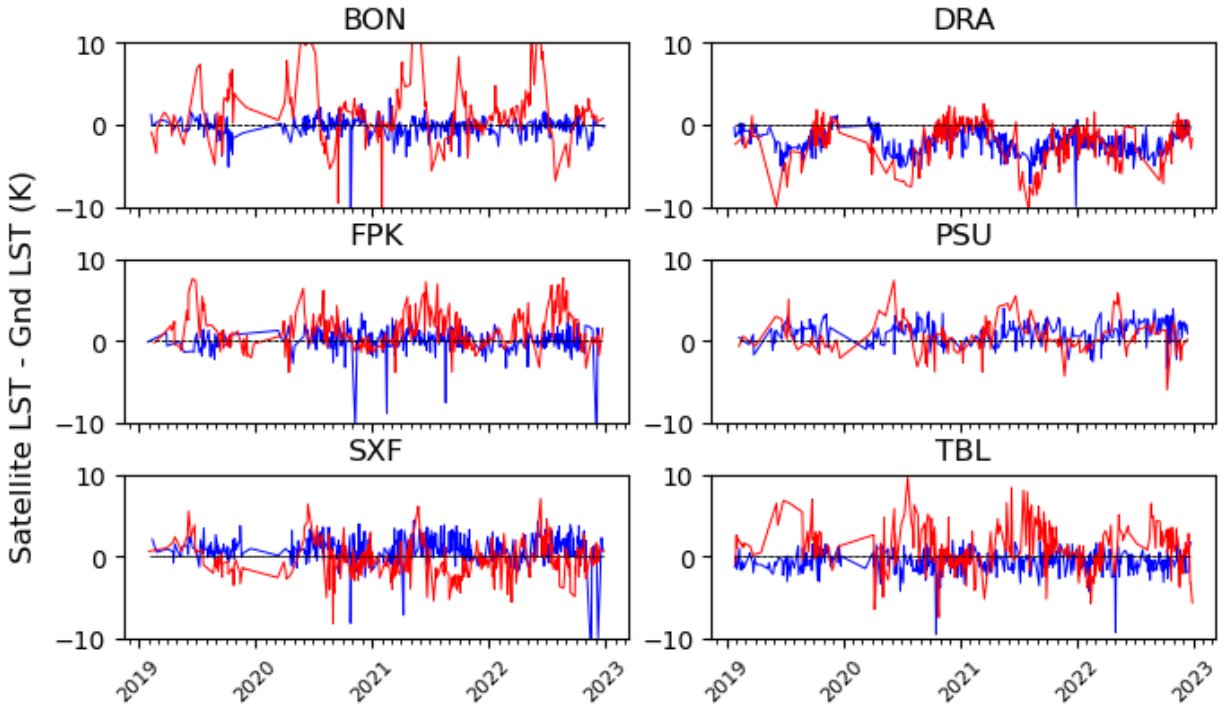




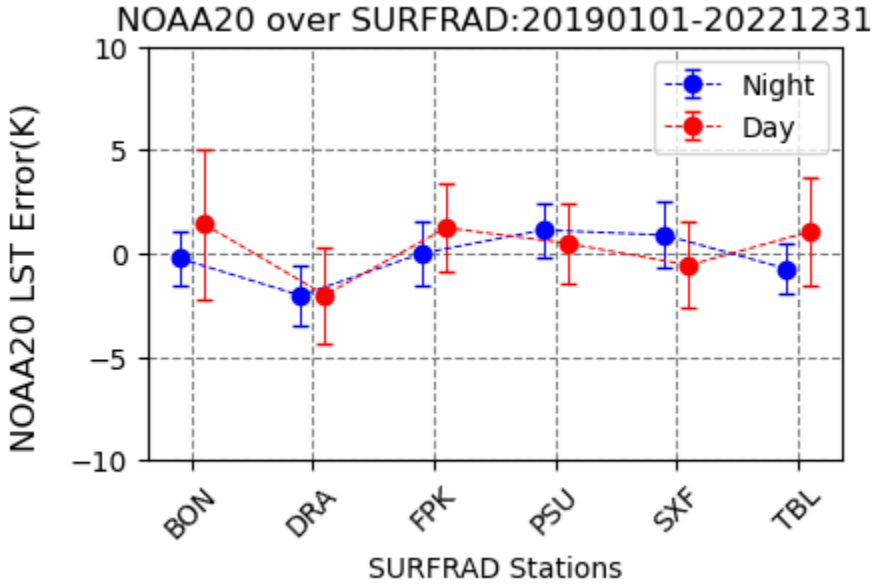
- The monthly LST anomaly was analyzed for each month in 2022, with sample months of January(top) and March(bottom) used for demonstration. The figures display the LST monthly anomaly, with the left figure for daytime, the middle figure for nighttime, and the right figure for the diurnal LST range.
- Generally, the nighttime anomaly shows milder variations compared to the daytime anomaly, with consistent trends observed in some regions but not always consistent with the daytime anomaly. For example, South America in January and middle Russia in March show inconsistent trends. The diurnal LST range anomaly mostly indicates variations during the daytime and depends on the relative trend between the daytime and nighttime anomalies.

Validation over SURFRAD

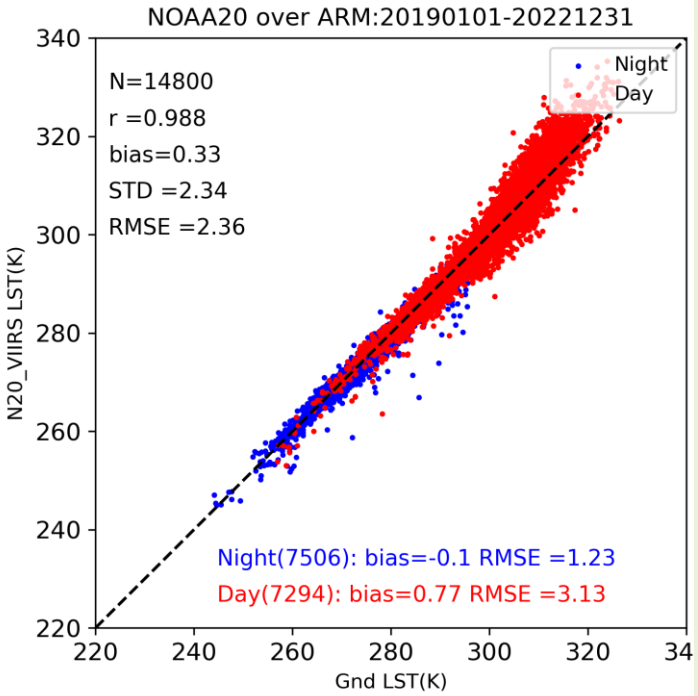


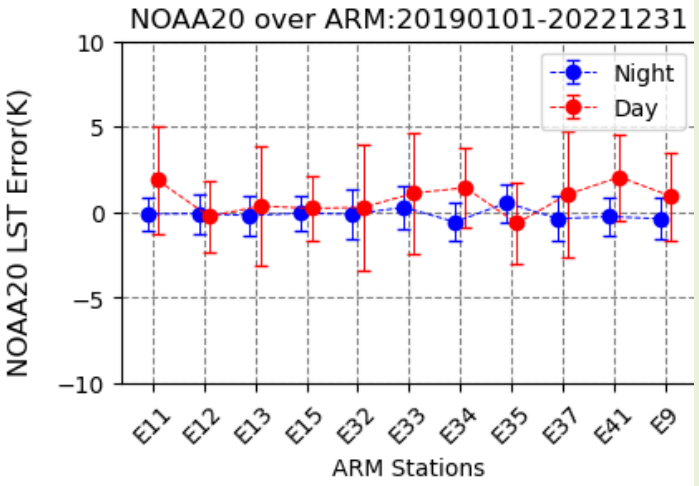


- The L3 VIIRS LST validation was conducted over six stations in the SURFRAD network for the time period from 2019 to 2022. Cloud screening and ground data quality checks were applied to the validation data.
- The overall results indicate a correlation of 0.99 between ground and satellite LST, with a bias of -0.3K and 0.2K, RMSE of 1.8K and 2.9K for nighttime and daytime, respectively. Outliers were observed at nighttime.
- The site-wide LST error time series indicates wide fluctuations during the daytime and seasonal variations over some stations, including FPK, TBL, and BON. The seasonal variation at nighttime is less prominent.

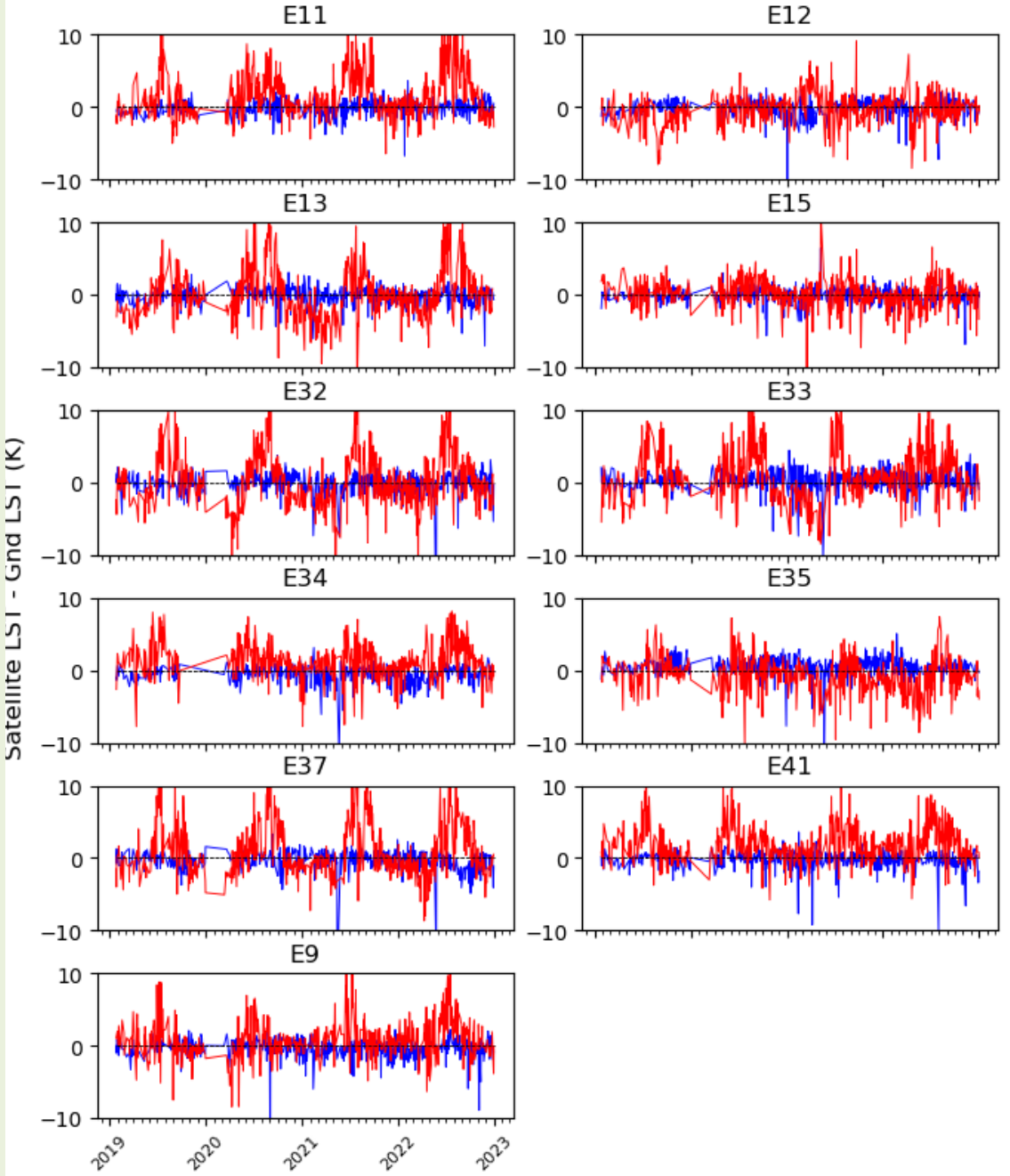


Validation over ARM

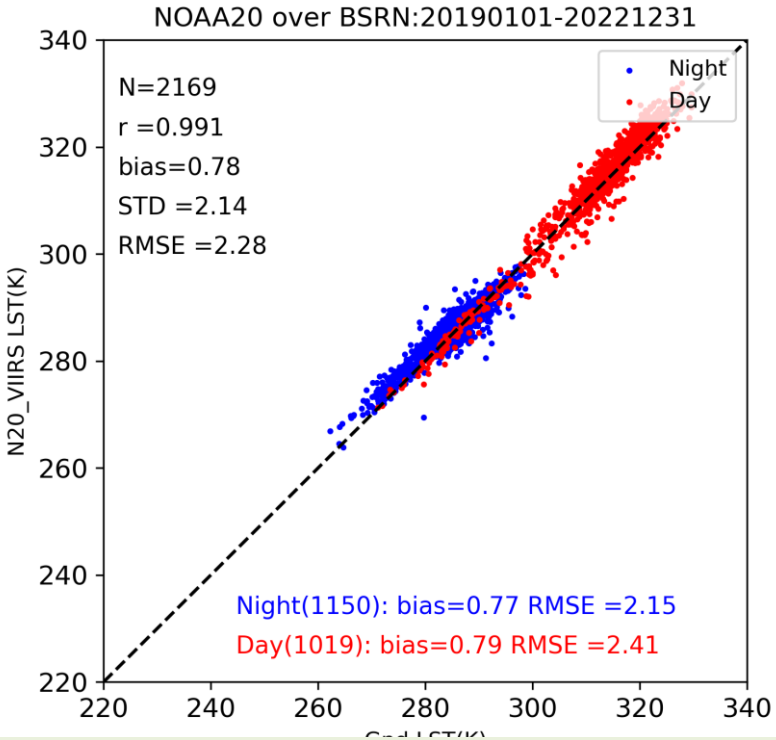


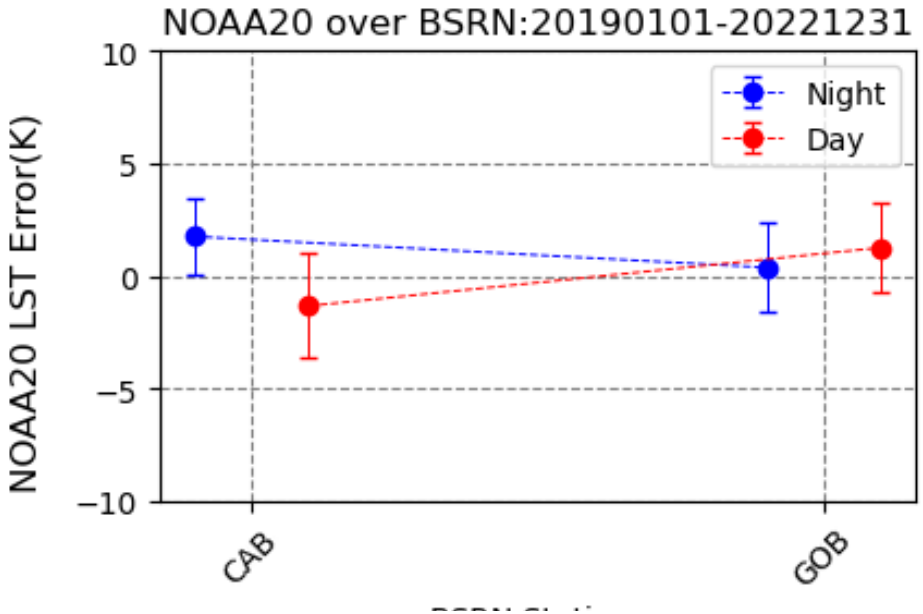


- The L3 VIIRS LST validation was conducted over 11 stations in the ARM network for the time period from 2019 to 2022. Several stations were excluded due to periodic data issues. Cloud screening and ground data quality checks were applied to the validation data.
- The overall results indicate a correlation of 0.99 between ground and satellite LST, with a bias of -0.1K and 0.8K, RMSE of 1.2K and 3.1K for nighttime and daytime, respectively.
- The site-wide LST error time series indicates wide fluctuations during the daytime and seasonal variations over most stations, including E11, 13, 32, 37, and E41. The seasonal variation at nighttime is less prominent

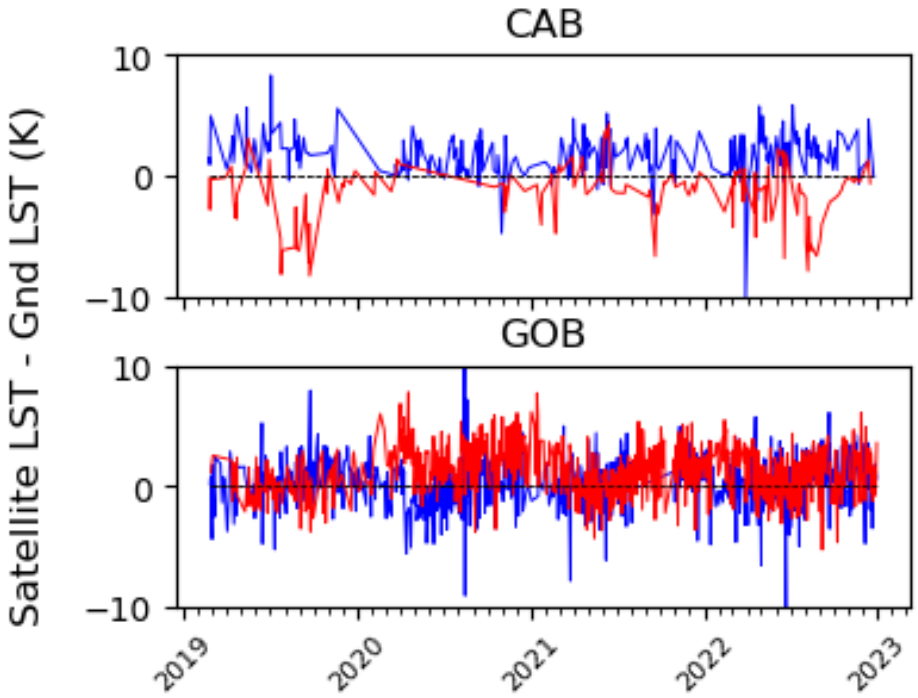


Validation over BSRN

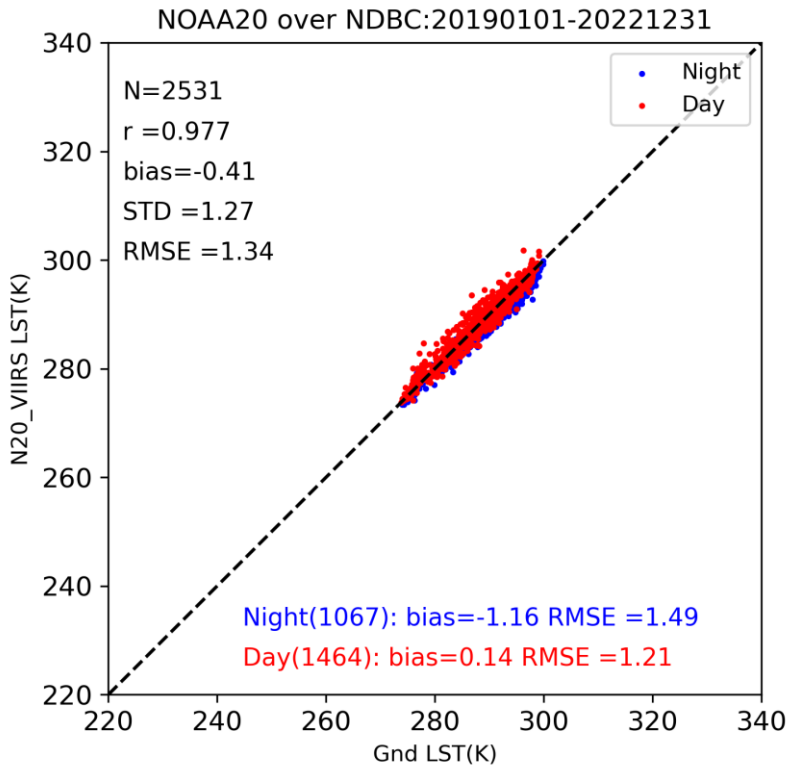


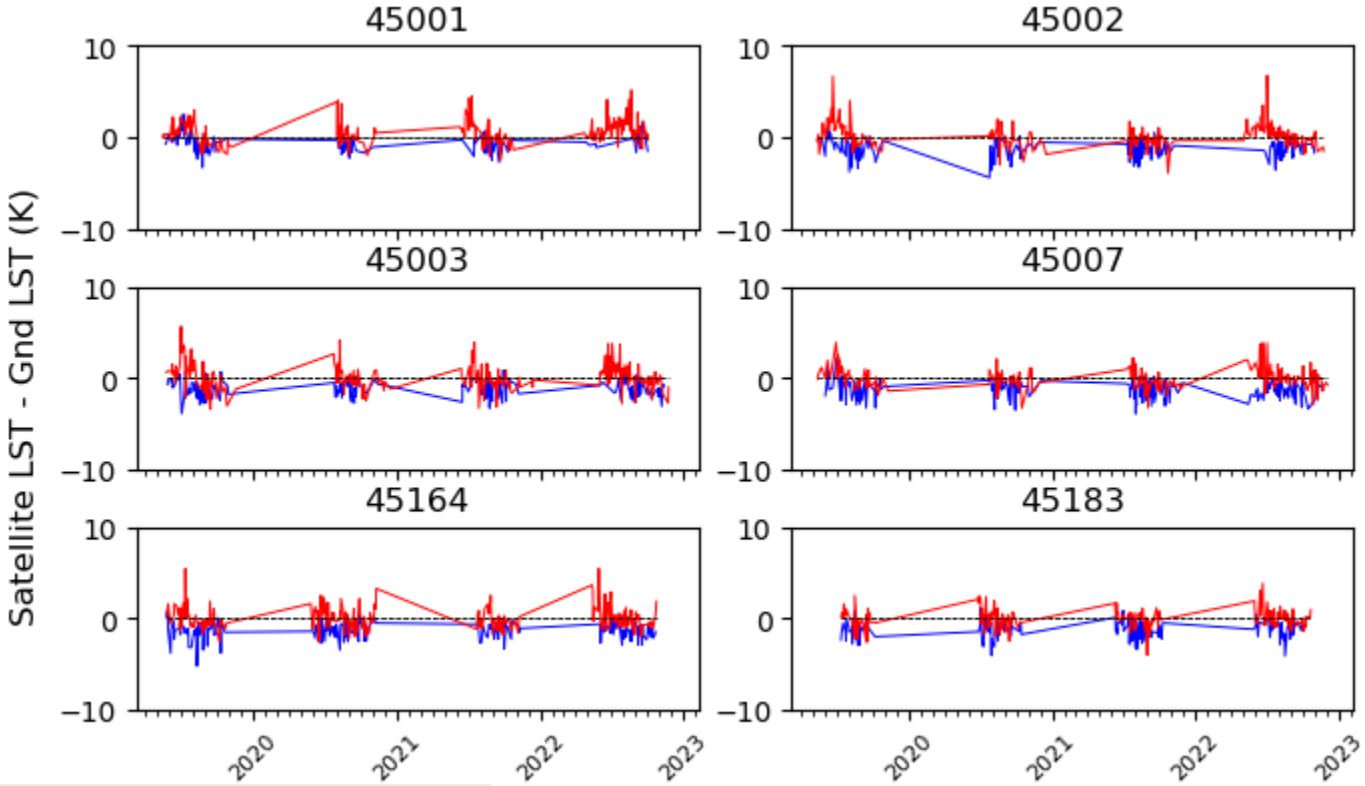


- The L3 VIIRS LST validation was conducted over six stations in the SURFRAD network for the time period from 2019 to 2022. Cloud screening and ground data quality checks were applied to the validation data. The problematic data in April to September 2021 was excluded over CAB site.
- The overall results indicate a correlation of 0.99 between ground and satellite LST, with a bias of 0.8 K, RMSE of 2.2 K and 2.4 K for nighttime and daytime, respectively.
- The site-wide LST error time series indicates a cold bias for nighttime and a warm bias for daytime over CAB site along the year, while a warm bias for daytime over GOB site. The seasonal variation is not prominent.

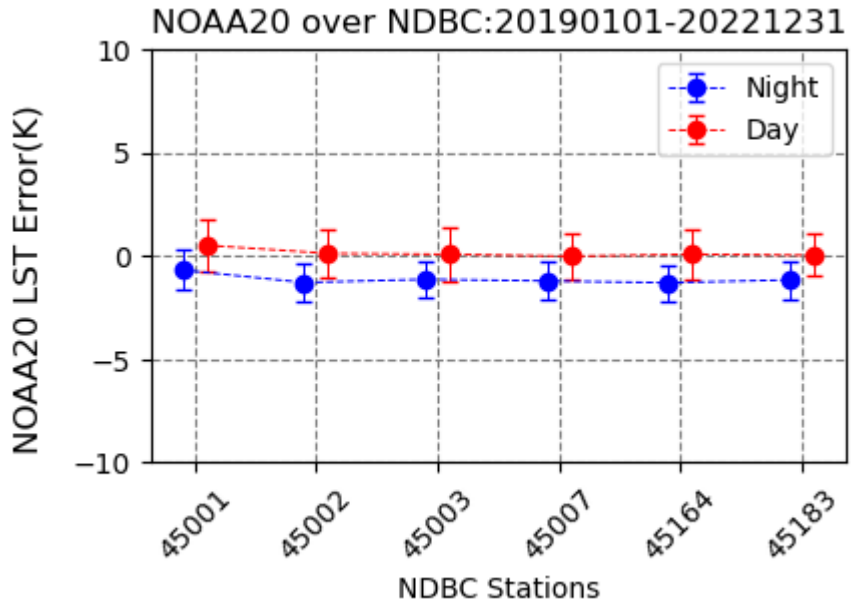


Validation over NDBC

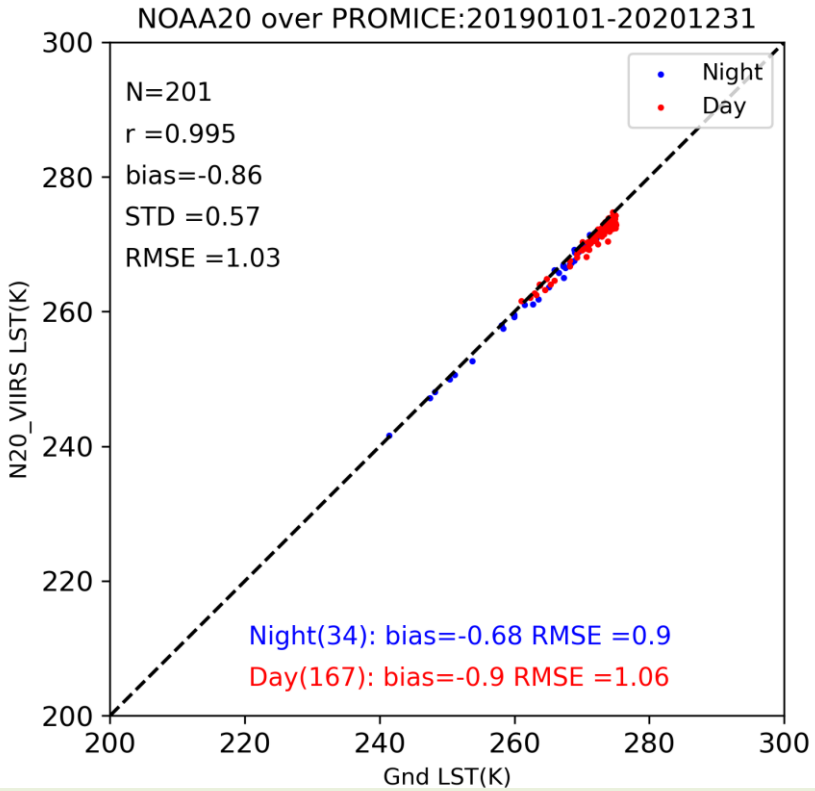


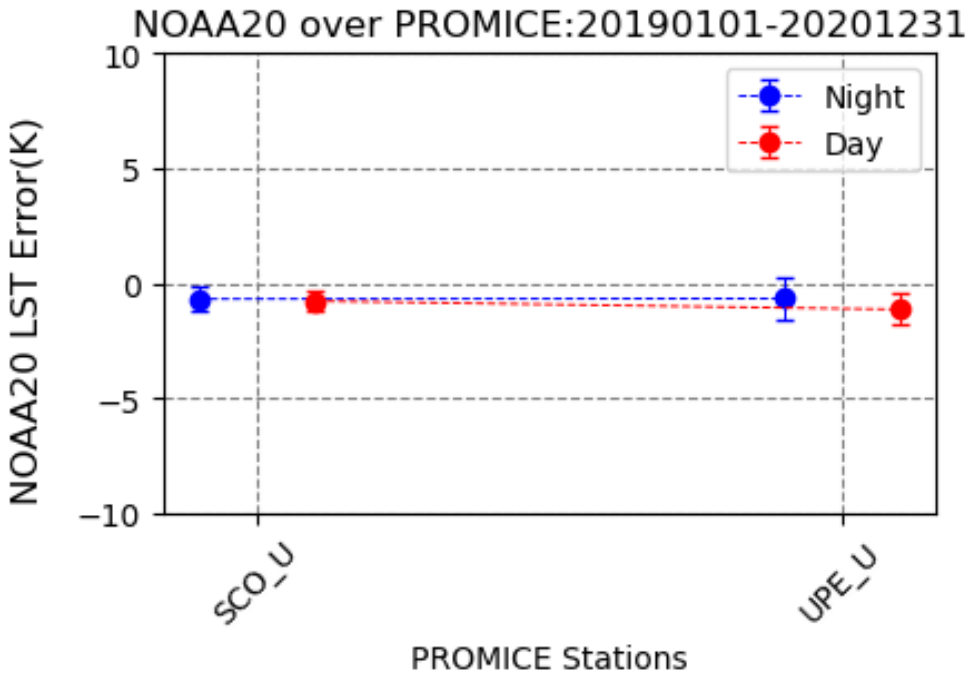


- The L3 VIIRS LST validation was conducted over six stations in the NDBC network for the time period from 2019 to 2022 over inland water surface. Cloud screening is applied to the validation data.
- The overall results indicate a correlation of 0.98 between ground and satellite LST, with a bias of -1.2 K and 0.1 K, RMSE of 1.5 K and 1.2 K for nighttime and daytime, respectively.
- The site-wide LST error bar indicates a similar performance over all stations for both daytime and nighttime, with a cold bias at night and nearly no bias at daytime.
- The time series result indicates a larger fluctuation at daytime compared to nighttime.

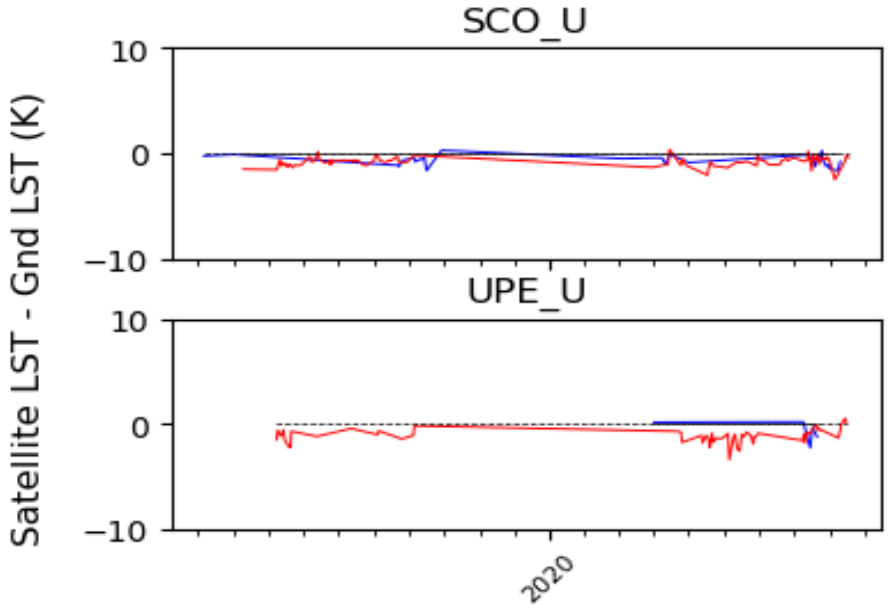


Validation over PROMICE





- The L3 VIIRS LST validation was conducted over two stations in the PROMICE network for the time period from 2019 to 2020 over snow/ice surface. Cloud screening is applied to the validation data.
- The overall results indicate a correlation close to 1.0 between ground and satellite LST, with a bias of -0.7 K and -0.9 K, RMSE of 0.9 K and 1.1 K for nighttime and daytime, respectively.
- The site-wide LST error bar indicates a similar performance over these two stations for both daytime and nighttime, with a cold bias at both day and night.
- The time series result indicates a minor fluctuation particularly at nighttime.



Surface Albedo

April 2023

Accomplishments / Events:

- Prepared and submitted the PPM Proposal for FY23
- Preparing the VIIRS BRDF DAP
  - Preparing the ATBD
  - Polished the code
  - Prepared a Detail Design Document
- Keep improving the v2r2 SURFALB processing
  - Dealing with the exceptions in the data processing
- Developing an updated global soil albedo map
  - Using the Google Earth Engine (GEE)
- Deriving the conversion coefficients from visible and Near-infrared bands to shortwave

Overall Status:

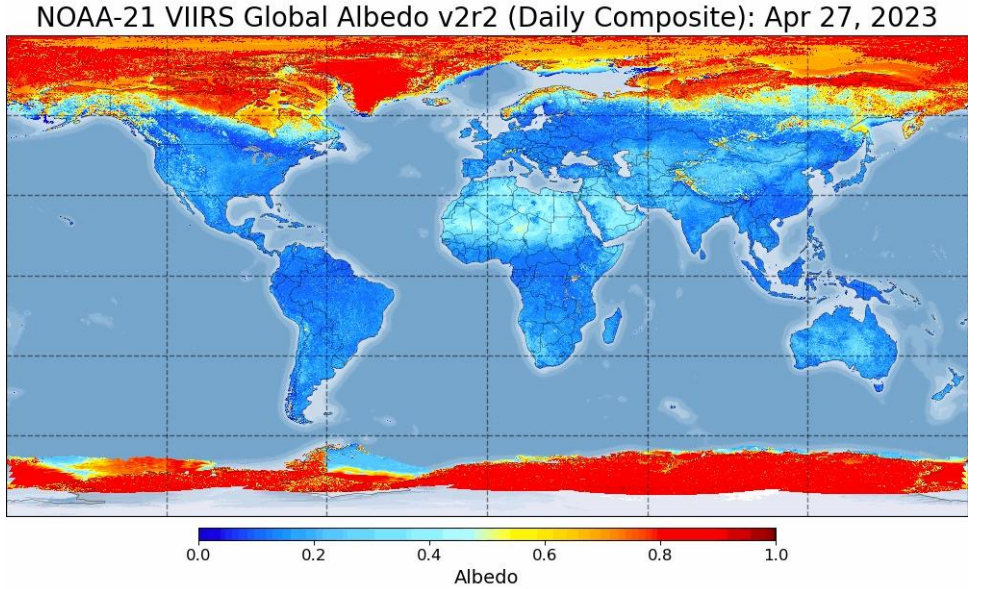
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

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:

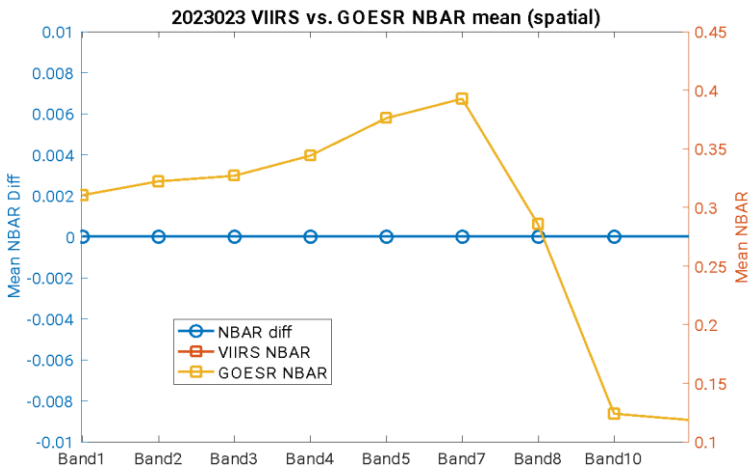
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Beta review of the NOAA-21 albedo	Mar-23	May-23		JPSS project plan
PMR review	May-23			
mDAP for NOAA-21 if needed	Aug-23			
Provional review of NOAA-21 LST	Sep-23			

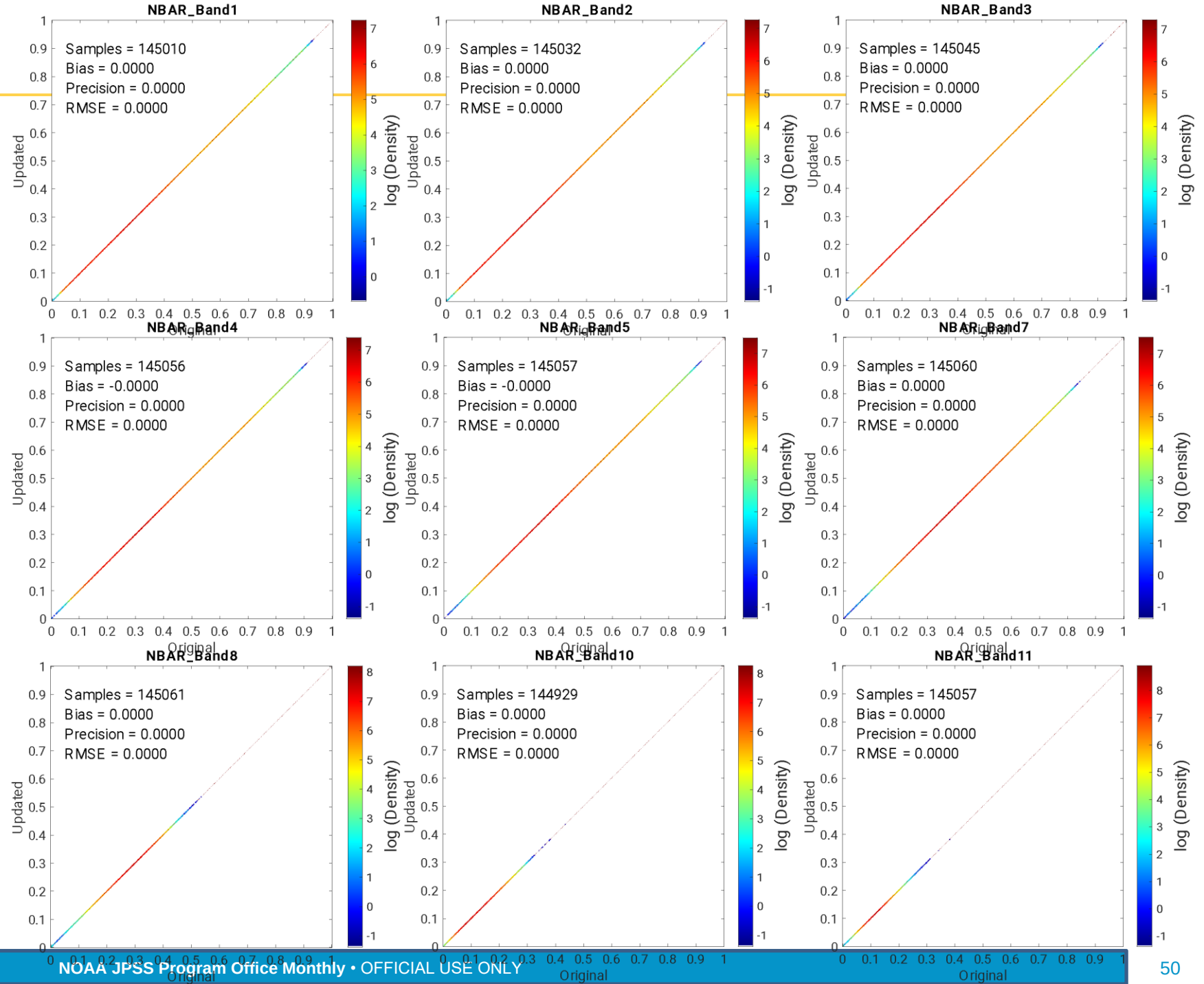
Highlights: NOAA-21 v2r2 albedo on Monitoring webpage



VIIRS BRDF Package Preparation

- The v2 is an improved version in running efficiency.
- The comparison between v1 and v2 NBAR shows they are the same.
- This confirms the modification of v2 is as expected and ready to deliver.





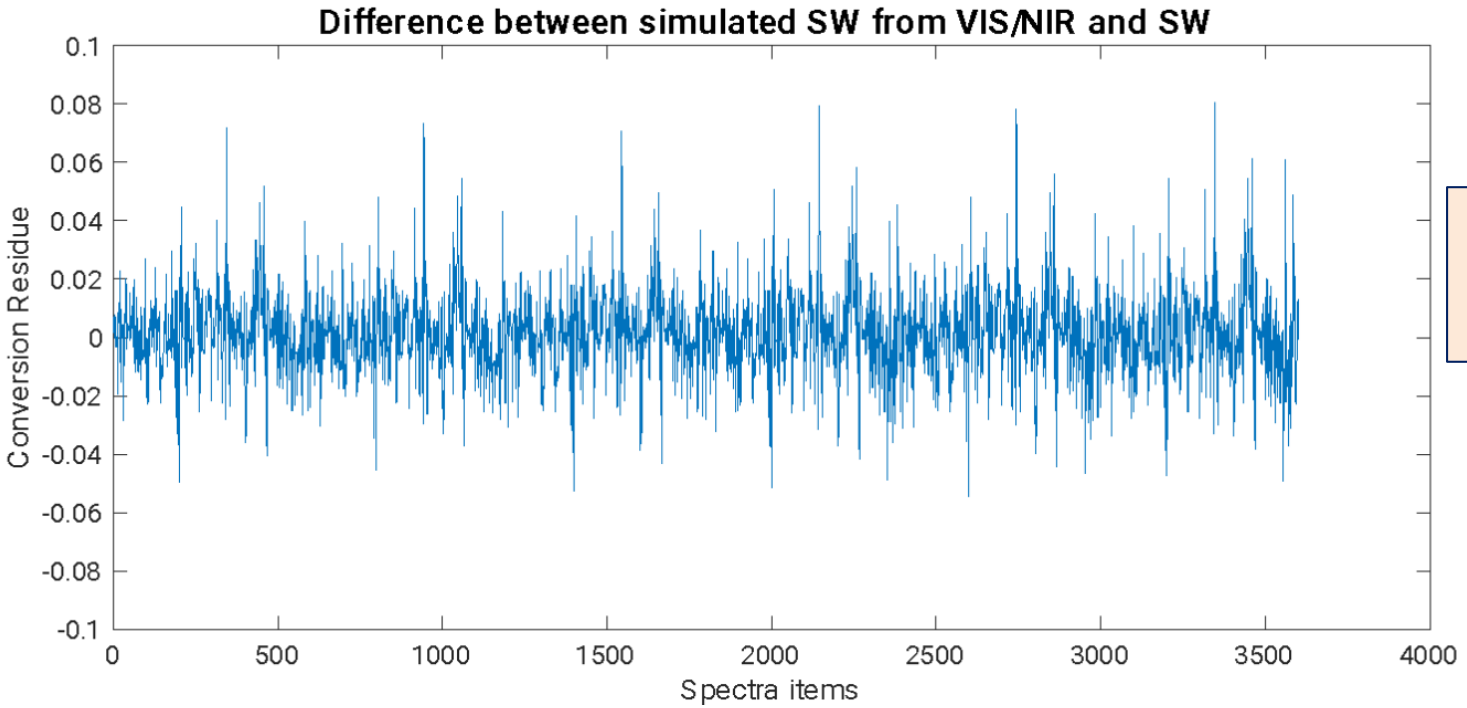
Deriving relationship between VIS/NIR bands and SW band

April, 2023

Background: Both visible and NIR albedo are related to shortwave albedo because they affect how much solar radiation is reflected back into space. Understanding the relationship between visible and NIR albedo and shortwave albedo is important for developing accurate models of the Earth's energy balance.
The relationship between visible and NIR albedo and shortwave albedo depends on the surface characteristics of the Earth's features. For example, surfaces that are smooth and have a low reflectivity in the visible range will typically have a high reflectivity in the NIR range, and vice versa.

Data source: spectral library, 3600 TOA spectrums derived from USGS surface spectrums

$$SW\_Ref = 0.2605 * VIS\_Ref + 0.7438 * NIR\_Ref$$



Mean_diff = 0.0015
Max_diff = 0.0808
Std_diff = 0.0145

Global Soil Albedo Map

April, 2023

Summary:

- **Background:** We are currently working on developing a revised global soil albedo map. A satellite-derived soil albedo map is crucial for current state-of-the-art general climate models (GCMs) to calculate surface albedo values. However, satellite-derived albedo products only provide overall albedo values, including vegetation cover's impact on surface albedo values. The main challenge of this study is to eliminate the influence of vegetation cover on albedo variation and extract background soil albedo information from historical albedo product archives.

- **Conclusion:** We utilized Google Earth Engine (GEE) to process a large volume of historical albedo products online. Firstly, we divided the albedo pixels into two categories: pure bare land and vegetated land. Secondly, for the bare land, we averaged the albedo values on a monthly scale. For the vegetated areas, we established a linear relationship between NDVI and albedo values at each pixel. Since albedo has a nearly negative correlation with NDVI, we set NDVI to 0.1 and estimated the local bare land albedo values based on the linear model.

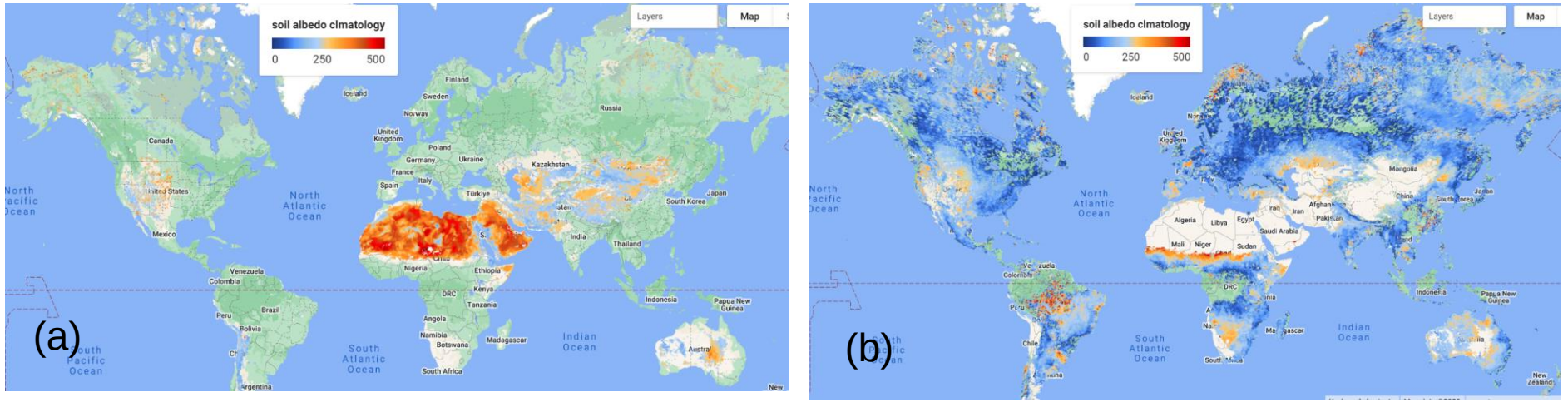


Figure. Global soil albedo map: (a) band land, (b) areas partially covered by vegetation

Surface Reflectance

April 2023

Accomplishments / Events:

- SR code update according to the SurfRefl Code review feedbacks.
- Work with NASA SR science team on the SR BRDF correction, which is developed for the SR inter-comparison between satellite with different solar and view geometry.
- Continue to test the local JPSS2 SR data with the PDA IT test datasets to check the algorithm is properly implemented.
- Discuss the path forward about the SR calibration between JPSS satellites, and the impact on the proposed blended downstream products.
- Continue to monitoring the SR products by the routine monitoring and validation tools.

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			

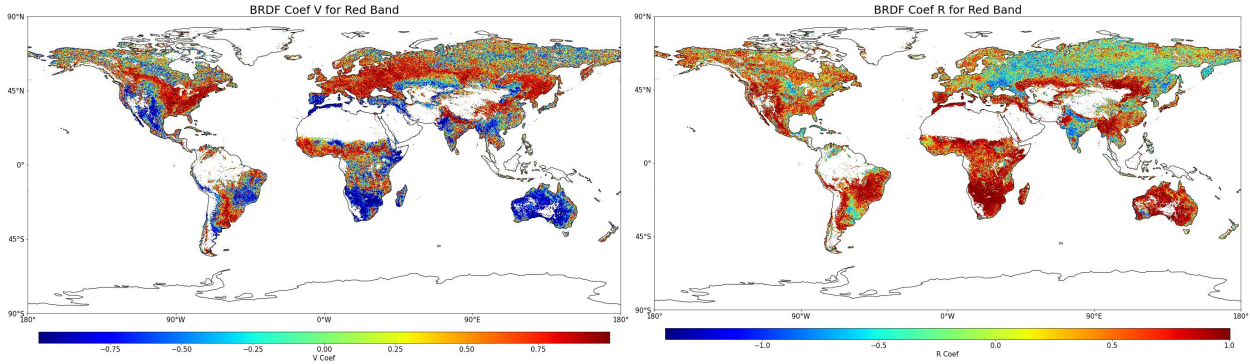
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SR LUT update and Test for SNPP, NOAA20 and J2	Oct-22	Nov-22	Dec-22	we generated two sets of LUTs for final decision
SNPP & N20 consistency analysis and correction.	Dec-22	Dec-22	Dec-22	
SR beta review for JPSS-2	Jan-23	Mar-23	May-23	Postponed due to the Project Plan
DAP update and delivery, if needed	Apr-23	May-23		
JPSS program Annual review	May-23	Jun-23		
JPSS-2 SR provisional Review	Aug-23	Sep-23		

Highlights:

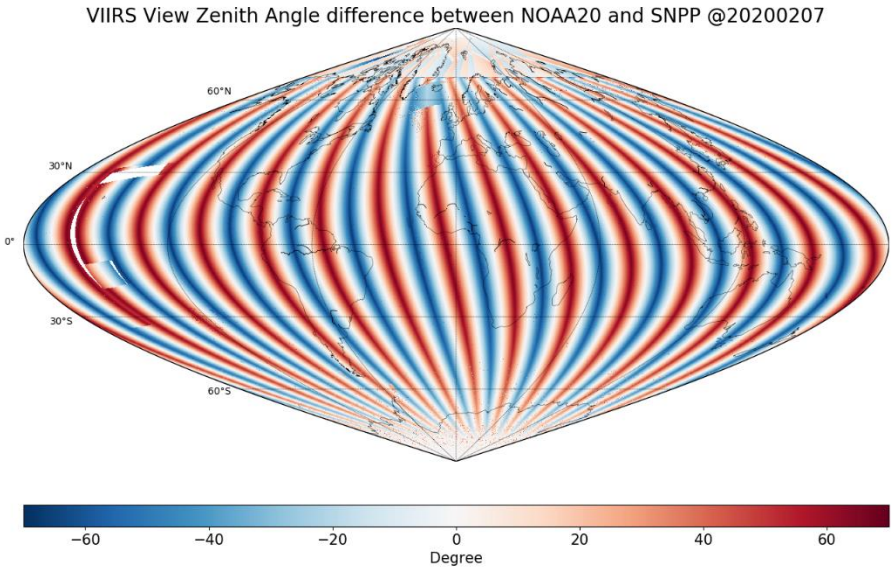


VIIRS SR (Red band, I1/M5) BRDF Correction Coefficients

SR BRDF Correction Theoretical Basis

Background:

- Surface reflectance is with strong anisotropy, so the SR inter-comparison is challenging for the SR with different solar and view angles.
- For JPSS satellites (SNPP, N20 and N21) the view geometry are with significant difference. A BRDF correction is required to get the Nadir BRDF-Adjusted Reflectance (NBAR).
- A global BRDF dataset has been derived using long term MODIS data by NASA SR science team.



The correction method, the NBAR is calculated at solar zenith angle of 45 using the kernel model:

$$\rho^N(45,0,0) = \rho(\theta_s, \theta_v, \phi) \times \frac{1 + VF_1(45,0,0) + RF_2(45,0,0)}{1 + VF_1(\theta_s, \theta_v, \phi) + RF_2(\theta_s, \theta_v, \phi)}.$$

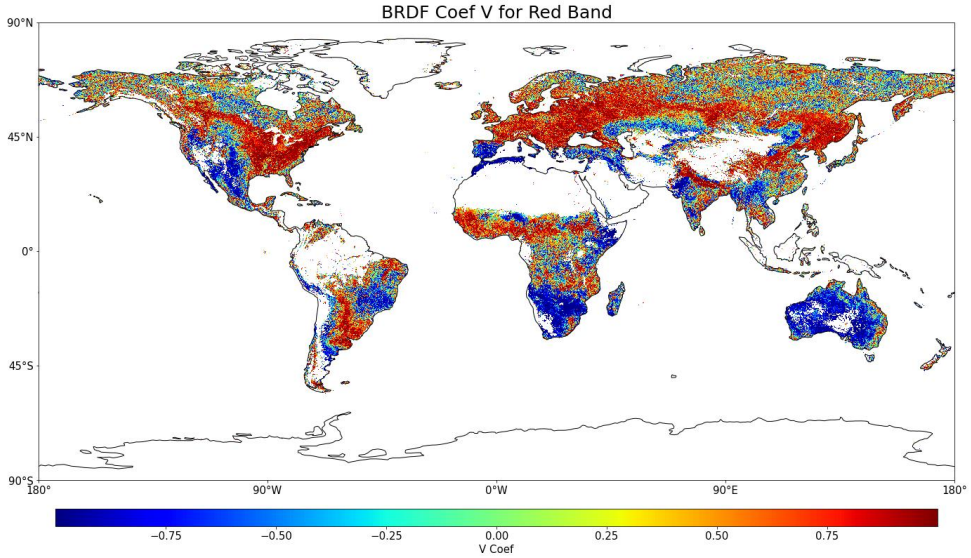
$$R = R_{slope}\, NDVI + R_{intercept}$$
$$V = V_{slope}\, NDVI + V_{intercept}$$

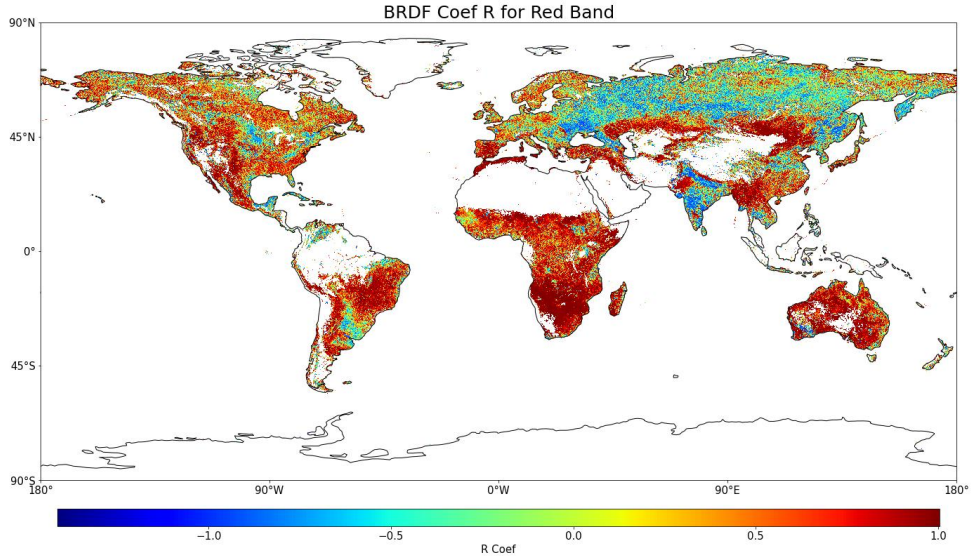
Here F1 is the volume scattering kernel, based on the Ross-thick function, but corrected for the Hot-Spot process, and F2 is the geometric kernel, based on the Li-sparse reciprocal function.
The kernel coefficients R and V is derived by the pre-calculated the linear regression coefficients (R_slope, R_intercept, V_slope, V_intercept) along with the dynamic NDVI.

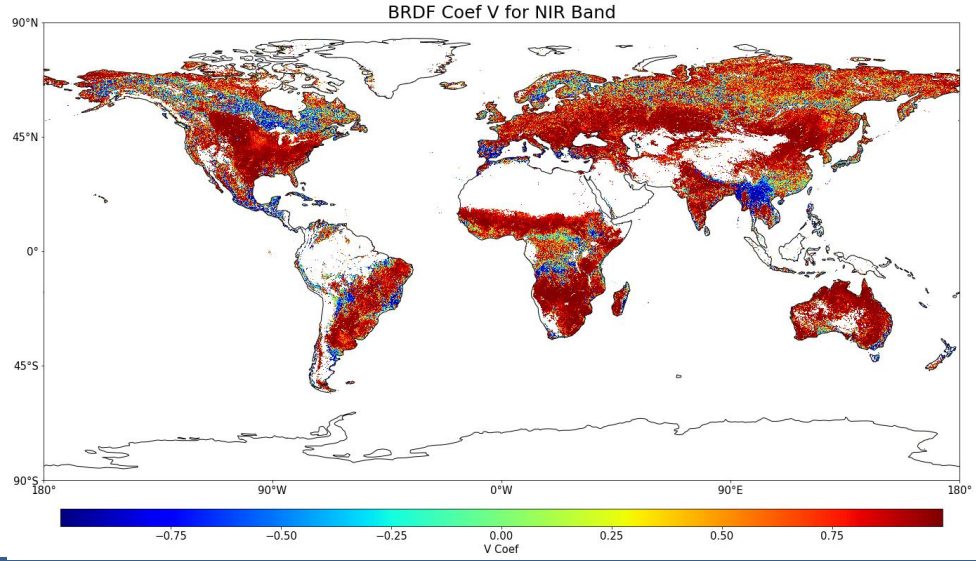
To be noted, for VIIRS data, the coefficients are approximate from MODIS closest bands (except the Blue, Green bands)

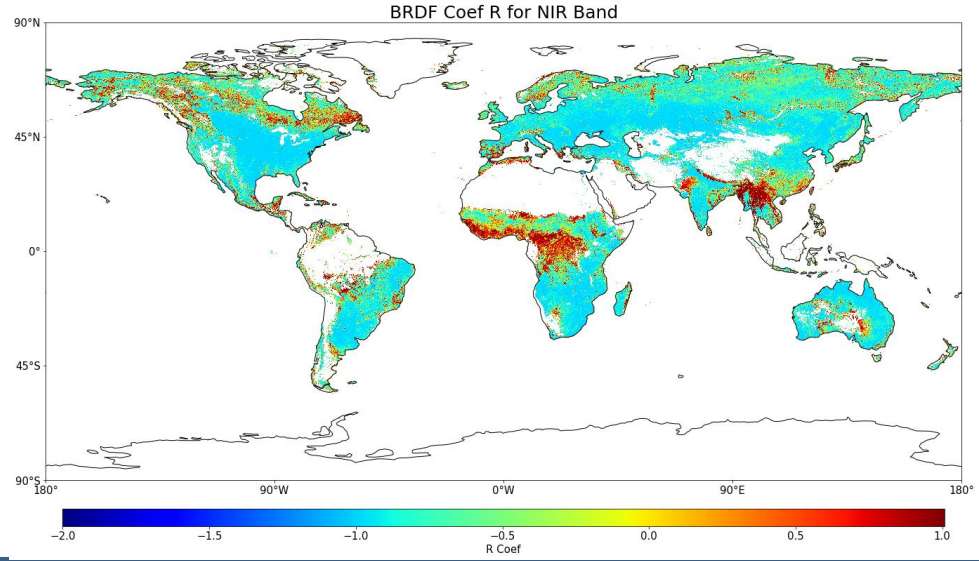
SR BRDF Correction Coefficients

The BRDF coefficients (R & V) for VIIRS Red (I1/M5) and NIR (I2/M7) band









MiRS Products

April 2023

Accomplishments / Events:

- The MiRS science team led a N21 L2 product Beta maturity walk-through review on April 26th. The review date was accelerated following a JSTAR management request. Based on validation results MiRS products have officially reached Beta maturity. Following additional discussions with JSTAR management, the Provisional maturity review date has been accelerated from October to June. The table below has been updated to reflect this change.
- The MiRS science team is currently reprocessing JPSS ATMS mission data through 2020. Analysis of MiRS products is being conducted to gain further insight into any long-term trends, seasonal cycles, regional dependence, and time of day asymmetries. The highlighted figure shows the time series of SNPP monthly mean surface emissivity (31 GHz) from January 2012 through December 2020 over East Texas. There appears to be a regular seasonal cycle of small magnitude (0.02), with higher emissivity in summer and lower emissivity in winter. This may be due to seasonal vegetation changes. Additionally, there appears to be a small difference of about 0.005 between ascending (daytime) and descending (nighttime) values, with daytime retrievals larger than nighttime retrievals. The analysis is continuing and comparisons will be made with other reference data sets.

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			

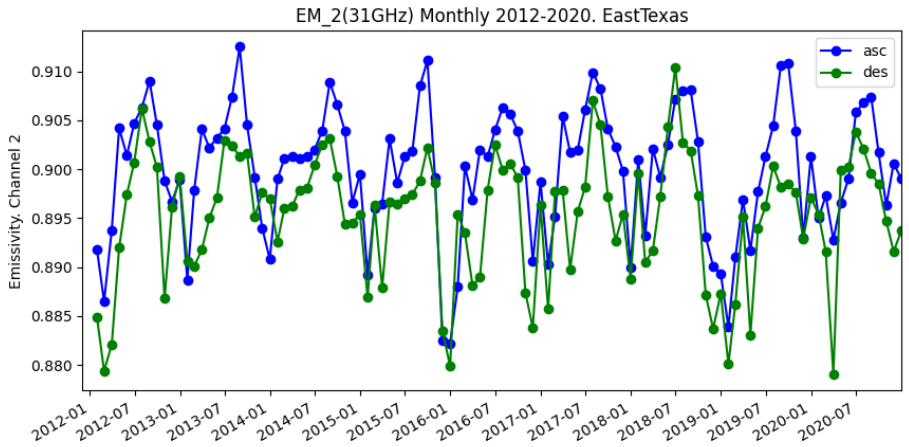
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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
MiRS DAP (v11.10): integrate SFR algorithm updates, code/science improvements, final J2 launch delivery	Feb-24	Feb-24		
NOAA-21 MiRS product validations, Provisional Maturity	Aug-23	Jun-23		

Highlights:



Time series of monthly mean surface emissivity at 31 GHz (mm) over East Texas from reprocessed MiRS SNPP/ATMS data for the period January 2012 – December 2020. There appears to be a regular seasonal cycle, as well as a systematic difference in ascending (daytime) vs. descending (nighttime) retrievals.

NUCAPS Products

April 2023

Accomplishments / Events

- Continued preparations for NOAA-21 Beta maturity review scheduled in May 2023. These include further evaluation of NOAA-21 NUCAPS products with collocated truth measurements, augmentation of the VALAR data matches for temperature and water vapor validations, cloudy and clear regression exercises, and bias tuning of microwave and IR radiances. We are currently experimenting whether the regression LUTs generated with two days could provide reasonable results similar to NOAA-20 regression that used four focus days spanned over different seasons. The team also initiated efforts in updating the ATMS and CrIS noise files based on NOAA-21 on-orbit sensor performance. The figure shows an evaluation of the carbon monoxide (CO) product from NOAA-20/NOAA-21 (1:30 pm orbit) and MetOp-C (10:30 am orbit) satellites demonstrating the enterprise nature of the NUCAPS algorithm, and a comparison with TROPOMI.
- Continued preparations of validation data for the upcoming NUCAPS (JPSS, MetOP) NCCF Operational Readiness Review. These include sanity checks of the NUCAPS offline version runs with the ASSISTT integrated HEAP version runs, and validation of the NUCAPS NOAA-20 and MetOp-B/C products using a compilation of 12 focus day runs and matched ECMWF, TROPOMI/OCO, and TCCON in-situ measurements.
- Submitted a paper entitled, "NUCAPS Ozone A-Priori Improvements and Validation with Averaging Kernel Analysis," for the NOAA-GML annual conference to be held May 23-24, 2023 in Boulder, Colorado.

Overall Status:

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

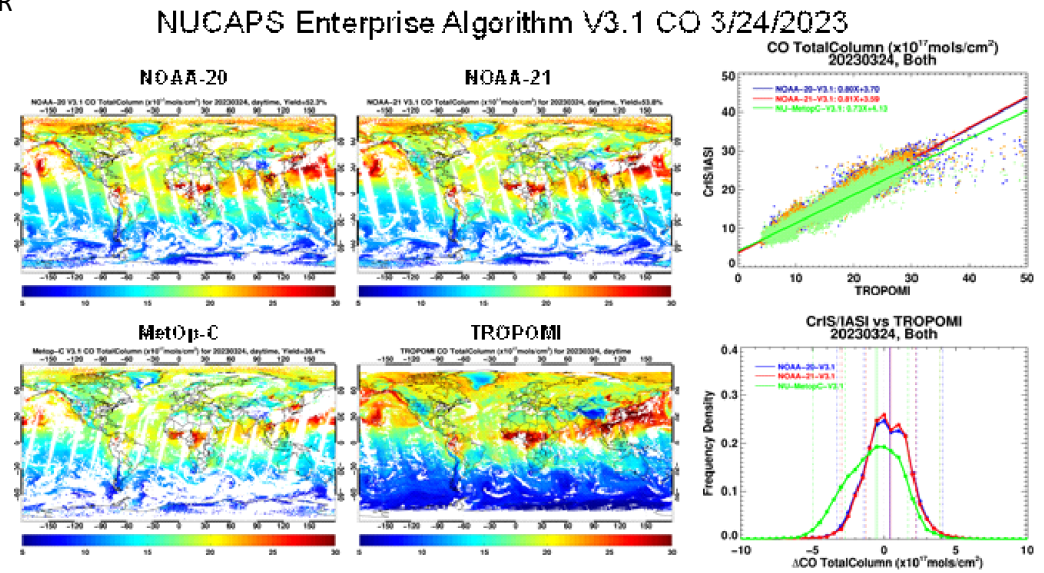
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
DAP Delivery with updates related damping factor, surface corrections, MetOp-B/C Averaging Kernels	Oct-22	Oct-22	11/04/22	
NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs, and user support for the CrIS Beta Maturity Review	Feb-23	Feb-23	02/23/23	NOAA-21 K-band transmitter swap
Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations	May-23	May-23		
NOAA-21 NUCAPS Product Beta Maturity	May-23	May-23		
NOAA-21 NUCAPS T(p), q(p), O3(p) Provisional Maturity	Nov-23	Nov-23		

- NUCAPS CO products from NOAA-20/NOAA-21 (1:30 pm orbit) and MetOp-C (10:30 am orbit) satellites demonstrate the enterprise nature of the NUCAPS algorithm, and a comparison with TR



OMPS SDR

April 2023

Accomplishments / Events:

- Derived and delivered NOAA-21 OMPS NM/NP weekly dark rate LUTs
- Derived and delivered SNPP/NOAA-20/NOAA-21 OMPS NP solar irradiance bi-weekly LUTs.
- Monitored NOAA-21 OMPS dark calibration rate performance, gain and non-linearity trending.
- Conducted intensive analysis about the NOAA-21 OMPS SDR provisional review action (fixing the NOAA-21 OMPS NM wavelength shift discrepancy at 84-86th): new LUTs, delivery and validation via inter-sensor comparison.
- Conducted intensive analysis about a new CCR associated with the sun-earth-distance correction and doppler shift adjustment: new LUTs; delivery and verification; reprocessing and validation via inter-sensor comparison.
- Completed Readme for the NOAA-21 OMPS SDR provisional review.
- Continued examining NOAA-21 OMPS NP residual stray-light features.
- Continued improving the V-CRTM v3.0 OMPS SDR simulation performance. New atmospheric transmittance coefficients are used, which lead to a much improved simulation accuracy (see Fig.a)
- Compared UV hyperspectral solar reference spectra from multiple sources to assess impacts on OMPS SDR calibration performance (see Fig. b)

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 First Light OMPS NM, NP SDR First Light and Beta Maturity	Feb-23	Feb-23	Feb-23	J2 Ka transmitter problem
OMPS NM, NP SDR Provisional Maturity	Mar-23	Apr-23	Mar-23	
Inter-sensor comparison among SNPP, NOAA-20, and NOAA-21 (OMPS NM)	Apr-23	Apr-23	Apr-23	On-going work
Inter-sensor comparison among SNPP, NOAA-20, and NOAA-21 (OMPS NP)	May-23			
Improve the calibration accuracy of NOAA-21 OMPS SDR towards Validated Review	Jun-23			
Inter-sensor comparison with Tropomi since the door-open	Aug-23			
OMPS NM, NP SDR Validated Maturity: Status Preview	Sept-23	Sep-23		Ka transmitter problem+ J2 TC high resol.
Delivery of weekly dark LUTs for NM and NP	Sep-23	Sep-23		
Delivery of wavelength and solar flux LUTs for NM and NP	Sep-23	Sep-23		

(a) NOAA-20 OMPS SDR VCRTM O-B Using the Improved CRTM: Significance of Accurate Surface Reflectivity in OMPS Simulation

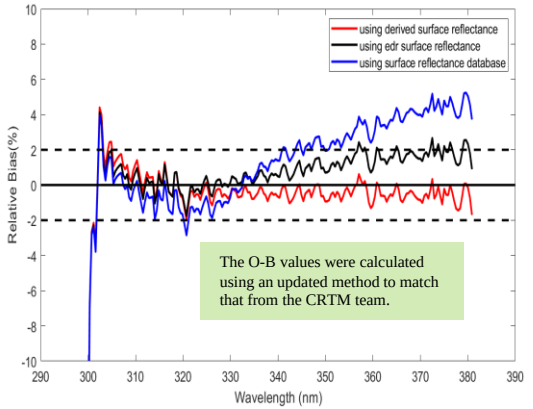


Figure NOAA-20 OMPS NM O – B by using three surface reflectivity inputs. The data is a granule over Mexico from March 13, 2023, while the three data sets are obtained from the derived surface reflectivity (red), the GOME-2 database (blue), and an EDR interpolated surface reflectivity (black).

(b) NOAA-20 OMPS NP Synthetic Solar Spectrum Comparison: Five Data Sources

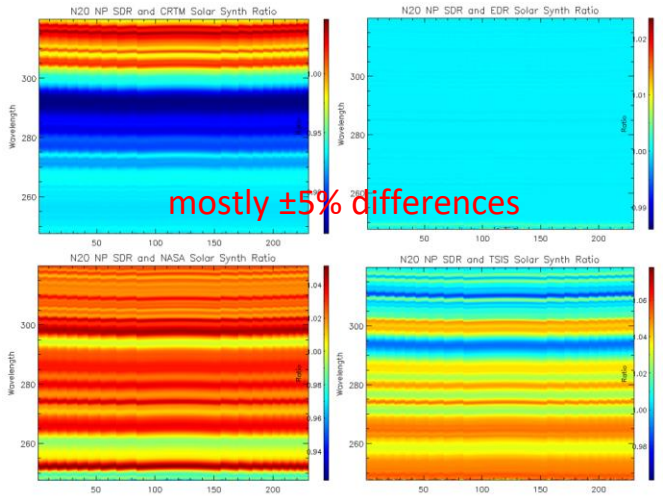


Figure NOAA-20 OMPS NP synthetic solar data ratios from other four data sets relative to the NOAA OMPS SDR synthetic data. Five data sets: NOAA SDR, STAR CRTM team (top left), STAR OMPS EDR team (top right), NASA OMPS team from Glen Jaross (bottom left), and the TSIS-2 spectrum (bottom right).

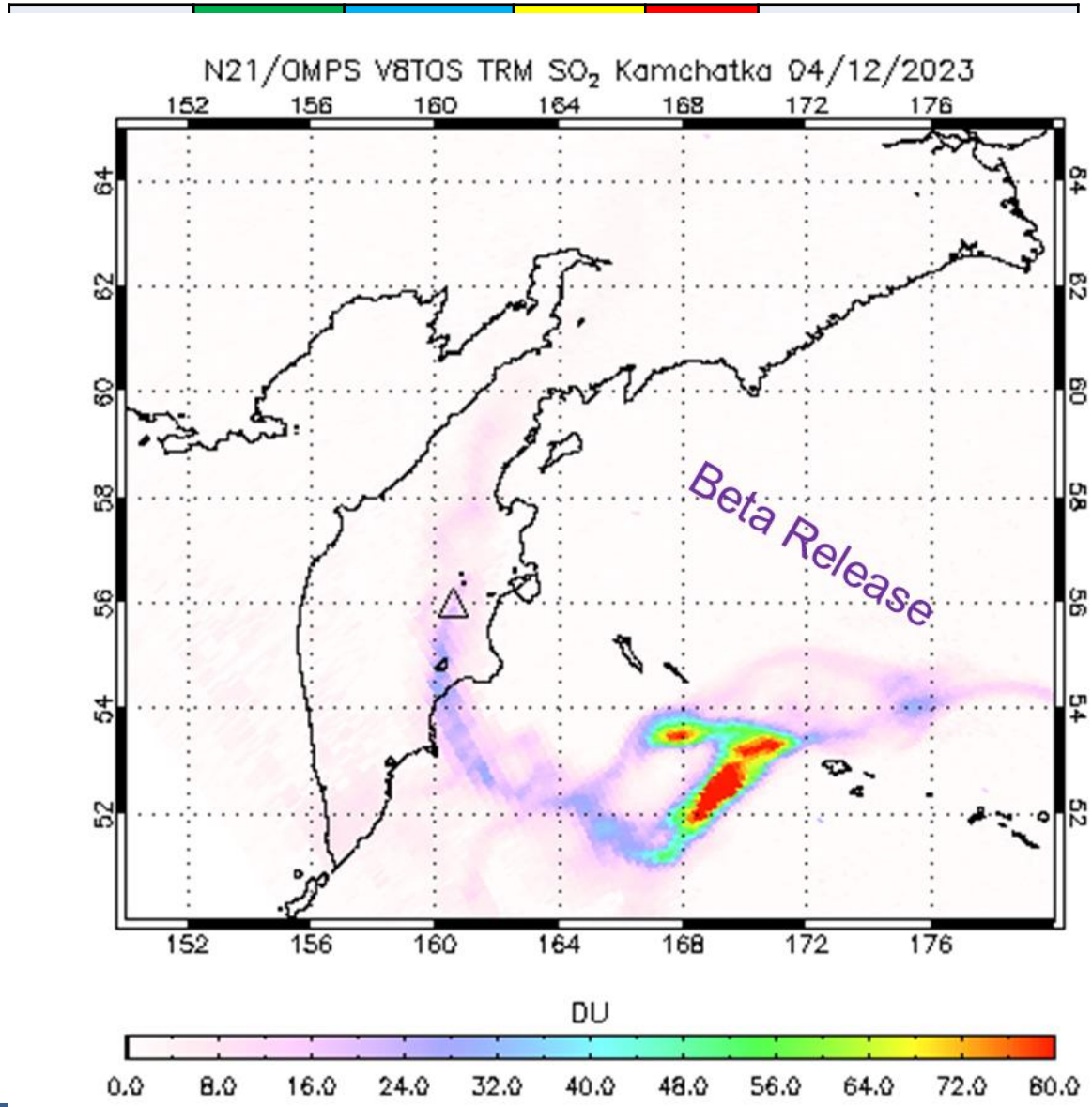
OMPS Ozone (V8Pro, V2Limb & V8TOz)

April 2023

Accomplishments / Events:

- The NOAA-21 OMPS NM provided measurements to estimate the SO_2 cloud from the recent eruptions of the Shiveluch Volcano in the Kamchatka Peninsula of Russia on April 11th and 12th. POC: Larry Flynn (SMCD/SCDA; Lawrence.E.Flynn@noaa.gov; 301-683-3612)
- **Significance:**
- • The higher spatial resolution of the NOAA-21 OMPS Nadir Mapper allows better tracking of the SO_2 plumes from volcanic eruptions. These can be used to refine aviation safety alerts.
- **Supports the following NOAA Mission Goals:**
- • Serve society's need for weather and water information by getting actionable environmental information in the hands of decision makers.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Verify performance of V8TOz for MetOp-B & -C for GOME-2	Dec-22	Dec-22	Dec-22	
Provide new Level 1a, 1b and 1g for S-NPP OMPS V2Limb	Dec-22	Dec-22	Dec-22	
Provide Delta to Level 1a, 1b and 1g for NOAA-21 OMPS V2Limb	Jan-23	Apr-23		NASA progress
Document Beta Maturity for V8TOz and V8Pro	Jan-23	Mar-23	Mar-23	Antenna
NOAA21 OMPS Ozone V8Pro, V8TOz Beta Maturity	Feb-23	Mar-23	Mar-23	Antenna
Update V8TOz and V8Pro tables for NOAA-21 Provisional	Feb-23 Mar-23	Apr-23 May-23		Antenna



SDR and EDR Reprocessing

April 2023

Accomplishments / Events:

- The official transition of the reprocessed SNPP SDRs to CLASS/NCEI started on December 1, 2021.
- The transition of the reprocessed SNPP ATMS (V1 and V2), CrIS, and OMPS (V1 and V2) data was completed in December 2021, February 2022 and March 9, 2022, respectively. These data are available at CLASS website now.
- The transition of the reprocessed SNPP VIIRS started on March 15, 2022.
- The reprocessed SNPP VIIRS SDR data from 1/2/2012 to 6/24/2018 (**1239.7T, 76.76%** of total) has been completed as of May. 10, 2023.
- It's expected that the VIIRS data transition will complete in October 2023.
- The SNPP EDR algorithm package was obtained from the ASSIST team. The RWG extracted the EDR software from the docker image, setup and configured EDR software on UMD Bamboo cluster successfully. The EDR software can run on Bamboo cluster to generate selected EDR products now.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Complete transition of reprocessed SNPP VIIRS SDR to CLASS	03/2022	10/2023		1 month
Complete VIIRS EDR reprocessing for Clouds, polar wind, Ice Concentration; Ice Thickness; Snow Cover; and Ice Surface Temperature	02/2023	10/2023		1 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		The UMD IT would not implement the docker for EDR reprocessing. The RWG is looking at the EDR package to see if it can be executed without a docker. Execution delay is expected.
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: Status of the Reprocessed SNPP Data Transition

Sensor	Data Type (name)	Period	Notes	Volume (Tb)	Status
ATMS	TDR (TATMS)	2011-11-08 to 2019-10-15	V2	0.406	Completed on Dec. 20, 2021
	SDR (SATMS)	2011-11-08 to 2019-10-15	V2	0.431	
	GEO (GATMO)	2011-11-08 to 2019-10-15	V2	0.420	
ATMS	TDR (TATMS)	2011-11-08 to 2017-03-08	V1	0.273	Completed on Dec. 30, 2021
	SDR (SATMS)	2011-11-08 to 2017-03-08	V1	0.289	
	GEO (GATMO)	2011-11-08 to 2017-03-08	V1	0.283	
CrIS	GCRSO	2012-02-20 to 2020-01-29	V2	0.369	Completed on Feb. 25, 2022
	SCRIS	2012-02-20 to 2020-01-29	V2	67.994	
	SCRIF	2014-12-04 to 2020-01-29	V2	74.455	
OMPS	TC (SOMTC, GOTCO)	2012-01-30 to 2018-09-30	V1	1.2	Completed on Mar. 4, 2022
	NP (SOMPS, GONPO)	2012-01-25 to 2017-03-08	V1	0.134	
OMPS	NP (SOMPS, GONPO)	2012-01-25 to 2021-06-30	V2	0.246	Completed on Mar. 9, 2022
	TC (SOMTC, GOTCO)	2012-01-30 to 2021-06-30	V2	1.695	
VIIRS	VIIRS ALL SDR	2012-01-02 to 2020-04-30	V2	1615	Completed **76.76**%
Total				1764.65	

Sea Surface Temperature

April 2023

Accomplishments / Events:

- N21 SST Beta Maturity Review was held on 27 Apr 2023, 3 months ahead of schedule
- Cal/Val activities of N21 SST show the following
  - SST Team recommends SST algorithm beta maturity as of March 20 (00:00 UTC)
  - N21/N20/NPP 'subskin' SSTs highly consistent & meet/exceed JPSS specs/users' expectations
  - Longer training period needed for validation of N21 VIIRS 'depth' SST algorithm
  - N21 shows SST anomalies during WUCDs. SDR team is aware & working to correct (see Fig.)
  - No N21-specific caveats or reservations have been observed.
- Future work towards N21 Provisional will include
  - Train SST 'depth'/retrain 'subskin' SST LUTs using longer time series from multiple seasons
  - Make N21 SST data available to users for evaluation/testing purposes
  - Work towards integrating into L3S-LEO product
- All other activities and milestones are on schedule.

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.*
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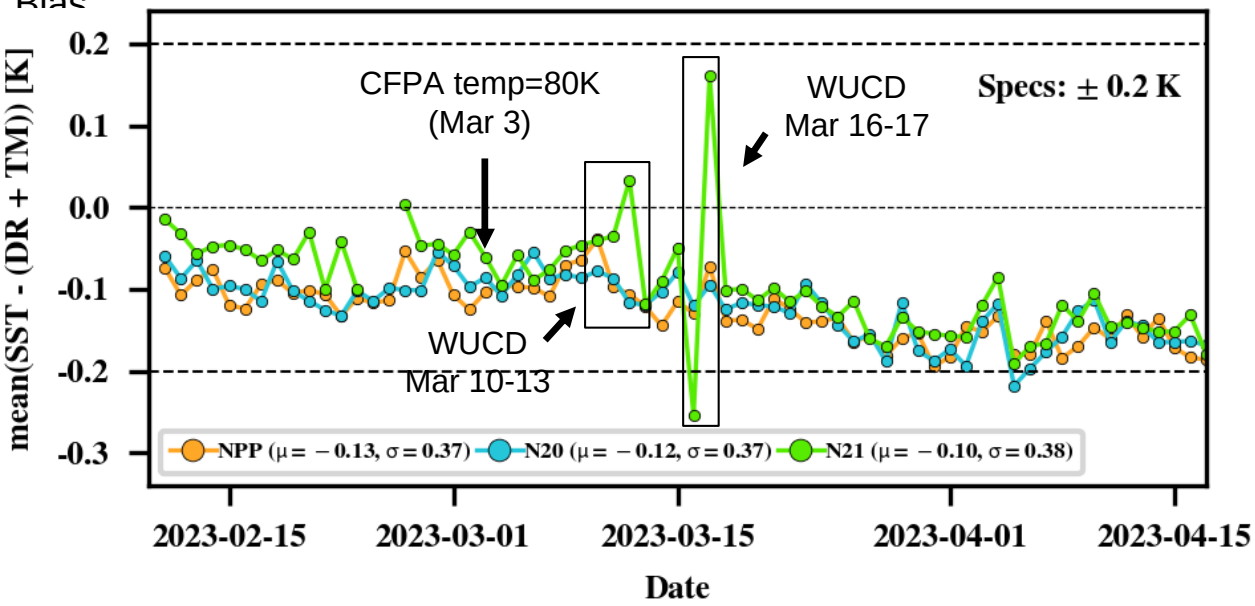
Issues/Risks:

Delay with opening cryoradiator doors on N21 VIIRS pushes back the reviews by approximately 2 months.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Deliver update to ACSPO v2.80 to retire GMODO	Aug-23	Apr-23	Mar-23	
NOAA-21 SST product Beta Maturity	Jul-23	May-23	Apr-23	
NOAA-21 SST product Provisional Maturity	Oct-23	Aug-23		
Product consistency & validation activities w/NPP/N20, non-JPSS LEO SSTs (AVHRR GAC/FRAC & MODIS).	Sep-23	Sep-23		

Highlights: N21 SST Beta Review 27 Apr 2023 – Daytime VAL Global Bias



Snowfall Rate

April 2023

Accomplishments / Events:

- Completed a new version of machine learning (ML) Snowfall Detection models for all satellites and implemented in the Enterprise SFR system
- Finalized a new version of ML SFR bias correction models for all satellites and implemented in the Enterprise SFR system.
- The NOAA-21 SFR Beta Review was held in late April. The product was declared Beta Mature on May 1 with an effective date on December 3, 2022 23:49:55 UTC (coincides with provisional maturity date for ATMS SDR).

Overall Status:

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

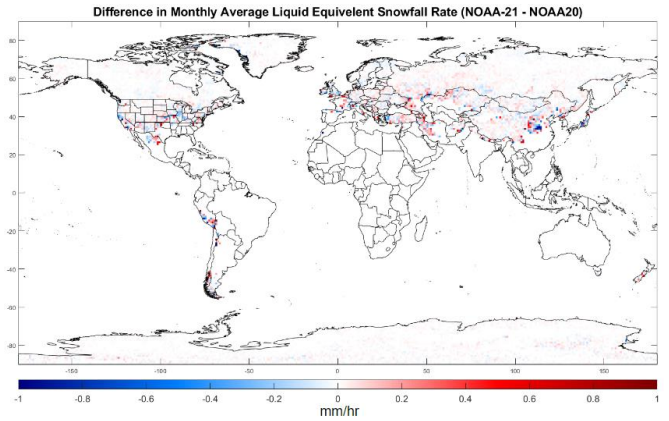
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

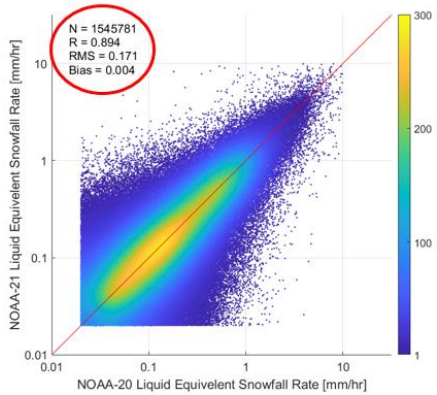
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Train a new machine learning snowfall detection model using N21 observations	Apr-23	Apr-23	Apr-23	
Train new machine learning models for 1DVAR initialization and SFR bias correction using N21 observations	Apr-23	Apr-23	Apr-23	
NOAA-21 SFR beta maturity review	May-23	May-23	Apr-23	
Enterprise SFR science code delivery to ASSISTT including N21 beta maturity SFR	May-23	May-23		
Enhance orographic snowfall retrieval through machine learning	Sep-23	Sep-23		

Highlights: NOAA-21 and NOAA-20 SFR Comparison





A study was conducted to compare NOAA-21 and NOAA-20 SFR using one-month of data. The results show that they have a high degree of consistency with a correlation coefficient of 0.89. Left: Difference between NOAA-21 and NOAA-20 monthly average SFR; Right: Scatter plot of collocated NOAA-21 SFR and NOAA-20 SFR. There is a 25-min time shift between the two products.

Surface Type

April 2023

Accomplishments / Events:

- STAR-UMD VIIRS Surface Type team has downloaded and processed S-NPP and NOAA-20 VIIRS daily granule surface reflectance data acquired in April of 2023 for the production of AST-2023.
  - VIIRS observations acquired in March and April showed that the San Joaquin Valley and much of the western U.S. is becoming much wetter and "dead" lakes reappear became larger than previous years due to abnormally heavy rains and snowfalls (see highlight)
- The team is examining the annual metrics calculated based on the 2022 monthly composites. These metrics are key inputs to the SVM classification algorithm for producing the 2022 global surface type classification map.
- In order to better leverage recent and new NASA missions and datasets (e.g., GEDI, ICESAT-2, SMAP, and SWOT) to improve the surface type product, the team attended the USFS-NASA JOINT APPLICATIONS WORKSHOP held from April 25 to 27.

Overall Status:

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

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

Issues/Risks:

None

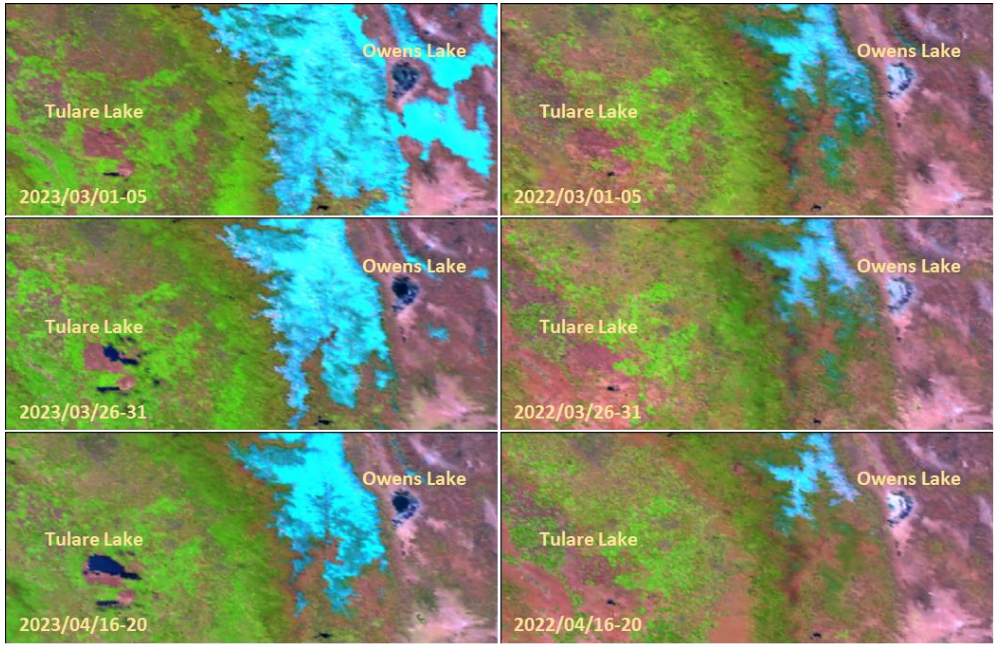
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop a 250m global water surface fraction product	Feb-23	Feb-23	Feb-23	
Complete global monthly composites for each of 2022 months	Each M.	Each M.	Each M.	
Generate global annual classification metrics	May-23	May-23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

Highlights:

The Tulare Lake had no water for many years due to sustained drought conditions that plagued California for much of the past decade. Recent VIIRS observations showed that it is being filled with increasingly more water thanks to torrents of rains and ongoing melting of the massive snowpacks that had piled up on the Sierra Nevada during the winter.

These image composites were created as part of the surface type processing flow using daily observations acquired by S-NPP and NOAA-20. Black or dark blue colors indicate water. Snow/Ice appears in different shades of cyan. Other colors indicate land areas not covered by water or snow/ice.

"Dead" Lake in California Is Being Revived



VIIRS SDR

April 2023

Accomplishments / Events:

- To support JPSS-4 VIIRS pre-launch testing, investigated presence of DNB leading-edge anomalies in the NOAA-21/JPSS-2 on-orbit observations: only the trailing-edge anomalies detected
- Investigated radiometric response degradation anomaly for NOAA-21 VIIRS SWIR bands: created, tested and submitted for deployment in the IDPS operations an updated F-PREDICTED LUT that provides anticipated time-dependent corrections and significantly reduces SWIR-band image striping
- Analyzed VIIRS TEB data acquired during the NOAA-21 pitch maneuver on 3/10/2023 and generated an updated Response Versus Scan-angle/Frame-number (RVS/RVF) LUT for the LWIR bands
- Analyzed VIIRS RSB and SDSM data acquired during the NOAA-21 yaw maneuvers on 3/6-7/2023 and generated updated RSBautoCal LUTs for screen transmission and solar diffuser BRDF
- Created, tested, and submitted for deployment in the IDPS operations the 2nd (out of 12) NOAA-21 VIIRS SDR DNB STRAY-LIGHT-CORRECTION LUT as well as the updated NOAA-21, NOAA-20 and Suomi NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired around the new moon on 4/20/2023

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			

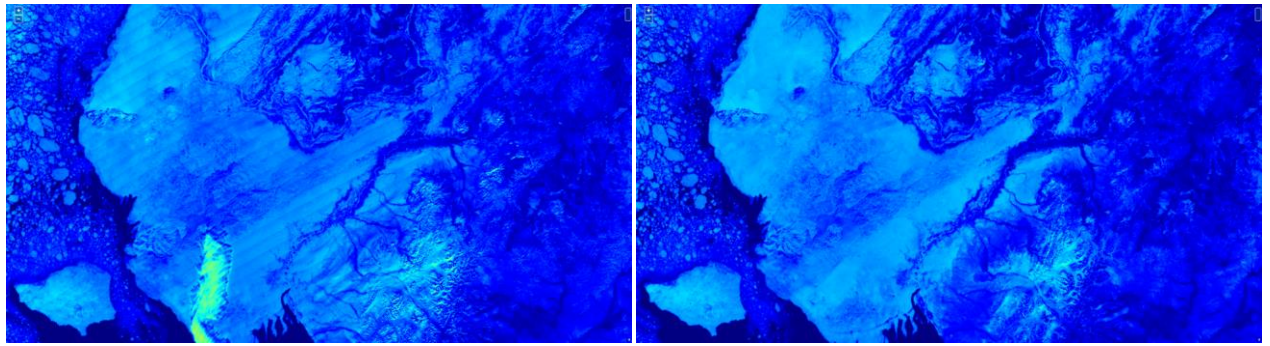
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Post-launch Cal/Val for J2 (from First light to VIIRS SDR Beta Maturity)	Dec-22	Feb-23	2/23/2023	KaTX anomaly
VIIRS SDR Provisional Maturity	Feb-23	Mar-23	3/30/2023	KaTX anomaly
VIIRS SDR Validated Maturity	May-23	Jul-23		KaTX anomaly
Monthly lunar calibration (predictions and analyses)	Jul-23	Jul-23		
Monthly delivery of VIIRS DNB calibration LUTs	Sep-23	Sep-23		
Geolocation monitoring using CPM (for NPP, N20 and N21)	Sep-23	Sep-23		
J2 on-orbit calibration LUT development	Sep-23	Sep-23		

Highlights:



NOAA-21 VIIRS SDR band M8 images over Alaska from 2023-04-19 (left) with the F-PREDICTED LUT #3 applied and from 2023-04-20 (right) with LUT #4 applied that reduced the striping, as re-projected in https://ncc.nesdis.noaa.gov/Regional/index.php

Vegetation Health

April, 2023

Accomplishments / Events:

- Continued monitoring of vegetation health as indicated by publication 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
- Team has been close to complete the update of the VHP climatology data of VCI, TCI and VHI using all AVHRR and VIIRS data including both VIIRS on SNPP and NOAA20 satellites.
- The impacts of smoothed NDVI and BT from all AVHRR and both SNPP VIIRS and NOAA20 VIIRS on VHI product quality were further examined. A final version of 1km VHI data products from NOAA20 VIIRS will be based on the climatology updated with both VIIRS data.

Overall Status:

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

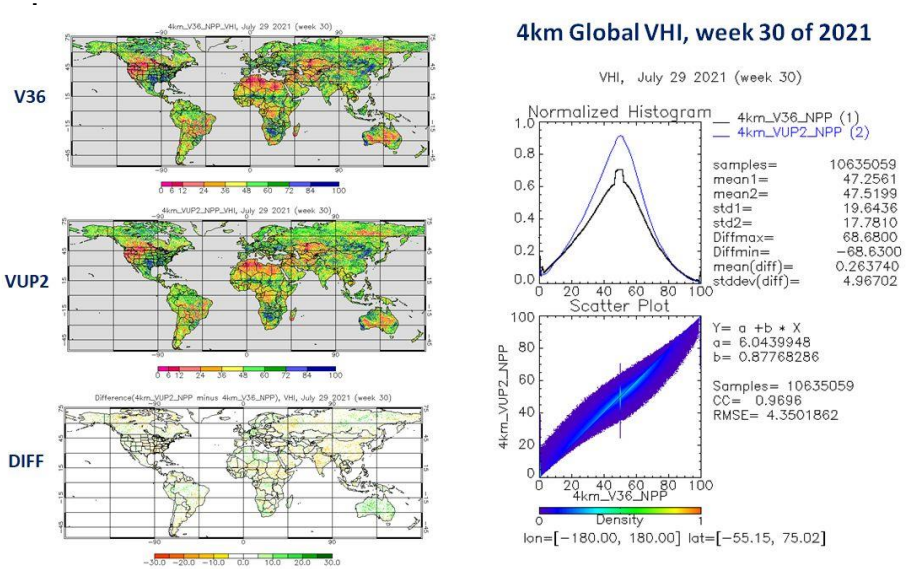
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Vegetation Health Beta Maturity	Sep-23	Sep-23		
NOAA-21 Vegetation Health Provisional Maturity	Apr-24	Apr-24		
NOAA-21 Vegetation Health Validated Maturity	Apr-24	Apr-24		

Impacts of NDVI and BT Climatology on VHI were Further Examin



VIIRS Polar Winds

April, 2023

Accomplishments / Events:

- [Apr 7] **VIIRS Polar Winds from Sodankylä, Finland Direct Broadcast Data:** As of 30 March 2023, S-NPP and NOAA-20 VIIRS polar winds are being generated in near-real time from direct broadcast (DB) data acquired at Sodankylä, Finland. The winds are produced using the Enterprise winds algorithm. Some years ago, VIIRS and MODIS winds were generated on site at Soldankylä using a computer supplied by the Cooperative Institute for Meteorological Satellite Studies (CIMSS)/Space Science and Engineering Center (SSEC) in 2007. That computer reached the end of its life and was not replaced. In recent years the Internet bandwidth from Soldankylä improved substantially, so it is now feasible to bring the VIIRS data to CIMSS and generate the wind data there. Polar wind production at the University of Alaska-Fairbanks has a similar history, and the same procedure has been employed for the past few years. The benefit of the DB winds is that they are available in about half the time compared to the operational wind products. Therefore, more wind data can be assimilated in model analyses and have a larger impact on forecasts. Examples of VIIRS polar winds over the Scandinavian region from Soldankylä direct broadcast data are shown in the figure below.

Overall Status:

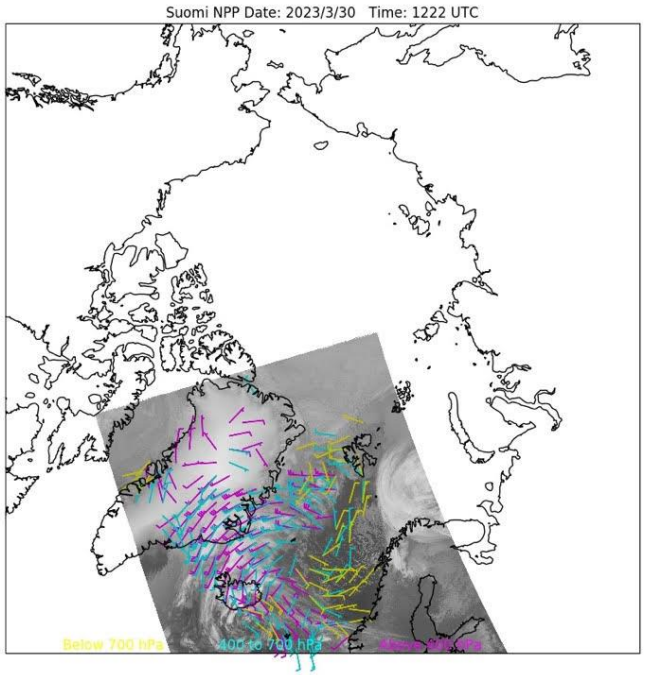
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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
Evaluate the impact of VIIRS tandem winds on NWP forecasts	Jun-23	Jun-23	Partially complete	
Generate VIIRS SWIR, DNB, “doublet” tandem winds over a 1-2 month period for use in forecast impact experiments by NWP Centers	Jul-23	Jul-23		
Evaluation of VIIRS DNB winds and impact to NWP	Sep-23	Sep-23		
NOAA-21 VIIRS Polar Winds Beta Maturity	Sep-23	Sep-23		



Volcanic Ash

April, 2023

Accomplishments / Events:

- Routine validation of existing JPSS volcanic ash EDRs from current sensors and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations.
- The Volcanic Ash science team has been collecting NOAA-21 (and NOAA-20) VIIRS SDR and Volcanic Ash EDR data for scenes containing volcanic ash. The Fuego volcano in Guatemala produced a moderately large volcanic ash cloud on May 4, 2023. The science team has run VOLCAT with the NOAA-21 SDRs for use in wind-height validation (the EDRs were also collected and will be included in the validation). The figure on the right shows the NOAA-21 Ash RGB and a histogram indicating the VOLCAT ash height retrievals (red histogram bars) as well as the science team wind-based height truth layer (black band–5100-6300m). The mean retrieved height error for this case was 0.15 km. This instills early confidence that the NOAA-21 data quality and algorithm retrievals are performing well and within algorithm requirements. A similar analysis is being conducted using the NOAA-21 Volcanic Ash EDR data. The Volcanic Ash science team will continue to perform similar analysis for ash emissions observed by NOAA-21 and will also include comparisons to NOAA-20 VOLCAT and EDR retrievals for the same cases (this is possible due to small time gap between the NOAA-20 and NOAA-21 orbits).
- Quality/Oversight Continued to ensure high quality Volcanic Ash retrievals from EDR algorithms and VOLCAT. Routine validation of existing JPSS volcanic ash EDRs from current sensors and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.

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 updated user training material	May-23	May-23		
Improve VIIRS volcanic ash plume identification and extraction	Jun-23	Jun-23		
Improve near source VIIRS volcanic ash height information	Jul-23	Jul-23		
NOAA-21 Volcanic Ash Beta Maturity	Sept-23	Sept-23		Changed due to data delays
NOAA-21 Volcanic Ash Provisional Maturity	Oct-23	Oct-23		Changed due to data delays
Maintain and monitor quality of volcanic ash EDR and JPSS-based products in VOLCAT	Sep-23	Sep-23		

Highlights: NOAA-21 VIIRS Ash RGB image centered on the Fuego volcano (left) from May 4 2023, the ash emission is pink/magenta in the RGB and highlighted by the red circle. The VOLCAT ash height retrieval histogram (right) shows good agreement with wind-based truth height layer (black band).