NOAA JPSS Monthly Program Office

AMP/STAR FY23 TTA

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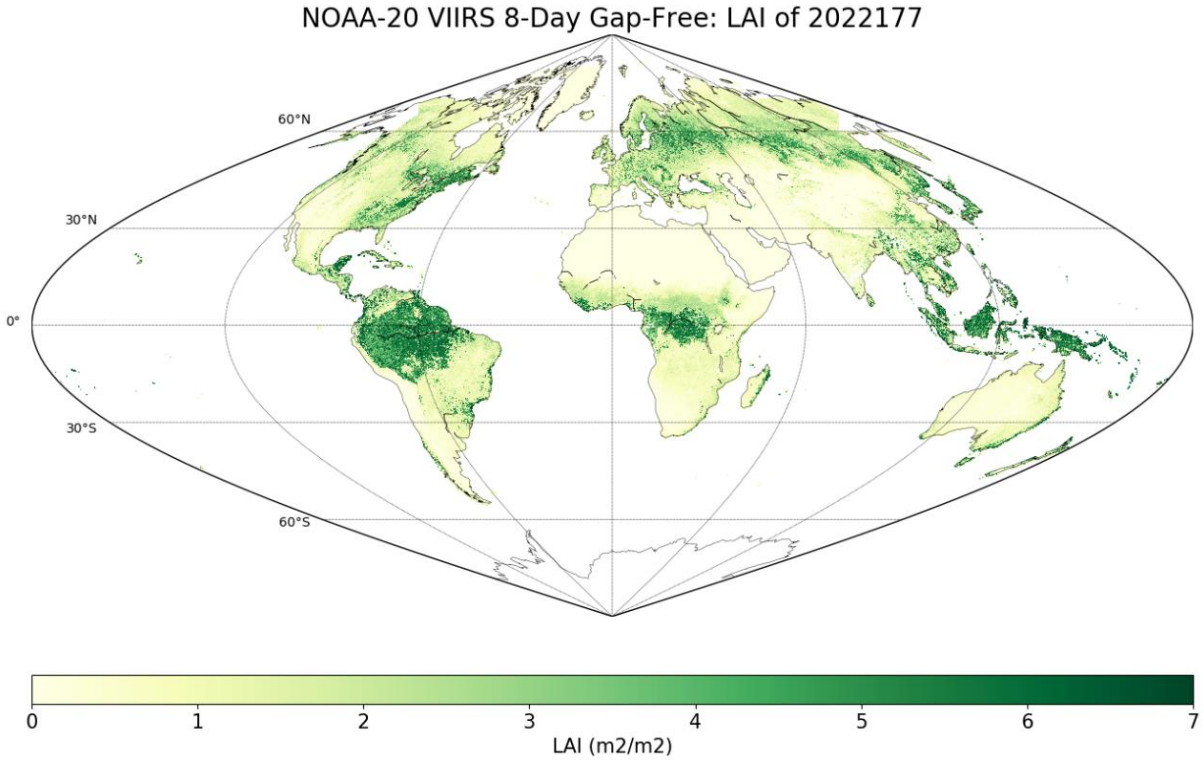
July, 2023

Highlights from the Science Teams (May)

JPSS Leaf Area Index Product developed



Leaf area index is a crucial climate variable that drives water and carbon fluxes, as well as energy exchanges, and plays a significant role in land surface models (LSMs), hydrology, and ecology models, among others. To support the NOAA LSM and other geoscience applications, a new JPSS LAI operational product is currently under development.

Satellite LAI data has been recorded for over two decades, and the massive amount of data has been used in various applications. A data-driven approach has been developed to derive near-real-time LAI from JPSS VIIRS observations, benefitting from the heritage of widely used satellite products.

Highlights from the Science Teams (May)

ATMS Gap-filled Brightness Temperature added to JSTAR Mapper

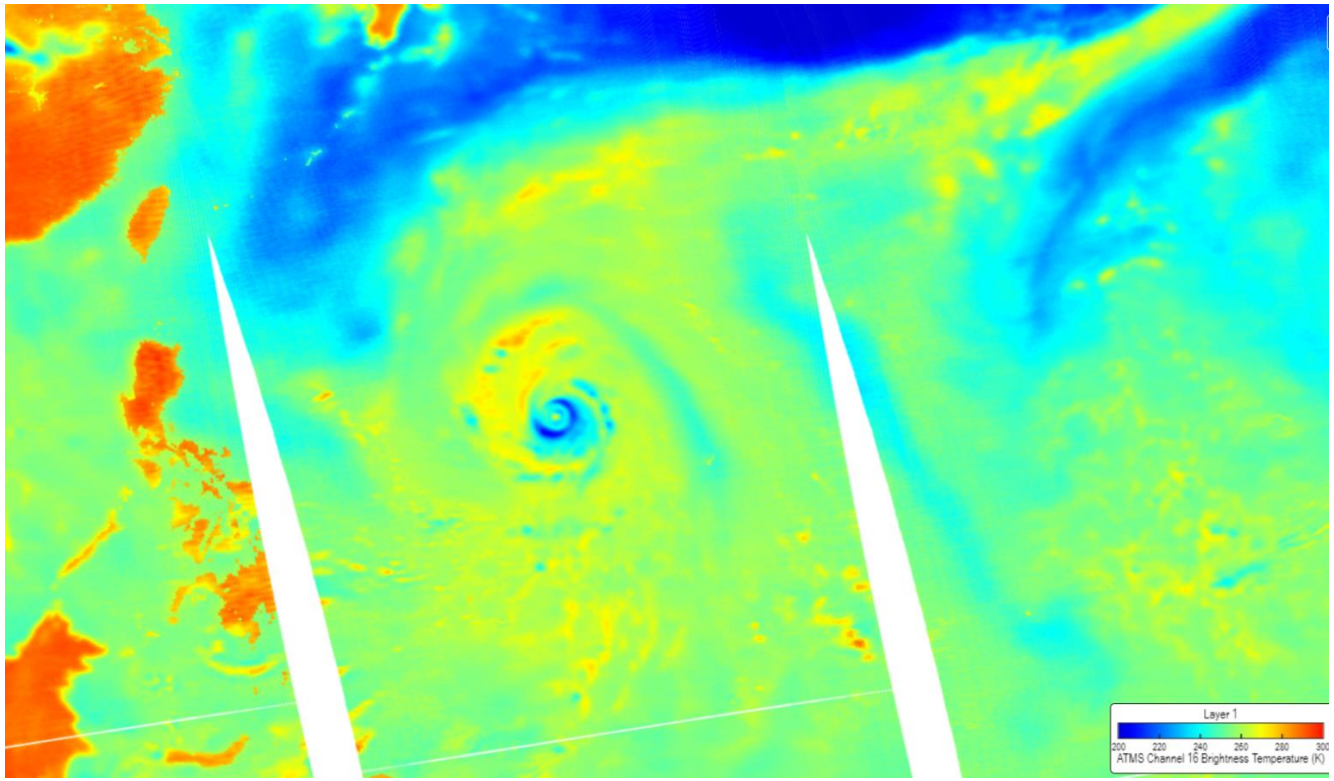
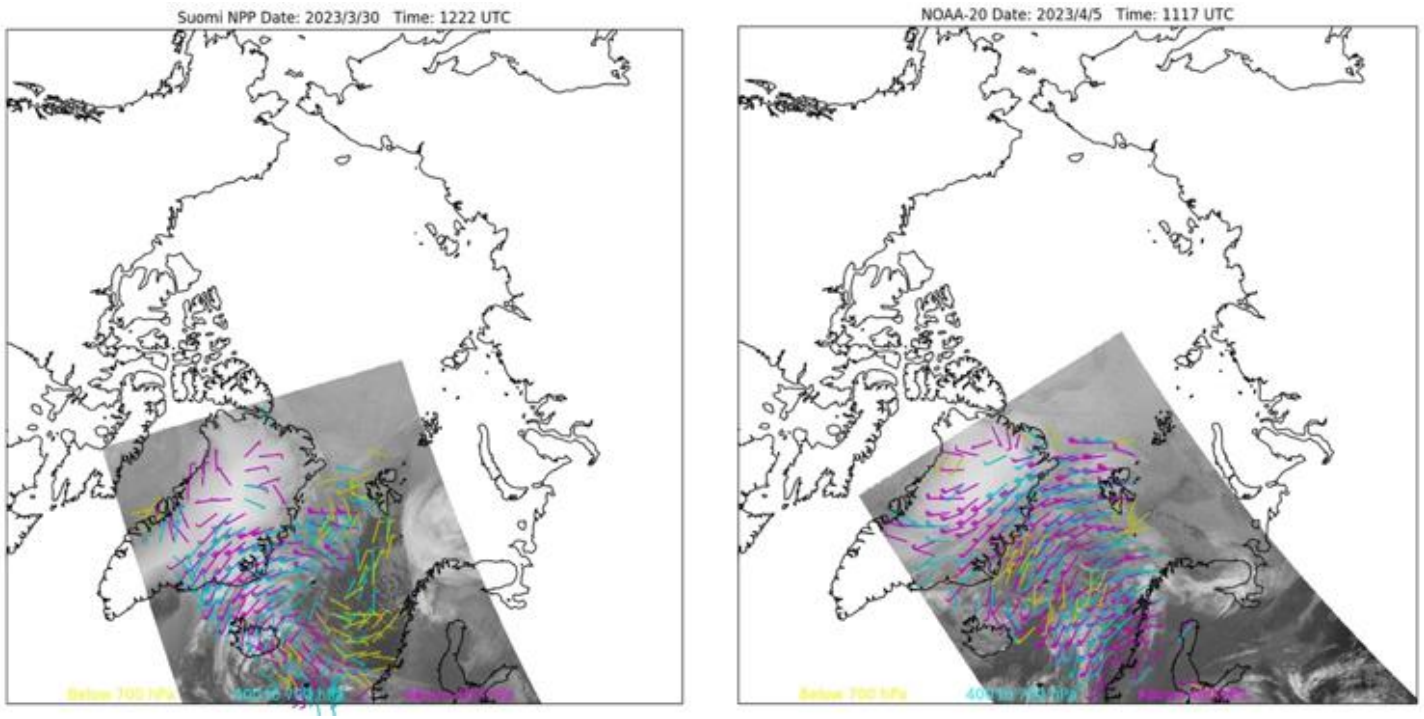


Figure. NOAA-20 ATMS Channel 16 brightness temperature imagery showing Typhoon Mawar as it passed near Guam on May 26.

The JSTAR Mapper team, in conjunction with the ATMS SDR team has added ATMS gap-filled brightness temperature imagery to the operational JSTAR Mapper website. This imagery, which is currently being made for all three JPSS satellites, for ascending and descending views, of channels 6, 16, and 18 – offers the public high quality microwave imagery.

Highlights from the Science Teams (May)

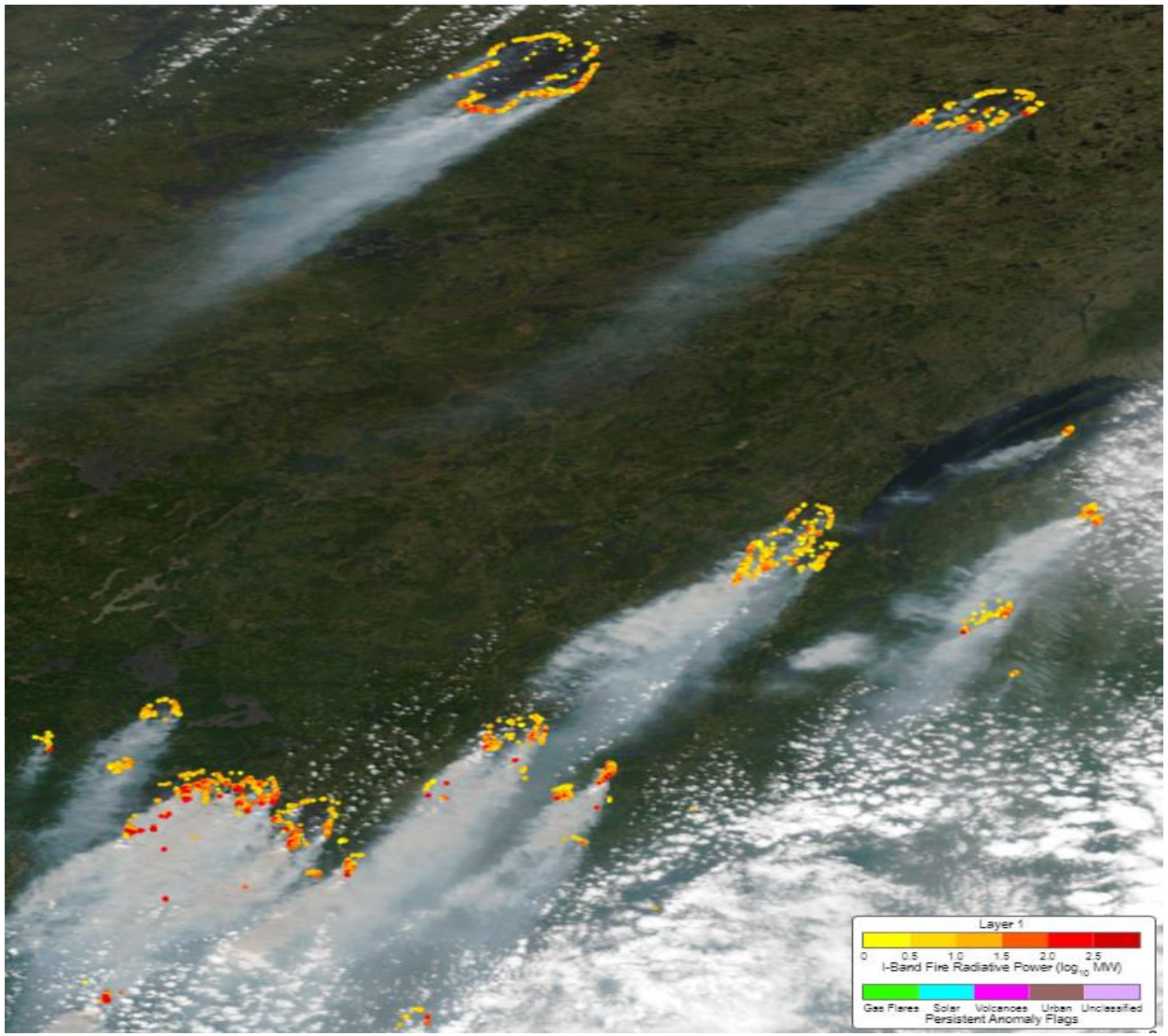
International Winds Working Group Meeting



The 16th International Winds Workshop was held in Montreal, Canada from 8-12 May 2023. The biennial International Winds Workshops are the forums used by the International Winds Working Group (IWWG) for cooperation in the operational and research community, and have strongly contributed to the improvement in quality of the derived wind fields and their use in Numerical Weather Prediction (NWP). Many members of the polar winds group attended.

Highlights from the Science Teams (June)

Observations of the Canadian Wildfires from the NOAA Operational 375 m VIIRS I-band Active Fire product



Throughout this spring large wildfires have engulfed parts of Canada. In addition to the Rocky Mountain region, which has seen intense fires annually for many years now, an unusual heat wave has caused intense fires in the sparsely populated woodlands of northern Quebec.

The Operational NDE VIIRS I-band Active Fire product has been providing high quality observations of the Canadian fire activity. The observations also feed into the NCEP operational High Resolution Rapid Refresh (HRRR)-smoke and Rapid Refresh (RAP)-smoke models, which transitioned from using the 750m VIIRS M-band product to the 375m VIIRS I-band product as input on May 16 and 31, respectively. The NOAA-21 NDE VIIRS I-band Active Fire product passed the Provisional Maturity review on June 1 and will be added to the three-satellite systematic JPSS observing constellation soon.

Figure. SNPP VIIRS 375 m daytime fire radiative power (FRP) image of fire activity in Quebec, on June 6, 2023. Image from JSTAR Mapper (https://www.star.nesdis.noaa.gov/jpss/mapper/)

Highlights from the Science Teams (June)

Smoke from Canadian wildfires observed by STAR ICVS system

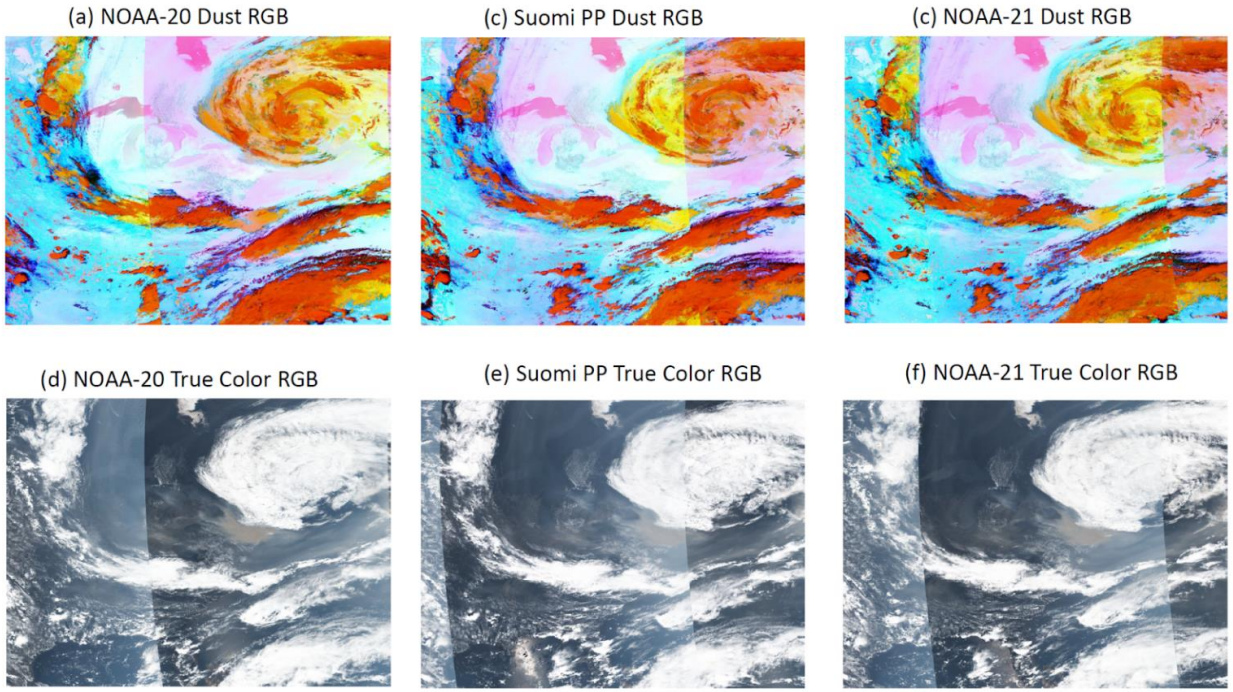


Figure. Dust RGB (top) and True Color RGB (bottom) for NOAA-20 (left), SNPP (middle), and NOAA-21 (right.)

New York City is found directly under the large pocket of brown smoky air as seen in the True Color imagery.

The Canadian Wildfires have produced intense plumes of smoke, some of which has drifted south over the northeastern and midwestern US. This smoke has caused intense sunsets and societal disruption due to unhealthy air quality. The VIIRS 'Dust' RGB composites using long wave infrared bands (M14-M16) the three JPSS satellites are shown in the figure. The 'dust' RGB images highlight the smoke plumes in light and red pink color traveling in between the two cloud systems in yellow and orange color, in particular the heavy smog occurrence in New York on June 7. These images also show the great potential of how we can integrate direct satellite SDR observations from the same sensors on different platforms to provide continuous high-resolution monitoring of extreme events.

Highlights from the Science Teams (June)

Maturity status updates in June

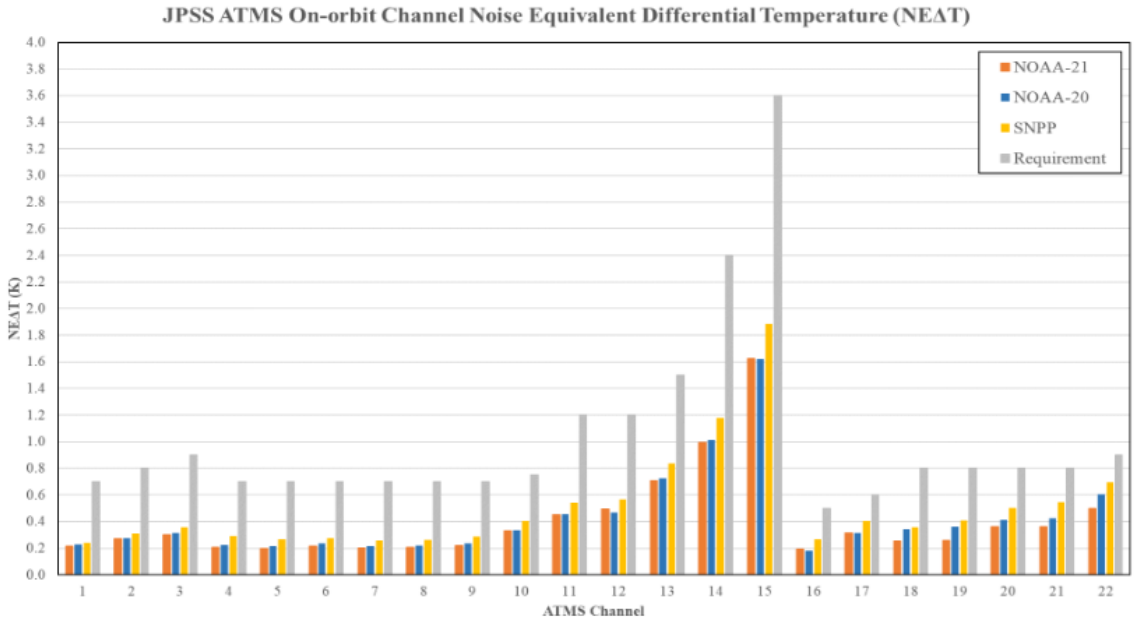


Figure. JPSS ATMS on-orbit channel NEΔT comparison (from the ATMS Validated Maturity presentation)

There were two NOAA-21 Maturity meetings in June. On June 1, Active Fires was declared beta and provisional, while NUCAPS Trace Gases and Soundings were declared Beta. On June 22, ATMS SDR/TDR was declared Validated. This is the first NOAA-21 product to reach the validated maturity level. Additionally, the MIRS EDR suite of products was declared provisional. The OMPS Ozone Profile EDRs, VIIRS Aerosol EDRs, and VIIRS Cloud Mask were all declared Beta at this meeting. There will be no maturity meeting in July, however, in August the VIIRS SDR and Imagery EDRs will be presented for validated, while the VIIRS Cryosphere products, a number of VIIRS Land Surface Products will be presented for beta. The OMPS Ozone Total Column and Profile EDRs will be presented for Provisional at this time as well.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
6/5	Patch (v1r1) delivery to resolve a bug of the RAVE North America CCAP to NCCF for integration.	NCCF
6/5	ACSPO SST AHI/AVHRR/VIIRS/L3S Preliminary CCAP for OSPO SCR.	NCCF
6/16	Final CCAP delivery of Surface Reflectance	NCCF
6/16	Patch delivery to fix NCCF errors of the SMOPS products.	NCCF
6/20	Preliminary CCAP of the Ocean Color algorithm for OSPO SCR.	Google Drive
6/22	Final CCAP delivery of V8TOS to NCCF.	NCCF
6/27	v1-2 Patch Delivery of GBBEPx AF M-band v4 to address scaling issues at different grid sizes, and fill value in the metadata (Blended Global Biomass Burning Emissions Product. Inputs: VIIRS SDR/Geo and ActiveFires)	NCCF
6/27	Final CCAP v1 delivery of the Ozone Mapping and Profiler Suite Nadir Profiler (OMPS NP) Version 8 Ozone Profile (V8PRO) v4r3 to NCCF for integration.	NCCF
6/29	Preliminary CCAP delivery of the VIIRS Radiance Cluster algorithm CCAP for OSPO review.	Google Drive
6/30	Patch Delivery of OHC Legacy Migration. Changes include changing metadata field from Level 3 to Level 4.	NCCF
7/06	The SMM and EUM for the V8TOZ J2 CCAP delivered	Google Drive

Accomplishments – JPSS Cal Val Support

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/2023
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/23
NOAA-21	Weekly OMPS TC/NP Dark Table Updates	06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/23
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	06/06/23, 6/2023, 7/5/23
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	6/13/23, 6/26/23
NOAA-21	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	6/13/23, 6/27/23
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	6/26/23
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	6/26/23
NOAA-21	Monthly VIIRS LUT Update of DNB Offsets and Gains	6/26/23
NOAA-21	Monthly VIIRS DNB Straylight correction update	6/26/23
NOAA-21	NOAA-21 OMPS Straylight LUT update - Fast Track - ADR 10360	6/20/23
S-NPP	SNPP CrIS Scan Baffle Temp Sensor hard failure (ADR 10362)	7/5/2023

NOAA-21 Cal/Val Maturity Reviews

June, 2023 Maturity Reviews		
ATMS SDR/TDR	Validated	Review held on 6/22; attained Validated maturity effective May 12.
MiRS EDRs	Provisional	Review held on 6/22; attained Provisional maturity effective May 12.
AOD/APS EDR	Provisional	Review held on 6/22; attained Provisional maturity effective February 10.
VIIRS Cloud Mask	Beta	Review held on 6/22; attained Beta maturity effective March 30.
July, 2023 Maturity Reviews (to be held August 3)		
VIIRS SDR	Validated	8/3 (live virtual presentation)
VIIRS KPP Imagery EDRs	Validated	8/3 (live virtual presentation)
VIIRS non-KPP imagery EDRs	Validated	8/3 (live virtual presentation)
OMPS Ozone V8TOz, V8TOS, and V8Pro	Provisional	8/3 (live virtual presentation)
Land Products: LST,LSA, SR, GVF, VI	Beta	8/3 (virtual review through email correspondence, no presentation)
Cryosphere Product(s): IST, Ice Concentration, Sea Ice Thickness/Age, Binary Snow Cover Binary Snow Cover	Beta	8/3 (virtual review through email correspondence, no presentation)
August, 2023 Maturity Reviews (to be held August 24)		
Volcanic Ash	Beta/Provisional	8/24 (live virtual presentation)
Aerosol Detection Product	Beta/Provisional	8/24 (live virtual presentation)
Enterprise Flood Mapping	Beta/Provisional	8/24 (live virtual presentation)
VIIRS SST EDR	Provisional	8/24 (live virtual presentation)

JSTAR Code/LUT/Product Deliveries

Date	DAPs to DPMS
6/14/23	ADR-10360/CCR-6548 NOAA-21 Straylight LUT update
6/16/21	ADR-10363/ CCR-6557 N21 VIIRS SDR LUT Update F-PREDICTED #7
6/28/23	ADR-10364/ CCR-6559 NOAA-21 VIIRS RSBautoCal LUTs Update
7/19/23	CrIS SNPP Baffle Temp sensor failure - CCR 6741 is under AERB review, Engineering Packet by mid August

Date	Remaining J2-Ready DAPs to NCCF
March, 2023 (delayed to October)	CCAP in October J2-ready OMPS LP DAP to NCCF (ASSISTT □ NCCF) Science team plan: delivered for SNPP, and expects to deliver J2-Ready in August ASSISTT team plan: 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 (Delivered on 6/20), 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. J2 Delivery Expected in August. ASSISTT Delivery will be in October.**	
Ocean Color J2 ready DAP (to NCCF)	Mar-23	**Aug-23**	Preliminary CCAP SCR Delivered: June 22, and Final 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 Initial Delivery Completed, Final Delivery on June 30**	
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 (SCR) delivered June 5, SCR review: 7/7; final CCAP in August).**	
Enterprise Fires	Apr-23	Apr-23	ASSISTT Delivered to NCCF on 4/19	
CCAP to NCCF (VH, VOLCAT Phase 1 for Volcanic Ash, OMPS V8TOz)	May-23	May-23	**Delivered V8TOz (4/23), VH (4/14) ASSISTT to** NCCF, VOLCAT SCR moved to June 21, Final CCAP: 11/17	
CCAP to NCCF (Gridded Land)	Jul-23	Jul-23	VIIRS Gridded Land Preliminary CCAP for software code review, OSPO completed Review on 6/1	
CCAP to NCCF (Cloud Provisional)	Jul-23	Jul-23	Patch delivery made, No plans yet from ASSISTT	

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	Not Needed	
FY24 Program Management Review (all teams)	Jun-23	Jun-23	Completed	
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 Mapper	Sep-23	Sep-23		
Images of the Month	Monthly	Monthly		

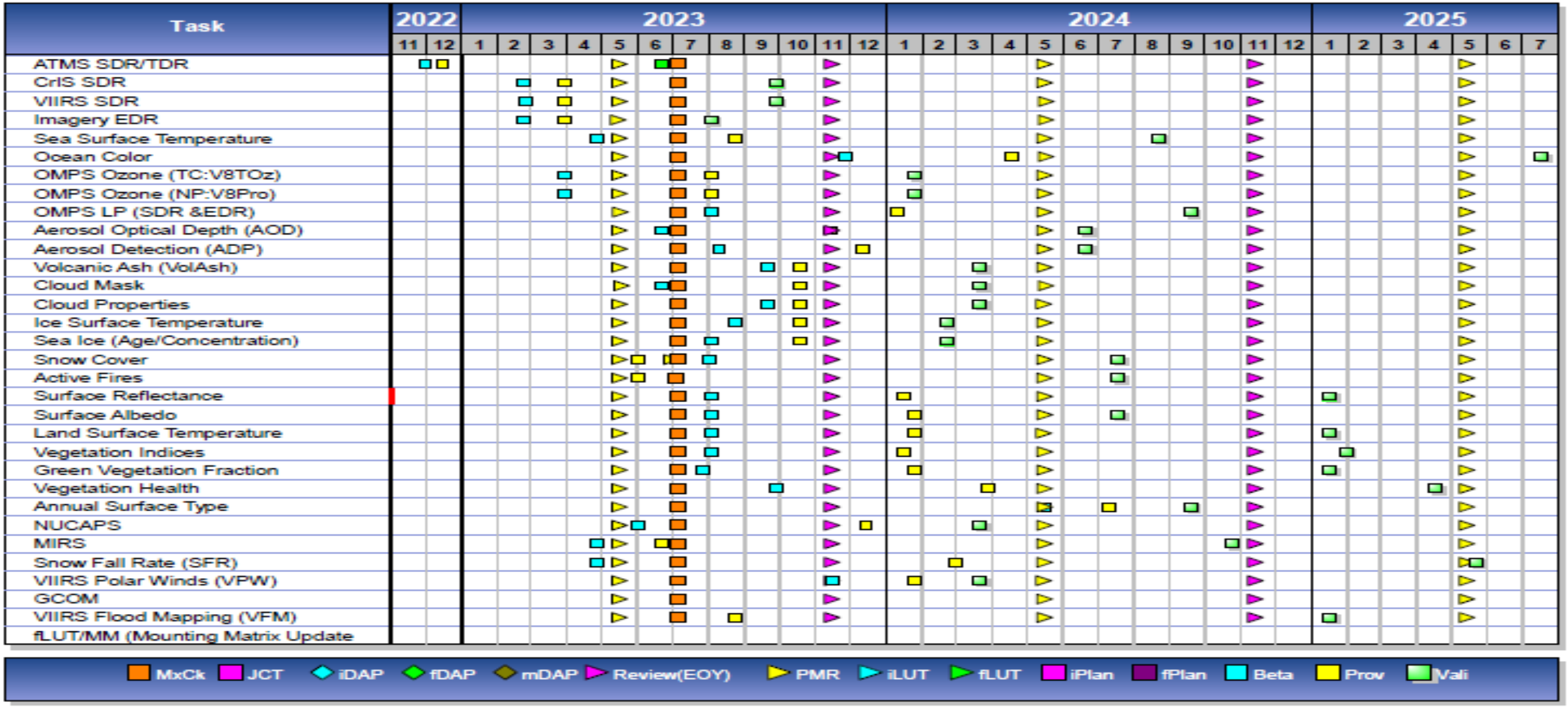
FY23 STAR JPSS Milestones

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**	Validated Review held 6/22; Attained Validated effective 05/12	
CrIS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	**Aug-23**	**Aug-23**	Provisional Achieved: 03/30; Validated Planned: 09/28	**Transmitter anomaly**
VIIRS SDR (B: Dec-22; P: Feb-23; V: May-23)	**May-23**	**May-23**	Provisional Achieved: 03/30; **Validated Planned: 08/03**	**Transmitter anomaly**
OMPS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	**Aug-23**	**Aug-23**	Provisional Achieved: 03/30; Validated Planned: 01/04/24	**Transmitter anomaly**
KPP VIIRS Imagery (B: Jan-23; P: Feb-23; V: May-23)	**May-23**	**May-23**	Provisional Achieved: 03/30; **Validated Planned: 08/03**	**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: 08/03**	**Transmitter anomaly**
Clouds (B: CM: Apr-23; Others: Jul-23; P: Aug-23)	**Aug-23**	**Aug-23**	Beta Review held: 6/22; Attained Beta effective 03/30	**Transmitter anomaly**
Aerosol AOD (B: Apr-23; P: Sep-23)	**Sep-23**	**Sep-23**	Beta Review held: 6/22; Attained Beta effective 02/10	**Transmitter anomaly**
Aerosol ADP (B: Mar-23; P: Aug-23)	**Aug-23**	**Aug-23**	**Beta/Provisional Review Planned: 8/24**	**Transmitter anomaly**
Volcanic Ash (B: Jul-23; P: Aug-23)	**Aug-23**	**Aug-23**	**Beta/Provisional Review Planned: 8/24**	**Transmitter anomaly**
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow)	**Aug-23**	**Aug-23**	**Beta Review Planned: 8/03**	**Transmitter anomaly**
Active Fires (B: May-23; P: Aug-23)	**Aug-23**	**Aug-23**	Beta/Provisional Review held: 6/1; Attained Provisional effective 03/30	**Transmitter anomaly**
LST/LSA/SR/GVF/VI (B: May-23)	**May-23**	**May-23**	**Beta Review Planned: 8/03**	**Transmitter anomaly**
Vegetation Health (B: Jul-23)	**Jul-23**	**Jul-23**	Beta Review Planned: 9/28	**Transmitter anomaly**
Ocean Color (B: Sep-23)	**Sep-23**	**Sep-23**	Beta Review Planned: 11/30	**Transmitter anomaly**
SST (B: Mar-23; P: Jun-23)	**Jun-23**	**Jun-23**	**Attained Beta effective 3/20; Provisional Review Planned: 8/24**	**Transmitter anomaly**
VPW (B: Sep-23)	**Sep-23**	**Sep-23**	Beta Review Planned: 11/10	**Transmitter anomaly**
VFM (B: May-23)	**May-23**	**May-23**	**Beta/Provisional Review Planned: 8/24**	**Transmitter anomaly**
NUCAPS (B: May-23)	**May-23**	**May-23**	Beta Review held on 6/1; Attained Beta effective 3/23	**Transmitter anomaly**
MiRS (B: Mar-23; P: Aug-23)	**Aug-23**	**Aug-23**	Provisional held: 6/22; Attained Provisional effective 5/12	**Transmitter anomaly**
SFR (B: May-23)	**May-23**	**May-23**	Beta Review held: 4/27; Attained Beta effective 12/3/2022	**Transmitter anomaly**
OMPS NP EDR V8Pro & V8TOz (B: Feb-23; P: Mar-23)	**Mar-23**	**Mar-23**	Beta Review held:03/30; Attained Beta: 4/3; **Provisional Planned 8/03**	**Transmitter anomaly**
OMPS LP (B: Mar-23)	**Mar-23**	**Mar-23**	TBC	**Transmitter anomaly**

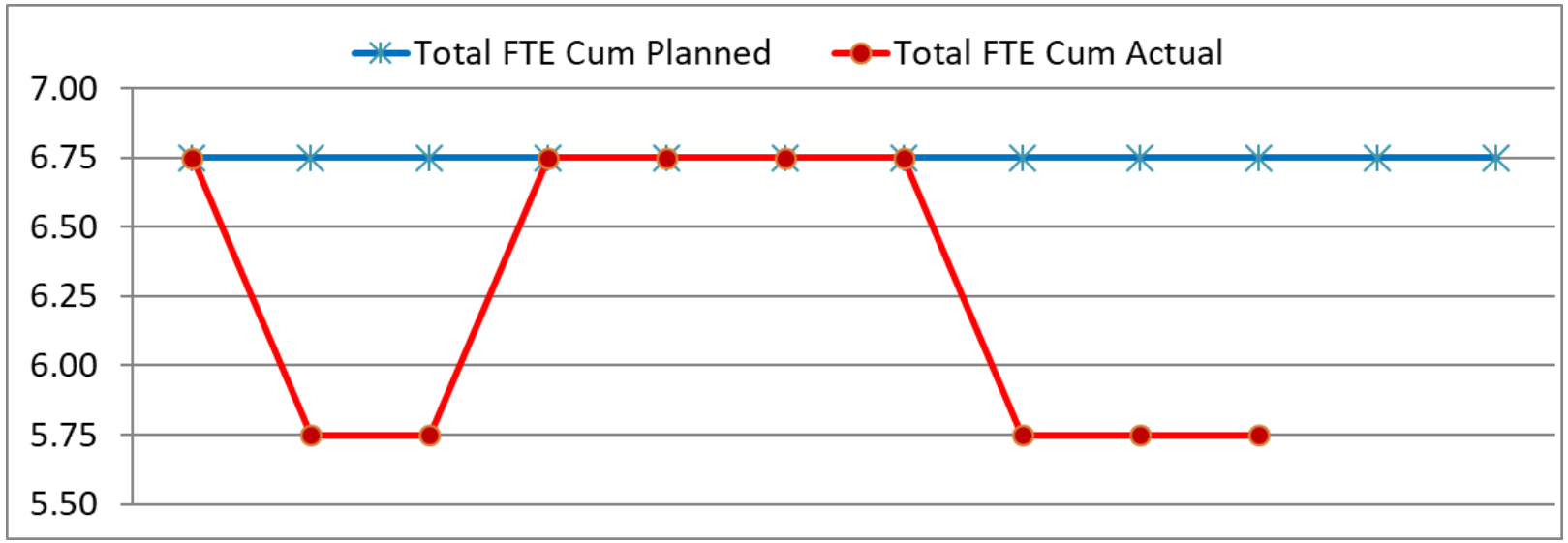
FY23 STAR JPSS Milestones

Operational/Program Support	Original Date	Forecast Date	Actual Completion Date
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, 05/02/23, 05/09/23, 05/16/23, 05/23/23, 05/31/23, **06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/2023**
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, 05/09/23, 05/23/23, **06/06/23, 6/2023, 7/5/23**
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, 05/3023, **6/26/23**
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, 05/02/23, 05/09/23, 05/16/23. 05/23/23, 05/31/23, **06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/23**
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, 05/02/23, 05/16/23, 05/31/23, **6/13/23, 6/26/23**
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, 5/26/23, **6/26/23**
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, 05/02/23, 05/09/23, 05/16/23, 05/23/23, 05/31/23, **06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/23**
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, 05/02/23, 05/16/23, 05/31/23, **6/13/23, 6/27/23**
NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	03/6/23, 3/28/23, 4/26/23, 5/25/23,**6/26/23**
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 Data call for Go/NOGO issued (June 1-28), STAR Report due and Go/NOGO: June 20 • TTO: July 5 • NCCF and NDE both perform verifications
Other CCRs include VIIRS DNB Straylight, OMPS Straylight LUTs for NOAA-21			• CCRs concurred as occurred on the MIS system

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	0.00	0.00	0.00		
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	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	5.75	5.75	5.75		

CS: vacant (Alisa Young now with GLERL)
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

June 2023

Accomplishments / Events:

- NOAA-21 eFire started running in the NCCF DEV environment. The STAR team is currently verifying the NCCF output.

- The Operational NDE VIIRS I-band Active Fire product has been providing high quality observations of the Canadian fire activity. The observations also feed into the NCEP operational HRRR-smoke and RAP-smoke models, which switched from the M-band to the I-band product in May.

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	May-23	June-23	Review held on 6/1
NOAA-21 Provisional Maturity	Aug-23	Aug-23	June-23	Review held on 6/1
NOAA-21 post-launch testing towards Provisional Maturity	Mar-23	Mar-23	May-23	Delay in data availability
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		

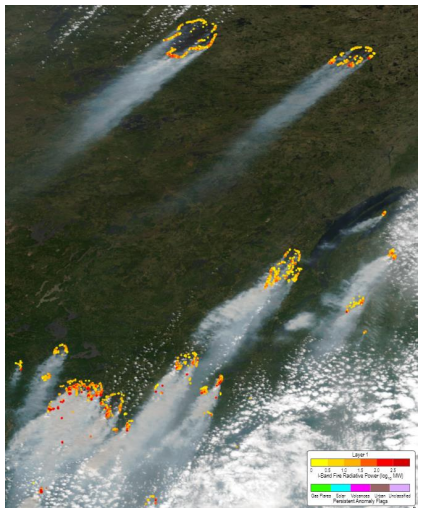


Figure: Suomi NPP VIIRS 375m daytime fire radiative power (FRP) image of fire activity in Quebec, Canada on June 6, 2023. Image from JSTAR Mapper (https://www.star.nesdis.noaa.gov/jpss/mapper/)

Aerosol

June 2023

Accomplishments / Events:

- SNPP VIIRS reprocessed AOD and ADP products generated by COVID-19 project were used in a study published by Environmental Research Letters. The paper title is “Markers of Economic Activity in Satellite Aerosol Optical Depth Data”.
- The reprocessing of SNPP VIIS and NOAA-20 VIIRS is continuing to keep the record up to date.
- NOAA NESDIS released a press release on the impact of smoke from Canada on US air quality. Press release link: https://www.nesdis.noaa.gov/news/noaa-satellites-tracked-historic-levels-of-harmful-smoke-impacting-millions-the-eastern-us. It show cased the power of near real time smoke observations.
- Team lead Shobha Kondragunta and team members Amy Huff and Michael Cheeseman gave interviews to online news outlet “Heatmap” and “Washington Post” on the impact of smoke from Canadian fires on US air quality.
- NOAA-21 AOD product reached provisional maturity status and ADP product maturity review is scheduled for August. The ADP product is expected to also reach provisional maturity status after the briefing.

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	June 23 (AOD) August 23 (ADP)	Scheduling
NOAA-21 Aerosol Products (ADP, AOD) Provisional Maturity	Aug-23 Sep-23	Aug-23 Nov-23	June 23 (AOD) August 23 (ADP)	
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	June 23	
Maintain and continue reprocessed AOD and ADP product	Jul-23	Jul-23	June 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			

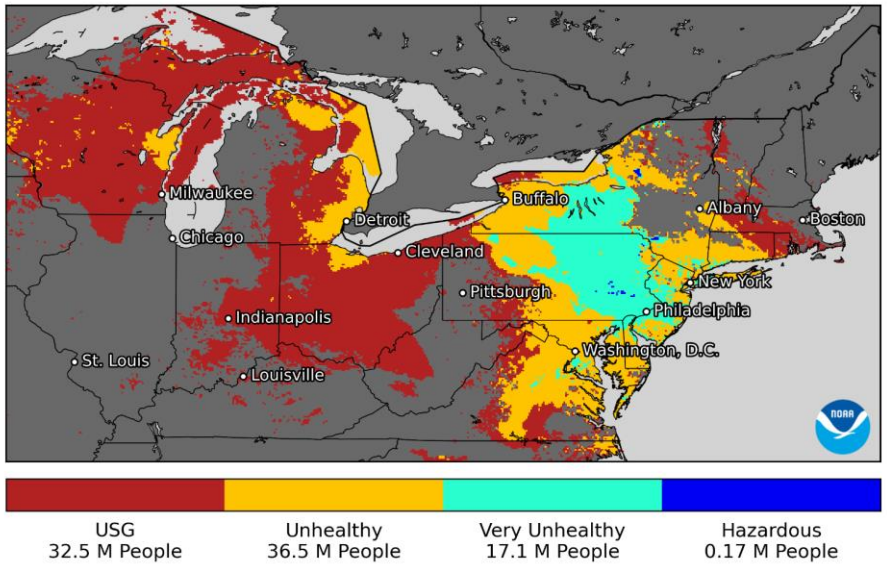
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight:

Millions (“M”) of people in the U.S. were exposed to harmful particulate pollution (PM2.5) on June 3-10, broken down by Air Quality Index (AQI) level, estimated from measurements of aerosol optical depth (AOD) made by NOAA’s Visible Infrared Imaging Radiometer Suite (VIIRS) on the NOAA-20 and SNPP satellites; gray indicates regions not impacted or no data. “USG” stands for “Unhealthy for Sensitive Groups” which includes children, senior citizens, and people with respiratory and/or cardiovascular diseases. Regions in Canada were not part of the analysis.



Clouds

June 2023

Accomplishments / Events:

- The Cloud team successfully completed the Cloud Mask EDR Beta Review. This resulted in the ECM for NOAA-21 being declared at provisional status. The team will be gathering data for the provisional review in September.
- The ACHA team, in collaboration with the VIIRS Polar winds team, identified that the ACHA algorithm within the v3r2 output did not contain critical fixes (delivered in June 2022) that were expected to be implemented. We are working with ASSISTT, who is working on getting it integrated into NCCF. This will result in a delay in Provisional review for ACHA and downstream products
- Work will be starting on the replacement of NCOMP with the ACHA Cloud optical depths. Also expecting a new ECM LUT in November 2023.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop VIIRS/CALIOP validation tools for JPSS-2	Dec-22	TBD	Jun 23	Code completed but requires N21 data to test
Integrate latest Enterprise Cloud Mask (ECM) version within NDE	Dec-22	Dec-22	Mar-23	A future update will be made post Provisional
Prepare Cloud Base Height (CBH)/Cloud Cover Layers (CCL) algorithm transition and operation for JPSS-2	Jan-23	Apr-23		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	June-23	Changed due to Transmitter issue
Validate CCL that was recently delivered, especially convective/supercooled layers as part of CCL Beta review	Jul-23	Sept-23		Changed due to Transmitter issue
NOAA-21 Cloud Products Beta Maturity	Jul-23	TBD		May need revisit die to ACHA code issue
NOAA-21 Cloud Products Provisional Maturity	Aug-23	TBD		May need revisit die to ACHA code 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		See Events bullet
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:

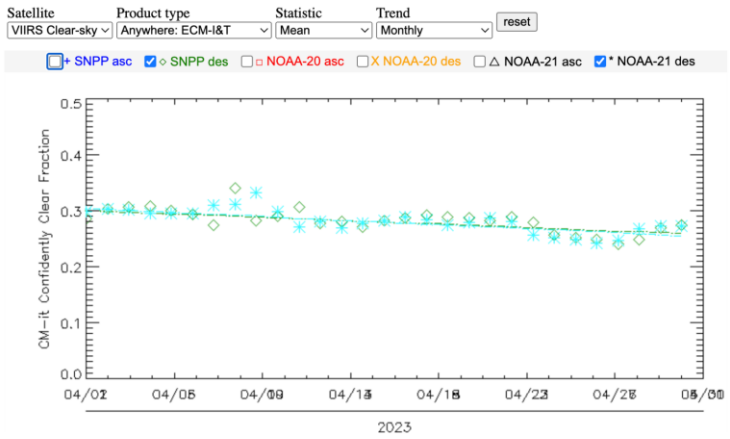


Figure 1. The cloud maske mean cloud fraction from the Integration and testing (IT) string for all three sensors. Note that the data from the NDE IT string is occasionally spotty in nature. Analysis such as this were shown in the NOAA-21 ECM Cloud mask review.

ATMS SDR

June 2023

Accomplishments / Events:

- Held NOAA-21 ATMS SDR validated maturity review meeting. Invited domestic and international NWP center scientists to report their findings using the post-launch calibrated NOAA-21 ATMS science data. The feedback proved that the N21 ATMS SDR data quality has reached their operational requirements. STAR and NASA ATMS team members also reported the working progress and accomplishments after the provisional maturity status. N21 ATMS SDR validated maturity status is approved on June 23, 2023. The effective date is on May 12, 2023, when the latest post-launch calibration coefficients are transitioned to operations.
- Analyzed different versions of NOAA-21 ATMS spectral response function (SRF) datasets from NG, NASA, and MIT/LL. Identified the discrepancies among them and compared the impact of different versions in radiative transfer model simulations. Compared the CRTM simulation results using the boxcar coefficients to the ones using the measured SRF coefficients. The study indicated that the boxcar coefficients derived from the instrument documentation may cause systematic bias against the measured SRF, which potentially affects the EMC DA results. ATMS SDR team has planned follow-up tasks to perform longer time series comparison to determine which CRTM coefficients are used in the future.
- Communicated with ECMWF DA team scientists to identify the discrepancies found between EC and STAR ATMS team O-B results. The analysis results approved that the discrepancies between selected channels are due to the different model simulation coefficients. EC used the first public release version of SRF, which has some deficiencies and is different from the boxcar coefficients in CRTM. As mentioned in the last bullet, ATMS SDR team will lead to release a updated SRF data soon.

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.*

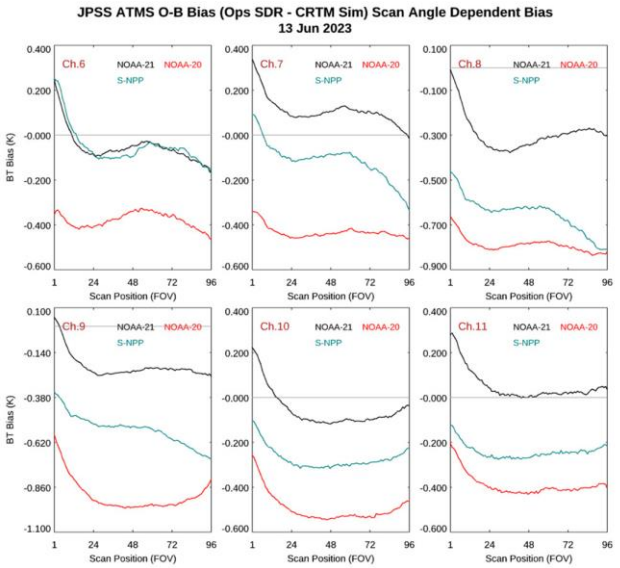
Issues/Risks:

None

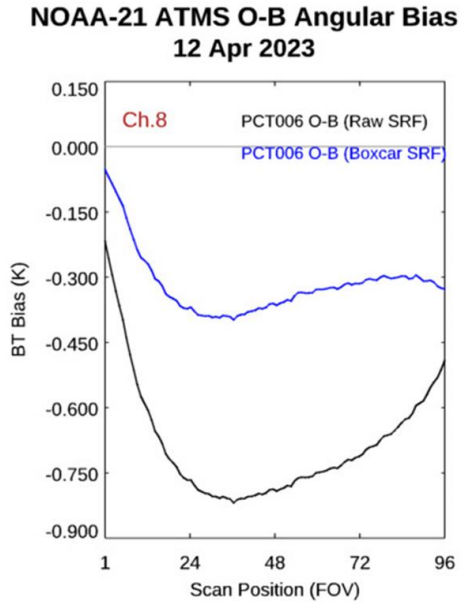
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 ATMS TDR/SDR First light and Beta Maturity	Nov-23	Nov-23	11/30/22	
NOAA-21 ATMS TDR/SDR Provisional Maturity	Dec-23	Dec-23	12/15/22	
NOAA-21 ATMS TDR/SDR Validated Maturity	May-23	May-23	6/22/23	
Evaluate new NEDT algorithm performance	Sep-23	Sep-23		
LTM and Anomaly Resolution (S-NPP, NOAA-20, NOAA-21)	Aug-23	Aug-23		

Highlights:

N21/N20/NPP ATMS SDR channel 6-11 boxcar O-B



N21 ATMS SDR channel 8 boxcar vs. raw SRF O-B



CrIS SDR

June 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 CrIS sensors (NOAA-20 and S-NPP)
- The SNPP CrIS SSM Baffle Temperature Anomaly, which was first observed on May 18, 2023, 14:04:47 UTC, has been extensively assessed and a solution proposed and tested. The solution includes the implementation of a model SSM temperature in a new engineering packet, EPv43 using existing SSM Temperature Offset parameters.
- Assessed the SNPP CrIS EPv43 using ADL and radiometric intercomparison tools, the results of which show that the solution of the anomaly via EP update is valid with good performance (**Fig. 1**). Also compared the operational SSM baffle temperature to the proposed model temperature using STAR's and UW's proposed temperature offset values (**Fig. 2**). Performed an assessment of the change in phase over time between proposed model SSM temperature for SNPP CrIS compared to the operational SSM temperature (**Fig. 3**)
- Developed radiometric analysis tools for CrIS sounder, including scene temperature dependence analysis, radiometric intercomparisons and time series of radiance differences at scan level, based on tools required by the SNPP CrIS anomaly assessment.
- Development of a monitoring tool for the data quality flag (DQF) work is underway, which will indicate the status of the overall DQF in terms of the number of occurrences on a daily basis and in terms of a daily time series (**Fig. 4**). A draft of the tool requirements was created and discussed.
- Completed NOAA-21 CrIS/IASI Metop-B and Metop-C SNO intercomparisons at FSR based.
- Completed checkout of Block2.3 Mx8 I&T Deploy Regression CrIS SDR products. The Block2.3 Mx8 I&T data were compared with the operational IDPS Block2.3 Mx7 SDR products for June 12, 2023; the CrIS algorithm update (ADR-10151/CCR-6287) works as expected and has no impact on I&T regression CrIS SDR product (**Fig. 5**)
- The NOAA-21 CrIS long-term Laser Diode temperature has been calculated from the beginning of the mission.
- Developed new tools to take the EPs and extract the fringe counts and partial fringe count data used in the neon calibration calculation of the resampling laser wavelength (**Fig. 6**)
- Completed the development of an emulation method using ADL to generate the NOAA-21 CrIS SDR data with the Neon Cal interval at every seven orbits, in preparation for the neon calibration interval increase from 109 min (every orbit) to 12.7 h (every 6 orbits). The implementation of the method was tested to be effective (**Fig. 7**).
- Updated the NOAA-21 CrIS long-term trend of spectral and radiometric calibration performance (**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

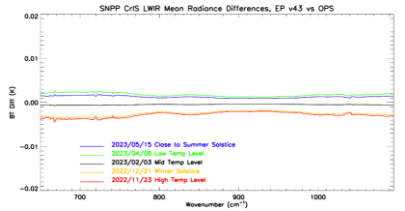
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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 UMD/CISESS has identified a potential replacement.**

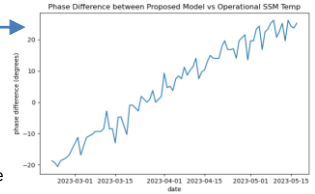
Highlights:

(1) SNPP CrIS radiometric intercomparison between EPv43 and the operational EP for the LWIR mean bias used for assessing the SSM baffle anomaly solution.

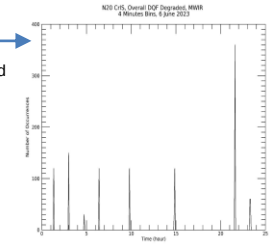


(2) There is a constant, good level of agreement between model and operational SSM temperature values in the evaluated period

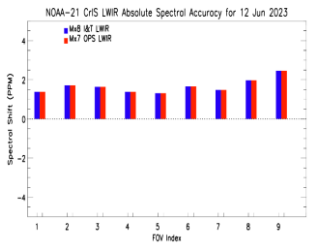
(3) Phase difference between proposed model and operational SSM temperature



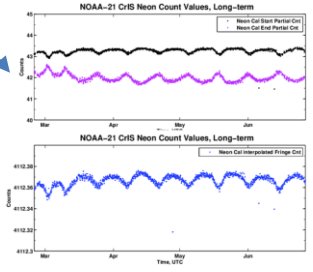
(4) NOAA-20 overall DQF status degraded accumulative number of occurrences every four minutes period for MWIR on 6/6/2023.



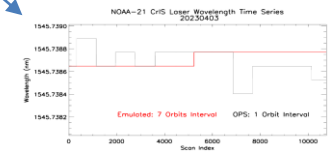
(5) Plot of the spectral shift between the Mx8 I&T and Mx7 operational for the Mx8 I&T regression checkout .



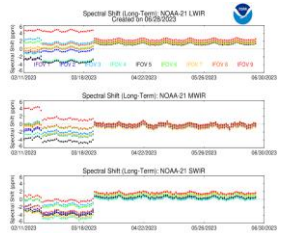
(6) Long-term time series of the neon partial fringe counts (top) and interpolated fringe counts (bottom) for NOAA-21 CrIS.



(7) Emulated NOAA-21 CrIS SDR Laser wavelength with Neon Calibration every seven orbits compared to every orbit (Operational)



(8) Spectral shift long-term time series for NOAA-21 CrIS



Cryosphere

June 2023

Accomplishments / Events:

Evaluation and accuracy assessment of NOAA-21 VIIRS snow products continues. Routine generation of NOAA-21 VIIRS daily gridded snow maps as well as monitoring of the product quality and accuracy continues. Daily global gridded snow cover maps are being examined visually and are being compared to IMS and in situ data for quantitative accuracy estimates. NOAA-21 VIIRS snow retrievals are compared with similar retrievals from SNPP and NOAA-20 to make sure that the derived binary snow and snow fraction values are consistent across all three products.

The assessment of NOAA-21 Binary Snow products in April, May, and June this year has shown its god quantitative agreement to snow products derived from SNPP and NOAA-20. This is seen in particular from Figure 1, which presents the fraction of snow-covered pixels in clear-sky retrievals in all three products. The value of the snow pixel fraction may be considered as a proxy for the snow extent. The difference in the estimated snow fraction between the three products does not exceed 5%. Note that at this time the cloud mask used in the NOAA-21 snow product is different from the cloud mask in SNPP and NOAA-20. This contributes to the difference in the estimated snow coverage between NOAA-21 and the other two snow products.

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 Cryosphere Products – Beta Maturity	May-23	Aug-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		

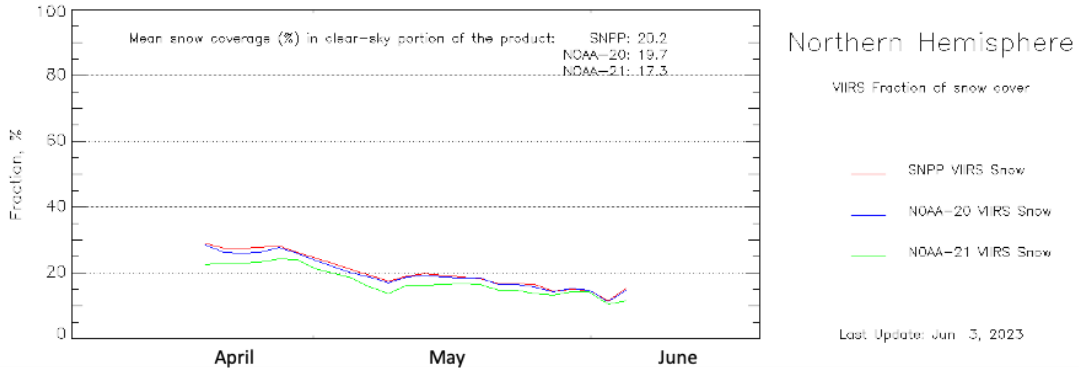


Figure 1. Daily fraction of snow-covered grid cells in the clear sky portion of VIIRS snow maps over the Northern Hemisphere in April, May, and June 2023. Data are presented for the Binary Snow product derived from VIIRS SNPP, NOAA-20 and NOAA-21.

NOAA Products Validation System (NPROVS) and JSTAR Mapper

June, 2023

Accomplishments / Events:

- The JSTAR Mapper/STAR Environmental Monitoring System (STEMS) team began producing image tiles of the STAR Satellite Rainfall Estimates Self-Calibrating Multivariate Precipitation Retrieval (SCaMPR)
- The NPROVS team initiated routine near-real-time ingest of NUCAPS NOAA-21 Beta sounding products for v3 and presented initial results at the NUCAPS All-Hands meeting **(Highlight)**
- NPROVS team attended the GRUAN Mid-Atlantic Committee (GMAC) specializing STAR/GRUAN applications at the Beltsville GRUAN site and NWS Sterling Field Support center (SFSC).
- Activity is underway to finalize paperwork for transferring FY-23 funds to the Department of Energy in order to purchase/deploy Radiosondes in support of the JPSS Dedicated Radiosonde Program

Overall Status:

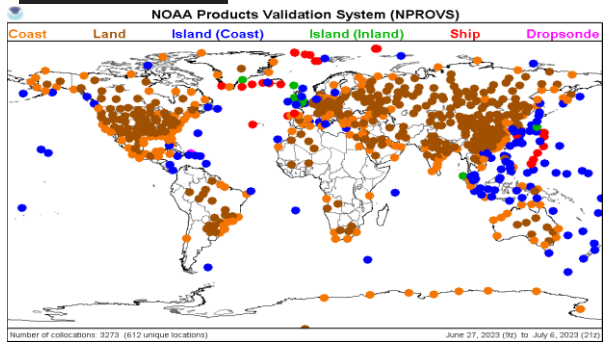
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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.*

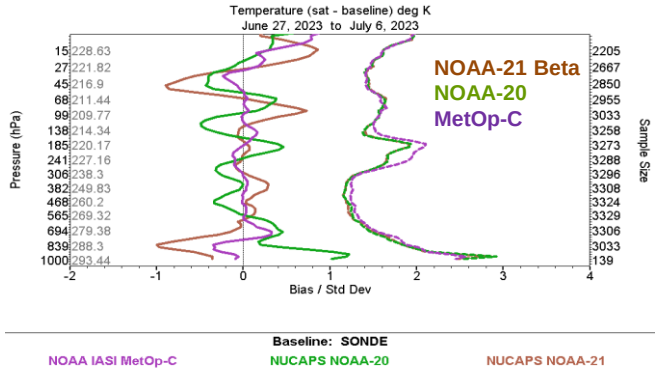
Issues/Risks: None

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		
Publications	Sep-23	Sep-23		

Highlights



The NPROVS system began accessing NUCAPS NOAA-21 Beta sounding products in early June. The above image show the locations of operational radiosondes during June/July which now include collocations with NUCAPS Beta products from NOAA-21 along with operational NUCAPS MetOp-C and NOAA-20, facilitating "enterprise" assessment of each system against identical sets of ground-truth radiosondes. This lends high confidence to inter-comparison statistics (right).



The above plots show vertical statistics of Bias (solid) and Standard Deviation (dashed) inter-comparing NUCAPS **NOAA-21 Beta** temperature soundings to operational products from **NOAA-20** and **MetOp-C**. Bias differences ranging from +1K (**NOAA-20**) to -1K (**NOAA-21 Beta**) are seen among the 3 sets of products in the lower troposphere below 600 hPa (4km); standard deviations appear similar. Monitoring will continue to track the NOAA-21 maturity process.

Accomplishments / Events:

- ***Rainfall EDR:*** Typhoon Mawar, as a category-4 storm, affected the region of the Mariana Islands, making its Guam landfall on May 24th. The strongest Northern Hemisphere tropical cyclone on record for the month of May brought mandatory evacuation, flash flooding, and rainfall rates of over 2 inches per hour to the island (20+ in within a 24-hour period). Strong winds and power outages resulted in disruption of the NWS radar operation on Guam, forcing the forecasters to rely on satellite observations and NWP products only. During this time, shortly before and soon after the hurricane's landfall, Advanced Microwave Scanning Radiometer-2 (AMSR2) on board GCOM-W1 made two overpasses over the region, capturing the tropical system within its swath. AMSR2 precipitation retrieval, maintained by the CISESS science team (Veljko Petkovic, Malar Arulraj, Ralph Ferarro, and Huan Meng), delivered detailed and highly-accurate estimates of the rainfall fields. Figure 1

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		

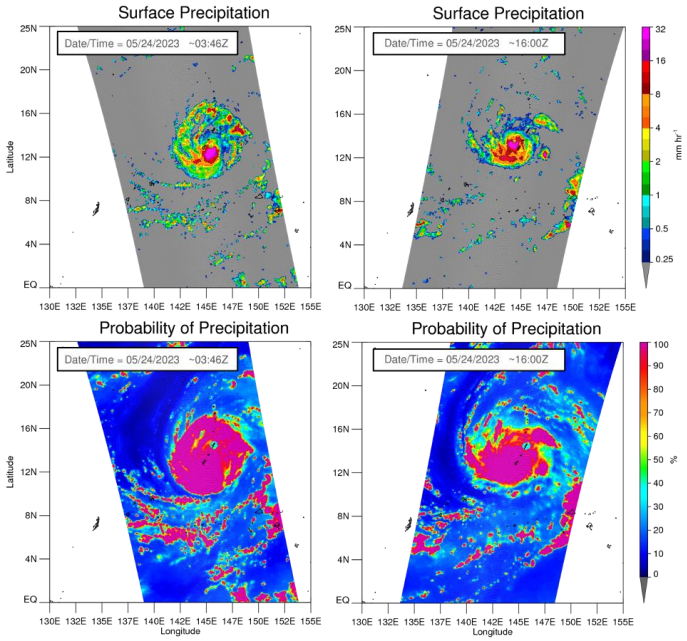
Overall Status:

	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

June 2023

Accomplishments / Events:

- Finished the development of OMPS vs. VIIRS inter-sensor comparison product to provide additional OMPS SDR data quality monitoring ability.
- Identified two N21 CrIS instrument anomalies. One is fringe count error (FCE) observed on June 15, which rarely happens and caused the symmetry change. The other is the Earth View zero path difference (ZPD) saturation. Both events have been reported to CrIS Cal/Val team for further analysis.
- Updated ICVS severe event watch web site to improve the organization of event list.Updated the package to include the support of NOAA-21 datasets.
- Updated JPSS ATMS NOAA-21 vs. NOAA-20/S-NPP 32-day averaged inter-sensor direct bias and O-B global mean bias inter-sensor double difference trending figures in ICVS beta for pre-operational preview and support for NOAA-21 ATMS validated maturity review.
- Attended two sessions of Git tutorial provided by ASSISTT to promote the use of Git in ICVS team software development and version control.
- Developed a VIIRS sync loss event trending product for N21/N20/NPP to compare the event occurrence rate of all VIIRS at the beginning of the missions. N21 and N20 have a similar rate at the early stage of mission. NPP VIIRS has a different trending due to the switch of sides.

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)		May-23	
Extend the existing OMPS-NM 380nm-VIIRS M1 monitoring to J2	Jun-23		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		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.*

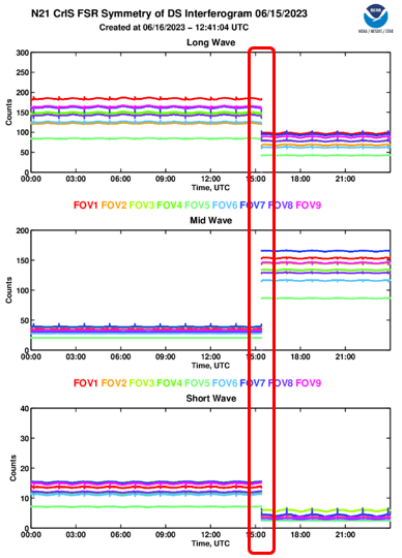
Issues/Risks:

None

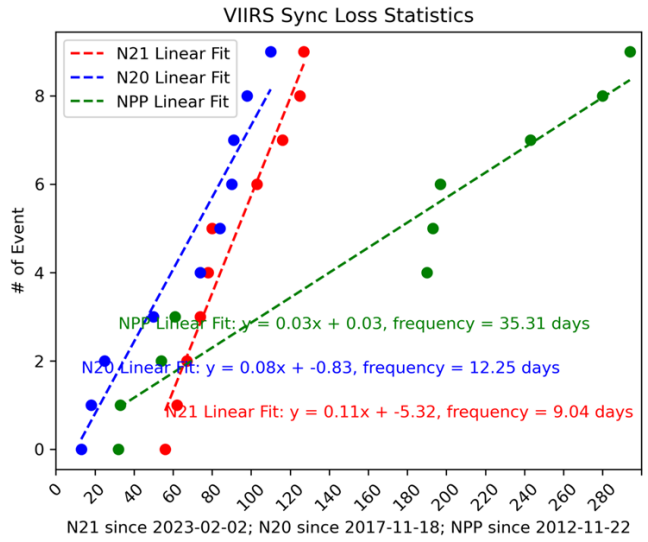
Highlights:

Significantly contribute to STAR SDR Teams

(a) NOAA-21 CrIS deep space interferogram symmetry change after the FCE on June 15, 2023



(b) JPSS VIIRS sync loss event occurrence rate at the beginning of the missions indicating a similar rate between N20 and N21



VIIRS SDR

June 2023

Accomplishments / Events:

- To further mitigate the radiometric response degradation for NOAA-21 (N21) VIIRS SWIR bands, worked with the DPMS/IDPS team on the re-initialization of the N21 VIIRS RSBautoCal processing in IDPS and verified that it was successful in the operational environment (DP-OE): valid F factor values started to be generated on 6/8/2023, enabling their application in the N21 VIIRS SDR processing for the SWIR bands in the near future, after additional RSBautoCal LUT updates
- Verified that the updated out-of-cycle N21 VIIRS SDR RVF (response versus scan angle or RVS) LUT, prepared based on data acquired during the spacecraft pitch ("backflip") maneuver to update the RVS table for the LWIR bands, was deployed in IDPS on 6/7/2023 and works as expected since then reducing scan-angle and scene-temperature dependent biases
- Assisted in scheduling and analyzed data from N21, N20, and Suomi NPP VIIRS lunar calibration (w/o spacecraft roll maneuvers) on 6/28/2023
- Delivered for deployment in the IDPS operations the 4th (out of 12) N21 VIIRS SDR DNB STRAY-LIGHT-CORRECTION LUT as well as the updated N21, N20 and NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired around the new moon on 6/18/2023

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.*
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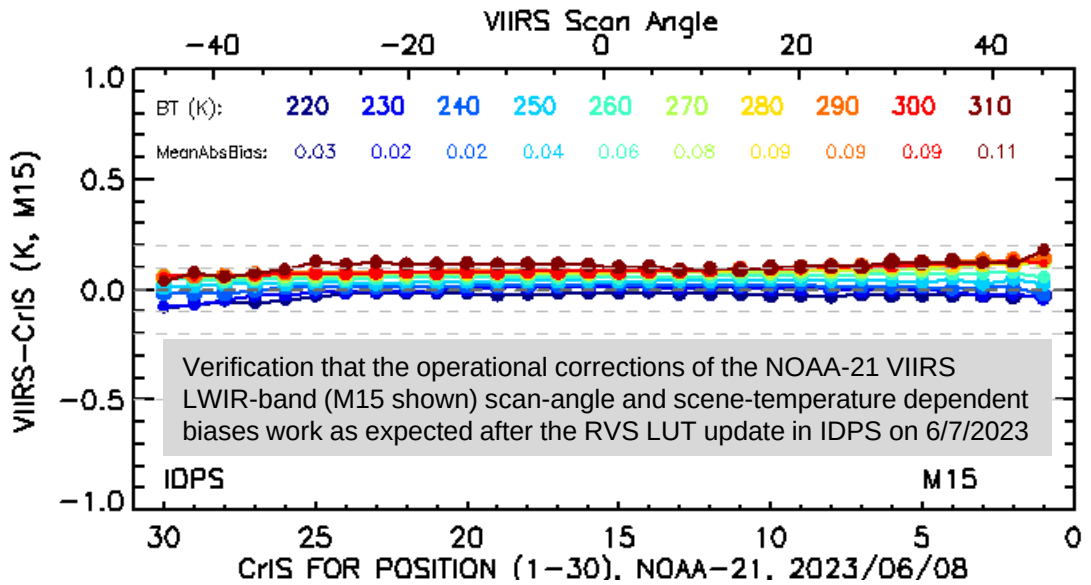
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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	Aug-23		KaTX anomaly Mx8 deployment
Monthly lunar calibration (predictions and analyses)	Jul-23	Jul-23	6/30/2023	End of season
Monthly delivery of VIIRS DNB calibration LUTs	Sep-23	Sep-23		
Geolocation monitoring using CPM (for NPP, N20 and N21)	Sep-23	Sep-23		
N21 (J2) on-orbit calibration LUT development	Sep-23	Sep-23		

Highlights:



Verification that the operational corrections of the NOAA-21 VIIRS LWIR-band (M15 shown) scan-angle and scene-temperature dependent biases work as expected after the RVS LUT update in IDPS on 6/7/2023

Surface Albedo

June 2023

Accomplishments / Events:

- Keep communicating with NDE about the v2r2 SURFALB producing issue
  - Found the issue in NDE script
- Presented the PMR FY24 in project meeting
- Analyzed the correlation between albedo anomaly and ENSO (ONI index) and related parameters

Overall Status:

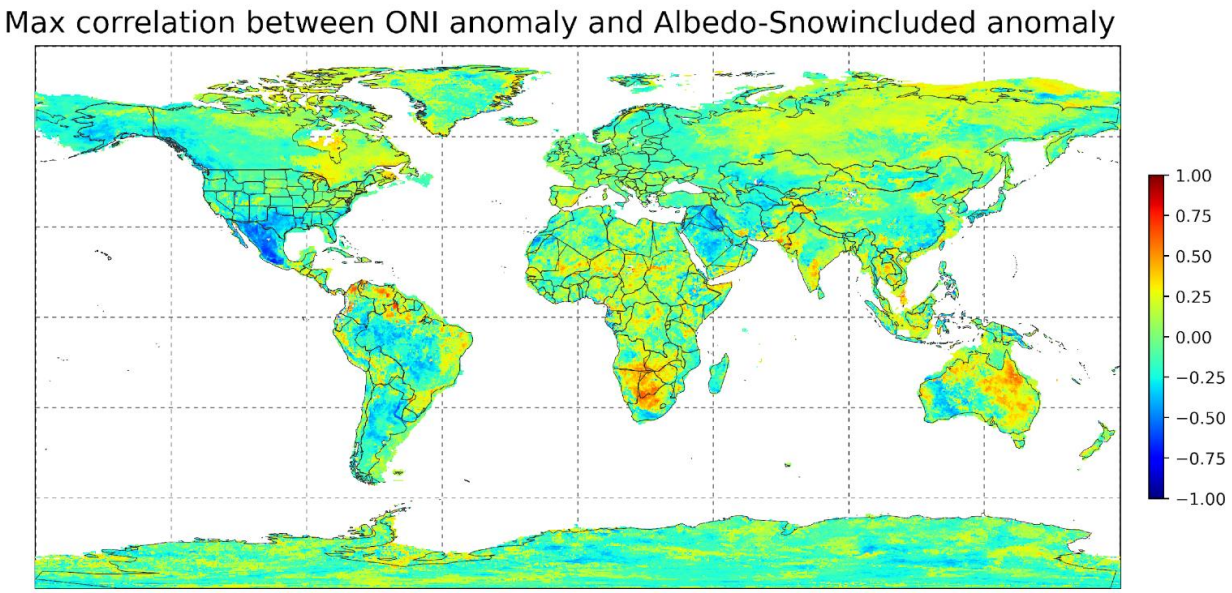
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

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.*

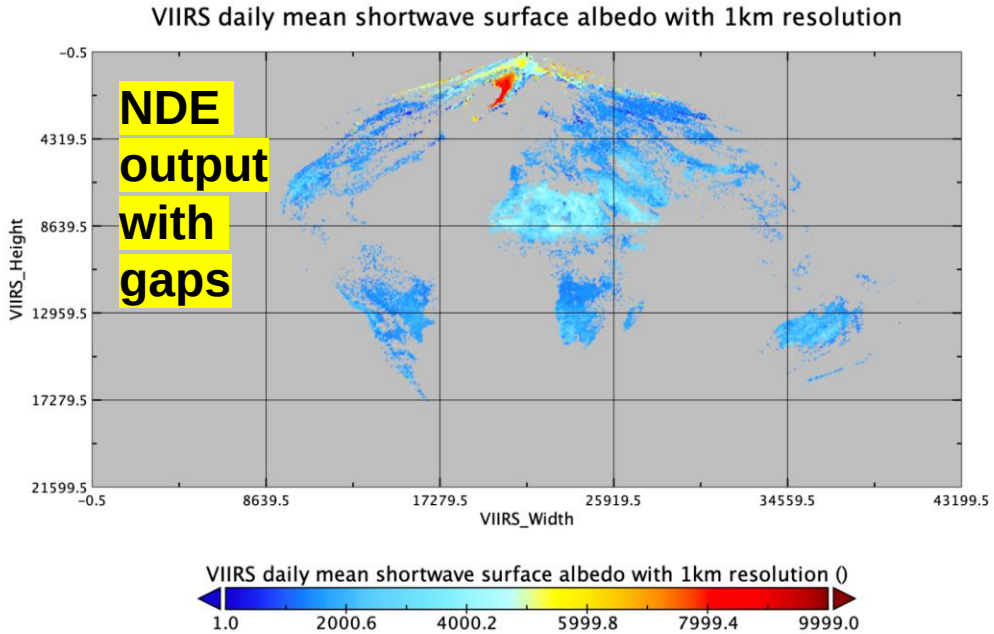
Issues/Risks:

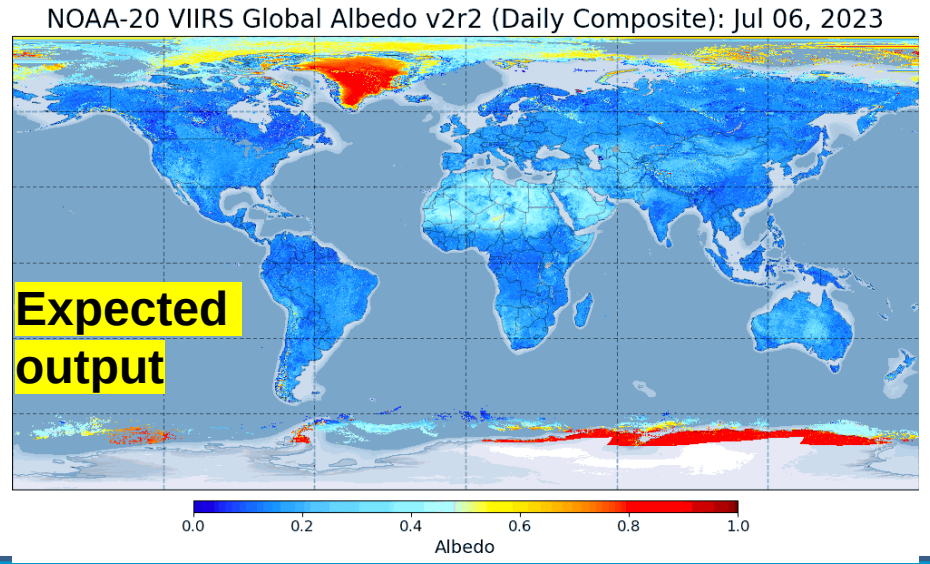
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Beta review of the NOAA-21 albedo	Mar-23	May-23		JPSS project plan
PMR review	May-23	Jun-23		
mDAP for NOAA-21 if needed	Aug-23			
Provional review of NOAA-21 Albedo	Sep-23			

Highlights: The impact of ENSO on albedo anomaly



Positioning the v2r2 albedo issue in NDE system





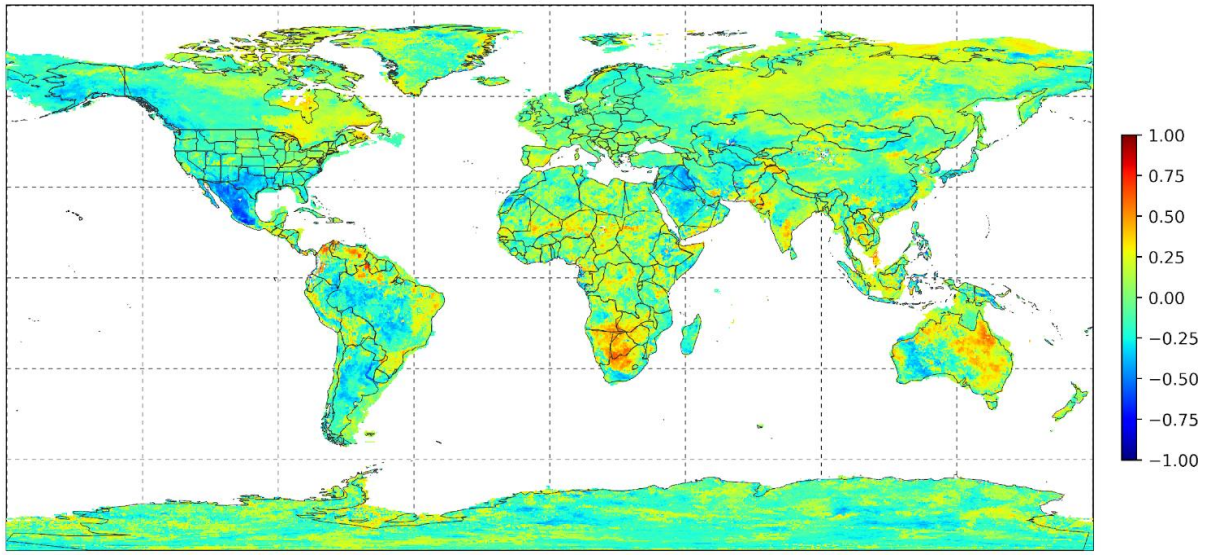
- **Issue:** unexpected data gap in VIIRS albedo
- **Actions in Science Team:** Requested the log files from NDE and positioned the reason
- **Progress:** It seems that the failure might be attributed to the script expecting a different key name in the PCF file, specifically the word before the '=' sign. The PCF is the script in system running generated by ASSISTT.
- **Mitigations:** The NDE team could be able to fix the script and provide the updated version to ASSIST or coordinate with ASSISTT.

Global correlation between ENSO and albedo anomaly

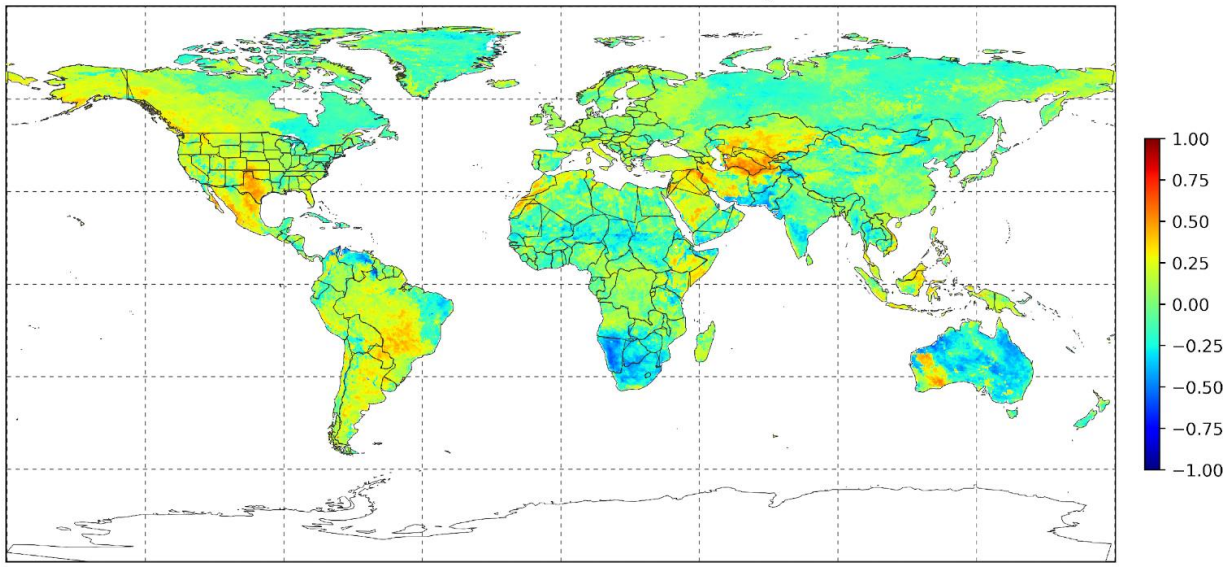
June, 2023

The El Niño-Southern Oscillation (ENSO), indicated by ONI index here, can have an impact on albedo anomalies. During El Niño events, characterized by the warming of the eastern tropical Pacific Ocean, alterations in cloud cover, precipitation patterns, and vegetation growth, can affect surface albedo. In regions experiencing El Niño, reduced cloud cover and decreased precipitation can lead to drier conditions and a decrease in surface albedo. Conversely, during La Niña events, characterized by the cooling of the eastern tropical Pacific Ocean, the opposite effects on albedo can occur.

Max correlation between ONI anomaly and Albedo-Snowincluded anomaly



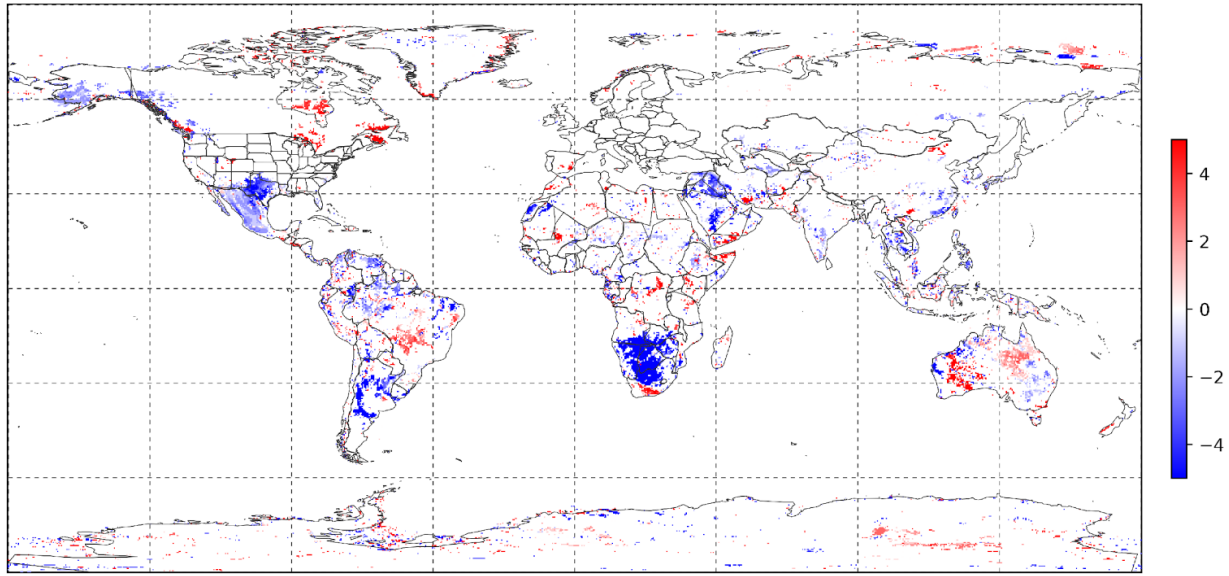
Max correlation between NDVI anomaly and ONI



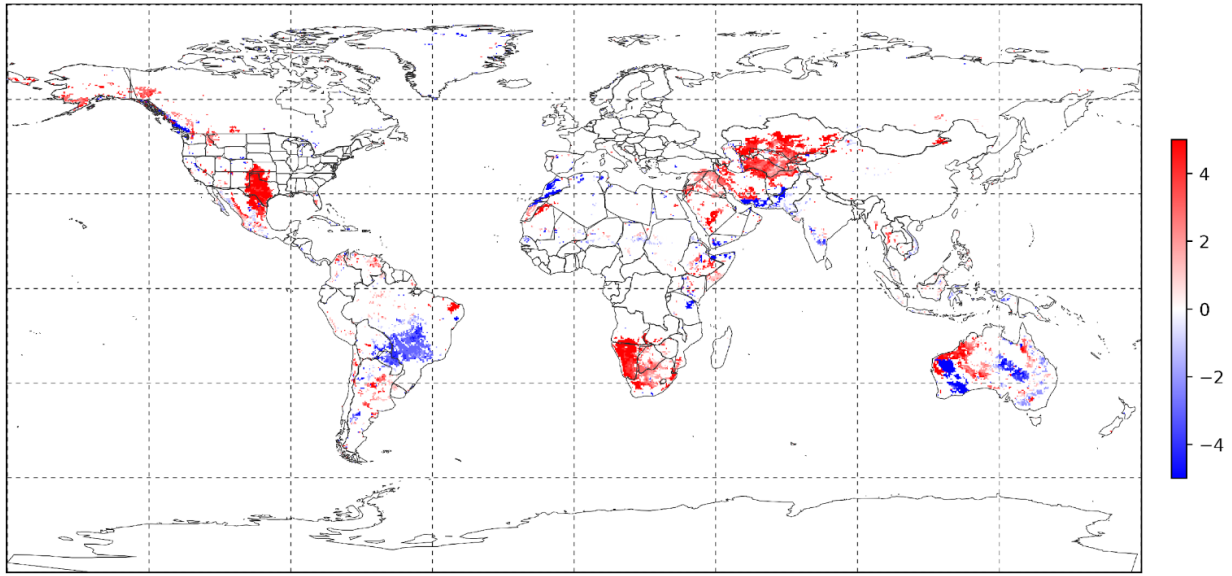
The albedo anomaly mainly results from vegetation anomaly. In areas where the vegetation types are dominated by grassland or savanna or open shrubland, albedo varies oppositely with NDVI, partly because the NDVI decrease results in more exposure of bare soil which has higher albedo than vegetation.

The response lag of albedo to ENSO

Lag of ONI Anomaly relative to Albedo-Snowincluded anomaly



Lag of NDVI anomaly relative to ONI



The response lag of albedo and NDVI (Normalized Difference Vegetation Index) to ENSO can vary depending on various factors, including the specific region, vegetation types, and the nature of the ENSO event itself.

Albedo is influenced by changes in land surface properties, such as vegetation cover, soil moisture, and snow or ice extent. In response to ENSO events, which can alter precipitation patterns and atmospheric circulation, there can be changes in vegetation growth and land surface conditions, subsequently affecting albedo. The response lag of albedo to ENSO can range from several weeks to several months, depending on the time required for changes in vegetation cover and surface properties to occur.

Surface Reflectance

June 2023

Accomplishments / Events:

- Verified the SR CCAP package results, after that, the package delivered to be OSPO.
- Developed the code for SR reprocess using the AWS cloud data, SDR, GEO data, AOD, Cloud and GFS data, at this stage, the data are not complete, the prototype code is underdevelopment and test.
- Checked the NASA VNP09 v001 and newly released v002, preliminary comparison between two version and NOAA SR data.
- Prepared the NOAA21 beta review using the data generated by PDA_IT.
- 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			

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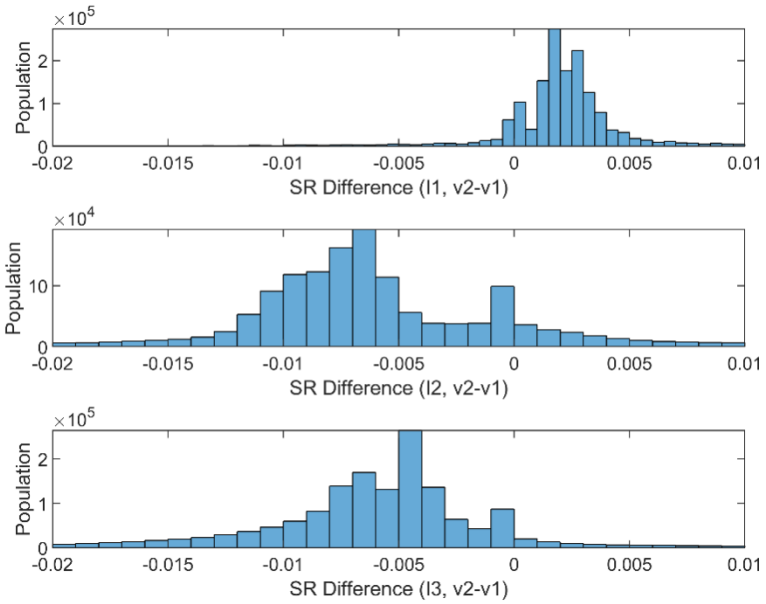
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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	Aug-23		
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:



The NASA VNP09 version 2 and version 1 difference for three Image bands. (Red, NIR and SWIR). Due to the calibration, version 2 SR has been adjusted using the coefficients derived from Aqua MODIS as reference.

SR Verification for the CCAP package

Background:
The cloud immigration is undergoing, before the final delivery, the SR verification is performed, this time mainly focus on the QFs, as the figure shows.
Verification results:

- Both the SR value and QF match well between local results and CCAP test data.
- Verified the I3 SDR quality for NOAA20 (scan line #29 saturation issue)
- Verified the QF7 AOD quantity (most recent update).

QFs need pay further attention: the updated AOD quantity QF:

The designed method is

SR1 = VIIRS M4 SR @aod=aod550, model=Urban clean
SR2 = VIIRS M4 SR @aod=0.01, model=Urban clean
DIF = abs(SR1-SR2)

Criteria:

Low: DIF [0, 0.15);Mod: DIF [0.15, 0.3);High: DIF (0.3, ∞)

Issue:

NASA and NOAA use different aerosol models, use Smoke model in the current code, while NASA use Urban clean model.

	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
QF1	Cloud Mask Quality		Cloud Detection Confidence		Day/Night Flag	Low Sun Flag	Sun Glint Flag (Partial Issue)	
QF2	Land/Water Mask			Cloud Shadow	Heavy Aerosol	Snow/Ice Flag	Reflective Cirrus Test	Emissive Cirrus Test
QF3	Bad M1 SDR	Bad M2 SDR	Bad M3 SDR	Bad M4 SDR	Bad M5 SDR	Bad M7 SDR	Bad M8 SDR	Bad M10 SDR
QF4	Bad M11 SDR	Bad I1 SDR	Bad I2 SDR	Bad I3 SDR	AOT Quality	Missing AOT	Invalid Aer. Model	Missing Prec. Water
QF5	Missing Column O3	Missing Surf Pressure	Quality of M1 Ret.	Quality of M2 Ret.	Quality of M3 Ret.	Quality of M4 Ret.	Quality of M5 Ret.	Quality of M7 Ret.
QF6	Quality of M8 Ret.	Quality of M10 Ret.	Quality of M11 Ret.	Quality of I1 Ret.	Quality of I2 Ret.	Quality of I3 Ret.	(unused)	
QF7	Snow Present	Cloud Adjacency	Aerosol Quantity		Thin Cirrus Flag	(unused)		

SR Reprocess Based on AWS data

- Develop the code to grab SR input data from AWS S3 and pre-process to fit for SR algorithm.

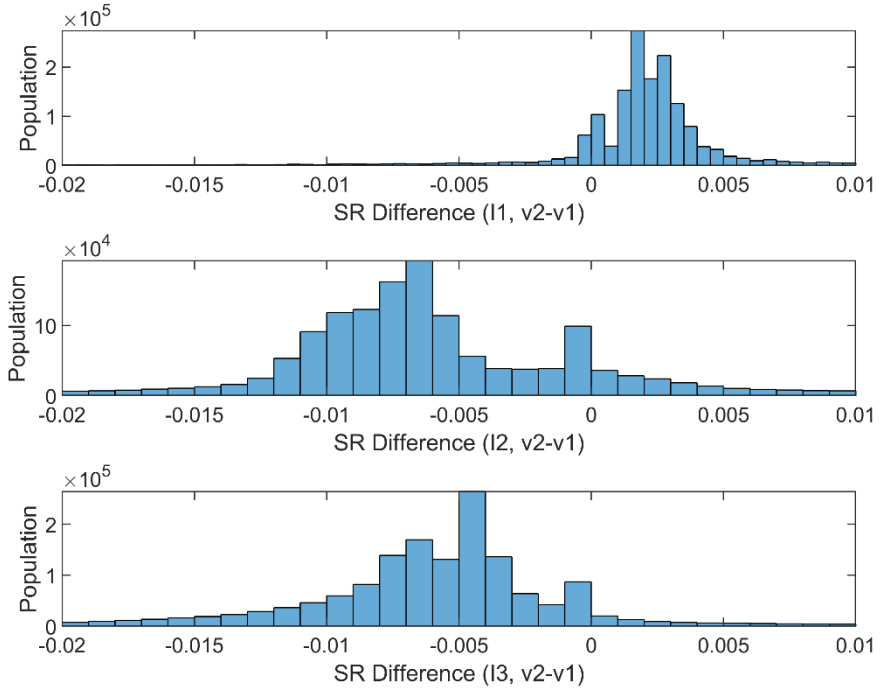
- SDR Data
  - S3://noaa-jpss/NOAA20/VIIRS/NOAA20_VIIRS_I-Band_01_SDR_SVI01/
  - Process: read TOA reflectance and related the QFs.
- GEO Data
  - S3://noaa-jpss/NOAA20/VIIRS/NOAA20_VIIRS_I-Band_SDR_TC_GEO_GITCO/
  - Process: read Lat/Lon, Solar/View Angles and match with SDR data
- AOD EDR
  - S3://noaa-jpss/ NOAA20/VIIRS/NOAA20_VIIRS_Aerosol_Detection_EDR/
  - Process: read AOD550, aerosol model and QFs
- Cloud Mask & Height EDR:
  - S3://noaa-jpss/NOAA20/VIIRS/NOAA20_VIIRS_Cloud_Mask_EDR/
  - S3://noaa-jpss/NOAA20/VIIRS/NOAA20_VIIRS_Cloud_Top_Height_EDR
  - Process: read the QFs that SR QF required.
- GFS
  - S3://noaa-gfs-bdp-pds/gfs.YYYYMMDD/atmos/
  - Process: read the surface pressure, TPW, Total O3, then spatially and temporally match with the Lat/Lon data.

- Execute the VIIRS SR algorithm using the latest algorithm and LUT to generated the SR datasets.

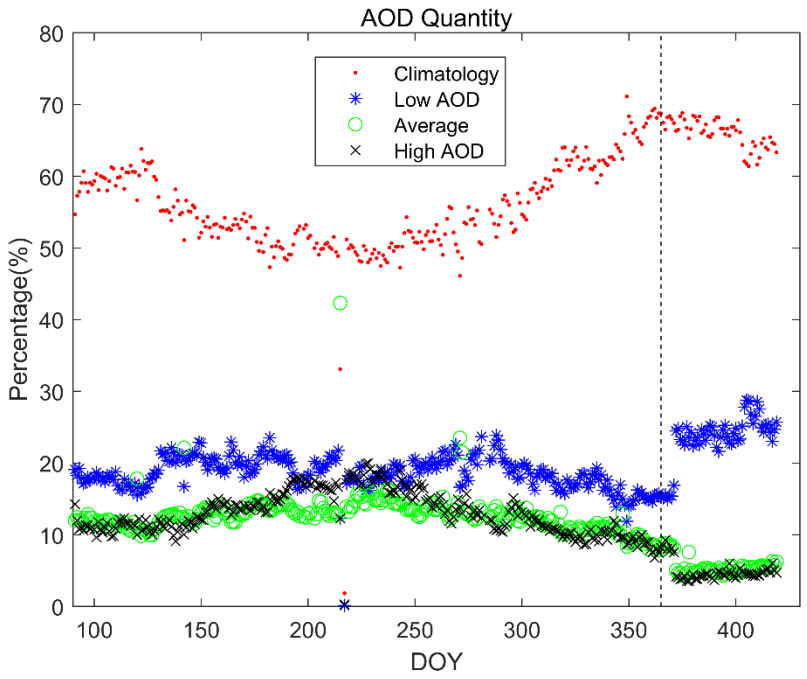
SR inter-comparison with NASA new version SR

Background: SR enterprise algorithm heritage from MODIS C6.1 product, the main algorithm is the same, but with different input data, particularly for the AOD data, which using different aerosol model scheme from MODIS SR. so NASA SR is an important reference for product inter-comparison, the new released v2 SR is different from v1 in following aspects:

- AOD quantity QF update (NOAA SR already done the same update as MODIS C6.1 did)
- New calibrated SR using Aqua MODIS as reference to deal with the inconsistency between SNPP and N20.



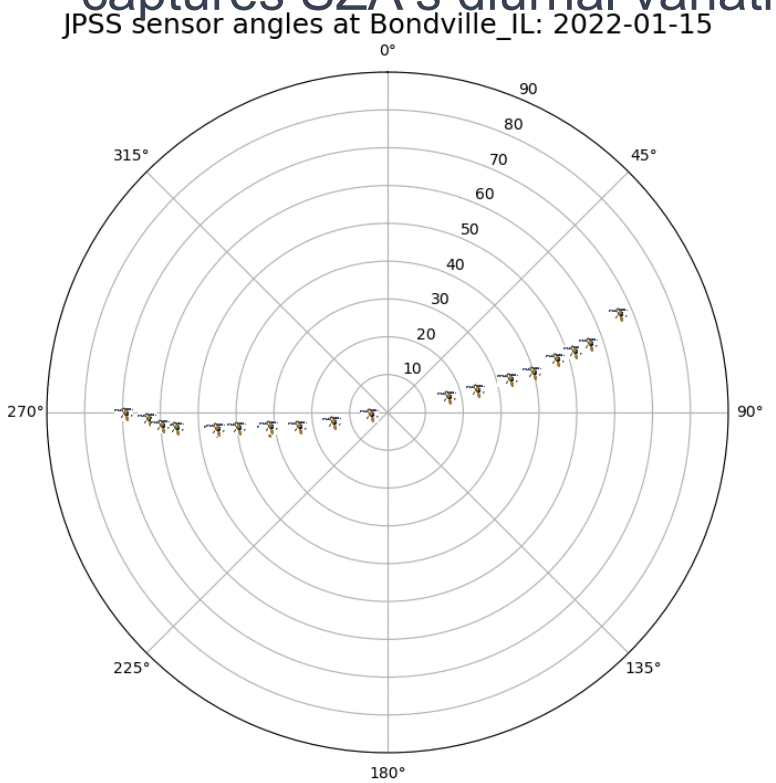
The comparison between VNP09 v2 and v1, further investigation will be performed to evaluate NOAA SR consistency.



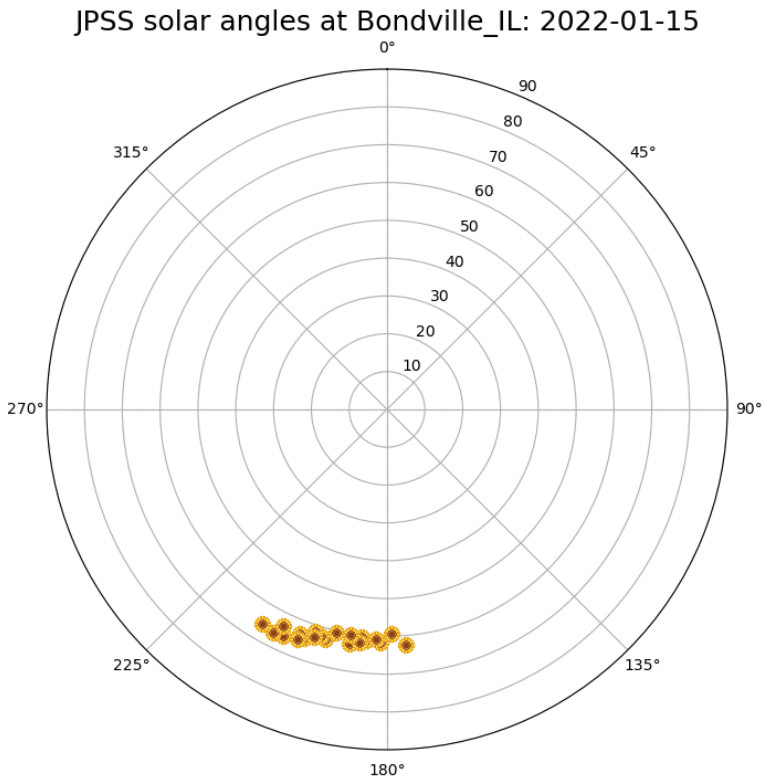
The QF update compared with v1 results in more low AOD and less high AOD (for NOAA SR this update perform on Jan 6, 2022)

JPSS and GOES observation angle features for BRDF (LEO vs. GEO)

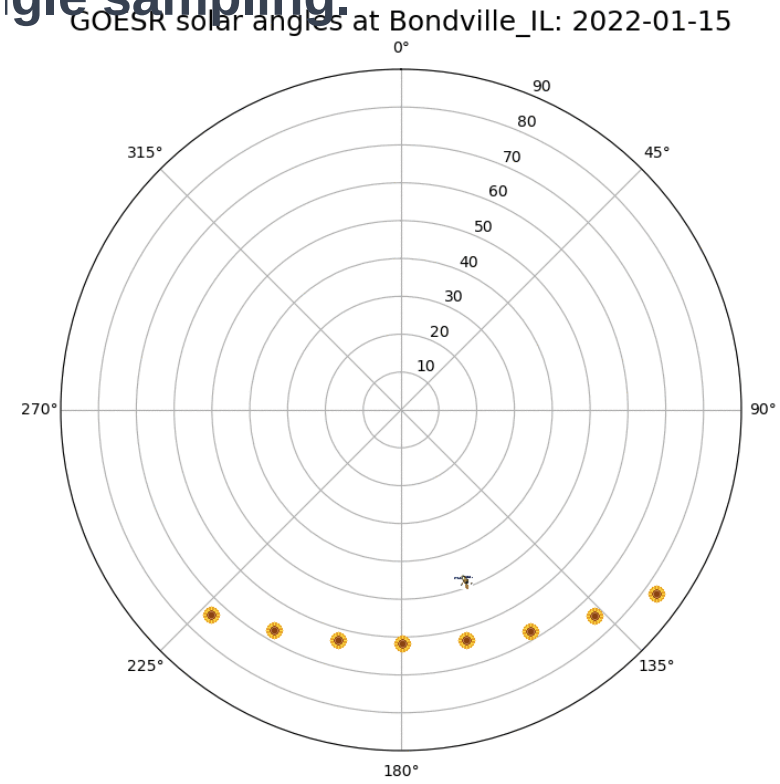
- The VIIRS deployed on Low Earth Orbit (LEO) JPSS satellites, allows VIIRS to capture data and imagery from different viewing angles as it orbits around the Earth. **VZA variation mainly provides multi-angle sampling**.
- The ABI deployed on Geostationary Earth Orbit (GEO) GOESR satellites, has fixed viewing angle but captures SZA's diurnal variati **gle sampling.**



VIIRS's VZA distribution within 16-days' BRDF window in each month



VIIRS SZA distribution within 16-days' BRDF window in each month



ABI's VZA and SZA distribution within one day in each month

Leaf Area Index

June 2023

Accomplishments / Events:

- Prepared and Presented the LAI science code package demo to ASSIST team to show how to run the LAI software.
- Tracking LAI project in JIRA environment and update weekly, work with the ASSIAT team for the code integration.
- Develop the validation tool to perform the LAI evaluation using the in-situ data for the JPSS LAI and other public LAI dataset.
- Improve the current LAI algorithm by using the clustering method to refine the training dataset, tried the Long-short memory deep learning method for LAI time series prediction.
- Summer intern project analysis of long-term vegetation trend (greening or browning) using MODIS LAI as the indicator.

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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2. *Project is within budget, scope and on schedule.*
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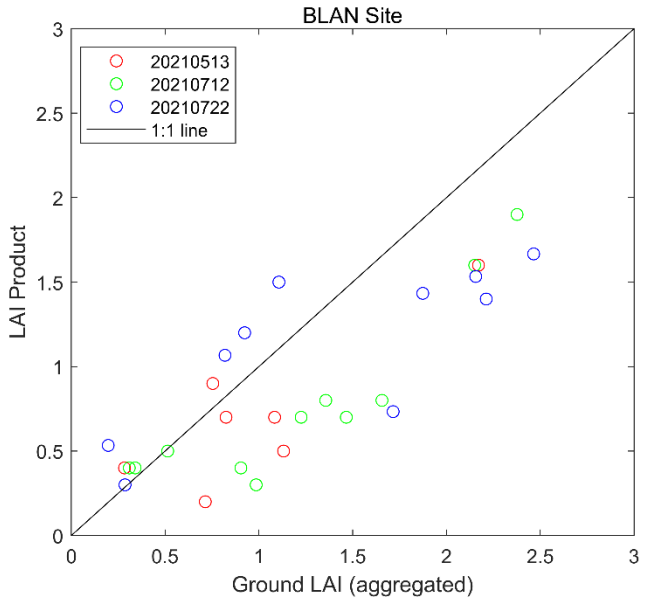
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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		

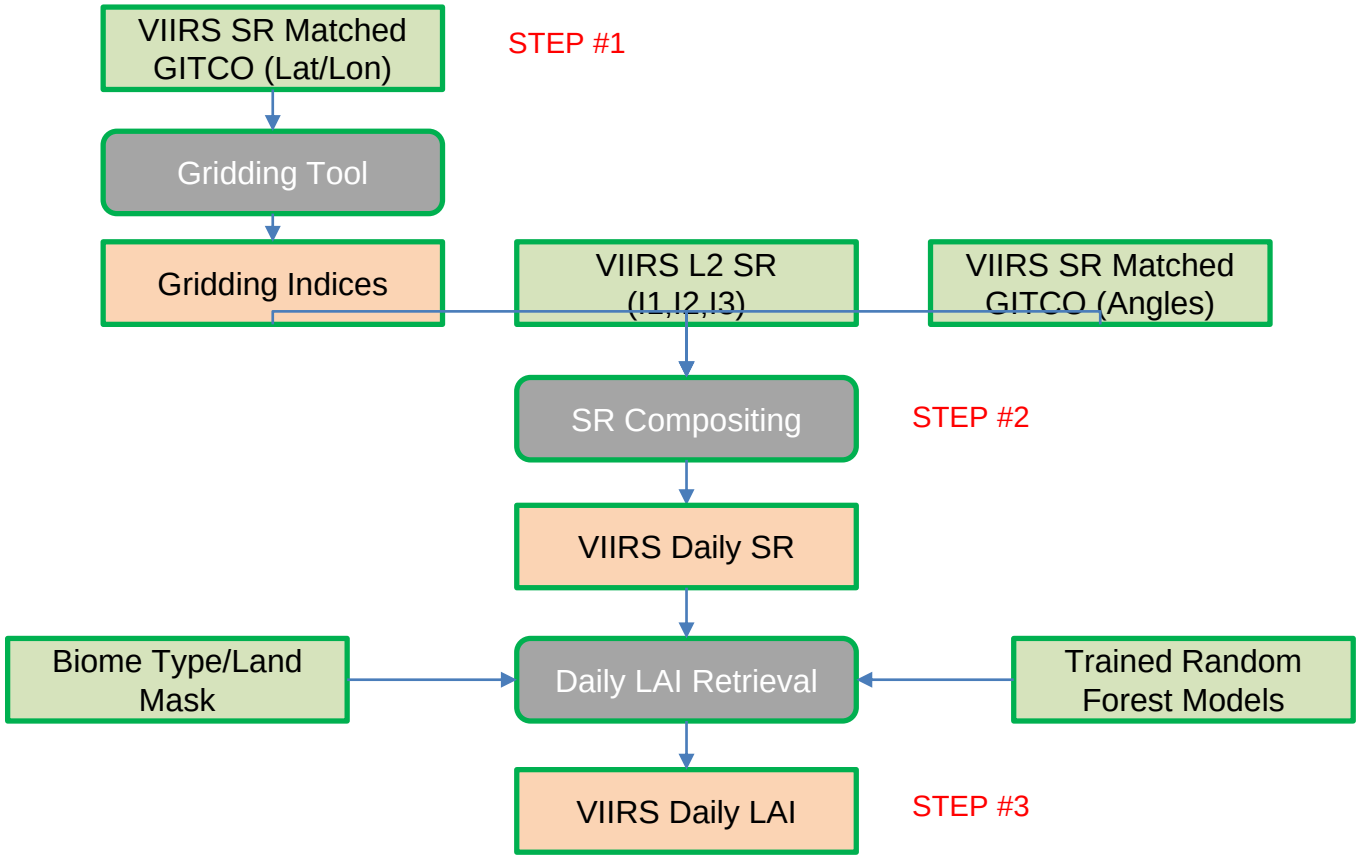
Highlights:



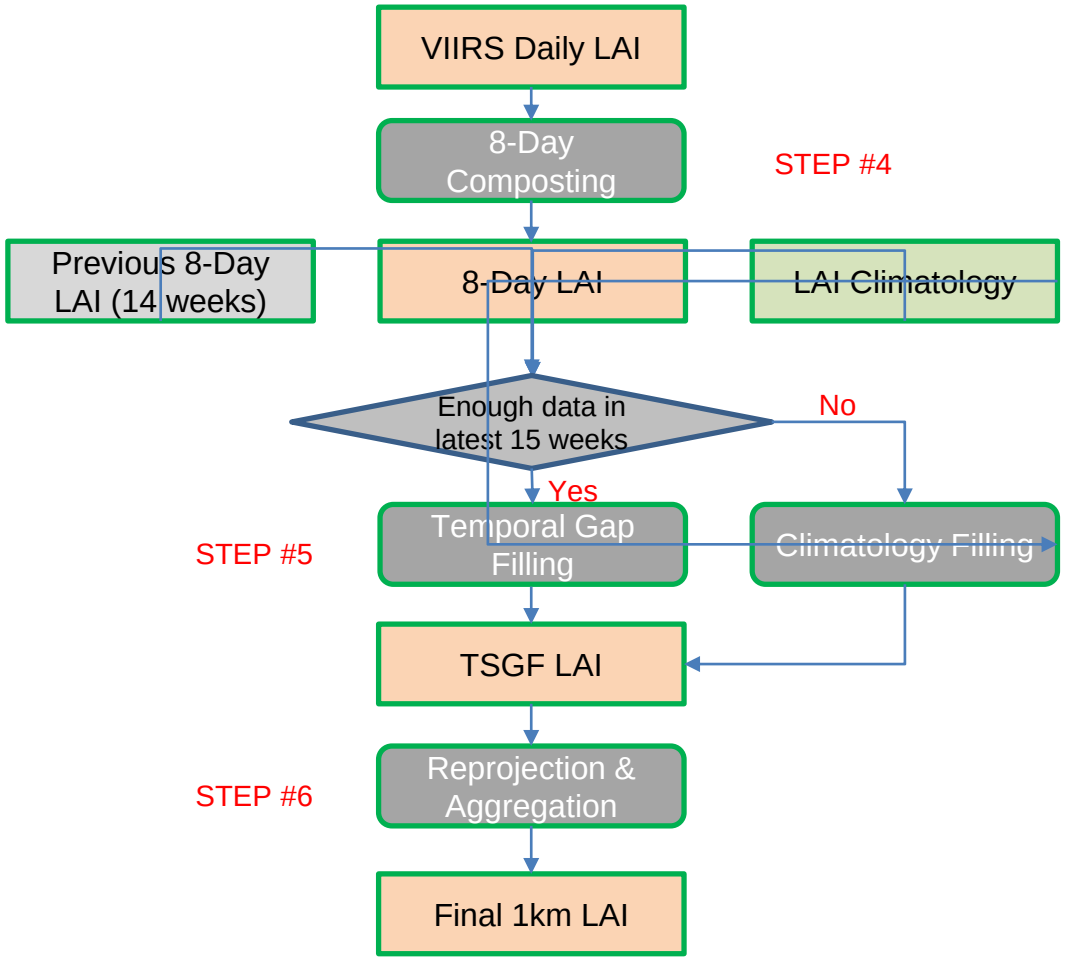
LAI validation using the Copernicus GBOV data. Here take a farm site (BLAN) as example for preliminary LAI validation. The validation results show a good agreement.

LAI Science Code Package Demo

1. LAI Daily Process



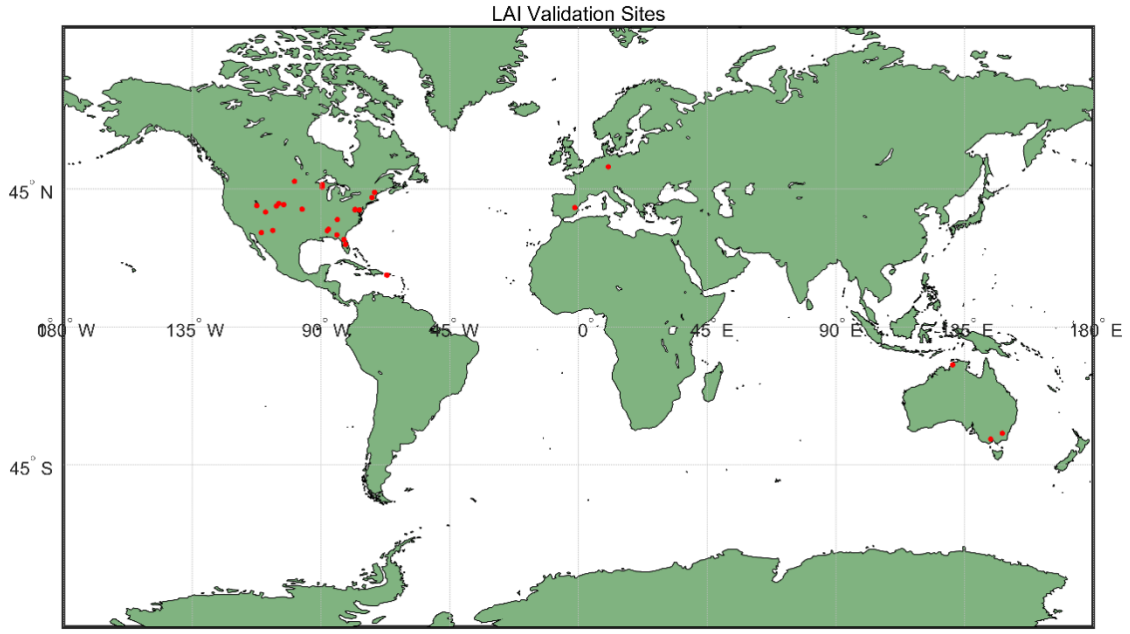
2. LAI 8-Day Process

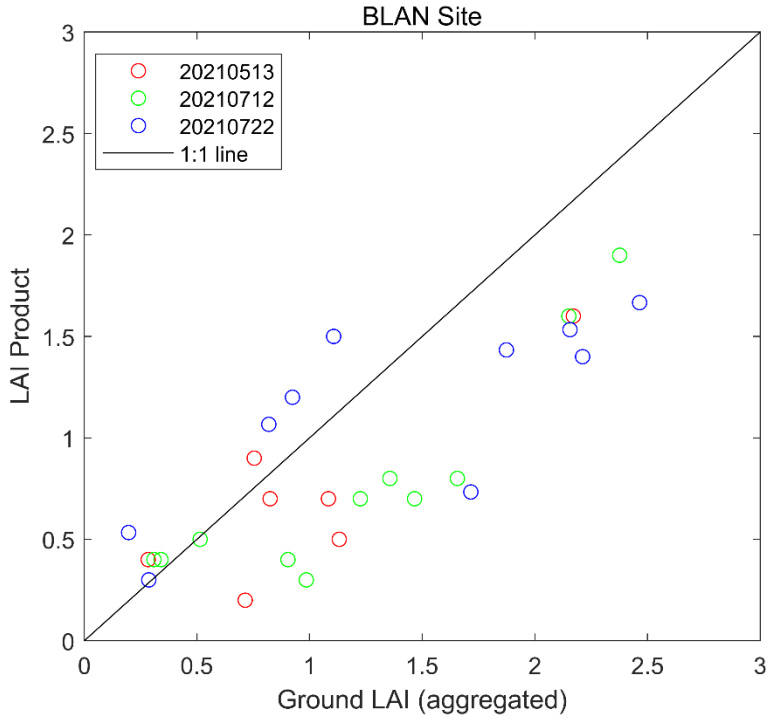


LAI Ground Validation

Ground validation dataset & method:

- Original ground observation is perform at NEON network using the DHP (digital hemispherical photography)
- High resolution satellite data is used as bridge to scale up the ground data to LAI at 20/30 m resolution.
- Aggregation high resolution to same resolution (500m) as the LAI product.
- Use the QC to filtering both ground data and LAI product for the final validation.





- A validation tool is under development
  - Read the original LAI data (value, QF & geo info)
  - Match the LAI data to certain date and location.
  - Aggregate the high resolution LAI into 500m as the product.
  - Perform the validation for VIIRS LAI and other LAI products
- A preliminary LAI validation at BLAN site shows a good agreement between ground adjusted LAI and the product as the scattering plot shows.

LAI Algorithm Improvement

❑ Current Method:

- Single time stamp data: f (SR, VZA, SZA, RAA, Biome) □ LAI
- Near-real time process

❑ Time series prediction:

- Bi-LSTM deep learning method
- A long time series data (at least half of growing season cycle): f (SR(t), VZA(t), SZA(t), RAA(t), Biome(t)) □ LAI(t)
- Time consuming

❑ Data fusion

- Put all the LAI candidates together to regress the growth function.

$$y(t) = \frac{c}{1 + e^{a+bt}} + d$$

Logistic function

$$y(t) = \alpha_1 + \frac{\alpha_2}{e^{(\delta_1(t-\beta_1))}} - \frac{\alpha_3}{\left(1 + e^{(\delta_2(t-\beta_2))}\right)}$$

Double Logistic function

MiRS Products

June 2023

Accomplishments / Events:

- The MiRS science team led the Provisional maturity review for MiRS NOAA-21 retrieval products. The review was successful and MiRS NOAA-21 products were declared to be Provisional maturity status, effective retroactively from May 12, 2023.
- Under funding from the JPSS Proving Ground Risk Reduction (PGRR) Initiative program, the MiRS science team has been reprocessing JPSS mission data with a recent version (v11.8) of MiRS in order to produce an improved and temporally consistent time record of retrieval products. Reprocessing of all planned S-NPP ATMS data for the period 2011-2020 has now been completed. In order to determine the applicability of the reprocessed data set to climate applications, analysis of total precipitable water (TPW) is continuing. The highlight shows the latitudinal dependence of the zonal mean TPW for the period 2012-2020 stratified into DJF, MAM, JJA, and SON time periods. The interannual evolution of TPW associated with seasonal changes in atmospheric circulation is clearly seen. For example, the tropical maximum of mean TPW reaches its maximum northward extent in boreal summer.

Overall Status:

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

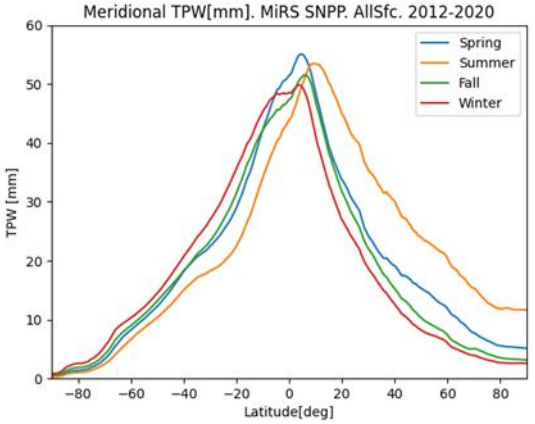
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:



Latitudinal dependence of zonally averaged MiRS reprocessed SNPP ATMS TPW for the period 2012-2020. The four curves correspond to N. Hemisphere Spring (March, April, May), Summer (June, July, August), Fall (September, October, November), and Winter (December, January, February).

Land Surface Temperature

June 2023

Accomplishments / Events:

- Communicated with NDE regarding JPSS-2 LST data generation. Both L2 and L3 NOAA-21 VIIRS LST are now available.
- Locally achieved all NOAA-21 LST related dataset including L2 LST, L3 LST and emissivity data.
- Performed verification of L2 LST (slide 2) and L3 LST (slide 3), as well as emissivity data(slide 4-5)
- Conducted the inter-comparison between L3 NOAA-20 and NOAA-21. (slide 6-7). Investigated the deviation in LST between the two sensors. (slide 8)
- Explored the Ameriflux radiation network and conducted LST validation. (slide 9)
- Continue to work on testing the random forest based LST retrieval model with new features and evaluated its performance.

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	Aug-23		Postponed. Data is not available yet.
All weather LST update	May-23	May-23		Project priories update
FY24 Program Management Review	Jun-23	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			

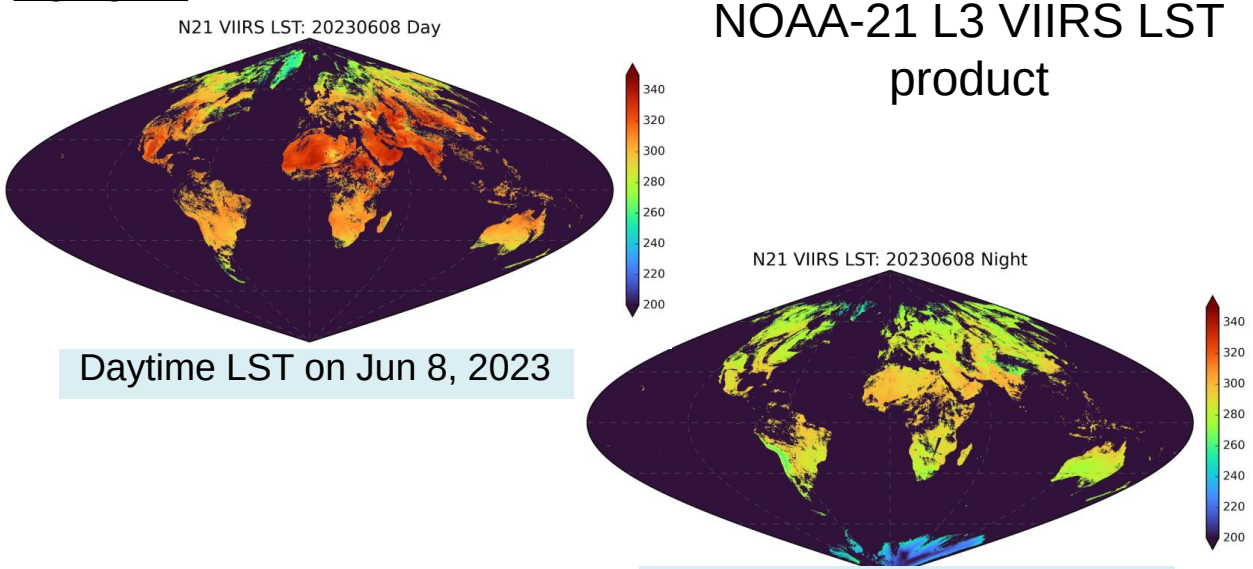
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Highlights:

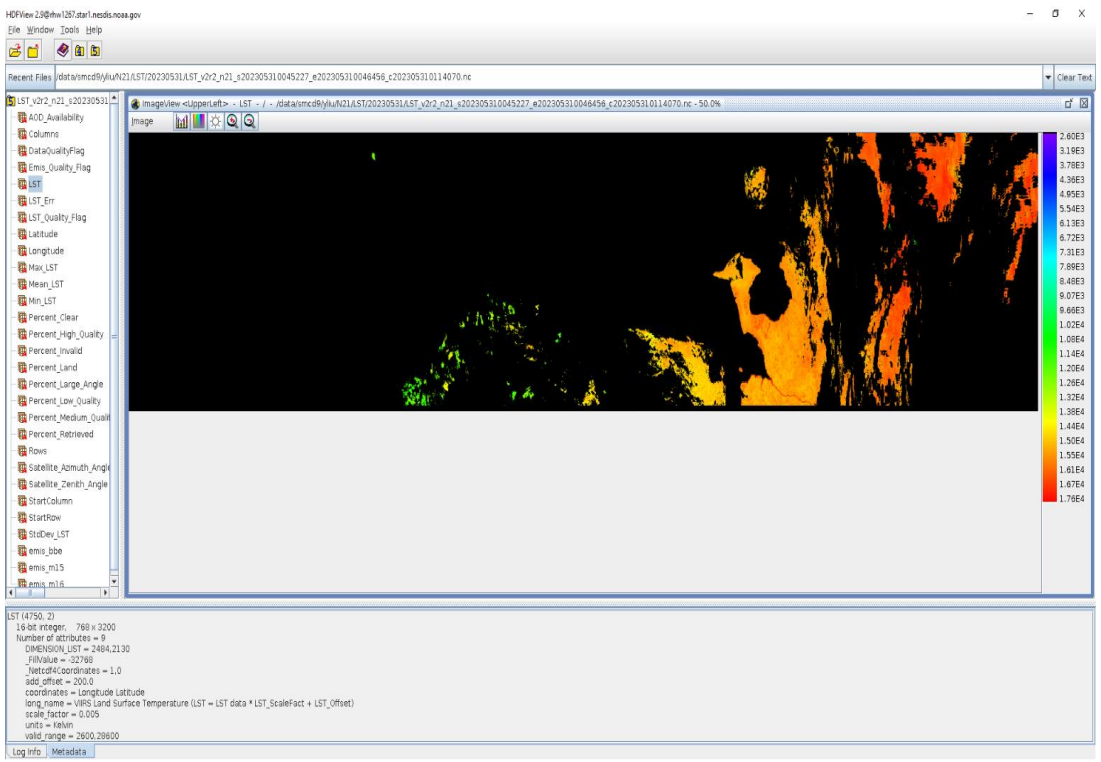
NOAA-21 L3 VIIRS LST product



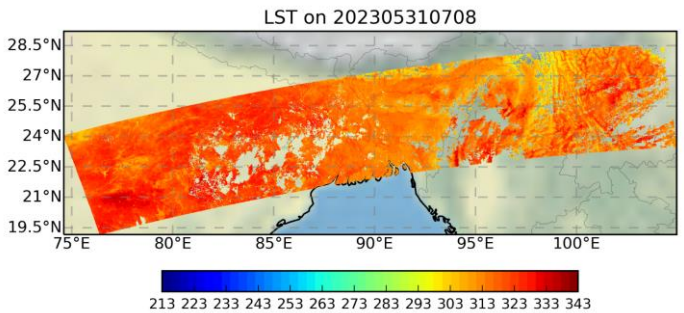
Daytime LST on Jun 8, 2023

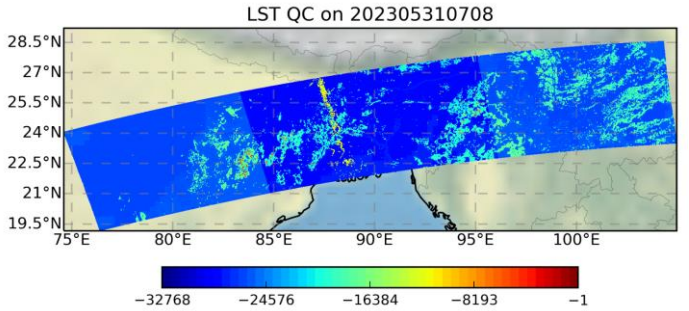
Nighttime LST on Jun 8, 2023

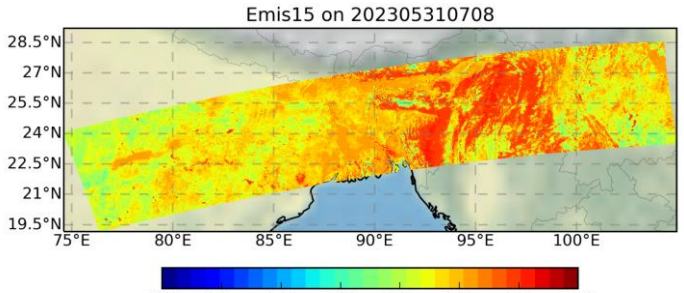
J-2 L2 LST data Verification

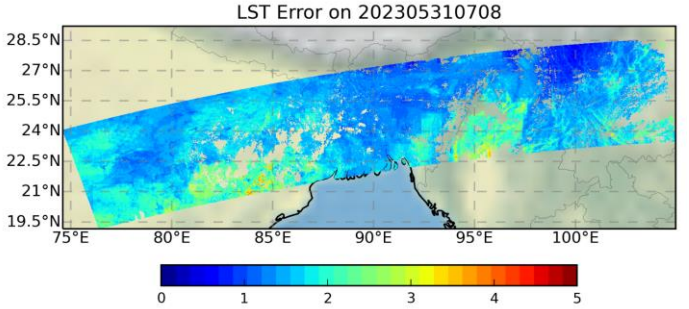


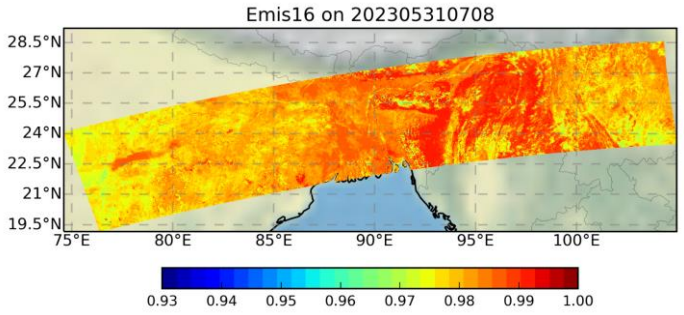
- NOAA-21 LST product is in v2r2 version with the latest update.
- The output layers are complete with the correct data attributes set
- Global metadata shows some updates
- The data layer distribution looks reasonable

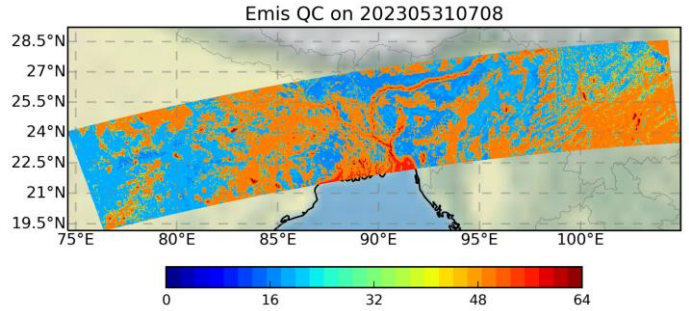






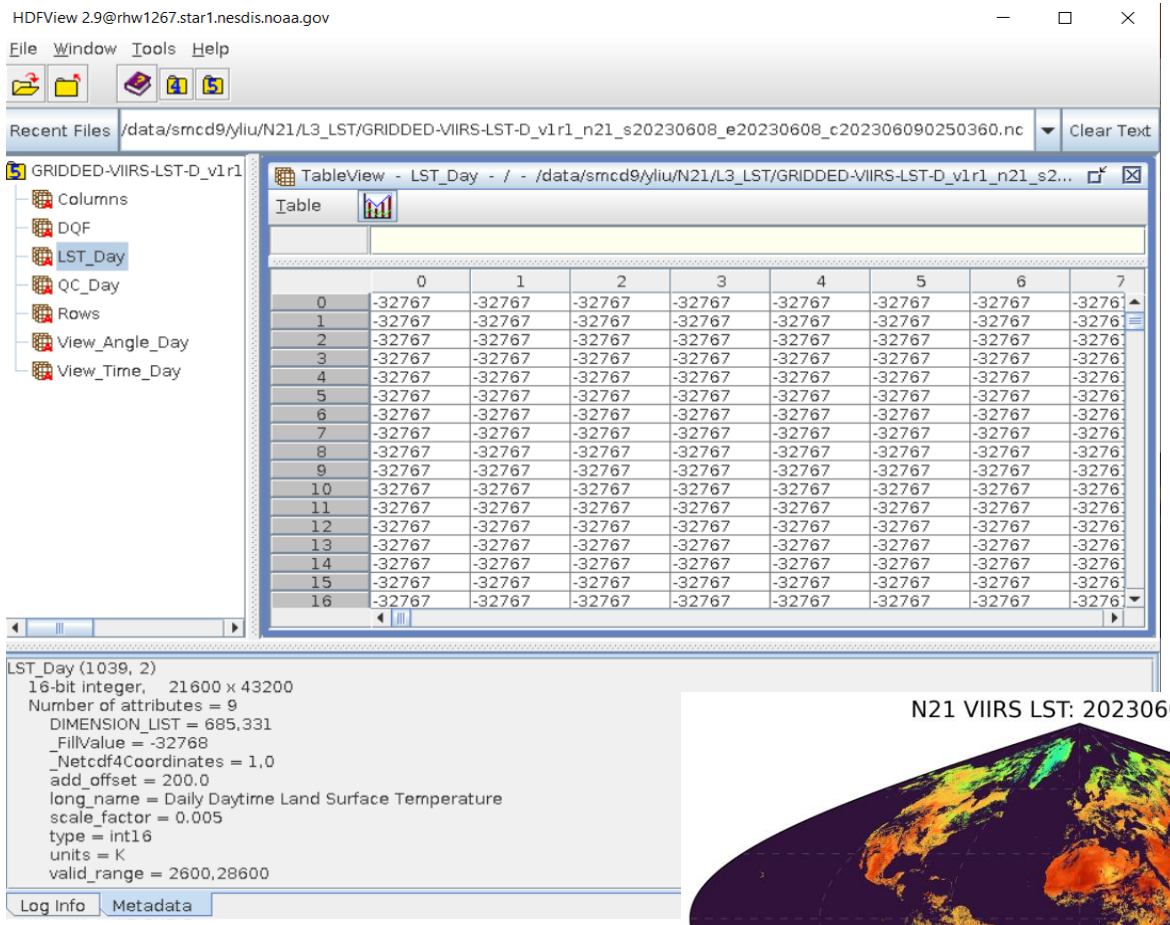




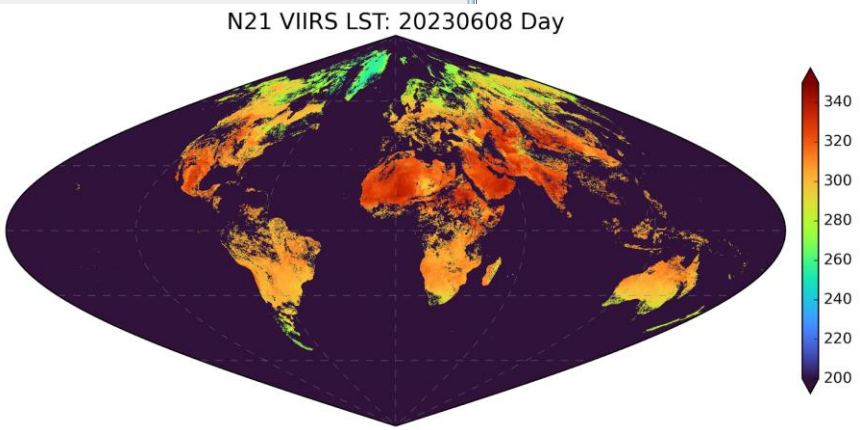


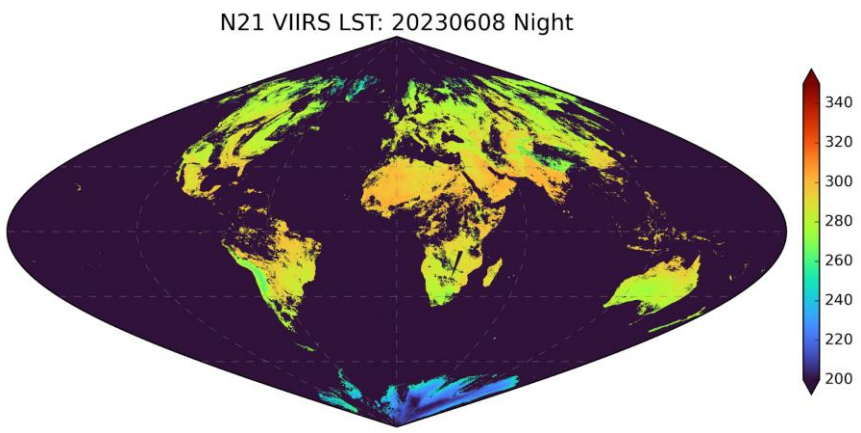
Figures: NOAA-21 LST data opened in the hdfview (top left); granule data set maps on the right including LST, LST quality flag, LST error, Emissivity for band 15, 16 and emissivity quality flag

L3 LST data verification

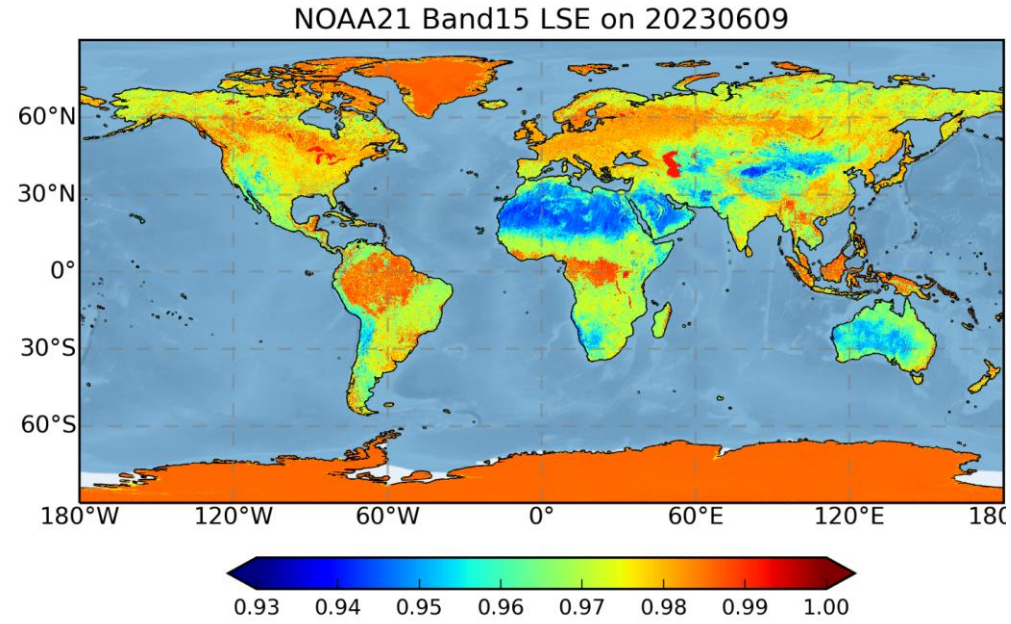


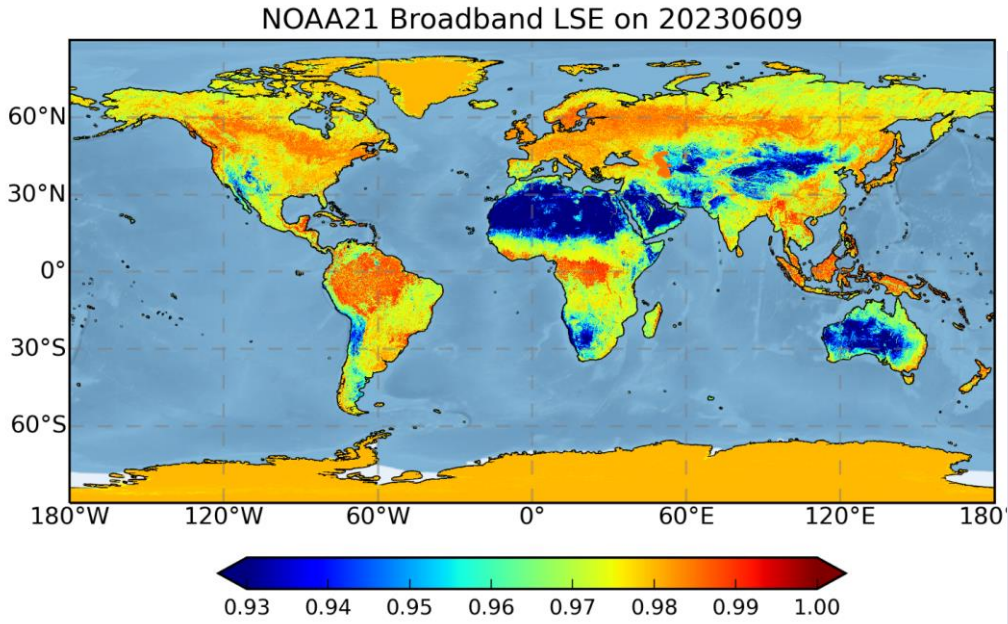
- The data stream begins on June 8th, 2023.
- The L3 N21 LST version is v1r1 while the current operational SNPP and NOAA20 LST are in v1r0 version.
- The data layers include LST, QC, View time, DQF, and View Angle, all with correct data attributes and valid ranges.
- The LST distribution pattern looks reasonable for both daytime LST and nighttime LST as shown in the bottom images.

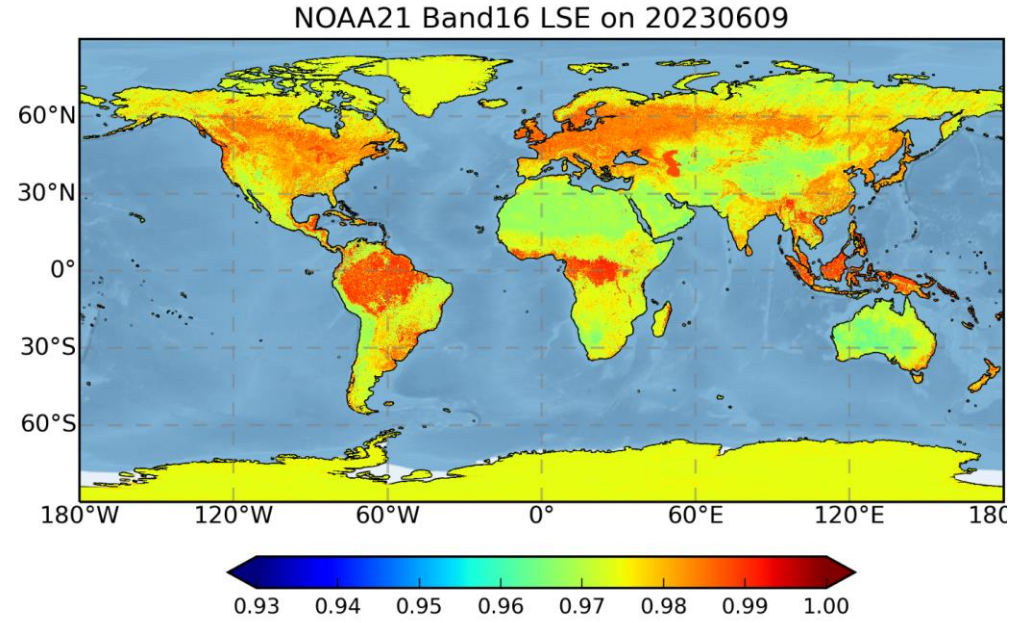


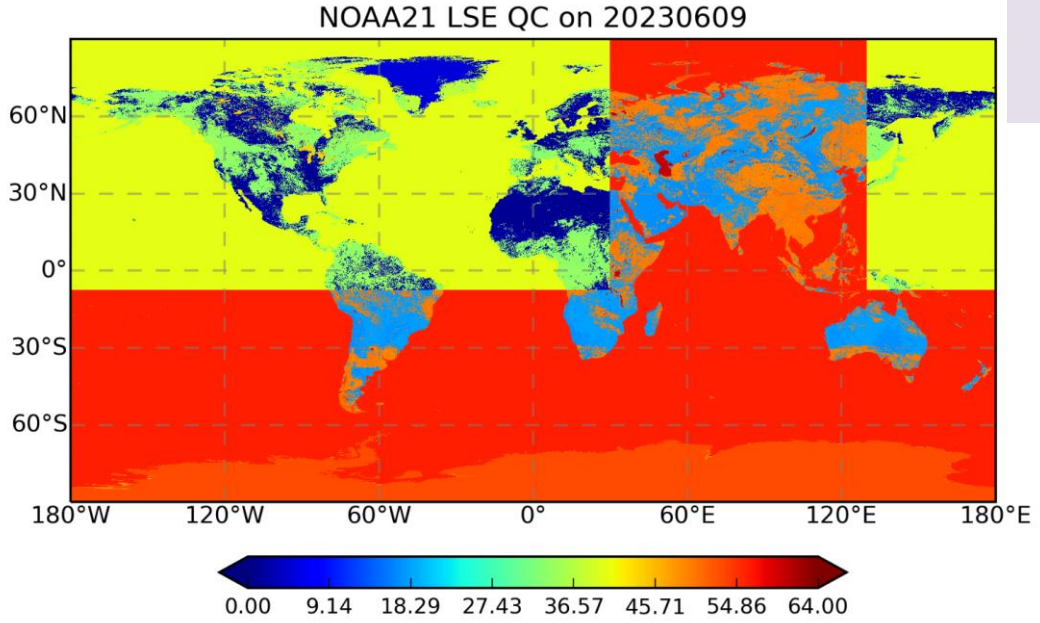


N21 Emissivity Data Verification



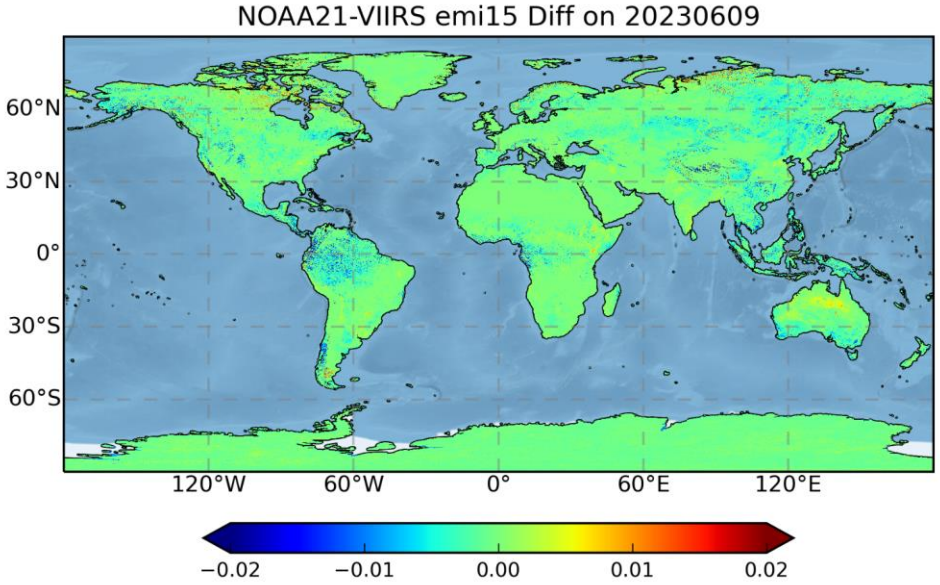


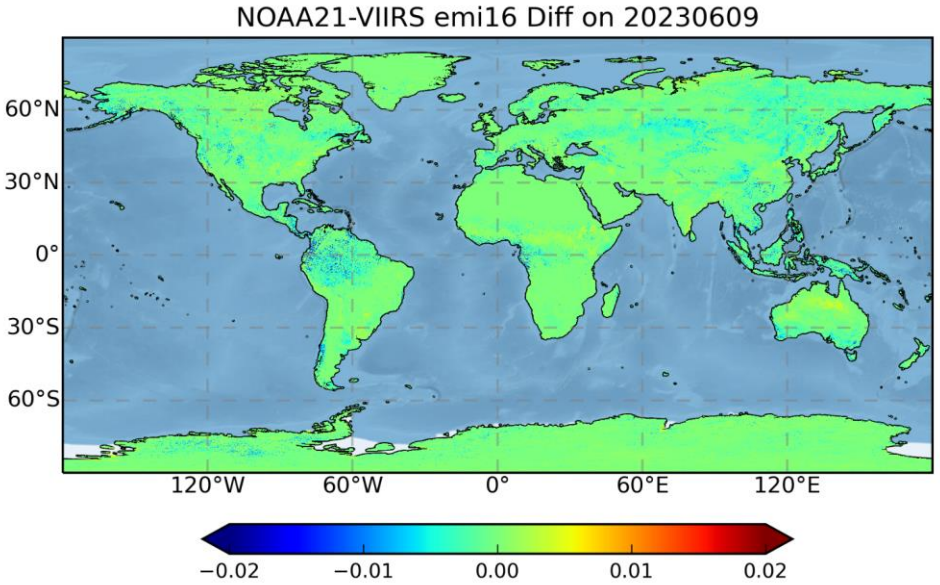


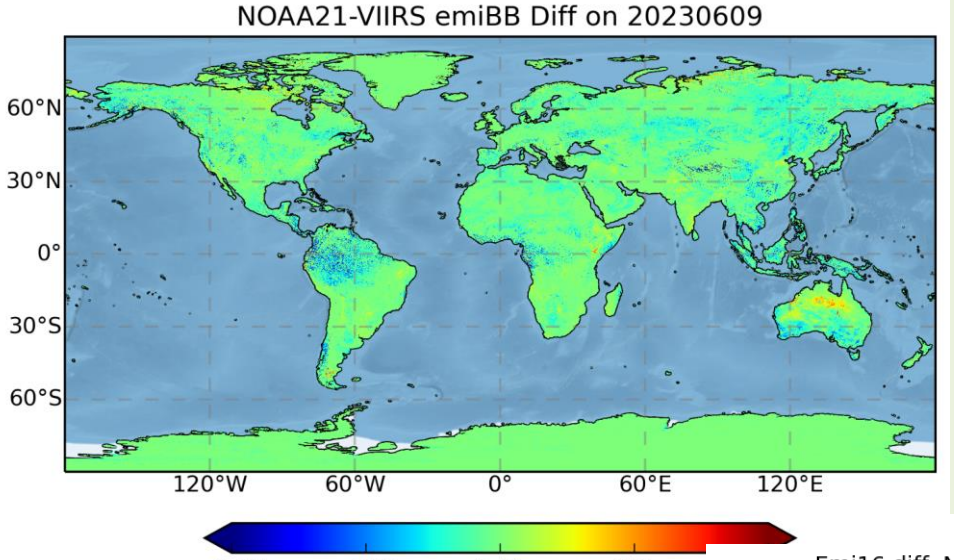


- The NOAA21 LSE data set is checked.
- M15, M16 and broadband LSE data value and its global distribution looks reasonable.
- The quality flag pattern also looks reasonable.

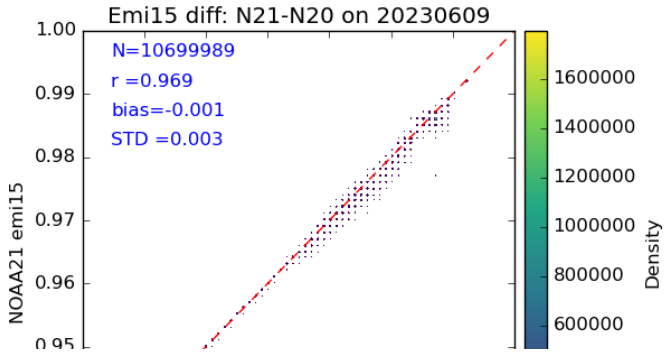
N21 Emissivity Data comparison with SNPP Emissivity

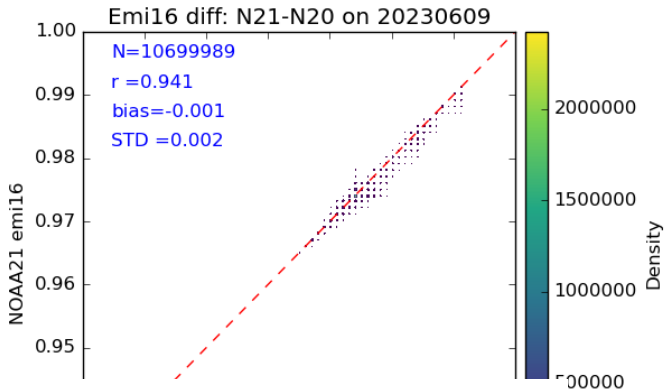


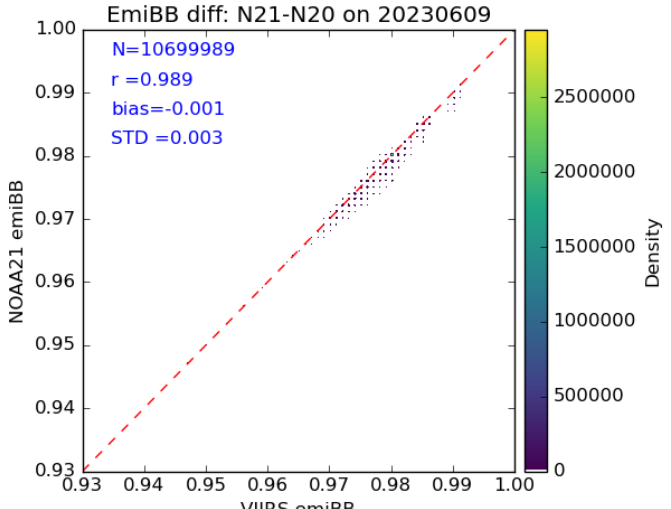


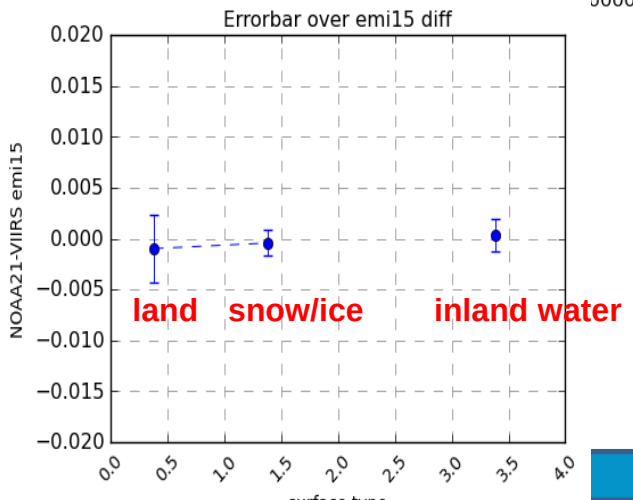


- NOAA21 LSE is compared with the emissivity for SNPP VIIRS
- N21 LSE is statistically lower than SNPP VIIRS LSE for both spectral bands and broadband with a bias of -0.001 and STD of 0.003 for emi15 and BBE and 0.0002 for emi16.
- The statistical difference is smaller for snow/ice and inland water surface. The main difference appears over vegetated areas.

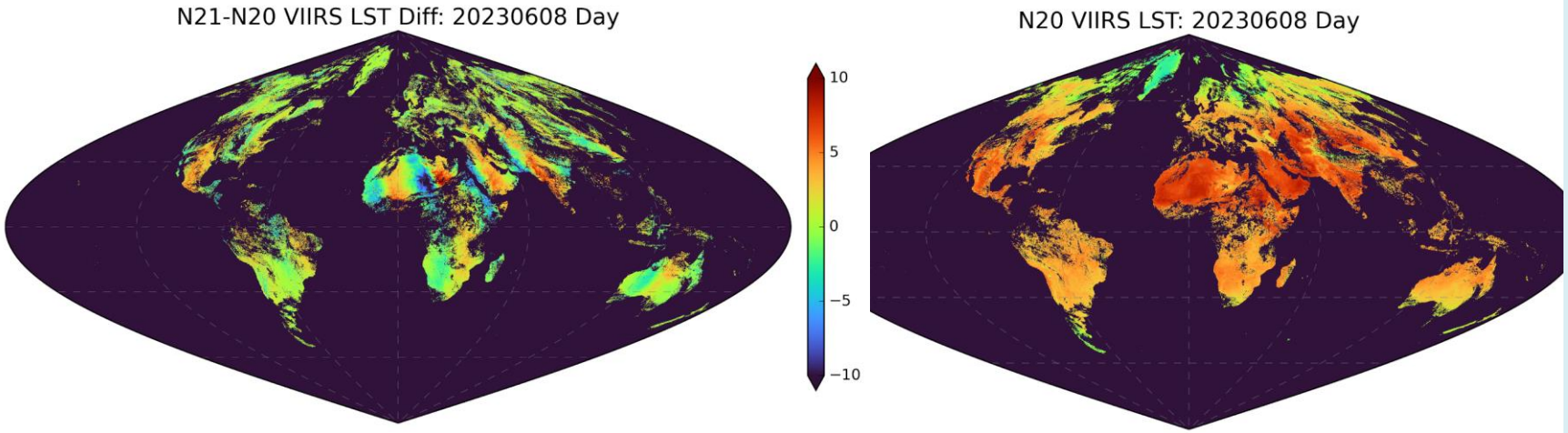




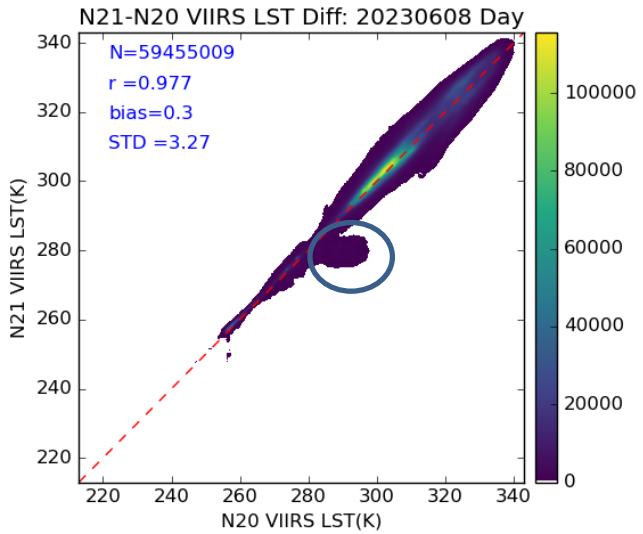


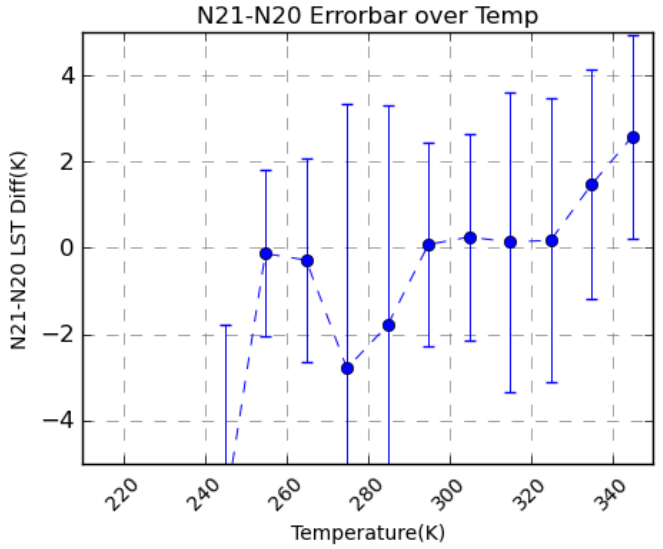


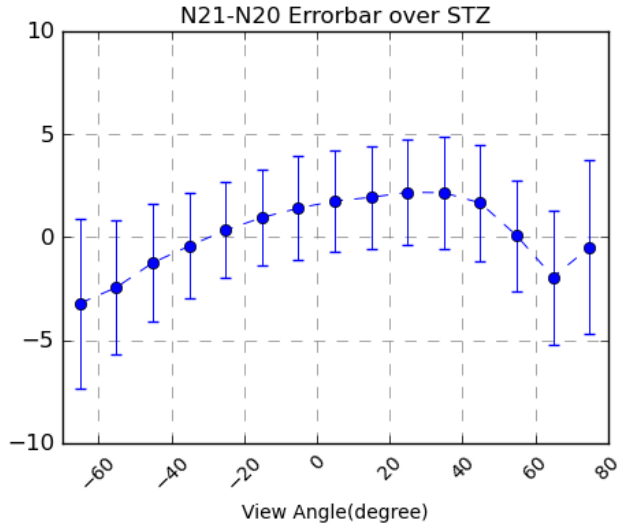
L3 N21 vs N20 LST Comparison Daytime

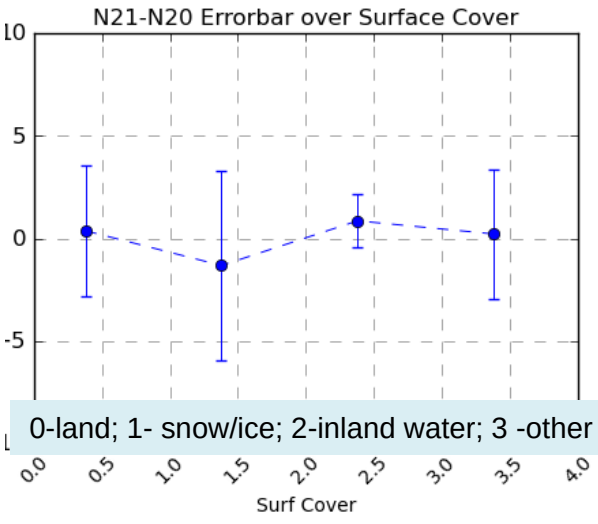


- The L3 N-21 LST and N-20 LST were compared for the day of June 8, 2023. The top left plot shows the difference between NOAA-21 and NOAA-20 LST while the top right plot is NOAA-20 LST.
- The bottom left plot displays a scatter plot of the two LSTs, and the LST difference is analyzed based on view angle and surface type cover.
- The comparison results indicate that the difference is relatively large at extreme temperature ends i.e. very low temperature and very high temperature. Furthermore, the difference gradually changes from negative to positive as the view angle ranges from -60 to 40 degree and then it becomes negative beyond 60 degrees.
- A significant deviation is observed within the circled area, highlighting a substantial difference between N21 LST and N20 LST.



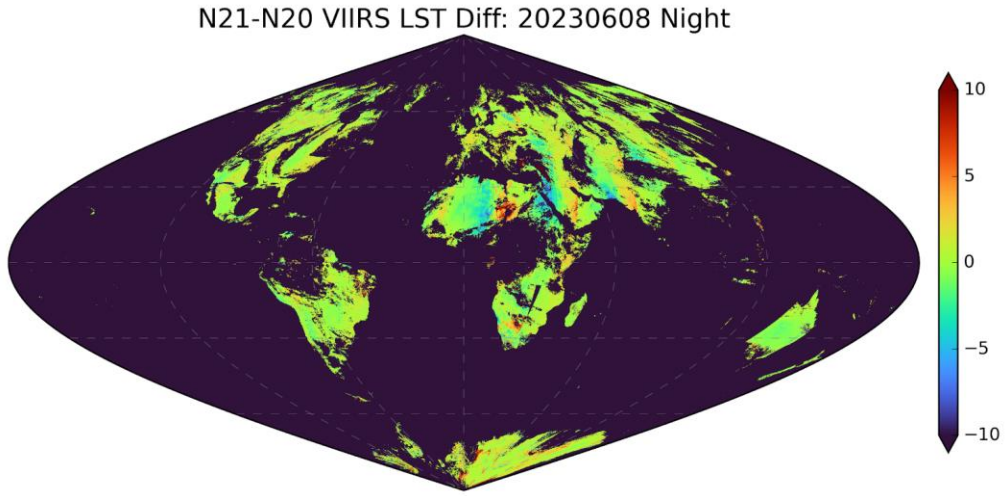




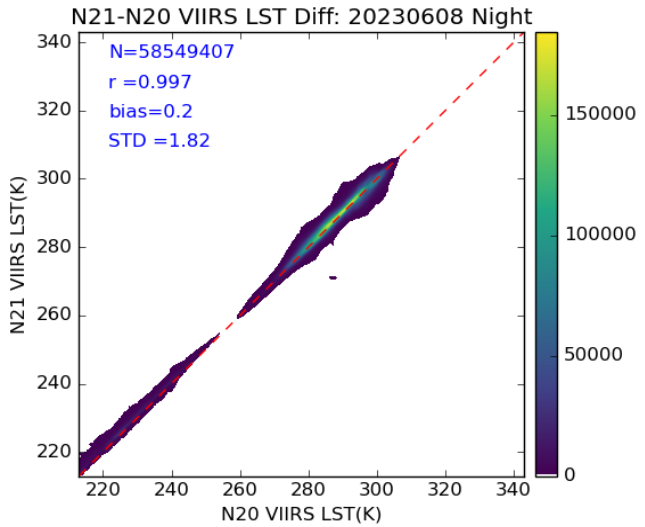


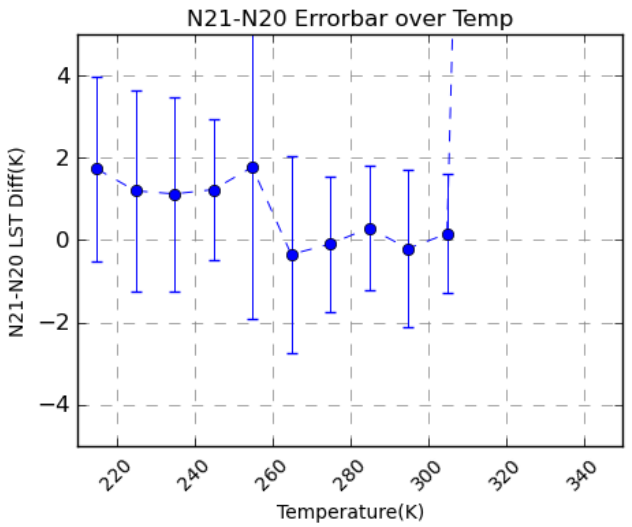
0-land; 1- snow/ice; 2-inland water; 3 -other

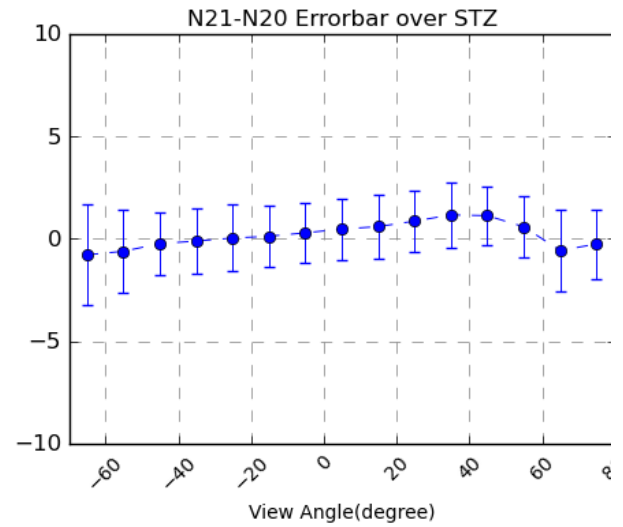
L3 N21 vs N20 LST Comparison Nighttime

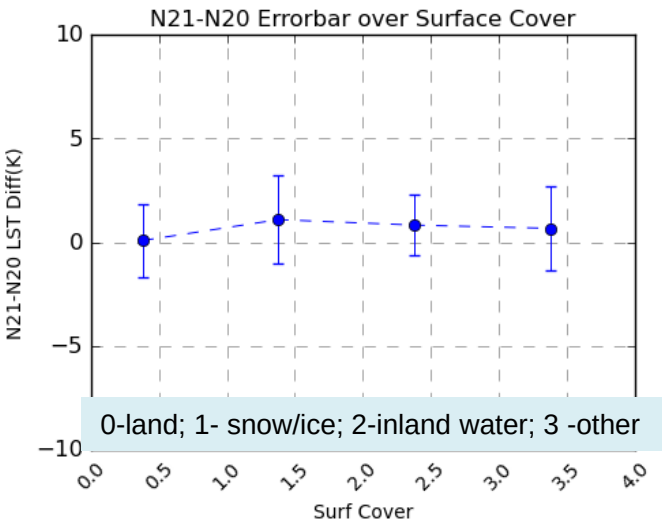


- The comparison between L3 N-21 LST and N-20 LST was conducted for nighttime on June 8, 2023. Top left plot shows the difference between N-21 LST and N-20 LST.
- Bottom left plot displays a scatter plot of the two LST values, with further analysis conducted based on temperature, view angle, and surface type cover.
- The comparison results indicate that there is a relatively significant difference over lower temperature values specifically those below 260 K. The difference generally increases gradually as the view angle range from -60 to 50 degree and then decreases until reaching 60 degrees.
- Another deviation is observed within the circled area, highlighting a substantial difference between N21 LST and N20 LST



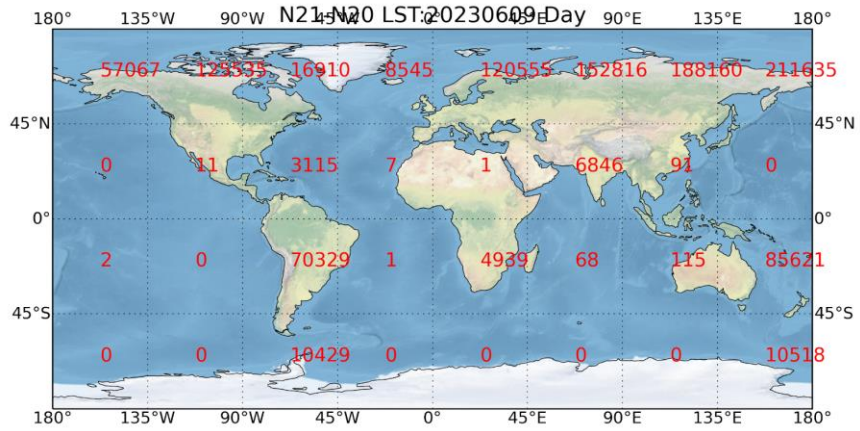


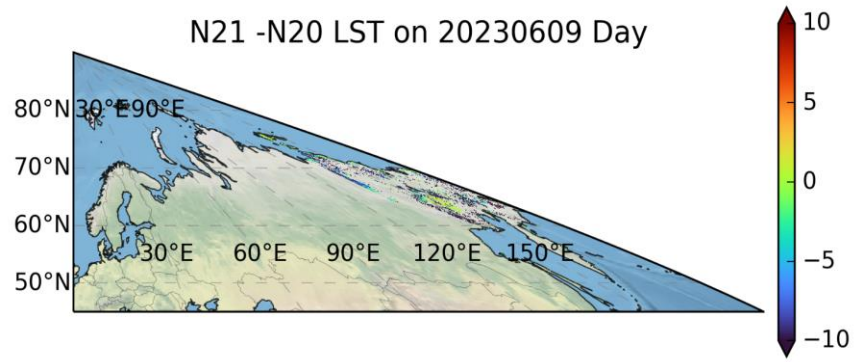


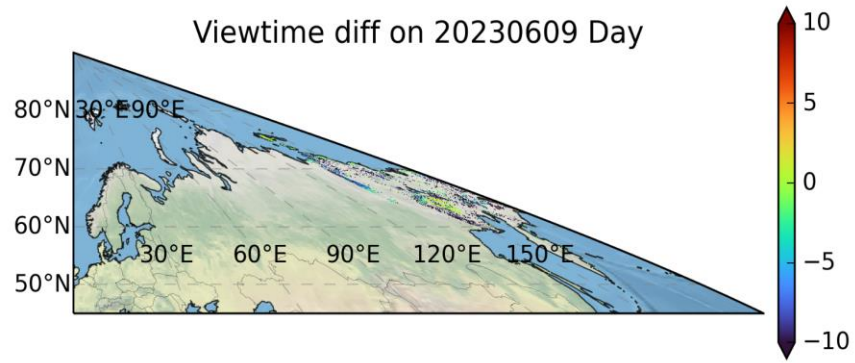


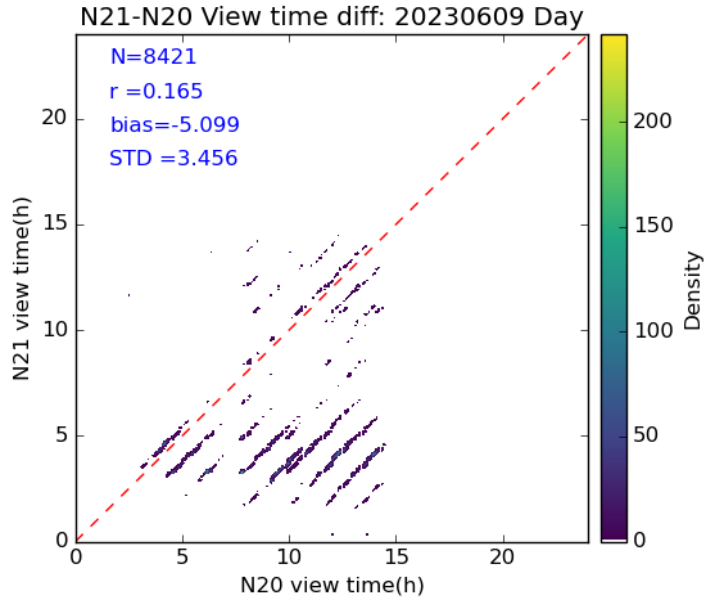
0-land; 1- snow/ice; 2-inland water; 3 -other

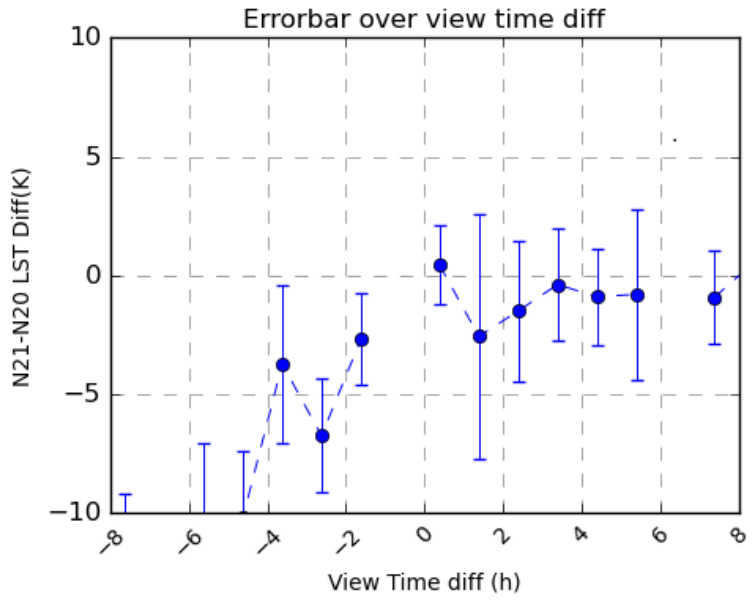
LST Deviation Investigation





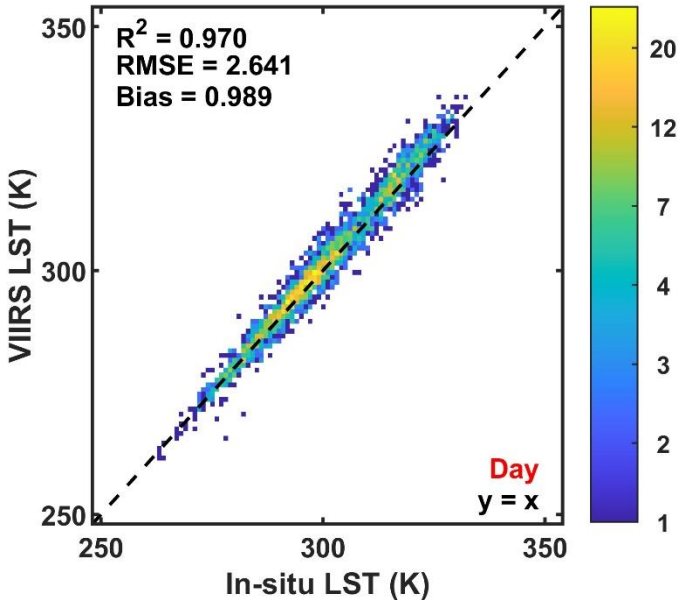


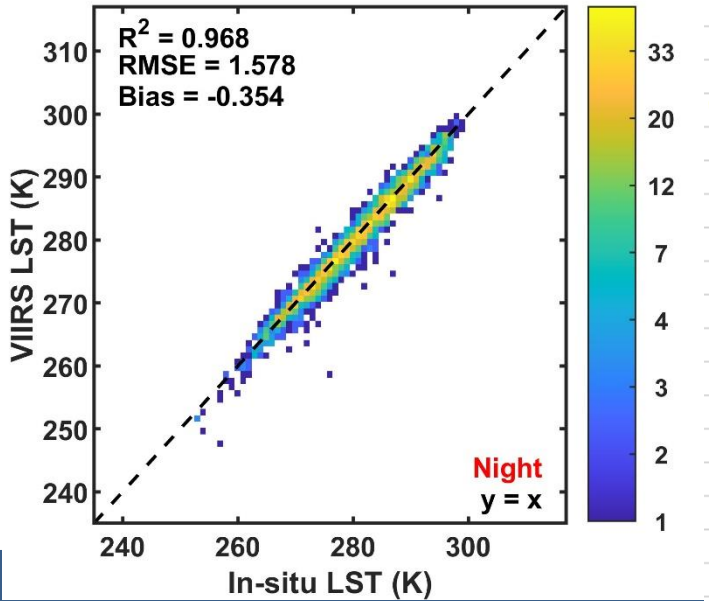




- The statistics of LST difference were analyzed for a specific subarea under the following conditions: both LST values are not filled, both are under cloud clear conditions, N20 LST is within the range of 280 to 298, and N21 LST is within the range of 275 to 285. The numbers in red indicate the total number of pixels that meet these conditions.
- It is observed that a higher number of pixels were found in the higher latitude area, particularly in the eastern hemisphere. Related factors such as view time difference and sensor view angle were examined. On average, there was a 5 hour difference in view time with N20 mostly having a earlier view time than N21.
- The LST difference differs significantly between preceding and subsequent time periods. As the negative time difference increased, the LST difference became more pronounced. However for positive time difference, the LST difference is not as distinct. This difference can be attributed to the updated composition method in version v1r1, where the view angle was considered in the criteria.

L3 VIIRS LST validation – AmeriFlux network





- AmeriFlux ground measurements were used to validate the L3 VIIRS LST. One year of data in 2020 was utilized in this study.
- A heterogeneity check was conducted and a total of 18 stations were selected in the validation process.
- The two left plots depict the validation results for daytime and nighttime, respectively. The daytime validation shows a bias of 0.99 K and RMSE of 2.6 K while the nighttime validation exhibits a bias of -0.35 K and a RMSE of 1.58 K for nighttime. The bottom right table provides sitewide statistical validation results, including information on vegetation coverage and elevation.

	Day	Night	Vegetation (IGBP)	Lon	Lat	Elevation (m)
'US-ARM'	3.66	1.36	Croplands	-97.49	36.61	314.00
'US-Ne1'	2.72	2.22	Croplands	-96.48	41.17	361.00
'CA-Cbo'	3.60	1.24	Deciduous Broadleaf Forests	-79.93	44.32	120.00
'US-MMS'	1.66	1.83	Deciduous Broadleaf Forests	-86.41	39.32	275.00
'US-UMB'	1.56	1.37	Deciduous Broadleaf Forests	-84.71	45.56	234.00
'US-UMd'	1.59	1.73	Deciduous Broadleaf Forests	-84.70	45.56	239.00
'US-WCr'	1.94	1.35	Deciduous Broadleaf Forests	-90.08	45.81	520.00
'CA-Ca3'	1.73	2.18	Evergreen Needleleaf Forests	-124.90	49.53	null
'US-Me2'	2.57	1.13	Evergreen Needleleaf Forests	-121.56	44.45	1253.00
'US-Me6'	2.86	2.01	Evergreen Needleleaf Forests	-121.61	44.32	998.00
'US-NC2'	2.55	1.67	Evergreen Needleleaf Forests	-76.67	35.80	5.00
'US-NR1'	2.79	1.59	Evergreen Needleleaf Forests	-105.55	40.03	3050.00
'US-KM4'	2.44	2.26	Grasslands	-85.33	42.44	246.30
'US-Seg'	2.12	0.97	Grasslands	-106.70	34.36	1596.00
'US-SRG'	2.82	1.75	Grasslands	-110.83	31.79	1291.00
'US-Wkg'	3.00	1.99	Grasslands	-109.94	31.74	1531.00
'US-Ses'	2.38	0.92	Open Shrublands	-106.74	34.33	1604.00
'US-Whs'	2.80	0.96	Open Shrublands	-110.05	31.74	1370.00

Vegetation Index and Green Vegetation Fraction

June 2023

Accomplishments / Events:

- Monitored and evaluated NOAA-21 VI and GVF data production. Found that VI are being produced normally. NOAA-21 GVF has same issue as operational SNPP and NOAA-20 GVF, which we expect to be resolved.
- Investigated the difference between operational GVF and the local run GVF and found that there was an error in the operational GVF.
- Evaluated the I&T GVF testing data after NDE fixed the problem and verified that NDE fixed the error in the I&T environment.
- Compared Copernicus fractional vegetation cover (FCOVER) data set to VIIRS GVF. Found significant differences, which are likely attributable to differences in algorithms.
- FY24 Program Management Review complete.

Overall Status:

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

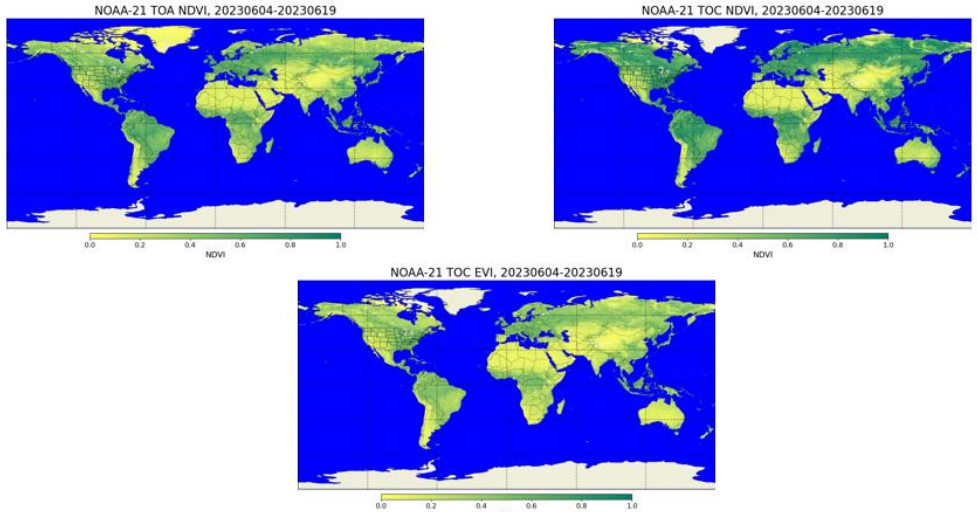
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
1km global VIIRS VI 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	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		

Highlights:



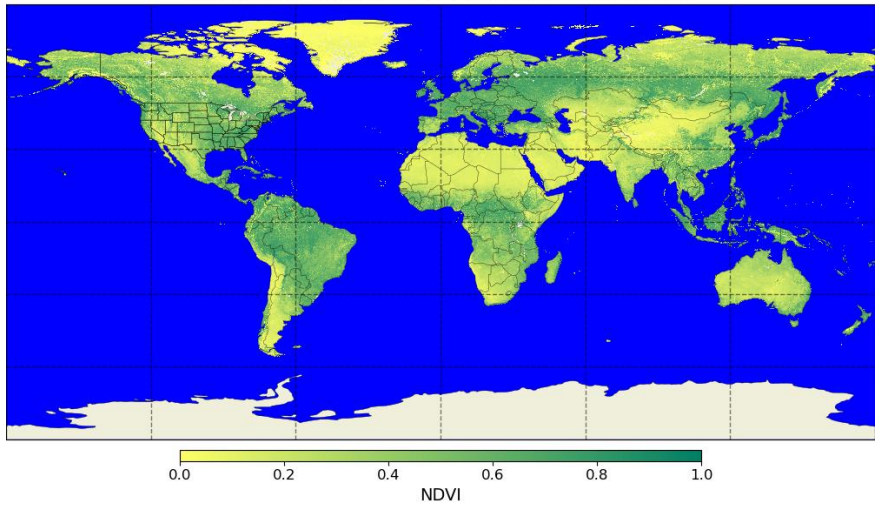
- NOAA-21 weekly and biweekly VI data now look like all necessary input data are being ingested.
- Daily, weekly, and biweekly, global and regional VI data now look reasonable for all VIs

Evaluation of NOAA-21 20230619 VI

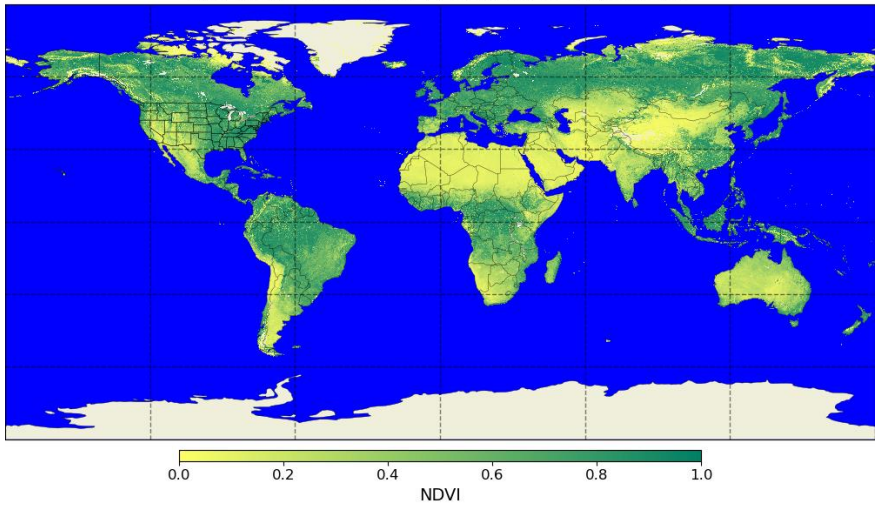
- Daily data from 20230619, weekly data from 20230612-20230619, and biweekly data from 20230604-20230619 were evaluated.
- Global and regional VI and quality flag images were made.
- Daily data look reasonable, as before.
- Weekly and biweekly data now look like full data period was used as input.
- Note: NOAA-21 VI and GVF production appears to have missed 20230623.

Example of NOAA-21 biweekly VI data

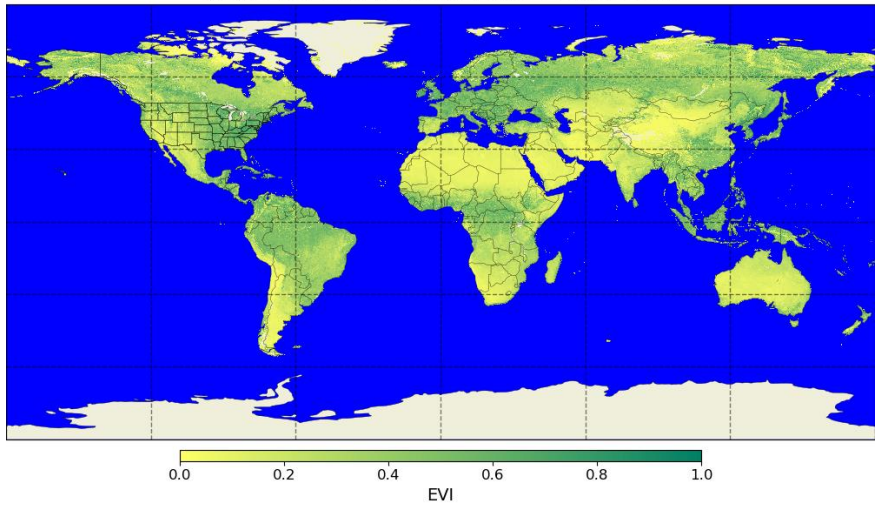
NOAA-21 TOA NDVI, 20230604-20230619



NOAA-21 TOC NDVI, 20230604-20230619

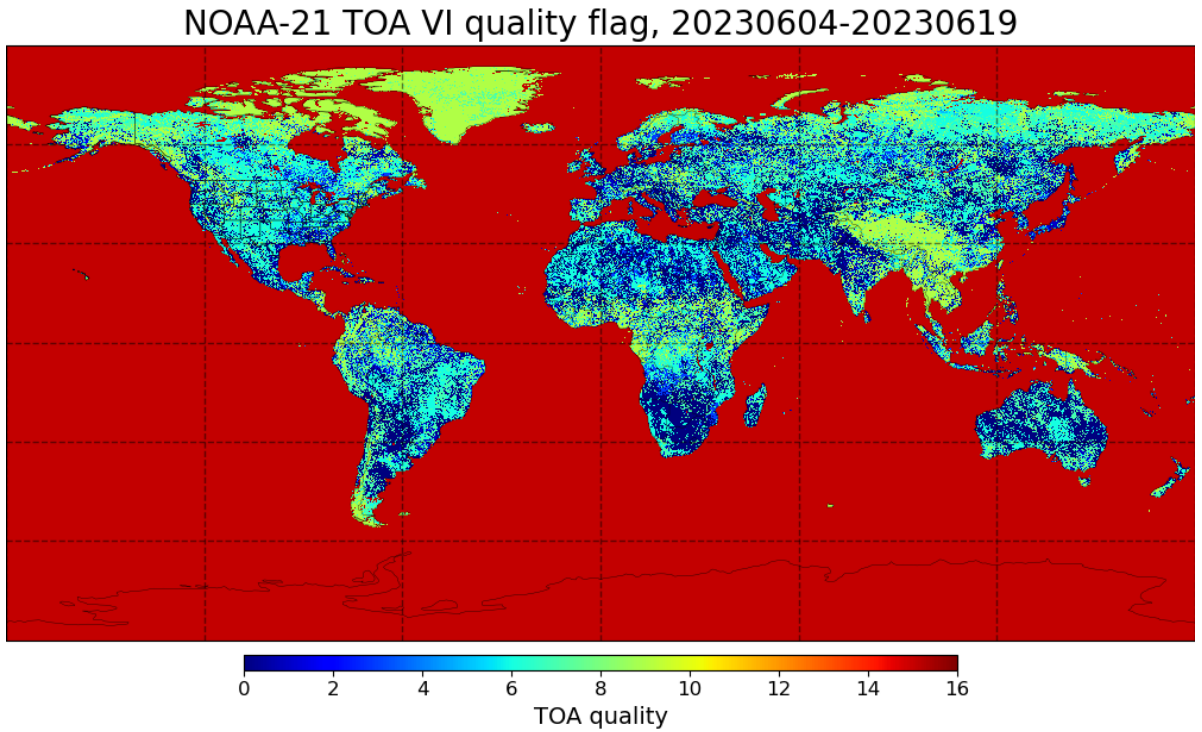


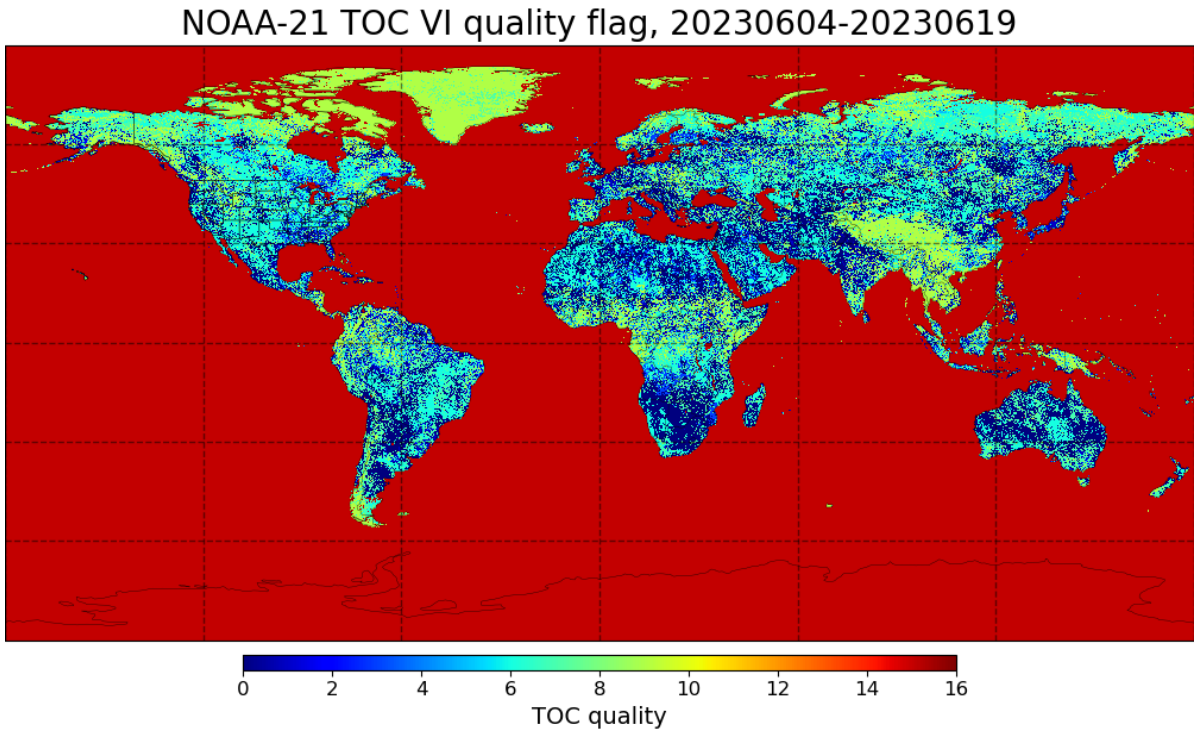
NOAA-21 TOC EVI, 20230604-20230619



- NOAA-21 weekly and biweekly VI data now look like all necessary input data are being ingested.
- Daily, weekly, and biweekly, global and regional VI data now look reasonable for all VIs

NOAA-21 biweekly TOA and TOC VI quality flags



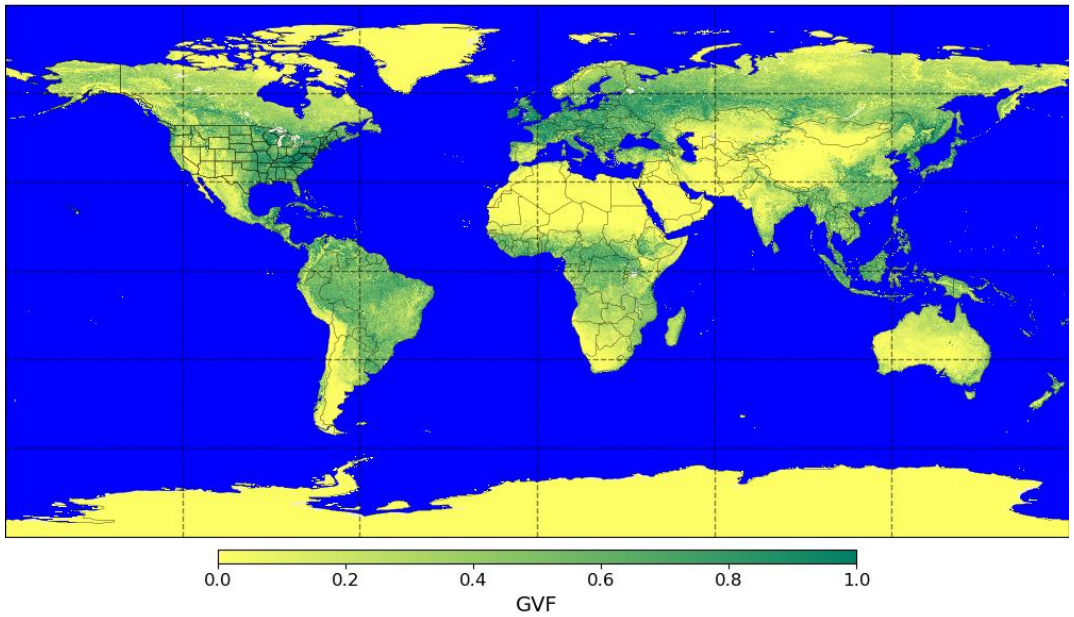


- Lower numerical values indicate higher quality
- Performance is similar to that of SNPP and NOAA-20

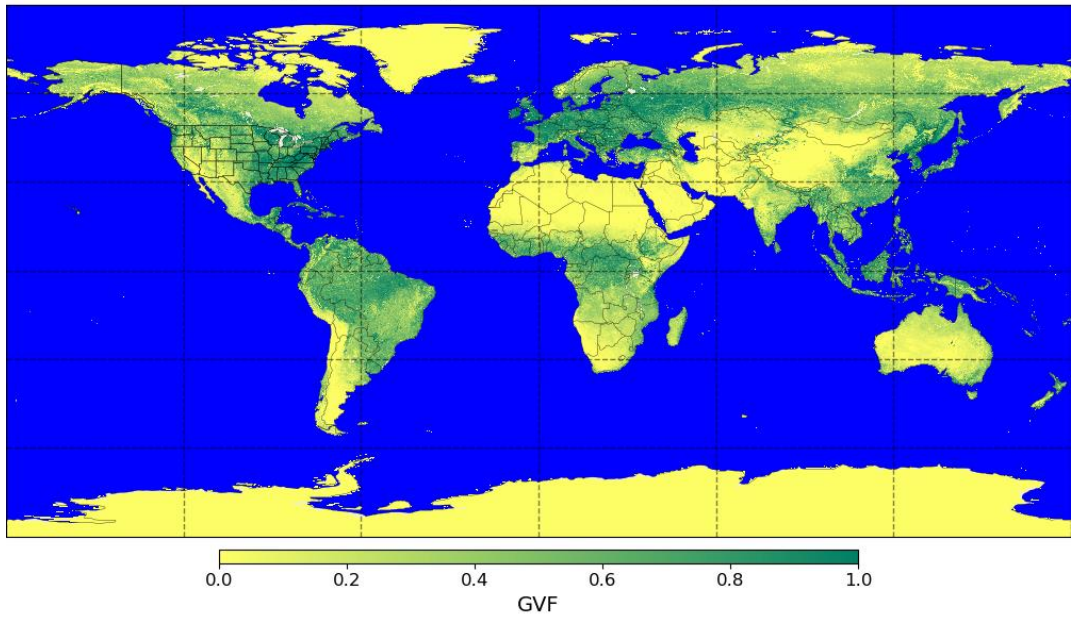
NOAA-21 GVF evaluation for 20230612-20230618

- NOAA-21 GVF from 20230612-20230618 were compared to local run GVF from the same time period
- No obvious issues just from looking at NOAA-21 GVF.
- NOAA-21 GVF values were consistently lower than local run NOAA-20 GVF.
- Both NOAA-21 GVF and NOAA-20 local run GVF file names identify version as “v3r0”.
- NOAA-21 GVF is more similar to NOAA-20 operational GVF than to NOAA-20 local GVF. This implies that the same processing error is occurring for NOAA-21 as for NOAA-20 operational processing.
  - NOAA-20 operational processing fix is in progress. Once this is complete, the same fix should apply to NOAA-21.

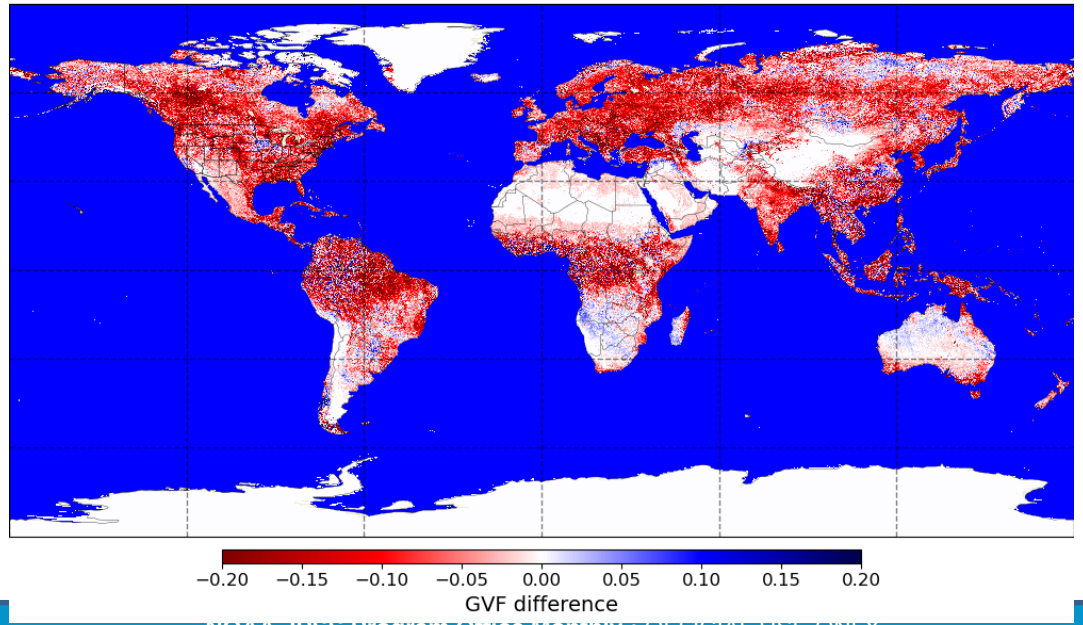
NOAA-21 GVF, 20230612-20230618



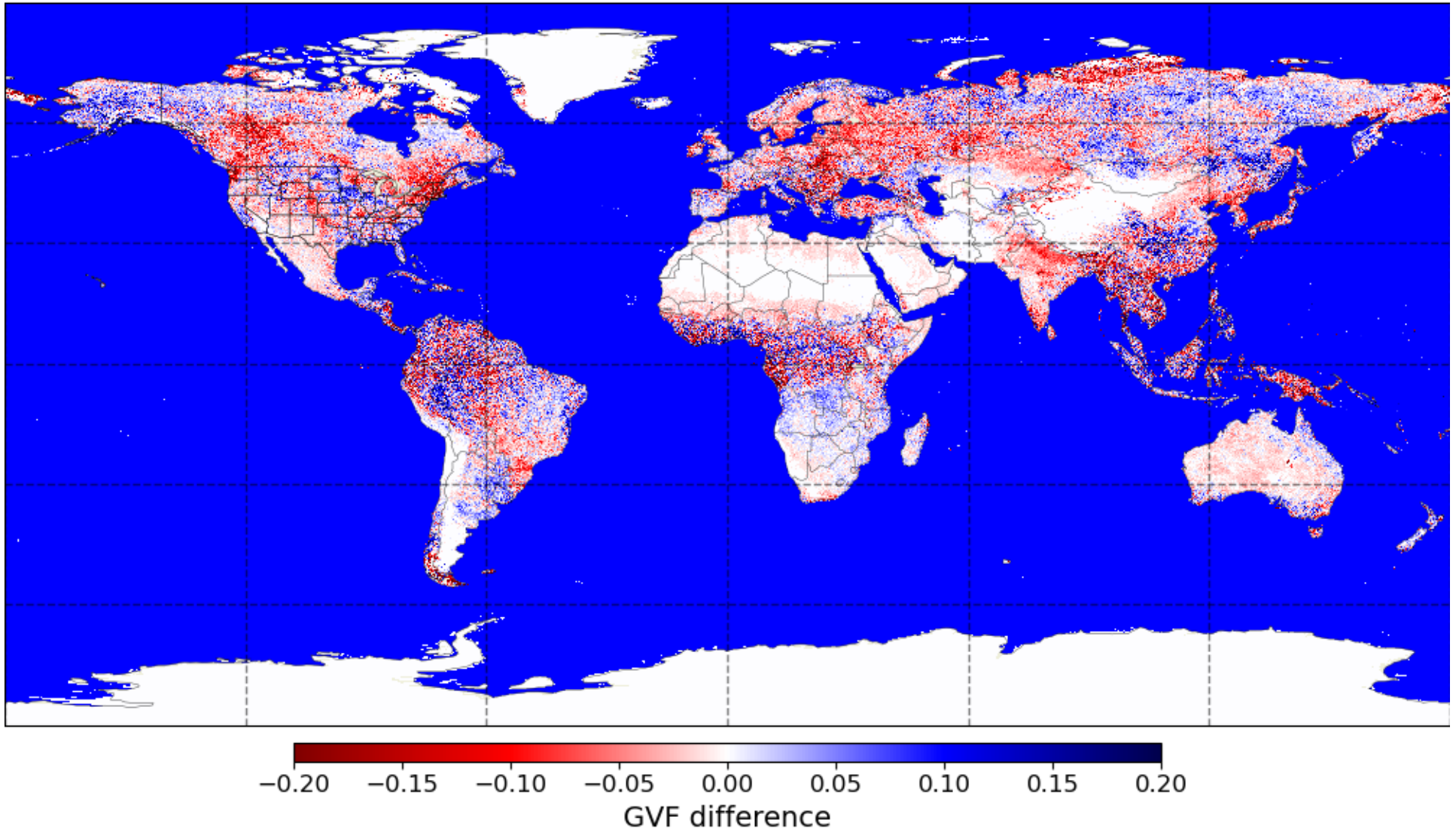
NOAA-20 GVF, 20230612-20230618



NOAA-21 - NOAA-20 GVF, 20230612-20230618

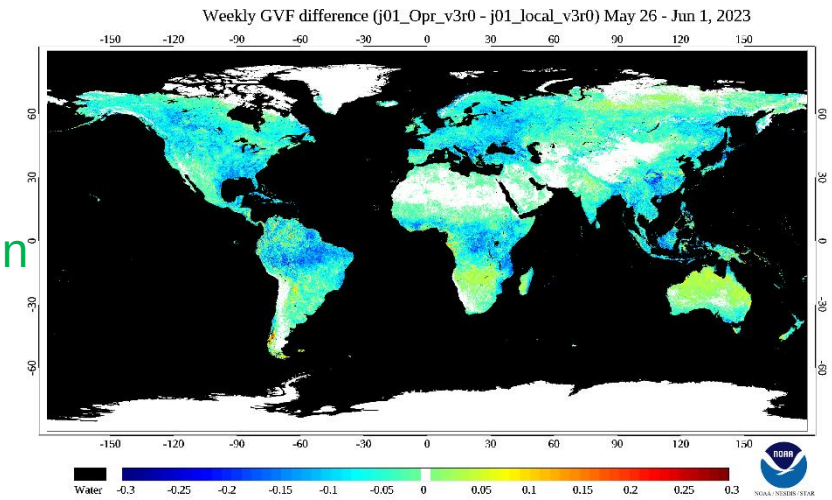


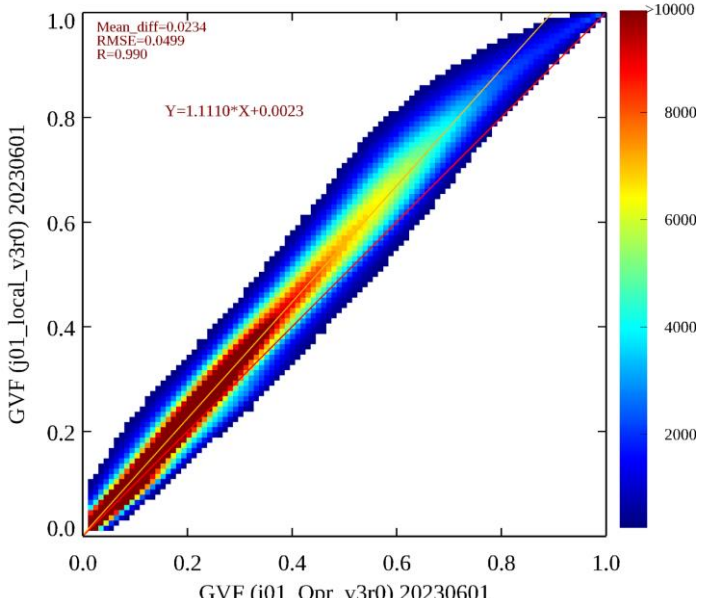
GVF difference, NOAA21 - NOAA20 ops, 20230612-20230618



Investigation of bias in the operational GVF

GVF comparison

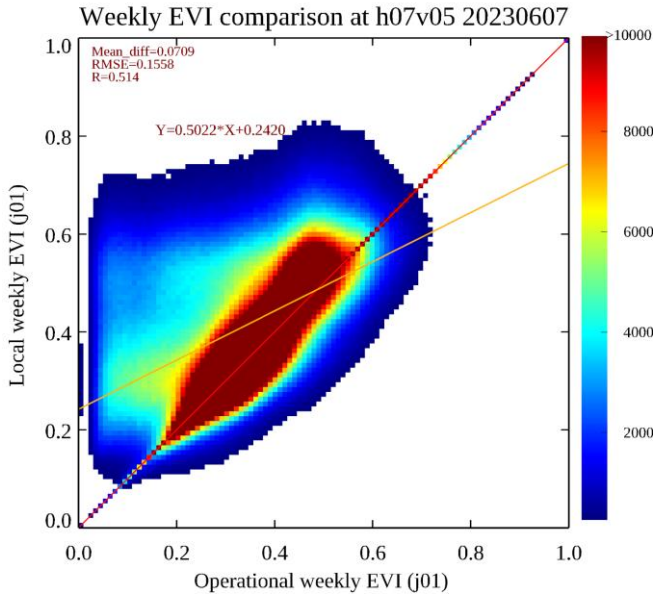


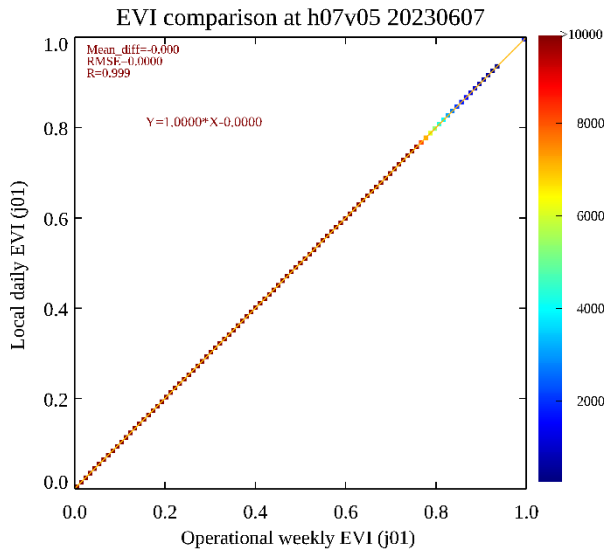


The GVF difference (operational GVF – local GVF) map showed that the operational GVF is lower than the local run GVF

There is a bias between them (0.02) and more investigation is needed to identify the source of the bias

EVI comparison





The operational GVF intermediate data (weekly EVI) was obtained from OSPO and compared with local run weekly EVI data

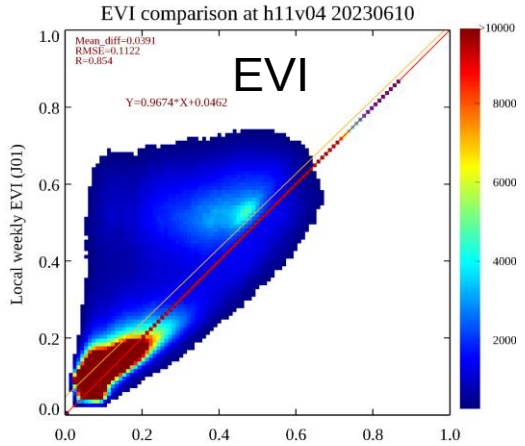
We found the operational weekly EVI was not consistent with the local weekly EVI.

However, it is identical to local daily EVI, which suggest that only 1 day of daily SR data, instead of a week of data, is read in the operational GVF system

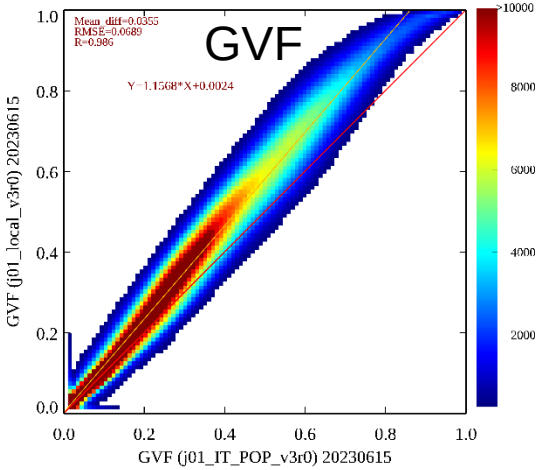
Evaluation of the I&T EVI and GVF data after NDE fixing

- We reported to OSPO the GVF error in reading in a week of VI daily SR data (only one day of daily SR is ingested to the GVF system)
- OSPO contacted NDE to fix the error and NDE fixed it in the I&T environment on June 16, 2023
- OSPO produced 10 days of GVF data (June 10-19) in the I&T environment and sent the intermediate and final GVF data to us for verification
- We verified the test data and found (1) the weekly EVI data is the same as local run data; (2) the GVF difference between I&T and local run became smaller after fixing

Before fixing

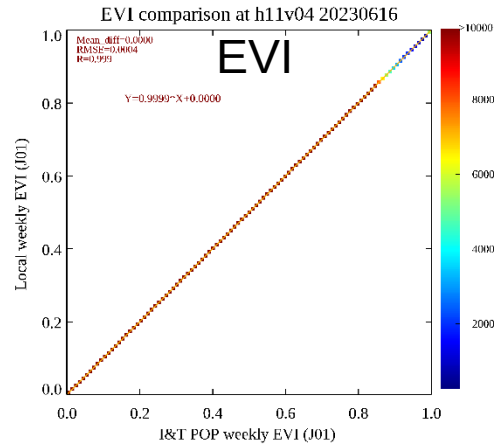


I&T weekly EVI is not consistent with local data

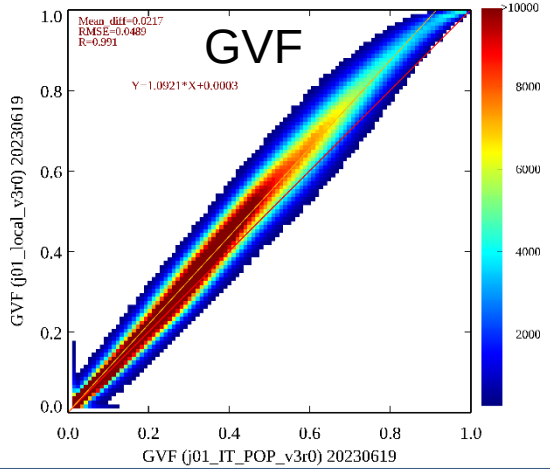


The operational GVF is lower than the local run GVF before fixing

After fixing



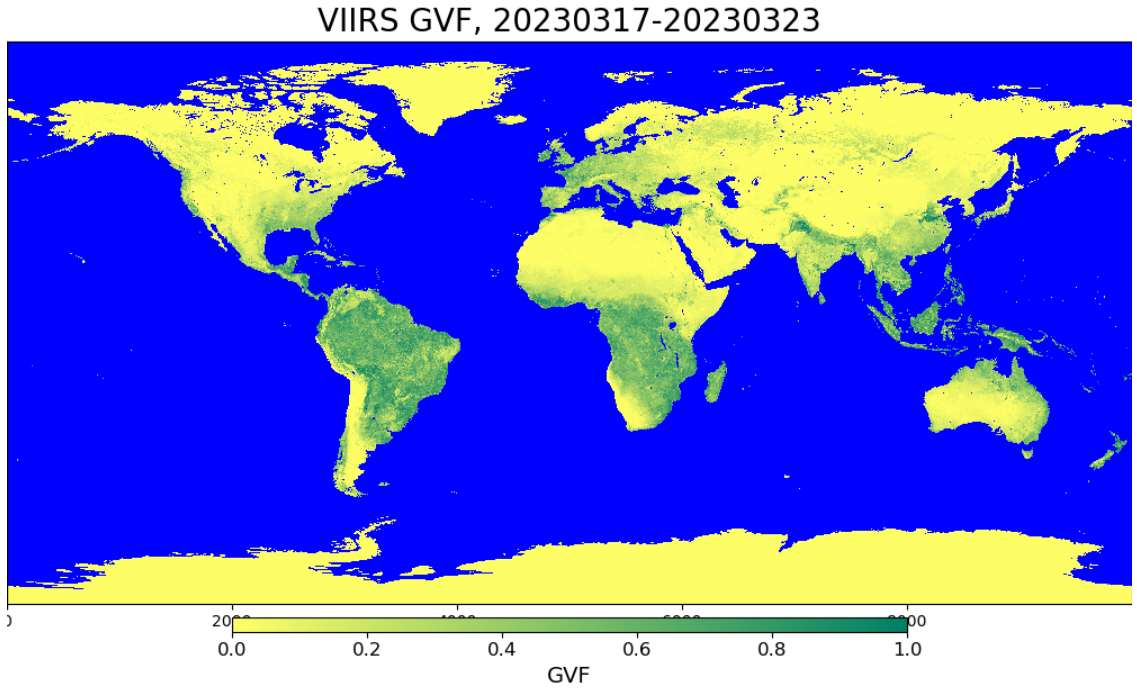
I&T weekly EVI is identical to local weekly EVI

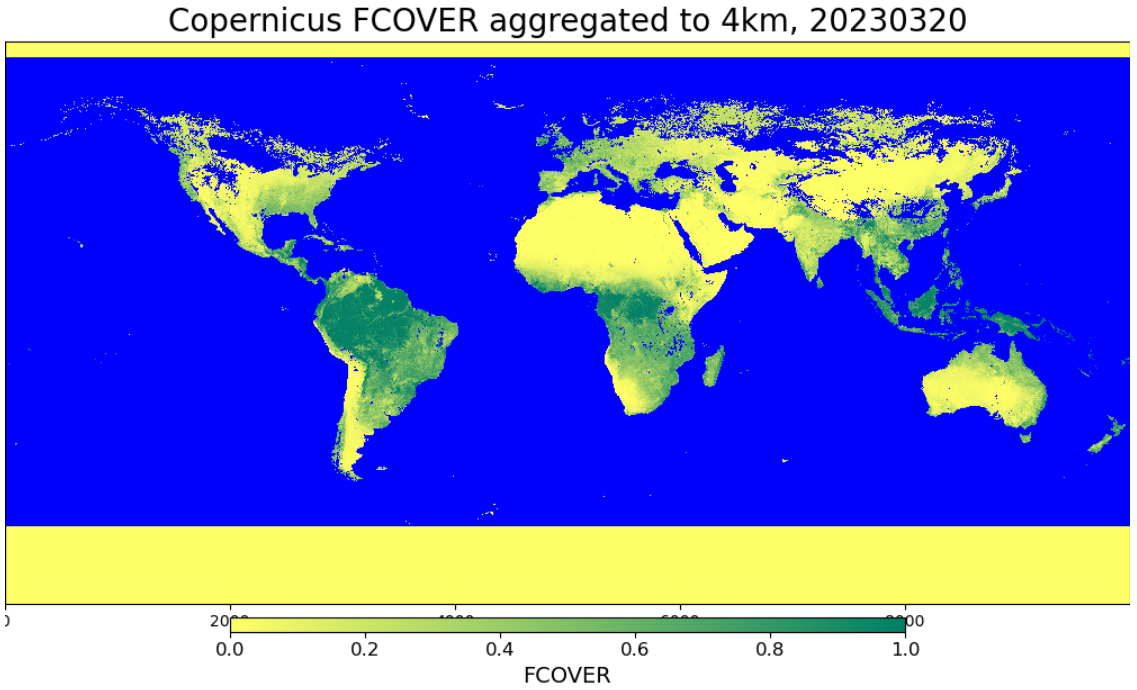


The GVF difference was reduced after fixing and it will diminish gradually

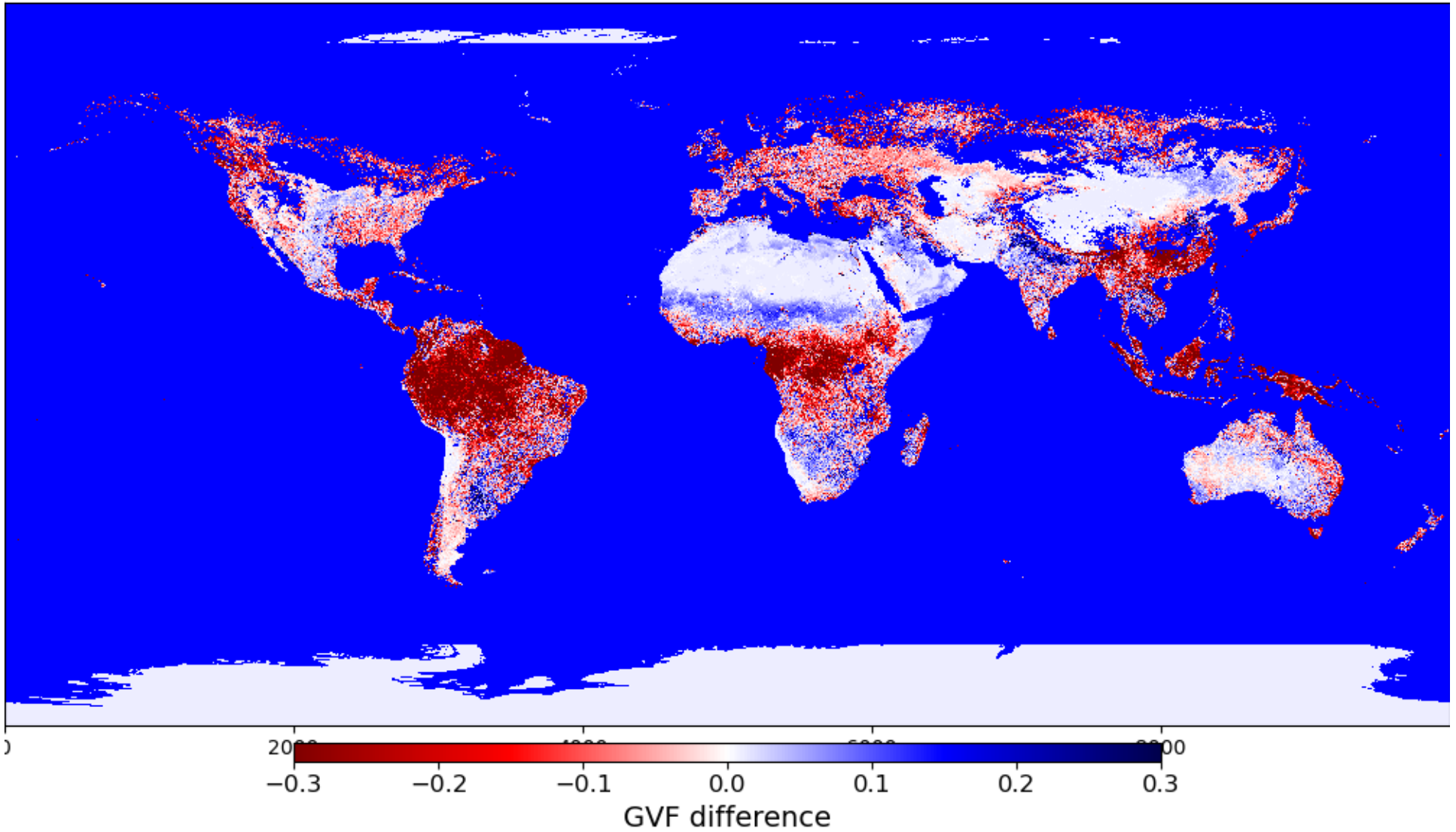
Copernicus FCOVER

- FCOVER = Fraction of vegetation cover
- Derived from Sentinel-3 data
- On plate carree grid at 1/336 degree (300 m) resolution
- Defined from 180° W to 180° E and from 65° S to 85° N
- Images shown are for Copernicus FCOVER on 20 March 2023 (central date of 10-day aggregation period), VIIRS GVF from 20230317 – 20230323
  - FCOVER uses data 5 days forward and backward from nominal date
- Highly vegetated areas have higher FCOVER than GVF
- FCOVER is offset by 5 degrees of latitude
  - I have checked Copernicus and VIIRS geolocation. Copernicus geolocation appears incorrect.


VIIRS GVF, 20230317-20230323
0.0
0.2
0.4
0.6
0.8
1.0
GVF


Copernicus FCOVER aggregated to 4km, 20230320
0.0
0.2
0.4
0.6
0.8
1.0
FCOVER

VIIRS - Copernicus vegetation cover, 20 March 2023



NUCAPS Products

June, 2023

Accomplishments / Events

- Continued efforts towards the NOAA-21 NUCAPS product provisional maturity. These include, (a) ATMS and CrIS radiance tuning, (b) cloudy and clear regression LUT updates, (c) ATMS and CrIS noise file updates in the retrieval algorithms, and (d) continuation of VALAR data sets to validate temperature and water vapor. In addition, the NUCAPS team is planning to archive and process focus day data sets (one day/week) to facilitate global evaluation of NUCAPS products collocated with ECMWF and other models; correlative satellite retrieved products (AIRS, TROPOMI, OCO-2).
- Continued preparations 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.
- NUCAPS team participated in the the NOAA-GML Annual Workshop held on 6/7 and presented the progress on trace gas product evaluations, availability of averaging kernels, and plans towards carbon tracker model assimilations.
- NUCAPS team analyzed NOAA-20 NUCAPS sounding profiles over the southern Great Plains for a severe thunderstorm event that eventually produced a destructive and fatal tornado at Perryton, Texas near 2200 UTC 15 June 2023. The sounding intercomparison illustrated (see figure) close agreement in mid-afternoon (1400 CDT) vertical temperature and moisture patterns and significant convective instability with elevated storm outflow wind potential, thus providing good lead time (three hours) to anticipate hazardous straight-line (downburst) winds and tornado occurrence

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	Initiated & Continuing	
NOAA-21 NUCAPS Product Beta Maturity	May-23	May-23	6/1/23	Beta attained effective 3/23
NOAA-21 NUCAPS T(p), q(p), O3(p) Provisional Maturity	Nov-23	Nov-23	On-time	

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-20 NUCAPS sounding profile observes severe wind and tornado potential over the southern Great Plains:

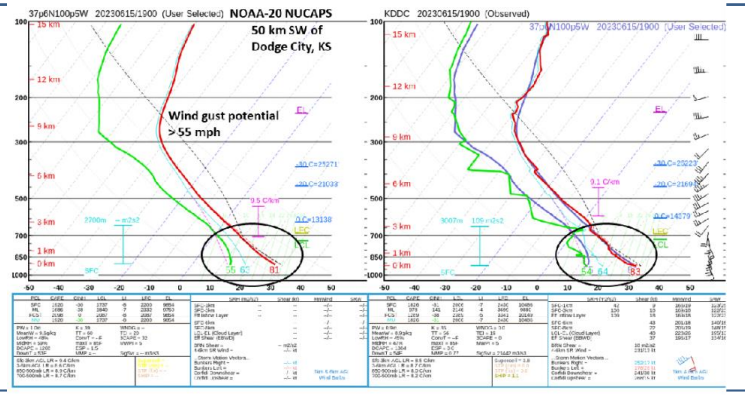


Figure. Comparison of the NOAA-20 NUCAPS sounding profile (left) to the closest radiosonde observation (RAOB) sounding profile at Dodge City, Kansas at 1900 UTC June 15, 2023.
During the afternoon of June 15, 2023, an intense line of thunderstorms developed over the high plains of Kansas, Oklahoma, and northwestern Texas that eventually produced a destructive and fatal tornado at Perryton, Texas. Near 2200 UTC (1700 CDT), as shown in the Figure, a supercell storm developed at the southern terminus of the squall line, producing large hail and a strong tornado that resulted in extensive structural damage, 3 fatalities, and over 100 injuries. For more information on this tornado event, see the online article published by the Texas Tribune: https://www.texastribune.org/2023/06/16/perryton-tornado-storms/

OMPS SDR

June 2023

Accomplishments / Events:

- Derived and delivered OMPS NM/NP weekly dark LUTs for SNPP, NOAA-20 and NOAA-21.
- Derived and delivered SNPP/NOAA-20/NOAA-21 OMPS NP solar irradiance bi-weekly LUTs.
- Derived and delivered a new NOAA-21 OMPS NM in-band SL LUT, associated with the analysis of the NOAA-21 pre-launch data, validation and comparison with the NASA LUT.
- Compared NOAA-21 OMPS NP and NM radiance values in the overlap region using data from both before and after the implementation of the new NM SL LUT.
- Issued a new DR-10365 to investigate the time-dependent 0.03 nm discrepancy in the differences between the Earth Radiance and Solar Irradiance wavelength scales.
- Examined and improved the NOAA-21 OMPS NP stray-light table to improve the NP SDR data quality.
- Improved current NP solar LUT method in comparison with Earth-View wavelength shift values.
- Analyzed NOAA-21 OMPS Photo Response Non-Uniformity (PRNU) measurement data..
- Continued to improve the OMPS SDR VCRTM package in coordination with the CRTM team.
- Re-examined NOAA-20 and SNPP OMPS NP solar diffuser measurements for the degradation.
- Verified the MX-8 ADL OMPS portion for the code change.

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	Sep-23		N21 OMPS NM/NP SLT analysis higher priority
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		

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

N0AA-21 OMPS Normalized Radiance between NM and NP from 300 to 310nm over Indian Ocean

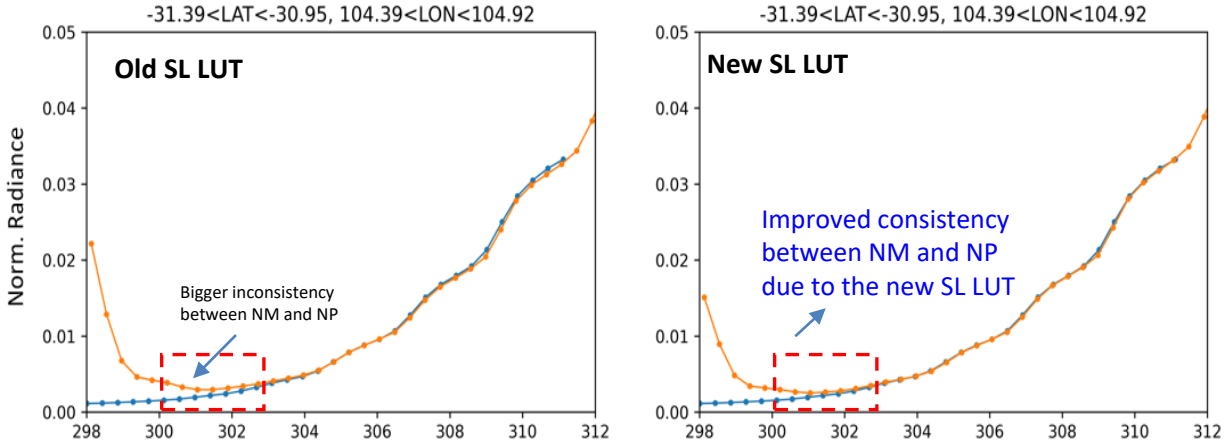


Figure NOAA-21 OMPS NP (blue) and NM (orange) normalized radiance values in the overlap region before (left image) and after (right image) applying the new stray-light LUT. The differences between the NP and NM normalized radiance values have improved with the new table.

OMPS Ozone (V8Pro, V2Limb & V8TOz)

June 2023

Accomplishments / Events:

- L. Flynn identified inconsistencies that led the SDR team to revise the N21 OMPS NM Stray Light correction. He also identified inconsistencies between the N21 OMPS NP irradiance and radiance wavelength shifts. The source of these differences is under investigation.
- R. Lindsay continued work to use the new V2.7Limb Level 1 codes to process the N21 OMPS Limb RDR and use their output as input for the Level 2. NASA has been revising tables and code.
- J. Niu has results for Metop-B & -C GOME-2 soft calibration and will deliver them this month. He has worked with ASSISTT and NCCF to get the EV8TOz and V8TOS successfully transitioned to the NCCF Development system.
- Z. Zhang has created multiple versions of soft calibration for N21 V8Pro & V8TOz. The work has been complicated by changes in the SDR stray light for the NM and in the SDR wavelength scales for the NP since the products became provisional.
- E. Beach continued to work on the monitoring figures for NOAA-21. He is transferring the weekly ancillary files we need to process the NOAA-21 OMPS Limb Profiler. He is capturing the NOAA-21 OMPS data and NCCF test data as they arrive at SCDR. He is providing overpass data sets for validation.

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	Aug-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	Jul-23 Jul-23		SDR Instability

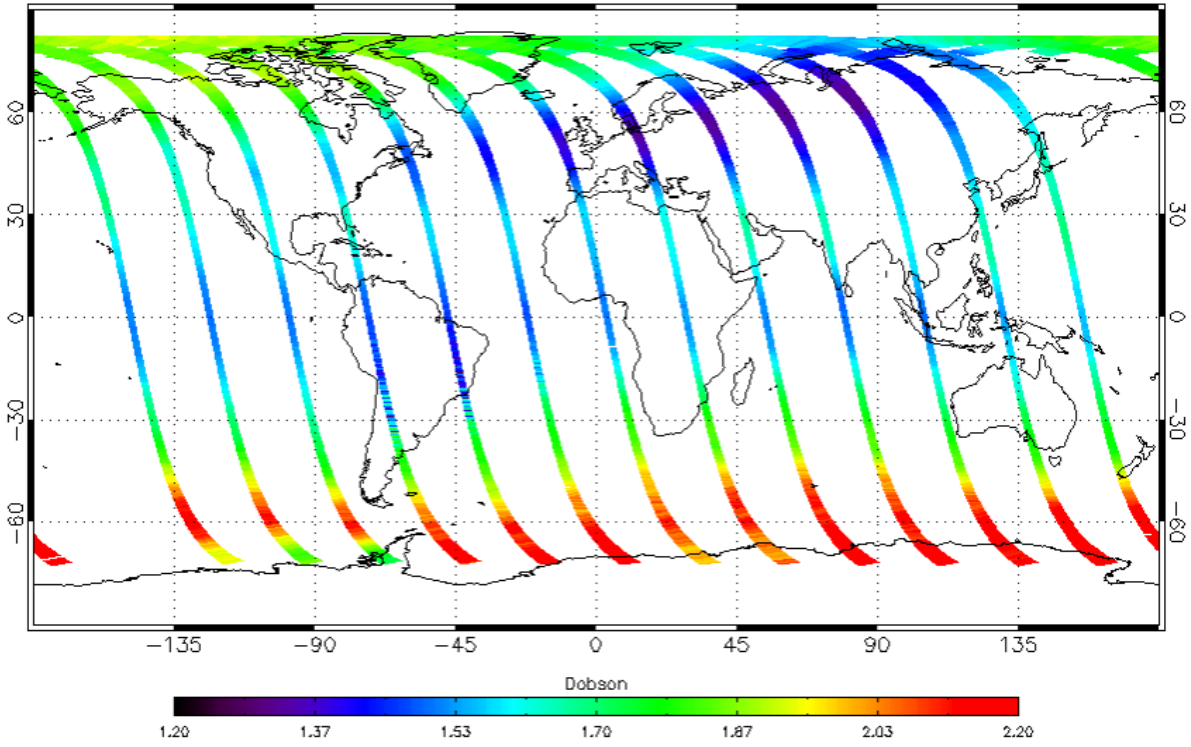
Overall Status:

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

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

Issues/Risks: None

Layer 15 Ozone V8Pro, NPP/N21/N20 for 2023/04/15



SDR and EDR Reprocessing

June 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 04/29/2019 (**1401.3T, 86.77%** of total) has been completed as of June 8, 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	05/2024		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 **86.77**%
Total				1764.65	

Sea Surface Temperature

June2023

Accomplishments / Events:

- N21 SST Cal/Val activities continue towards provisional maturity
- Recently performed analyses suggest that N21 SST has reached provisional maturity
  - Depth SST LUTs were trained (and subskin SST re-trained) using longer time series/seasons
  - Analyses of SST Imagery and clear-sky mask are of high quality, and consistent w/NPP/N20
  - The N21 appear to be accurate/consistent w/NPP/N20 to start integration into L3S-LEO
- Performance of both Skin and Depth SSTs for N21 is in line with NPP and N20. See Figure of validation statistics against fully independent Argo Floats.
  - Histograms are near-Gaussian, centered close to zero, narrow. No significant outliers
  - The accuracy is ~-0.05K for both skin and depth. (Specs: ±0.20K).
  - Precision is ~0.31K for skin, ~0.28K for depth. (Specs: 0.60K)
- Coordinated w/JSTAR Team and scheduled N21 provisional review on 23 August 2023
- 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			

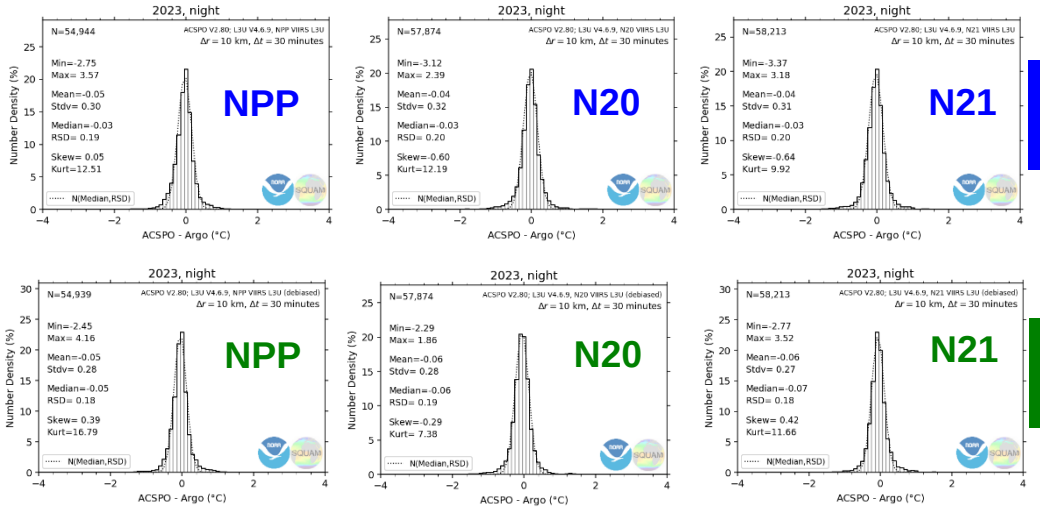
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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: VAL Statistics Against Independent Argo Floats – Full 2023



Skin SST: Accuracy (Global Bias) NPP: -0.05K; N20: -0.04K; N21: -0.04K
Skin SST: Precision (Global SD) NPP: 0.30K; N20: 0.32K; N21: 0.32K
Depth SST: Accuracy (Global Bias) NPP: -0.05K; N20: -0.06K; N21: -0.06K
Depth SST: Precision (Global SD) NPP: 0.28K; N20: 0.28K; N21: 0.27K

Snowfall Rate

June 2023

Accomplishments / Events:

- Completed reprocessing SFR from the JPSS, Metop and NOAA-19 missions for the period of January 2012 to May 2023 using the algorithms delivered to ASSISTT in this May. The reprocessed data will be integrated in the CPC CMORPH2 retrospective dataset. The SFR team is coordinating with the CMORPH team on data delivery since the dataset is very large.
- Conducted a channel sensitivity study for the LEO Precipitation Workshop report. ATMS, AMSU-A/MHS, and GMI frequencies from 6 satellites are examined for their sensitivity for snowfall detection and intensity both over land and over ocean. The analyses resulted some valuable information and will be summarized in the workshop report for the LEO program to reference in the development of future missions.

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			

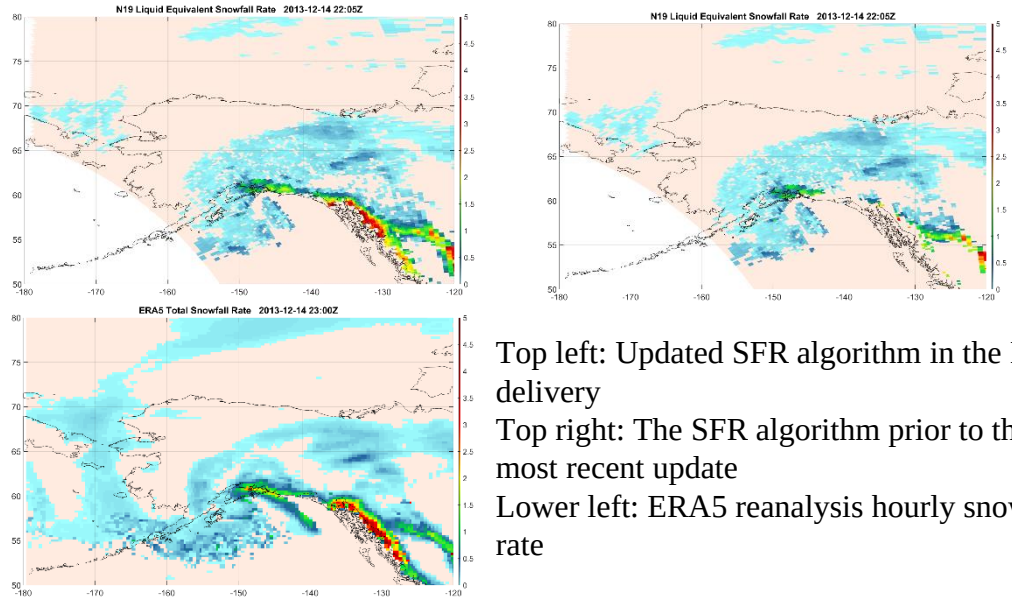
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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: Improvement from Updated SFR Algorithm



Top left: Updated SFR algorithm in the May delivery
Top right: The SFR algorithm prior to the most recent update
Lower left: ERA5 reanalysis hourly snowfall rate

Surface Type

June 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 June of 2023 for the production of AST-2023.
- The team is on track towards finalizing the AST-2022 product:
  - It is working on improving the SVM classification derived based on 2022 VIIRS observations using newly available fine resolution land cover maps and other ancillary data sources.
- The team continues to explore the use of VIIRS observations to evaluate surface type changes caused by wildfires and other large scale disturbance events (see highlight).

Overall Status:

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

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

Issues/Risks:

None

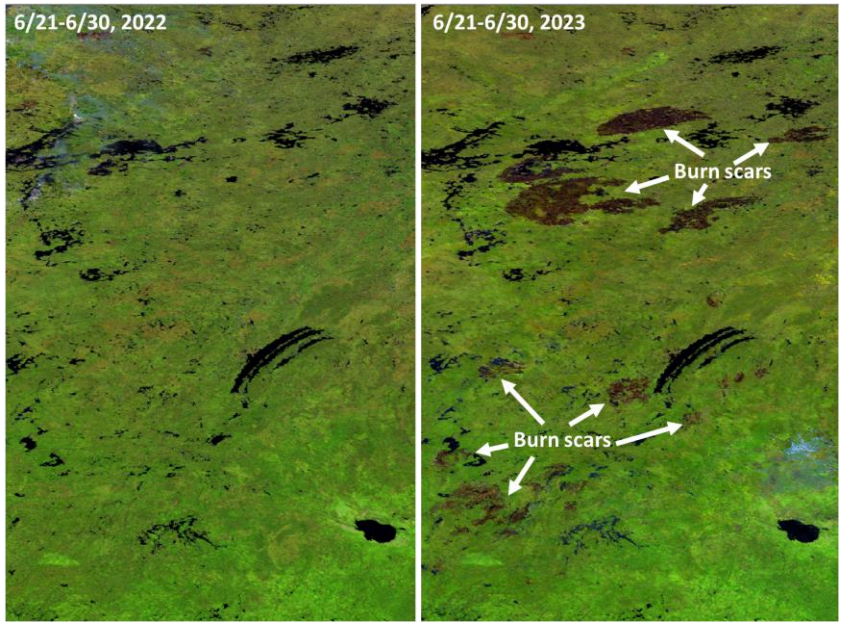
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop a 250m global water surface fraction product	Feb-23	Feb-23	Feb-23	
Complete global monthly composites for each of 2022 months	Each M.	Each M.	Each M.	
Generate global annual classification metrics	May-23	May-23		
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:

A VIIRS Record of Canada's Worst Fire Season

With 6 more months to go in 2023, this year's wildfire season has already been declared the worst in Canada's recorded history. Smokes from the wildfires led to unhealthy air qualities in Chicago, New York, and many other populated places in eastern US and Canada, and the smokes have reached as far as Europe.

The burn scars from the wildfires have been well captured by VIIRS composites produced as part of the surface type processing flow. This figure is a comparison of the 10-day composites in June of 2022 and 2023. Burn scars had dark brownish tones. Black areas are water, while vegetation appears in different shades of green.



Vegetation Health

June 2023

Accomplishments / Events:

- Continued monitoring of vegetation health as indicated by publications of weekly vegetation health products (VHP) from currently operational NOAA-20 VIIRS observations via STAR webpage at https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_browse.php
- 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.
- Vegetation Health Index data over CONUS of late June is compared with the official weekly US Drought Monitor publication. Spatial patterns of both maps (see quad 4) generally matched well. USDM is an interactive integration of more than a dozen other drought indices including VHI.

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.*

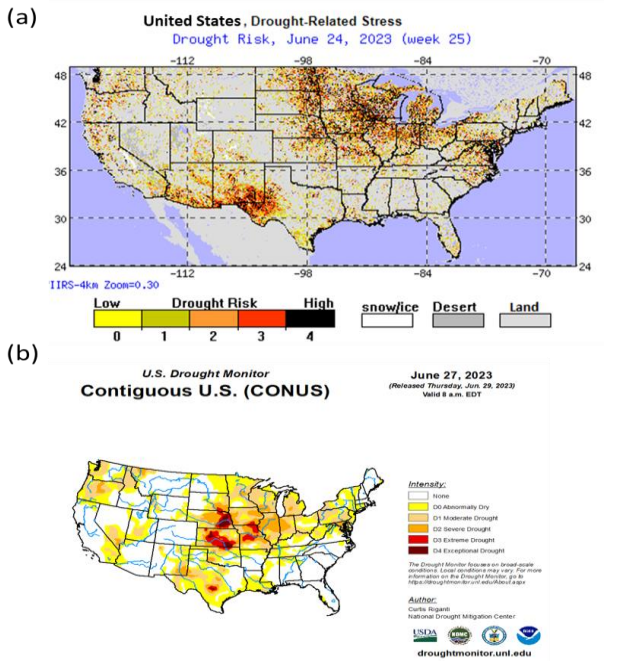
Issues/Risks:

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		

Highlight:

Drought area and intensity for late June 2023 based on: (a) drought assessment based on VHI values derived from NOAA-20/VIIRS observations and (b) the official weekly US Drought Monitor. Drought risk (D) values based on VHI are defined as follows: D=4 is 'high Exceptional Drought' if VHI<=5, D=3 'Extreme Drought' if VHI=6-15, D=2 is 'Severe Drought' if VHI=16-25, D=1 is 'Moderate Drought' if VHI=26-35, D=0 is 'Abnormally Dry Condition" if VHI=35-40



Volcanic Ash

June, 2023

Accomplishments / Events:

- Quality/Oversight Continued to ensure high quality Volcanic Ash retrievals from EDR algorithms and VOLCAT. Routine validation of existing JPSS volcanic ash EDRs from current sensors and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.
- The volcanic ash science team has continued to identified volcanic cloud emissions observed by NOAA-21 VIIRS. Data collection and validation analysis for these events continues in preparation for necessary product maturity reviews. Recent communication with JPSS program office has resulted in scheduling of Provisional/Beta reviews for August given a sufficient number of NOAA-21 VIIRS cases have been identified and analyzed to this point.
- The moderate assurance real-time processing at the University of Wisconsin/SSEC/CIMSS is now including NOAA-21 VIIRS VOLCAT volcanic ash processing. The science team is assessing the output and the results have been consistent with other characterizations of these emissions from NOAA-20 VIIRS as well as various GEO instruments. The VOLCAT NOAA-21 VIIRS ash results are being distributed to the VOLCAT website for end-user uptake and evaluation. An example VOLCAT volcanic ash alert from the real-time processing of NOAA-21 VIIRS for the Popocatepetl volcano in Mexico on July 1, 2023 can be seen in included figure.
- VOLCAT VIIRS volcanic ash plume identification and extraction work is taking longer than originally anticipated, but good progress establishing expert classified VIIRS granule database for training AI/ML approach to plume detection has been made.

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	May-23	
Improve VIIRS volcanic ash plume identification and extraction	Jun-23	Sep-23		More time to establish sufficient labeled data
Improve near source VIIRS volcanic ash height information	Jul-23	Jul-23		
NOAA-21 Volcanic Ash Beta Maturity	Sept-23	Aug-23		Moved back to August
NOAA-21 Volcanic Ash Provisional Maturity	Oct-23	Aug-23		Moved back to August
Maintain and monitor quality of volcanic ash EDR and JPSS-based products in VOLCAT	Sep-23	Sep-23		

Highlights:

An example VOLCAT volcanic ash alert from the UW/SSEC moderate assurance real-time processing system using NOAA-21 VIIRS data. This VOLCAT alert was for an ash emission from the Popocatepetl volcano on July 1, 2023.