NOAA JPSS Monthly Program Office

AMP/STAR FY23 TTA

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August, 2023

Highlights from the Science Teams (July)

Recovering from the S-NPP shutdown

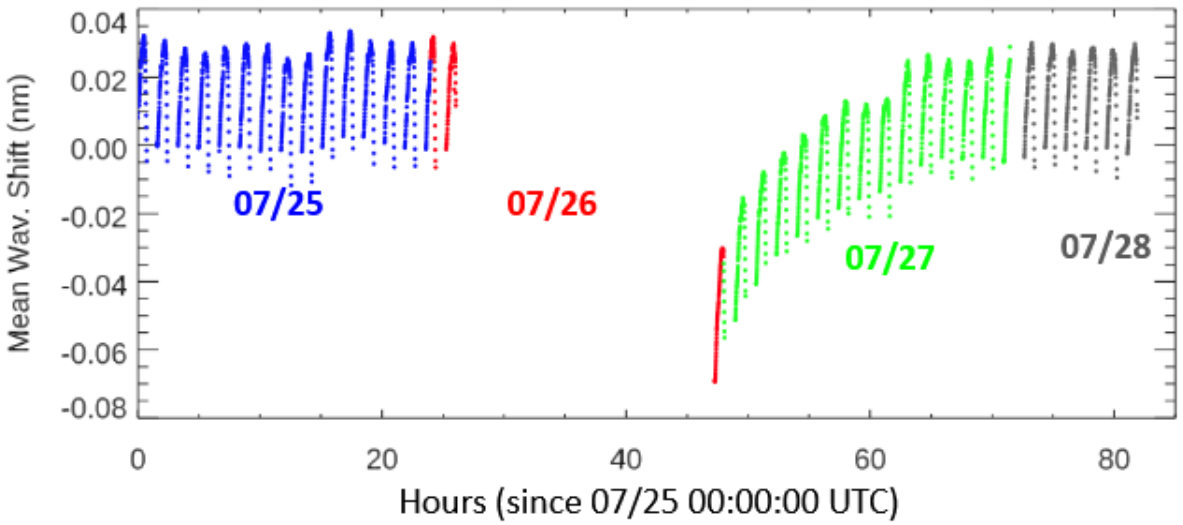
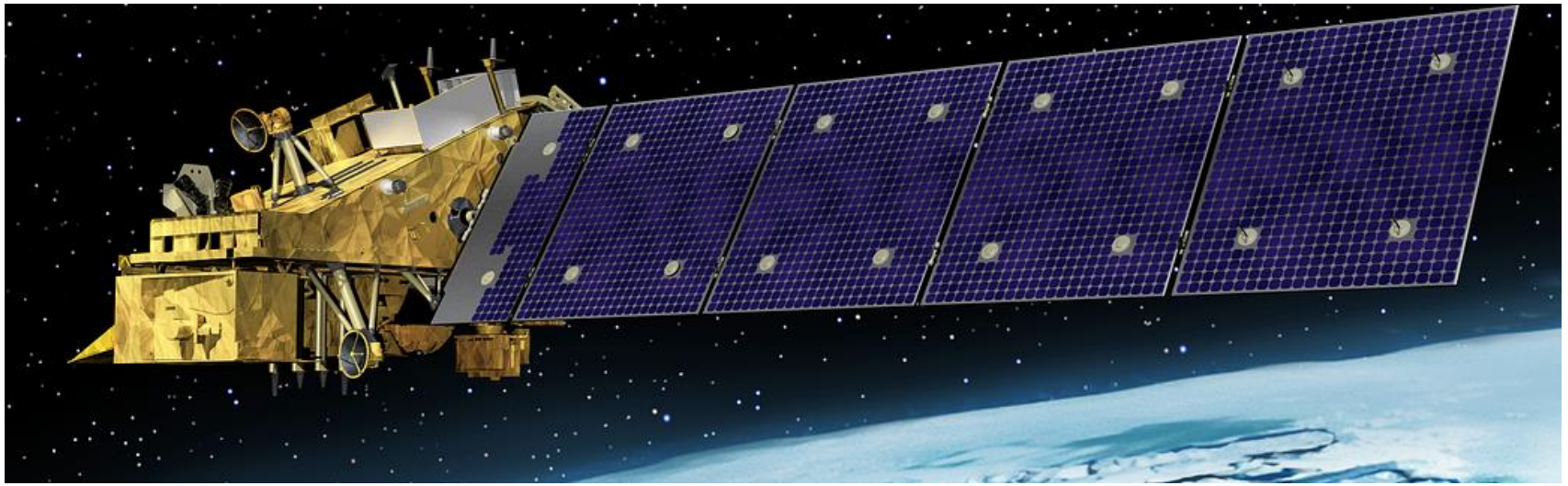


Figure. A sample of the type of data that the SDR teams were investigating in response to the S-NPP CDP reset. In particular, this shows SNPP OMPS NP intra-orbital wavelength shift values for July 25 (blue), 26 (red), 27 (green), and 28 (grey). A large change in shift value can be seen on July 26, which had recovered by the morning of July 28.

On July 26, 2023, at 232 UTC, Suomi NPP entered a non-nominal state and was put into safe mode, requiring a central data processor (CDP) reset. Due to the CDP reset, the STAR Sensor Data Record (SDR) teams were required to confirm the quality of the data being received from the satellite before dissemination of the data could resume. The data after the recovery indicated that S-NPP science data for each of the SDR products (ATMS, CRIS, VIIRS, and OMPS) had reached the nominal quality level and met the requirements for downstream data products and NWP applications. This, in turn, allowed the data to resume distribution to downstream customers. Figure 1 shows a sample of the type of status monitoring data which the SDR teams worked with to determine the data quality

Highlights from the Science Teams (July)

JPSS-2 Instrument and Imagery Cal & Val Teams received the prestigious NASA Robert H. Goddard Science Award



The team is recognized for the dedicated mission critical support to JPSS-2/NOAA21 for its pre-launch and post-launch calibration/validation of satellite instruments including ATMS, CrIS, VIIRS, and OMPS. ATMS and CrIS observations are critical for numerical weather prediction and have very high impact scores for the accuracy of weather forecasts to protect property and life. ATMS and CrIS from NOAA 21 are especially needed because the current instruments on NOAA-20 and Suomi NPP are aging with reduced capabilities. The loss of the midwave infrared bands in CrIS, and the ATMS scan drive anomaly, both on Suomi NPP are fresh reminders of the constraints. Award recipients include members of the STAR JPSS sensor data record and imagery science teams, JPSS program leads, NASA scientists and contractors.

Highlights from the Science Teams (July)

Record Low Sea Ice Extent for the Antarctic in June 2023

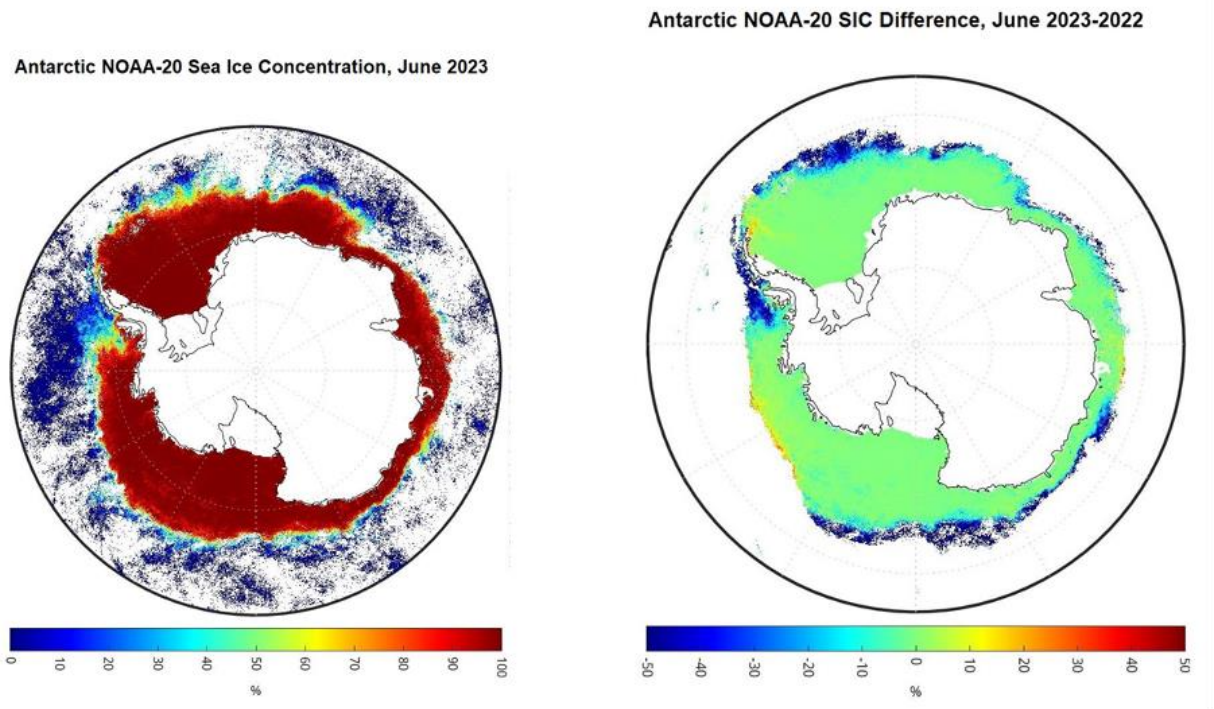


Figure. Left: NOAA-20 VIIRS June 2023 average SIC (clear sky only). Blue (red) colors represent low (high) concentration. Right: June 2023 minus 2022 SIC difference with blue (red) colors representing lower (higher) SIC in 2023. Green represents near zero change.

Both the European Copernicus Earth observation system and the National Snow and Ice Data Center (NSIDC) reported a record low June Sea Ice Extent (SIE) of 17% below normal for Antarctica. This is a continuation from the all-time (since 1979) observed record minimum SIE that was set in February. The most salient negative anomalies are in the Bellingshausen Sea, east Weddell into west King Haakon VII seas and northwest of the Ross Sea (north of Victoria land).

These anomalies can be seen using the VIIRS Sea Ice products. The figure shows a comparison between 2022 (which was already below average) and 2023. It compares well to the other data sources.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
7/06/23	The SMM and EUM for the V8TOZ J2 CCAP delivered	Google Drive
7/12/23	Surface Reflectance EUM and SMM	Google Drive
7/13/23	The MiRS CCAP package for CSPP Leo Milk machine	UW/CIMSS
7/19/23	Preliminary CCAP delivery of the Ensemble Tropical Rainfall Potential (eTRaP) v3 (add J2) for SCR at OSPO.	Google Drive
7/27/23	v1-3 Patch Delivery of GBBEPx AF M-band v4.0 to the NCCF S3 bucket.	NCCF
7/27/23	Enterprise HEAP v3r1 CCAP for Metop B/C and JPSS v3 Final CCAP delivery to the Cloud (Averaging Kernels).	NCCF
7/31/23	Preliminary CCAP delivery of the JPSS Ice Age (CCAP-1) and Ice Concentration (CCAP-2) v3 for SCR at OSPO.	Googld Drive
8/1/23	Preliminary CCAP delivery of VOLCAT for SCR by OSPO.	NCCF
8/2/23	MTCSWA (Multiplatform Tropical Cyclone Surface Wind Analysis) algorithm final CCAP	NCCF
8/3/23	SMM and EUM V8TOS	Google Drive
8/7/23	Enterprise Flood Mapping patch CCAP that fixes the problem of "upside images at high northern latitudes" (noticed with both the VIIRS NWS001 Mosaic outputs and some VIIRS granule outputs)	NCCF
8/11/23	RAVE North America Patch CCAP v1-2 path delivery to NCCF (Regional hourly Advanced Baseline Imager and Visible Imaging Radiometer Suite Emissions, RAVE uses Active Fire Product)	NCCF
	OSPO Code Reviews Completed for Ice Age/Concentration (8/11), eTRAP (8/03), ACSPO SST (7/7/23)	Google Drive

Accomplishments – JPSS Cal Val Support

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	7/5/23, 7/11/23, 7/18/23, 7/26/23, 8/2/23
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	7/5/23, 7/11/23, 7/18/23, 7/26/23, 8/2/23
NOAA-21	Weekly OMPS TC/NP Dark Table Updates	7/5/23, 7/11/23, 7/18/23, 7/26/23, 8/2/23
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	7/5/23, 7/18/23, 8/1/23
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	7/12/23, 7/26/23, 8/8/23
NOAA-21	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	7/12/23, 7/26/23, 8/8/23
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	7/26/23
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	7/26/23
NOAA-21	Monthly VIIRS LUT Update of DNB Offsets and Gains	7/26/23
NOAA-21	Monthly VIIRS DNB Straylight correction update	7/26/23
NOAA-21	NOAA-21 OMPS Straylight LUT update - Fast Track - ADR 10360	7/26/23

NOAA-21 Cal/Val Maturity Reviews

July, 2023 Maturity Reviews (held on August 3)		
VIIRS SDR	Validated	Review held on 8/3; Attained Validated maturity effective June 23.
VIIRS KPP Imagery EDRs	Validated	Review held on 8/3; Attained Validated maturity effective June 23.
VIIRS non-KPP imagery EDRs	Validated	Review held on 8/3; Attained Validated maturity effective June 23.
OMPS Ozone V8TOz, V8TOS	Provisional	Review held on 8/3; Effectivity of Provisional maturity date will be upon successful implementation of August Soft Calibration Coefficient Updates.
Land Products: LST,LSA, SR, GVF, VI	Beta	Review successfully held on 8/3; Review Panel recommendations on the way
Cryosphere Product(s): IST, Ice Concentration, Sea Ice Thickness/Age, Binary Snow Cover Binary Snow Cover	Beta	Review successfully held on 8/3; Review Panel recommendations on the way
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)
September, 2023 Maturity Reviews (TBD)		
CrIS SDR	Validated	TBD
Vegetation Health	Beta	TBD
Ozone v8 Pro	Provisional	TBD

JSTAR Code/LUT/Product Deliveries

Date	DAPs to DPMS
7/19/23	CrIS SNPP Baffle Temp Sensor failure - CCR 6741 is under AERB review, Engineering Packet by mid August
7/24/23	ADR-10547/CCR-6747 N21 VIIRS SDR LUT Update F-PREDICTED #8
8/10/23	ADR-10549/ CCR-6756 N21 VIIRS SDR CAL-AUTOMATE LUT Update to Automate SWIR-Band Calibration

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 (v2.7/v2.6)
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 (8/25)

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 18).**	
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		

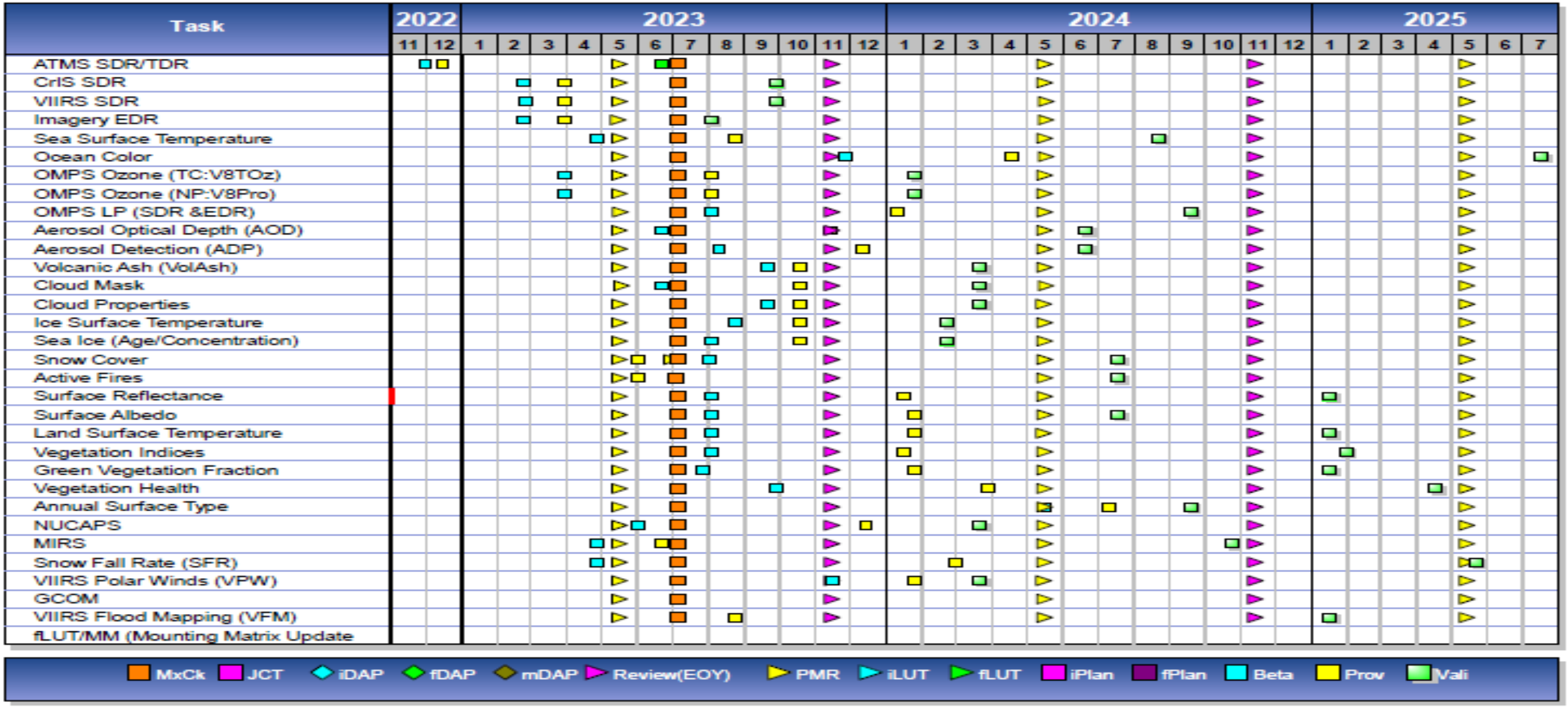
FY23 STAR JPSS Milestones

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; **Attained Validated maturity effective June 23**	**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; ; **Attained Validated maturity effective June 23**	**Transmitter anomaly**
Non-KPP VIIRS Imagery (B: Feb-23; P: Mar-23; V: Jul-23)	**Jul-23**	**Jul-23**	Provisional Achieved: 03/30; ; **Attained Validated maturity effective June 23**	**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 successfully held: 8/03; Review recommendations on the way**	**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 successfully held: 8/03; Review recommendations on the way**	**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 maturity held on 8/3 for V8TOz, V8TOS. Effectivity upon successful implementation of soft calibration tables in August. Provisional review planned for V8Pro: 8/24**	**Transmitter anomaly**
OMPS LP (B: Mar-23)	**Mar-23**	**Mar-23**	TBC	**Transmitter anomaly**

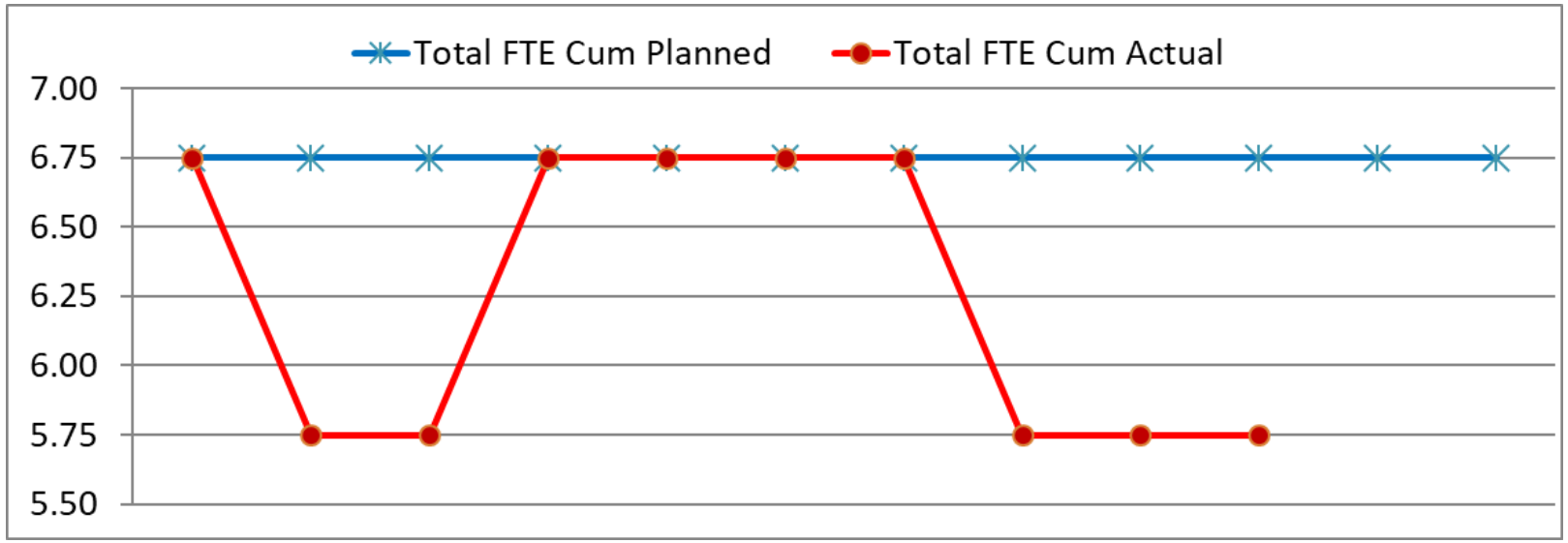
FY23 STAR JPSS Milestones

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, **7/5/23, 7/11/23, 7/18/23, 7/26/23, 8/2/23**
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/12/22, 10/26/22, 11/08/22, 11/22/22, 12/06/22, 12/19/22, 01/03/23, 01/17/23, 1/31/23, 02/14/23, 02/28/23, 03/14/23, 3/28/23, 4/4/23, 4/11/23, 4/25/23, 05/09/23, 05/23/23, 06/06/23, 6/20/23, **7/5/23, 7/18/23, 7/26,23, 8/1/23**
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, **7/26/23**
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, 7/11/23, 7/18/23, 7/26/23, 8/2/23, 8/8/23**
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, **7/12/23, 7/26/23, 8/8/23**
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, **7/26/23**
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, **7/11/23, 7/18/23, 7/26/23, 8/2/23, 8/8/23**
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, **7/12/23, 7/26/23, 8/8/23**
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, **7/26/23**
Mx builds deploy regression review/checkout (Mx8 - 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: 6/20 ✔ NCCF and NDE both performed verifications ✔ **TTO: 7/13**

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

July 2023

Accomplishments / Events:

- The team worked on the verification of the Enterprise Fire VIIRS I-band output data produced by NCCF UAT
- A minor discrepancy was found between the STAR and the NCCF output, which was traced back to a reset of the water persistence file in NCCF production
- The issue affects only detections over water and the impact is minor
- NCCF, OSPO, ASSIST and STAR is working on identifying the root cause and developing a patch
- Given the low impact on the final product, the agreement is to continue the transition to operations process, with user notification of the issue and its impact

Overall Status:

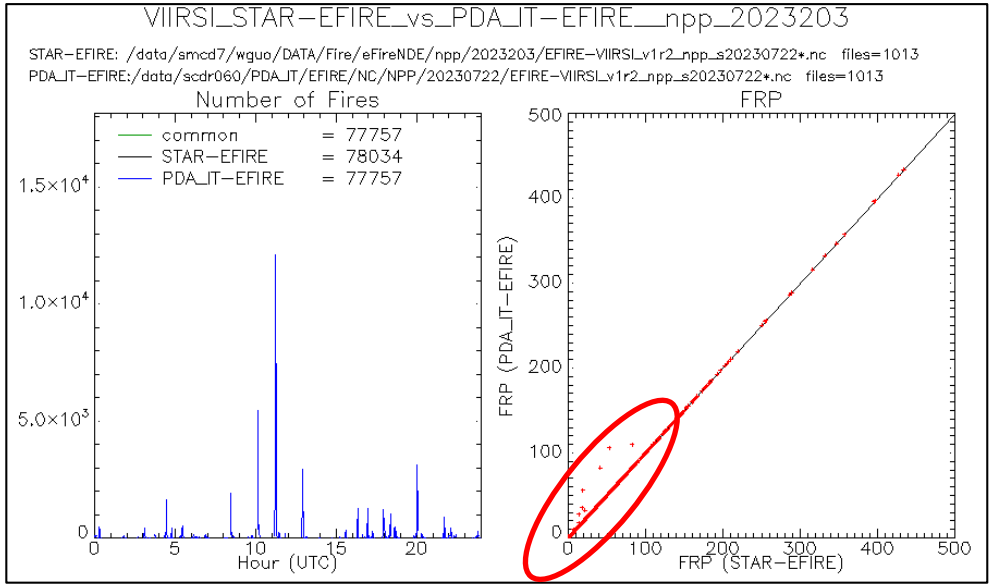
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

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		

Highlight: Comparison of Enterprise VIIRS I-band data from STAR and NCCF UAT



Left: Comparison of detections between STAR and NCCF. Right: comparison of fire radiative power data between STAR and NCCF. FRP differences are caused by missed detections over water in the NCCF version.

Aerosol

July 2023

Accomplishments / Events:

- The reprocessing of SNPP VIIS and NOAA-20 VIIRS is continuing to keep the record up to date.
- Converting the ADP algorithm code from C to Python and adapting it to run on Terra MODIS for comparison with NASA's MISR aerosol type product
- A new call-back method to retrieve missing smoke detections when smoke is thick has been developed. This procedure uses upstream cloud optical depth product and uses a threshold of optical depth <20 to identify scenarios where it could be either smoke or cloud or smoke/cloud mixture and attempt a retrieval. This is to fill gaps in smoke plumes due cloud algorithm aggressively screening out smoke pixels as clouds.
- We have successfully completed separating surface PM2.5 estimated from SNPP VIIRS AOD into "anthropogenic" and "non-anthropogenic (smoke+dust)" PM2.5. We are also conducting spatial heterogeneity testing of surface PM2.5 product using Moran I statistical analysis to identify spatial similarities in retrievals. This is expected to shed light on data artifacts in urban areas and inform us if features seen in data are real and if they have any environmental justice implications
- Several Fall 2023 AGU abstracts were submitted to sessions involving atmospheric composition and air quality

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			

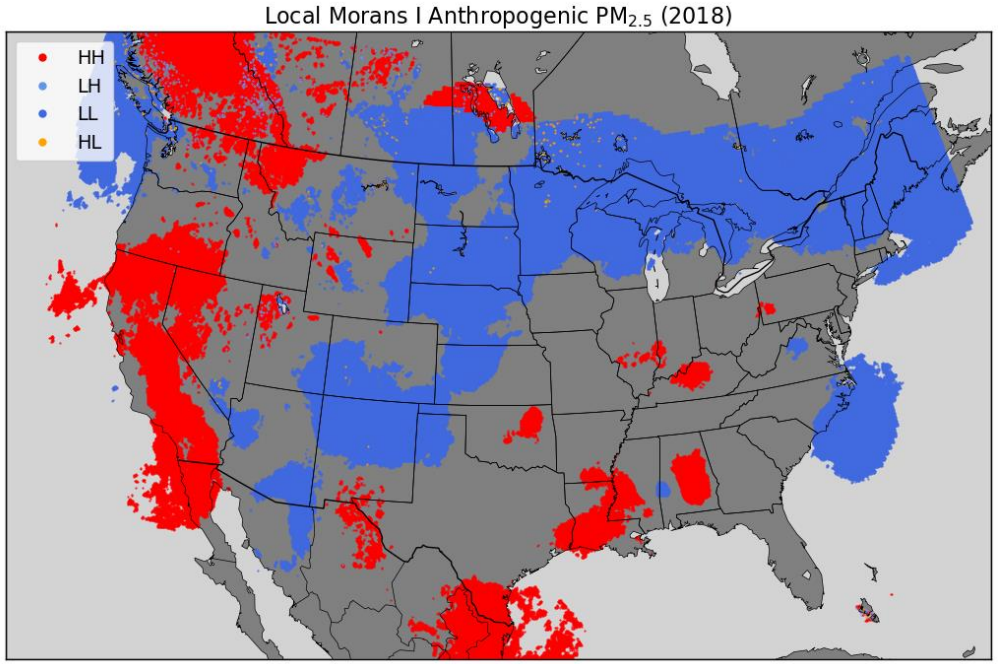
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight:

Moran's I hot spot analysis of annual average SNPP VIIRS PM2.5 for 2018. Areas highlighted in red color indicate that PM2.5 values are spatially correlated and areas in blue show that PM2.5 values are not spatially correlated. With this analysis, when zoomed into urban areas we can isolate exposure disparities for advantaged vs. disadvantaged populations.



ATMS SDR

July 2023

Accomplishments / Events:

- Revisited NOAA-21 ATMS spectral response function (SRF) raw data and verified the newly generated public release candidate datasets provided by NASA, NG, and STAR teams. Held multiple ATMS SDR team meetings to discuss how to convert ATMS raw SRF data to user friendly data. Several scientific and data processing issues have been identified in the very first version, which was demonstrated to have some errors that may affect the simulation accuracy.
- Participated S-NPP CDP reset recovery activities by providing NRT S-NPP ATMS instrument performance and science data quality evaluation results. Attended OSPO NPP CDP reset daily meetings to present ATMS trending products to support the resume of NPP ATMS operational data dissemination.
- Verified ADL Mx8 pre-operational I&T ATMS science data sets. This operational IDPS release include cold/warm NEdT calculation and satellite dependent instrument health status calculation coefficients updates. The new version was TTO on July 13, 2023. Prepared and submitted NOAA-21 ATMS PCT update ADR to reset the ATMS instrument health status warning threshold set right after N21 ATMS beta maturity to suppress the SDR QF-1 due to the conversion coefficients error.
- Reviewed N21 ATMS active geolocation accuracy data analysis report and discussed the application of results in ATMS geolocation error correction algorithm development
- Finished writing and reviewing of ATMS SDR Users' Manual document and published in NOAA technical report library.

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.*

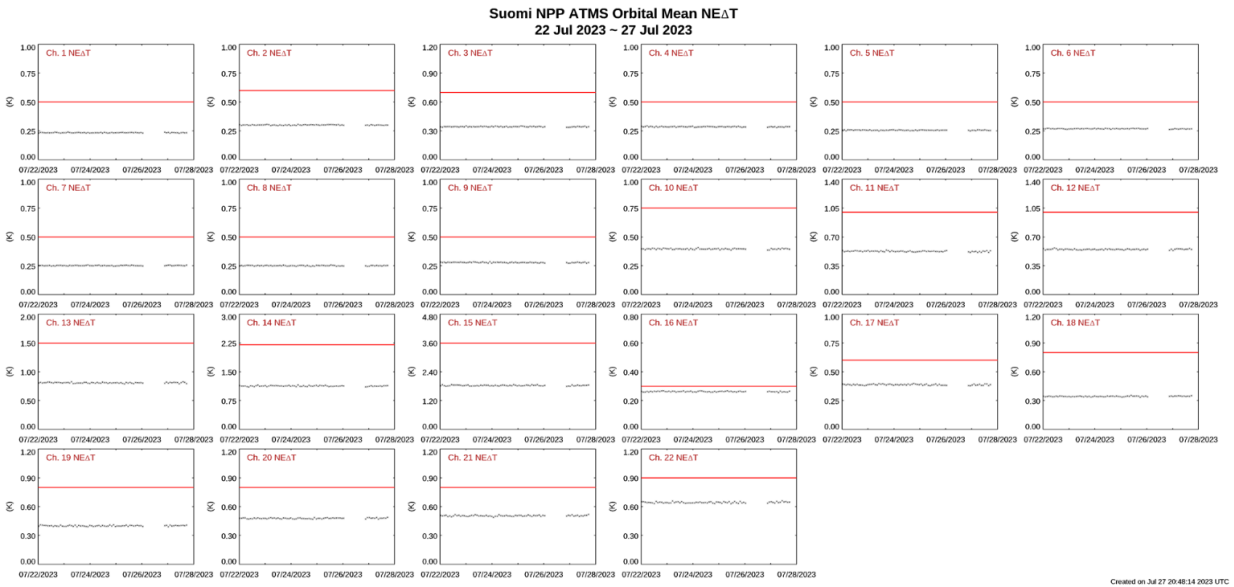
Issues/Risks:

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:

NPP ATMS channel NEdT before and after CDP reset event on July 27, 2023, indicating that NPP ATMS instrument performance has returned to the status before the event



Clouds

July 2023

Accomplishments / Events:

- The Cloud team provided critical support during a Suomi-National Polar orbiting Partnership (SNPP) satellite anomaly that occurred on 26 July 2023., SNPP Enterprise Cloud products (cloud mask, type, and height) were analyzed to determine whether any degradation in product performance occurred after the anomaly. Several different analyses were performed, and the Cloud Algorithm Working Group (AWG) team's long term monitoring site was heavily utilized during this monitoring exercise. No issues were found post-anomaly
- The Cloud team is actively working on assembling data necessary for the NOAA-21 Cloud Products Beta and Provisional reviews, which are tentatively scheduled for early October
- Work is ongoing with 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:

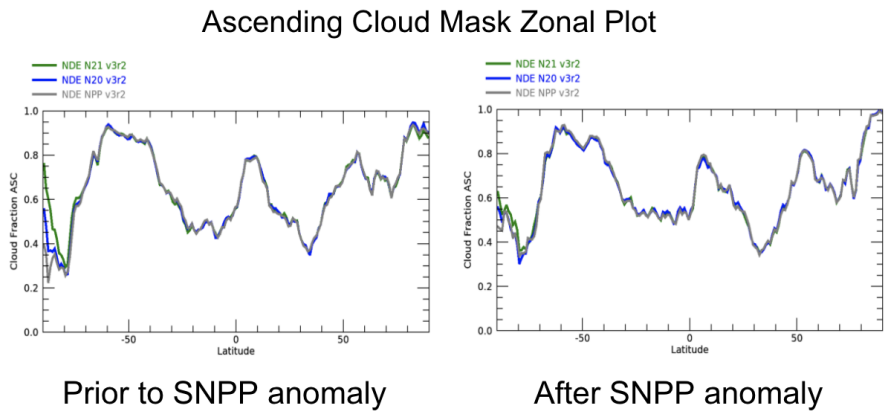


Figure 1.Ascending orbit zonal cloud fractions derived from SNPP the day before (left) and after (right) the recent SNPP anomaly that occurred on 26 July 2023.

CrIS SDR

July 2023

Accomplishments / Events:

- Continue to monitor the NOAA-21 CrIS instrument (quality flags, CrIS-ABI intercomparisons, NEdN noise monitoring, geolocation accuracy, instrument responsivity, telemetry), along with the other two sensors (NOAA-20 and S-NPP)
- Generated EP v212 with updated LWIR FOV9 nonlinearity coefficient, mapping parameters, and geolocation accuracy parameters. Updated PCT table with polarization correction. Performed radiometric assessment of new parameters and generated new NOAA-21 geolocation parameters for geolocation assessment (**Fig. 1**)
- Updating the geolocation accuracy assessment using terrain-corrected VIIRS data. Updating geolocation tools such that a single software suite can process any of the CrIS sensors with terrain-corrected VIIRS
- Organized and Chaired an invited Session at IGARSS 2023 on the Next Generation of LEO/GEO Microwave and Infrared Sounders.
- Updated Telemetry tool to compute the ICT and Laser Diode temperature using the precision method as laid out in the ATBD. Used this Laser Diode temperature data to look for correlations between the laser diode temperature and the laser wavelength, in order to further characterize the observed behavior of the NOAA-21 CrIS metrology laser wavelength.
- USNO-PolarWander data set was reported missing on 7/7, 23:15 UTC. Intensive assessment of the impact on CrIS SDR products was carried out and the impact was nil, with no degradation of radiometric, spectral, geolocation, noise, or telemetry
- Support for the AI research project being carried out in the Lapenta Internship program
- Successful emulation of NOAA-21 CrIS Neon Cal interval at every seven orbits, while spectral accuracy assessment of emulated NOAA-21 CrIS SDR data showed that enlarged Neon cal interval had negligible impact on spectral accuracy (**Fig. 2**). Time series of emulated laser wavelength updates are as expected (**Fig. 3**)
- Completed NOAA-21 and NOAA-20 CrIS/IASI Metop-B and Metop-C SNO intercomparisons at FSR for all SNO events thus far (all on CrIS website) (**Fig. 4**)
- NOAA-21 pitch maneuver polarization analysis showed NOAA-21 exhibits different and higher FOV dependence for polarization, and sensor polarization angle is offset in the MWIR band for NOAA-21 compared to NOAA-20, and NOAA-21 exhibits much more dependence of polarization angle on wavenumber compared to NOAA-20 and SNPP (**Fig. 5**)
- Relative spectral and radiometric calibration assessments of NOAA-21 showed that NOAA-21 is at least as good, stable and accurate with FOV-to-FOV spectral and radiometric calibration performance as NOAA-20 (**Fig. 6**)
- Prototype created for new data quality flag maps and number of occurrences compilation (**Fig. 7**)
- SNPP CrIS CDP reset anomaly created a data loss for 7/26 and 7/27; extensive assessment performed, which showed that the data product has overall recovered (**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

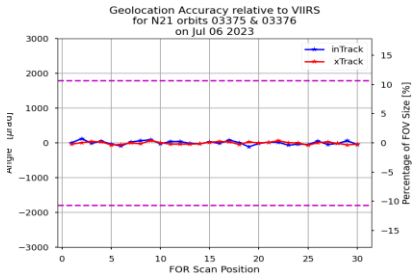
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

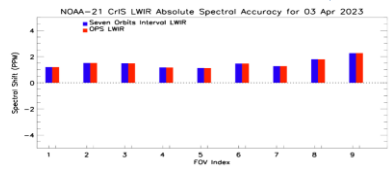
- The CrIS Team got a 100TB storage on STAR servers (data638 and data645) in May 2022. However, the CrIS Team is still in need of hardware/software resources. Presently, there is only one server dedicated to 6 CrIS Team members. We have received access to new servers, but these are shared with other 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.

Highlights:

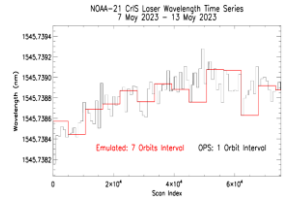
(1) NOAA-21 CrIS geolocation accuracy on 7/6/2023 using EPv211d. This is nearly the final version EPv212.



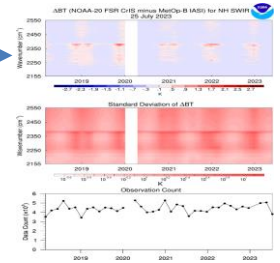
(2) Spectral accuracy assessment of emulated NOAA-21 CrIS SDR with enlarged Neon calibration interval for LWIR



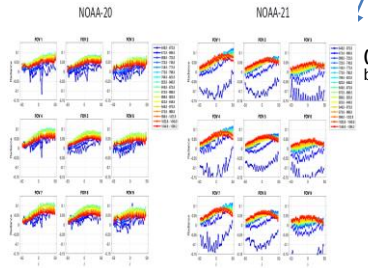
(3) Time series of laser wavelength used in NOAA-21 CrIS SDR data for both the emulated and operational data



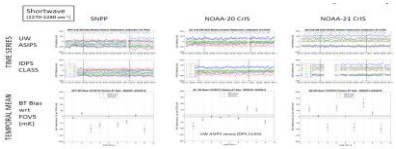
(4) Average, and standard deviation of, BT differences between NOAA-20 CrIS and Metop-B IASI for northern hemisphere, across the entire SWIR spectral range



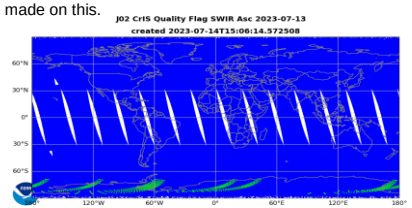
(5) The wavenumber dependence of the sensor polarization angle, in radiances, in the LWIR for NOAA-20 (left) and NOAA-21 (right).



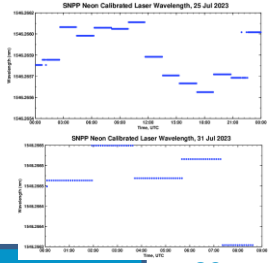
(6) UW CrIS FOV-to-FOV relative radiometric calibration in mK. This shows that NOAA-21 CrIS SW FOVs are within 100 mK, without the aid of polarization correction.



(7) Beta version of CrIS DQF3 plots; further progress has been made on this.



(8) SNPP CrIS Neon Calibration Laser Wavelength on July 25 before the anomaly (top) vs on July 31 after the anomaly (bottom)



Cryosphere

July 2023

Accomplishments / Events:

Record Low Sea Ice Extent for the Antarctic in June 2023: Both the European Copernicus Earth observation system and the National Snow and Ice Data Center (NSIDC) reported a record low June Sea Ice Extent (SIE) of 17% below normal (Figure 1) for Antarctica. This is a continuation from the all-time (since 1979) observed record minimum SIE that was set in February. Figure 2 shows the Sea Ice Concentration (SIC) and associated anomaly for June 2023 compared to average. The average SIC derived from the ERA5 and provided by Copernicus shows that the Sea Ice edge is well below the mean extent, with the main exception being over the Amundsen Sea on the East Pacific side of the Antarctic continent. The most salient negative anomalies are in the Bellingshausen Sea, east Weddell into west King Haakon VII seas and northwest of the Ross Sea (north of Victoria land).

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	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		

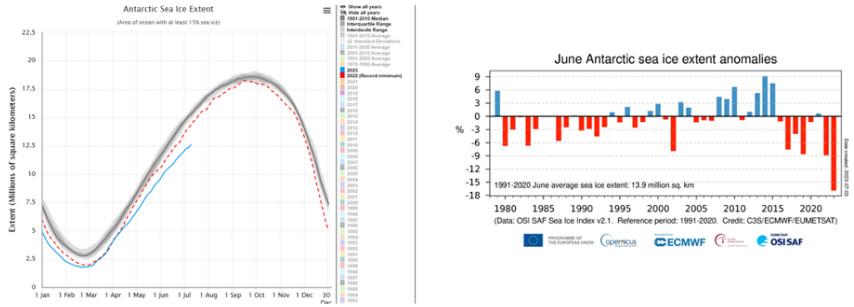


Figure 1. Left: Daily Antarctic Sea Ice Extent from NSIDC with the black line being the median value, red dashed line being 2022 and cyan being 2023. Right: June ice extent anomalies for each year since 1979 from Copernicus that utilizes the OSI SAF Ice charts.

GCOM-W

Accomplishments / Events:

- In preparation for AMSR3 retrieval delivery, a long-term record assessment of the current (GPROF2010v3) and new algorithm (GPROF2017) performance is continued using MRMS observations over the CONUS as a reference. In the second step, Detection Metrics of Rainfall Estimates are compared on monthly scales. (Example for June 2022 shown in the figure). The new algorithm shows better performance in all standard metrics.
- The long-term record assessment is being created to allow for easy implementation to the existing validation system (NPreciSe)

Overall Status:

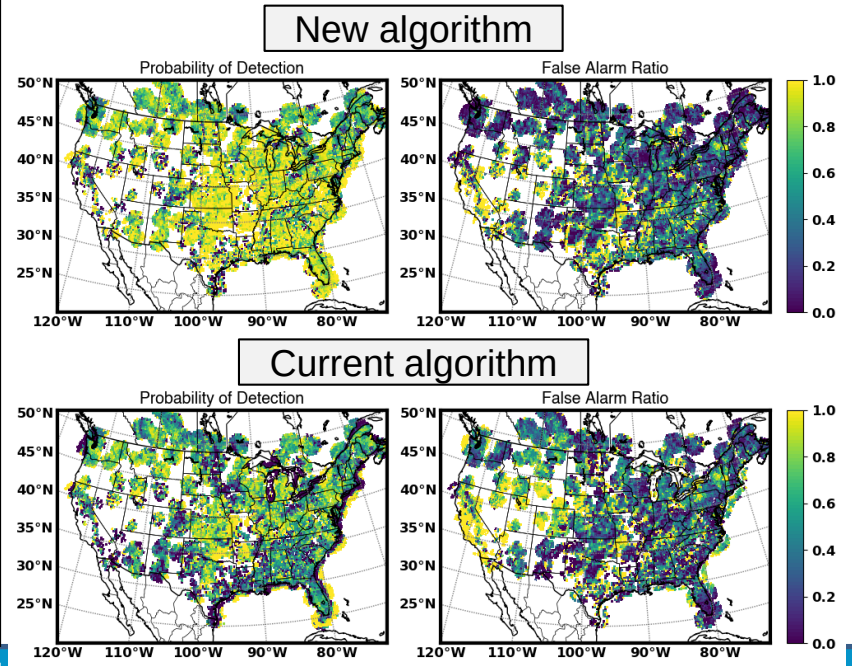
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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:

Need additional funding for continuity of GCOM-W AMSR2 and GOSAT-GW AMSR3 products

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		



June 2022	Current algorithm	New algorithm
POD	0.61	**0.78**
FAR	0.41	**0.30**
CSI	0.43	**0.59**
HSS	0.59	**0.73**

NOAA Products Validation System (NPROVS) and JSTAR Mapper

July, 2023

Accomplishments / Events:

- The JSTAR Mapper/STAR Environmental Monitoring System (STEMS) team initiated the NESDIS Get-D Drought monitoring system providing 2-km resolution imagery of Evaporative Stress and Evapotranspiration (ET) indices in 2 to 12 week composite generated from GOES 16 and 17 ABI.
- The NPROVS team continued routine near-real-time ingest of NUCAPS NOAA-21 Beta sounding products for v3 and v3.1 in support of the operational implementation maturity process.
- A case study was developed on NUCAPS soundings associated with the severe storms and downburst winds that impacted Washington DC late in the day on July 29th **(HIGHLIGHT)**
- Good progress was made in the reprocessing of NPROVS Special collocations which includes multiple satellite product suites collocated with the latest versions of Global Climate Observing System (GCOS) Reference Upper Air Network (GRUAN) Radiosondes
- 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 within allotted time-frames as defined by NOAA and DOE.

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		

Overall Status:

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

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

Issues/Risks: None

Highlights

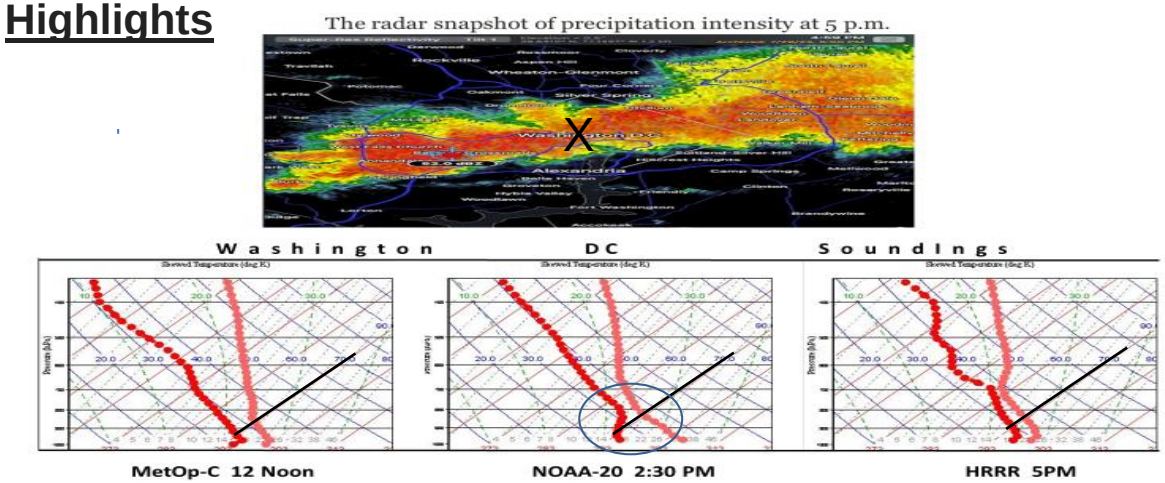


Figure 1 shows snapshots of radar imagery (top) and NUCAPS temperature (lighter red) and dewpoint (darker red) profiles from the MetOp-C (left), NOAA-20 (middle) polar satellites and associated profile from the NWS High Resolution Rapid Refresh (HRRR) analysis (right) at the location "X" foreshadowing the severe thunderstorms and downburst winds that ripped through Washington DC at 5PM on July 29th. Profiles are plotted on a skew-T/Log P thermodynamic diagram with the 293K isotherm (68F) highlighted. Daytime heating and increasing moisture are shown by the sequential satellite overpasses at around noon and 2:30 local time (circle) culminating in the highly unstable profiles shown by the HRRR at around 5PM when the storms hit DC. A more detailed case study including imagery/profiles as the storms moved southward into Southern Maryland is available.

VIIRS Polar Winds

July 2023

Accomplishments / Events:

- **Shortwave Infrared Winds from Heritage and Enterprise Algorithms in Good Agreement:** Currently, at CIMSS the NOAA Enterprise winds algorithm is running routinely, producing shortwave infrared (SWIR) atmospheric motion vectors (AMVs) from S-NPP VIIRS (Figure 1). This is a product that is not running in NESDIS operations. The product utilizes the VIIRS 2.2 µm (M11) channel reflectance to track cloud features. The unique advantage of this channel is that liquid phase objects, including supercooled water droplets that are ubiquitous in polar clouds during the summer season, are highly reflective. Ice phase objects, on the other hand, are less reflective in the shortwave infrared. Overall, the result is a much higher contrast between supercooled water cloud tops and the underlying ice surfaces (Figure 1). In theory, this would lead to much better tracking of many cloud features (e.g., supercooled water clouds) in the M11 band compared to M15 (11 µm), which is used in current operations.

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
Evaluation of VIIRS DNB winds and impact to NWP	Sep-2023	Sep-2023		
VPW Beta Maturity	Nov-2023	Nov-2023		
VPW Provisional Maturity	Jan-2024	Jan-2024		
VPW Validated Maturity	Mar-2024	Mar-2024		

Highlight: Direct Broadcast VIIRS Winds

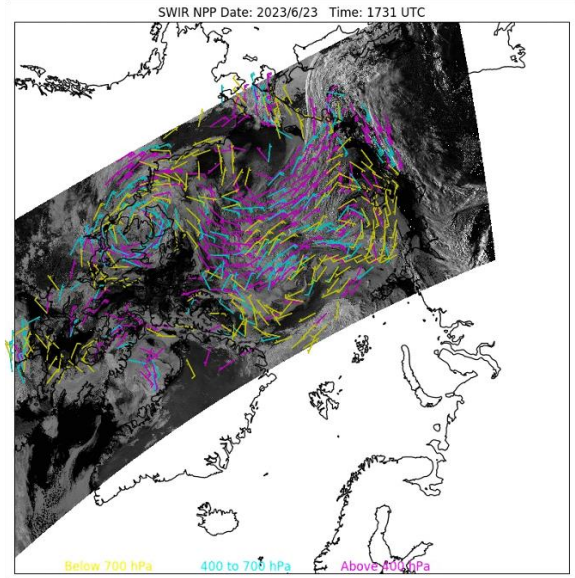


Figure 1: SWIR AMV observations from VIIRS S-NPP on 23 June 2023, at 17:31 UTC over the Arctic.

ICVS

July 2023

Accomplishments / Events:

- Attended IGARSS 2023 meeting held from July 16-21, 2023 in Pasadena, CA. There are two oral presentations from ICVS team. One is given by Banghua Yan titled “Visualizing Radiometric Features of Severe Weather Events Using JPSS SDR Data Within ICVS Framework”, the other by Ding Liang titled “Feasibility ANALYSIS OF OMPS NM SDR DATA LONG-TERM STABILITY ASSESSMENT USING DEEP CONVECTIVE CLOUD TARGETS”.
- Generated 2023 CONUS heat dome event 3D structure using ATMS SDR data to support IGARSS oral presentations.
- Started AMSR-2 radiance data analysis experiments by exploring the significant feature in AMSR-2 SDR observations by different weather events. The purpose of this study is to develop new monitoring products from JPSS supported SDR/L1b data.
- Updated ICVS hurricane event watch package to include NOAA-21 datasets. Provided new hurricane event monitoring products in ICVS severe event watch web pages.
- Finished back processing NOAA-20 OMPS and VIIRS SDR inter-sensor comparison products and post in ICVS-beta website for pre-operational testing..
- Finished the study on OMPS-NM SDR quality evaluation using DCC method and developed a ICVS OMPS modules to process long term data using OMSP reprocessing SDR.
- Support S-NPP CDR recovery activities by providing S-NPP instrument performance and science data quality near real time monitoring products in ICVS website.

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 (inputs are the NDE-generated LP L1B and L1G SDR data per SDR Ozone EDR group’s request)	Jul-23	Dec-23		The data are not available until Nov.
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.*

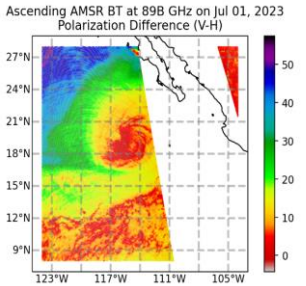
Issues/Risks:

None

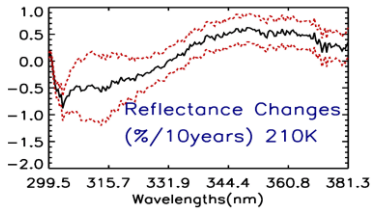
Highlights:

Significantly contribute to STAR SDR Teams

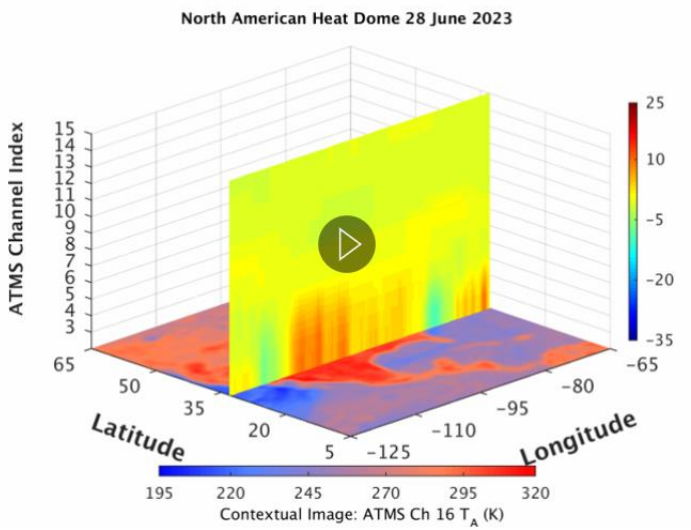
(a) 2023 Hurricane Adrian warm core feature observed by AMSR V-H polarization differences at 89B GHz



(b) S-NPP OMPS NM reprocessing data 10-Year reflectance change trending using DCC method



(c) 2023 CONUS heat dome 3D structure animation using NOAA-20 ATMS SDR data



VIIRS Imagery

July 2023

Accomplishments / Events:

- Evaluated S-NPP EDR Imagery following 7/26 CDP reset. Reported results to SDR team.
- Continued collection and analysis of NOAA-21 VIIRS Imagery, including comparisons with NOAA-20 and S-NPP, communicating findings with the SDR team.
  - Preparation for Aug 3 Val Maturity Review
- CIRA hired two new Imagery Production Experts who, in part, will support the Imagery team with production and dissemination of Imagery
  - These new employees are being spun-up on VIIRS Imagery capabilities, and imagery production techniques. They have already begun generating/sharing imagery!
- Familiarization and optimization of the ASF DNB-to-NCC LUT Generation code was completed. Testing of code continues.
- 13 VIIRS Imagery Posts on CIRA Twitter this Month. A few:
  - Central California at Night in NCC
  - Laval flow in Day Fire RGB
  - Outflow Boundaries in Day Cloud Phase Distinction RGB

Overall Status:

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

1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
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Issues/Risks:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Deliver NOAA-21 VIIRS "First Light" EDR Imagery	Dec-22	Dec-22	Dec-22	
Participate in N-21 VIIRS EDR Imagery Maturity Reviews (B:Feb-23, P:Mar-23, V:Aug-23)				
FY24 Program Management Review	Jun-23	Jun-23	Jun-23	
NCC LUT Development Capability	Sep-23	Sep-23		
New Imagery products or product enhancements (display on SLIDER)	Sep-23	Sep-23	continuing	
Realtime Imagery monitoring and display systems (SLIDER, etc.)	Sep-23	Sep-23	continuing	
Interesting VIIRS Imagery to Social Media and Blogs	Sep-23	Sep-23	continuing	
McIDAS-X/V Enhancements for processing/display of VIIRS Imagery	Sep-23	Sep-23	continuing	
Block 2.3 Mx builds deploy regression review/checkout (Mx8:Jun-23, …)				

Highlights: Image of the Month

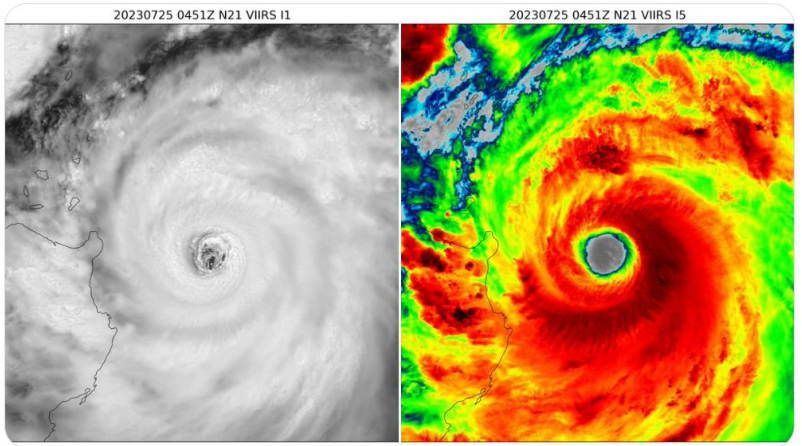

Figure: 25 July 2023 NOAA-21 VIIRS I1 and I5 (VIS and IR) EDR imagery of Typhoon Doksuri in the western pacific Ocean, produced by the Imagery team, and shared by NESDIS comms across social media.

MiRS Products

July 2023

Accomplishments / Events:

- 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. Analysis of reprocessed MiRS SNPP TPW data is continuing. A preliminary analysis of the spatial distribution of TPW trends (mm/decade) is shown in the highlights. The analysis is shown based on data for the period 2012-2022 and indicates that there is significant spatial dependence of the TPW trends. Notably, there appear to be areas of strong positive trends in the subtropical Pacific, the tropical Atlantic, the Arabian Sea, and the Northern Indian Ocean, while negative trends are seen in the Eastern Indian Ocean, Western Australia, the equatorial Pacific, and Western U.S. Generally positive trends are seen in both Northern and Southern polar regions. When averaged globally this results in an estimated trend for the period of 0.33 mm/decade. It should be noted that some of the positive trends may be due to the very strong El Nino event which occurred during 2016-2017, and that analysis using a longer time record of data may show somewhat smaller trends. Comparison with ERA5 reanalysis trends is also planned.

Overall Status:

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

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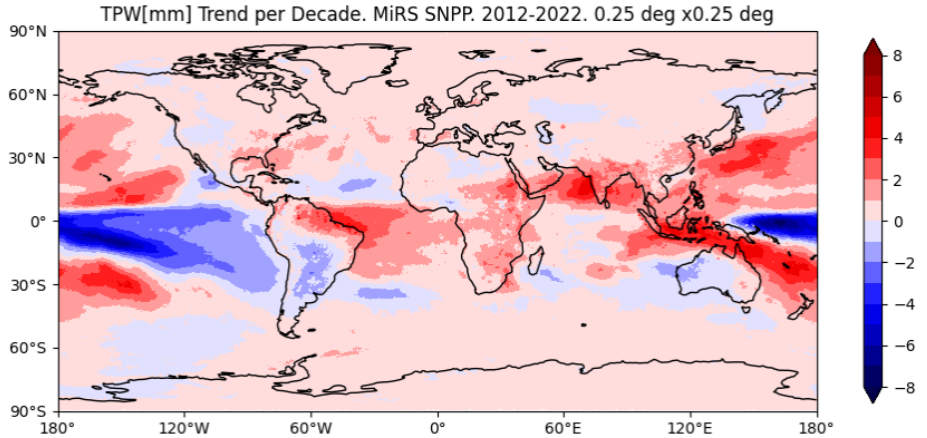
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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		

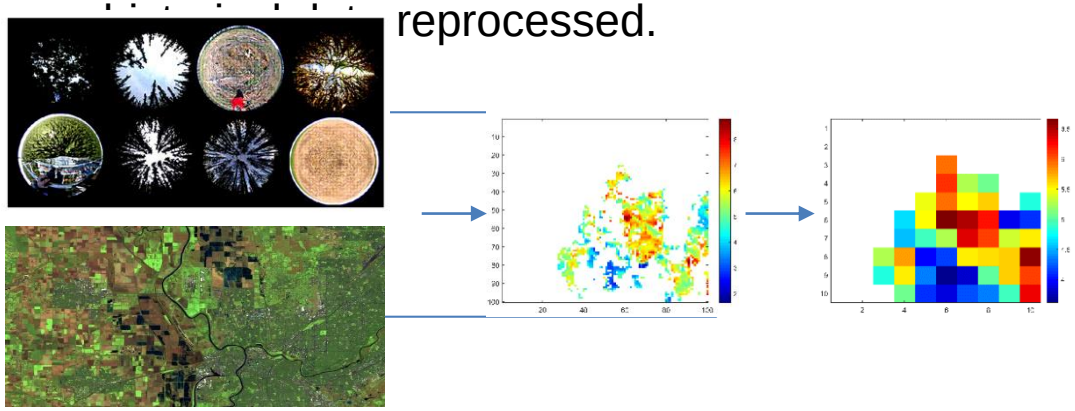
Highlights:

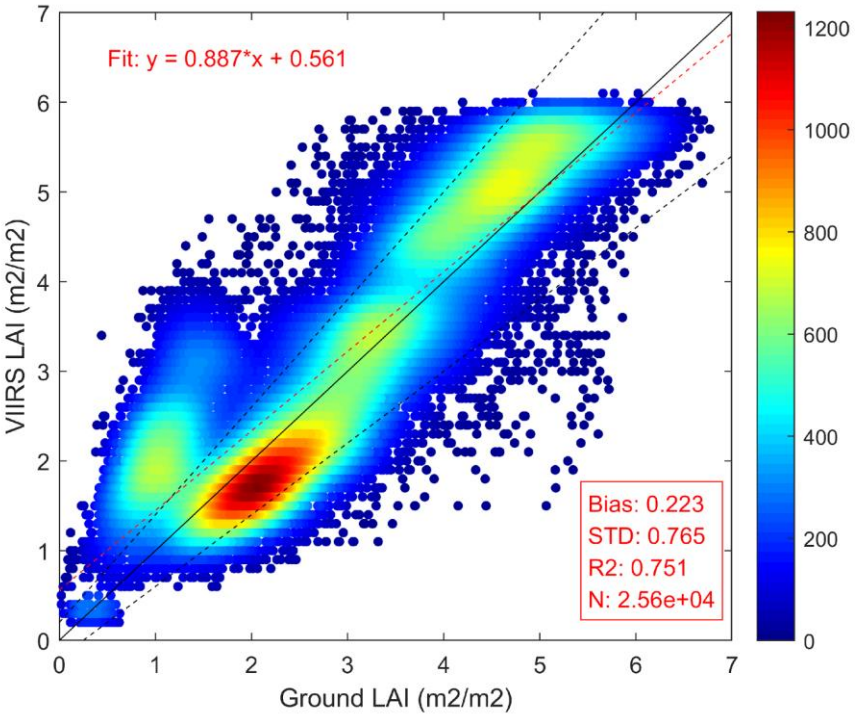


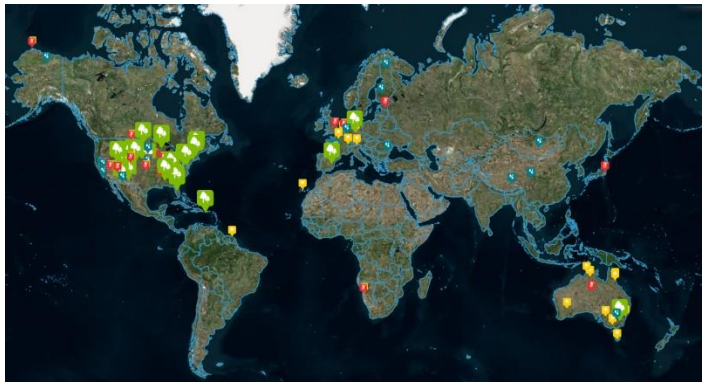
Analysis of global spatial patterns of trends (mm/decade) in MiRS reprocessed SNPP TPW data for the period 2012-2022.

GBOV LAI validation Results

- Copernicus GBOV LAI (https://gbov.acri.fr/)
  - Digital hemispherical photography (DHP) Measurement at sites
  - Upscaling process using high resolution satellite data (L8, S2)
  - Aggregation to 500m for validation
- Validation performance
  - The agreement is good with R^2 of 0.75, while RMSE < 0.8 for all the available sites
  - Should be noted a positive bias is observed, which is similar as the PROBA-V validation (Copernicus validation report, 2019)
  - Other network data will be used for validation once the [illegible] reprocessed.







The GBOV LAI ground sites location (marked with icon of tree the data update to 2022)

Leaf Area Index

July 2023

Accomplishments / Events:

- Keep tracking LAI project in JIRA environment and update weekly, work with the ASSIST team for the code integration & update. Work on the metadata information and setup.
- Reviewed and learned the GBOV LAI dataset validation and performance, investigate the uncertainty of this data.
- Explore the potential use of the GEDI LAI product for inter-comparison in forest and dense vegetation areas.
- Attend IEEE IGARSS 2023 conference and present the “Leaf Area Index Product Development for JPSS Mission”.
- Summer intern project to analyze the vegetation change over the past 20 years and it correlation with land surface temperature trend.

Overall Status:

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

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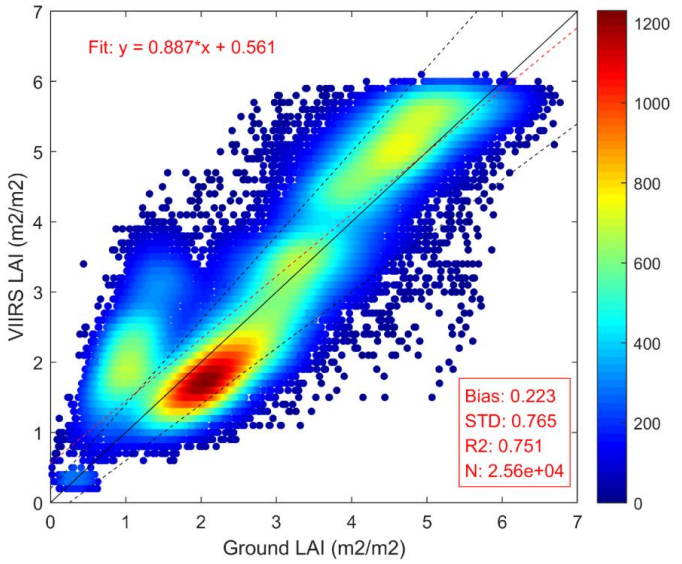
Issues/Risks:

None

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

Highlights:



The LAI preliminary validation using the Copernicus GBOV data (Here use the NEON sites through year of 2020), overall good agreement, the bias is under investigation.

Ocean Color

July 2023

Accomplishments / Events:

NO JULY UPDATE

Overall Status:

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

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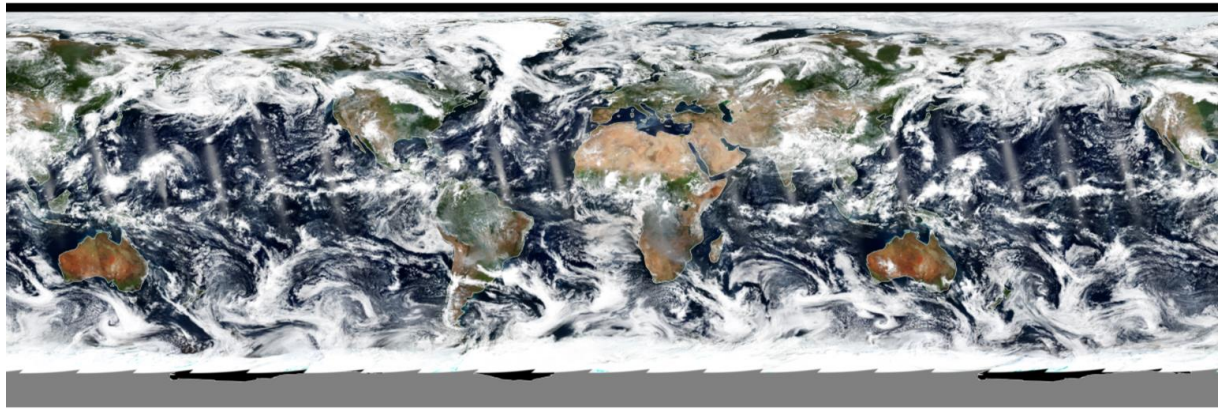
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Ocean Color Image from https://www.star.nesdis.noaa.gov/socd/mecb/color/ocview/ocview.html



GBOV LAI validation Results

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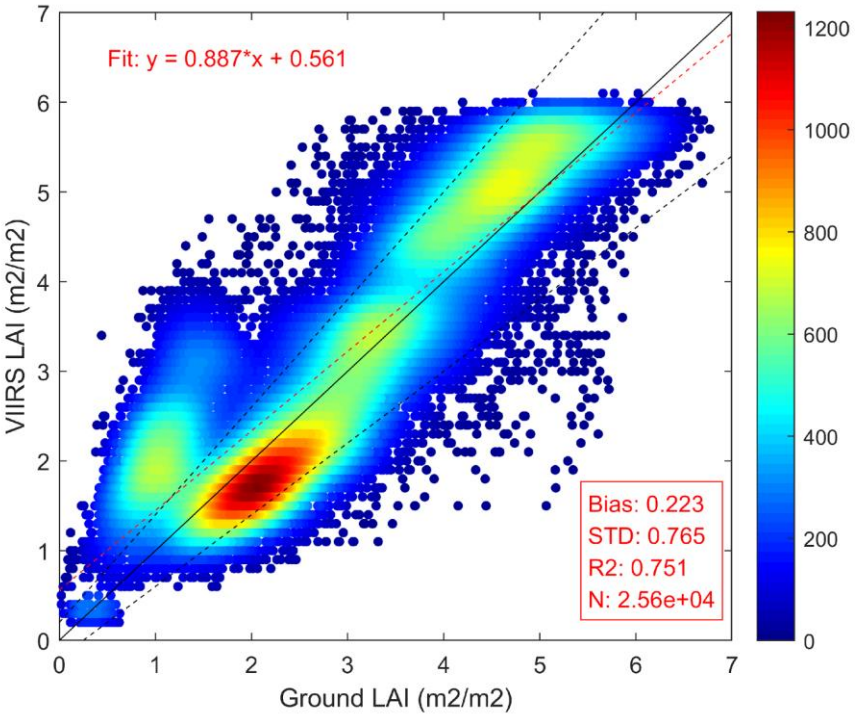
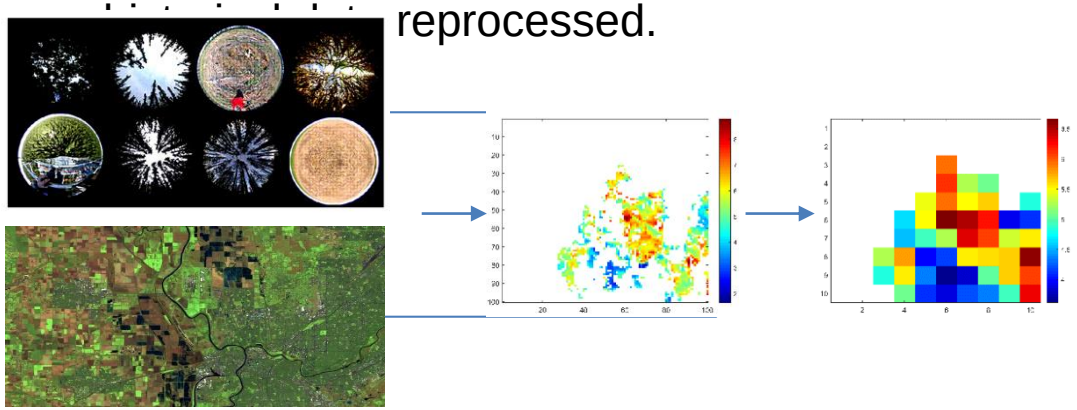
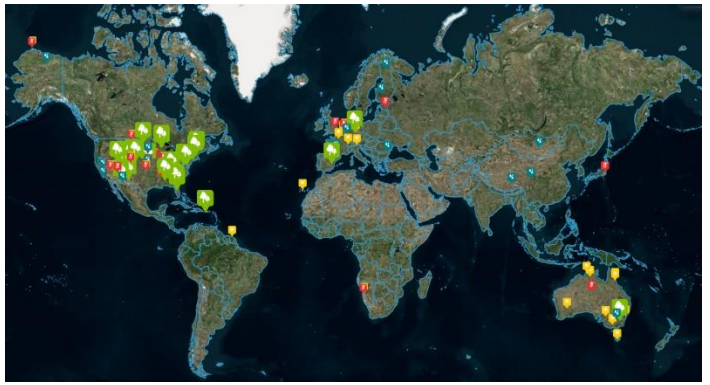
  - Digital hemispherical photography (DHP) Measurement at sites
  - Upscaling process using high resolution satellite data (L8, S2)
  - Aggregation to 500m for validation
- Validation performance
  - The agreement is good with R^2 of 0.75, while RMSE < 0.8 for all the available sites
  - Should be noted a positive bias is observed, which is similar as the PROBA-V validation (Copernicus validation report, 2019)
  - Other network data will be used for validation once the [illegible] reprocessed.



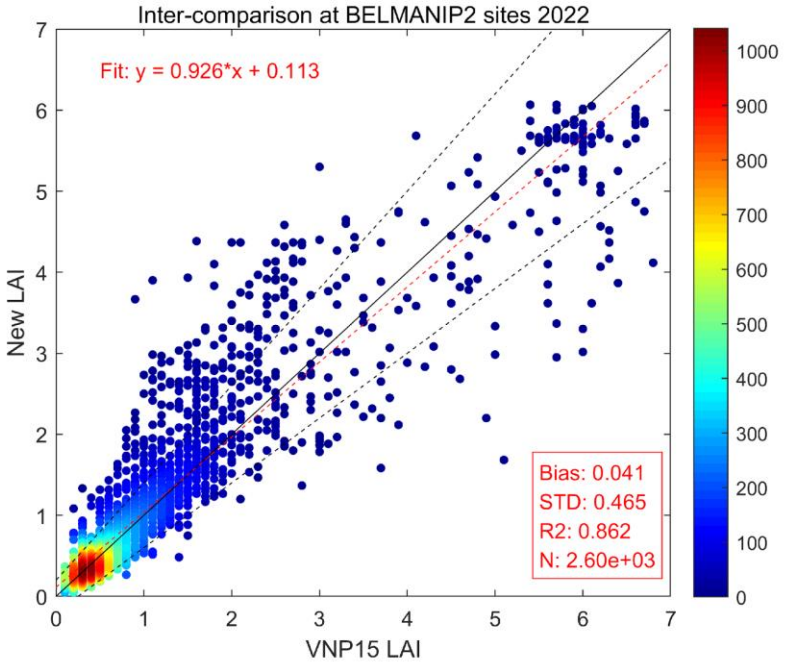


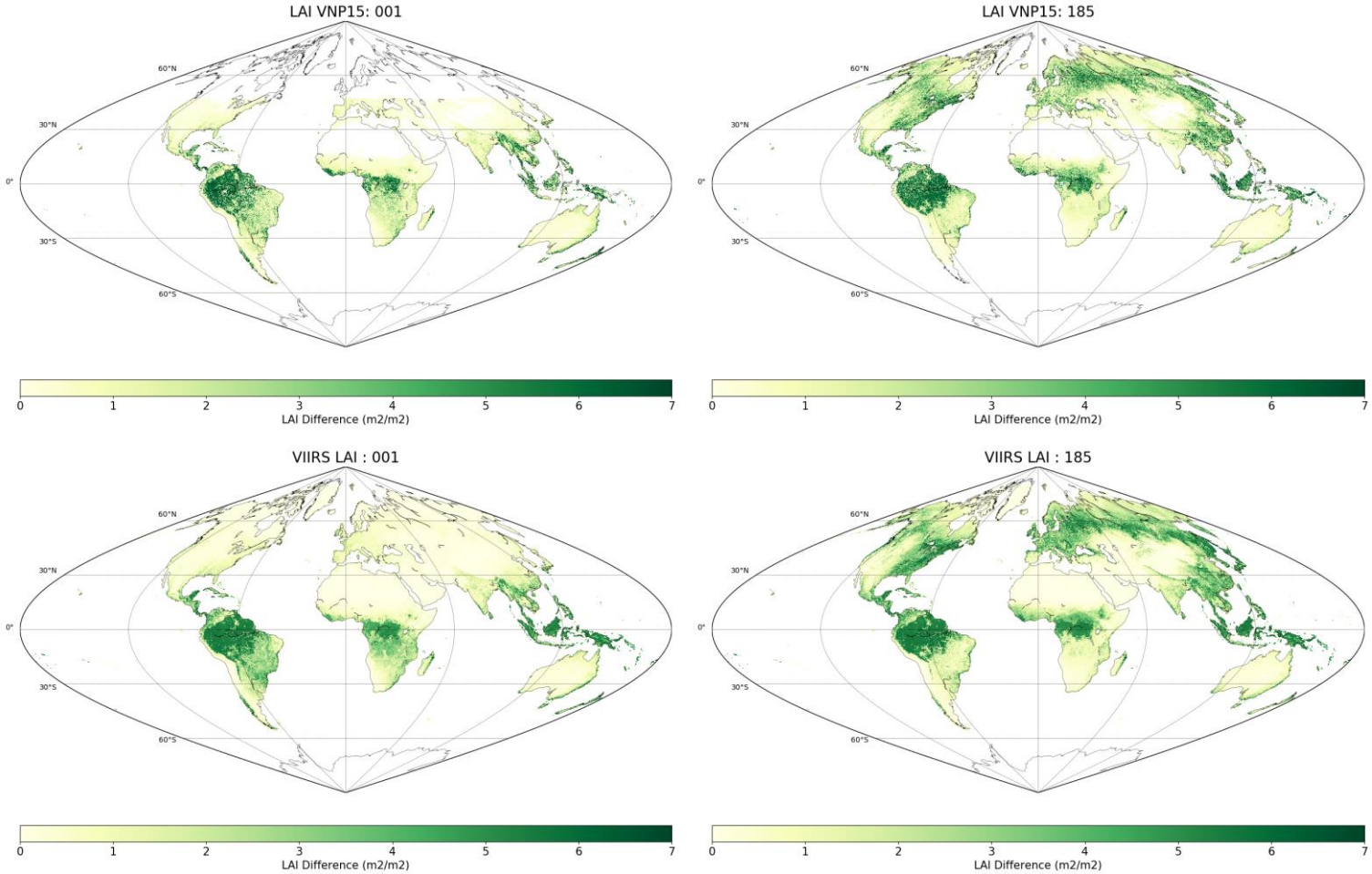


The GBOV LAI ground sites location (marked with icon of tree the data update to 2022)

Evaluation: inter-comparison with VNP15

- Inter-Comparison with wildly used LAI products.
  - Compared with VNP15A2H (Clear sky, main algorithm only)
  - BELMANIP2 (Global 445 sites)
- Results summary
  - Agree well with VNP15





GEDI LAI Investigation

Background:

- LAI has the saturation issue at dense vegetation area, so classic radiative transfer model algorithm has larger uncertainty for forest area.
- Existing LAI products (MODIS, Probe-V, GLASS) differ each other at dense vegetation area.
- LiDAR could direct detection of the vertical structure to get a better LAI estimation
- GEDI L2B LAI (PAI) product has been archived since Feb, 2019

About GEDI PAI:

- Algorithm: GEDI PAI is estimated from gap fraction (P) based on Beer's law. The gap fraction can be inverted by the ground-to-total energy ratio (Eq. 1-2, Tang, 2019)
- The PAI (plant area index) include not only leaves but also branches and trunks which also reflect the laser.
- The PAI is effective LAI, need the correction using clumping index to get true LAI.
- Calculate the total PAI from vertical PAI.
- Data filtering is needed, not only the QFs, but also ancillary data such as DEM.
- Validations are still limited and challenging. Need more investigation before apply on our product development or evaluation.

$$LAIe = -\frac{1}{G \times \Omega} \times In(P) \qquad (1)$$

$$P = 1 - \frac{1}{1 + \frac{R_g}{R_v} \times \frac{\rho_v}{\rho_g}} \qquad (2)$$

where G is the leaf projection distribution function, Ω is the clumping index, Rg/Rv is the ground-to-total energy ratio, and the *rv*/*rg* is the ratio of vegetation and soil reflectance.

Surface Albedo

July 2023

Accomplishments / Events:

- Visual inspection of the NOAA-21 albedo in comparison with NOAA-20 and S-NPP
- Ground validation of NOAA-21 albedo
- Global cross-comparison between NOAA-21 SURFALB and NOAA-20 and S-NPP counterpart
- Evaluated the quality flag and metadata performance in the Beta test dataset

Overall Status:

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

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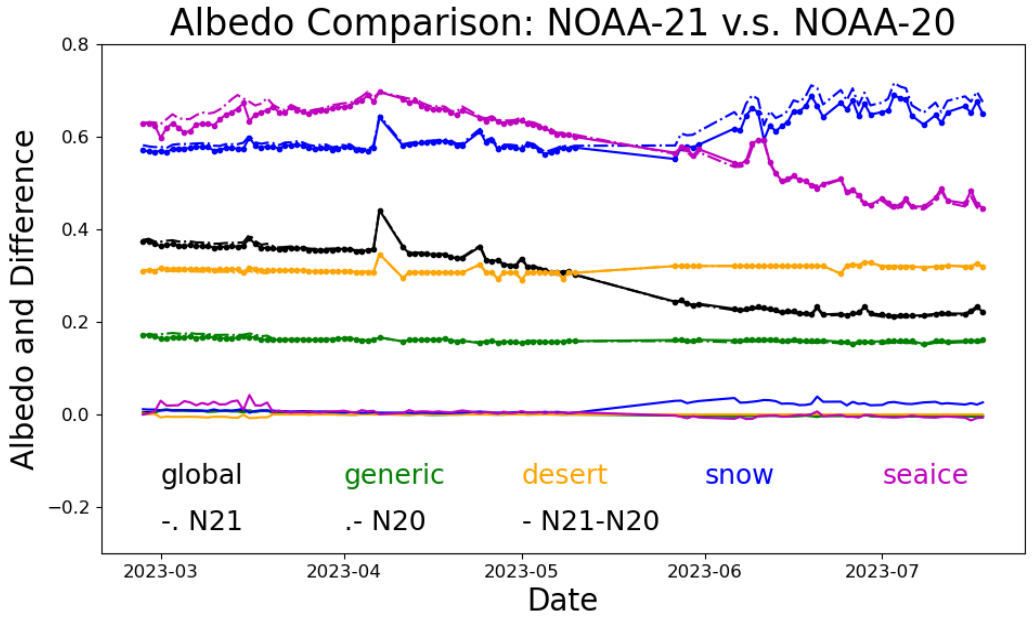
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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			

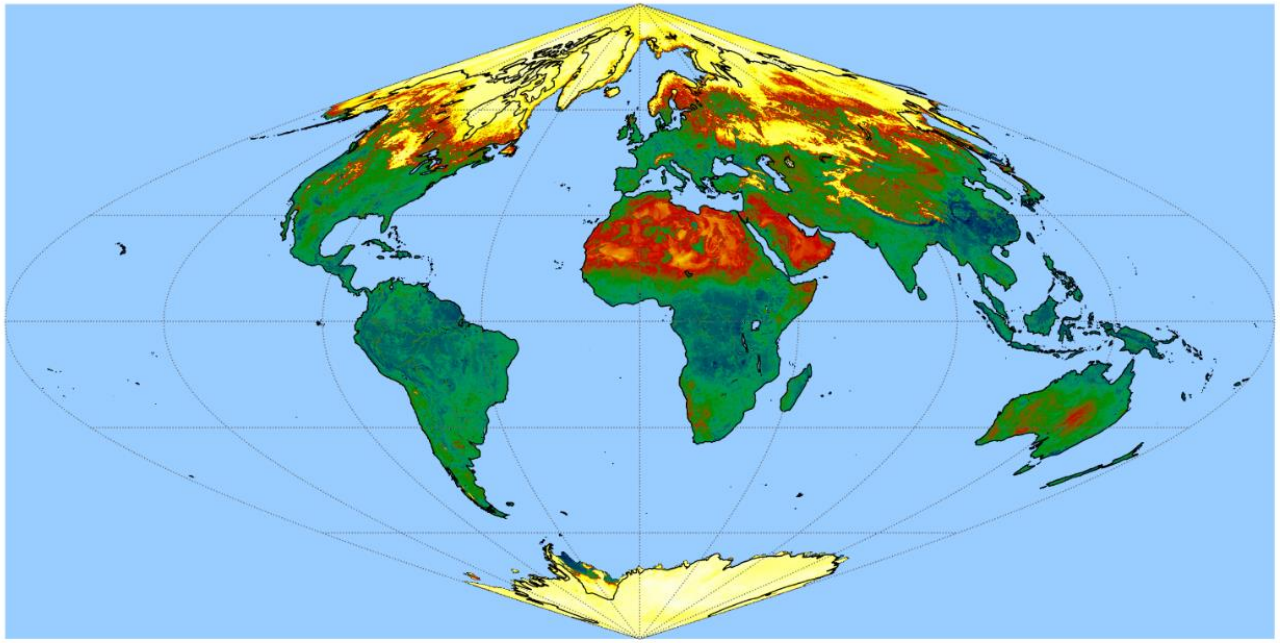
Highlights: Cross-comparison between NOAA-21 and NOAA-20



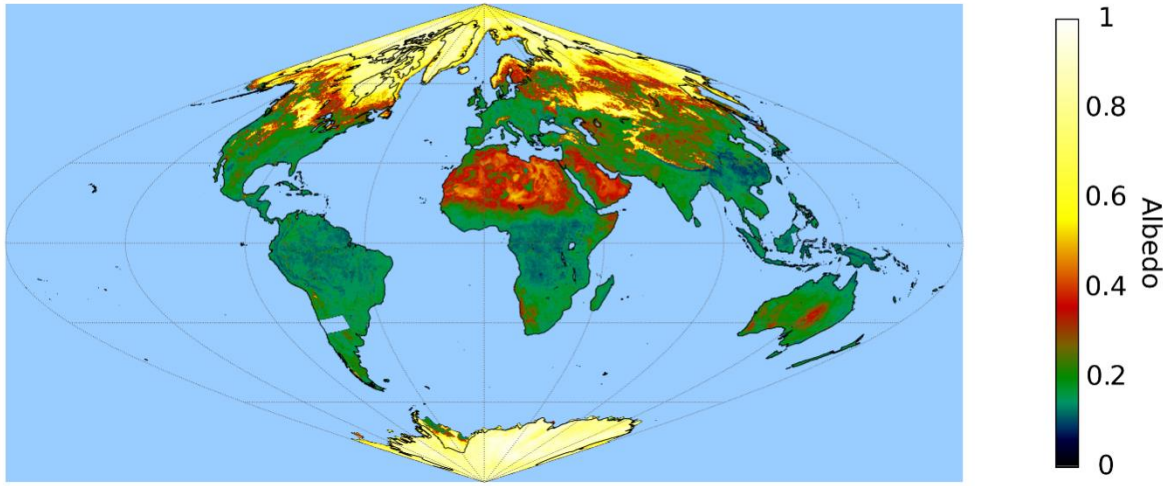
Evaluation of algorithm performance to specification requirements

- ***Algorithm performance evaluation***
  - Visual Inspection

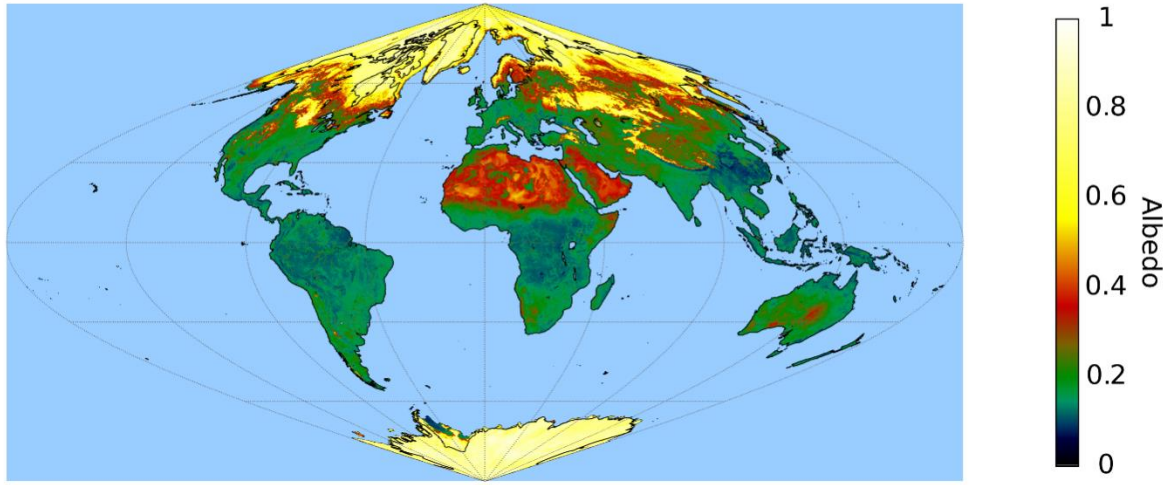
NOAA21 VIIRS v2r2 SURFALB Albedo Mar 20 2023



SNPP VIIRS v2r2 SURFALB Albedo Mar 20 2023

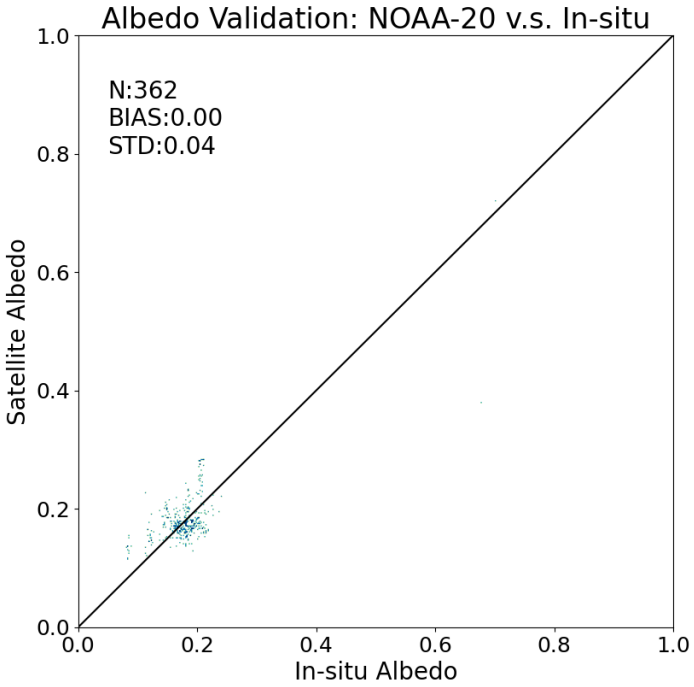


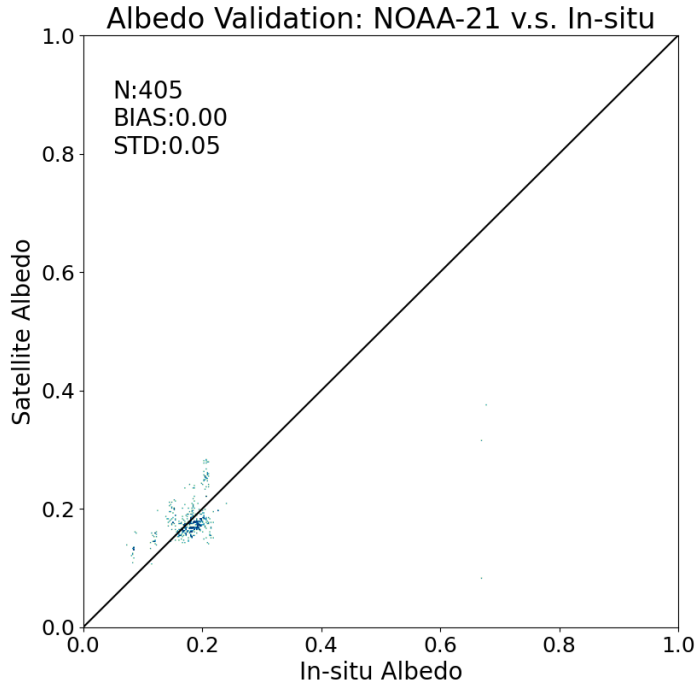
NOAA20 VIIRS v2r2 SURFALB Albedo Mar 20 2023

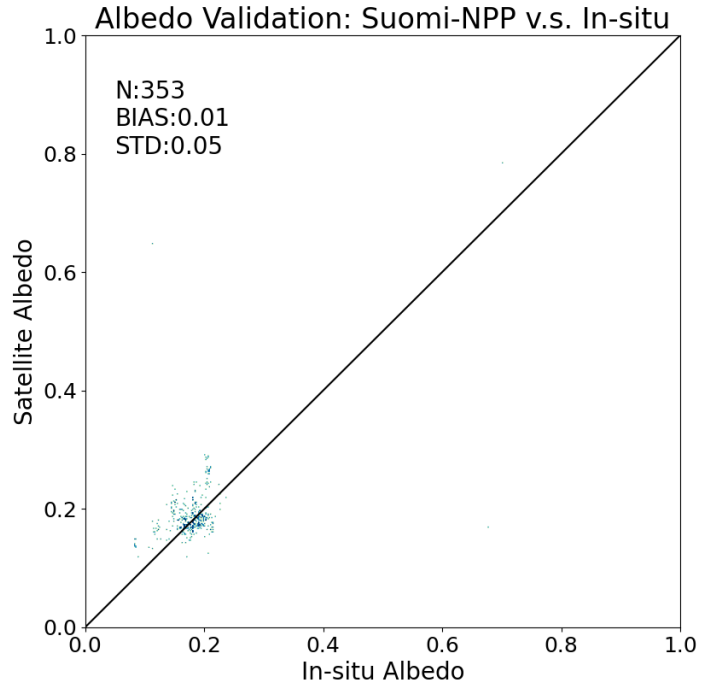


The NOAA21 VIIRS albedo has similar distribution as that from NOAA20 and SNPP.

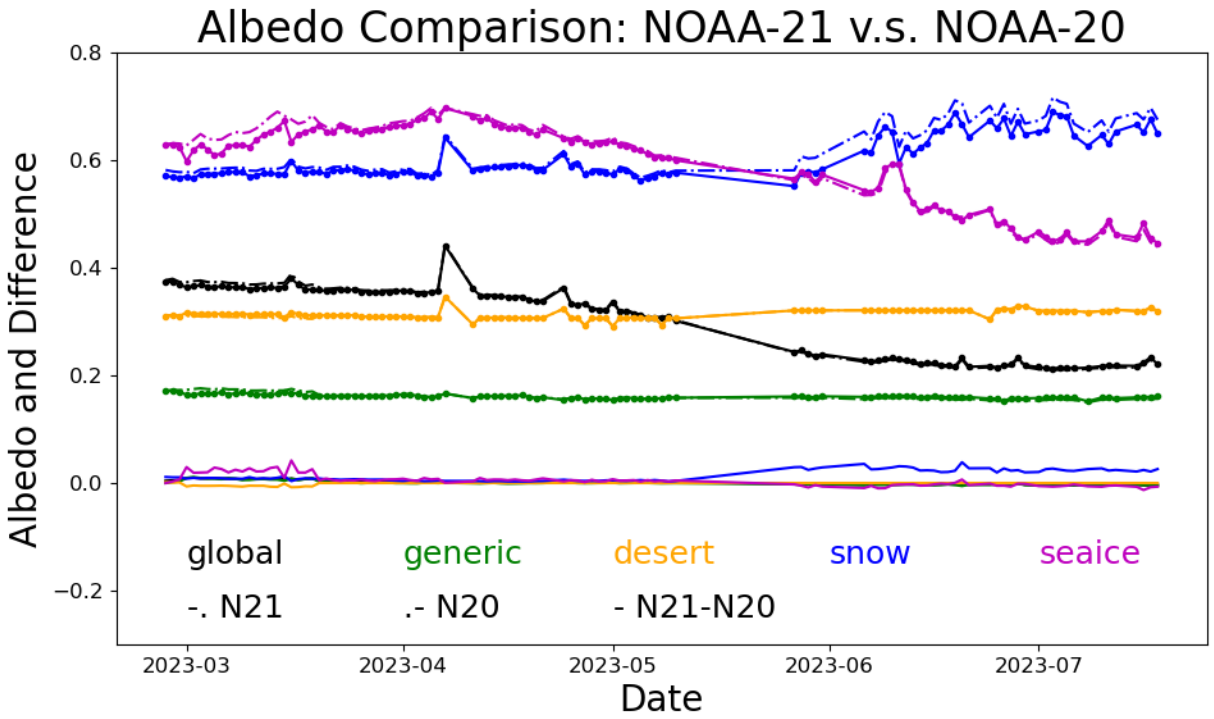
- ***Algorithm performance evaluation***
  - Validation data sets
    - Ground measurements from SURFRAD, BSRN, ARM-SGP, NEON from Feb 22 to Jul 18, 2023
  - Validation strategies / methods
    - Direct comparison
  - Validation results
    - The N21 accuracy and bias has met the requirements

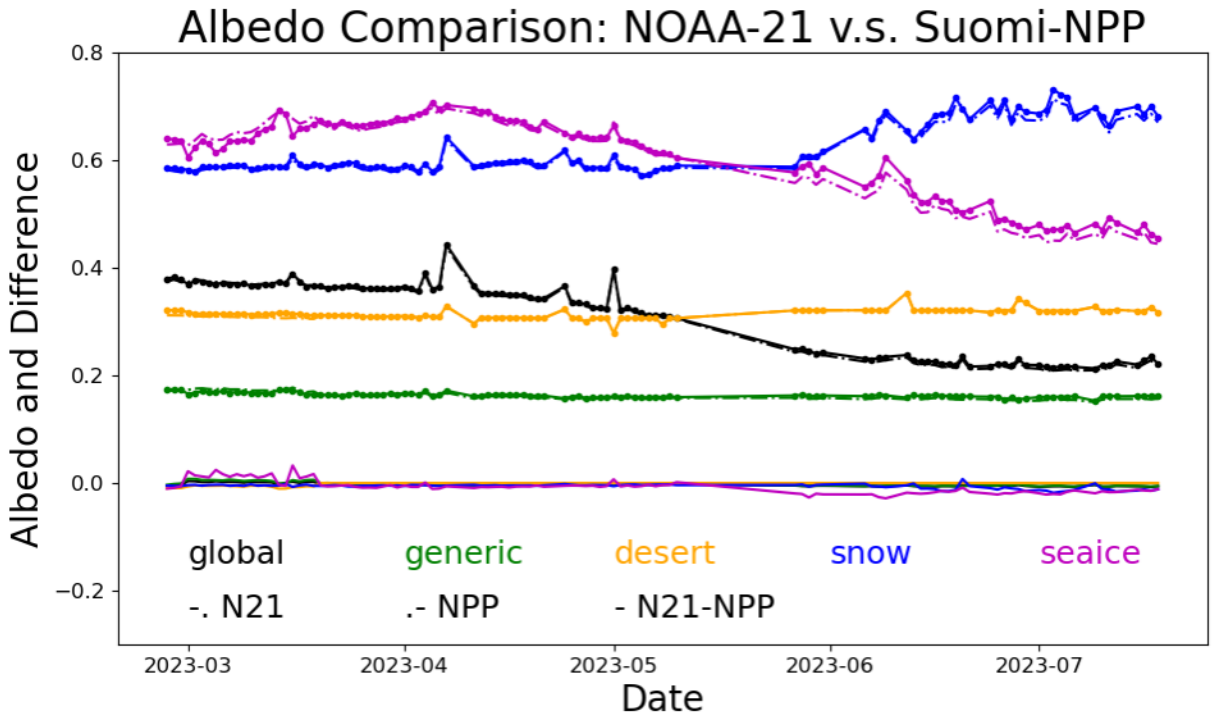






- Inter-sensor comparison
  - Compare with S-NPP and NOAA-20 over the globe and different retrieval paths
  - The algorithm version of the data source was the same v2r2 before May 10, and then S-NPP and NOAA-20 went back to v1r4 due to resource allocation and NOAA-21 uses v2r2
  - Results suggest NOAA-21 LSA is similar with S-NPP and NOAA-20 under the same version

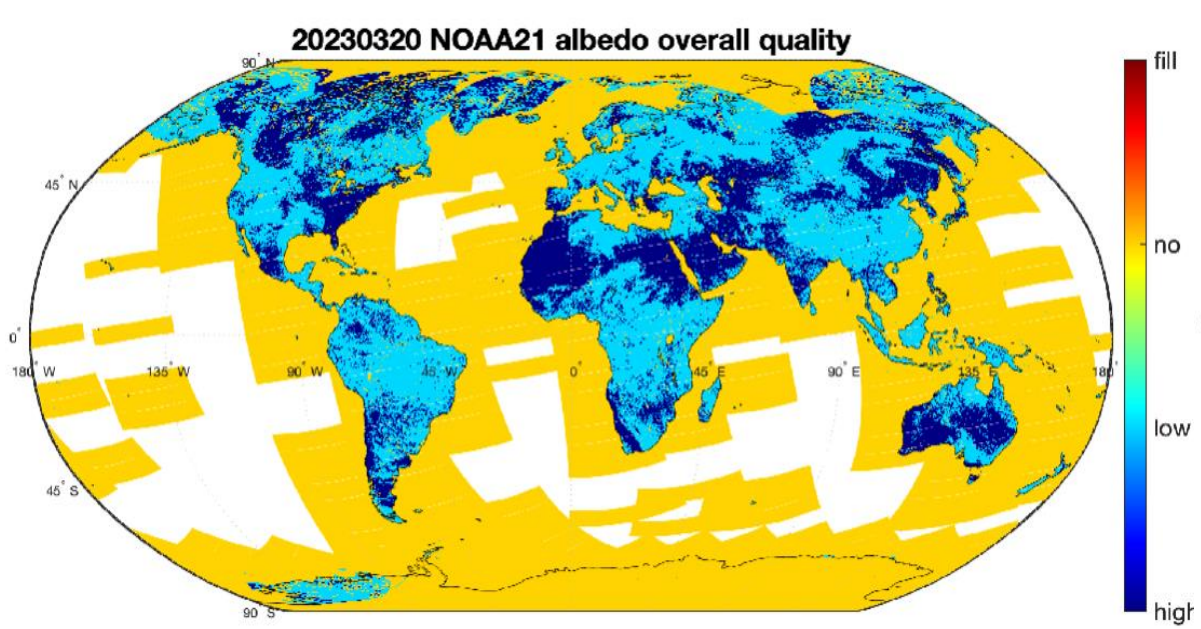


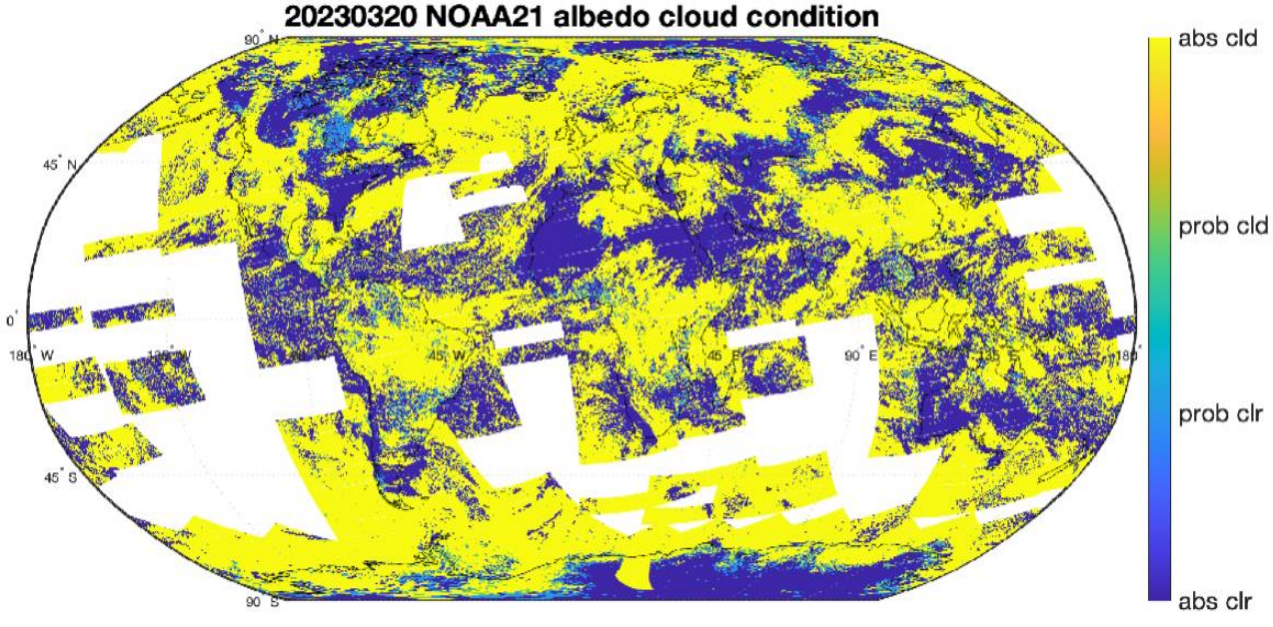


The NOAA-20 LSA and S-NPP LSA before May 10 used the same version (v2r2) with NOAA-21, meaning they use the same snow/ice mask, leading to a better consistency. After May 10, the difference over snow and ice albedo are larger due to the difference between VIIRS snow mask/ice concentration and IMS snow/ice mask.

Quality flag analysis/validation

- Defined Quality Flags

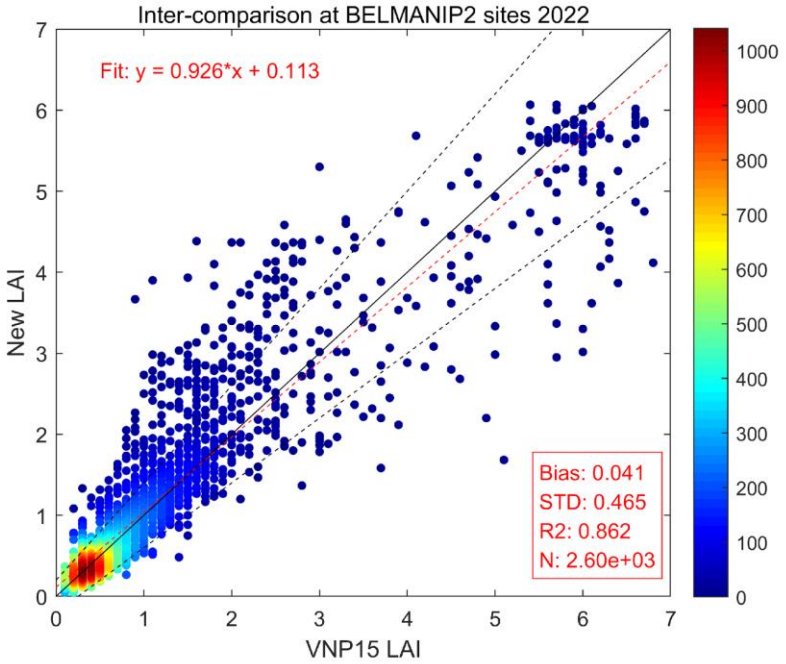


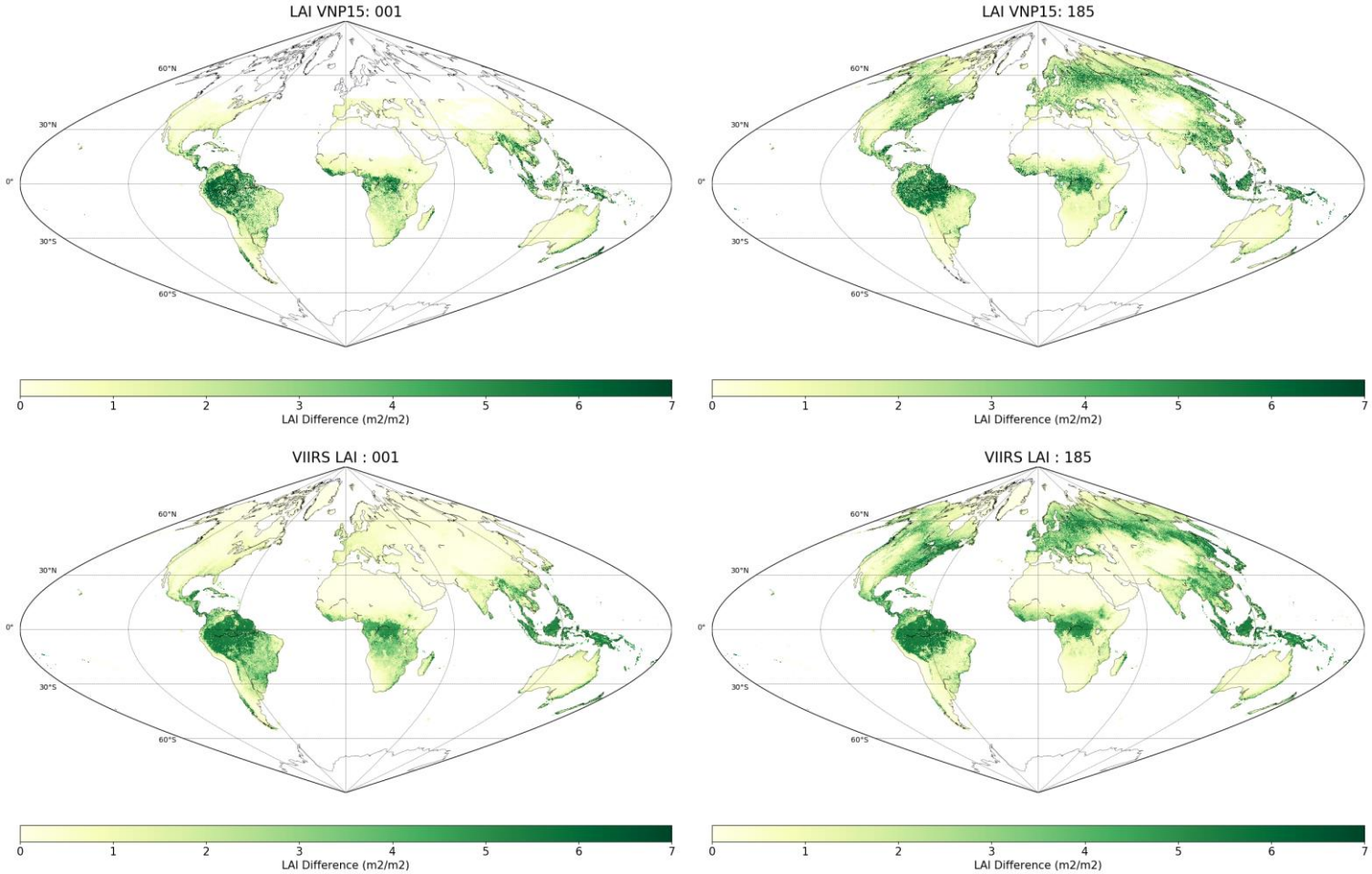


- The overall quality flag is largely determined by the cloudy condition.
- The overall quality flag and the cloud flag are consistent, and their distribution look reasonable

Evaluation: inter-comparison with VNP15

- Inter-Comparison with wildly used LAI products.
  - Compared with VNP15A2H (Clear sky, main algorithm only)
  - BELMANIP2 (Global 445 sites)
- Results summary
  - Agree well with VNP15
  - Slightly positive bi





GEDI LAI Investigation

Background:

- LAI has the saturation issue at dense vegetation area, so classic radiative transfer model algorithm has larger uncertainty for forest area.
- Existing LAI products (MODIS, Probe-V, GLASS) differ each other at dense vegetation area.
- LiDAR could direct detection of the vertical structure to get a better LAI estimation
- GEDI L2B LAI (PAI) product has been archived since Feb, 2019

About GEDI PAI:

- Algorithm: GEDI PAI is estimated from gap fraction (P) based on Beer's law. The gap fraction can be inverted by the ground-to-total energy ratio (Eq. 1-2, Tang, 2019)
- The PAI (plant area index) include not only leaves but also branches and trunks which also reflect the laser.
- The PAI is effective LAI, need the correction using clumping index to get true LAI.
- Calculate the total PAI from vertical PAI.
- Data filtering is needed, not only the QFs, but also ancillary data such as DEM.
- Validations are still limited and challenging. Need more investigation before apply on our product development or evaluation.

$$LAIe = -\frac{1}{G \times \Omega} \times In(P) \qquad (1)$$

$$P = 1 - \frac{1}{1 + \frac{R_g}{R_v} \times \frac{\rho_v}{\rho_g}} \qquad (2)$$

where G is the leaf projection distribution function, Ω is the clumping index, Rg/Rv is the ground-to-total energy ratio, and the *rv*/*rg* is the ratio of vegetation and soil reflectance.

OMPS SDR

July 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.
- Analyzed NOAA-21 OMPS NM PRNU data taken throughout February and June.
- Continued the DR-10365, which was opened to investigate the time-dependent 0.03 nm discrepancy in the Solar Irradiance wavelength scales for NOAA-21 OMPS NP.
- Further examined and improved the NOAA-21 OMPS NP stray-light table.
- Routinely monitored NOAA-21 OMPS dark rate performance, gain and non-linearity trending.
- Continued on analysis of OMPS NP Earth-View wavelength shift values.
- Continued on analyzing the sensitivity of the NOAA-21 OMPS NP bandpass data.
- Re-assessed the SNPP OMPS NM and NP SDR data quality: dark rate variation and impact assessment; the dark LUTs; instrument temperature; SNR and wavelength shift features.
- Continued to improve the OMPS SDR VCRTM package in coordination with the CRTM team.

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	Oct-23		N21 OMPS NM/NP SLT analysis higher priority; SNPP recoveray
Improve the calibration accuracy of NOAA-21 OMPS SDR towards Validated Review	Jun-23		Jun-23	A new NM SL LUT; new NP solar LUTs
Inter-sensor comparison with Tropomi since the door-open	Aug-23	Oct-23		SNPP recovery assessment
OMPS NM, NP SDR Validated Maturity: Status Preview	Sept-23	Nov-23		SNPP recovery assessment; new bandpass data analysis
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:

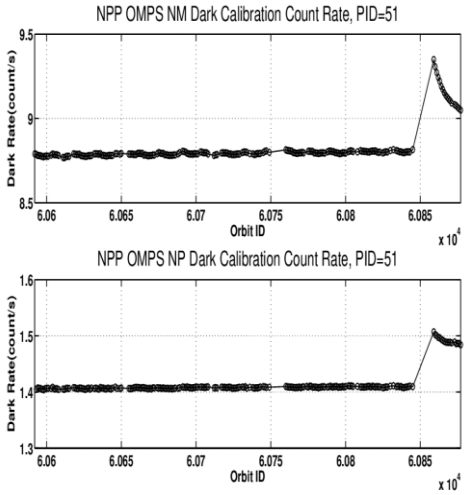
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule			x		

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

Left: SNPP OMPS NM (top) and NP (bottom) dark count rate time series



Right: SNPP OMPS NM along-track wavelength before and after the recovery

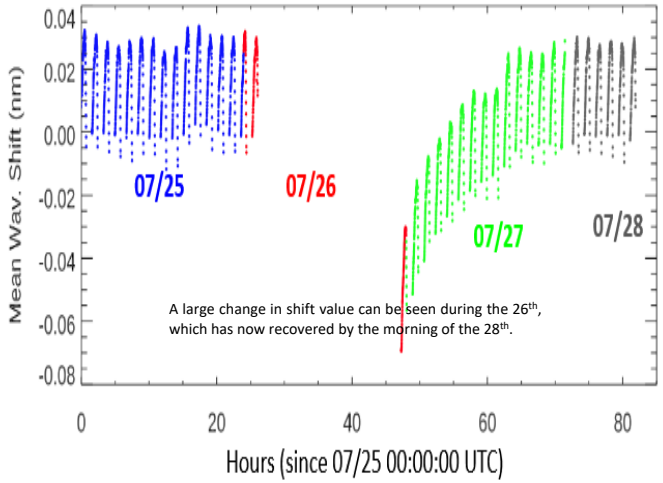


Figure Left panel: SNPP OMPS NM (top) and NP (bottom) dark calibration count rates up through orbit 60877. Right panel: SNPP OMPS NP intra-orbital wavelength shift values for July 25 (blue), 26 (red), 27 (green), and 28 (grey)

Vegetation Index and Green Vegetation Fraction

July 2023

Accomplishments / Events:

- Prepared for beta review of NOAA-21 VI and GVF through
  - Visual assessment
  - Inter-sensor comparison
  - Stratified and time series statistics

  Overall performance meets specifications for all variables
- Worked on developing very high resolution Veg product using data fusion between VIIRS VI and Sentinel-2 data
- Evaluated the operational GVF data after NDE resolved an input data issue

Overall Status:

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

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

Issues/Risks:

None

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:

TOC EVI

Attribute Analyzed	Requirement/ Threshold	On-orbit Performance		Meet Requirement?
		NOAA-21 vs NOAA-20	NOAA-21 vs. S-NPP	
Accuracy	0.05 VI units	0.0042	0.0149	Yes
Precision	0.04 VI units	0.0278	0.0293	Yes
Uncertainty	0.11 VI units	0.0281	0.0329	Yes

GVF

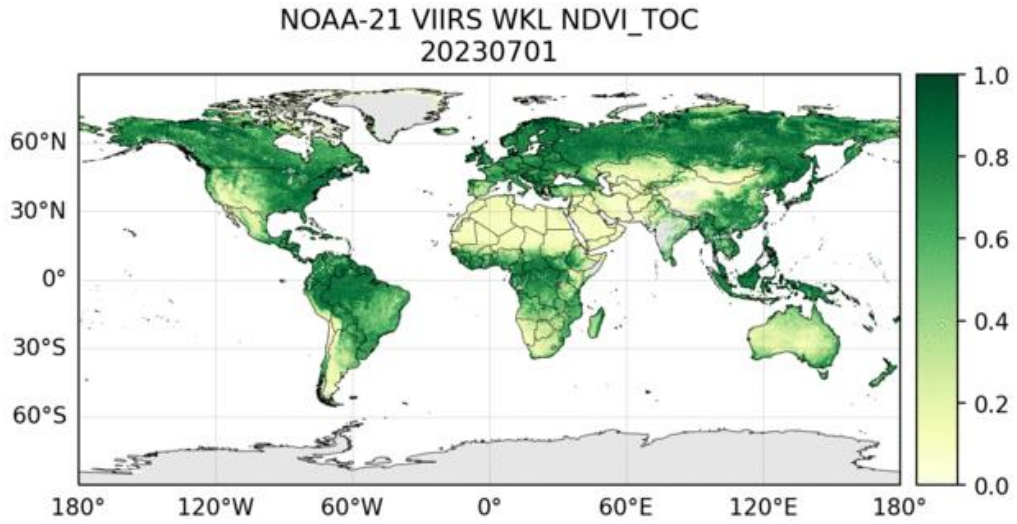
Attribute Analyzed	Requirement/ Threshold	On-orbit Performance		Meet Requirement?
		NOAA-21 vs NOAA-20	NOAA-21 vs. S-NPP	
Accuracy	12%	0.73%	1.43%	Yes
Precision	15%	4.80%	4.98%	Yes
Uncertainty	17%	4.85%	5.18%	Yes

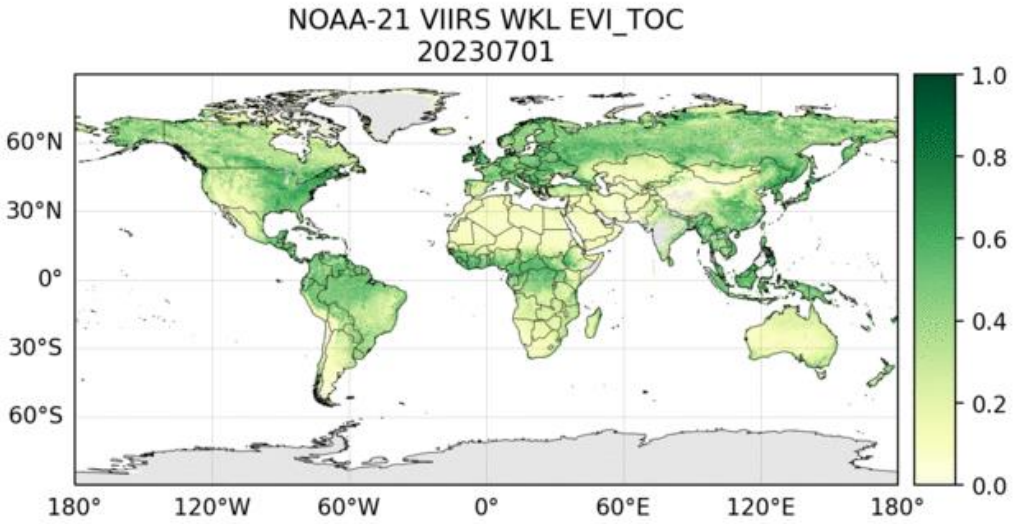
All VI variables and GVF meet specified performance with NOAA-21 data when compared against NOAA-20 and SNPP.

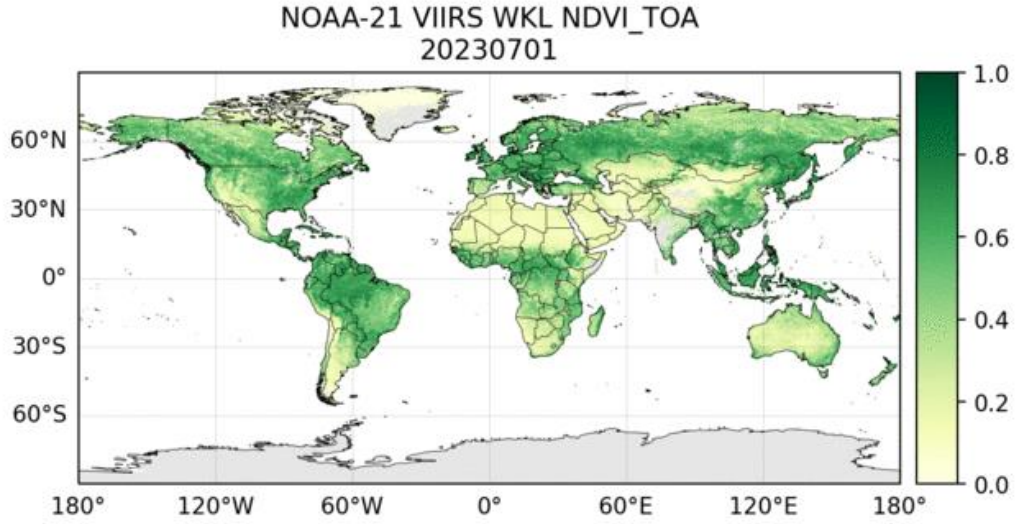
Shown to the left are TOC EVI and GVF. TOA NDVI and TOC NDVI also meet specifications (shown on slide 10.)

Visual Assessment of NOAA-21 VI: Animation

- Weekly VI variation from 20230701 to 20230710



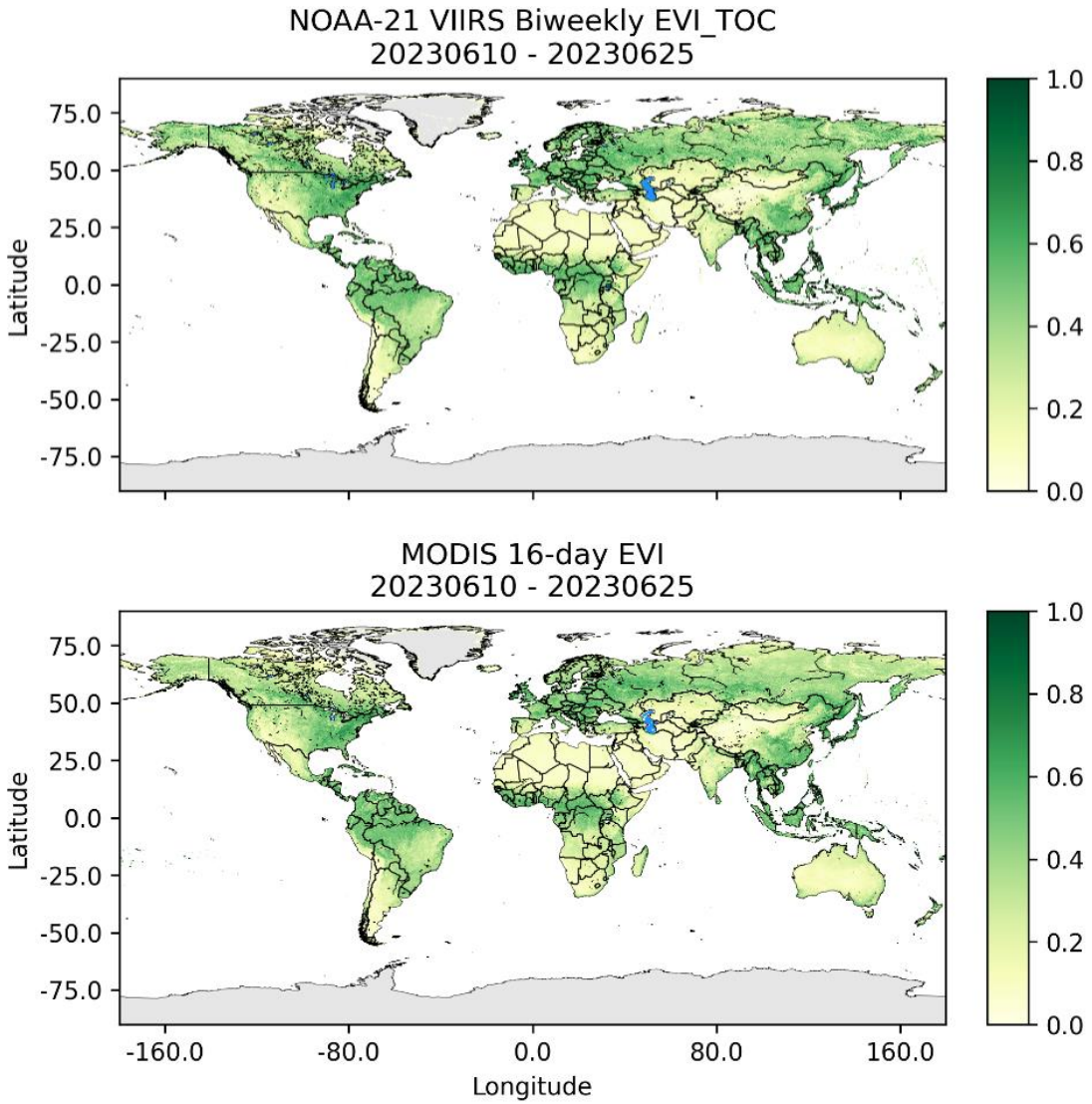




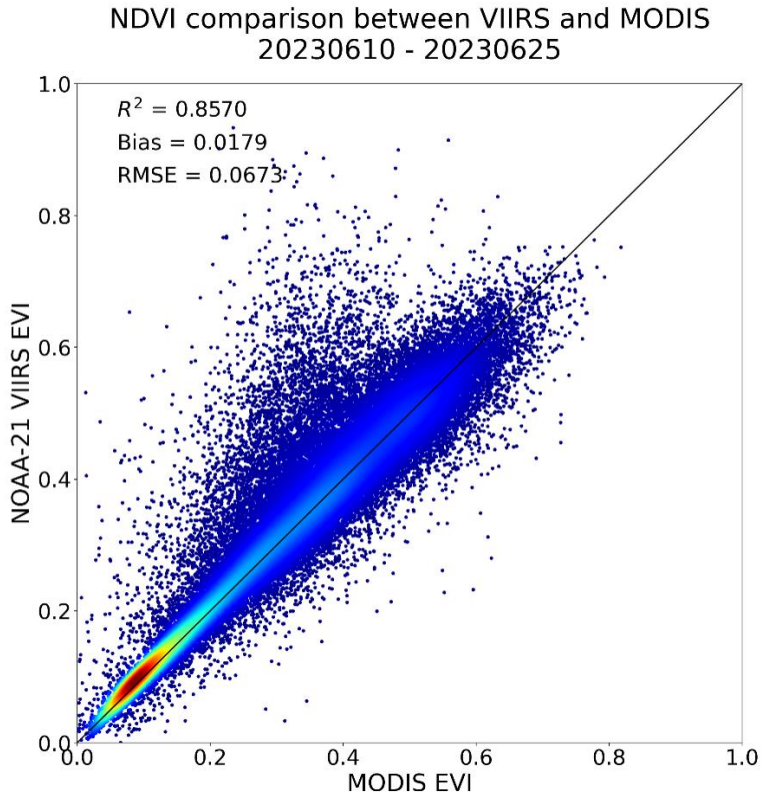
- ✔ All the three VI variables show reasonable land cover dependence and spatial patterns in the month of July;
- ✔ Weekly VIs are relatively stable during the selected time period because land covers don't change rapidly in a 10-day period.

Inter-sensor Comparison of VIIRS and MODIS EVI

- Compare with MODIS EVI product



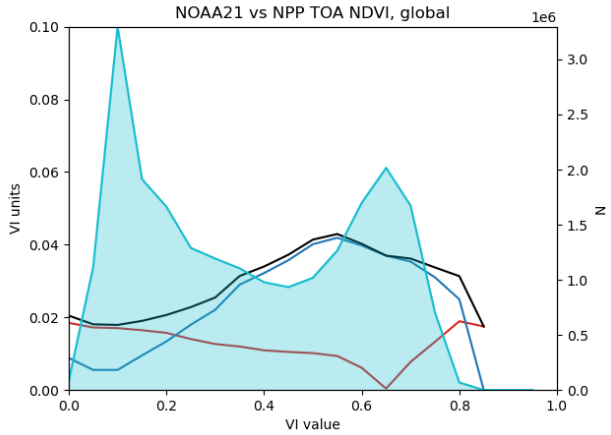
- ✔ VIIRS Biweekly EVI_TOC v.s. MODIS Aqua 16-day EVI (MYD13C1).
- ✔ VIIRS Biweekly VI product of 20230625 is selected to match with MODIS VI product of 20230618 due to the different definition of temporal composite between the two products.

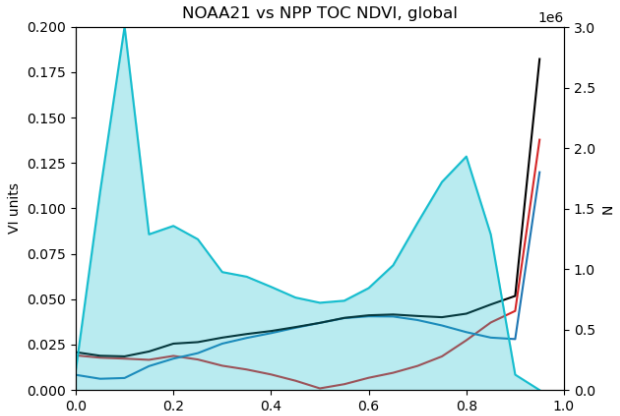


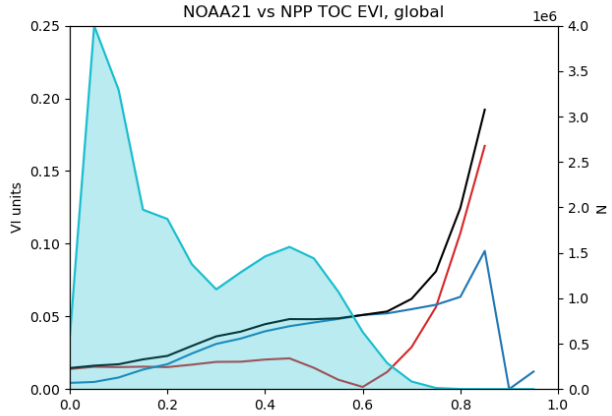
- ✔ Visual assessment shows similar distribution patterns, and quantitative comparison also indicates high correlation and consistence between the two products.

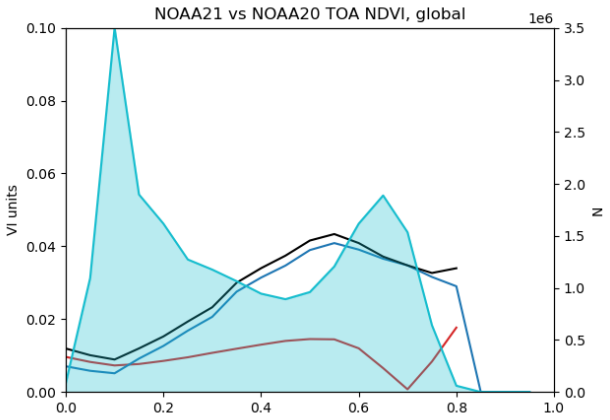
Comparison of NOAA-21 VI with SNPP and NOAA-20 VI: Stratified

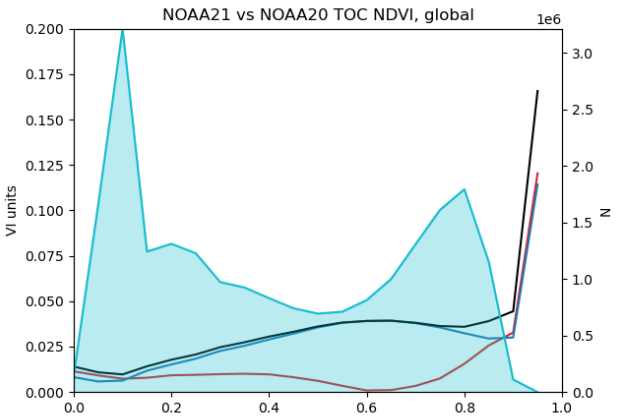
- NOAA-21 mean absolute difference (accuracy), standard deviation (precision), and RMS difference (uncertainty) were found using 8 days of global TOA NDVI, TOC NDVI, and TOC EVI compared to NOAA-20 and SNPP VIs for 0.05 VI unit bins. APU statistics and histograms of pixel numbers in each bin are shown below.
- Accuracy, precision, and uncertainty only exceed specifications at the highest TOC NDVI and TOC EVI values, where there are few pixels with those values.

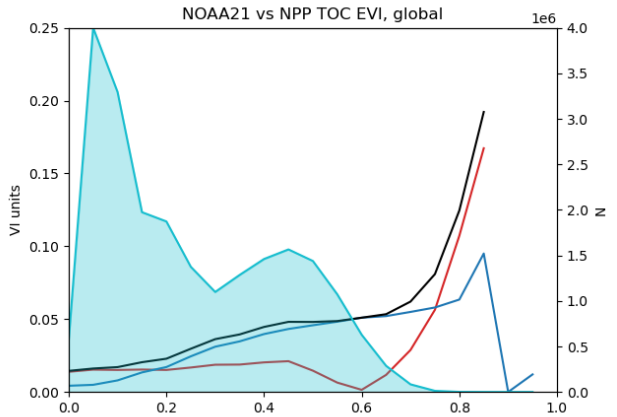








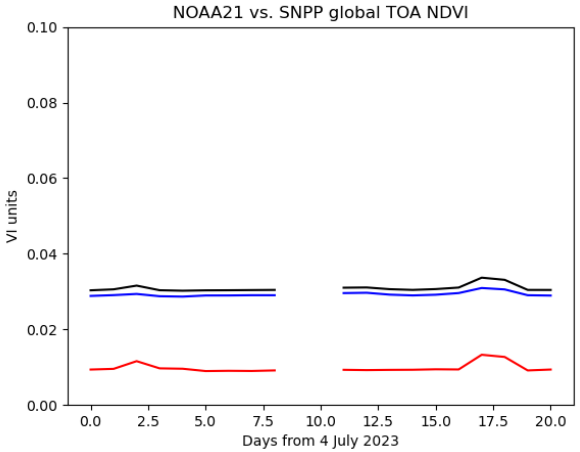


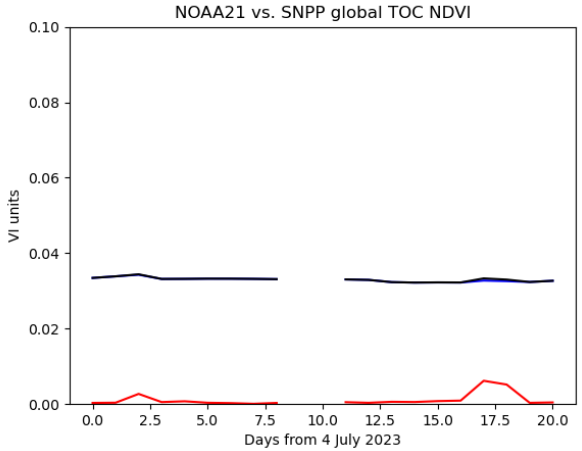


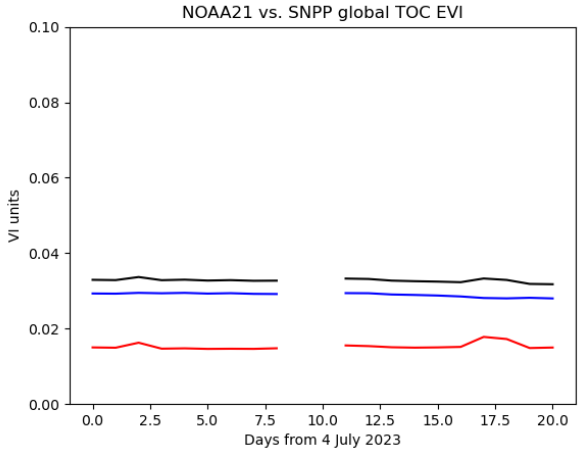
Accuracy
Precision
Uncertainty
Number of pixels

Comparison of NOAA-21 VI with SNPP and NOAA-20 VI: Time series

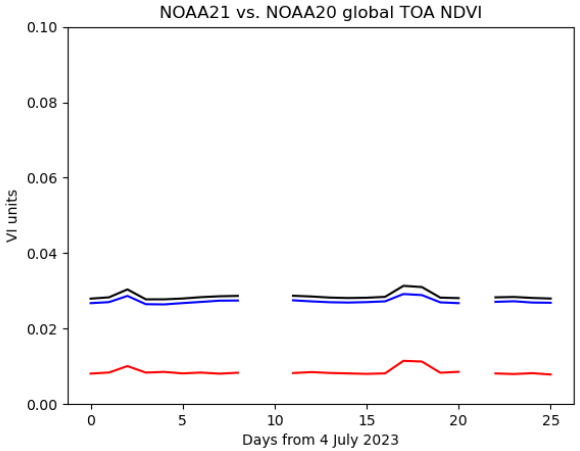
- Time series of NOAA-21 accuracy, precision, and uncertainty statistics were made for each VI against 21 days of SNPP VIIRS data and 26 days of NOAA-20 VIIRS data. Data gaps are due to missing NOAA-21 data in I&T stream.
- The statistics were within specifications and stable across these short time series. Time series analyses over longer time intervals will be made once more data are available.

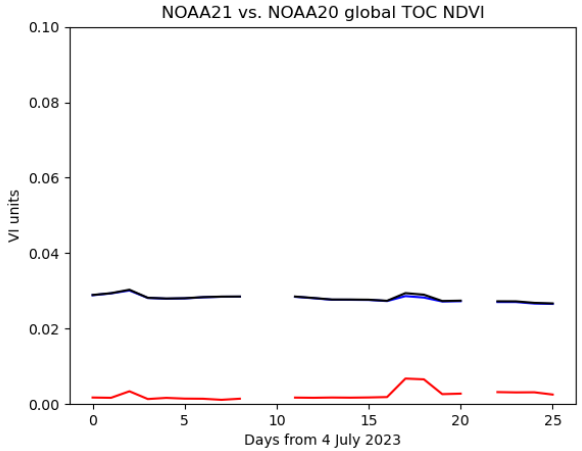


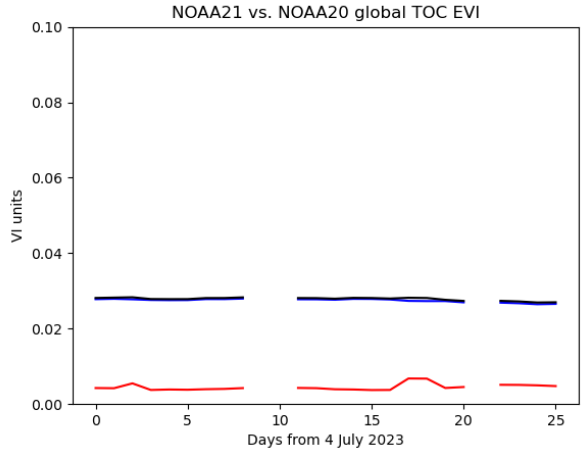




Accuracy
Precision
Uncertainty





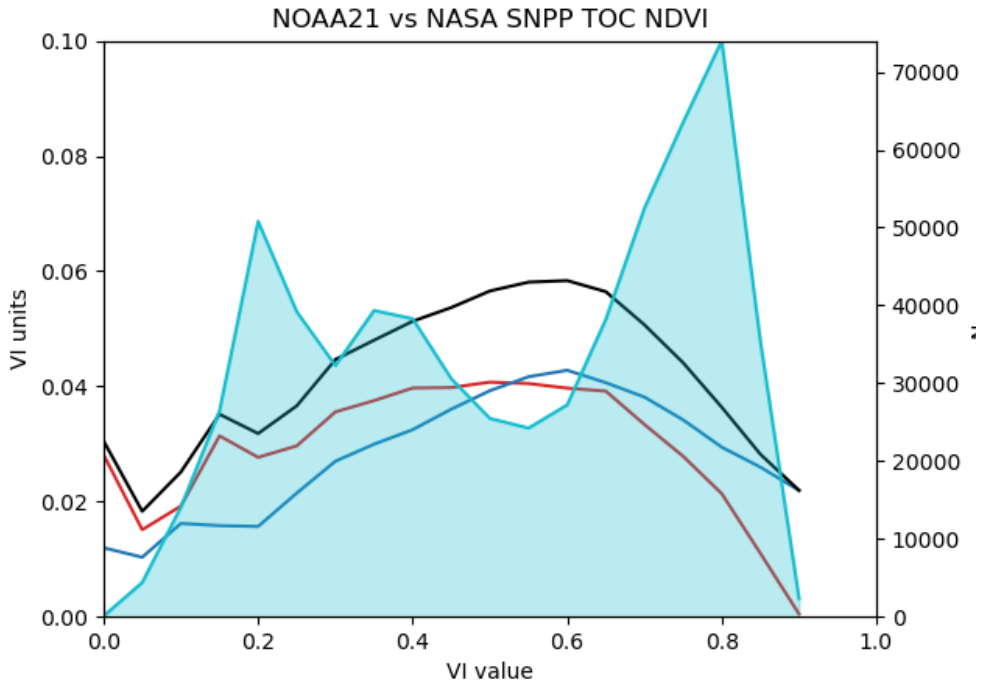


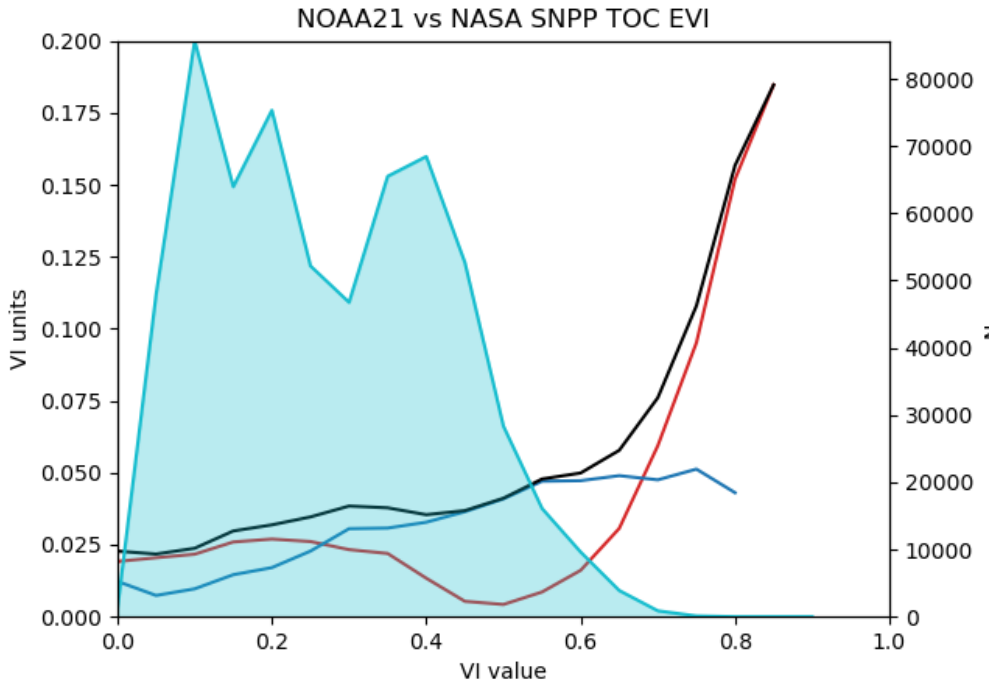
Comparison of NOAA-21 VIs with NASA SNPP VIs

- NOAA-21 TOC NDVI and TOC EVI stratified by VI value were compared against NASA SNPP TOC NDVI and TOC EVI. (NASA SNPP VIIRS TOA NDVI data are not available.)
- Statistics summary for NOAA-21 vs. NASA SNPP VIIRS VIs for period 20230626-20230711:

  TOC NDVI Accuracy = 0.0310, Precision = 0.0326, Uncertainty = 0.0450

  TOC EVI Accuracy = 0.0178, Precision = 0.0290, Uncertainty = 0.0340
- Stratified statistics meet specifications everywhere except for high values of TOC EVI, where there are few pixels with those values.

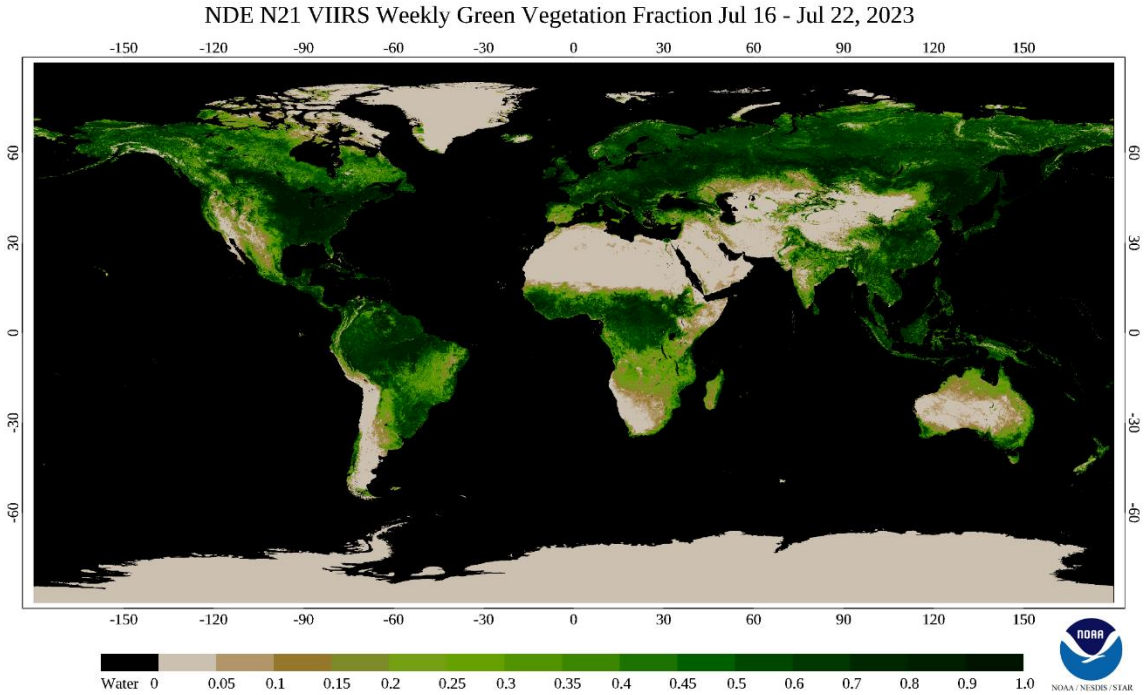




Accuracy
Precision
Uncertainty
Number of pixels

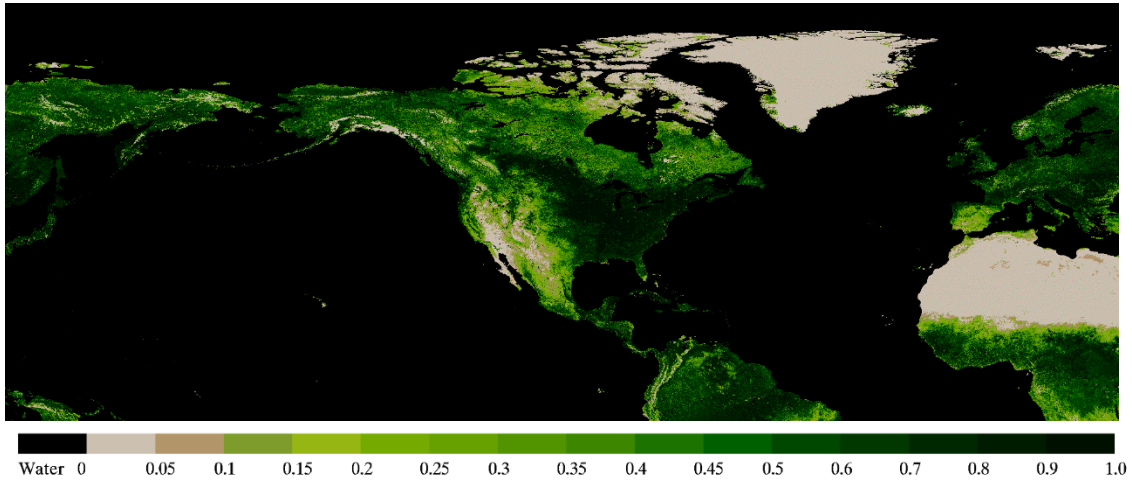
Visual Assessment of NOAA-21 GVF

NOAA-21 VIIRS weekly global GVF map



- The weekly GVF map showed reasonable patterns of green vegetation fraction in July globally

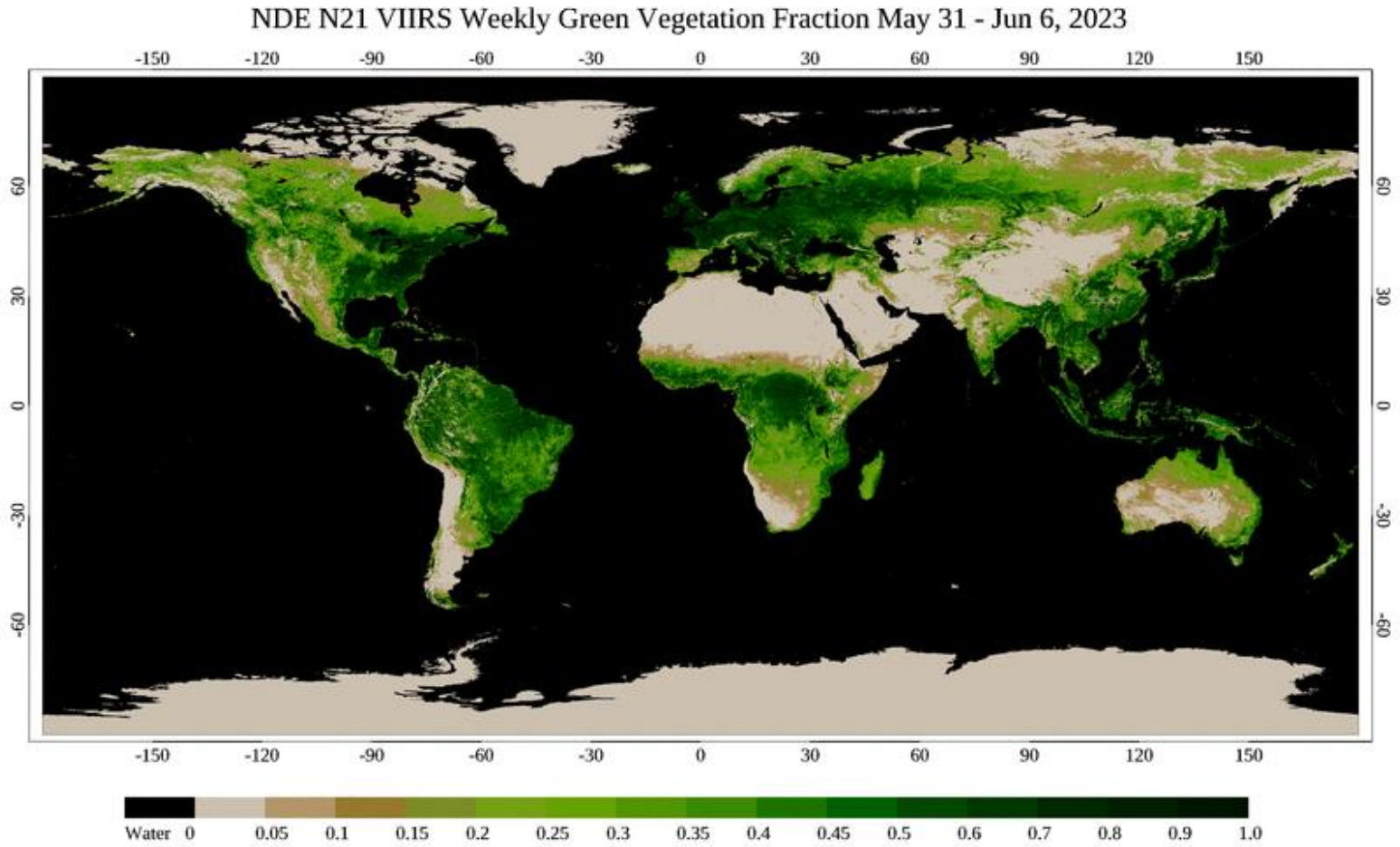
NOAA-21 VIIRS weekly regional GVF map
(July 16-22, 2023)



- The regional GVF map showed reasonable patterns of green vegetation fraction in July in area centered by North America

Visual Assessment of NOAA-21 GVF: Animation

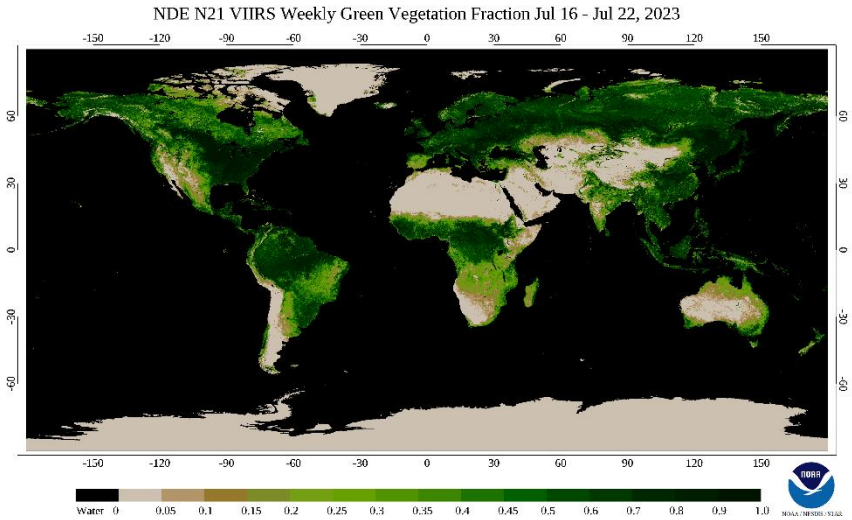
May 31, 2023 – July 23, 2023

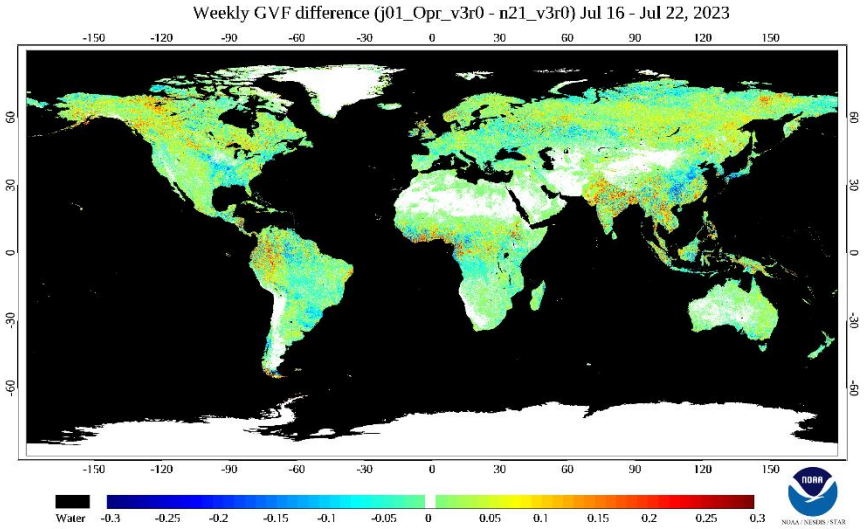


- The GVF animation showed reasonable variations of green vegetation fraction in June and July
- GVF in North hemisphere showed increasing vegetation in June and July
- GVF in Australia showed decreasing vegetation in June and July
- GVF in Amazon area increased due to more valid observations being accumulated

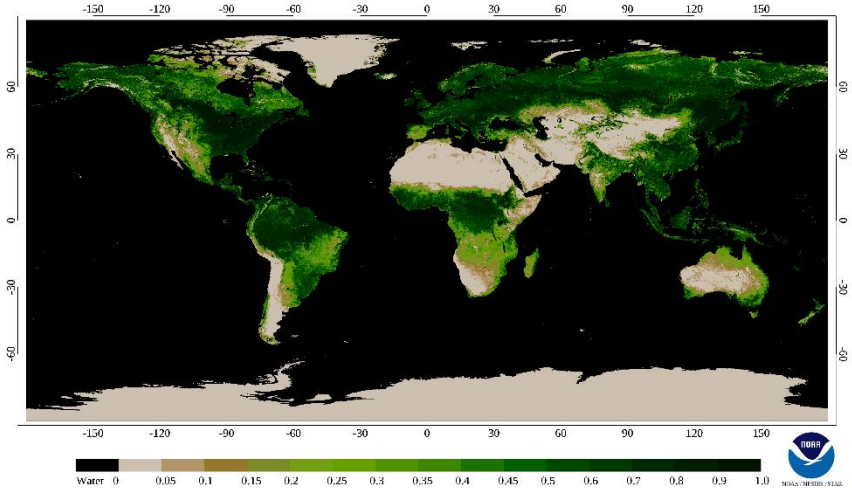
NOAA-21 GVF vs. NOAA-20 GVF

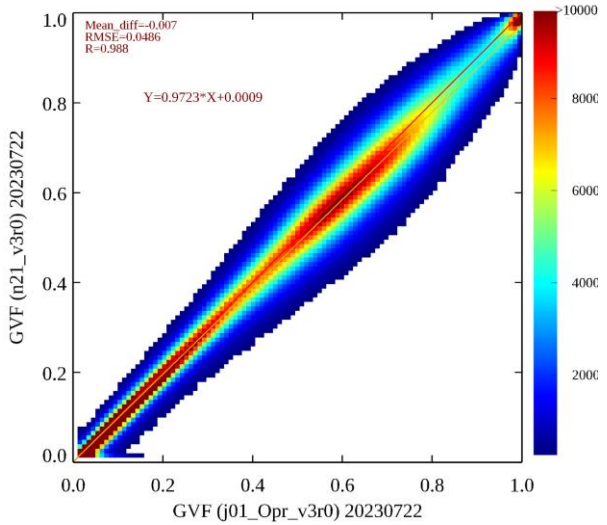
NOAA-21 GVF

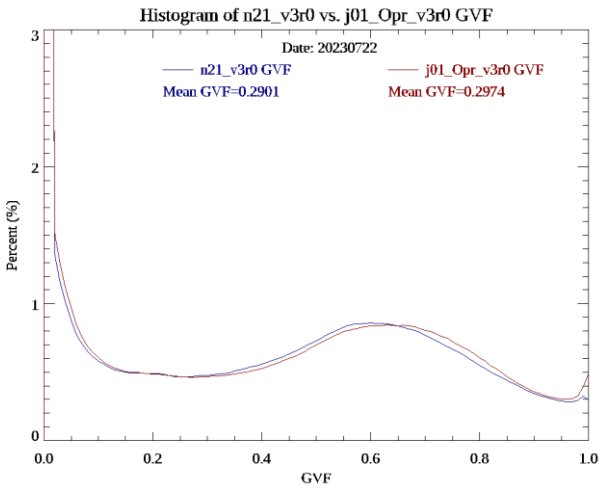




NOAA-20 GVF







- NOAA-21 GVF products are highly consistent with NOAA-20 GVF products (R=0.988, bias=0.007)

NOAA-21 TOA NDVI and TOC NDVI meet specifications compared to NOAA-20 and SNPP

TOA NDVI

Attribute Analyzed	Requirement/ Threshold	On-orbit Performance		Meet Requirement?
		NOAA-21 vs NOAA-20	NOAA-21 vs S-NPP	
Accuracy	0.05 VI units	0.0085	0.0095	Yes
Precision	0.04 VI units	0.0271	0.0290	Yes
Uncertainty	0.11 VI units	0.0284	0.0305	Yes

TOC NDVI

Attribute Analyzed	Requirement/ Threshold	On-orbit Performance		Meet Requirement?
		NOAA-21 vs NOAA-20	NOAA-21 vs. S-NPP	
Accuracy	0.05 VI units	0.0017	0.0006	Yes
Precision	0.04 VI units	0.0286	0.0334	Yes
Uncertainty	0.11 VI units	0.0287	0.0334	Yes

NOAA-21 TOC EVI and GVF meet specifications compared to NOAA-20 and SNPP

TOC EVI

Attribute Analyzed	Requirement/ Threshold	On-orbit Performance		Meet Requirement?
		NOAA-21 vs NOAA-20	NOAA-21 vs. S-NPP	
Accuracy	0.05 VI units	0.0042	0.0149	Yes
Precision	0.04 VI units	0.0278	0.0293	Yes
Uncertainty	0.11 VI units	0.0281	0.0329	Yes

GVF

Attribute Analyzed	Requirement/ Threshold	On-orbit Performance		Meet Requirement?
		NOAA-21 vs NOAA-20	NOAA-21 vs. S-NPP	
Accuracy	12%	0.73%	1.43%	Yes
Precision	15%	4.80%	4.98%	Yes
Uncertainty	17%	4.85%	5.18%	Yes

Surface Reflectance

July 2023

Accomplishments / Events:

- Prepared the NOAA-21 Surface Reflectance Beta Review, including learning about the upstream data beta review results (SDR & AOD), collecting the feedback from the downstream users (VI/GVF), summarized the long-term validation results at AERONET and compared with the performance of SNPP and NOAA20.
- Double check and prepared the documents (ATBD, User Readme) for the Beta Review.
- Keep working on the BRDF correction for inter-comparison between SNPP, NOAA20 and NOAA21, follow the work about the inconsistency between NPP and N20 report and calibration from the SDR team.

Overall Status:

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

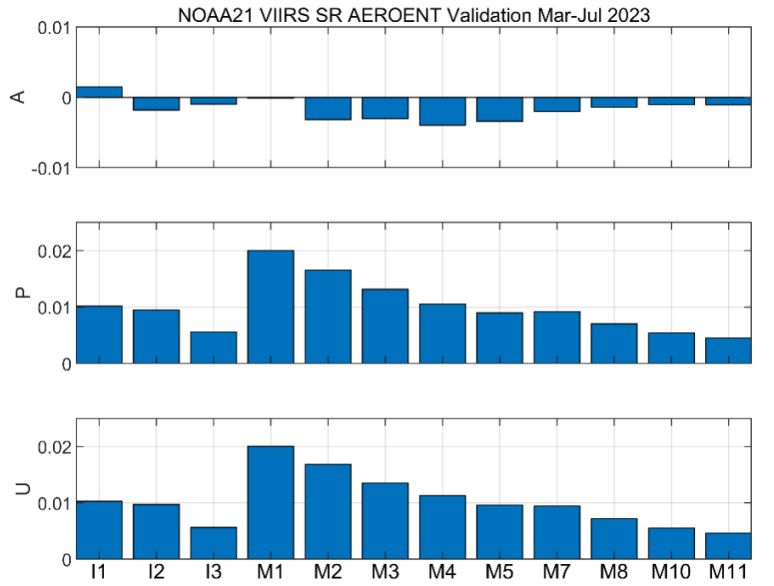
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SR LUT update and Test for SNPP, NOAA20 and J2	Oct-22	Nov-22	Dec-22	we generated two sets of LUTs for final decision
SNPP & N20 consistency analysis and correction.	Dec-22	Dec-22	Dec-22	
SR beta review for JPSS-2	Jan-23	Aug-23	Aug-02-23	
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		

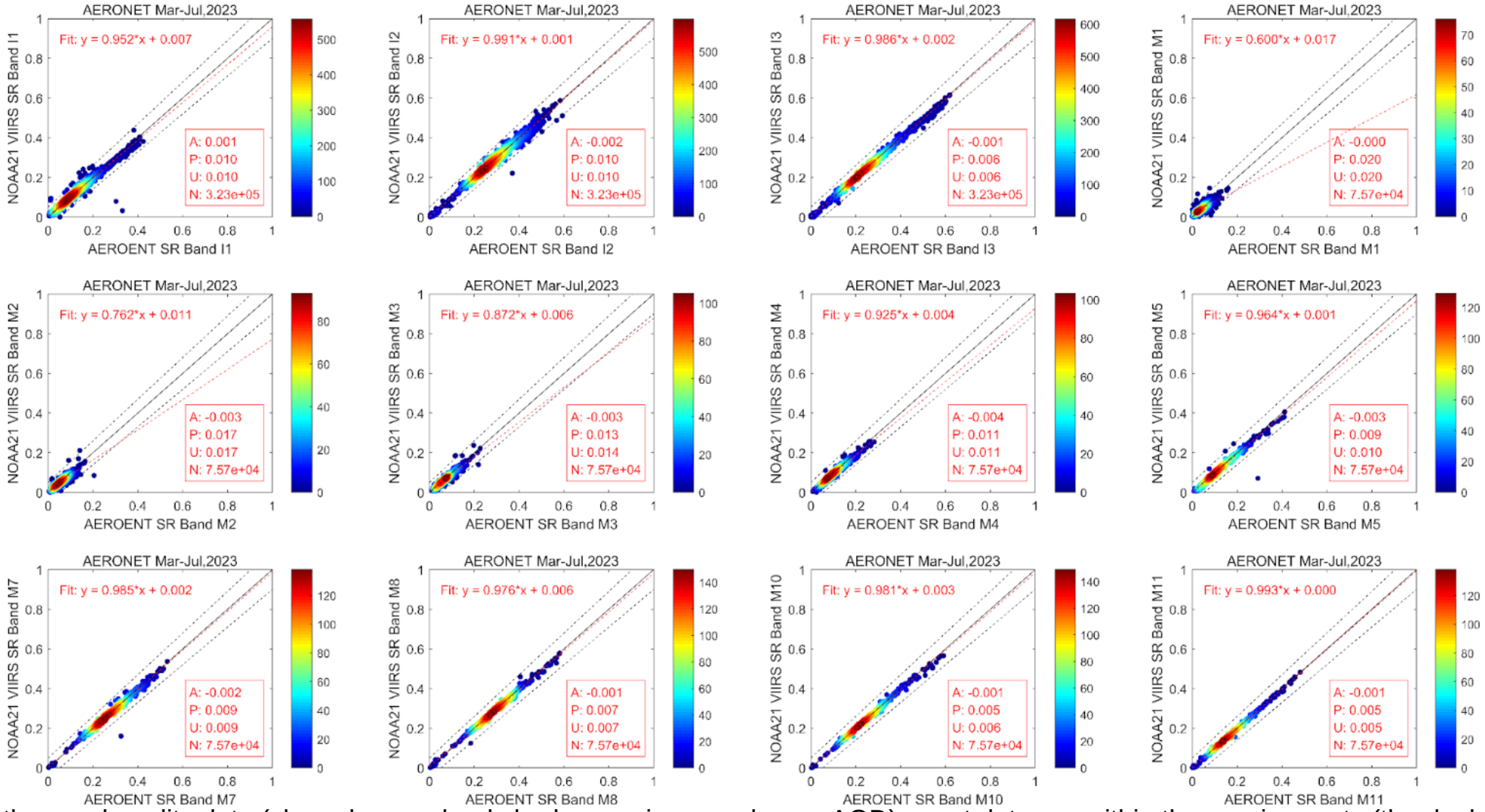
Highlights:



NOAA21 VIIRS SR validation at AERONET. One Month globally distributed AEROENT sites SR compared with the AERONET derived reflectance shows good agreement and meet the product requirement.

NOAA-21 SR Validation at AERONET

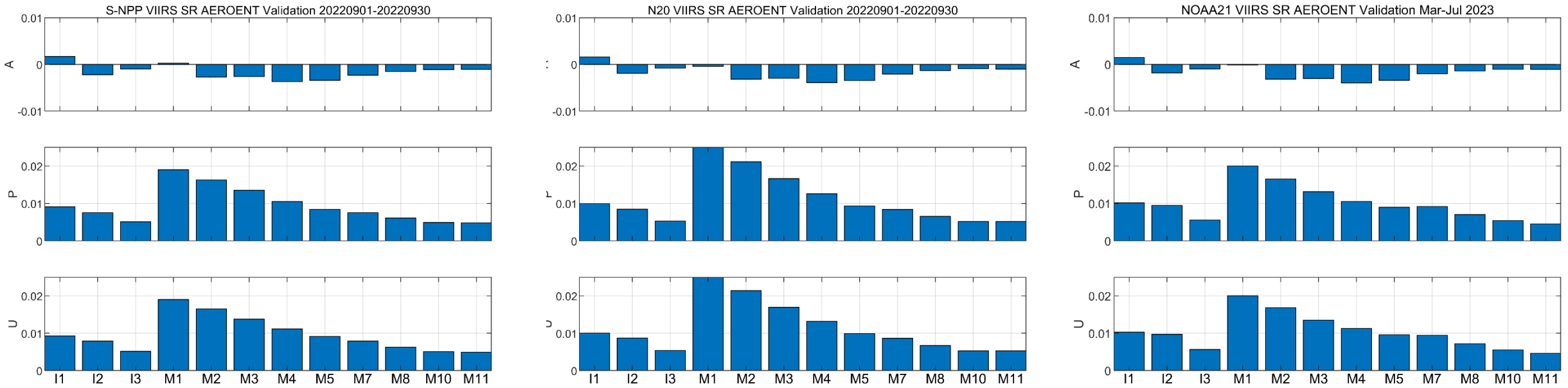
July 2023



For the good quality data (clear sky, no cloud shadow or cirrus, no heavy AOD), most data are within the requirements (the dash line)
The shorter wavelength bands (M1-M3) a little bit worse, but still meet the requirement (two times of the other channels)

N21 SR Performance Inter-comparison with SNPP and N20

July 2023



- The NOAA21 SR validation at AERONET shows comparable performance with SNPP and NOAA20
- The short wavelength (M1-M3) band with larger uncertainty due to the intrinsic issue.
- Other bands with good performance

- Directional SR inter-comparison between different satellite/sensor are challenging due to angle sensitive.
- A BRDF corrected SR inter-comparison in under going, some preliminary results are included in the backup slides.

Summary of NOAA21 Beta Review

- Cal/Val results summary:
  - The SR value and QFs are performed as expected, no obvious issue is found.
  - The AERONET validation shows the SR with good quality could meet the requirements.
  - Good consistence with SNPP, NOAA20 product.
  - Latest LUT have not been incorporated into current data, so similar issue (I1 band slight bias) were found as NPP and N20, the update LUT has been tested and included in the CCAP delivery.
  - According to the SDR team, there is a degradation issue found in the band M8, M10 and M11, close monitoring has been carried out and calibration coefficients are update frequently.
  - Users and downstream products have not found significant issues for NOAA21 SR.
- Lessons learned for NOAA-21 Cal/Val
  - Independent in-situ measurements are limited. SDR data uncertainty or inconsistency could not be detected by AERONET validation.
- Planned improvements
  - Update the LUT to the latest version which has been tested in the CCAP package.
  - Mitigation algorithm used for data classified as the dust aerosol model.
- Future Cal/Val activities / milestones
  - Inter-comparison with NASA VJ209 product (once available)
  - Inconsistency between JPSS satellites analysis and impact evaluation.
  - Long term validation at AERONET, develop routine validation tool and post the results on the website
  - Further collaboration with the vegetation team to evaluate the performance

NUCAPS Products

July, 2023

Accomplishments / Events

- Continued efforts towards the NOAA-21 NUCAPS product provisional maturity. These include: (a) tuning of 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).
- Verified NUCAPS v3.1 HEAP CCAP products with the offline runs for NOAA-20/21 and MetOp-C to ensure product consistency. The results of evaluation indicated close agreement and the EDR products generated from these two implementations match well within the computer precision.
- NUCAPS team members attended two different conferences showcasing the use of NUCAPS sounding products in the detection of atmospheric instabilities (presented by Ken Pryor in the AMS Weather Analysis and Forecasting Conference, 17-21 July, 2023 Madison, WI), and on the latest NUCAPS product improvements and environmental applications (presented by Murty Divakarla in the IGARSS-2023 conference, 16-21 July, 2023, Pasadena CA). Both these papers were well received.
- NUCAPS team analyzed NOAA-20 NUCAPS sounding profiles to study the 2023 southern US heatwave. A six day time series of 850 mb temperatures for the June 22-27 period were analyzed and the NUCAPS accurately captures the eastward expansion and subsequent northward erosion of the heat dome during this period.

Overall Status:

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

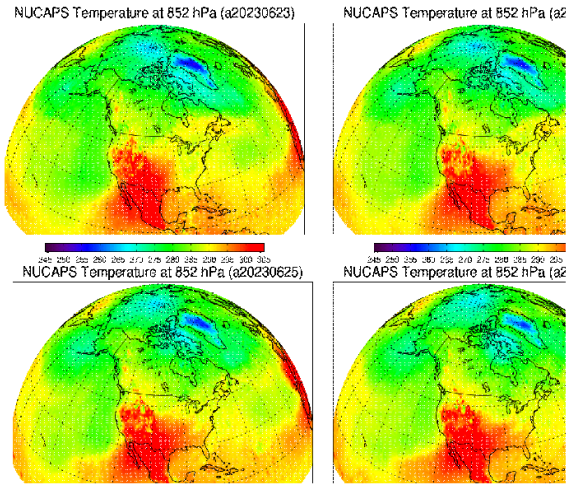
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

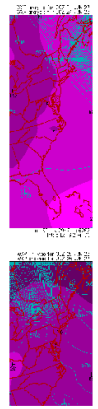
Issues/Risks:

None

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

NOAA-20 NUCAPS products towards the detection of southern US heatwave (June 22-27) and comparison with observed 850 mb temperatures





OMPS Ozone (V8Pro, V2Limb & V8TOz)

July 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

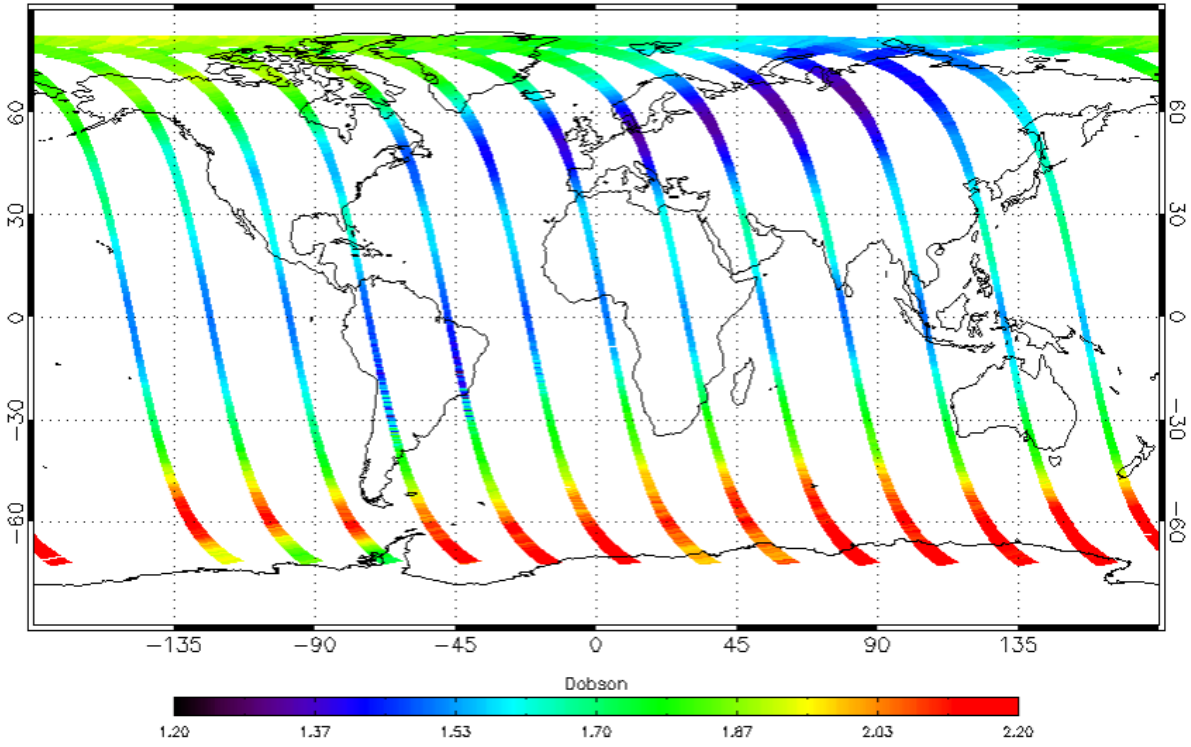
Overall Status:

	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



Land Surface Temperature

July 2023

Accomplishments / Events:

- Oral presentation titled “Global Daily VIIRS LST Product Quality Evaluation And Applications” at IEEE IGARSS 2023 conference in Pasadena, CA, July 16-21, 2023.
- Oral presentation titled “All-weather LST: Methodology and experiment ” at 2023 NOAA CoRP Symposium in Madison WI, July 25-27, 2023.
- Conducted the ground evaluation of the NOAA-21 LST using ground observations from SURFRAD and ARM. (slide 2-4)
- Updated the inter-sensor comparison among NOAA-21 LST and NOAA-20/ SNPP LST by limiting the temporal difference between them. (side 5)
- Complete the review of the enterprise algorithm project plan for both L2 and L3 VIIRS LST.
- Prepared materials for NOAA-21 LST beta review and completed the slide.
- Heatwave monitoring based on L3 VIIRS LST for Phoenix and Southwest in early July (highlights)

Overall Status:

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

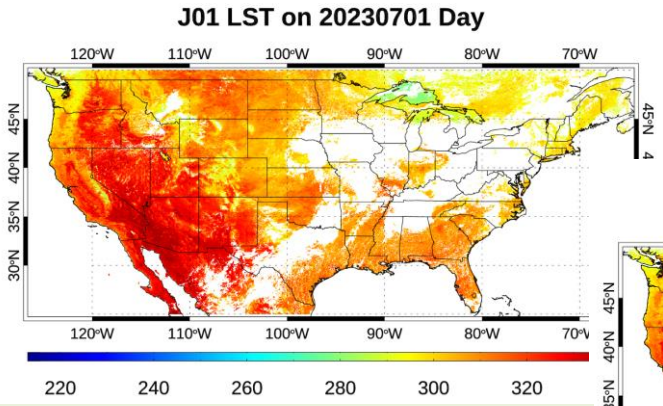
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

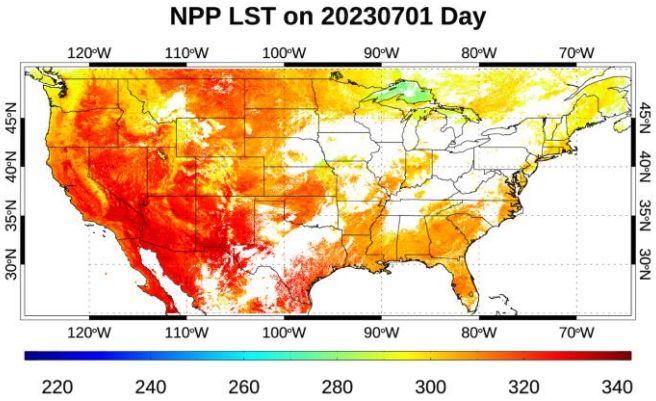
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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	Aug-23	Postponed. Data is not available yet.
All weather LST update	May-23	May-23		Deferred due to Project priories update
FY24 Program Management Review	Jun-23	Jun-23	Jun-23	
Routine monitoring tool and its update	Jul-23	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		

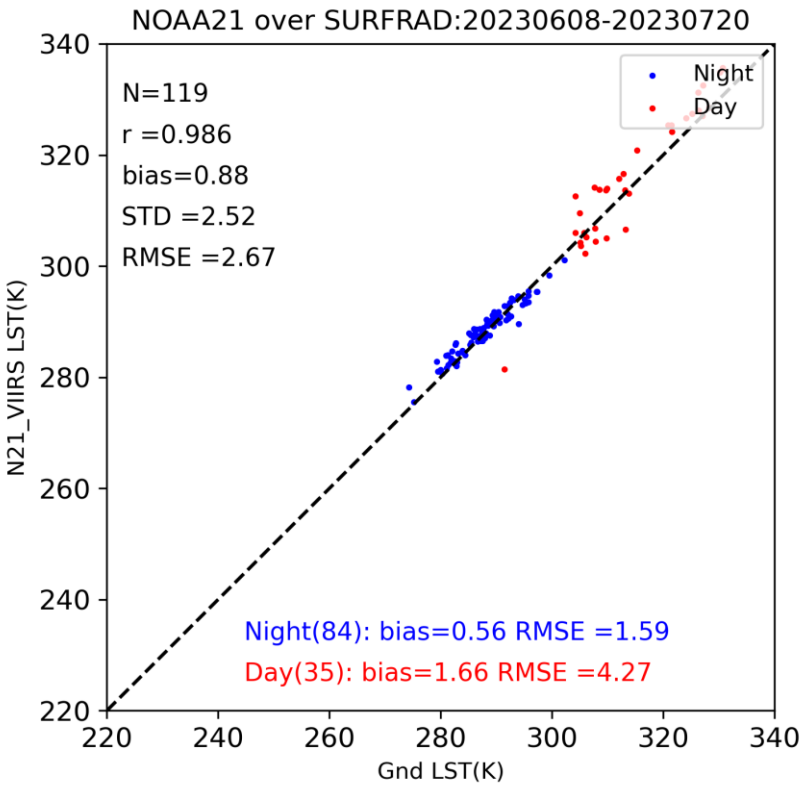
Highlights: Heatwave bound for Phoenix and Southwest in early July

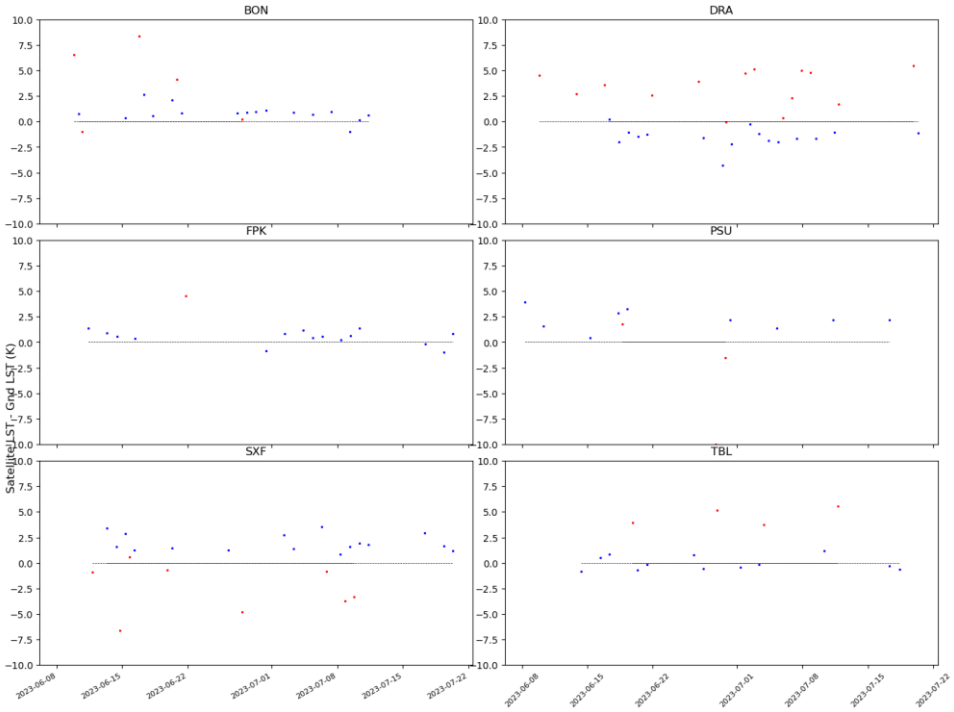


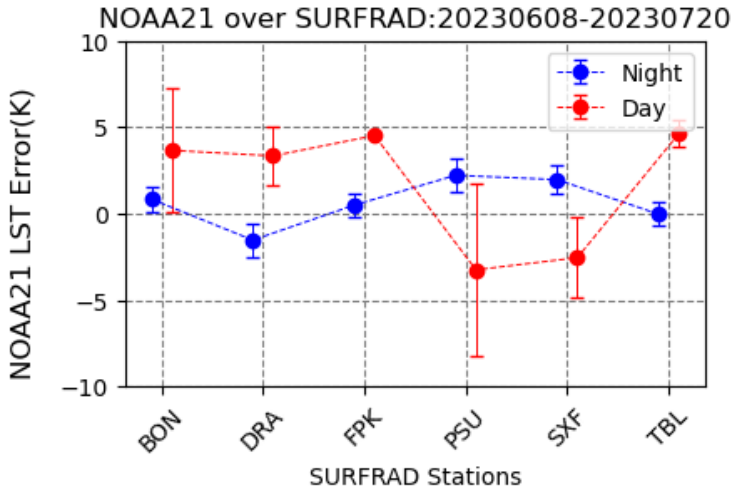


The Southwest United States is enduring a heat wave in both intensity and longevity. The L3 VIIRS LST from NOAA-20 and SNPP is used to monitor the heatwave progress.

L3 NOAA-21 LST validation-SURFRAD



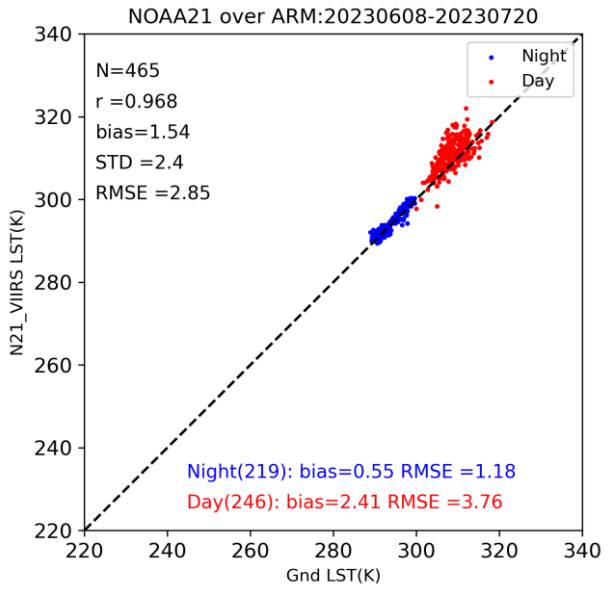


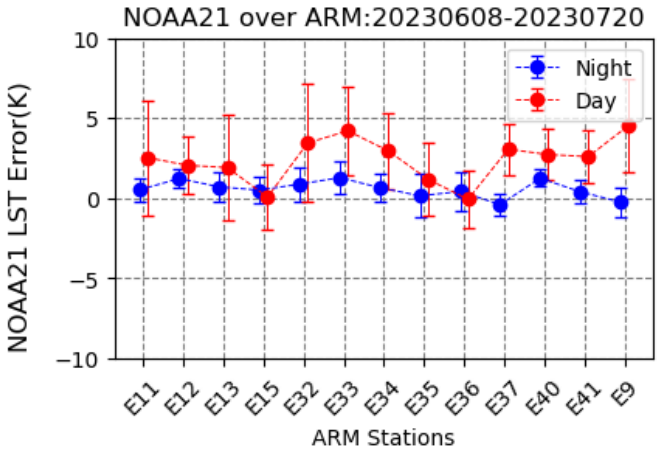


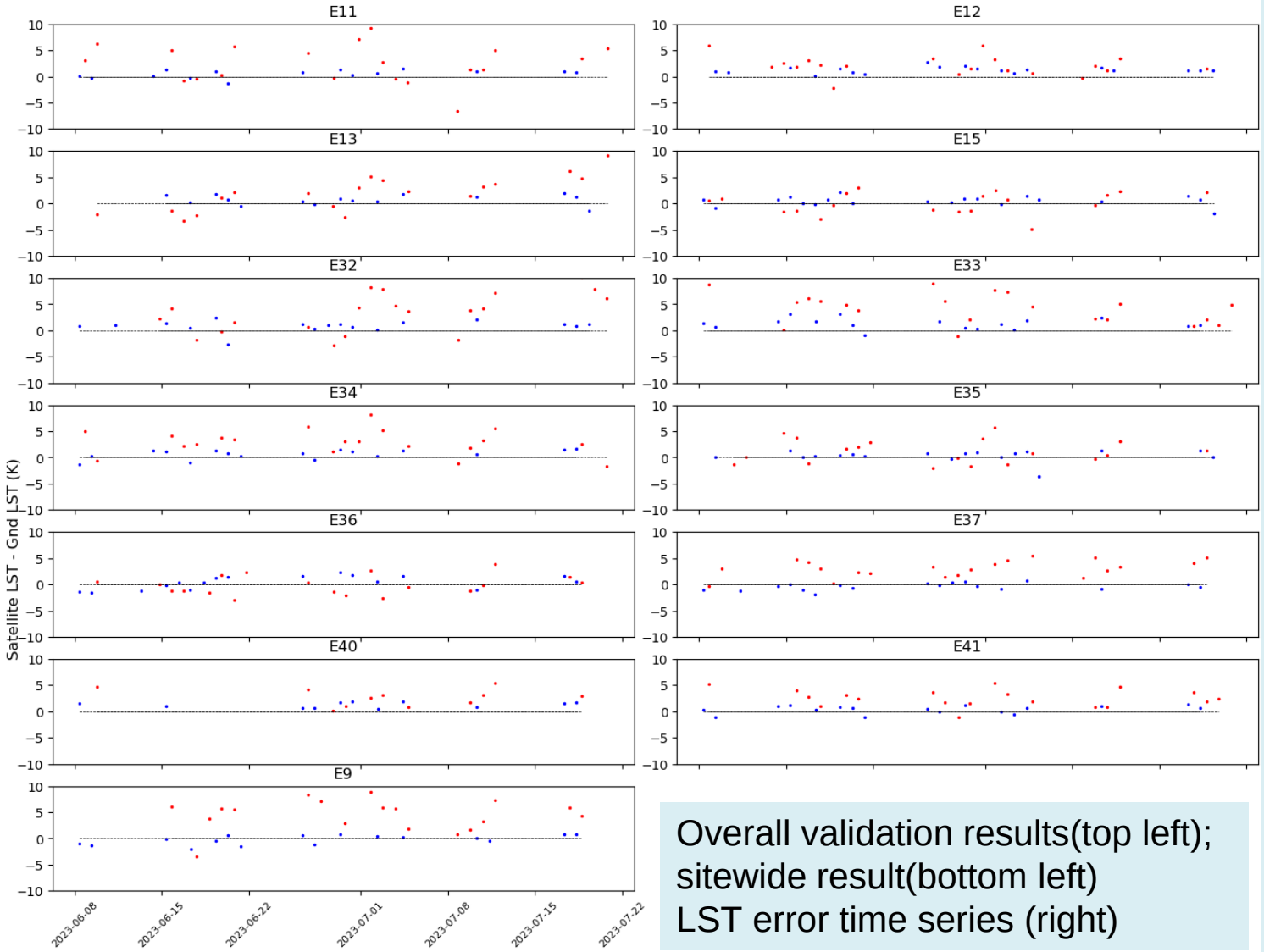
Left figure shows the scatter plot with statistics results for overall, and day/night separated situations; middle figure is sitewide LST error time series and the right figure displays the sitewide validation performance, separated for day/night.

- The data for the time period from June 8th 2023 to July 20th, 2023 is used to validate against ground observations in SURFRAD.
- A significant positive bias is observed at daytime possibly due to the seasonal representativeness of the ground site. The sitewide performance varies significantly over site with positive bias over BON, DRA, FPK and TBL, and negative bias over PSU and SXF station.
- The bias and STD is fine for nighttime LST.

L3 NOAA-21 LST validation-ARM



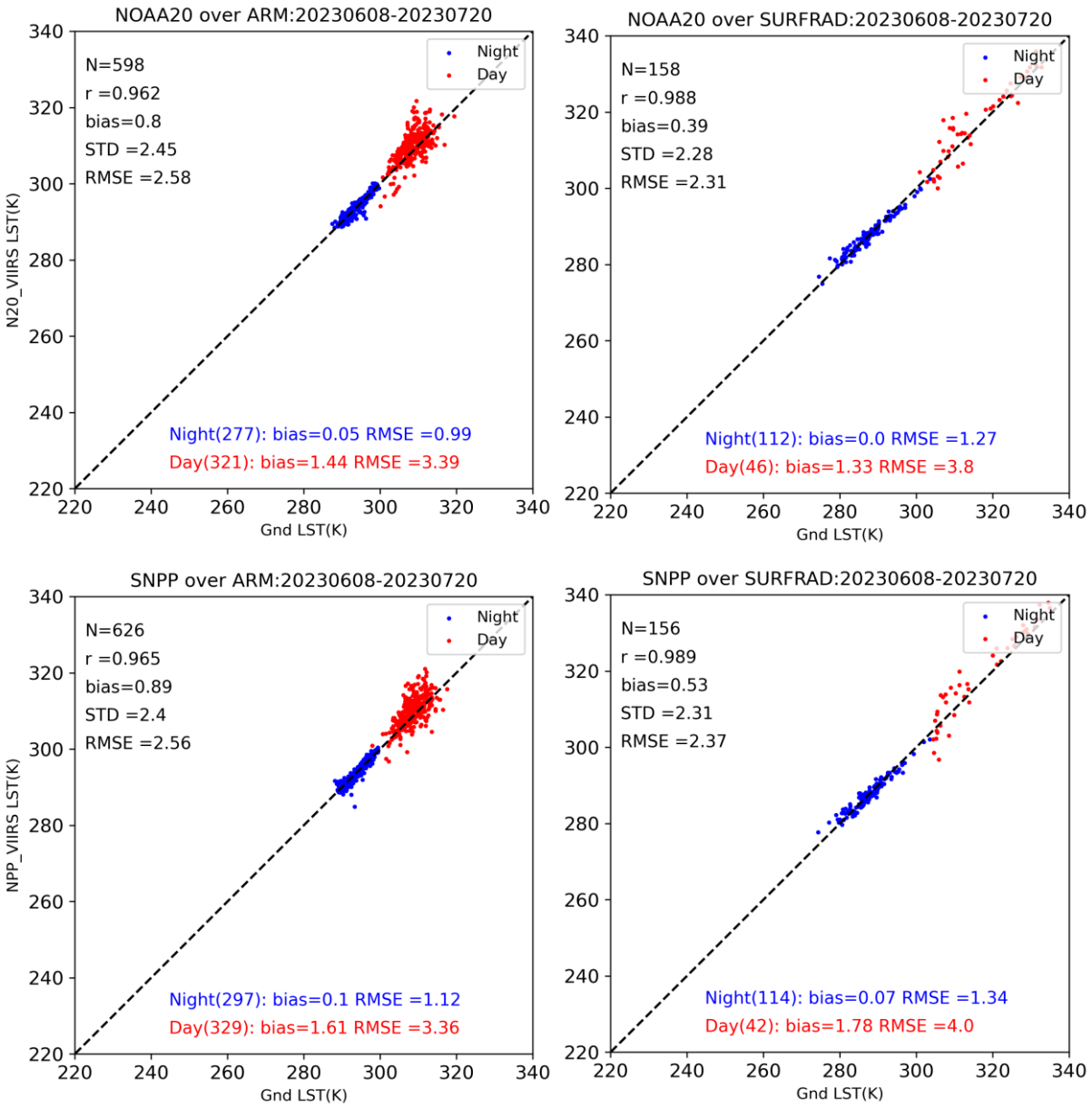


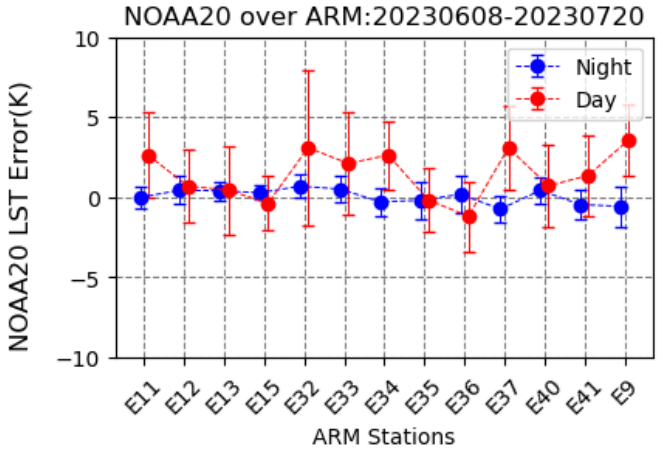


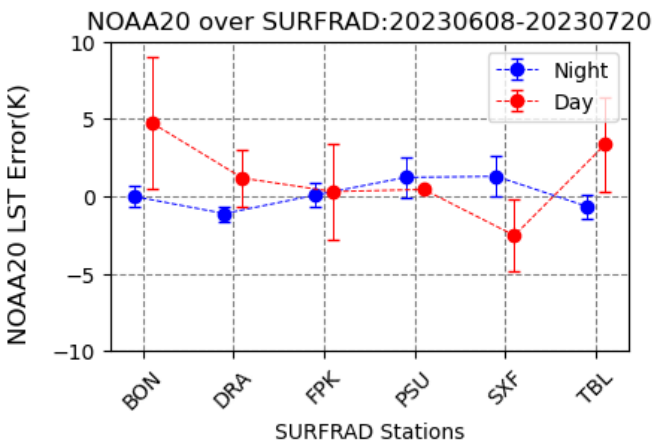
Overall validation results(top left); sitewide result(bottom left)
LST error time series (right)

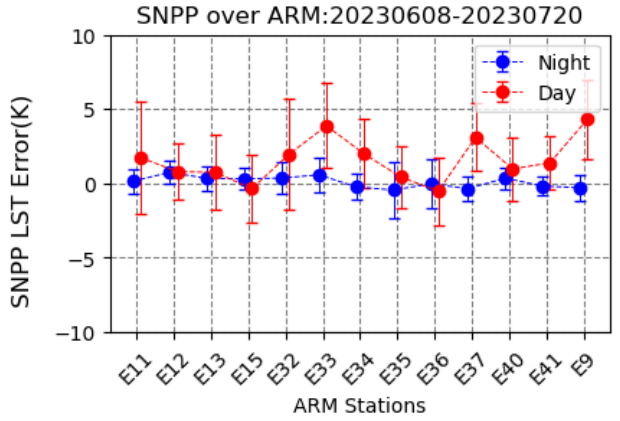
- The data for the time period from June 8th 2023 to July 20th, 2023 is used to validate against ground observations in ARM.
- A significant positive bias is observed at daytime possibly due to the seasonal representative ness of the ground site
- The bias and STD is fine for nighttime LST.

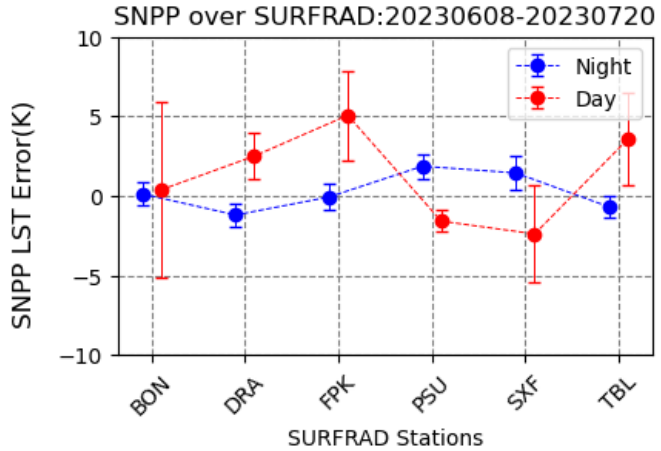
Validation comparison –SNPP and NOAA20





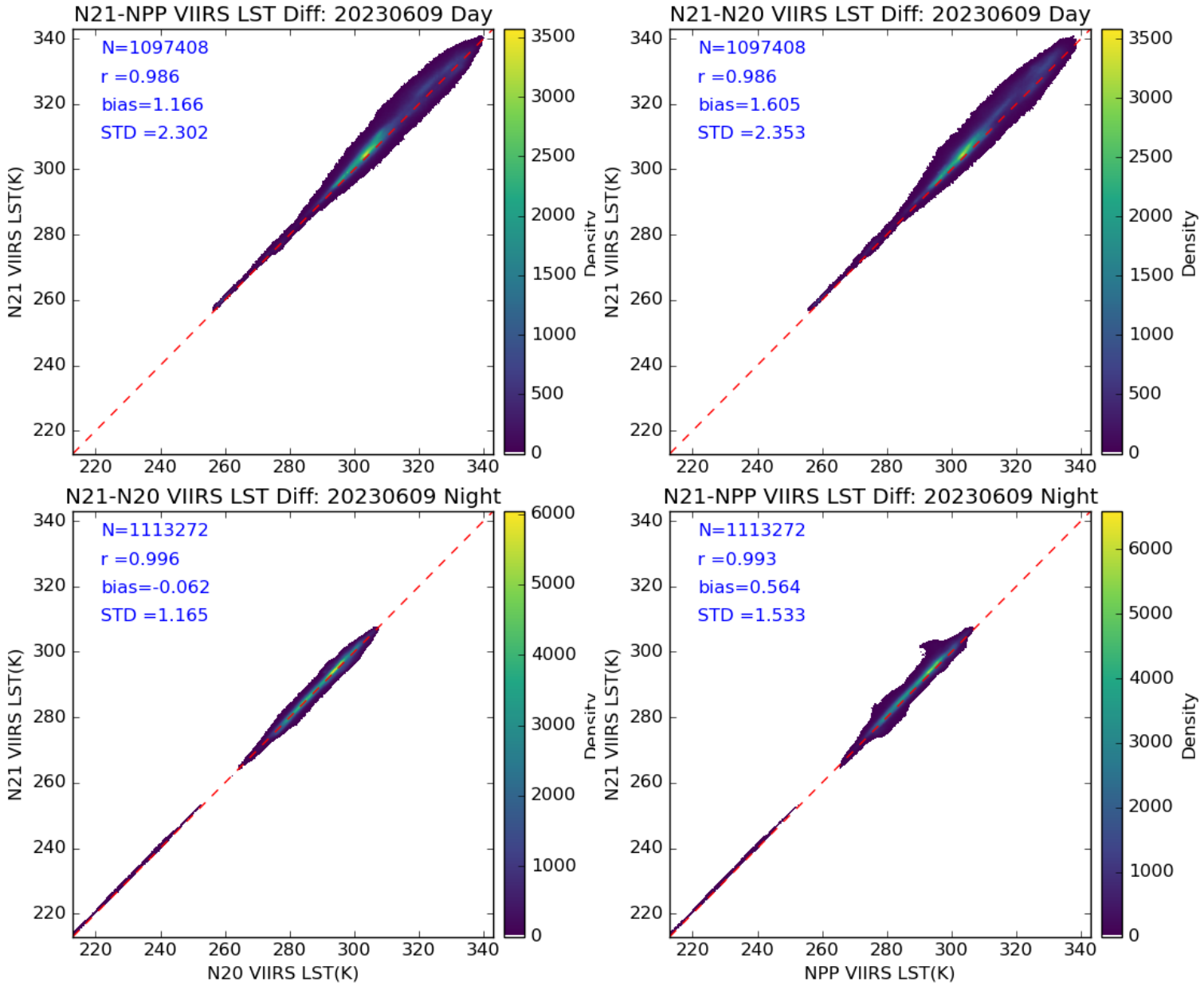






- The SNPP and NOAA-20 VIIRS LST are validated against SURFRAD and ARM observations for the same time period as a reference.
- The validation results indicate a positive bias at daytime, ranging from 1.33 K to 1.78 K, nearly no bias at nighttime.
- NOAA-21 LST exhibits a higher LST estimation than both SNPP and NOAA-20 LST particularly during daytime.

Inter-sensor LST Comparison update



- The global LST comparisons were made under the following conditions: all cloud clear; LST not fill; and a temporal difference less than 60 minutes(a newly added criteria to mitigate the impact of the observation time difference)
- The statistical analysis was performed for the difference between NOAA-21 and SNPP/NOAA-20 LST for both daytime(top) and nighttime(bottom)
- The results indicate no significant LST difference observed. During the daytime, NOAA-21 LST is statistically higher than NOAA-20 LST and SNPP LST with a bias of 1.6 K and 1.1 K, respectively. At nighttime, NOAA-21 LST is close to NOAA-20 LST with a bias close to zero, but it is 0.5 K higher than SNPP LST.

SDR and EDR Reprocessing

July 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

July 2023

Accomplishments / Events:

- Participated in NPP recovery efforts. Evaluated impact of platform outage on SST product
  - NPP post-outage performance is comparable with N20/N21 nominal performance
  - Data gaps verified and filled in as appropriate in PO.DAAC archives
- NPP/N20/N21 SST Cal/Val continue. SST Team is ready for N21 Provisional review. Coordinating schedule with JSTAR for 24 Aug review.
- Reprocessing MODIS records and integrating with two hi-res SSTs (METOP-FG AVHHR FRAC & JPSS VIIRS) is underway. Preliminary VAL results for one full year of data are shown in Table.
  - Checks for consistency with MODIS was planned and conducted as a part of VIIRS Cal/Val
  - MODIS SSTs are of good quality, and only slightly degraded compared with VIIRS
  - Integration of MODIS SST into L3S-LEO AM (Metop-FG is supplemented by Terra), PM (JPSS will be supplemented by Aqua), and DY (daily product combining PM and AM) is underway
- 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 Stats Against DTMs for 2 VIIRSs & 2 MODISs – Full 2019**

	SST Product	Mean Sub-skin	Mean Depth	SD Sub-skin	SD Depth	CSR %
Night	ACSPO Terra	+0.01	+0.00	0.33	0.29	20.6
	ACSPO Aqua	+0.00	+0.00	0.33	0.28	19.1
	ACSPO NPP	-0.01	-0.02	0.32	0.27	18.8
	ACSPO N20	+0.00	-0.02	0.32	0.28	18.8
Day	ACSPO Terra	+0.02	+0.01	0.42	0.33	19.3
	ACSPO Aqua	+0.03	+0.01	0.42	0.31	20.4
	ACSPO NPP	-0.03	+0.00	0.38	0.28	19.8
	ACSPO N20	-0.04	+0.00	0.38	0.29	20.0

Global Validation Statistics against Drifters and Tropical Mooring buoys for full year 2019, from 2 VIIRS and 2 MODIS instruments

Note that VIIRS VAL statistics are slightly superior compared to the MODIS statistics

Work is underway to document MODIS 20+ years reprocessing, and incorporate MODIS SST into 0.02° global L3S-LEO SST product (data fusion from multiple hi-res LEO satellites/sensors). This will extend L3S-LEO-PM data record from 2012-on (NPP) to 2002-on (Aqua), and L3S-LEO-AM from 2006 (Metop-A) to 2000 (Terra).

Snowfall Rate

July 2023

Accomplishments / Events:

- The SFR team is assisting the ASSISTT team to debug some issues they have encountered in running the newly delivered standalone SFR system. The SFR Preliminary CCAP delivery is scheduled for August 16th.
- We started the effort to improve the 1DVAR-based physical SFR model. the study to improve the microphysics of the RTM used in the SFR algorithm. Currently, we are investigating several available single scattering databases. The goal is to eventually replace the database for spherical shape ice particles with one for more realistic non-spherical ice particles and aggregates.

Overall Status:

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

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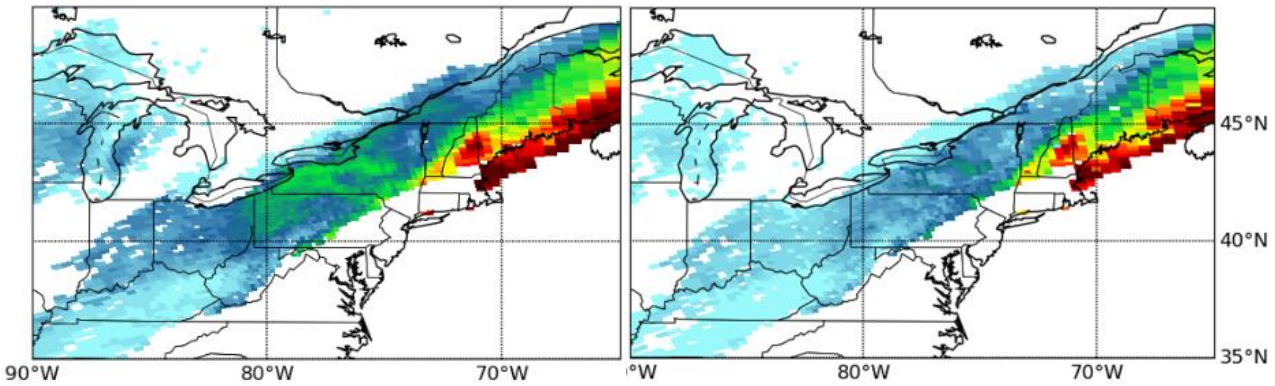
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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	May-23	
Enhance orographic snowfall retrieval through machine learning	Sep-23	Sep-23		

Highlights: Improving SFR Algorithm through Microphysics



Left: Un-bias-corrected SFR assuming spherical ice habit
Right: Un-bias-corrected SFR assuming large plate aggregates from the Atmospheric Radiative Transfer Simulator (ARTS) database
These results demonstrates the significant impact microphysics can have on SFR retrievals.

Surface Type

July 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 July of 2023 for the production of AST-2023.
- The team attended the Asia Oceania Geosciences Society (AOGS) annual conference held in Singapore from July 30 – August 4, 2023:
  - PI Huang and NOAA lead Zhan co-organized, chaired and presented to a special session titled "HS15 - Satellite Remote Sensing for Water and Carbon Cycle Studies" of the AOGS 2023 Annual Meeting in Singapore on August 2nd, 2023
  - The team delivered an oral presentation titled "Integration of Fine and Moderate Resolution Land Cover Products for Improved Global Surface Water Mapping"
- The team is on track towards finalizing the AST-2022 product by August

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.*
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Issues/Risks:

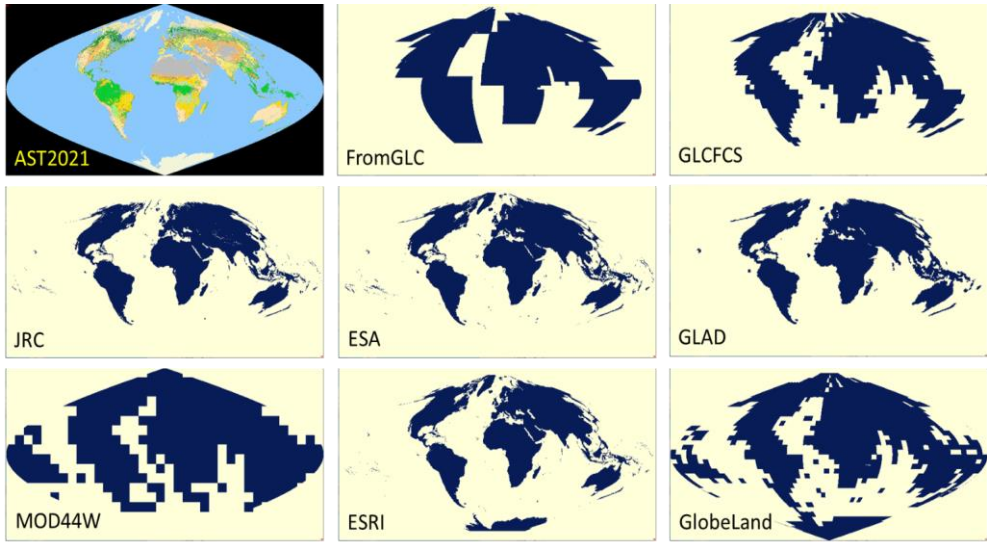
None

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 number of global fine resolution land cover products have become available recently. While these products provide fine spatial details for improving the mapping of small waterbodies, they are not truly "global". The surface type team has developed a strategy for improved water mapping by integrating these products, which was presented at the AOGS annual conference.

Challenges and Opportunities for Using Fine Resolution Land Cover Data to Improve Global Surface Water Mapping



Spatial coverage of 8 fine resolution land cover products. Areas covered by each product are shown in blue. Yellow indicates no-data area.

VIIRS SDR

July 2023

Accomplishments / Events:

- Intensive Cal/Val for VIIRS SDR was conducted by the STAR VIIRS Cal/Val team during the Suomi NPP recovery from the CDP Reset anomaly on 7/26/2023: Based on VIIRS SDR team recommendation, NPP VIIRS SDR was approved for operational use starting at 17:00 UTC on 7/27/2023, after the DNB onboard offset tables were restored
- To further mitigate the radiometric response degradation for NOAA-21 (N21) VIIRS SWIR bands, worked with the DPMS/IDPS team on updating five “out-of-cycle” RSBautoCal LUTs needed before automated calibration of the SWIR bands can be enabled in the IDPS operational environment
- Delivered for deployment in the IDPS operations the 5th (out of 12) N21 VIIRS SDR DNB STRAY-LIGHT-CORRECTION LUT as well as the updated N21, NOAA-20 and NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired around the new moon on 7/17/2023

Overall Status:

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

1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
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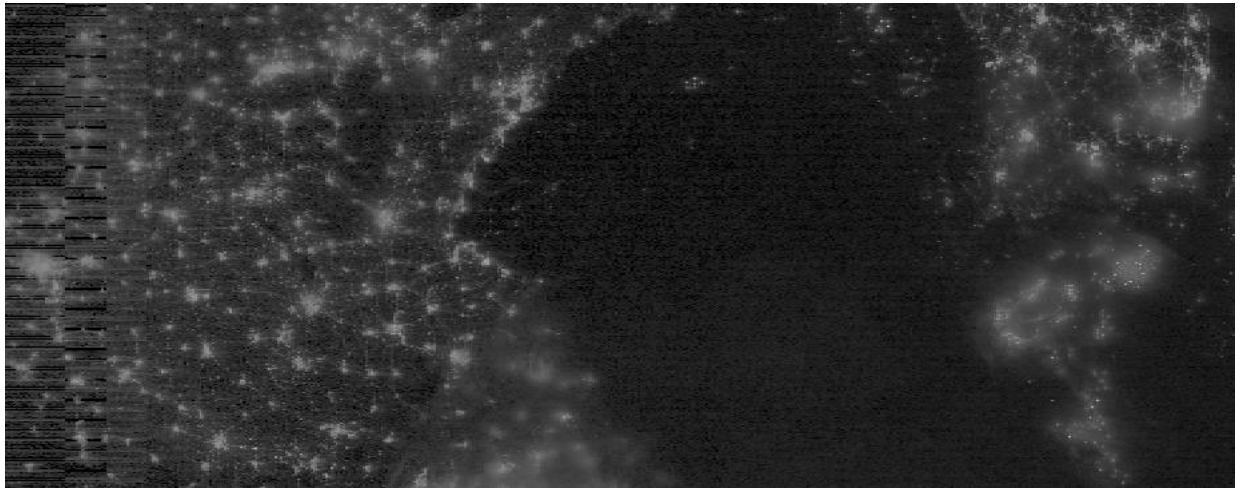
Issues/Risks:

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:



Suomi NPP DNB nighttime image acquired on 2023-07-27 at 17:09 UTC (after recovery from the CDP Reset anomaly): striping visible on scan edges (left side of the image - will be corrected with the DN0 LUT update after the new moon on 8/16/2023)

Vegetation Health

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

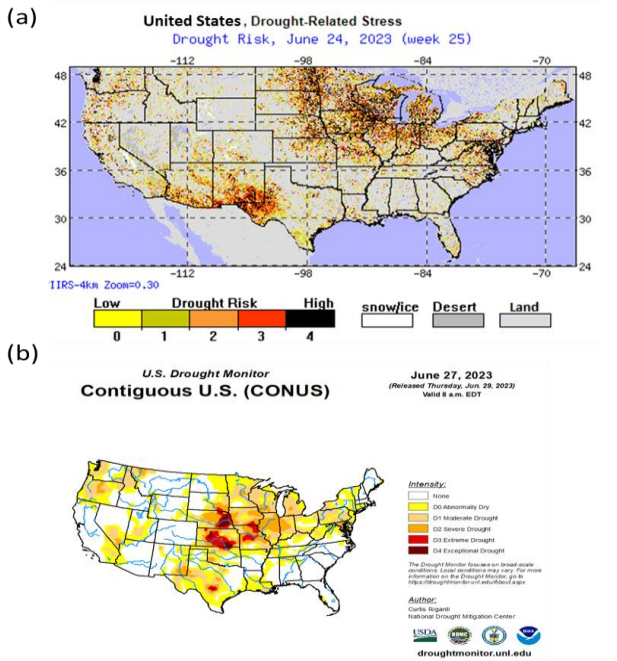
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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

July, 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 ash height validation for the upcoming review utilizes an advection pattern (also known as wind-height validation) approach. The science team has collected 42 volcanic clouds observed by NOAA-21 VIIRS that are suitable for the ash height advection pattern analysis. The included figure shows the error distribution of the NOAA-21 VIIRS EDR ash height retrieval relative to the advection pattern truth heights. The results are encouraging and demonstrate the NOAA-21 VIIRS EDR ash heights are meeting the specifications (mean error of -1.59 km vs. specification of 3.0 km accuracy).
- 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:

NOAA-21 VIIRS EDR ash height error relative to advection pattern truth data. The data is comprised of 42 volcanic clouds observed by NOAA-21 VIIRS during April - July 2023. The mean error is -1.59 km, which exceeds the product specification and is consistent with the algorithm validation analysis conducted for previous instruments.