AMP/STAR FY24 TTA

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Highlights from the Science Teams (December)

VIIRS Sea Ice Concentration Product Monitors World's Largest Iceberg A23A

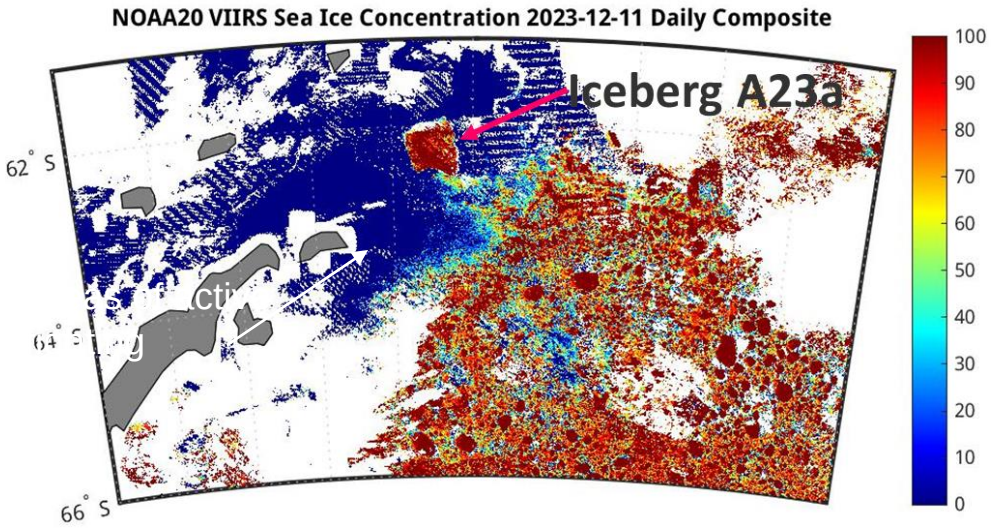


Figure: VIIRS NOAA-20 Sea Ice Concentration from December 11, 2023 daily composite over northwest Weddell Sea near the northern tip of the Antarctic peninsula.

Since late November, the world's largest iceberg garnered plenty of media attention as it has broken free from the ocean floor along the Antarctic Peninsula (e.g., https://www.bbc.com/news/science-environment-67507558). Currently it is moving away from the peninsula into open ocean in the far north Weddell Sea. The iceberg is so large that it is easily detected by the Cooperative Institute for Meteorological Satellite Studies (CIMSS) Sea Ice Concentration products, such as from NOAA-20 VIIRS (see figure). The CIMSS/NOAA cryosphere group will keep monitoring the iceberg as it moves further into open ocean and interest grows as it has potential to effect shipping routes across the Southern Ocean.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
12/08/23	Patch CCAP delivery of ALPW (Advected Layer Precipitable Water). The output files of the Remap MiRS unit are no longer being zipped (the PR document has been updated to reflect this), and n21 capability has been added.	NCCF
12/13/23	SnowFall Rate (SFR) CCAP Patch Delivery to the Cloud (v1-1)	NCCF
12/21/2023	Final delivery for Blended Hydro. Adds GOES for TPW products, and N21 capacity has also been added.	NCCF
01/04/2024	v1-1 Patch CCAP Delivery of the Ozone Mapping and Profiler Suite Nadir Profiler (OMPS NP) Version 8 Ozone Profile (V8PRO) v4r4 to NCCF for integration. This patch includes 6 new look-up tables (2 for each satellite SNPP, N20, N21).	NCCF

Accomplishments – JPSS Cal Val Support

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

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

NOAA-21 Cal/Val Maturity Reviews

December 2023 Maturity Reviews: None		

January 2024 Maturity Reviews		
VIIRS Polar Winds	Beta/Provisional	01/25/24
Cryosphere Products – Sea Ice Thickness/Age, Binary Snow Cover & Fractional Snow Cover	Provisional	01/25/24
Land products: LST, Surface Albedo, Surface Reflectance, GVF, VI	Provisional	01/25/24
NUCAPS (all products)	Provisional	01/25/24
OMPS LP (SDR & EDR)	Beta	01/25/24

February 2023 Maturity Reviews		
IST, Ice Concentration, Sea Ice Thickness/Age	Validated	02/29/24
Ocean Color	Beta/Provisional	02/29/24
SnowFall Rate (SFR)	Provisional	02/29/24
OMPS LP (SDR & EDR)	Beta	02/29/24

JSTAR Code/LUT/Product Deliveries

12/22/2023	ADR-10553/CCR-6799 NOAA-21 OMPS-NP Hot pixel requires a change to the NOAA-21 OMPS-NP flight and IDPS sample table

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

FY24 STAR JPSS Milestones

Algorithm Updates DAPs/CCAPs	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
ALPW (Advected Layer Precipitable Water from MiRS)	Oct-23	Oct-23	Delivered on 10/27	
Ocean Color final CCAP	Nov-23	Nov-23	Delivered on 11/03	
Aerosols (update to VIIRS AOD coefficient files)	Nov-23	Nov-23	Delivered on 11/13	
RAVE (Regional Hourly ABI and VIIRS Suite Emissions) update to eFires	Nov-23	Nov-23	Delivered on 11/17	
eTRAP (Enterprise Tropical Rainfall Potential)	Nov-23	Nov-23	Delivered on 12/08	
Snowfall Rate (add additional log-files)	Dec-23	Dec-23	Delivered 12/13	
Blended Global Biomass Burning Emissions Product (GBBEPx)	Dec-23	Dec-23	**Moved to January (01/19)**	
VOLCAT (Phase 1) NCCF implementation	Dec-23	Dec-23	**Moved to January (01/12)**	
Heap with J2 LUTs	Dec-23	Dec-23	Moved to January/February (Delivery after the maturity review 01/25)	
LST EDR J2 Provisional (updates to LSE)	Dec-23	Jan-24	Expected (01/16)	
ACSPO SST_v2 release version + patch to CCAP for MetOP	Jan-24	Jan-24		
Cloud Mask (LUT update for J2)	Jan-24	Jan-24		
OMPS-NP (J2 LUT Delivery)	Jan-24	Jan-24	Delivered 01/04/2024	
RAVE (Science bug fix)	Jan-24	Jan-24		
Vegetation Health	Jan-24	Jan-24		
GBBEPx (Enterprise Fires I-Band update)	Jan-24	Jan-24		
LAI Initial Delivery	Feb-23	Feb-24		

The above table is based on the ASSISTT CCAP delivery schedule. This table gets updated every month removing the delivered items after a confirmation and adding new items from a long list of ASSISTT schedules available until the end of FY24.

FY24 STAR JPSS Milestones

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

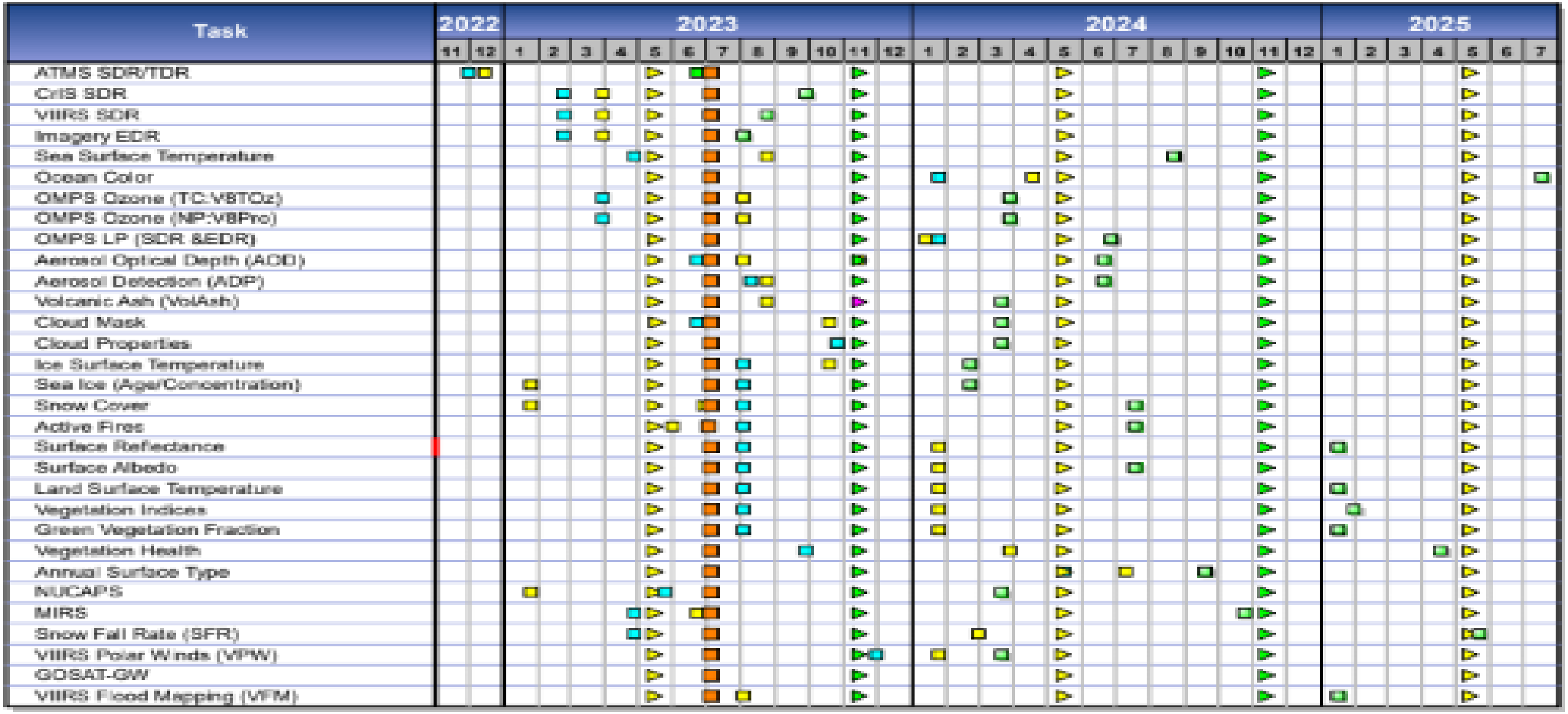
FY24 STAR JPSS Cal/Val Maturity Reviews

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
Clouds (V: Mar-24)	**Mar-24**	**Mar-24**	Provisional Review held (except for DCOMP and NCOMP): October 26, 2023; Attained Provisional effective March 30. **DCOMP and NCOMP Provisional Review occurred virtually on December 4, 2023, and attained Provisional effective March 30.**	
Aerosol AOD (V: Jun-24)	**Jun-24**	**Jun-24**	Attained Beta Provisional effective February 10, 2023	
Aerosol ADP (V: Jun-24)	**Jun-24**	**Jun-24**	Attained Provisional effective February 10, 2023	
Volcanic Ash (V: Mar-24)	**Aug-23**	**Aug-23**	Attained Provisional effective March 30, 2023	
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow; V: Feb-24 (SI & Binary Snow); V (other) :Jul-24	**Jul-24**	**Jul-24**	Attained Beta effective May 1, 2023. Ice Temperature and Ice Concentration Attained Provisional effective May 1, 2023.	
Active Fires (V: Jul-24)	**Jul-24**	**Jul-24**	Attained Provisional effective March 30,2023.	
LST/LSA/SR/GVF/VI (P: Jan-24; V: Jul-24 to Jan-25 FY25)	**Sep-24**	**Sep-24**	Attained Beta effective March 29, 2023	
Vegetation Health (V: Apr-25 FY-25)	**FY-25**	**FY-25**	Attained Provisional effective March 30, 2023	
Ocean Color (B/P: Jan-24; V:Jul-25 FY25)	**Jan-24**	**Sep-23**	**Beta/Provisional Planned for February 2024**	
SST (V: Aug-24)	**Aug-24**	**Aug-24**	Attained Provisional effective March 20, 2023	
VPW (B/P: Jan-24; V: Mar-24)	**Mar-24**	**Mar-24**	**Beta/Provisional Planned for January 2024.**	
VFM (V: Jan-25)	**FY-25**	**FY-25**	Provisional Review held 8/24; Effective date will be upon successful integration of v1.1 to be delivered in September 2023.	
NUCAPS P: Jan-25; V: Mar-Jun-24)	**Jun-24**	**Jun-24**	Attained Beta effective 3/23, Provisional Planned: January 2024	
MiRS (V:Oct-24)	**Oct-24**	**Oct-24**	Attained Provisional effective May 12, 2023	
SFR (P: Feb-24; V: May-24)	**May-24**	**May-24**	Attained Beta effective December 3, 2022	
OMPS NP EDR V8Pro & V8TOz & V8TOS (V: Mar-24)	**Mar-24**	**Mar-24**	OMPS NP EDR V8Pro Attained Provisional Effective June 20, 2023. OMPS NP EDR V8Toz Attained Provisional September 19, 2023.	
OMPS LP (B: Jan-24; P: Feb-24; V:Sep-24	**Sep-24**	**Sep-24**	**Beta and Provisional Planned 1/25/24**	

FY24 STAR JPSS Milestones

Operational/Program Support	Original Date	Forecast Date	Actual Completion Date
S-NPP: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	**12/5/23, 12/12/23, 12/19/23, 01/03/24**
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	**12/05/23, 12/19/23, 01/03/24**
S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	**12/18/23**
NOAA-20: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	**12/5/23, 12/12/23, 12/19/23, 01/03/24**
NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	**11/28/23, 12/12/23, 01/03/24**
NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains,	Monthly	Monthly	**12/18/23**
NOAA-21: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	**12/5/23, 12/12/23, 12/19/23, 01/03/24**
NOAA-21: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	**11/28/23, 12/12/23, 01/04/24**
NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	**12/18/23**
Mx builds deploy regression review/checkout (Mx9/MX10)			✔ Tentative dates: **Mx9: Jan 16, 2024** Mx10: Apr. 16, 2024

STAR JPSS Schedule: TTA Milestones



Color code:

Green: **Completed Milestones**

Gray: **Ongoing FY24 Milestones**

Active Fires

December 2023

Accomplishments / Events:

- The team developed further screening of corrupt bad VIIRS SDR data in the processing algorithm to eliminate spurious detections
  - Further screening of input SDR data to detect poor quality observations
  - Additional screening of fire mask to detect residual spurious detections
- The team worked with OSPO to identify the root cause of the product monitoring alerts that occurred on December 12, 2023
  - It was determined that the alerts were related to the day-night-band calibration event, during which shortwave band data were missing
  - Possible mitigation steps to integrate calibration event information into product monitoring are recommended

Overall Status:

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

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

Issues/Risks:

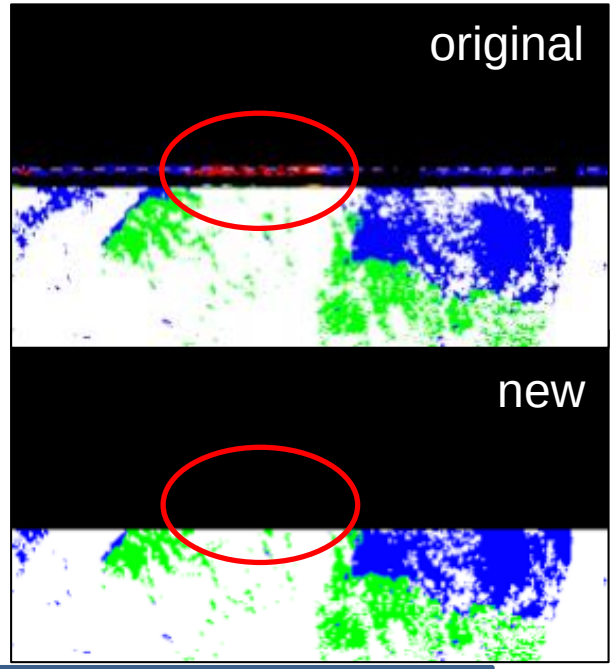
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Baseline / eFire / NGFS cross verification and cal/val	Sep-24	Sep-24		
eFire NOAA-21 validated maturity analysis	Jul-24	Jul-24		
ASSIST, NCCF and DB I&T support	Dec-23	Dec-23	Dec-23	
Reactive maintenance of Suomi NPP,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

Highlight: Removing spurious detections from EFIRE output

Suomi NPP Enterprise Fire VIIRS I-band fire mask, 8/16/2012,17:31 UTC, using reprocessed SDR input.

Top: original output

Bottom: updated output after applying new filtering approach for corrupt input SDR and spurious detections



Aerosol

October 2023

Accomplishments / Events:

- AAC team member Jim Limbacher is developing an experimental over ocean aerosol layer height algorithm using a single VIIRS channel which is an M9. These retrievals are reliable only for aerosol optical depths > 0.5 and potentially have cirrus influence.
- AAC team member developed a new VIIRS and TROPOMI blended aerosol detection algorithm. This enterprise approach allows for smoke and dust retrievals from METImage, TROPOMI, and VIIRS using consistent science across all platforms
- In preparation for Metop-SG launch, EUMETSAT has released new proxy datasets for METImage and UVNS. AAC team downloaded the data for testing of aerosol detection algorithm
- Kondragunta and Cheeseman are drafting a policy paper entitled “Can satellite data drive public policy of fine particle pollution?”
- Kondragunta and Laszlo worked with OCS PPM manager Kari St. Laurent in updating aerosol detection product project plan in preparation for FY24. One of the milestones is for NOAA-21 aerosol detection product to reach provisional maturity level. For aerosol optical depth, complete development and evaluation of new over-land aerosol models for VIIRS is one of the milestones.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Update to a faster version AI-based surface-reflectance-relationship algorithm (ML-SFRA)	Jun-23	Sep-23	TBD	developer left

Overall Status:

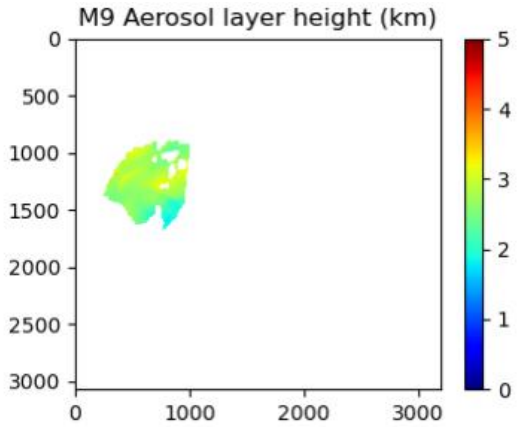
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

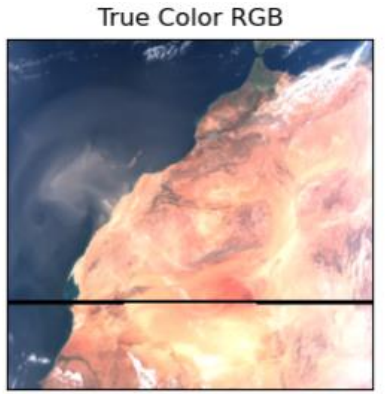
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight:





An experimental aerosol layer height over ocean using VIIRS M9 (1.3 um) for dust transport case. Example retrieval for March 30, 2023

ATMS SDR

December 2023

Accomplishments / Events:

- Worked with ASSISTT to successfully compile ADL Mx8.01 in STAR CentOS9 (RHEL9) server. Due to the STAR IT security requirements, all STAR linux servers, including Virtual Machines (VMs), will be upgraded directly from CentOS7 to CentOS9. The successful completion of ADL compilation test ensures that ATMS operational calibration algorithm or PCT updates can be performed in the latest CentOS9 servers.
- Introduced the latest development progress of lunar radiative transfer model, which will improve the lunar observation analysis quality to support the ATMS science data quality improvement. Shown in Fig.1 is the comparison between the lunar radiative transfer model and on-orbit lunar observations.
- Analyzed the operational ATMS SDR overall data quality degradation issues observed when multiple consecutive repaired science RDR granules present. Reported the findings in DRAT meeting to support IDPS system diagnose.
- Reviewed ATMS SN 305 regression TVAC test requirements and CDRLs including Regression Test Report, System Calibration Test Procedure, and revisions to the Calibration Data book, and Sensor Math Model
- Attended AGU 2023 conference to present NOAA-21 ATMS post-launch cal/val activities and science data quality based on the beta/provisional/validated maturity review reports to promote the use of ATMS data in community.
- Host team discussion to propose and finalize the FY24 team working milestones to support STAR JPSS and DPMS ground projects.

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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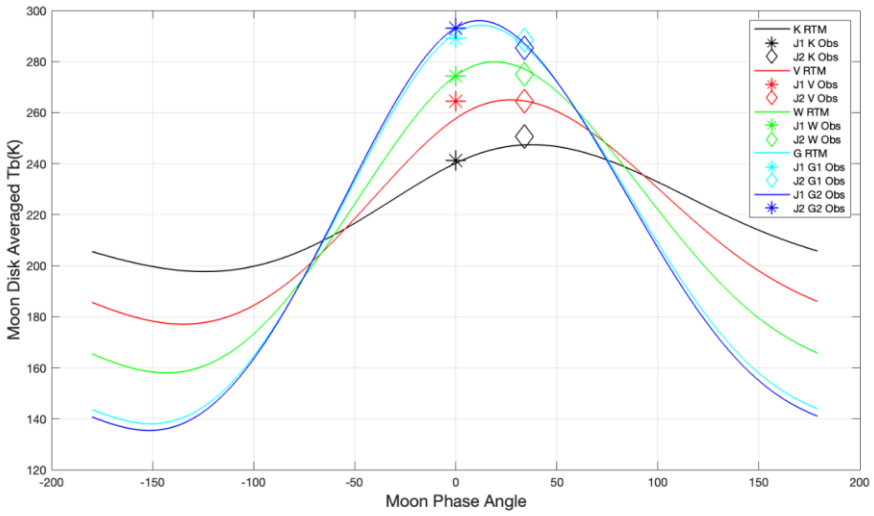
Issues/Risks:

None

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

Highlights:

Figure 1. NOAA-21 and NOAA-20 ATMS band dependent lunar observations and ATMS lunar radiative transfer mode w.r.t. moon phase angle



Clouds

December 2023

Accomplishments / Events:

- The Cloud team has been working on the Readmes for the products that have passed provisional in December.
- Work is ongoing with the replacement of NCOMP with the ACHA Cloud optical depths. Also expecting a new ECM LUT in Early 2024
- The CIRA team updated 3D cloud data processing with the addition of NOAA-21 VIIRS data for cloud vertical cross-sections on CIRA's aviation website and and product display on SLIDER for public release after the NOAA-21 VIIRS cloud product provisional maturity review completion.

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

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

Highlights:

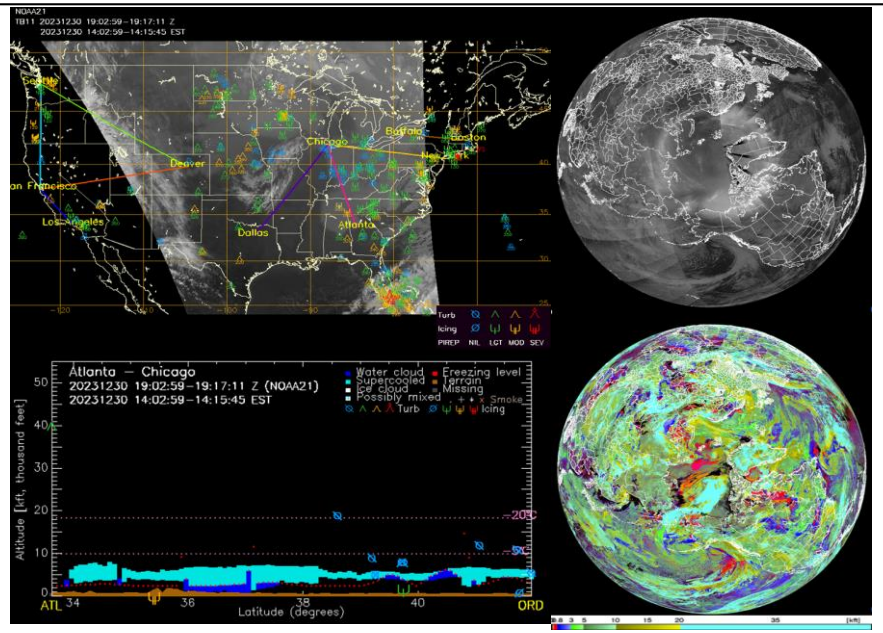


Figure 1.Example of a cloud cross-section from NOAA-21 VIIRS along a flight path between Atlanta and Chicago with 10.7-µm image over CONUS (left: 19:02 UTC - 20:19 UTC on 30 Dec 2023) and Cloud Base Altitude with DNB (right) on CIRA's SLIDER which has been updated with the addition of NOAA-21 VIIRS data

CrIS SDR

December 2023

Accomplishments / Events:

- An SNPP CDP reset anomaly occurred on November 2, 2023, stopping the flow of SDR data. Recovery of SNPP CrIS occurred on 12/6/2023. An extensive assessment was performed and it was concluded that the Radiometric, Spectral, Noise, Geolocation accuracy, Telemetry and Intercomparisons returned to nominal values shortly thereafter (**Fig. 1**)
- Using UMBC Ccast Software and tools, succeeded in using it to analyze the JPSS-2 CrIS TVAC gas cell data, radiances, and to compute the measured transmittances (**Fig. 2**)
- Investigation continues into the elevated imaginary radiance observations from the NOAA-21 CrIS data. A hypothesis is suggested that this is due to stray-light contamination because a transient (in both the Deep Space and ICT) radiance magnitude and phase is observed during the solar eclipse exit during descending orbit (**Fig. 3**)
- Simulated CO2 Gas Cell Transmittances were successfully computed using LBLRTM and in-house tools that were developed using approximate CO2 Gas cell parameters (refined using measured parameters were conducted later). These transmittances were then verified by comparing to previous JPSS-2 TVAC measurement results, as well as HITRAN online tools.
- Transmittances were refined by reducing the spectral resolution to be in-line with the CrIS TVAC data. This was performed by first taking the inverse Fourier transform (FT) of transmittance to form an interferogram, next truncating the interferogram to the number of datapoints in the CrIS TVAC radiance product, and then forward FT to determine a transmittance that meets CrIS specifications to compare against the gas cell TVAC data for the TVAC spectral calibration (**Fig. 4**). Additional comparisons showed improved agreement with prior J2 CrIS TVAC test results.
- The work of experimentally expanding the matching criteria for the SNO intercomparisons have continued, with the focus being on bringing the intercomparison methodology more in line with the reference paper (Loveless et al, 2023). This includes using a corrected weighting of big circles for the collocations (**Fig. 5**).
- A review of the CrIS ICT model was performed and several suggestions to improve the current ICT model were presented, including improvement in the characterization of the diffuse versus specular contributions to the ICT emission, and including this in the model (**Fig. 6**).
- Continue to monitor the NOAA-21 CrIS instrument (quality flags, CrIS-ABI intercomparisons, NEdN noise monitoring, geolocation accuracy, instrument responsivity, telemetry), along with the other two sensors (NOAA-20 and S-NPP)

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

Overall Status:

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

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

Issues/Risks:

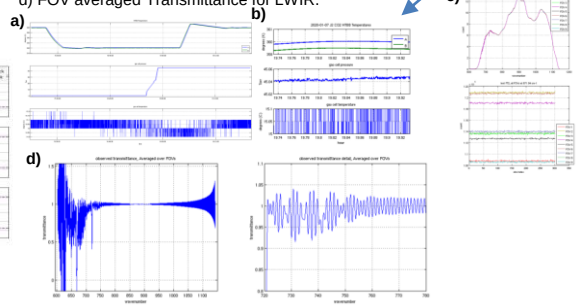
Red: There is a misalignment between the IDPS ground processing environment and NOAA-STAR. The IDPS ground processing will be based on RHEL Centos version 8 (RHEL8) starting with MX9 (TTO Feb 8, 2024). NOAA-STAR currently has RHEL7 (Centos version 7) and will migrate to RHEL9. **The risk is that NOAA-STAR will not be able to run or deliver the ADL code updates based on the IDPS Operational Processing.**

Yellow: 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 two server dedicated to 6 CrIS Team members, **and these servers have shown to have issues (as exemplified by the rhw1304 and rhw1377 failures during the 9/30/23 weekend).** 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 internal review on Jan. 6, 2023.

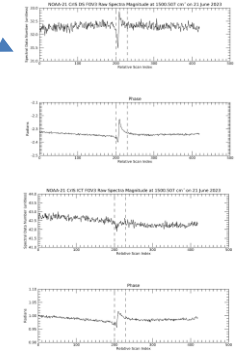
Highlights:

(1) SNPP CrIS geolocation accuracy for FOR 1, 15 and 30 in the past 3 months. The accuracy measurements in December 2023 indicate nominal performance.

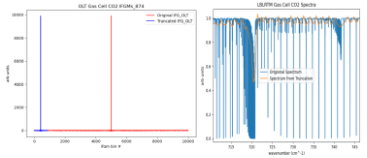
(2) Using CCAST and TVAC tools from UMBC, a) JPSS-2 TVAC Hot Blackbody Temperature (HBT, top) Gas Cell Pressure (middle) and Gas Cell Temperature (bottom). b) same parameters for HBT=360K and gas cell being full (FT1). c) LWIR Radiance for FT1. d) FOV averaged Transmittance for LWIR.



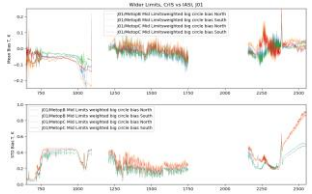
(3) NOAA-21 Time Series at 1500.5 cm^{-1} (MWIR/FOV3 from 6/21/2023), with DS views on the left (magnitude on top, phase on the bottom) and ICT views on the right side.



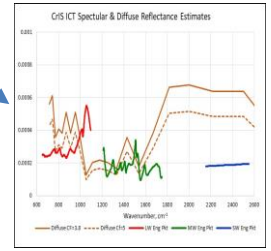
(4) Reduction of the The interferograms (left) and transmittance spectra (right) of one of the HITRAN online tools



(7) NOAA-20 CrIS vs METOP-B/C IASI using Big Circle means intercomparison method, for data covering July 2023 through December.



(8) Diffuse is generally larger than specular. LW up to 2x and SW up to 3x. Total emissivity is e > 0.999. However, the larger diffuse term is not in the EP.



Accomplishments / Events:

VIIRS I-band Sea Ice Concentration (SIC) and Blended Product Capture Polynya and Smaller-scale Features in Antarctica:

On 16 September 2023, a polynya was observed by AMSR2 and NOAA-20 VIIRS SIC products (Figure 1) off eastern Antarctic in the far Southern Ocean (south of Indian Ocean). This report focuses on the eastern intermediate concentration ice portion of the polynya and coastal sea ice (fast ice) north of Enderby Land (Figure 1 boxed area). This area of interest is observed by AMSR2 to have much more intermediate SIC of between 50-80%, while VIIRS is observed to have a more sharp distribution with more acute values that are closer to 0 or 100%. We next utilize the highest resolution VIIRS data at 375-m, also called I-band (Figure 2). The VIIRS I-band RGB image (I1, I2, I3) confirms the existence of open water areas in the region of interest. The I-band SIC shows greater detail, capturing much smaller features, such as leads and smaller scale coastal polynyas in the fast ice areas that are unable to be identified in lower resolution microwave based products. Finally, we create zoomed-in images of the daily AMSR2 and VIIRS (NOAA-20) blended product in the boxed region (Figure 3). This clarifies the lack of detail and missing open water in the AMSR2 product. We also show the better detail and open water detection of the blended SIC (Figure 3b-c). The blended product does a better job at detecting leads and smaller scale coastal polynyas than AMSR2. The blended product is also better at detecting the remaining small-scale high concentration ice within the open ocean polynya. It is also worth pointing out the more gradual increase in SIC surrounding the open water polynya in AMSR2, compared to VIIRS the gradient is more sharp, resulting in a positive difference than seen in Figure 3c. Otherwise, differences are negative in open water features not captured by AMSR2.

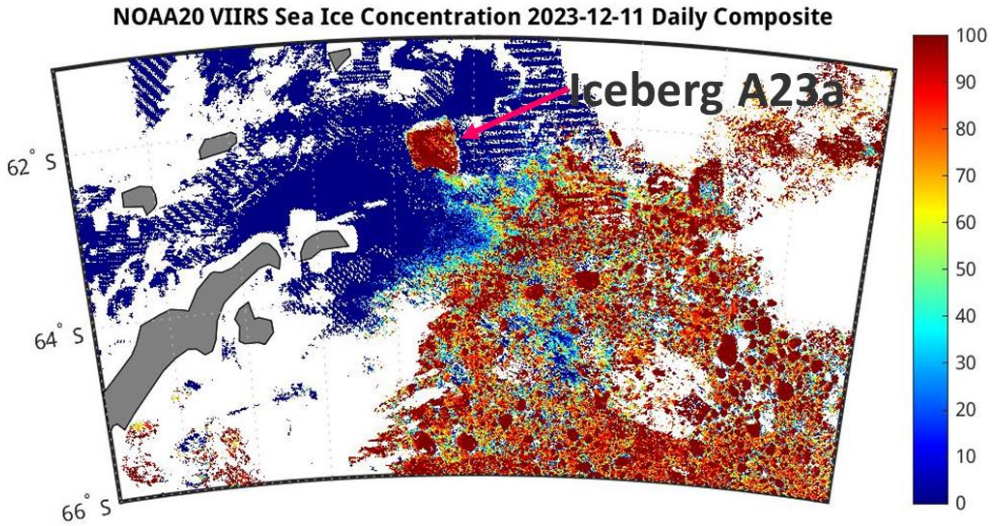


Figure: VIIRS NOAA-20 Sea Ice Concentration from December 11, 2023 daily composite over northwest Weddell Sea near the northern tip of the Antarctic peninsula.

GCOM-W

November, 2023

Accomplishments / Events:

- Participated in the JAXA joint PI AMSR2/AMSR3 meeting conducted on November 6-9, 2023. An update of NOAA's AMSR2 activities and plans for AMSR3 were presented.
- Reviewed AMSR3 manuals provided by JAXA
- Submitted AMSR2 all-weather SST abstract to the AMS Tropical meeting
- Working with ASSISTT on transitioning the AMSR2 all-weather wind speed algorithm, which is currently running in the AMSR2 NRT R&D processing system.
- (S. Alsweiss, Z. Jelenak and P. S. Chang, "Extending the Usability of Radiometer Ocean Surface Wind Measurements to All-Weather Conditions for NOAA Operations: Application to AMSR2," in IEEE Transactions on Geoscience and Remote Sensing, vol. 61, pp. 1-12, 2023, Art no. 5301112, doi: 10.1109/TGRS.2023.3266772.)

Task Category	Task/ Description	Start	Finish	Deliverable	Requirement (Dev Only)
Development (D)	Assessment of all EDR's for AMSR2, initiate changes for AMSR3	Oct 2023	Sept 2024	Beta versions of Pre-launch algorithms and LUTs	Refer to IORD/L1RD; NESDIS priorities; STAR-National Center User Engagements
Integration & Testing (I)	Reprocessing of L2 EDR's	Nov 2023	July 2024	Full L2 products from launch through July 2023	
Calibration & Validation (C)	Continue AMSR2 L1 monitoring; develop AMSR3 capabilities	Oct 2023	Sept 2024	Annual cal/val report; AMSR3 prototype off-line system	
Maintenance	Deliver any algorithm updates	Jan 2024	May 2024	Updated code to ASSISTT	

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

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

December 2023

Accomplishments / Events:.

- The JSTAR Mapper/STAR Environmental Monitoring System (STEMS) team Implemented a new VIIRS product on the JSTAR Mapper display system called Flood Mapping which shows the floodwater fraction percentage with a rainbow color scale at the VIIRS resolution.
- The NPROVS team provided preliminary assessments of the latest NUCAPS v3 candidates in support of NOAA-21 Provisional Maturity validation **(HIGHLIGHT)**
- NPROVS team achieved preliminary success to replace the “near-real-time” MetOp-GRAS Radio Occultation (RO) sounding products currently ingested into NPROVS with a more advanced “post-processed” version.
- NPROVS team member Dr Bomin Sun attended the American Geophysical Union (AGU) annual conference in San Francisco (Dec 11-15) and presented a poster entitled “*Utilization of NOAA Satellite Atmospheric Sounding Retrieval Products to Monitor and Detect Severe Weather and Environmental Events*”

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
CPC Morphing (CMORPH) technique transferred from JSTAR Mapper to STEMS	Q2	Q2		
NPROVS Special expanded to integrate advanced CFH moisture radiosonde	Q4	Q4		
JPSS Dedicated Radiosonde Programs expanded to include new Bankhead National Forest (BNF) ARM site in northwest Louisiana	Q3	Q3		
NPROVS User Support expanded to integrate new NWS NUCAPS–Forecast Product	Q3	Q3		
NPROVS supports maturity review for NUCAPS v3.1 for NOAA-21	Q2	Q2		

Overall Status:

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

1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
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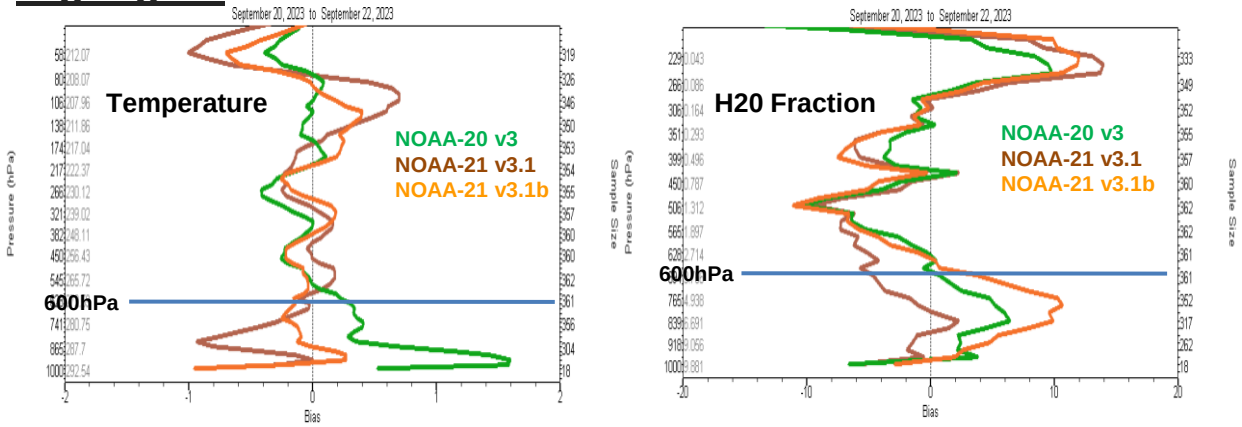
Issues/Risks: None

Highlights



The two panels show vertical statistics of global “radiosonde minus NUCAPS” temperature (left) and H20 vapor fraction (right). Results are shown for three independent versions (v) of NUCAPS products from the current operational NOAA-20 and pending Beta versions of NOAA-21, from single focus day, September 21, 2023. Results, although preliminary, suggest systematic bias differences particularly in the lower troposphere (*solid lines, 600hPa; 4km)*) of high interest to NWS forecast users. It can be seen that the latest NOAA-21 **v3.1b** shows a tendency toward overall reduced bias for temperature. A later version for NOAA-21 (v3.1c) is pending, including expanded results covering 3 focus days in March, September and December; monitoring continues.

ICVS

December 2023

Accomplishments / Events:

- Started the development of OMPS NM deep convective cloud (DCC) inter-sensor comparison against VIIRS M1 module. After the verification of product quality, a reprocessing of S-NPP OMPS NM and VIIRS M1 data was performed to build a time series trending to support OMPS SDR team activities. NOAA-21 OMPS NM vs VIIRS M1 comparison module is still under development due to the change of OMPS NM data format. A preliminary comparison trending product is expected to be generated soon.
- Diagnosed NOAA-21 OMPS NM vs. NOAA-20 NM 32-day running mean bias trending anomaly. Reprocess the NOAA-21 OMPS NM data to re-build the 32-day inter-sensor comparison time series against S-NPP and NOAA-20. Fixed the processing bugs due to the data delay.
- Updated NOAA-21 spacecraft monitoring module to add spacecraft power delivery unit chassi current monitoring products, as shown in Fig.c, to support NASA flight NOAA-21 spacecraft health monitoring and troubleshooting activities.
- Updated Hurricane 3D warm core structure animation package to replace the MatLab based gap filling code by Python version, which shows an improved gap filling quality in image generation. The full replacement of remaining MatLab code by Python will be finished soon.
- Started the transition of VIIRS vs. ABI inter-sensor comparison package to fix the processing error.

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

Overall Status:

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

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

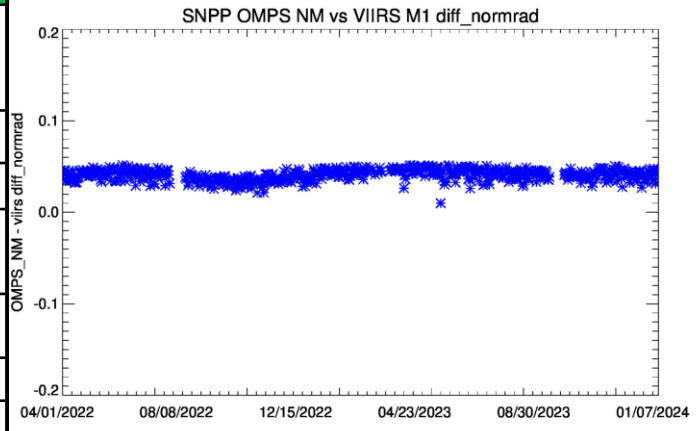
Issues/Risks:

None

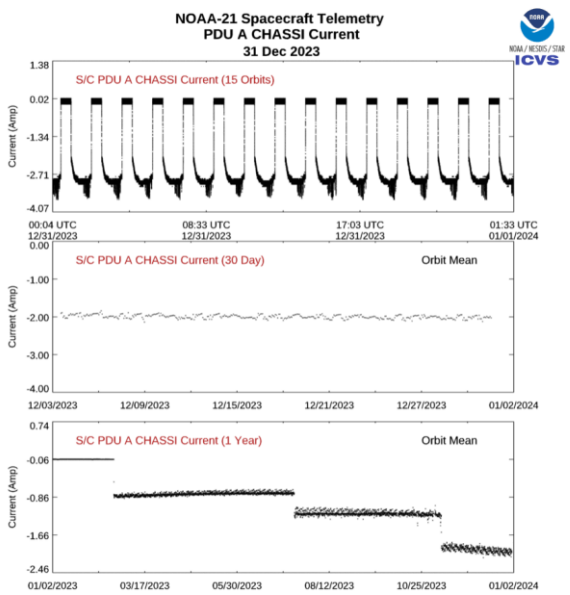
Highlights:

Significantly contribute to STAR SDR Teams

(a) S-NPP OMPS NM vs VIIRS M1 inter-sensor comparison time series through DCC



(b) NOAA-21 spacecraft PDU A Chassi Current



VIIRS Imagery

December 2023

Accomplishments / Events:

- VIIRS Imagery made available in CIRA's Satellite Library were used by the media to highlight the movement of iceberg A23a.
  - Yahoo! News UK: "Timelapse Footage Captures World's Largest Iceberg Floating Out to Sea"
  - Accuweather: "The world's largest iceberg caught on camera..."
  - ABC 7 – Bay Area: "Timelapse footage captured the world's largest iceberg floating..."
- 17 VIIRS Imagery Posts on CIRA Social Media this Month. A few top posts:
  - Visible (I1) Imagery of world's largest iceberg (A23a) – 26.6K views
  - Day Land Cloud RGB Imagery of engorged water bodies after heavy rainfall – 6.5K views
  - MWIR (M13) Imagery of Grindavik, Iceland volcanic eruption hot spot – 7.5K Views

Overall Status:

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

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

Issues/Risks:

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

Highlights: Image of the Month

Figure: NOAA-21 VIIRS 375-m Visible Imagery (I1) of A23a, the world's largest iceberg. High-res Imagery can be found on the CIRA Satellite Library here.

Leaf Area Index

December 2023

Accomplishments / Events:

- Present the LAI product validation and verification plan demo, work with ASSIST team to figure out the available verification datasets and then start to archive the required data.
- Double check the LAI code for the finally DAP delivery, improve the exceptional handling part to deal with possible risks.
- Reprocessed the historical data, mainly on the daily gridded SR (Image bands), keep the historical VIIRS data are archived for the future use, and keep the data continuality.
- Keep working on the LAI in-situ validation, explore more in-situ measurements to enrich the ground validation with diverse data source.

Overall Status:

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

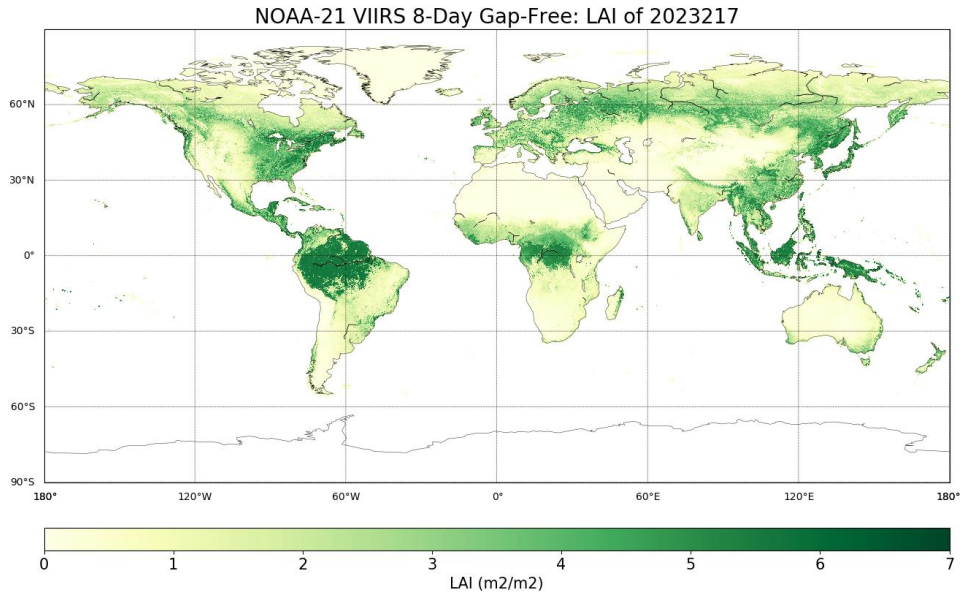
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:



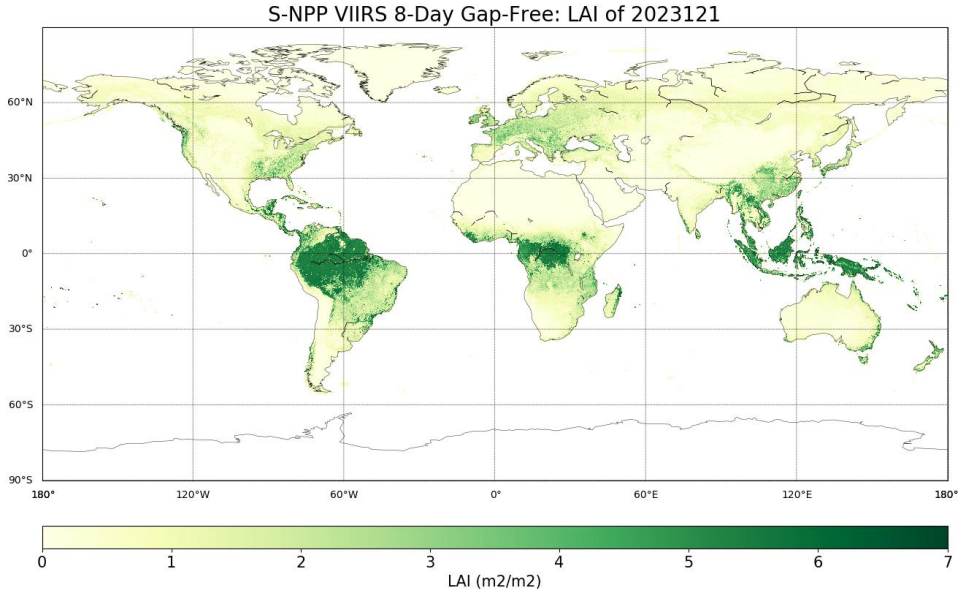
LAI Product Example data. Figure shows N21 LAI (DOY 217, 2023 0805-0812) at 1 km resolution.

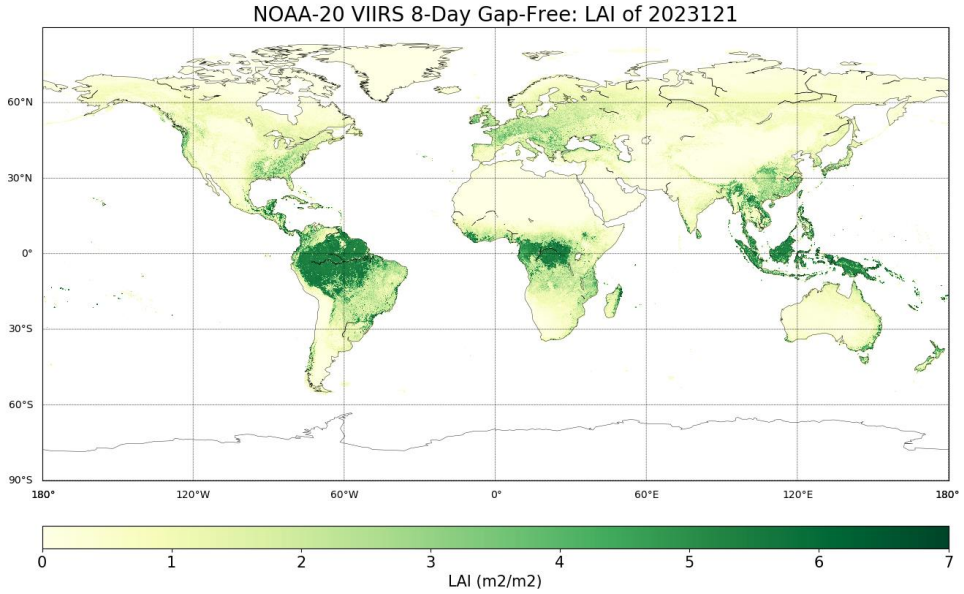
LAI Verification & Validation Plan Demo

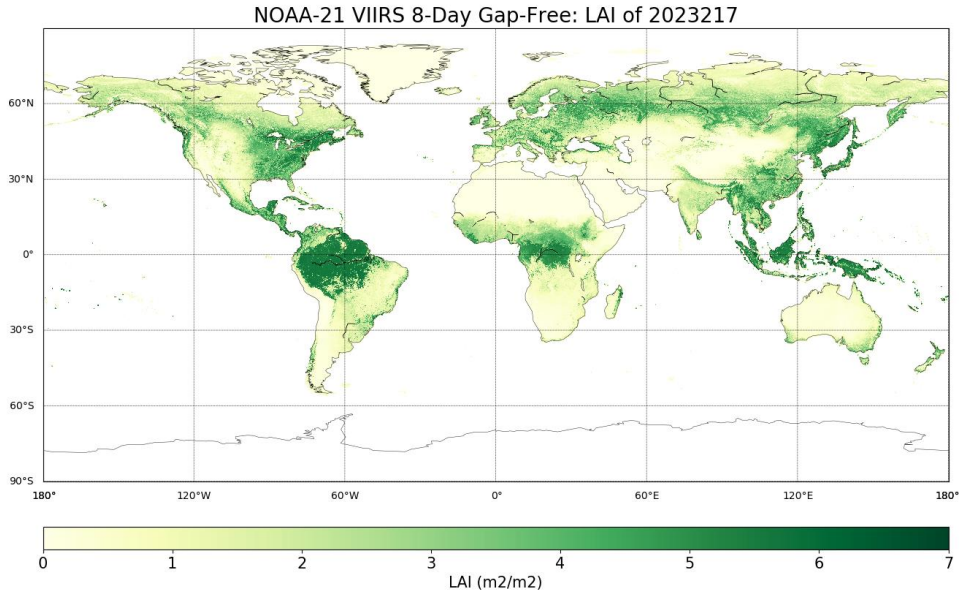
- Datasets for Verification
  - Final global LAI (1km in Lat/lon)
  - Data range (the final LAI data involve the input data up to 120 days)
    - SNPP: 09/01/2023 – 01/03/2024 (Week 32-46)
    - NOAA-20: 09/01/2023 – 01/03/2024 (Week 32-46)
    - NOAA-21: 11/01/2023 – 02/04/2024 (W39-46 + W1-8)

- LAI validation
  - In-situ LAI from NEON network observation will be used for the LAI ground validation.
    - Most sites locate at CONUS area, updated to Mid of 2022.
    - Other ground LAI datasets will be used for validation once the reprocessed SR data are available.
  - Inter-comparison with MODIS LAI, GLASS, GEOv2 will be performed for the validation
  - Both the LAI value and LAI time series will be evaluated and inter-compared with current widely used products (e.g. GEOv2, GLASS)
  - The monthly climatology for each biome type derived from the product will be tested by incorporating into EMC land surface model.

LAI Preliminary Evaluation and Validation







The LAI test data final product (smoothed and GAP free 8-Day LAI)

- SNPP LAI (Top Left), 20230501-20230508 (Day of Year: 121)
- NOAA-20 LAI (Top right), 20230501-20230508
- NOAA-21 LAI (Bottom left), 20230805-20230812 (DOY: 217)

Surface Albedo

December 2023

Accomplishments / Events:

- Delivered the soil albedo data to model team users
- Evaluating the NOAA-21 albedo using in-situ measurements and peer products from S-NPP and NOAA-20 to prepare for the provisional review
- Keep exploring the early detection of extreme weather events such as heatwave/coldwave

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

Overall Status:

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

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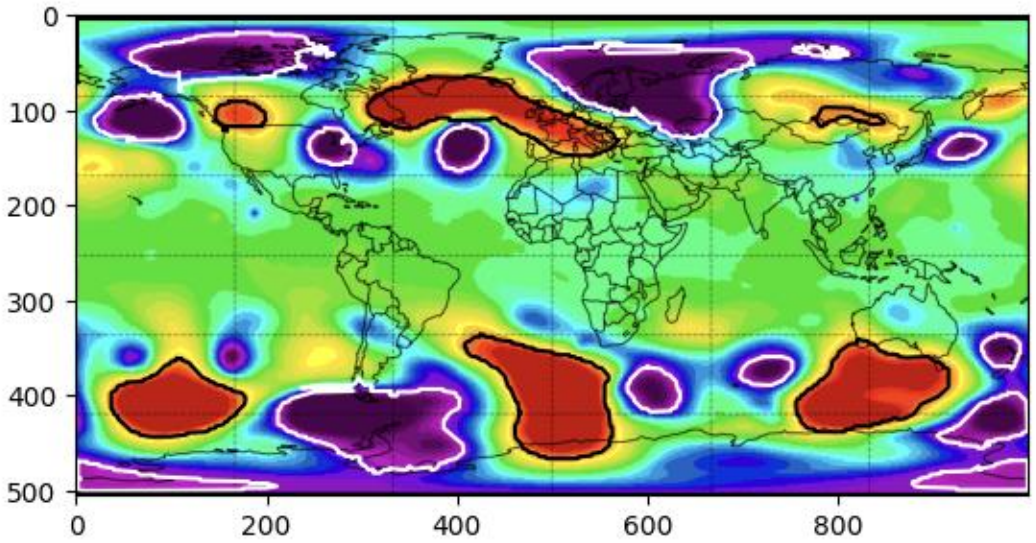
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

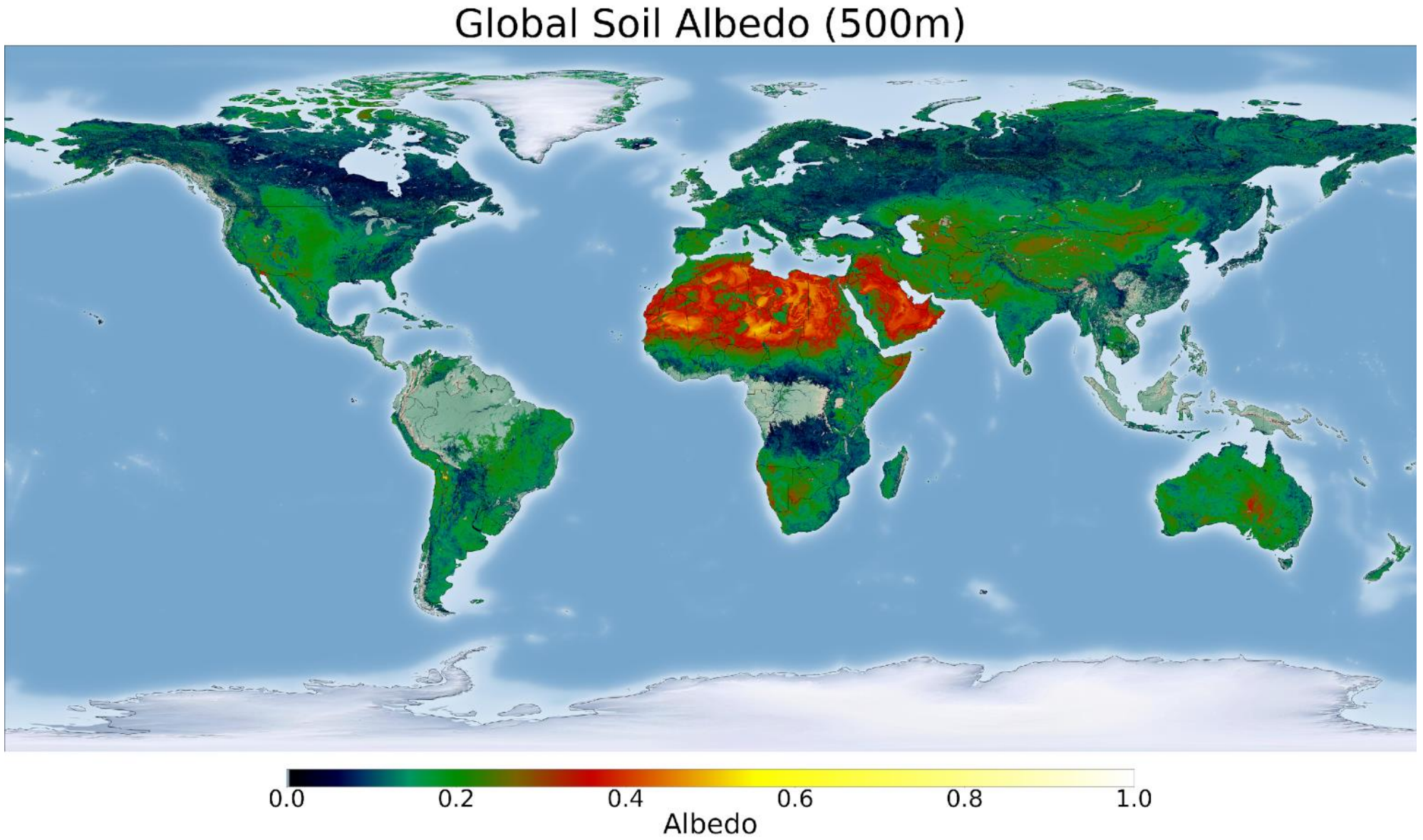
Issues/Risks:

Highlights:

Detecting the areas with extreme high/low anomaly



Delivered the Global Soil Albedo Data to Model Team

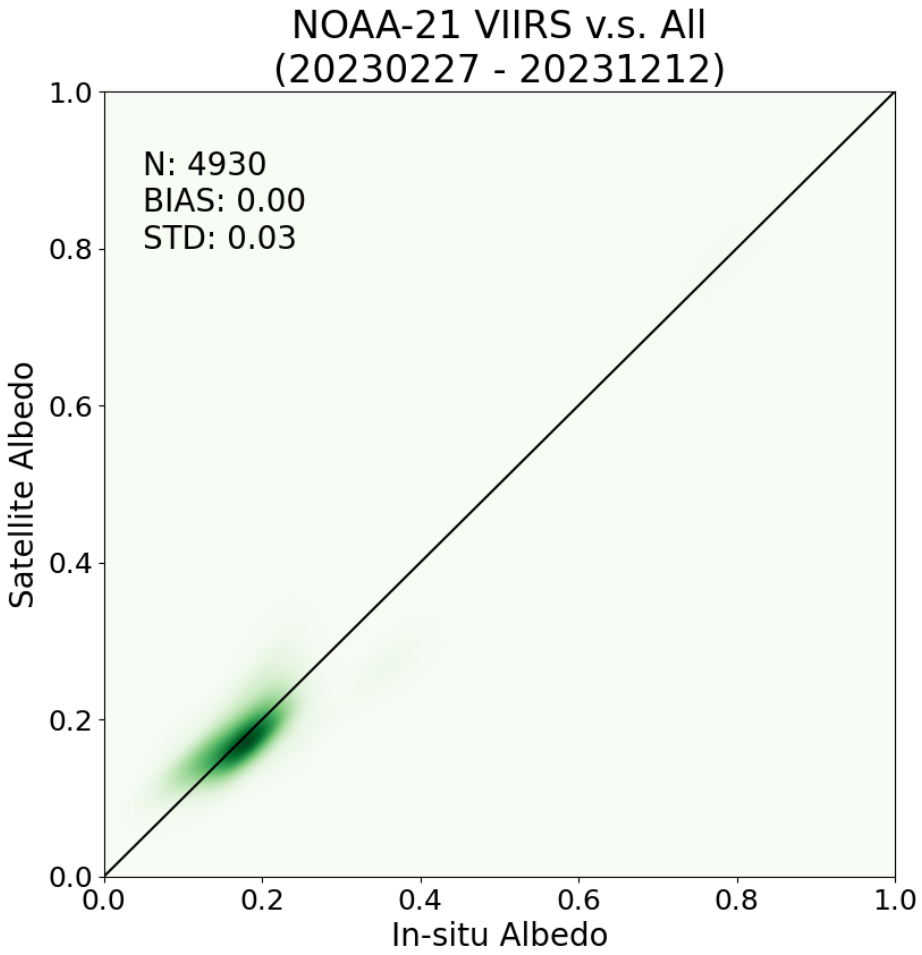


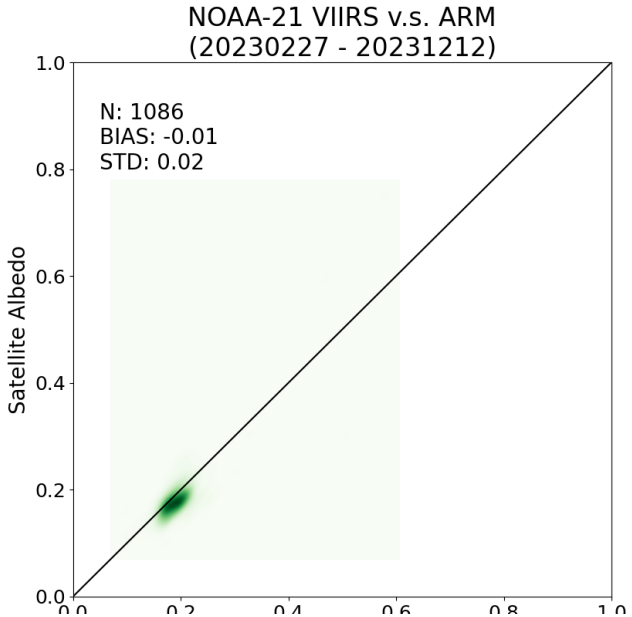
The soil albedo dataset was sent to the model team users

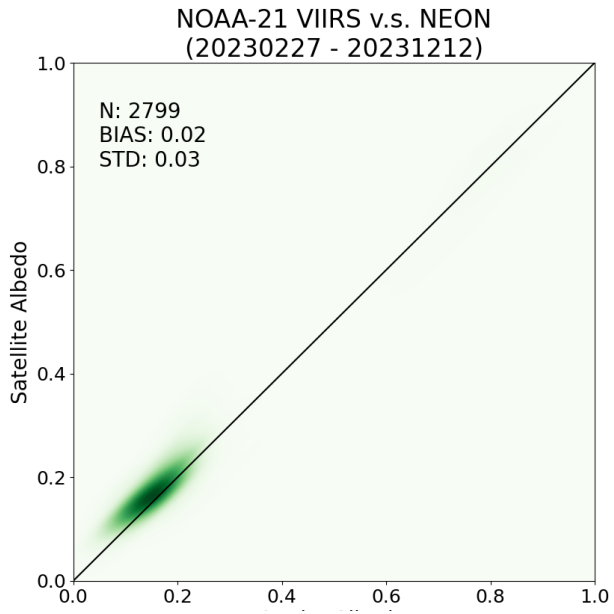
In-situ validation

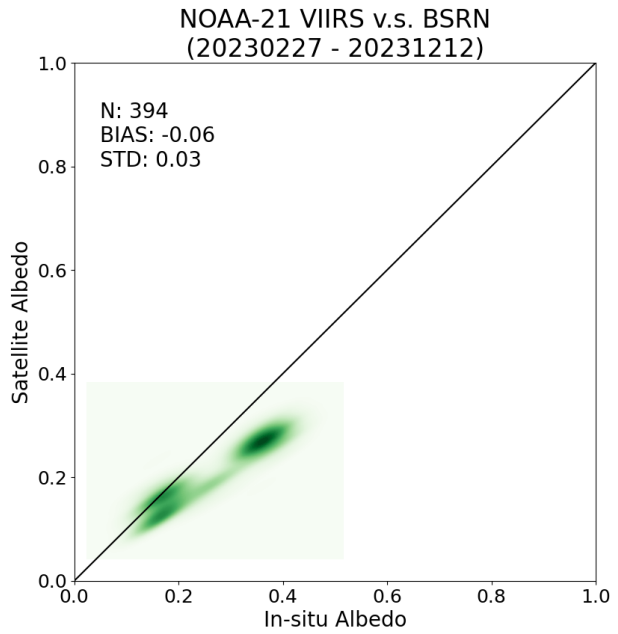
NOAA-21 albedo was evaluated using ground measurements.

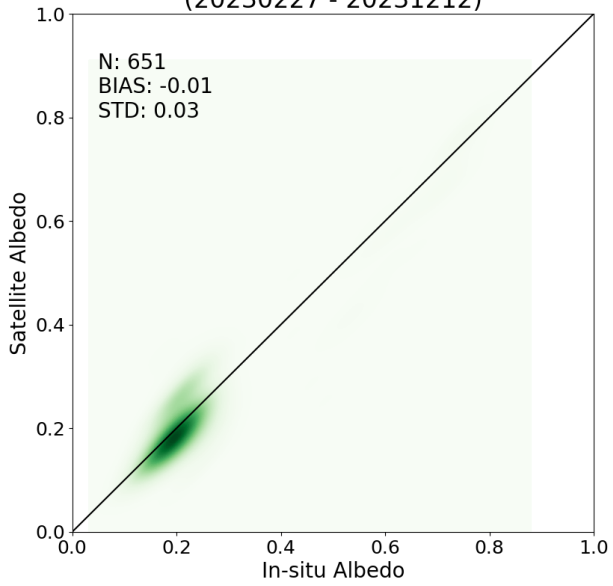
Good performance from the satellites based on the routine in-situ network data.





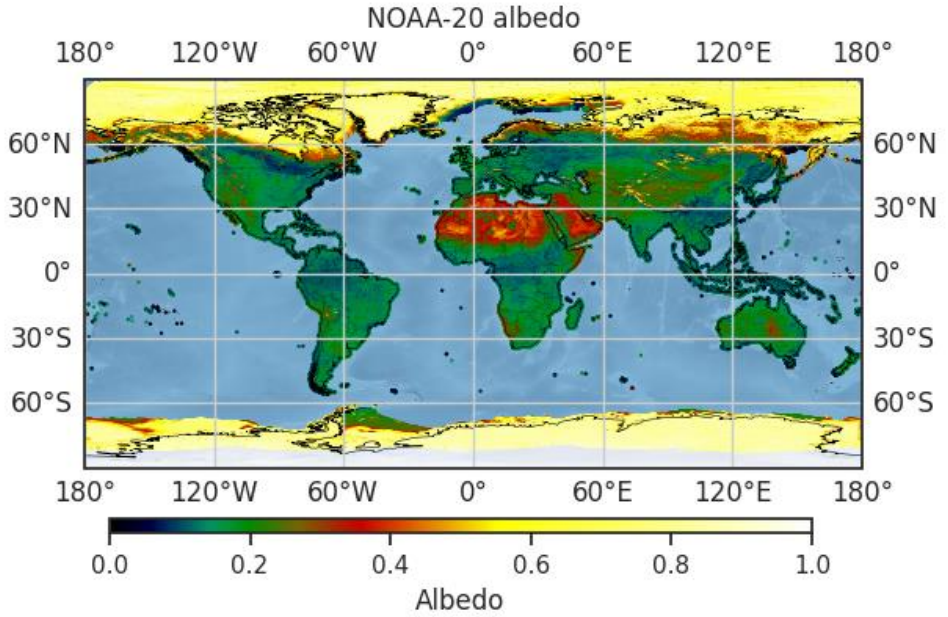






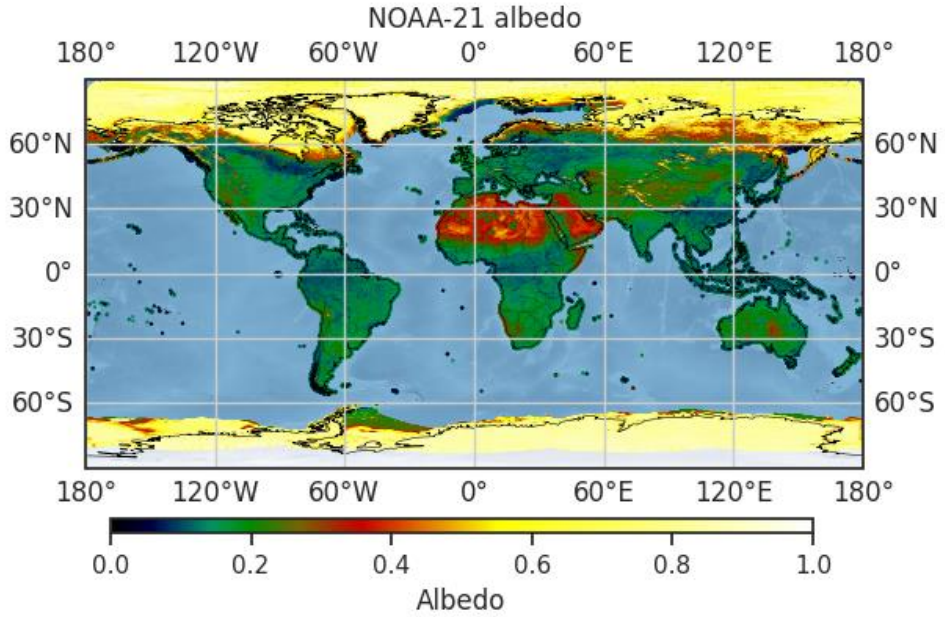
Cross-comparison (Albedo)

- Spring case (Apr 28, 2023)

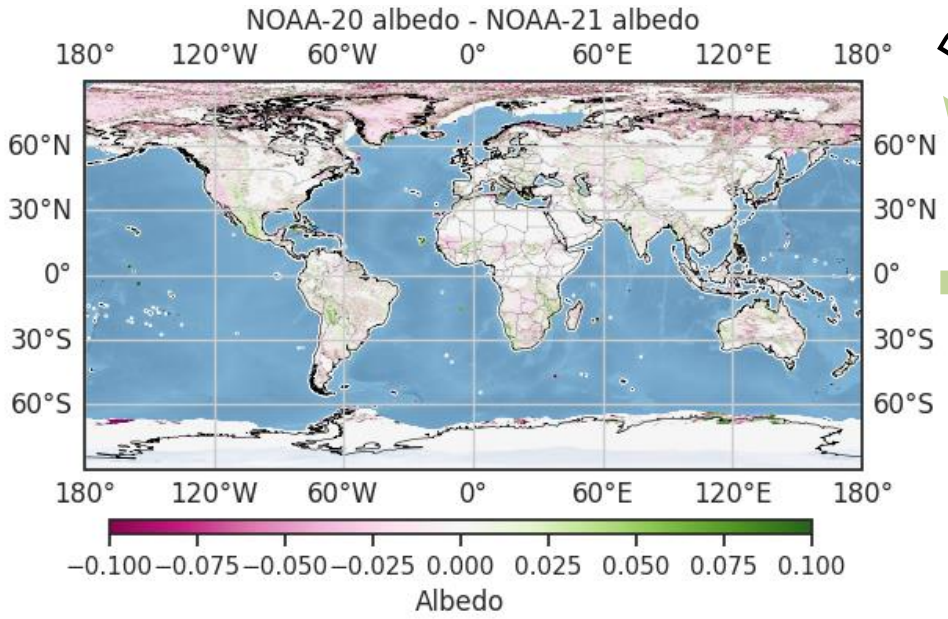


High consistency

NOAA-20 v.s. NOAA-21

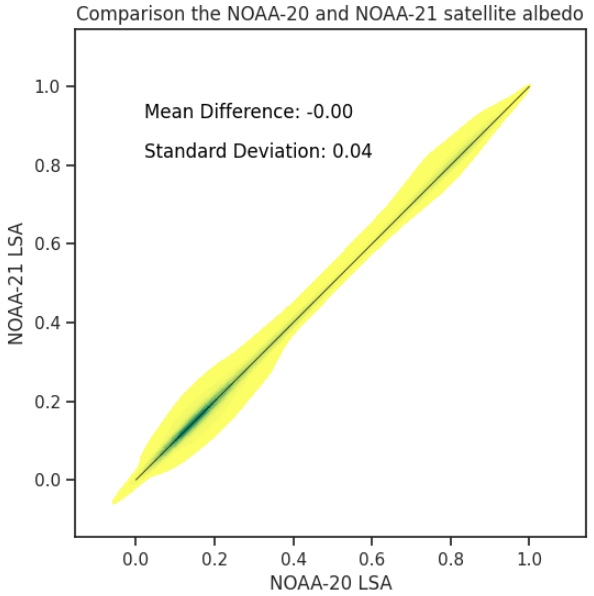


Difference Map



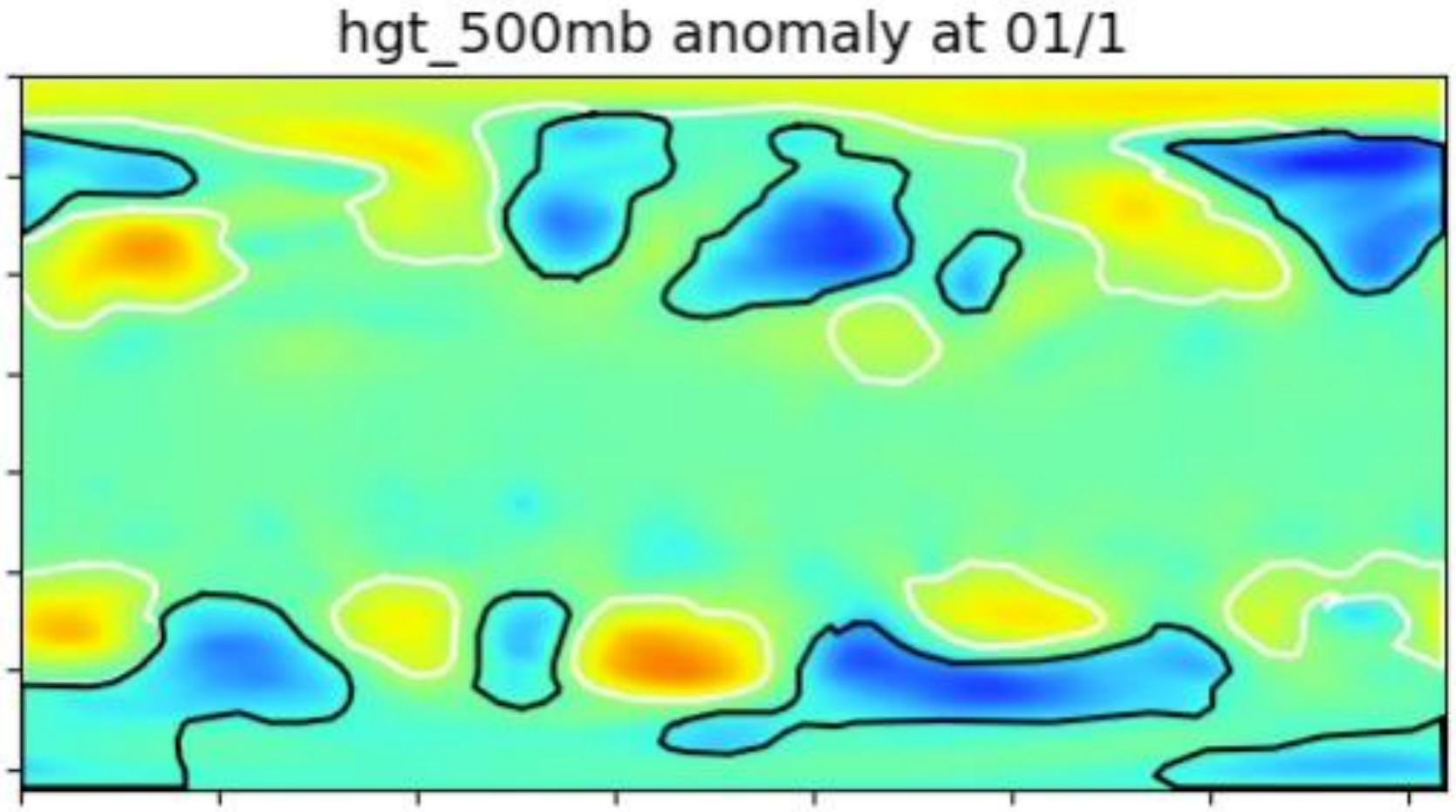
Statistics

Bias and Std



- Zero bias exists between NOAA-20 and NOAA-21 albedo measurements.
- Some scattered

Early Detection of HGT anomaly events



The areas with high anomaly are extracted.

Areas with blue shading indicate regions where the geopotential height is lower than average, which can be associated with troughs in the atmosphere and potentially more stormy and unsettled weather.

Areas with yellow or orange shading indicate higher-than-average geopotential heights, which may correspond to lower-than-average temperature anomalies.

OMPS SDR

December 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 bi-weekly LUTs.
- Analyzed the OMPS NP inter-sensor latitudinal dependency feature to identify the root cause by examining and comparing OMPS NP dark rate values, OMPS NP Earth-View wavelength shift values; OMPS NP EV360 data features between SNPP, NOAA-20, and NOAA-21.
- Determined and adjusted the dark overcorrection by using the dark-side EV360 data.
- Compared the NOAA-21 OMPS NP average radiance data for 32 days against NPP and NOAA-20 values by using the updated dark tables.
- Investigated the root cause of higher 32-day averaged N21 NM normalized radiance (NR) values than either SNPP or NOAA-20 (for NR: N21 >N20 or SNPP about 5%)
- Continued the analysis of NOAA-21 OMPS NM stray-light LUT Out-of-Range (OOR) values by using the NOAA-20 and SNPP as a reference.
- Applied the solar activity corrections to OMPS NP degradation rates.
- Presented a poster with the title of “On-Orbit NOAA-21 OMPS SDR Data (remote).
- Analyzed the OMPS NM bandpass values to see how re-centering the bandpass curves impacted synthetic solar data.

Overall Status:

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

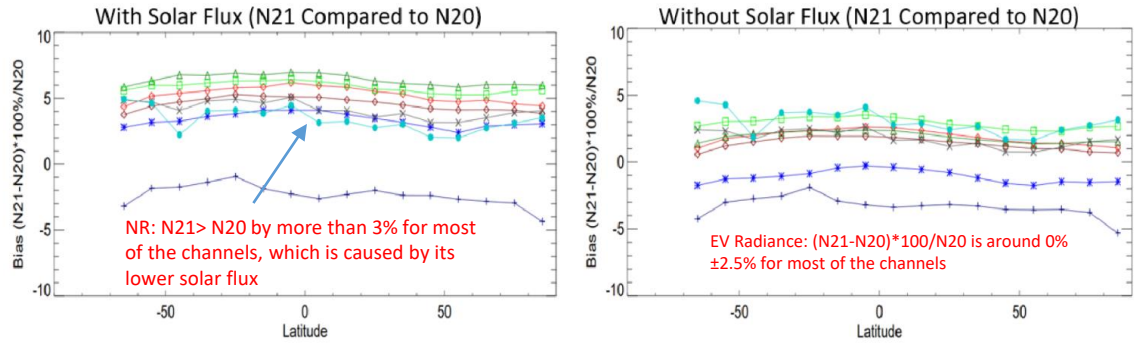
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

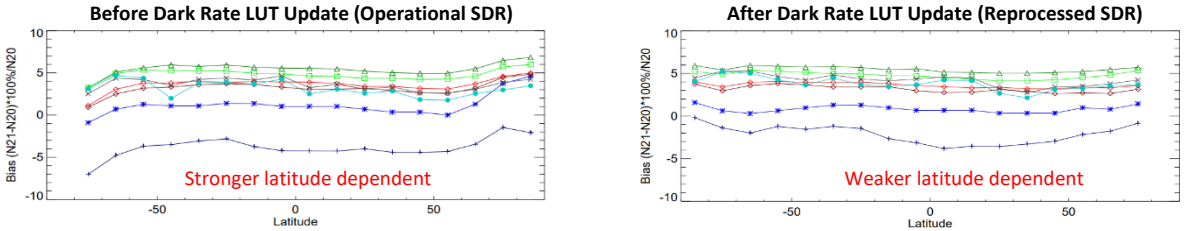
None

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

Part I: Higher Normalized Radiance (NR) for N21 due to its lower Solar Flux



Part II: Impact assessment of the over-corrected dark rate on 32-day averaged NR Differences



MiRS Products

December 2023

Accomplishments / Events:

- The MiRS team research on the Tonga eruption was officially published in December in Geophysical Research Letters. The strongest volcanic eruption since the 19th century occurred on 15 January 2022 at Hunga Tonga-Hunga Ha'apai, generating unprecedented atmospheric waves not seen before in observations. We used satellite microwave observations from (a) Advanced Technology Microwave Sounder (ATMS) on board the National Oceanic and Atmospheric Administration (NOAA)-20 and the Suomi-National Polar-orbiting Partnership (SNPP) and (b) Advanced Microwave Sounding Unit (AMSU)-A on board Meteorological operational satellite (MetOp)-B/MetOp-C to study these waves in the stratosphere immediately after the eruption. The NOAA Microwave Integrated Retrieval System (MiRS) was applied to these microwave observations to produce atmospheric temperature profiles. The atmospheric Lamb wave and fast-traveling gravity waves are clearly revealed in both the brightness temperatures and the MiRS retrieved temperatures, revealing their vertical phase structures. **This study is the first attempt to perform a detailed analysis of the stratospheric impact of the Tonga eruption on operational satellite microwave observations and the corresponding MiRS retrievals.** The figure shows analysis of wave patterns as seen in MiRS retrievals at 2.5 hPa. Further details can be found in the GL article. Reference: Lee, Y. K., Hindley, N., Grassotti, C., & Liu, Q. H. (2023). The Hunga Tonga-Hunga Ha'apai Volcanic Eruption as Seen in Satellite Microwave Observations and MiRS Temperature Retrievals. Geophysical Research Letters, 50(23). doi:10.1029/2023gl106439

Overall Status:

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

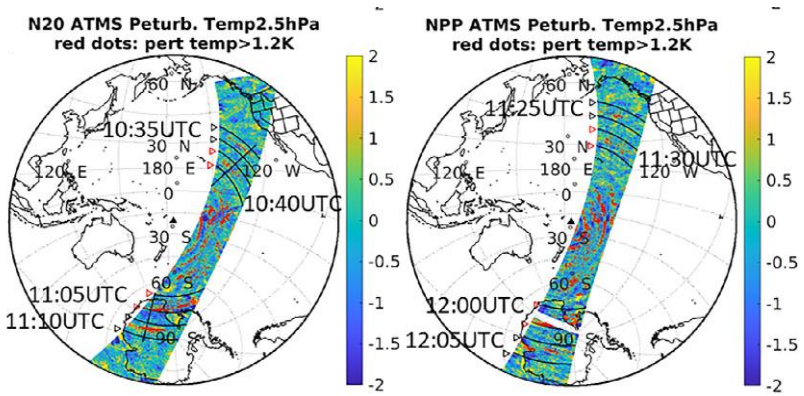
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:



(a) (b)

Local perturbations of MiRS retrieved atmospheric temperature from a descending orbit of (a) NOAA-20 ATMS, and (b) SNPP ATMS at 2.5 hPa on 15 January 2022. The black triangle at the center for each panel is the Tonga volcano location. Red dots indicate the pixels where the atmospheric temperature perturbation is larger than 1.2 K. Evidence of both Lamb and gravity waves are seen. See article for further details.

Vegetation Index and Green Vegetation Fraction

December 2023

Accomplishments / Events:

- Working towards NOAA-21 VIIRS VI and GVF provisional maturity review.
- Compared the N21 GVF with N20 and SNPP GVF and found the new N21 GVF is consistent with the N20 and SNPP GVF
- Compared global NOAA-21 VIs to NOAA-20 and SNPP VIs for provisional review, stratified by VI value and by latitude. Results showed good consistency.
- Conducted inter-comparison between VIIRS 4km/ MODIS 1km and VIIRS 1km/ MODIS 1km VI products.
- Working on 1km global GVF code update.
- Working on building the downscaling weighting table for more representative cropland area for 20m VI

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

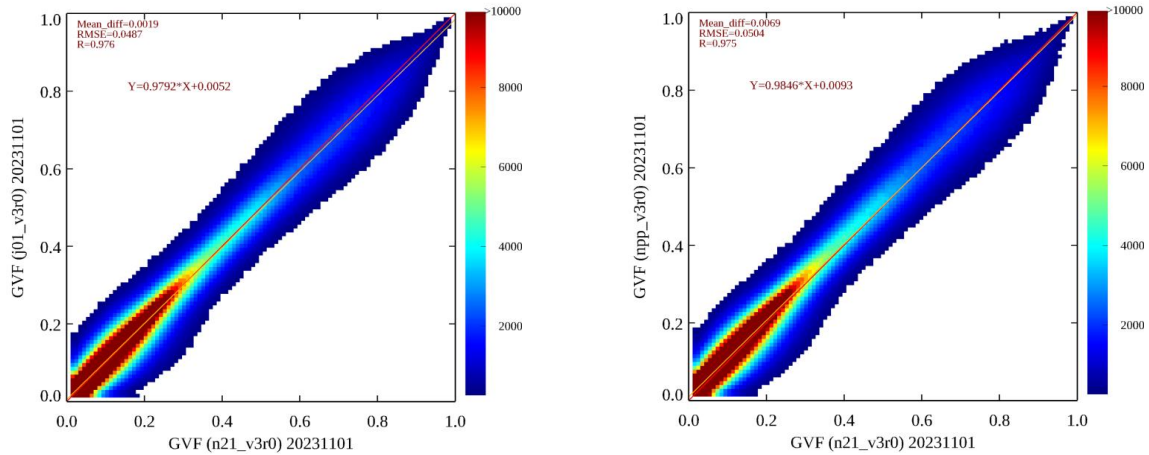
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
1km global VIIRS VI code and documentation ready for delivery	Oct-23	Nov-23	Nov-23	Personnel access to NOAA systems issues
NOAA-21 VI and GVF provisional maturity review	Jan-24	Jan-24		
1km global VIIRS GVF code and documentation ready for delivery	Feb-24	Feb-24		
Experimental data test of blended VI and GVF products	Apr-24	Apr-24		
Operational readiness for NCCF migration	Aug-24	Aug-24		
Annual algorithms/ products performance report	Aug-24	Aug-24		
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-24	Sep-24		

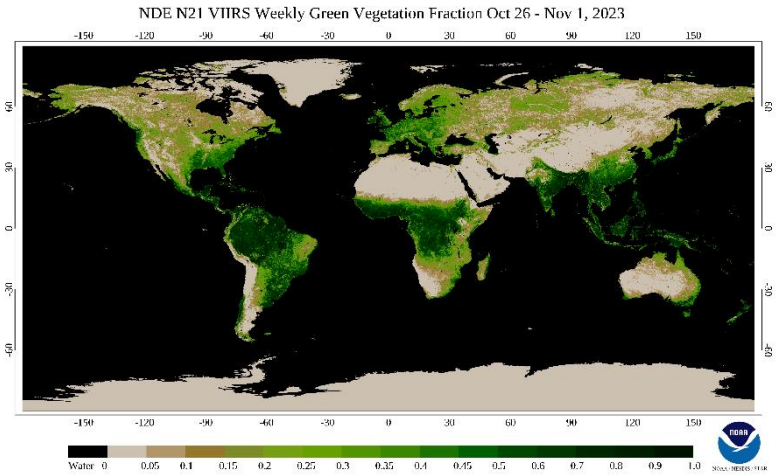
Highlights:

Scatterplots show NOAA-21 GVF on X axis and NOAA-20 (left) and SNPP (right) GVF on y axis for period of 20231026 – 20231101. Correspondence is good between NOAA-21 GVF and the current operational GVF from both satellites.

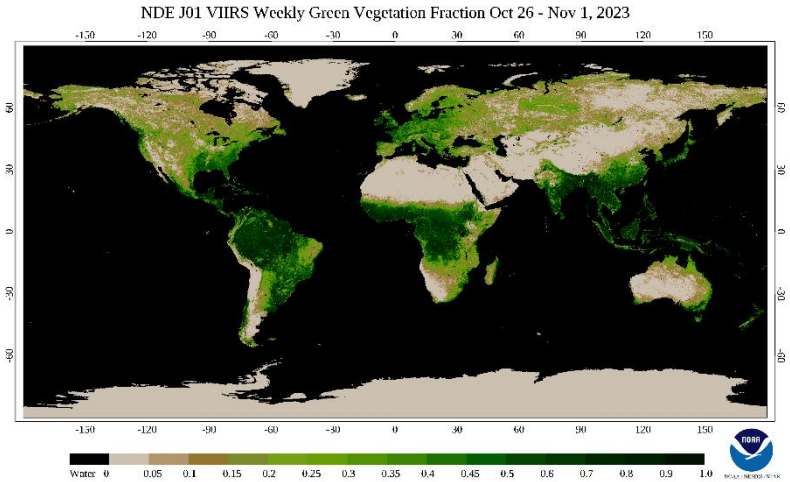


Compare N21 GVF with N20 GVF

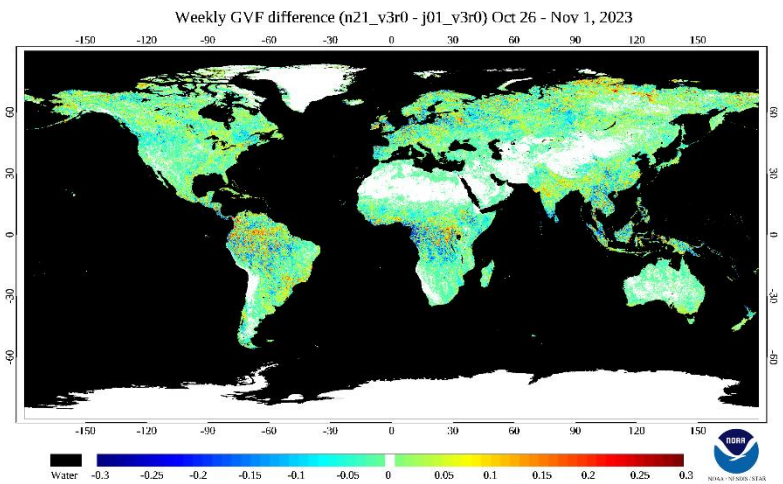
N21 GVF



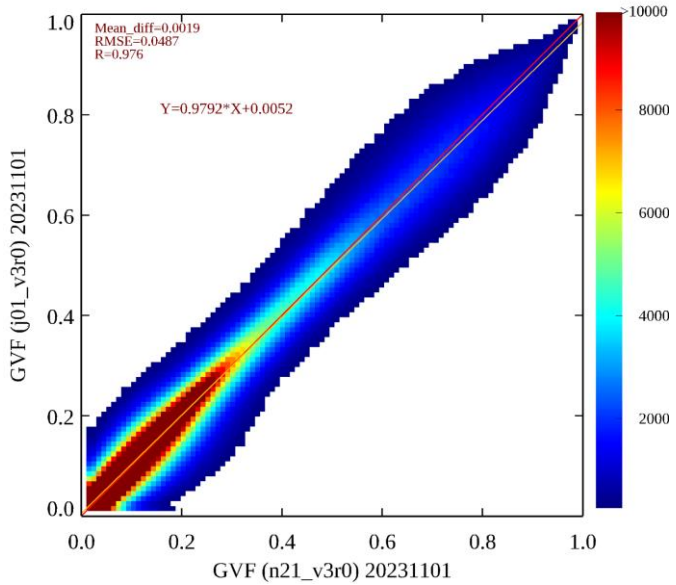
N20 GVF

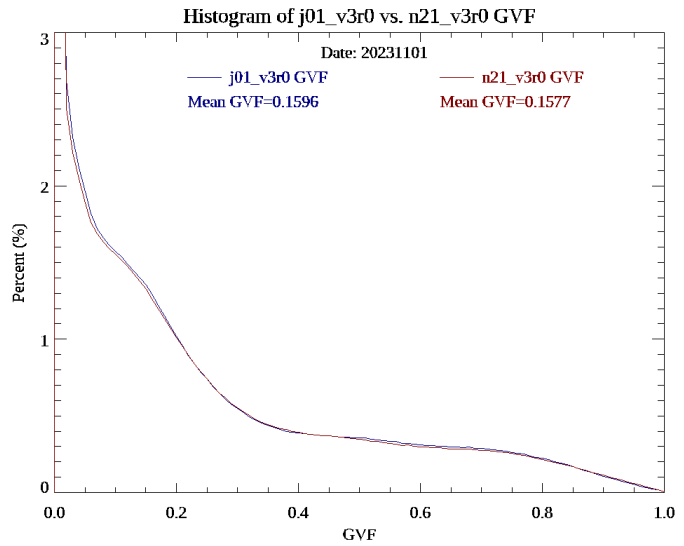


GVF



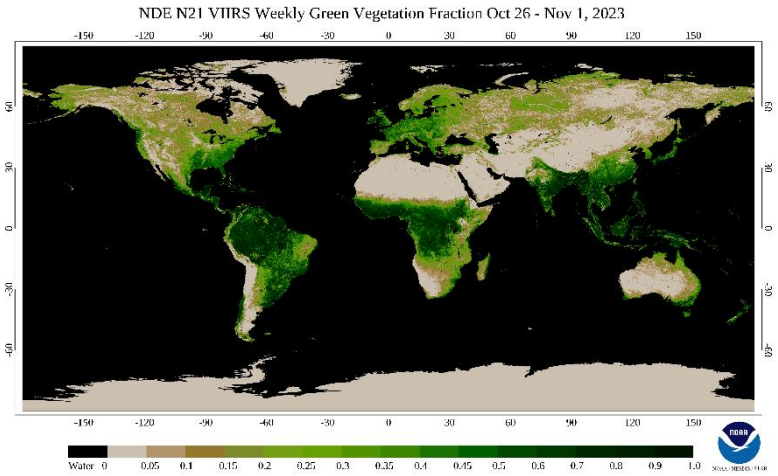
- The NOAA-21 GVF was produced on the NDE I&T environment
- The N21 GVF map is consistent with the operational N20 GVF.
- The GVF difference map showed very small difference globally
- GVF histograms of the two GVF datasets matched very well



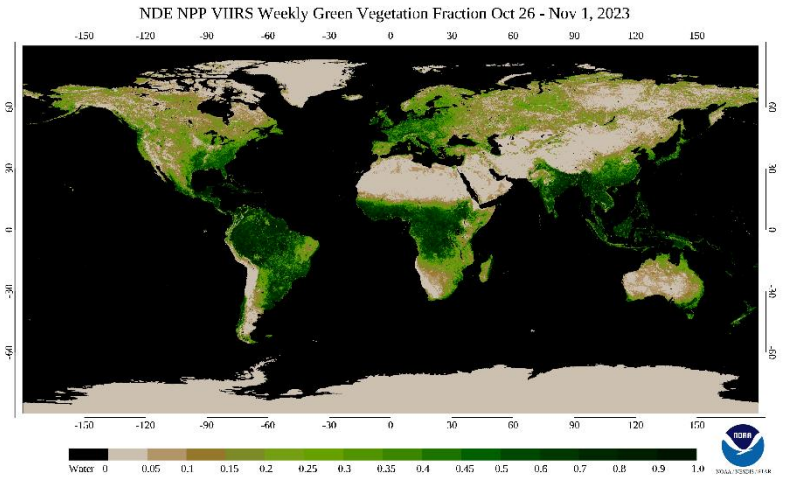


Compare N21 GVF with SNPP GVF

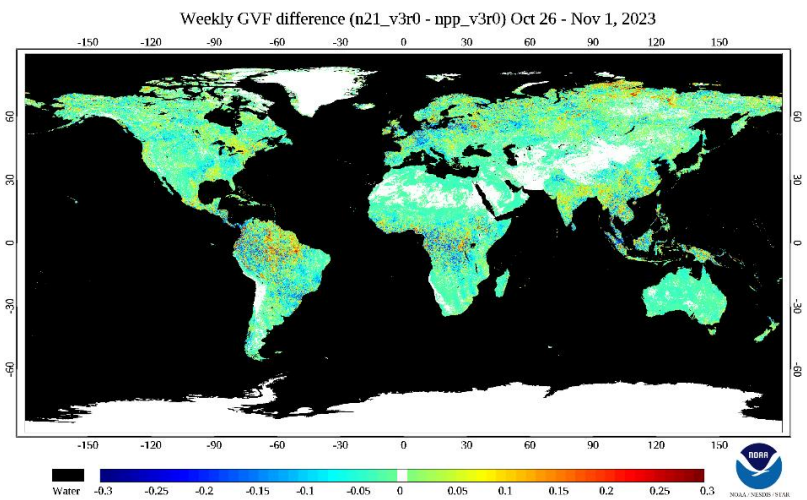
N21 GVF



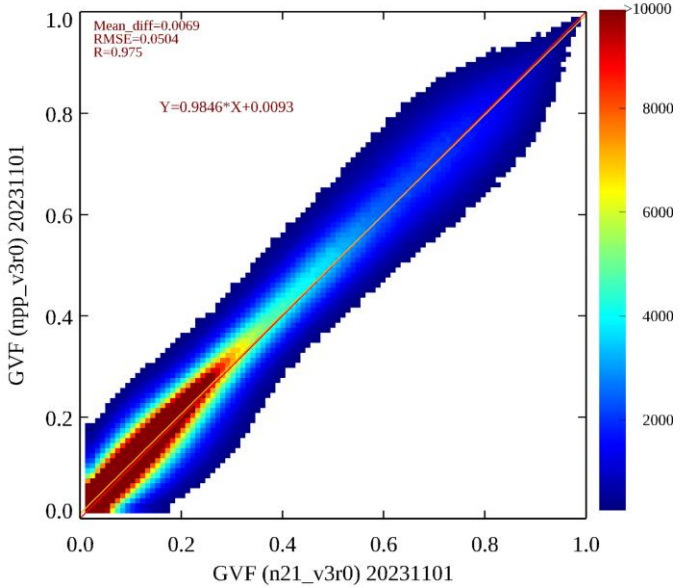
SNPP GVF

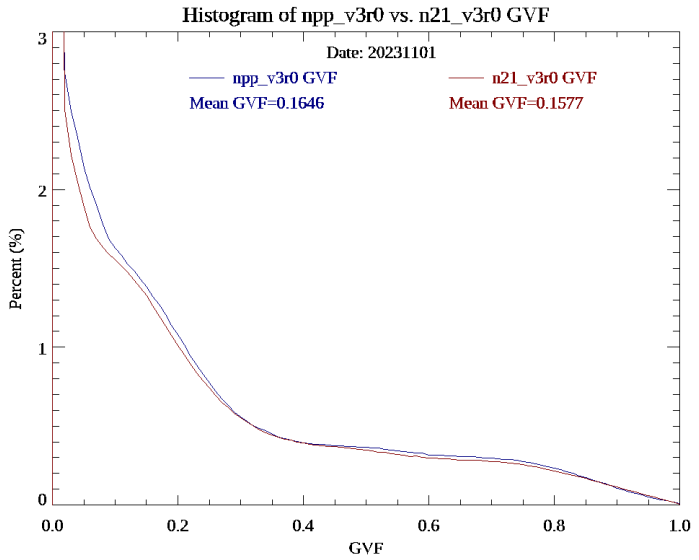


GVF

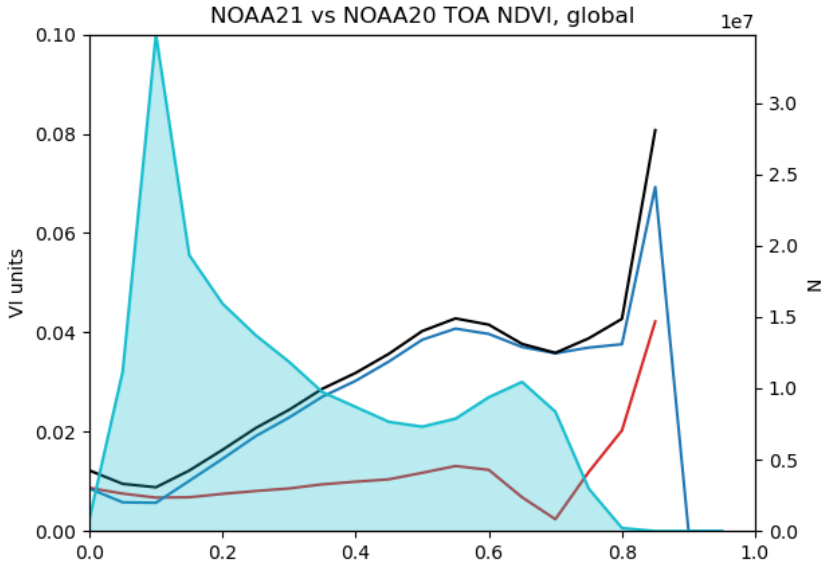


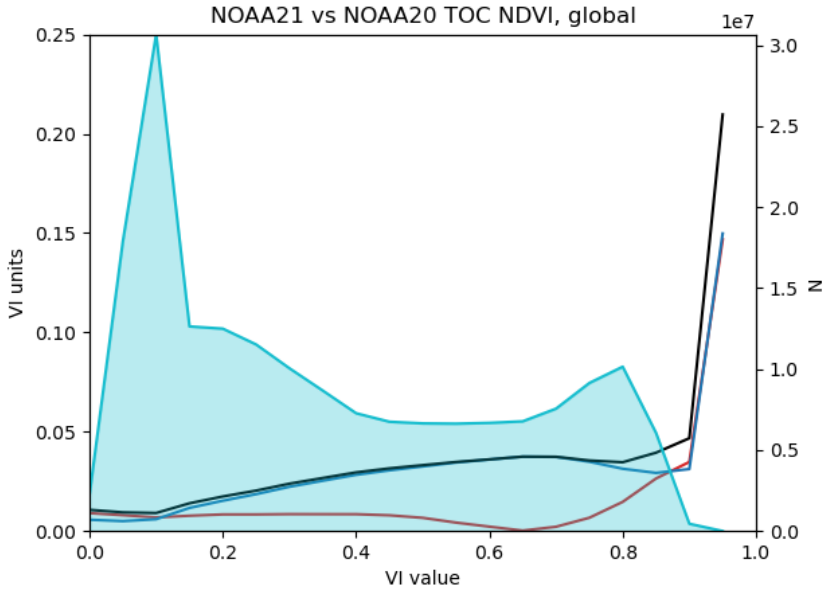
- The N21 GVF map is consistent with the operational SNPP GVF
- The GVF difference map showed very small difference globally
- GVF histograms of the two GVF datasets matched very well

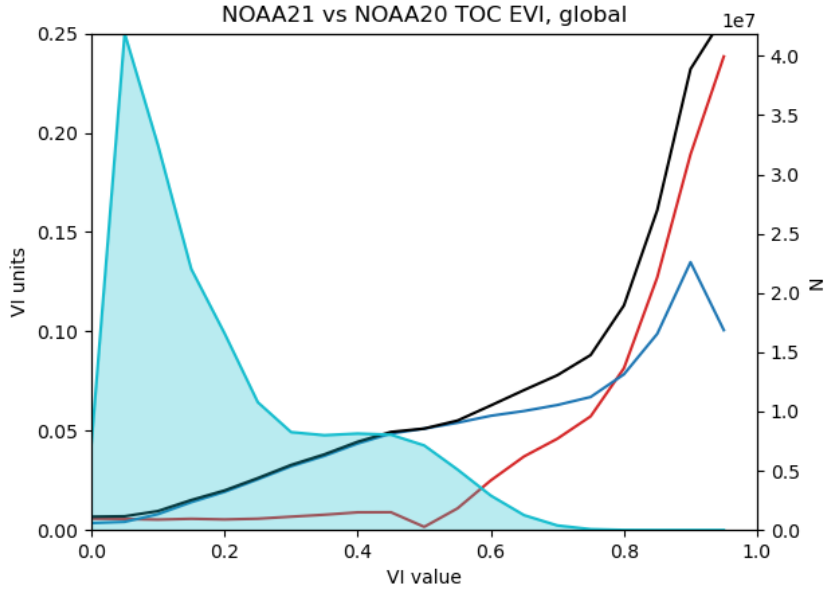




NOAA-21 vs. NOAA-20 vegetation indices, stratified by VI value



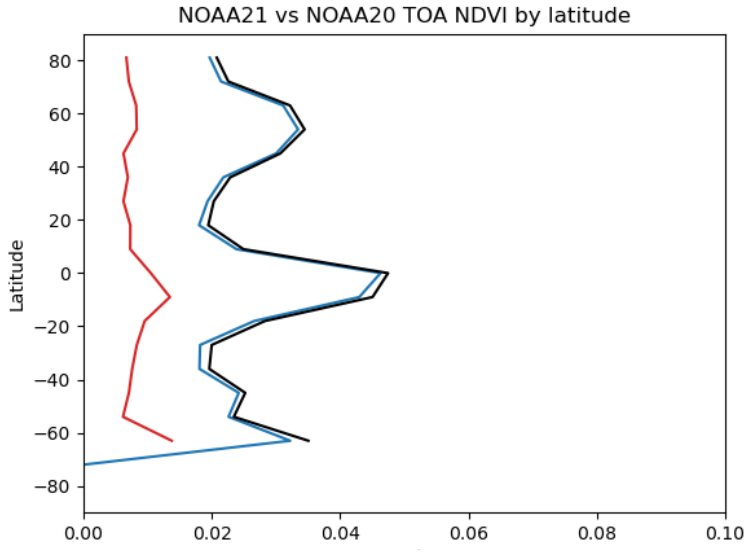


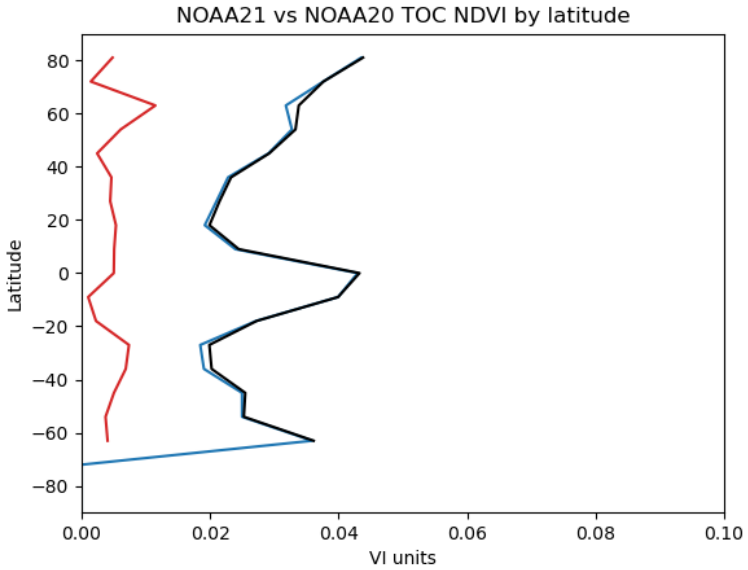


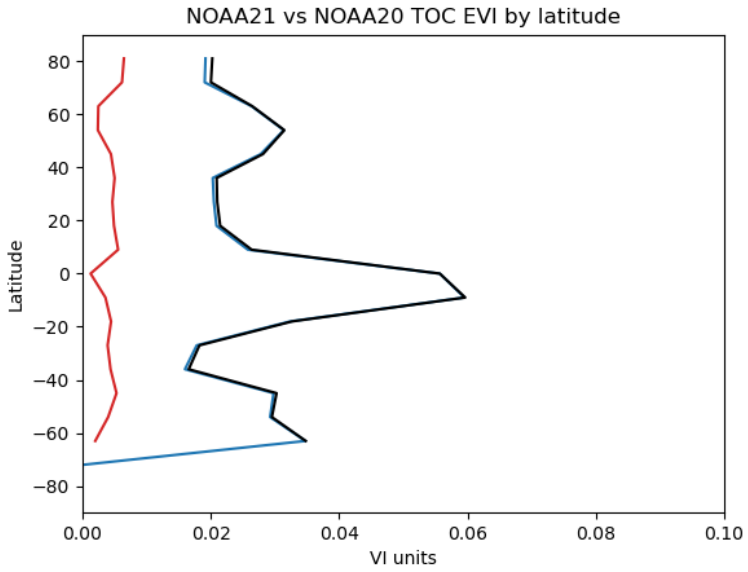
Mean absolute difference
Standard deviation
RMS difference
Number of pixels

- Differences are well within specifications except for a small number of high VI pixels
- Difference statistics results are similar for NOAA-21 vs. SNPP VIs.

NOAA-21 vs. NOAA-20 vegetation indices, stratified by latitude







Mean absolute bias

Standard deviation

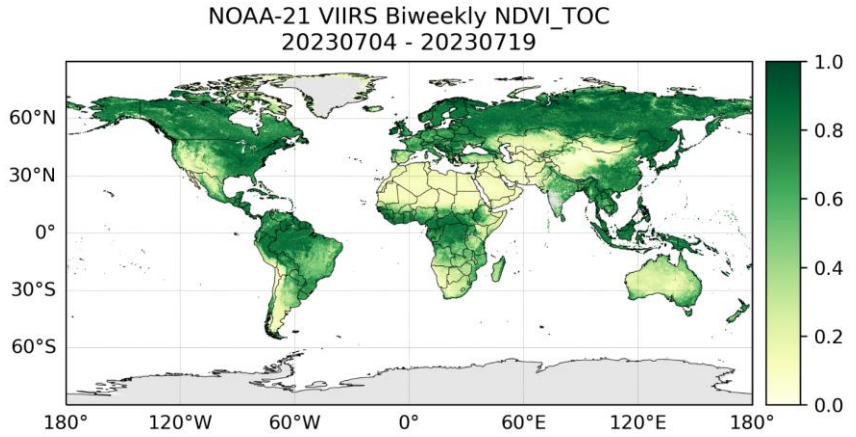
RMS difference

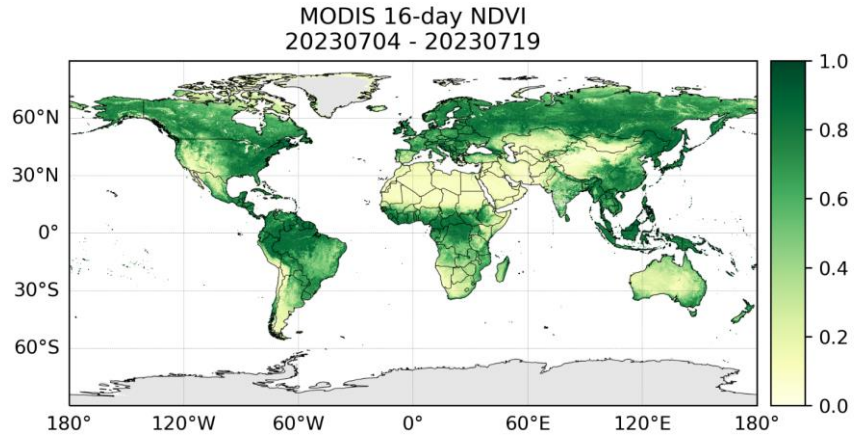
- Difference statistics (mean absolute difference, standard deviation, and RMS difference) were found as a function of latitude
- Comparisons were made between NOAA-21 vs. NOAA-20 and SNPP. Results were similar for NOAA-20 and SNPP comparisons.
- RMS differences rarely exceeded 0.05 VI units.
- Differences were greatest at high latitudes and near the equator. This is to be expected, because these are the latitudes with the most cloud cover.

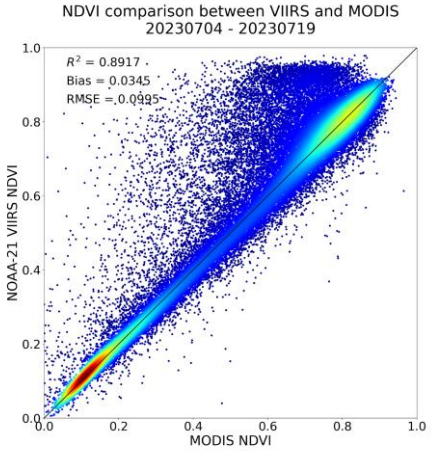
NOAA-21 vs. MODIS comparison for provisional review

- Inter-comparison with MODIS 5km 16-day VI products (MxD13C1)
  - ✔ Global, 20230704~20230719
  - ✔ Correspondence is also good for 3 other 16-day time periods.

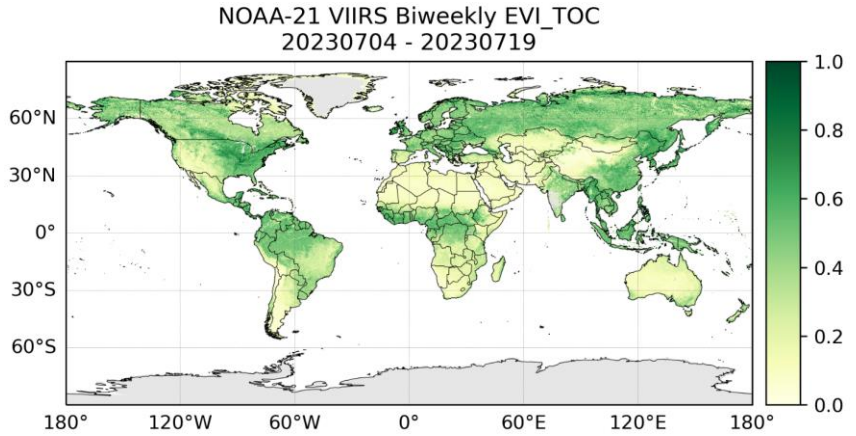
NDVI

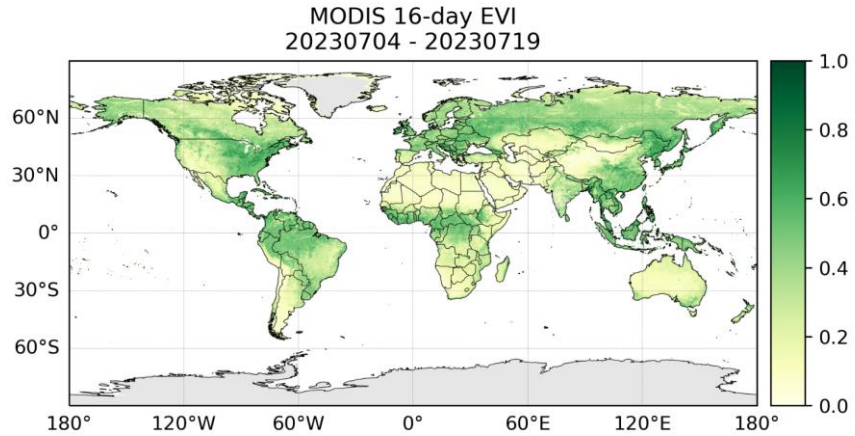


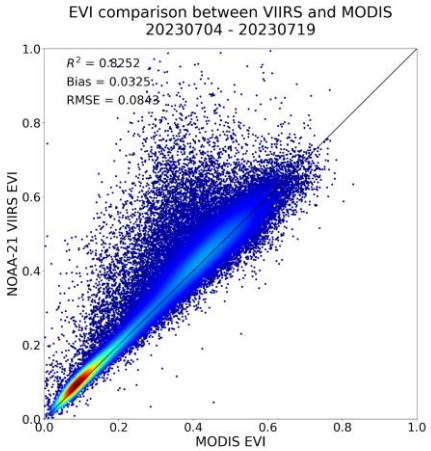




EVI



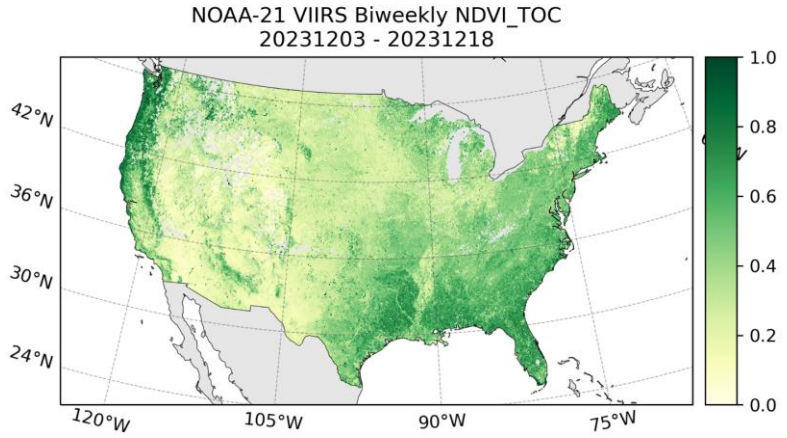




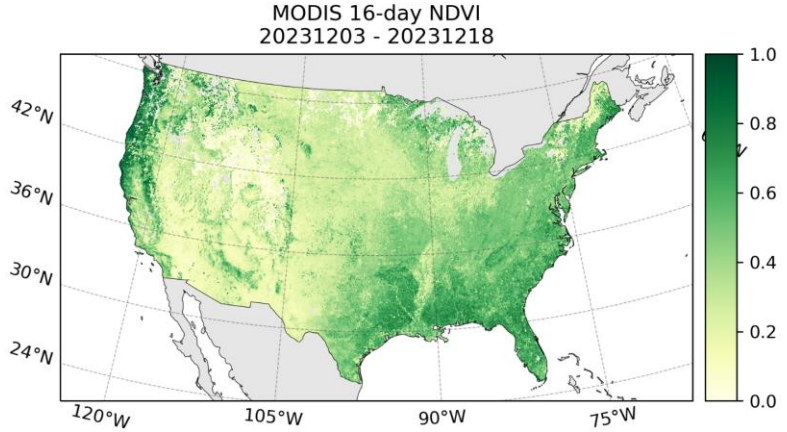
NOAA-21 vs. MODIS comparison for provisional review

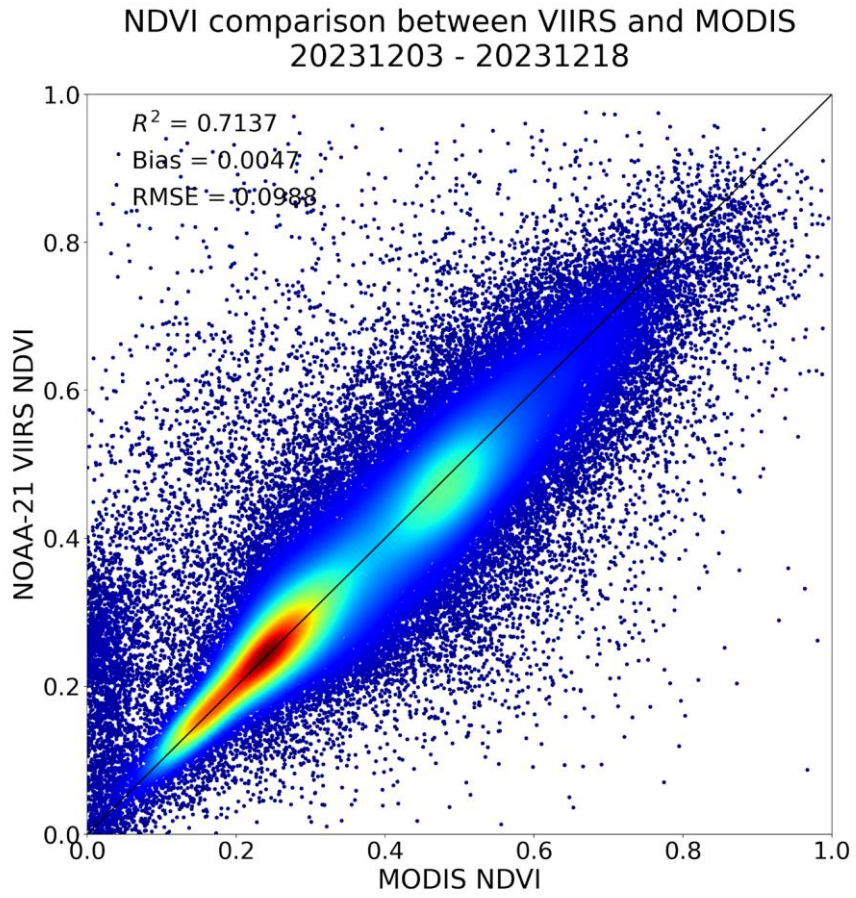
- Inter-comparison with MODIS 1km 16-day VI products (MxD13A2)
  - ✔ CONUS, 20231203 ~ 20231218, NDVI
  - ✔ Comparison also shows good correspondence for EVI for this time period
  - ✔ Comparison shows good NDVI and EVI correspondence for 20230610 ~ 20230625.

VIIRS



MODIS





Surface Reflectance

December 2023

Accomplishments / Events:

- Drafted the NOAA21 Surface Reflectance provisional review, extensively evaluated the product, including the data completeness, data value and quality flags, in-situ validation and inter-comparison.
- Reprocessed the missed routine daily gridded true color SR and AERONET subset data for all of the related datasets (SR, inputs & ground measurements and reference data).
- Keep working on the routine validation datasets processing transition from NOAA SCDR to AWS. SR product routinely monitoring, particularly focus on the status of NOAA21.
- Complete the mitigation algorithm evaluation, verified the improvement for the dust aerosol uncertainty.

Overall Status:

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

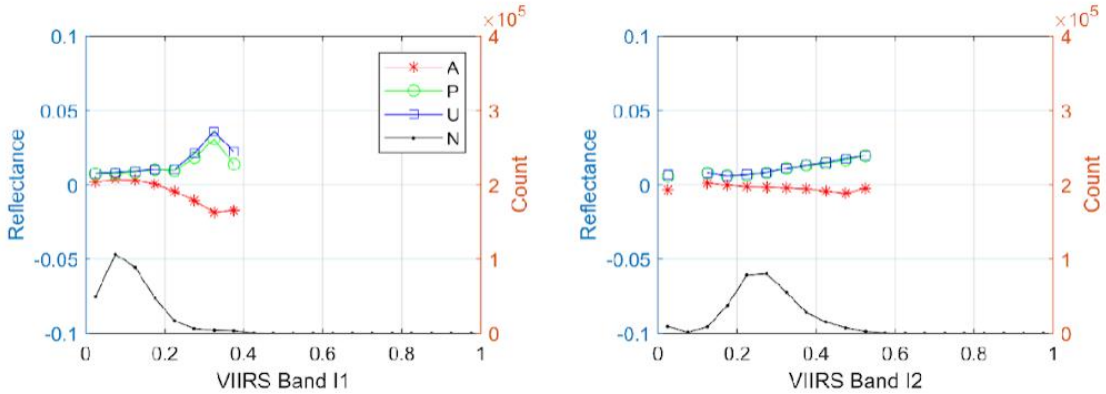
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NCCF SR DAP redelivery and verification	Sep-23	Sep-23	Sep 20, 2023	
Mitigation algorithm development for the dust aerosol model	Dec-23	Dec-23	Dec 19, 2023	
Provional Maturity of NOAA-21	Feb-24	Feb-24		
The JPSS (SNPP, N20, N21) SR consistency evaluation and correction	Mar-24	Mar-24		
GOES-R enterprise SR algorithm development and experimental product	Jun-24	Jun-24		
Operational Readiness Review (ORR) for NDE Migration to NCCF	Aug-24	Aug-24		

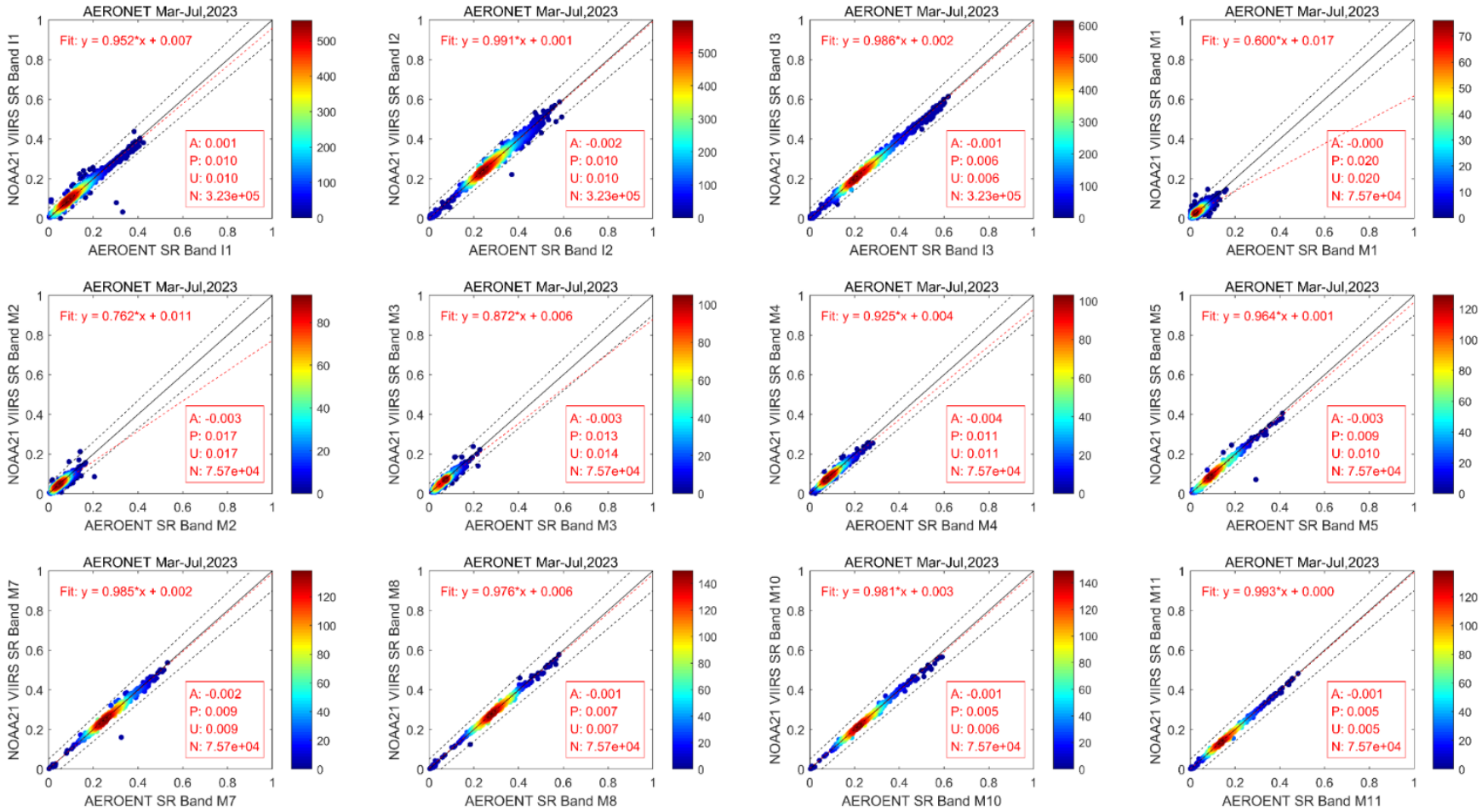
Highlights:

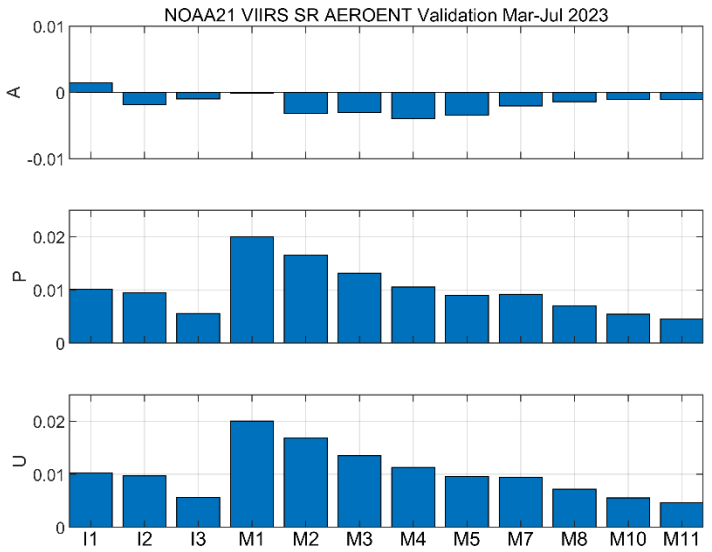


Reprocessed SNPP SDR compared with current operational SDR (VIIRS I1 (upper) and I2 (bottom).

NOAA 21 Provisional Review Evaluation

- AERONET SR validation
- Using all available AERONET sites subsets (9*9 M band pixels, with valid ground aerosol model)
- Use clear sky only (no cloud shadow, no high aerosol, no snow)
- Use 6s v2.1 to derived AERONET based SR as reference.

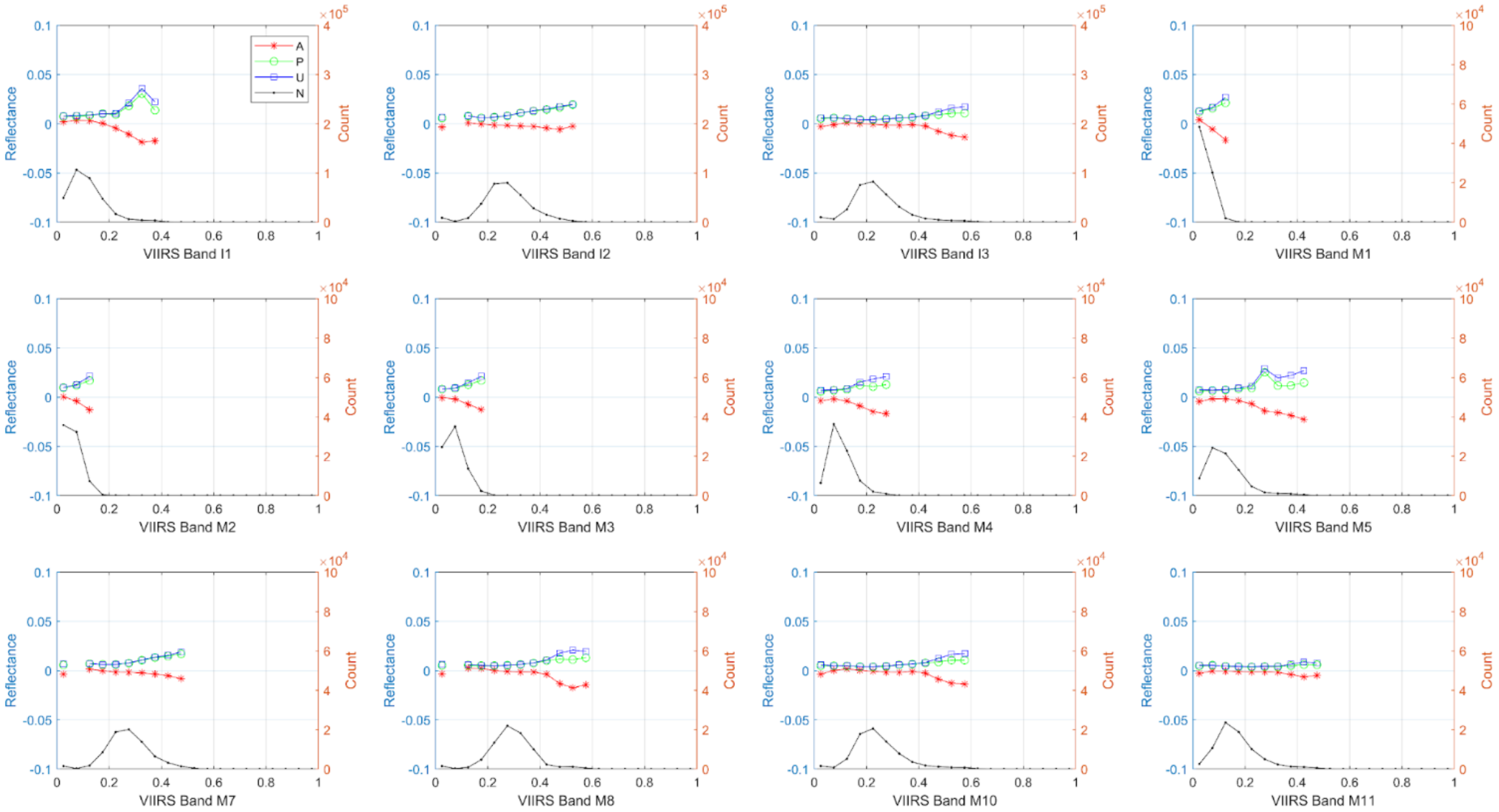




VIIRS SR validation APU statistics.

- Negative bias mainly due to the misclassified dust aerosol
- I1 band bias has been corrected in the NCCF version.

NOAA 21 Provisional Review Evaluation (2)



The stratified SR validation for more details, overall, the NOAA21 SR meet the requirements.

NUCAPS Products

December, 2023

Accomplishments / Events

- Continued preparations for the NOAA-21 provisional maturity developing NOAA-21 v3.2 algorithm with (1) regression LUTs developed using five focus days spanning across different seasons, (2) CrIS and ATMS bias tuning LUT, and (3) New CH4 a-priori to account for recent CH4 trends. A set of three focus days are in use to evaluate the performance of v3.2 upgrades and move forward with the provisional maturity.
- Continued processing and generating the NOAA-21 CrIS OLR daily and monthly evaluations with the NOAA-20 CERES.
- Two NUCAPS team members attended AGU 2023 annual meeting in San Francisco, CA and two presented two poster presentations
    - Tong Zhu et al., "Monitoring 2023 North America Heatwave Events with NUCAPS Temperature Retrievals."
    - Margarita Kulko et al., "Performance of the NOAA-21 CrIS Outgoing Longwave Radiation (OLR) Product versus Correlative Observations from AIRS and CERES."

Overall Status:

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

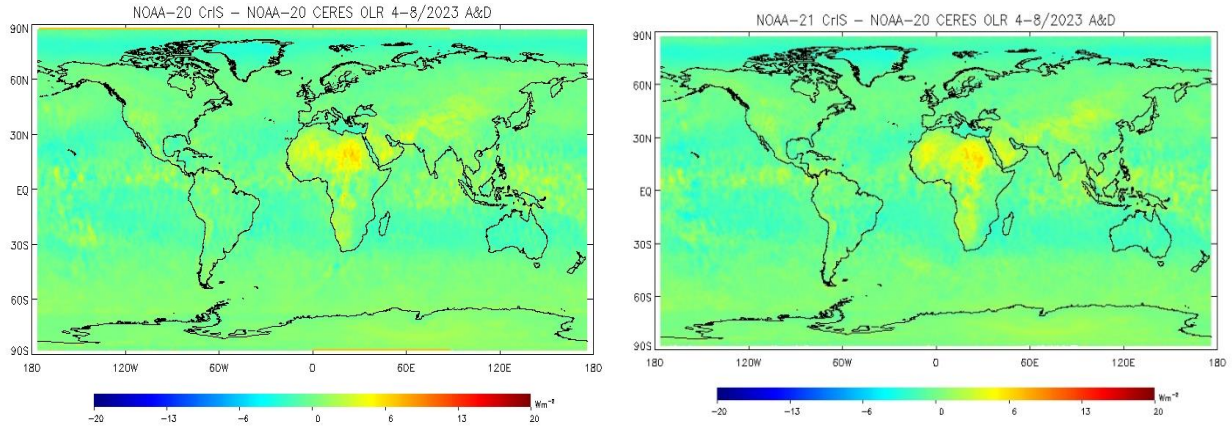
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
DAP Delivery with updates related damping factor, surface corrections, MetOp-B/C Averaging Kernels	Oct-22	Oct-22	11/04/22	
NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs, and user support for the CrIS Beta Maturity Review	Feb-23	Feb-23	02/23/23	NOAA-21 K-band transmitter swap
NOAA-21 NUCAPS Product Beta Maturity	May-23	May-23	6/1/23	Beta attained effective 3/23
NOAA-21 NUCAPS T(p), q(p), O3(p), OLR, CO, CH4 and CO2 Provisional Maturity	Nov-23	Dec-23	Jan-24	Combined review for all the NUCAPS Products
Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations	May-23	May-23	Mar-24	On-going process to meet validation needs
Addition of CAMEL emissivity database for the emissivity first guess	Mar-24	Apr-24	On-schedule	
Mission-long reprocessing of NOAA-21 NUCAPS products: Reprocessing version and evaluation of reprocessed products	Jun-24	Jun-24	On-schedule	

Outgoing Longwave Radiation (OLR) mean difference maps using five months of OLR data (April – August 2023):
(Left) NOAA-20 CrIS OLR vs NOAA-20 CERES, Right: NOAA-21 CrIS OLR with NOAA-20 CERES



OMPS Ozone (V8Pro, V2Limb & V8TOz)

November 2023

Accomplishments / Events:

- The Ozone Team provide rapid evaluation and validation of products to allow timely decisions on restoring distribution of NPP V8TOz, V2Limb and V8Pro EDRs following the spacecraft shutdown.
- Z. Zhang developed soft calibration adjustments for NPP, N20 and N21 V8pro following changes by the SDR Team.
- R. Lindsay revised the NetCDF output from the V2.6 Level 2 to match the current V2.5 Level 2 content as well as possible. He is preparing deliveries for December. New sample products were provide to the reformatter toolkit team.
- L. Flynn presented the validation results at the successful MetOp-B & -C GOME-2 EV8TOz NCCF ORR with support from the team.
- J. Niu helped to resolve complications with the NCCF V8TOS implementation.
- E. Beach continued to work on the monitoring figures for NOAA-21, delivering overpass data to OAR, and transferring the weekly ancillary files we need to process the S-NPP and NOAA-21 OMPS Limb Profilers. He is capturing the NOAA-21 OMPS data and NCCF test data as they arrive at SCDR.
- J. Wild prepared two posters on OMPS for presentations at the AGU and AMS meetings..

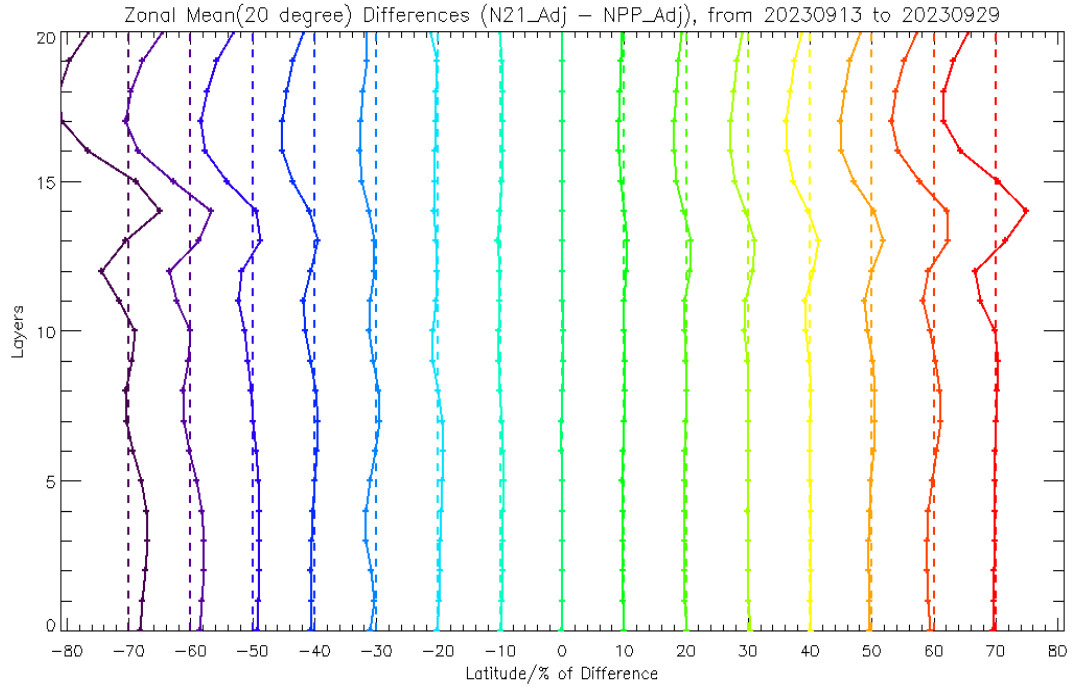
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Provide Delta to Level 1a, 1b and 1g for NOAA-21 OMPS V2Limb	Jan-23	Dec-23		NASA R&D
Update V8TOz and V8Pro tables for NOAA-21 Provisional	Feb-23 Mar-23	Jul-23 Jul-23	Aug-23 Dec-23	SDR Instability

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		CAC Badge renewals, SDR instability, Limb Development

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

Issues/Risks: IMSG ProTech Contract follow-on must be in place next month.



Zonal Mean differences after soft calibration adjustments for NPP, N20 and N21 V8pro following changes by the SDR Team

Land Surface Temperature

December 2023

Accomplishments / Events:

- Conducted R-based LST validation with BSRN and NDBC, and performed statistical analysis of the results. (slide 2-3)
- Completed software package for L2 NOAA-21 LST validation against ground observations from SURFRAD, ARM, BSRN and NDBC network. Added exception handling in the file I/O processing. (slide 4-7)
- Updated the software code for the ground validation result analysis, addressing issues related to the ground LST calculation under situations with missing data.
- Completed the software package for all weather LST extension to global domain and code conversion from MATLAB to Python. The software package is now pending for a thorough test.
- Reviewed and made revisions to a co-authored book chapter titled “Land Surface Temperature Product Development for JPSS and GOES-R Missions”
- Conducted the inter-comparison among NOAA-21, SNPP and NOAA-20 VIIRS LST for daytime and nighttime, respectively (slide 8-11).

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			

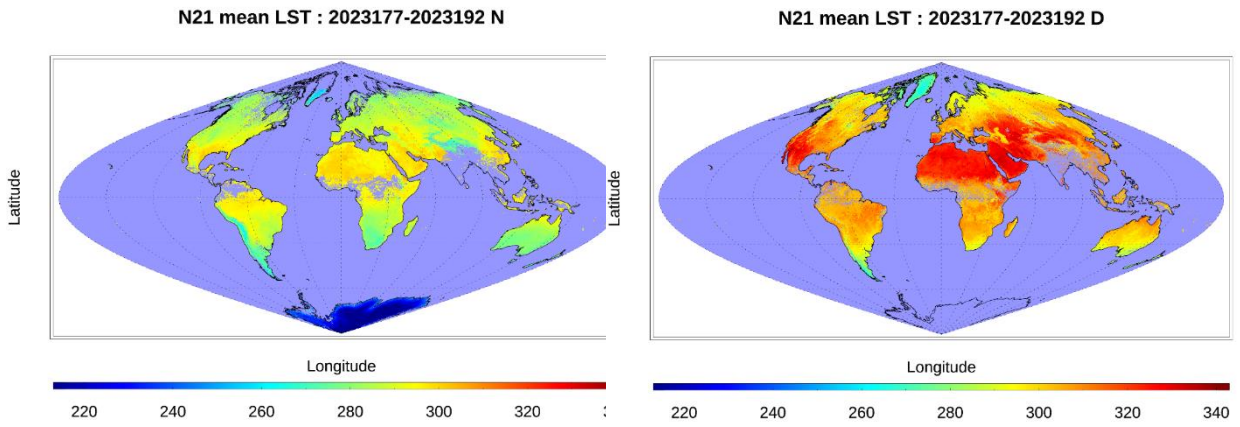
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

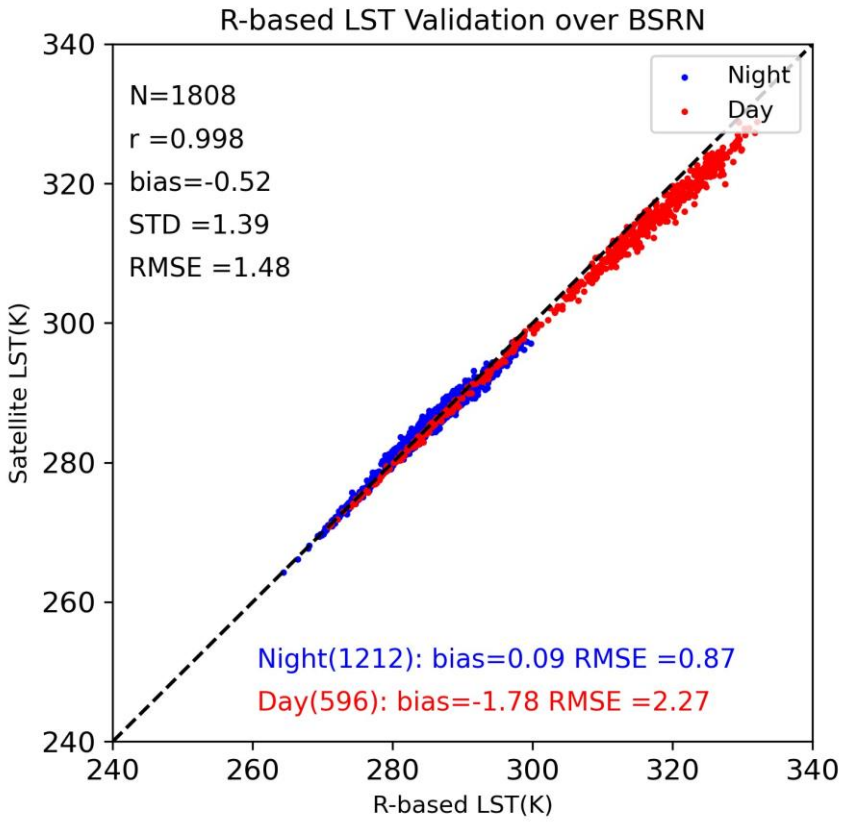
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
LSE update DAP delivery	**Aug-23**	**Oct-23**	**Oct-23**	
NOAA-21 data monitoring, evaluation and provisional maturity review	**Oct-23**	**Jan-24**		
CCAP Initial Delivery - All weather LST	**Oct-23**	**Feb-24**		
SDR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

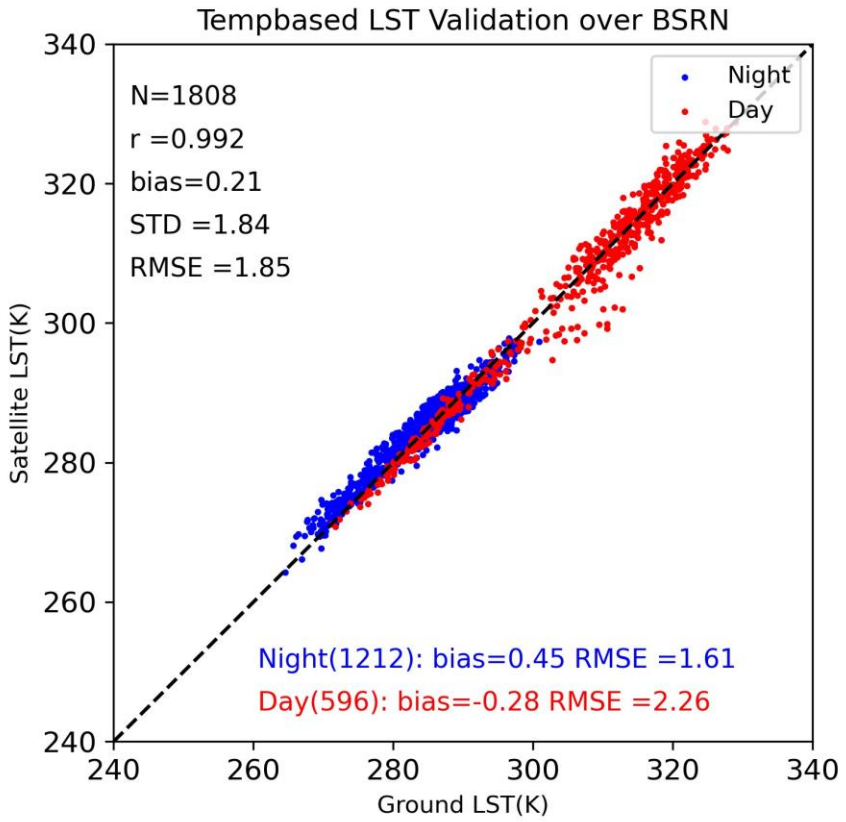
Highlights:

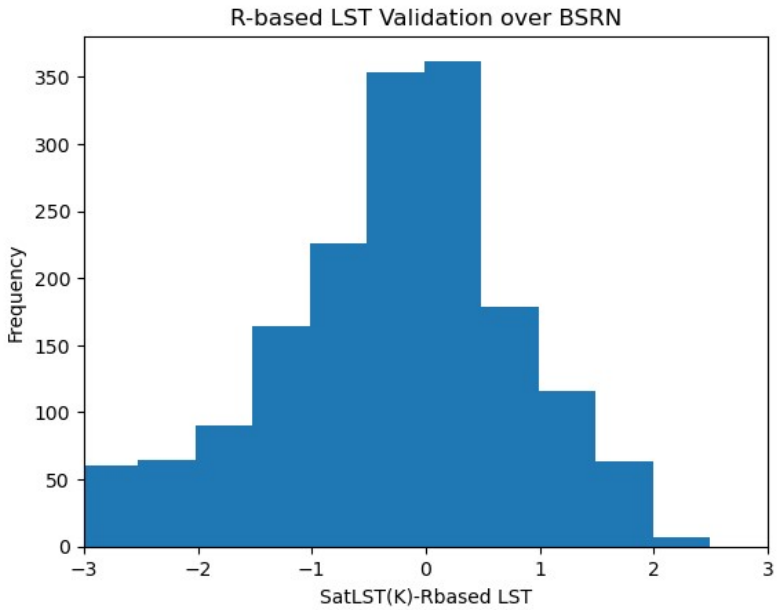


NOAA-21 16-day mean LST for nighttime(left) and daytime (right) over the time period from June 26 to July 11, 2023

R-based SNPP VIIRS LST validation over BSRN

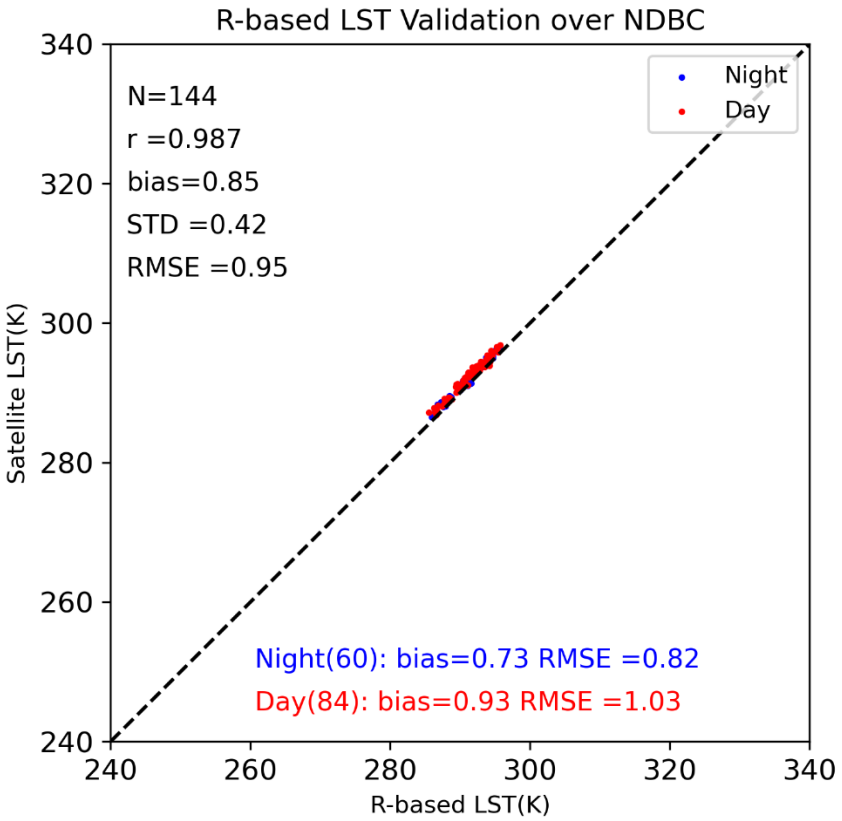


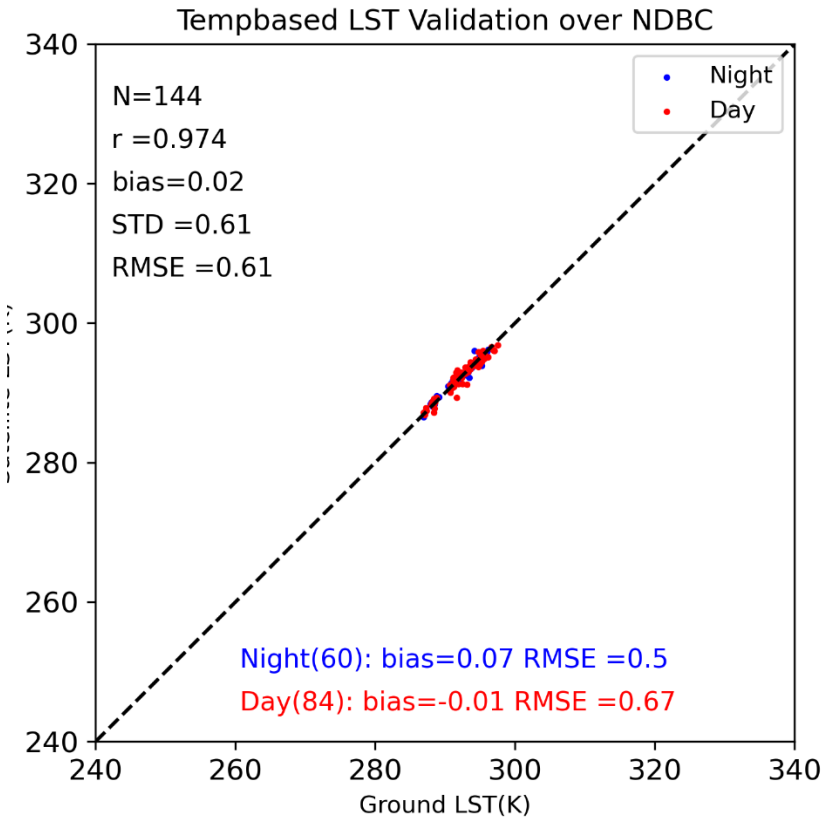


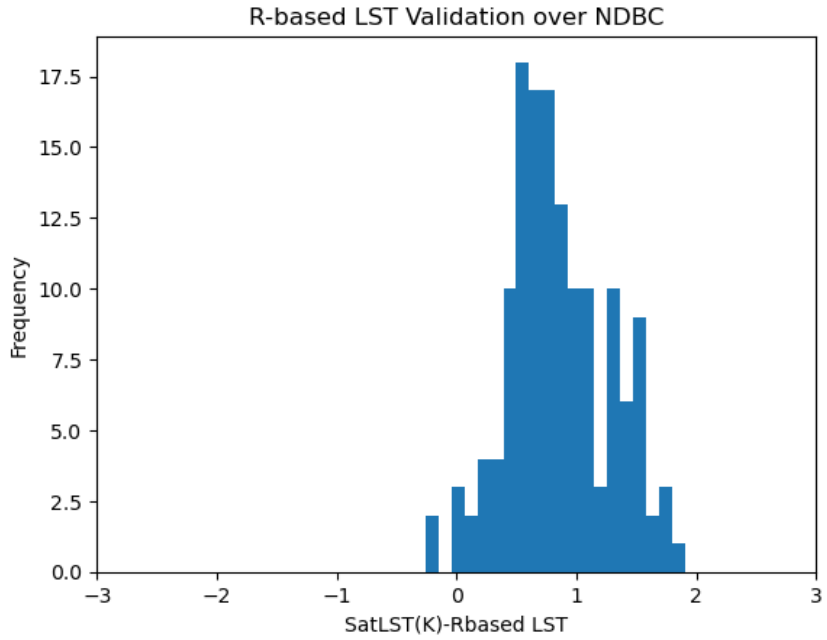


- R-based SNPP VIIRS LST validation over BSRN stations for the time period from Jan. 1, 2018 to Dec. 31, 2022
- The left figure displays the r-based validation result, the middle figure shows the temp-based LST validation result, and the right figure presents the histogram of LST difference between satellite LST and R-LST.
- Overall a better agreement is achieved for r-based LST validation than for temperature based validation
- Nighttime exhibits a smaller bias and root mean square error, while daytime shows a negative bias of about 1.78 K

R-based SNPP VIIRS LST validation over NDBC

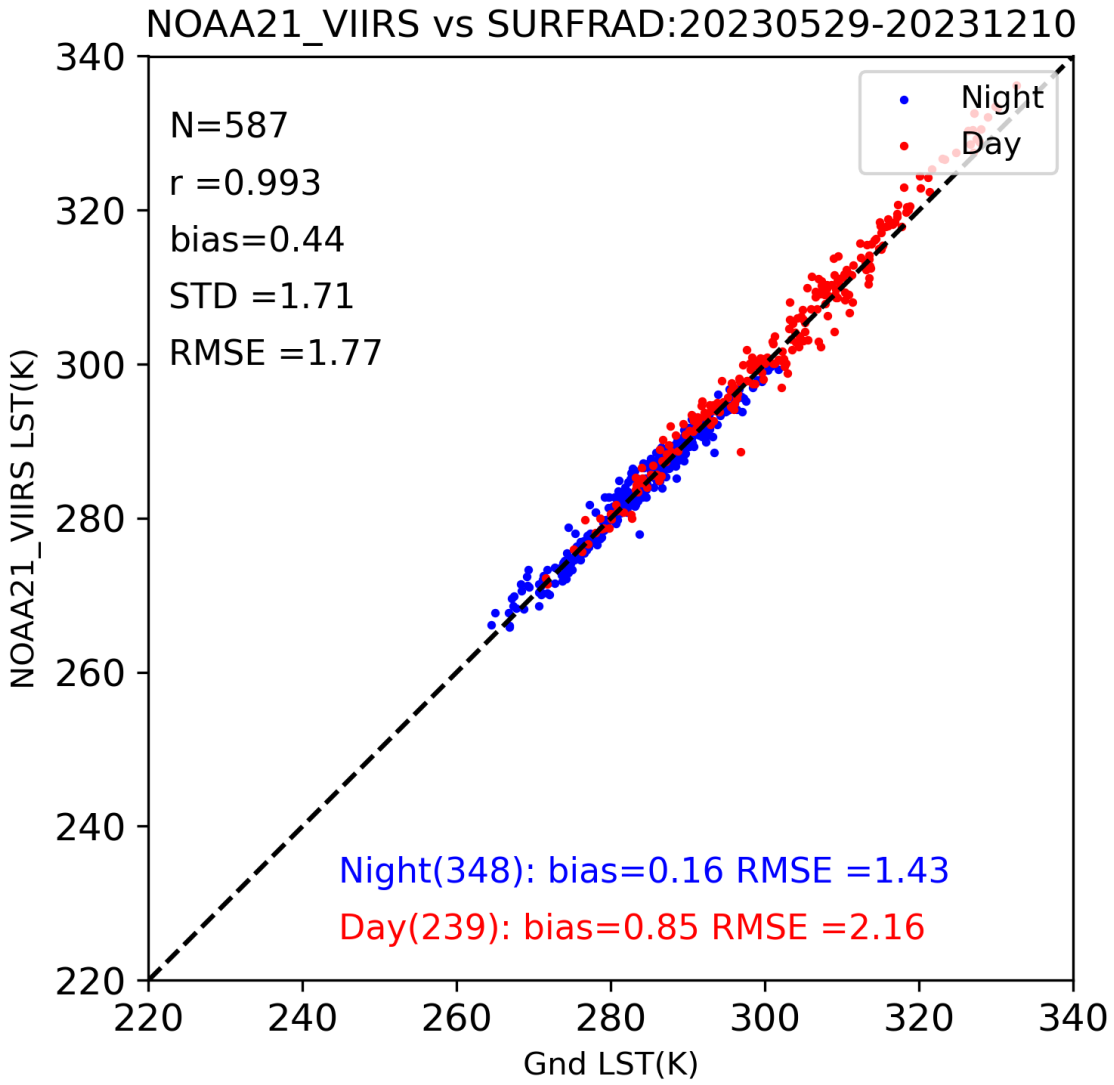


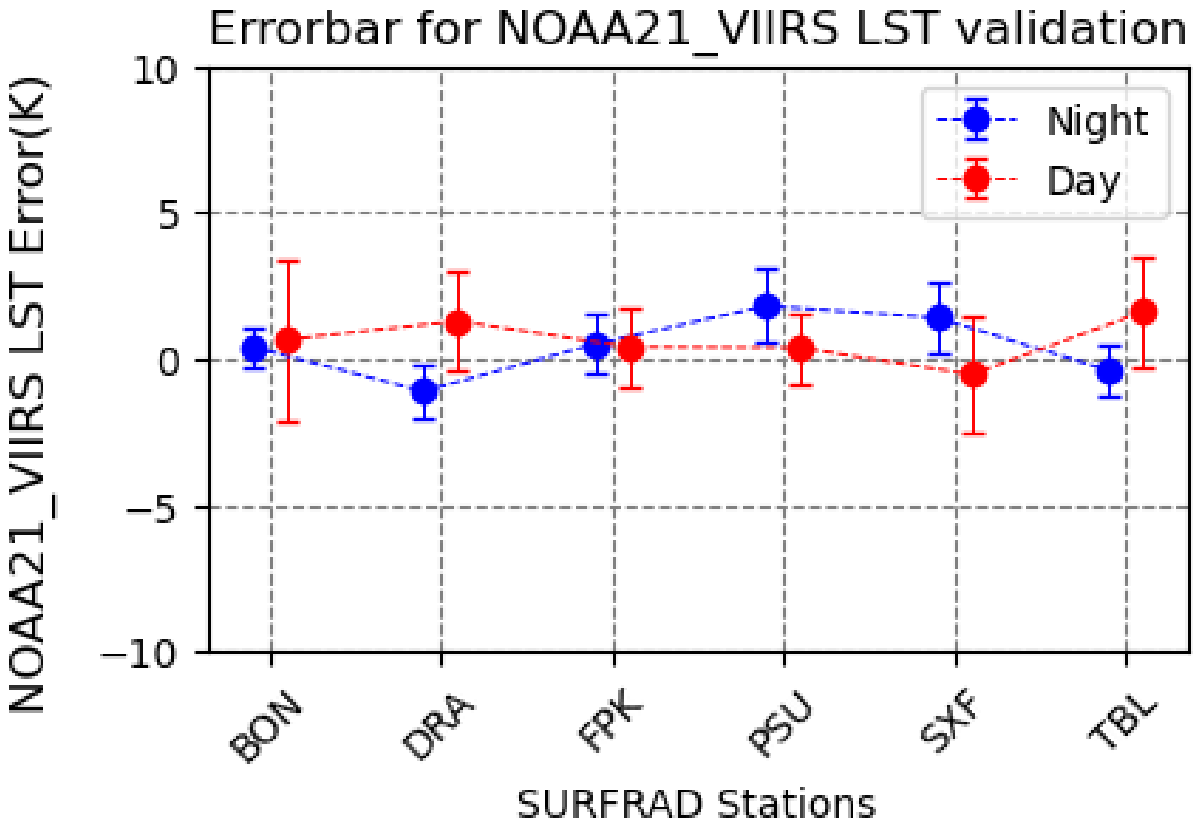




- R-based SNPP VIIRS LST validation over NDBC stations for the time period from Aug. 22 to Sep. 30, 2023.
- The left figure displays the r-based validation result, the middle figure shows the temp-based LST validation result, and the right figure presents the histogram of LST difference between satellite LST and R-LST.
- Overall a smaller STD and a larger bias is achieved for r-based LST validation, than for t-based validation,
- Nighttime exhibits a smaller bias and root mean square error; while both daytime and nighttime show a positive bias of 0.9 K and 0.7 K, respectively.

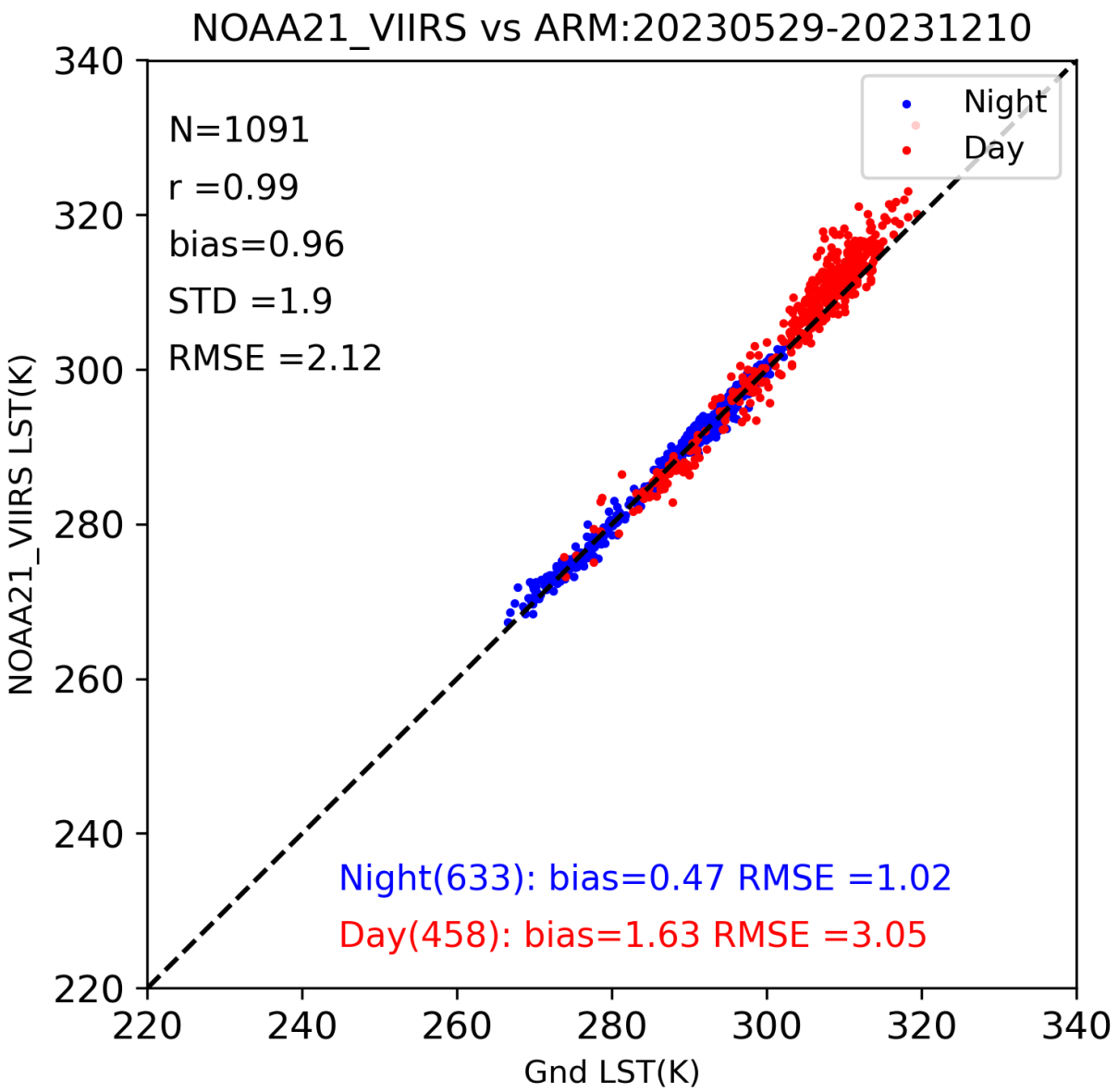
L2 NOAA-21 LST Ground Validation-SURFRAD

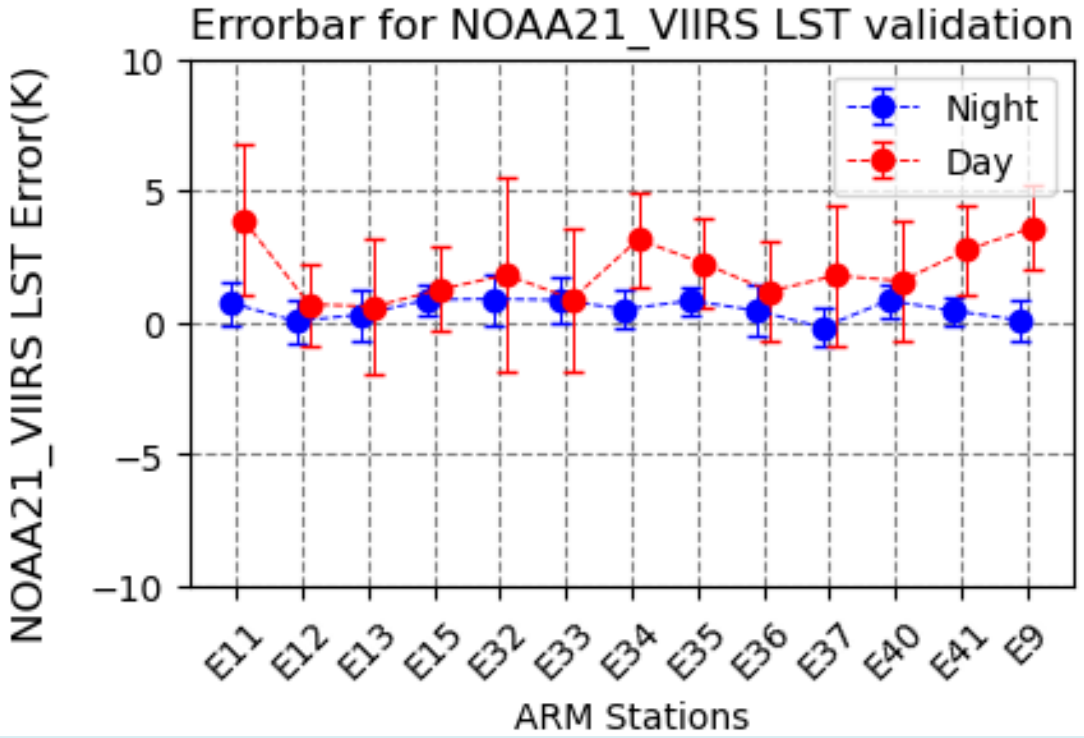




- Left figure presents the combined results from six SURFRAD stations, and the right figure displays the station wide validation results. (blue for nighttime, red for daytime)
- Day/night combined results indicates a bias of 0.4 K and precision of 1.7 K.
- Nighttime LST outperforms daytime LST with a bias of 0.2K and RMSE of 1.4 K, whileas it is 0.85 K and 2.16K for daytime.

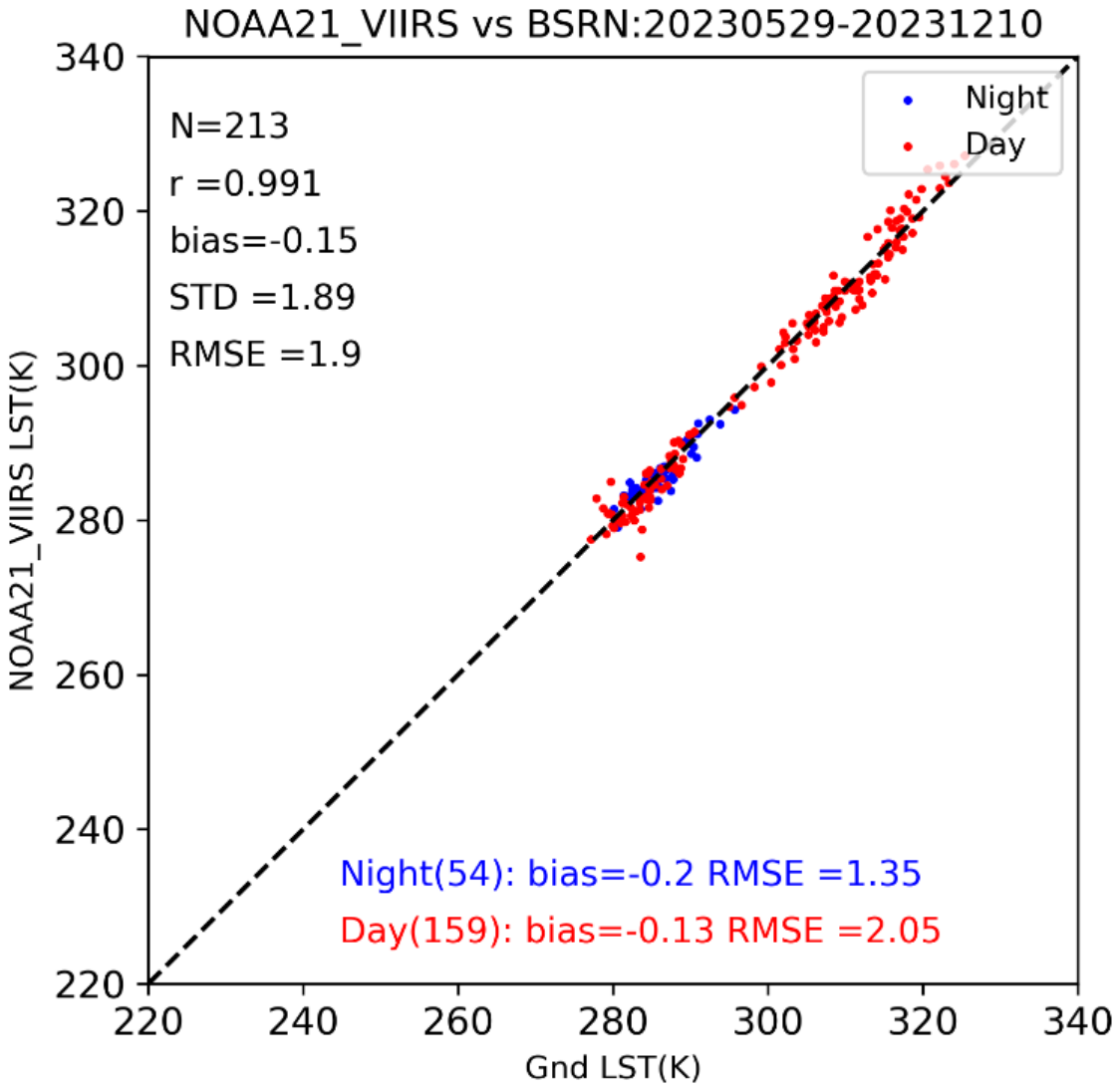
L2 NOAA-21 LST Ground Validation-ARM

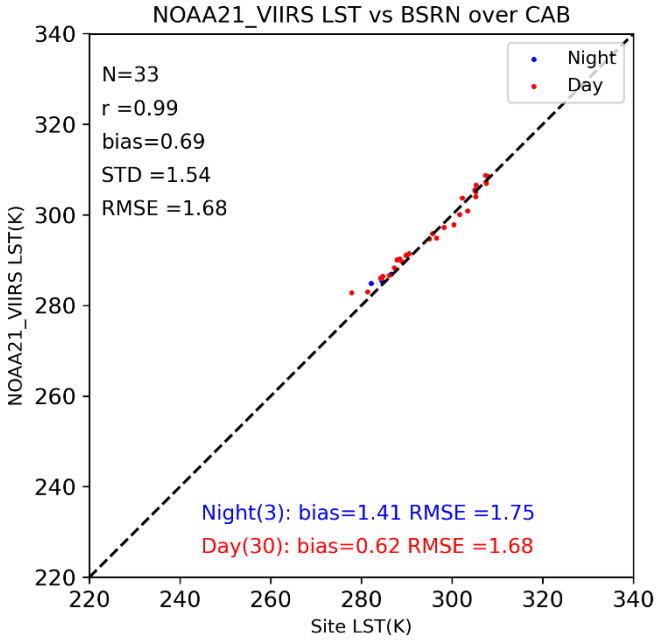


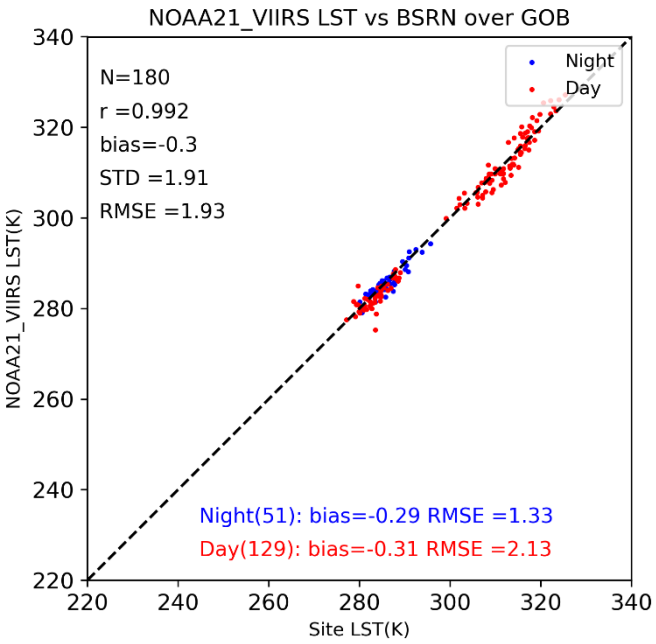


- Left figure presents the combined results from thirteen ARM stations, while the right figure displays the station wide validation results.
- Day/night combined results indicates a bias of 0.96 K and a precision of 1.9 K.
- Nighttime LST outperforms daytime LST with a bias of 0.47 K and RMSE of 1 K, whileas it is 1.63 K and 3.05 K for daytime.
- The side wide results indicate a positive bias over most stations at daytime, particularly over E11, E34, E41, and E9 station.

L2 NOAA-21 LST Ground Validation-BSRN

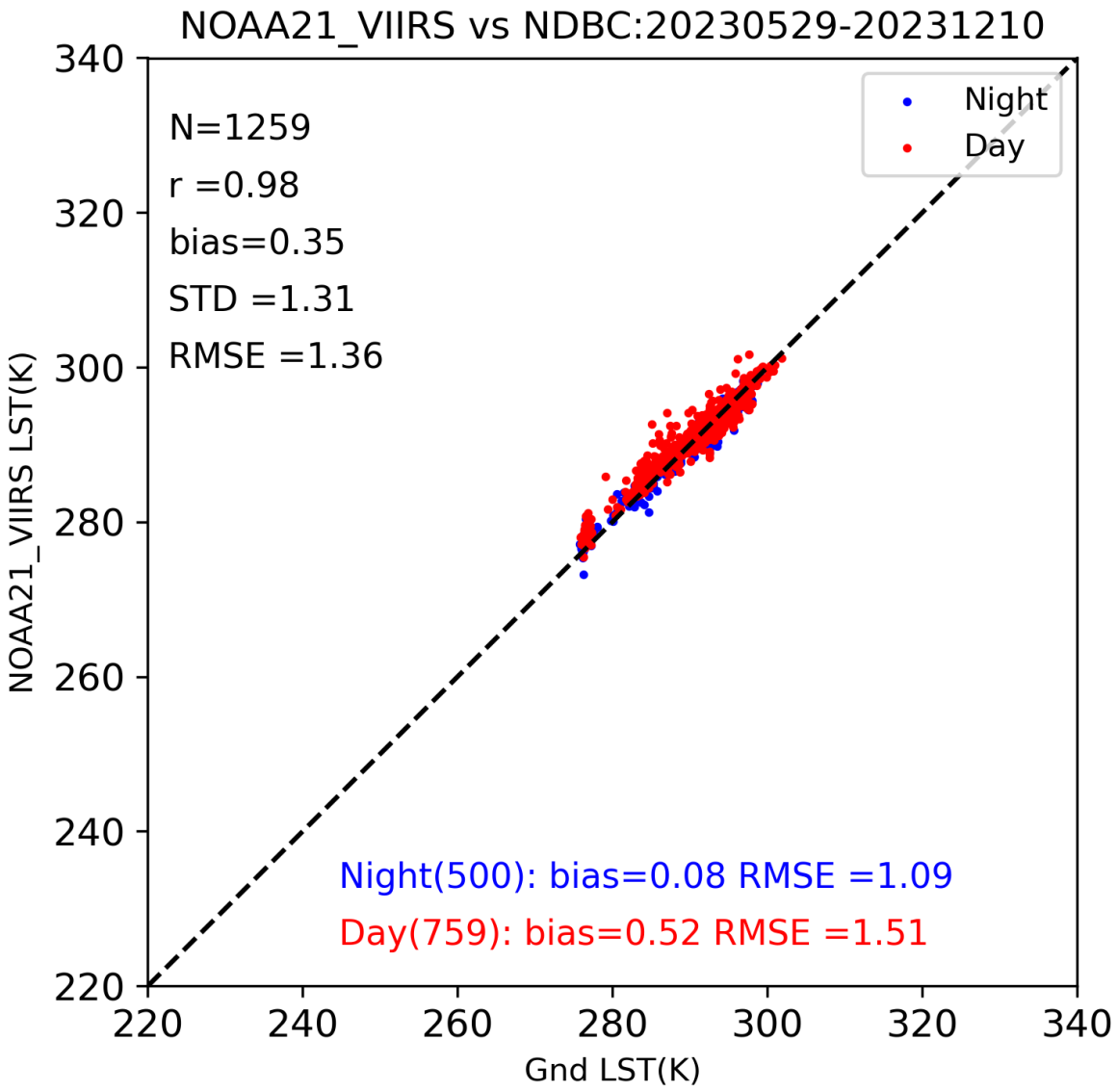


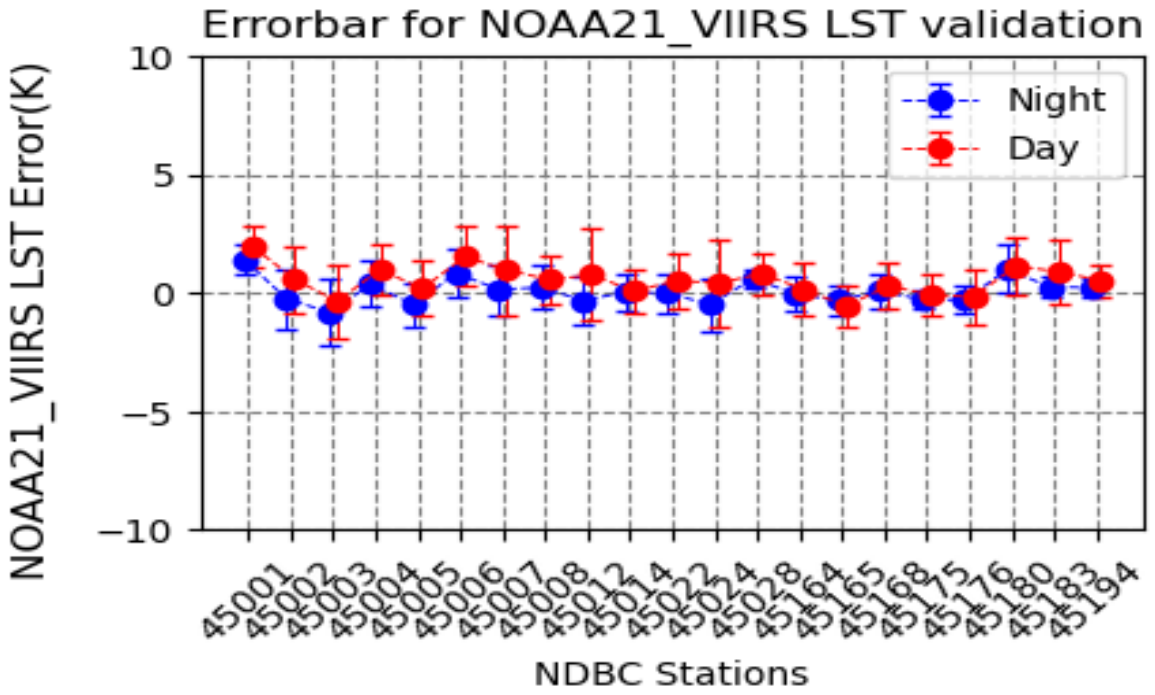




- Two stations from BSRN were used for ground validation, covering the time period from May to November 2023.
- The left figure presents the combined validation results from the two BSRN stations, while the right two figure display the site wide validation results for CAB(middle) and GOB stations(right)
- Day/night combined results indicates a bias of -0.15 K and a precision of 1.9 K with a correlation of 0.99. Nighttime outperforms daytime with a RMSE of 1.4 K, while it is 2.1 K for daytime.
- It shows a bias of 0.7 K and a precision of 1.5K over CAB station, whileas it is -0.3 K and 1.9 K over GOB station.

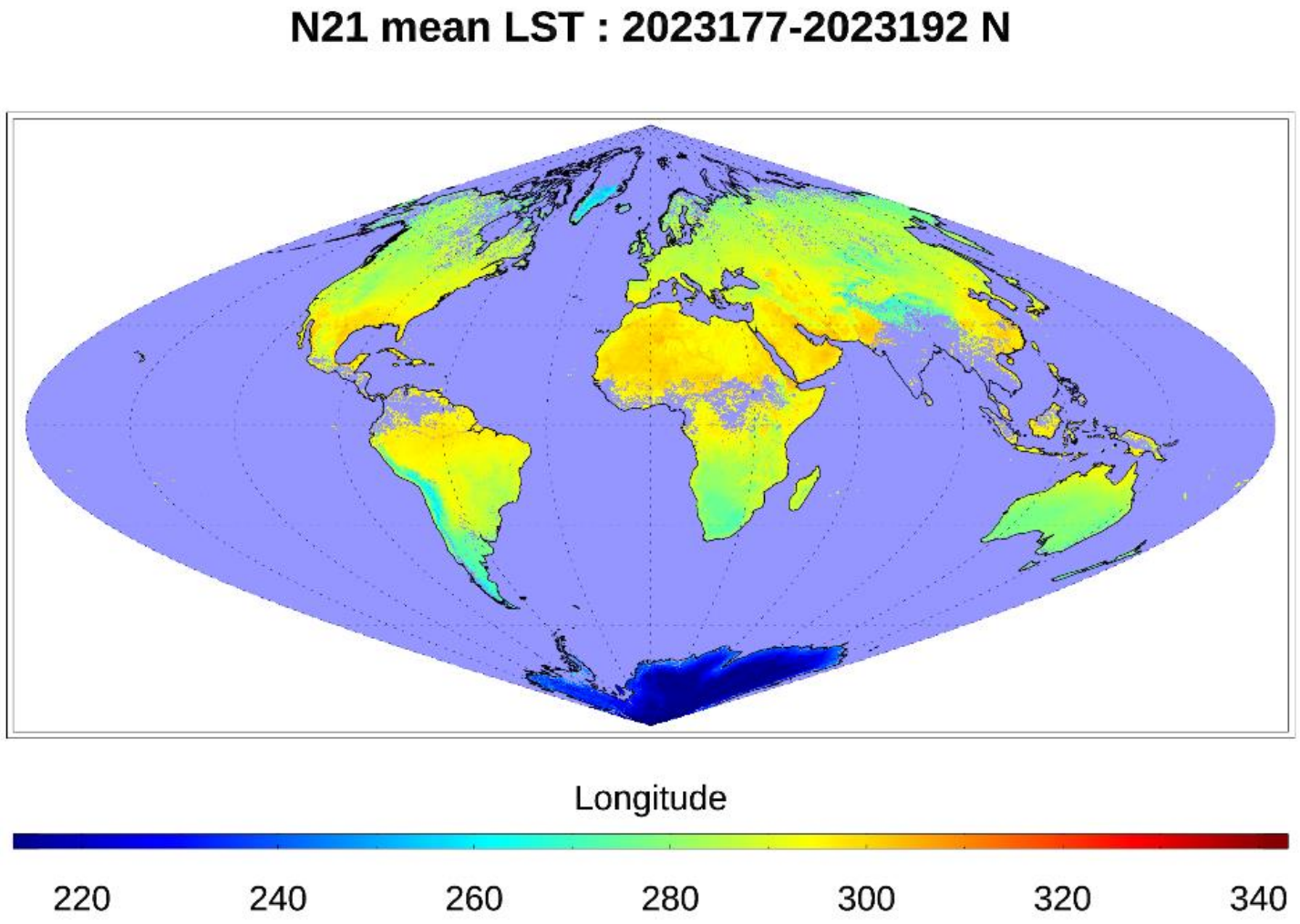
L2 NOAA-21 LST Ground Validation-NDBC

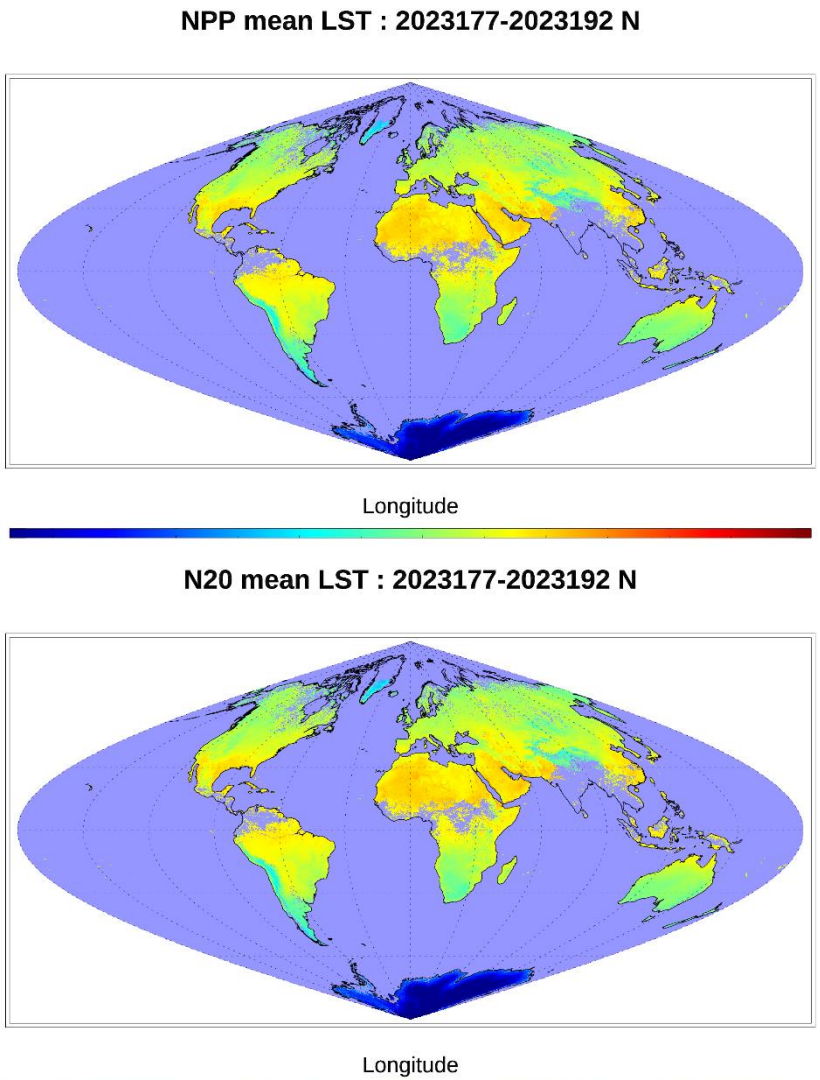




- The data covers the time period from May to October, 2023. The left figure presents the combined validation results from 21 NDBC stations, while the right figure displays the site wide validation results.
- Day/night combined results indicates a bias of 0.35 K and a precision of 1.3 K. Nighttime outperforms daytime LST with a bias of 0.1 K and RMSE of 1.1 K, while it is 0.5 K and 1.5 K for daytime.
- The site wide result provides a generally consistent result except at several stations such as 45001,45003,45005, and 45176.

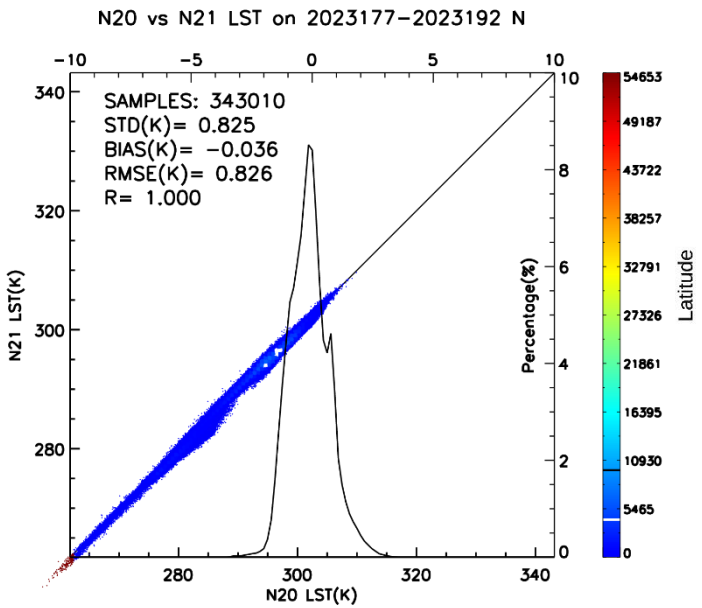
L3 VIIRS LST Inter-comparison- Nighttime

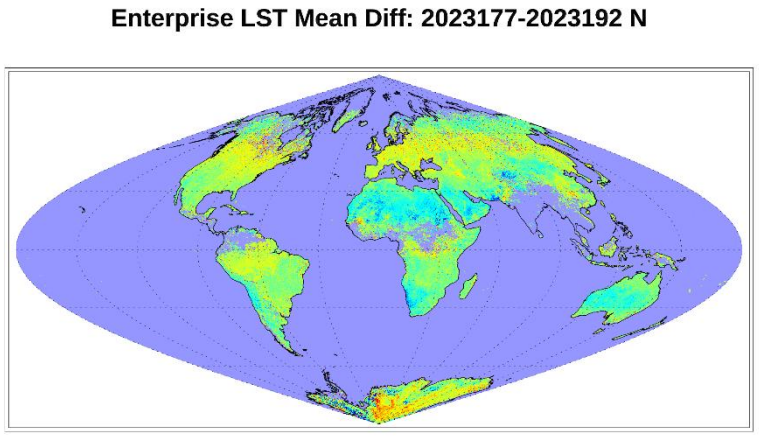


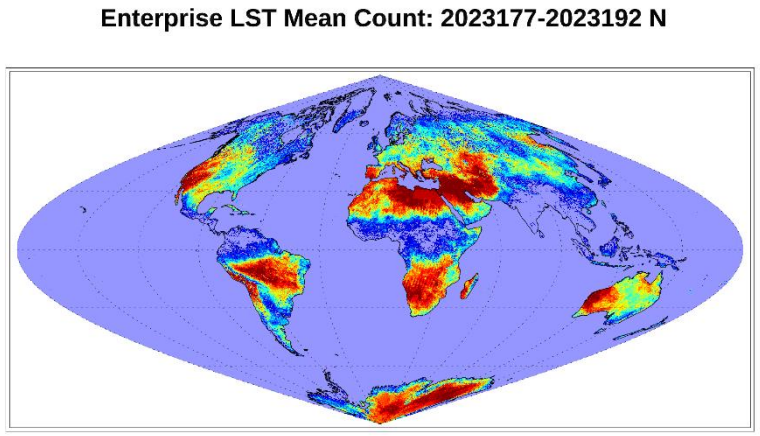


- The nighttime inter-comparison among JPSS VIIRS LSTs is conducted based on the mean LST calculated within consecutive 16-day time periods to mitigate the impact from viewing angle and view time. The time period covers from June 26 to July 11, 2023.
- The comparison used only cloud clear pixels in the statistics. The left figure display the mean LST for NOAA21, the top right figure shows the mean LST for SNPP, while the bottom right shows the mean LST for NOAA-20.

L3 VIIRS LST Inter-comparison- Nighttime







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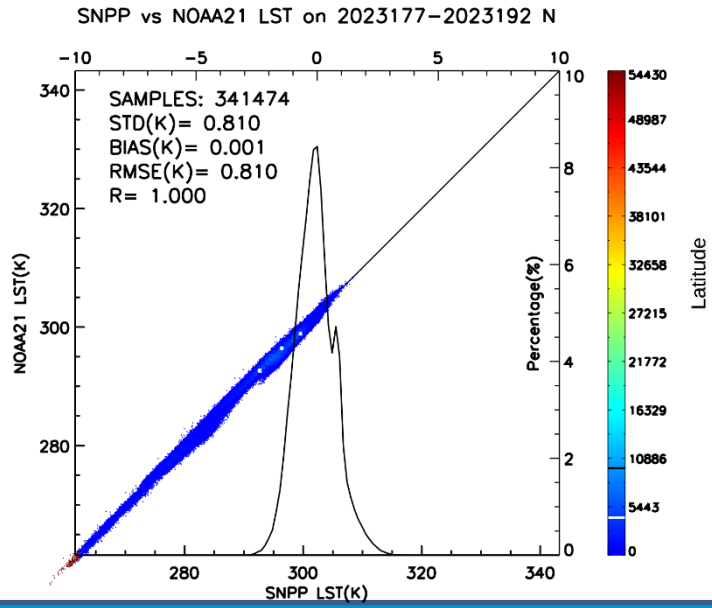
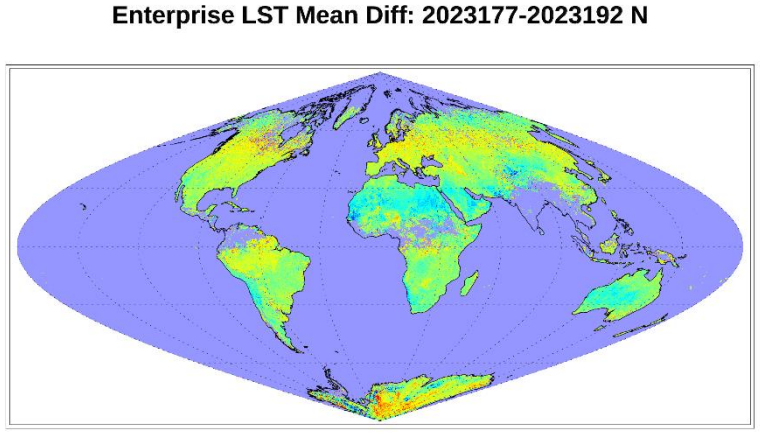
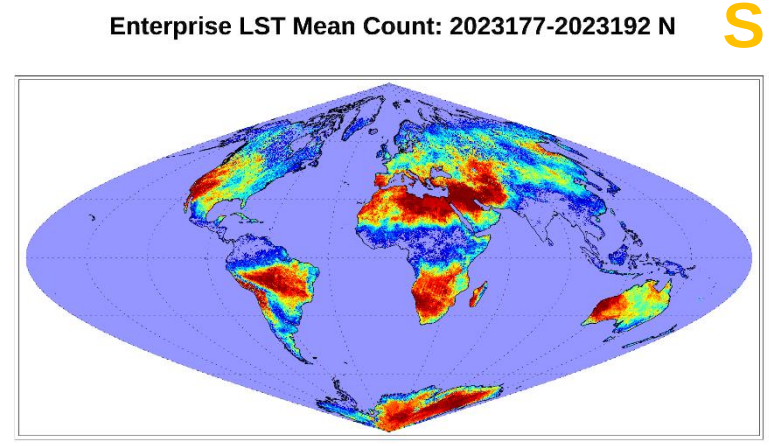
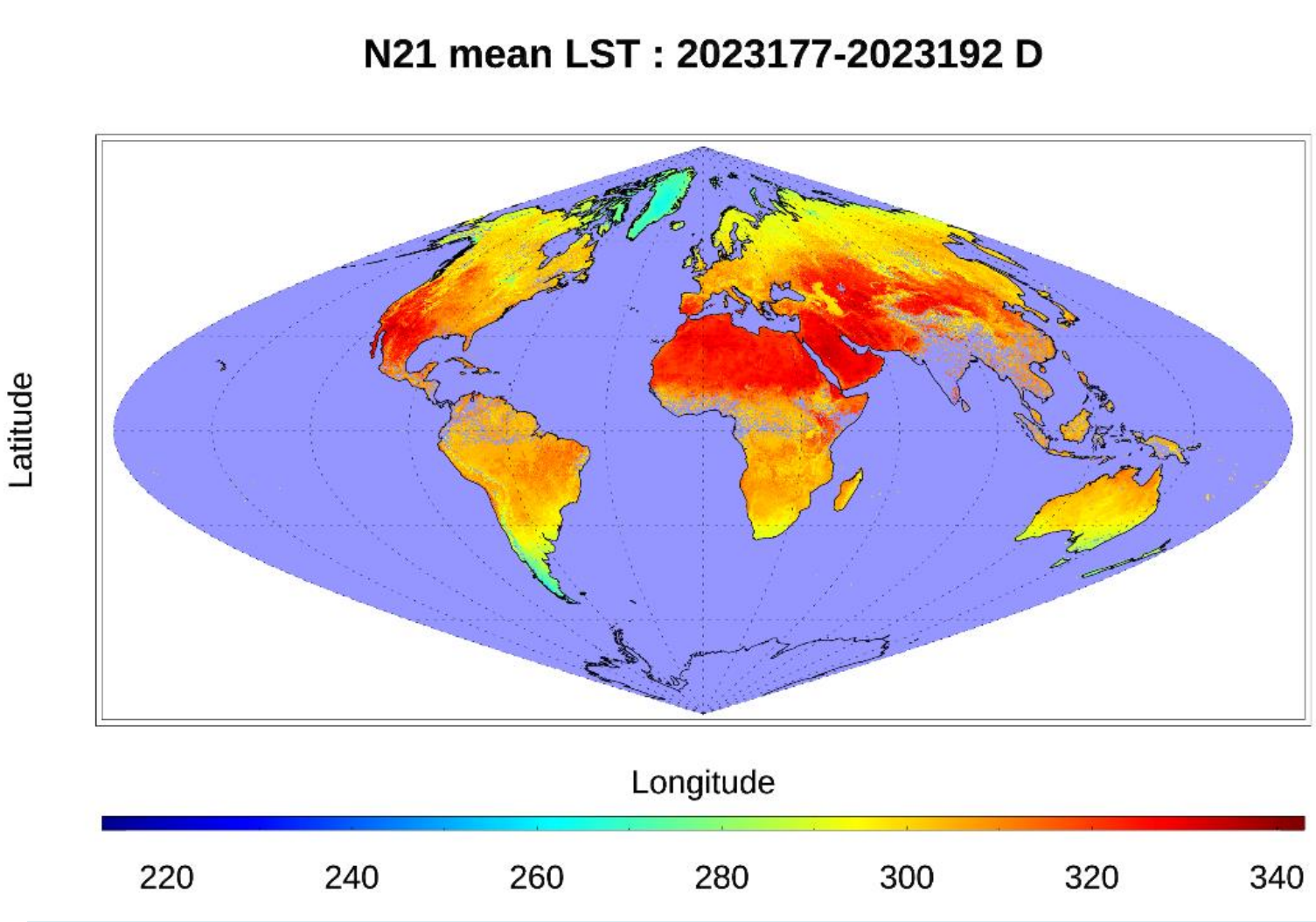


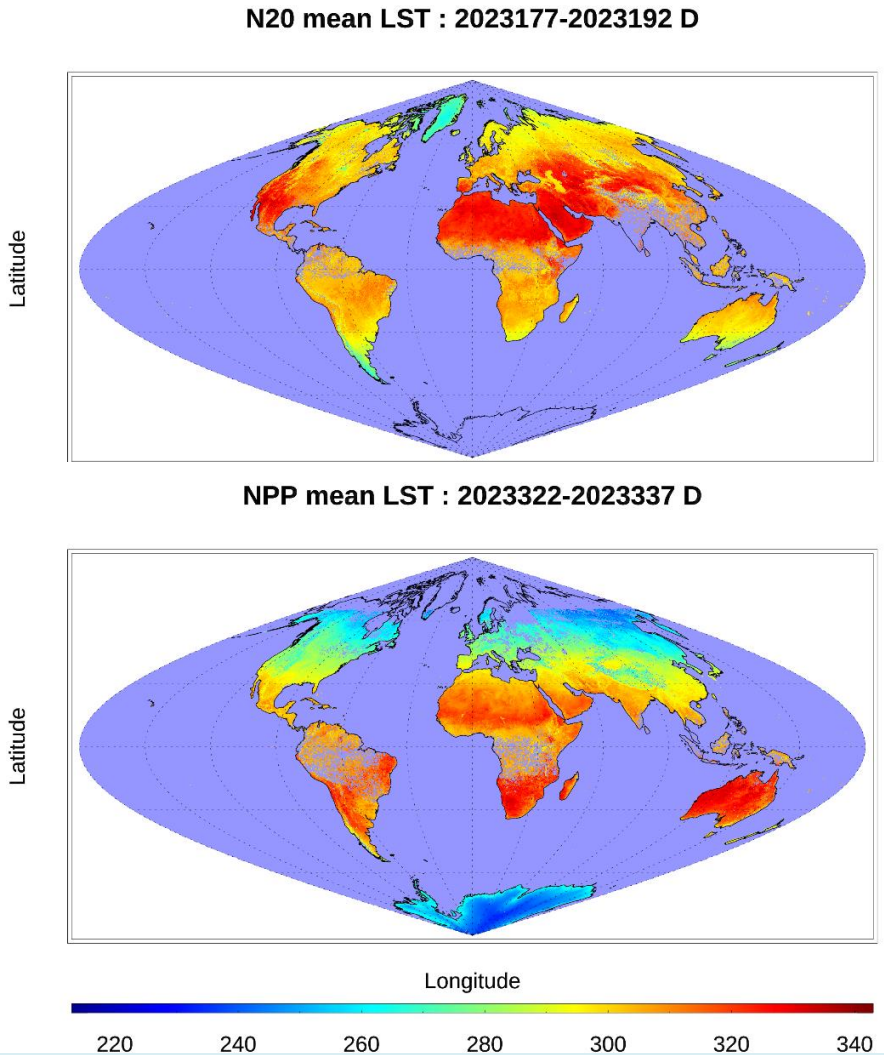




SNPP

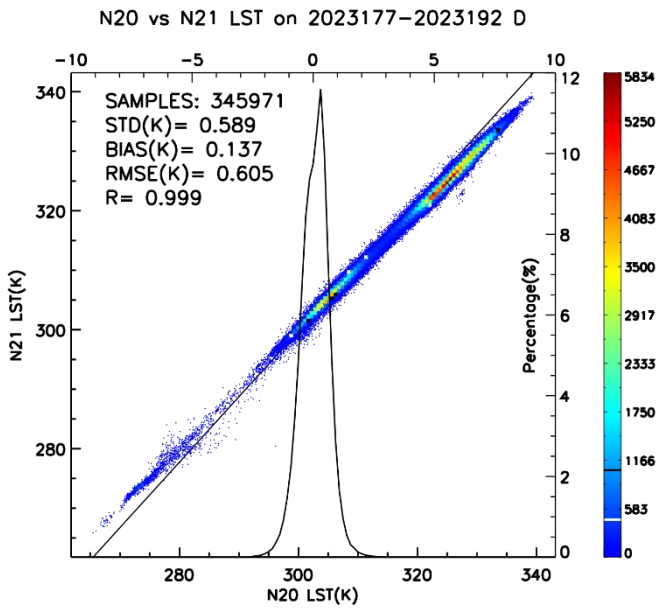
L3 VIIRS LST Inter-comparison- Daytime

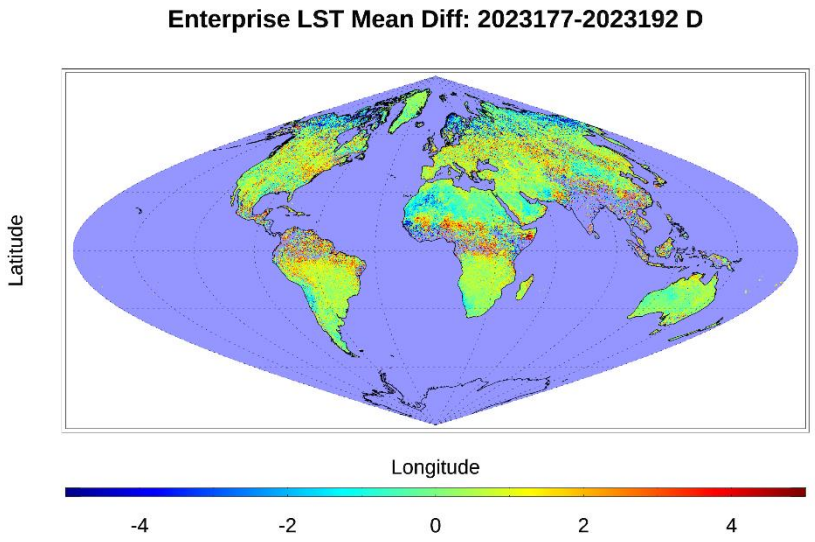


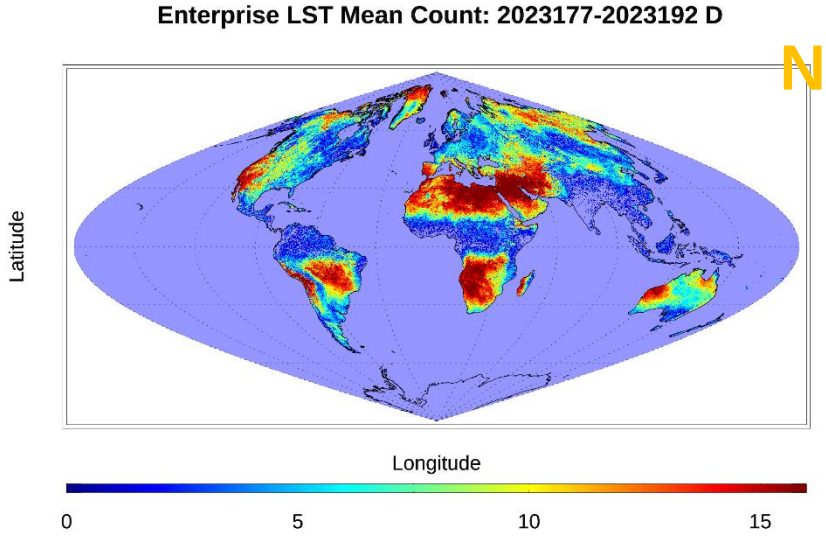


- The daytime inter-comparison among JPSS VIIRS LSTs is conducted based on the mean LST calculated within consecutive 16-day time periods to mitigate the impact from viewing angle and view time. The time period covers from June 26 to July 11, 2023.
- The comparison used only cloud clear pixels in the statistics. The left figure display the mean LST for NOAA21, the top right figure shows the mean LST for SNPP, while the bottom right shows the mean LST for NOAA-20.

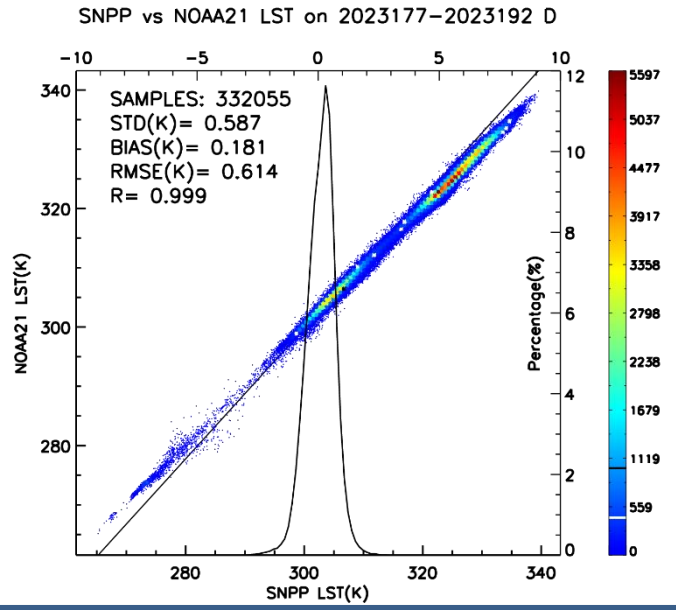
L3 VIIRS LST Inter-comparison- Daytime

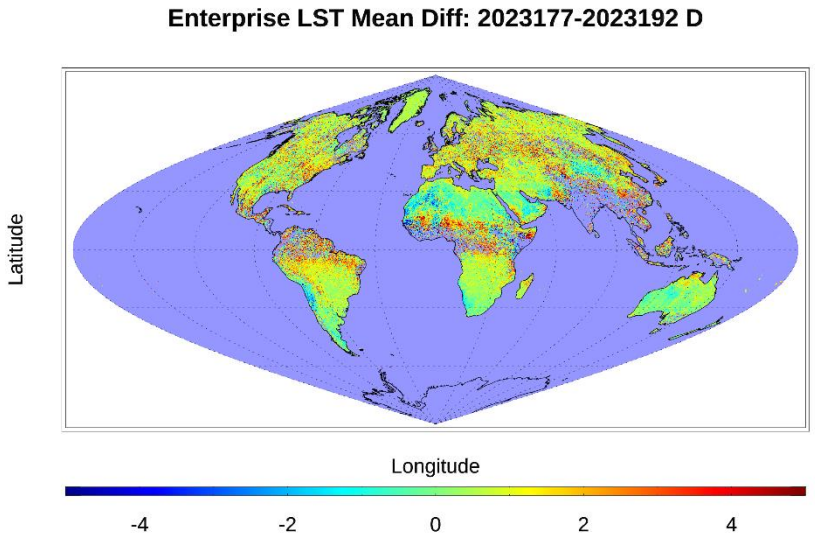


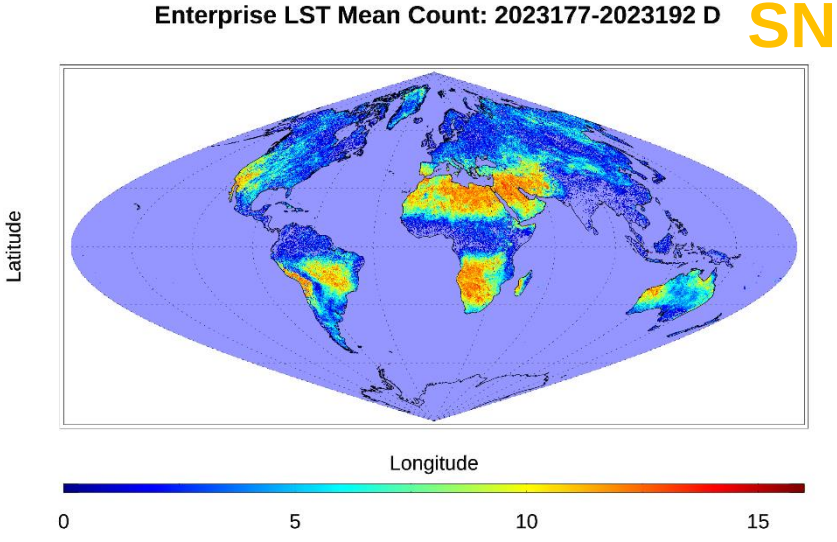




N20







SNPP

EDR Reprocessing

December 2023

Accomplishments / Events:

- The RWG configured the VIIRS EDR reprocessing software packages and related libraries for cloud products, e.g. cloud mask, cloud phase, cloud height, cloud base height, cloud layers, daytime and nighttime cloud optical and microphysical properties, on Bamboo cluster.

- The RWG is currently reprocessing Cloud EDRs for Aug. 2018~Jul. 2019 on 12 nodes of the Bamboo cluster.

- Due to the storage limitation on Bamboo, the RWG checks and transfers the completed reprocessing results to STAR server in a timely manner. When the transfer between Bamboo and STAR servers is completed and checked, the RWG cleans up the space in Bamboo cluster for subsequent processing.

- The RWG is developing software tools for reprocessing results analysis.

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

Overall Status:

	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic			X		Execution delay is expected due to issues in STAR servers and UMD Bamboo system
Schedule			X		

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

Issues/Risks:

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

Sea Surface Temperature

December 2023

Accomplishments / Events:

- The in-situ SST quality monitor (iQuam) online system is the source of all in situ SST needed for JPSS SST cal/val activity. Out of all the various in-situ data sources, drifting buoys are most important due to their large number and near-uniform global distribution. In recent years, iQuam's sole input source for drifting buoys (FNMOC) has degraded in quality with multiple data gaps that never get filled. As a response we have been working on inclusion of additional data sources for in situ SST data.
- Two new sources on situ SST data have been implemented in an experimental (development) version of the iQuam online system. The two sources are CMEMS (Copernicus Marine Service) and ICOADS (International Comprehensive Ocean-Atmosphere Data Set). Preliminary results show that number of unique in situ SST observations is increased and data gaps are eliminated (see Figure in the lower right).
- We plan on pushing the updates to the live iQuam website in summer 2024 along with other updates such as improved quality control and more consistent treatment of in situ SST from Argo floats.

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:

iQuam source of drifting buoys SST data (FNMOC) has become less reliable

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
SST EDR support to SDR team on Warm up - Cool down anomalies	Feb-24	Feb-24		
SST EDR Support to JPSS-3 Data System Test Event *(Dependency on JPSS)*	Apr-24	Apr-24		
SST EDR Enterprise Cal/Val and ACSPO Algorithm "Agency Report" Presentation to GHRSST science community	Jun-24	Jun-24		
SST EDR Enterprise Cal/Val Plan Initial Updates	Jul-24	Jul-24		
Promote experimental iQuam updates to live access	Aug-24	Aug-24		
SST EDR Validated Maturity Review	22-Aug-24	22-Aug-24		

***Highlights*: Additional iQuam input data sources improve data completeness**

Hourly timeseries for drifting buoys number of unique SST observations (NOBS) for May 2023 on the live iQuam website (top) and development site (bottom). The development site includes FNMOC, ICOADS and CMEMS as input data sources. The live page only includes FNMOC. Overall NOBS are increased in development version and gaps (red circles) are eliminated.

Snowfall Rate

November 2023

Accomplishments / Events:

- NOAA-21 SFR (Beta) was added to the SFR processing system at GINA, University of Alaska Fairbanks. The product is being produced and disseminated to Alaska Weather Forecast Offices.
- NOAA-21 SFR was also added to the DB-based CISESS SFR production system and the images are posted online in near real-time. The product is being disseminated to SPoRT who will integrate the data to their LDM distribution and make it available to all NWS WFOs.
- Collaborated with and assisted both SPoRT and GINA with their SFR configuration and display in AWIPS
- Collected forecaster feedback on SFR

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			

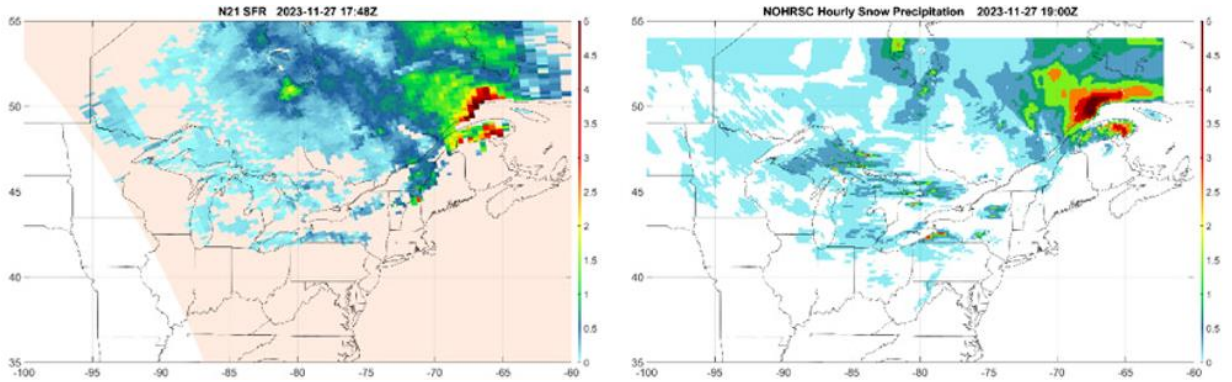
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights: NOAA-21 SFR Captures Intense Snowfall Event



Left: NOAA-21 SFR on November 27, 2023; Right: The corresponding NORHSC hourly snowfall analysis. NOAA-21 captured an intense snowstorm in the Northeast into Quebec, Canada. It also successfully detected the lake effect snow in the Great Lakes region, e.g. over and around Lake Erie and Lake Ontario, but underestimated the snowfall intensity due to the shallow snowfall system.

Surface Reflectance

December 2023

Accomplishments / Events:

- Drafted the NOAA21 Surface Reflectance provisional review, extensively evaluated the product, including the data completeness, data value and quality flags, in-situ validation and inter-comparison.
- Reprocessed the missed routine daily gridded true color SR and AERONET subset data for all of the related datasets (SR, inputs & ground measurements and reference data).
- Keep working on the routine validation datasets processing transition from NOAA SCDR to AWS. SR product routinely monitoring, particularly focus on the status of NOAA21.
- Complete the mitigation algorithm evaluation, verified the improvement for the dust aerosol uncertainty.

Overall Status:

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

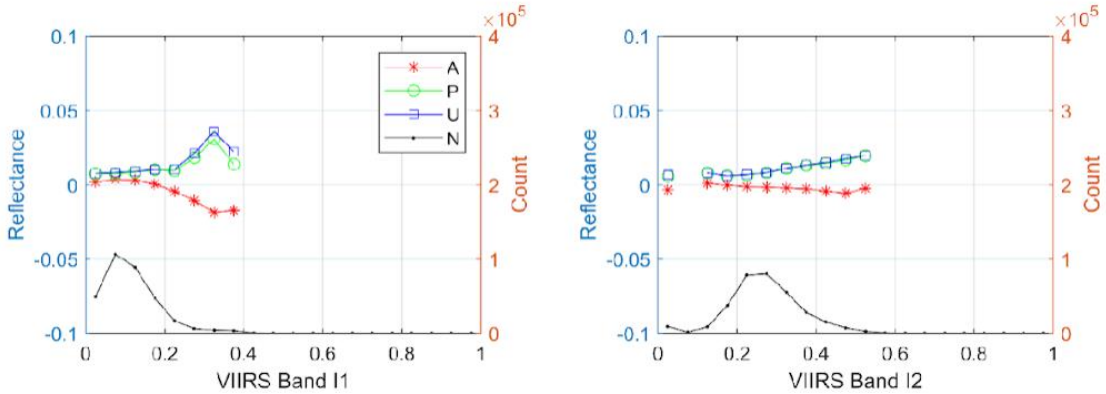
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NCCF SR DAP redelivery and verification	Sep-23	Sep-23	Sep 20, 2023	
Mitigation algorithm development for the dust aerosol model	Dec-23	Dec-23	Dec 19, 2023	
Provional Maturity of NOAA-21	Feb-24	Feb-24		
The JPSS (SNPP, N20, N21) SR consistency evaluation and correction	Mar-24	Mar-24		
GOES-R enterprise SR algorithm development and experimental product	Jun-24	Jun-24		
Operational Readiness Review (ORR) for NDE Migration to NCCF	Aug-24	Aug-24		

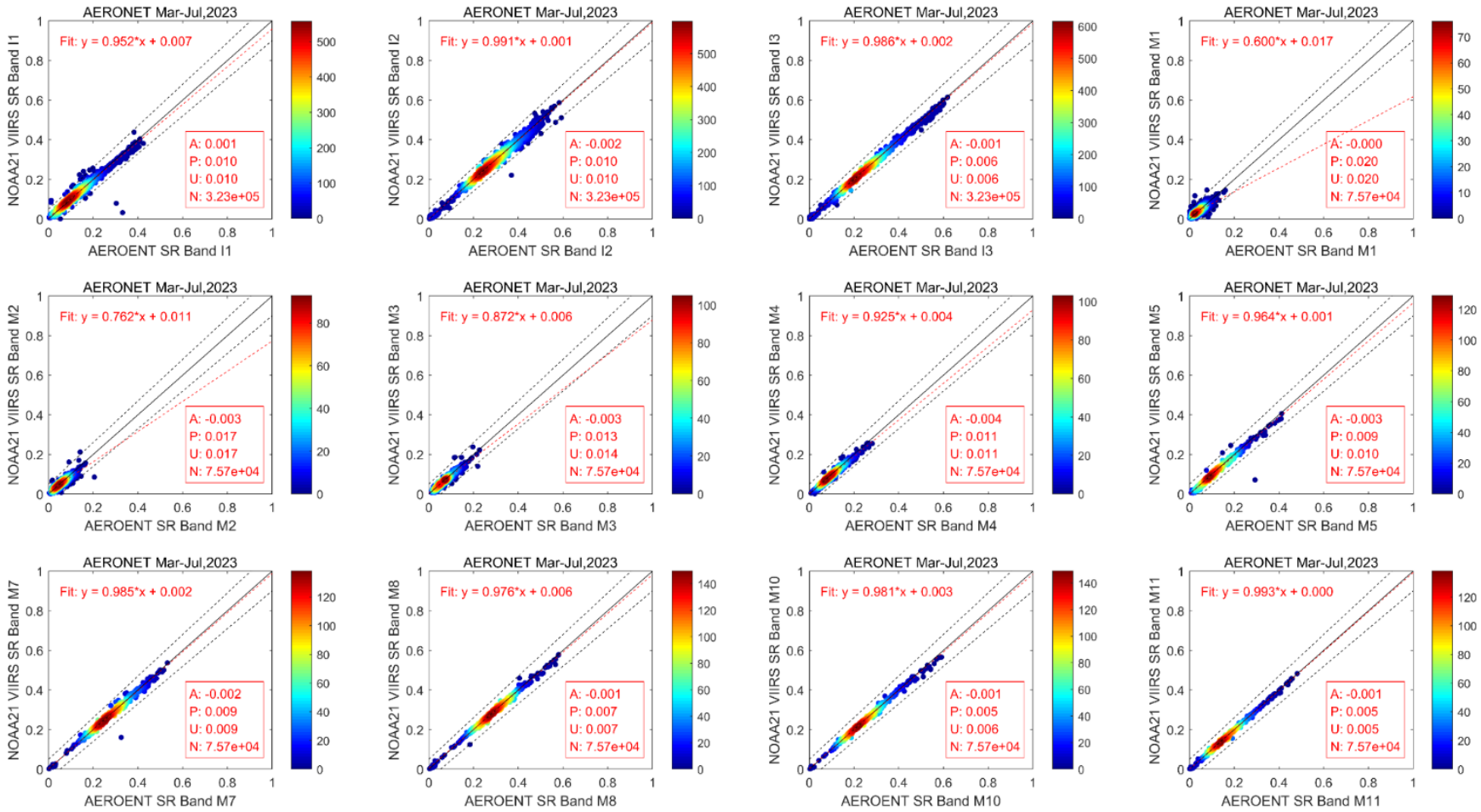
Highlights:

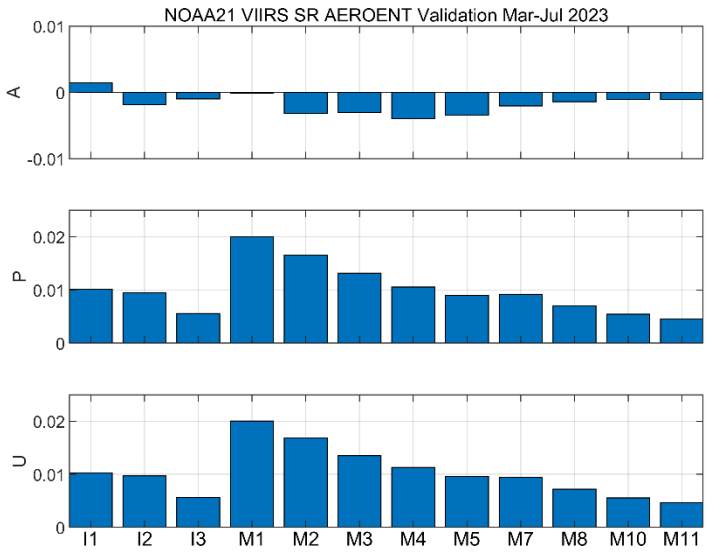


Reprocessed SNPP SDR compared with current operational SDR (VIIRS I1 (upper) and I2 (bottom).

NOAA 21 Provisional Review Evaluation

- AERONET SR validation
- Using all available AERONET sites subsets (9*9 M band pixels, with valid ground aerosol model)
- Use clear sky only (no cloud shadow, no high aerosol, no snow)
- Use 6s v2.1 to derived AERONET based SR as reference.

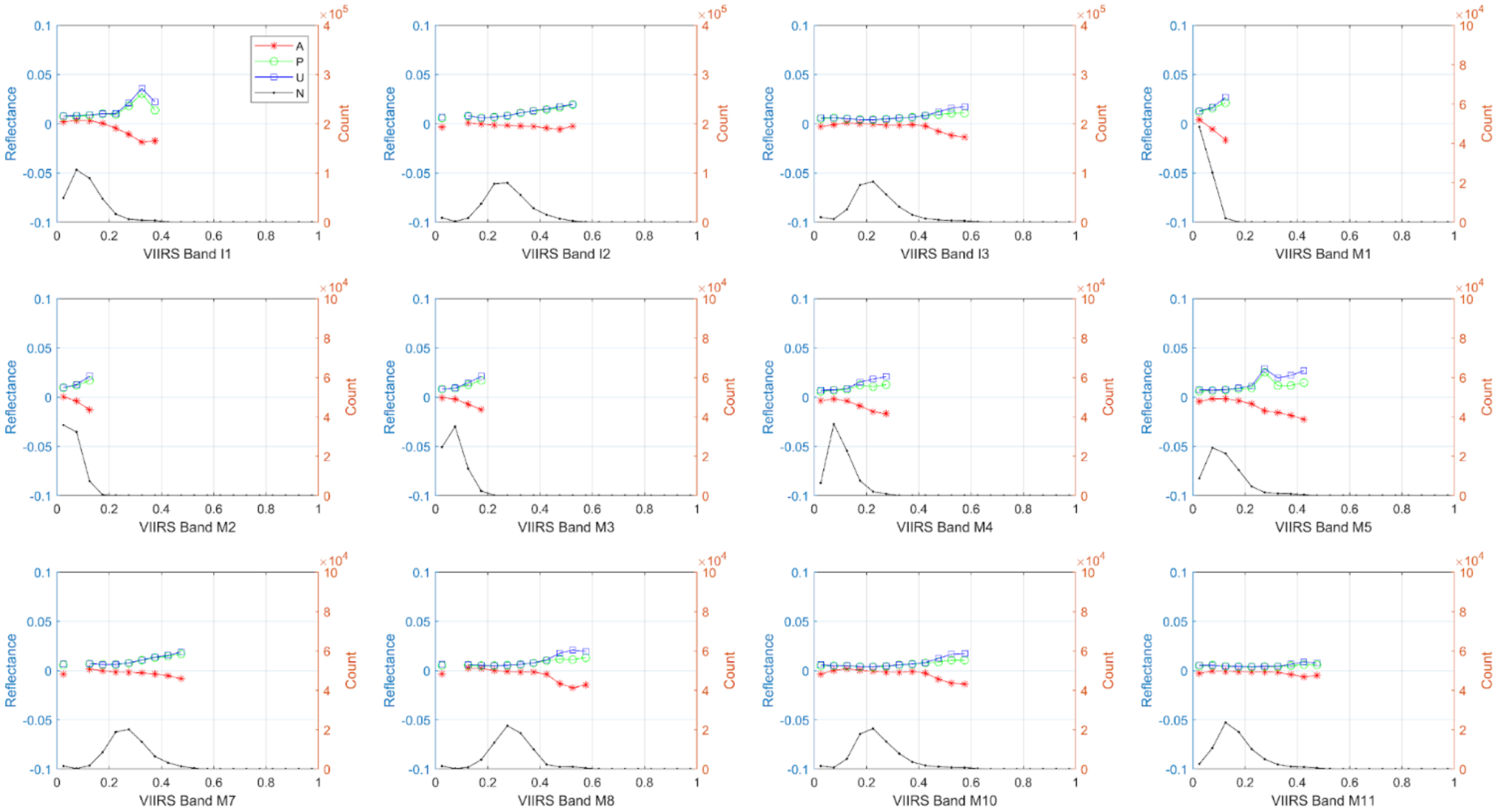




VIIRS SR validation APU statistics.

- Negative bias mainly due to the misclassified dust aerosol
- I1 band bias has been corrected in the NCCF version.

NOAA 21 Provisional Review Evaluation (2)



The stratified SR validation for more details, overall, the NOAA21 SR meet the requirements.

Surface Type

December 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 December of 2023 for the production of AST-2023.
- In preparing for the development of the AST23 product, the team examined the AST22 and AST21 products to assess the effectiveness of key approaches implemented during the development of AST22 (see examples shown in the highlights section).
  - These approaches will be further improved for AST23 development.
- The team is exploring the feasibility to produce surface type data that capture seasonal changes in surface water and snow/ice cover by incorporating other important JPSS data products, including flooding and snow/ice data

Overall Status:

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

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

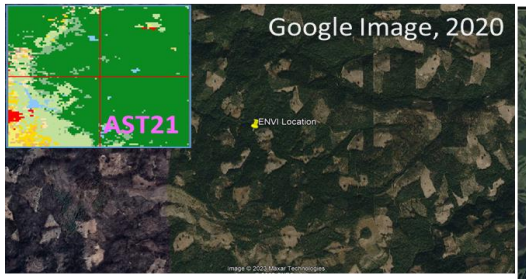
Issues/Risks:

None

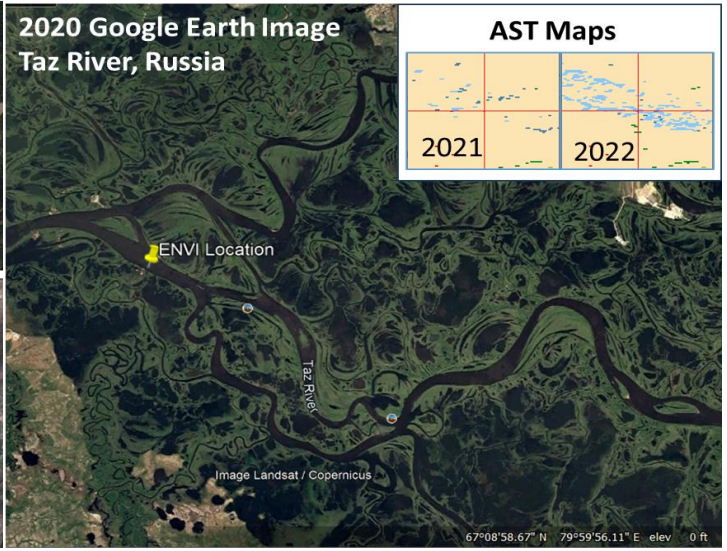
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop a 250m global water surface fraction product	Feb-23	Feb-23	Feb-23	
Complete global monthly composites for each of 2022 months	Each M.	Each M.	Each M.	
Generate global annual classification metrics	May-23	May-23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

Highlights:

Example Improvements of AST2022 over AST2021



(Left) Forest loss (green in AST21, brown in AST22) in California due to fire followed by salvage logging mapped by AST22



(Right) Use of the 250m WSF product allow for more accurate mapping of the extensive surface water cover (light blue) along the Taz River floodplain by AST22.

VIIRS SDR

December 2023

Accomplishments / Events:

- Organized VIIRS SDR Cal/Val Status meeting and presented "NOAA-21 VIIRS SDR Band M4 Striping Correction for Convective Cloud Images" as well as "NOAA-21 VIIRS SDR SWIR Band Radiometric Calibration Status Update"; Created a new ADR for the out-of-cycle LUT update for NOAA-21 VIIRS SDR, ADR-10555: N21 VIIRS SDR Band M4 Striping Correction for Convective Cloud Images [POC: S. Blonski]
- The NOAA STAR VIIRS radiance team analyzed the NOAA-21 VIIRS TEB performance using data up to November 30, 2023. MWIRs have been degrading at nearly constant rates since June 2023, with no signs of slowing down. The band averaged degradations are from 3.6 to 5.0% so far. The total degradations are up to 10% for I4 D27 (14%/year) and M12 D13 (15%/year). NOAA-21 VIIRS LWIR degradations continue to be much smaller than the MWIRs (up to 0.6%). However, the rate of degradations for I5 and M15 are about 1% and 0.7% per year, more than 2 times faster than those for S-NPP and NOAA-20 during their early missions. VIIRS-CrIS inter-comparison results show the impacts of NOAA-21 TEB degradations on SDRs are still small [POC: W. Wang]
- Analyzed the latest CPM results and estimated that the 3-sigma uncertainties of VIIRS SDR geolocation products for the 12-month time period from December 2022 to November 2023 are 346 m for NOAA-20 and 333 m for S-NPP, with respectively 99.81% and 99.85% of the analyzed geolocation circular errors not larger than 400 m specified in the JPSS Ground System requirements (at nadir, with the 0.975 cross-correlation threshold) [POC: S. Blonski]
- Analyzed the latest CPM results and estimated that the 3-sigma uncertainty of NOAA-21 VIIRS SDR geolocation products for the time period from March to November 2023 is 394 m, with 99.71% of the analyzed geolocation circular errors not larger than 400 m specified in the JPSS Ground System requirements (at nadir, with the 0.97 cross-correlation threshold) [POC: S. Blonski]

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

Overall Status:

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

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

Issues/Risks:

J3/J4 VIIRS granule size change

Highlights:

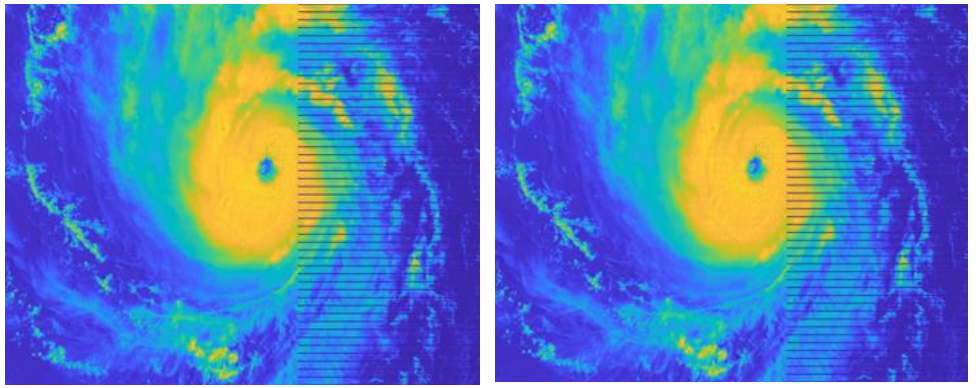


Figure 1. NOAA-21 VIIRS SDR band M4 reflectance image processed with the current IDPS LUTs (left) and with the proposed updated LUTs (right): granule 2023-09-07 16:17 UTC shown with striping reduction for the tropical cyclone clouds

Vegetation Health

Nov 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 started an effort on Vegetation Health Indices-based yield modeling. Wheat yield forecasting is tested with correlation and regression analysis for five selected countries (see Highlights in the lower right quad). Wheat yield data from FAO and Vegetation Health Indices data from the STAR VH website have been used for testing.

Overall Status:

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

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

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Vegetation Health Provisional Maturity	Apr-24	Apr-24	Sept-23	Maturity reached before plan
NOAA-21 Vegetation Health Validated Maturity	Apr-24	Apr-24		

Highlight:

Correlation statistics for wheat yields of five countries and global VIIRS vegetation health product are summarized below: Optimal week correlation between listed VH indices and wheat yield (improved)

Country	Planting and Harvest months	Sampling method			VCI vs. Wheat		TCI vs. Wheat		VHI vs. Wheat	
		*DY	**TP	One year lag for week> 26?	***OW	****CC	OW	CC	OW	CC
Australia	P 5-7 H 10-1	1961-2021	1982-2021	Yes	**50**	**0.629**	**41**	**0.704**	**41**	**0.707**
India	P 10-12 H 3-5	1961-2021	1982-2021	Yes	44	0.186	**34**	**0.507**	42	0.099
Mongolia	P 4-6 H 8-9	1961-2021	1982-2021	No	30	0.373	27	0.477	28	0.466
Russia	PW 9-10; PS 4-5 HW 7-8; HS 8-9	1992-2021	1992-2021	No	52	0.344	**23**	**0.578**	**23**	**0.538**
Ukraine	PW 9-10; PS 4-5 HW 7-8; HS 8-9	1992-2021	1992-2021	No	6	0.339	**24**	**0.563**	**25**	**0.565**

Volcanic Ash

December, 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 continues to collect and analyze volcanic ash emissions as nature allows in preparation for the full maturity review, currently scheduled for early 2024. The NOAA-21 cloud advection validation dataset now contains 79 volcanic emission cases totaling over 44,000 EDR ash pixels. The included figure shows an example of a recent volcanic emission from the Klyuchevskoy volcano in the Kamchatka Peninsula of Russia on December 31, 2023. As the figures demonstrate, both VOLCAT and EDR ash height retrievals agree well with the cloud advection pattern wind-height truth data, with median biases of -0.05 km and -1.24 km, respectively.
- VOLCAT VIIRS volcanic ash plume identification and extraction work is an enhancement to the VOLCAT methodology. This work was deprioritized during the second half FY23 in lieu of focus on NOAA-21 EDR/VOLCAT validation. This work will continue through much of FY24. Most recent progress toward this goal is the needed VOLCAT modifications have been made to enable output of VOLCAT metrics for missed detections and non-ash clouds. This will enable a full training database to be generated for ash and non-ash clouds for training the AI/ML methodology, including both detected and missed volcanic clouds by the current VOLCAT algorithm..

Overall Status:

	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule			x		VOLCAT enhancement (improved detection was deprioritized for validation work) will continue into much of FY24)

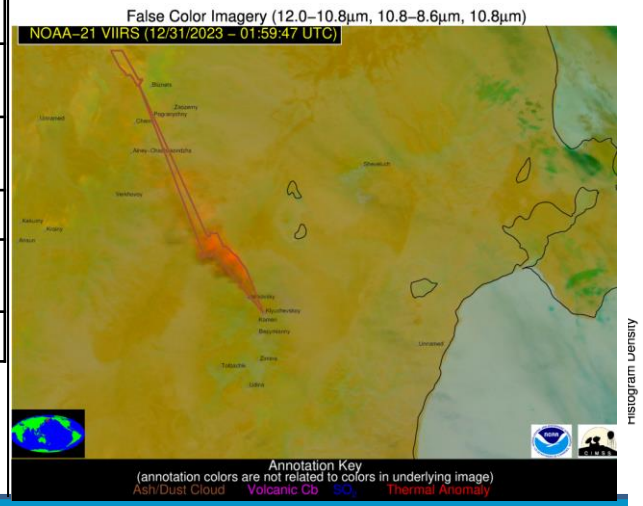
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

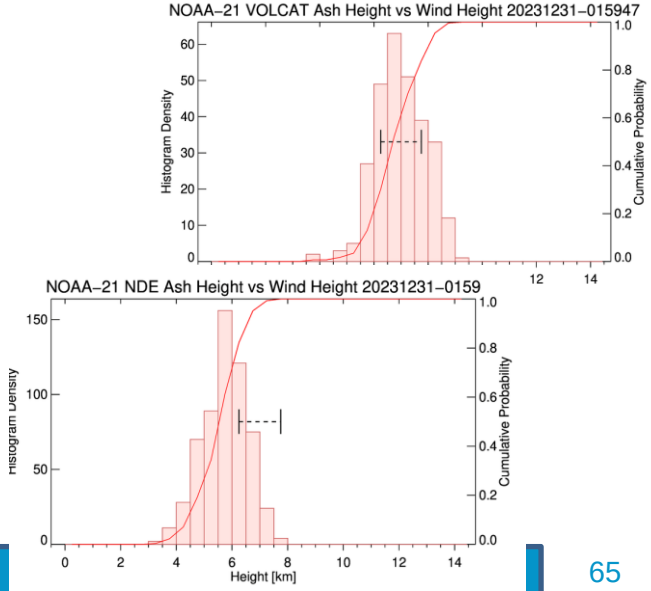
Issues/Risks:

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

Highlights:

Volcanic ash science team has continued to add cases to the NOAA-21 validation for full maturity review. A recent example from the Kamchatka Peninsula in Russia from December 31, 2023 is shown. NOAA-21 Ash RGB false color image (left) and cloud advection validation for VOLCAT (top right) and EDR (bottom right).





Ocean Color

October 2023

Accomplishments / Events:

- VIIRS-NOAA-21 global ocean color products have been routinely produced. Data flow has been smooth (Level-1B to Level-2 to Level-3) without any issues.
- All VIIRS-NOAA-21 global ocean color product images have been routinely generated and displayed in OCView, including Level-3 daily, 8-day, monthly, and climatology data/images.
- In addition, VIIRS-NOAA-21 derived ocean color data are being routinely monitored and compared with those from in situ measurements (MOBY, AERONET-OC).
- In preparing for the VIIRS-NOAA-21 ocean color Beta maturity review, we have evaluated VIIRS-NOAA-21 ocean color data quality, compared with VIIRS-SNPP and VIIRS-NOAA-20, as well as those from in situ data.
- Summary: For VIIRS-NOAA-21 ocean color data to be useful, we must do the vicarious calibration for VIIRS-NOAA-21 and reprocess the mission-long data (i.e., it must be after the combined Beta/Provisional maturity).

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-2024		
Ocean Color Provisional Maturity	Mar-2024	Mar-2024		
Ocean Color Validated Maturity	Jul-2025	Jul-2025		

Overall Status:

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

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

Issues/Risks: None

Ocean Color FY24 Milestones/Deliverables

Task/Milestone	Planned Completion Date	Fiscal Quarter	Comments
NOAA-21 OC data processing			
NOAA-21 Beta maturity for ocean color EDR	Sep-23 (or 8 months after NOAA-21 Beta SDR available)	Q4 FY23	NOAA-21 OC data
NOAA-21 Provisional maturity for OC EDR	Feb-24 (or 12 months after NOAA-21 Provisional SDR)	Q2 FY24	NOAA-21 OC data
NOAA-21 OC EDR vicarious calibration using MOBY data	Jan-24 (or dependent on available of MOBY data)	Q2 FY24	NOAA-21 OC data
VIIRS calibration/validation			
Continue VIIRS Cal/Val data analysis (SNPP, NOAA-20, and NOAA-21)	Sep-24	Q4 FY24	Cal/Val
Cal/Val team complete the 9th VIIRS ocean color dedicated cruise	Jul-24	Q3 FY24	Cal/Val
In situ data collections from OC Cal/Val team including NOAA dedicated cruise and other opportunities, particularly for NOAA-21 OC validation	Aug-24	Q4 FY24	Cal/Val
VIIRS algorithm refinement (Maintenance DAP)			
Improvement of the OCView tool for OC products monitoring	Aug-24	Q4 FY24	
Producing consistent VIIRS ocean color products	Aug-24	Q4 FY24	
Continue working on improvement of the ocean color data processing system (MSL12), particularly over global coastal and inland water regions	Sep-24	Q4 FY24	
VIIRS OC data processing/reprocessing			
Continue producing consistent VIIRS SNPP-NOAA-20 OC products and start to work on NOAA-21 OC data consistency with other two VIIRS sensors	Sep-24	Q4 FY24	
Updated DAP (MSL12) to CoastWatch, if needed	Sep-24	Q3 FY24	

Sustainment Project for TTA	J1/J2 Sustainment Activities	PFO Sustainment Activities	
	Examples: N21/GCOM support; major upgrades to algorithms to be implemented before J3/J4/GOSAT-GW timeframe	Examples: J3/J4/GOSAT-GW support; major upgrades to algorithms to be implemented in J3/J4/GOSAT-GW timeframe	**Note: Maintenance activities are not listed here, this is for sustainment only**
NASA MOU Surface Reflectance	Support for surface reflectance provisional status , continue efforts to support validation status in FY25	Cal/Val Plan update that identifies differences between J3 and NOAA-21/20/S-NPP and related algorithm upgrades needed. Peer review for cal/val plan update in August 2024	
Aeronet NASA	Support for Aerosol validation status	Support for unique observations related to any differences between J3 and NOAA-21/20/S-NPP and related algorithm upgrades needed.	
Aerosol EDR Algorithm and Cal Val	Support for Aerosol validation status	Cal/Val Plan update that identifies differences between J3 and NOAA-21/20/S-NPP and related algorithm upgrades needed. Peer review for cal/val plan update in August 2024.	