NOAA JPSS Monthly Program Office

AMP/STAR FY23 TTA

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Feb, 2023

Highlights from the Science Teams (January)

Monitoring N21 during transmitter issues

Figure. DNB data over the Gulf of Mexico region on Jan. 6, 2023 using the NOAA/STAR GReVS system.

The NOAA-21/JPSS-2 onboard Ka-band transmitter anomaly poses challenges for evaluating the VIIRS SDR data quality. The direct broadcast data from NOAA-21 received at the University of Wisconsin-Madison ground station provides limited but invaluable SDR data for assessing NOAA-21 VIIRS sensor health and SDR data quality while waiting for the NOAA-21 anomaly resolution. The Global Regional Validation Site system (GReVS) developed at STAR has been modified and adapted to interface with the NOAA-21 VIIRS direct broadcast data. Three regions around CONUS such as the US Pacific Coast, Gulf of Mexico, and Great Lakes are being closely monitored at the GReVS. NOAA-21 DNB data quality will be closely monitored and compared with Suomi NPP and NOAA-20 using the GReVS after the opening of the cryo-cooler door and after the calibration update using scheduled DNB observations under new moon conditions.

*** Disclaimer: Data from NOAA-21 are preliminary without calibration/validation and may contain errors. Users should be cautious when using NOAA-21 NOAA/STAR GReVS system.**

Highlights from the Science Teams (January)

AMS Annual Meeting Short Course on Working with GOES-R and JPSS Data using Python

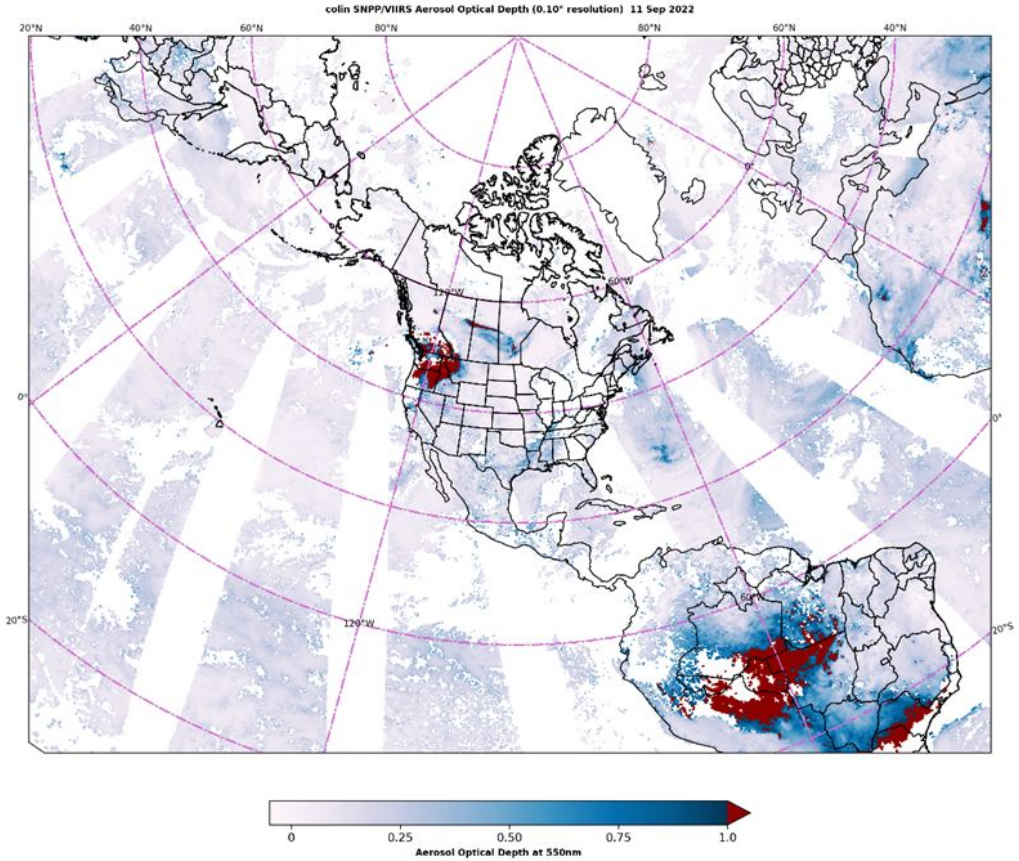


Figure. Sample image created using the techniques taught in the short course

Amy Huff developed and led a full-day Short Course at the 103rd AMS Annual Meeting on January 8, 2023. The hybrid course attracted over 85 participants with attendance split between remote and in-person in Denver, Colorado. The course was completely hands-on; participants ran live Python code on their own computers demonstrating the proper workflow for GOES-R and JPSS data files, with the end goal of making professional-quality imagery suitable for use in scientific presentations, journal articles, or social media.

Highlights from the Science Teams (January)

VIIRS Captures Brunt Ice Shelf Calving Event

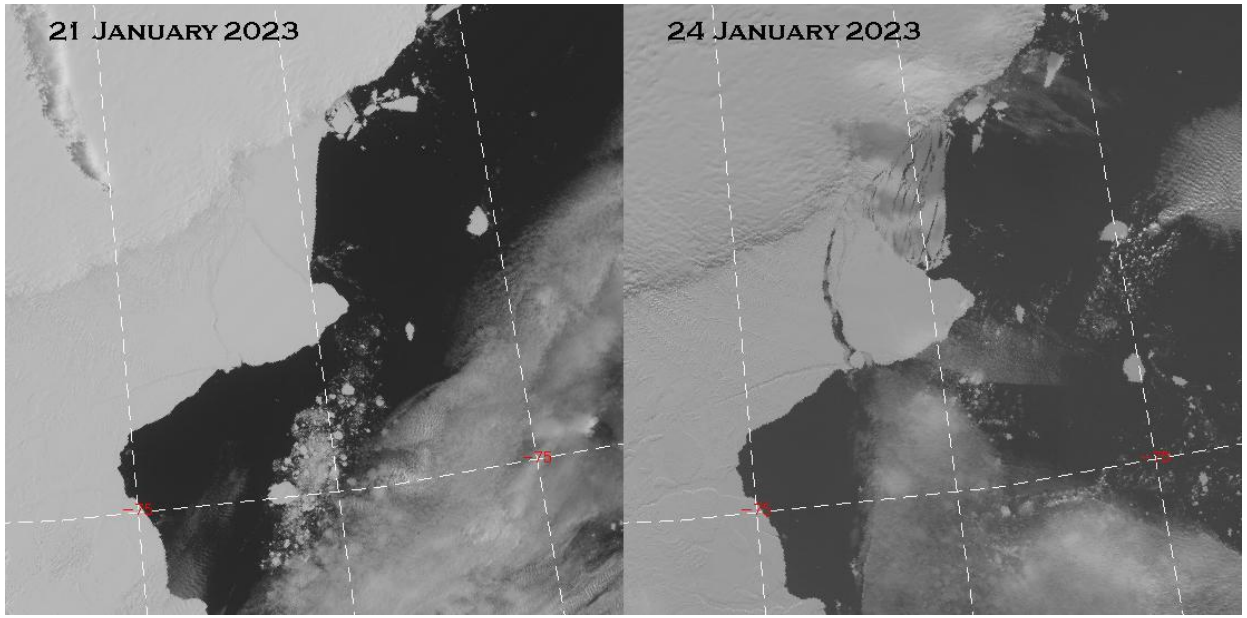


Figure. VIIRS Band I-01 images before (left) and after (right) the January 2023 Brunt Ice

On 23 January 2023, an iceberg estimated to be “the size of London” broke free from the Brunt Ice Shelf in Antarctica. This event was widely reported on a variety of news outlets, including CNN, The Washington Post and Fox News. The VIIRS instruments on both Suomi-NPP and NOAA-20 captured this event. The figure below shows 375m resolution visible-band images of the Brunt Ice Shelf before and after the calving event as viewed on CIRA’s Polar SLIDER website. A direct link to the full loop is here: https://col.st/s8AW2 Near-realtime global VIIRS imagery is available on Polar SLIDER at the following URL: https://rammb-slider.cira.colostate.edu/?sat=jpss (POC: C. Seaman, CIRA; curtis.seaman@colostate.edu; Funding: JPSS)

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
1/6/2023	Derived Motion Winds (DMW) J2 Final CCAP	NCCF
1/6/2023	EN V8TOz L2 and L3 Final CCAP	NCCF
01/11/2023	VIIRS SDR LUT Update (ASSISTT to DPMS 1/6) passed DPMS functional test	Package Drop https://auth.dpae.jpss.noaa.gov/my.policy
01/11/2023	Green Vegetation Fraction (GVF) and Vegetation Index (VI) Final CCAP Delivery	NCCF
01/18/2023	ATMS J2 PCT updates (STAR delivered to DPMS (1/10), passed DPMS functional Test	Package Drop https://auth.dpae.jpss.noaa.gov/my.policy
1/19/2023	OMPS J2 LUTs/Code Updates delivery (OMPS Team to ASSISTT, 1/7/2023) , ASSISTT-> DPMS	Package Drop https://auth.dpae.jpss.noaa.gov/my.policy
1/19/2023	VIIRS Super Final DAP v3r2 Delivery to CSPP LEO	UW/CIMSS
1/20/2023	VIIRS LSA Final CCAP	NCCF
1/25/2023	BUFR Toolkit v5.6 Final CCAP Patch	NCCF
1/25/2023	Offline LSA Final DAP to CSPP LEO	UW/CIMSS
1/26/2023	MiRS v11.9 Final CCAP	NCCF
2/5/2023	Derived Motion Winds (DMW) J2 Final CCAP Patch to include dockerfile and executables	NCCF
2/6/2023	HEAP Kernel Averaging Preliminary CCAP to OSPO for SCR	Google Drive

Accomplishments – JPSS Cal Val Support

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	01/03/23, 01/10/23, 01/17/23, 01/23/23, 0131/23
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	01/03/23, 01/10/23, 01/17/23, 01/23/23, 0131/23
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	01/03/23, 01/17/23, 1/31/23
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	01/10/23, 01/24/23
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	01/03/23, 01/30/23
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	01/03/23, 01/30/23
NOAA-21	Weekly OMPS TC/NP Dark Table Updates	01/31/23

Upcoming NOAA-21 Cal/Val Maturity Reviews

- **December, 2022 Maturity Review:**
  - ATMS TDR/SDR (Provisional Maturity)
- **January, 2023 Maturity Review:**
  - Maturity Reviews moved to February due to Ka-band transmitter anomaly/investigations
- **February, 2023 Maturity Review:**
  - VIIRS SDR (Beta Maturity, **02/23 or 3/2 assuming first light ~2/8)**
  - VIIRS KPP Imagery EDRs (Beta Maturity, **02/23 or 3/2 assuming commissioning ~2/8**)
  - CrIS SDR (Beta Maturity, **02/23 or 3/2 assuming first light ~2/8**)
  - OMPS SDR (OMPS-NP & OMPS-TC, Beta Maturity **3/2 assuming first light ~2/9**)
- **March, 2023 Maturity Review:**
  - VIIRS SDR (Provisional Maturity, **TBC: 3/30 OR 4/6**)
  - CrIS SDR ((Provisional Maturity, **TBC: 3/30 OR 4/6**)
- **April, 2023 Maturity Review**
  - OMPS SDR (OMPS-NP & OMPSTBC-TC, (Provisional Maturity, **TBC: 4/14**)
  - VIIRS KPP Imagery EDRs (Provisional Maturity, **TBC: 4/6**)
  - VIIRS non-KPP Imagery EDRs (Beta Maturity, **TBC:4/6**)
  - OMPS Ozone EDR (V8Pro & V8TOz, Beta Maturity, **TBC**)

Upcoming Milestones/Deliveries

- JSTAR Code/LUT/Product Deliveries:

  DAP to DPMS:
  - Jan-23: CrIS J2 Eng Pkg update delivery
    - Moved to February 19 after the CrIS door opening.

  NOAA-20/JPSS-2 Algorithm DAP to NCCF: (only two remaining for J2-Ready)
  - Mar-23: J2-ready OMPS LP DAP to NCCF (ASSISTT □ NCCF)
  - Mar-23: J2-ready Ocean Color DAP to NCCF (ASSISTT □ NCCF)

FY23 STAR JPSS Milestones

Milestones	Original Date (column I)	Forecast Date	Actual Completion Date	Variance Explanation
Algorithm Updates DAPs/CCAPs				
ATMS J2 PCT updates (as needed)	Jan-23	Jan-23	Delivered	
CrIS J2 Eng Pkg update delivery	Jan-23	Jan-23	Moved to February (planned for 02/19)	
VIIRS J2 LUTs update delivery	Jan-23	Jan-23	Delivered	
OMPS J2 LUTs update delivery	Jan-23	Jan-23	Delivered	
OMPS LP J2 ready DAP (to NCCF)	Mar-23	Mar-23		
Ocean Color J2 ready DAP (to NCCF)	Mar-23	Mar-23		
CCAP to NCCF (Aerosol AOD & ADP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (CM, Phase, Height, CBH, CCL, COMP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (VPW, Cryosphere, Volcanic Ash)	Nov-22	Nov-22	11/15/2022, 11/18/2022, **VPW: 01/06/2023**	
CCAP to NCCF (LST, LSA)	Nov-22	Nov-22	Delayed to 12/15/2022 **Delayed: 01/20/2023**	
CCAP to NCCF (VI, GVF)	Nov-22	Nov-22	11/15/2022, **1/11/2023**	
CCAP to NCCF (MiRS, OMPS NP V8Pro)	Jan-23	Jan-23	MiRS:12/31(separate delivery) **MiRS: v11.9 Final CCAP Delivered:1/26/2023** **Delivered: OMPS 12/23**	
CCAP to NCCF (HEAP, N4RT)	Mar-23	Mar-23	**Code delivered for SCR 2/6**	
CCAP to NCCF (ACSPO SST)	Apr-23	Apr-23		
Enterprise Fires	Apr-23	Apr-23		
CCAP to NCCF (VH, VOLCAT Phase 1, OMPS V8TOz)	May-23	May-23		
CCAP to NCCF (Gridded Land)	Jul-23	Jul-23		
CCAP to NCCF (Cloud Provisional)	Jul-23	Jul-23		

FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
Algorithm Cal/Val/LTM				
JPSS-2 First Light Images (Nov-22: ATMS; Dec-22: CrIS, VIIRS, OMPS)	Dec-22	Dec-22	11/22/2022 ATMS	
FY22 End of Year Science Team Presentations (all teams)	Nov-22	Nov-22	Not Needed	
FY24 Program Management Review (all teams)	Jun-23	Jun-23		
AST-2022 (VIIRS Annual Surface Type)	Sep-23	Sep-23		
Transfer reprocessed S-NPP SDR data to CLASS (finish by Oct-2023); Start EDR reprocessing for some products	Sep-23	Sep-23		
JPSS-3 pre-launch test data review/analyze (SDR teams); JPSS-3/JPSS-4 activities/reviews support	Sep-23	Sep-23		
Maintain / Update ICVS (develop ICVS JPSS-2 modules to support varies activities: monitoring, inter-sensor comparison, …)	Sep-23	Sep-23		
Maintain / Expand (to include JPSS-2 products) JSTAR Mappers	Sep-23	Sep-23		
Images of the Month	Monthly	Monthly		

FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
NOAA-21 Cal/Val Maturity Reviews				
ATMS TDR/SDR (B/P: Dec-2022; V: May-2023)	May-23	May-23	Provisional Achieved 12/15	
CrIS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	Aug-23	Aug-23	Beta Moved to Feb 23 OR March 2; P: 1st week of April	K-band Transmitter swap
VIIRS SDR (B: Dec-22; P: Feb-23; V: May-23)	May-23	May-23	Beta Moved to Feb 23 OR March 2; P: 1st week of April	K-band Transmitter swap
OMPS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	Aug-23	Aug-23	Beta Moved to March 2; P: Second week of April	K-band Transmitter swap
KPP VIIRS Imagery (B: Jan-23; P: Feb-23; V: May-23)	May-23	May-23	Beta Moved to Feb 23 OR March 2; P: 1st week of April	K-band Transmitter swap
Non-KPP VIIRS Imagery (B: Feb-23; P: Mar-23; V: Jul-23)	Jul-23	Jul-23	Beta Moved to 1st week of April P: 2nd week of May	K-band Transmitter swap
Clouds (B: CM: Apr-23; Others: Jul-23; P: Aug-23)	Aug-23	Aug-23		K-band Transmitter swap
Aerosol AOD (B: Apr-23; P: Sep-23)	Sep-23	Sep-23		K-band Transmitter swap
Aerosol ADP (B: Mar-23; P: Aug-23)	Aug-23	Aug-23		K-band Transmitter swap
Volcanic Ash (B: Jul-23; P: Aug-23)	Aug-23	Aug-23		K-band Transmitter swap
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow)	Aug-23	Aug-23		K-band Transmitter swap
Active Fires (B: May-23; P: Aug-23)	Aug-23	Aug-23		K-band Transmitter swap
LST/LSA/SR/GVF/VI (B: May-23)	May-23	May-23		K-band Transmitter swap
Vegetation Health (B: Jul-23)	Jul-23	Jul-23		K-band Transmitter swap
Ocean Color (B: Sep-23)	Sep-23	Sep-23		K-band Transmitter swap
SST (B: Mar-23; P: Jun-23)	Jun-23	Jun-23		K-band Transmitter swap
VPW (B: Sep-23)	Sep-23	Sep-23		K-band Transmitter swap
VFM (B: May-23)	May-23	May-23		K-band Transmitter swap
NUCAPS (B: May-23)	May-23	May-23		K-band Transmitter swap
MiRS (B: Mar-23; P: Aug-23)	Aug-23	Aug-23		K-band Transmitter swap
SFR (B: May-23)	May-23	May-23		K-band Transmitter swap
OMPS NP EDR V8Pro & V8TOz (B: Feb-23; P: Mar-23)	Mar-23	Mar-23		K-band Transmitter swap
OMPS LP (B: Mar-23)	Mar-23	Mar-23		K-band Transmitter swap

Requires approximately a delay of 2 months to reach Beta and Provisional maturity. Since the validated maturity has a longer span, there is a possibility that the science teams may be able meet the validated maturity dates without any delays.

TBC with the EDR teams

NOAA-21 VIIRS, CrIS, and OMPS Beta and Provisional Maturity (Subject to Change)

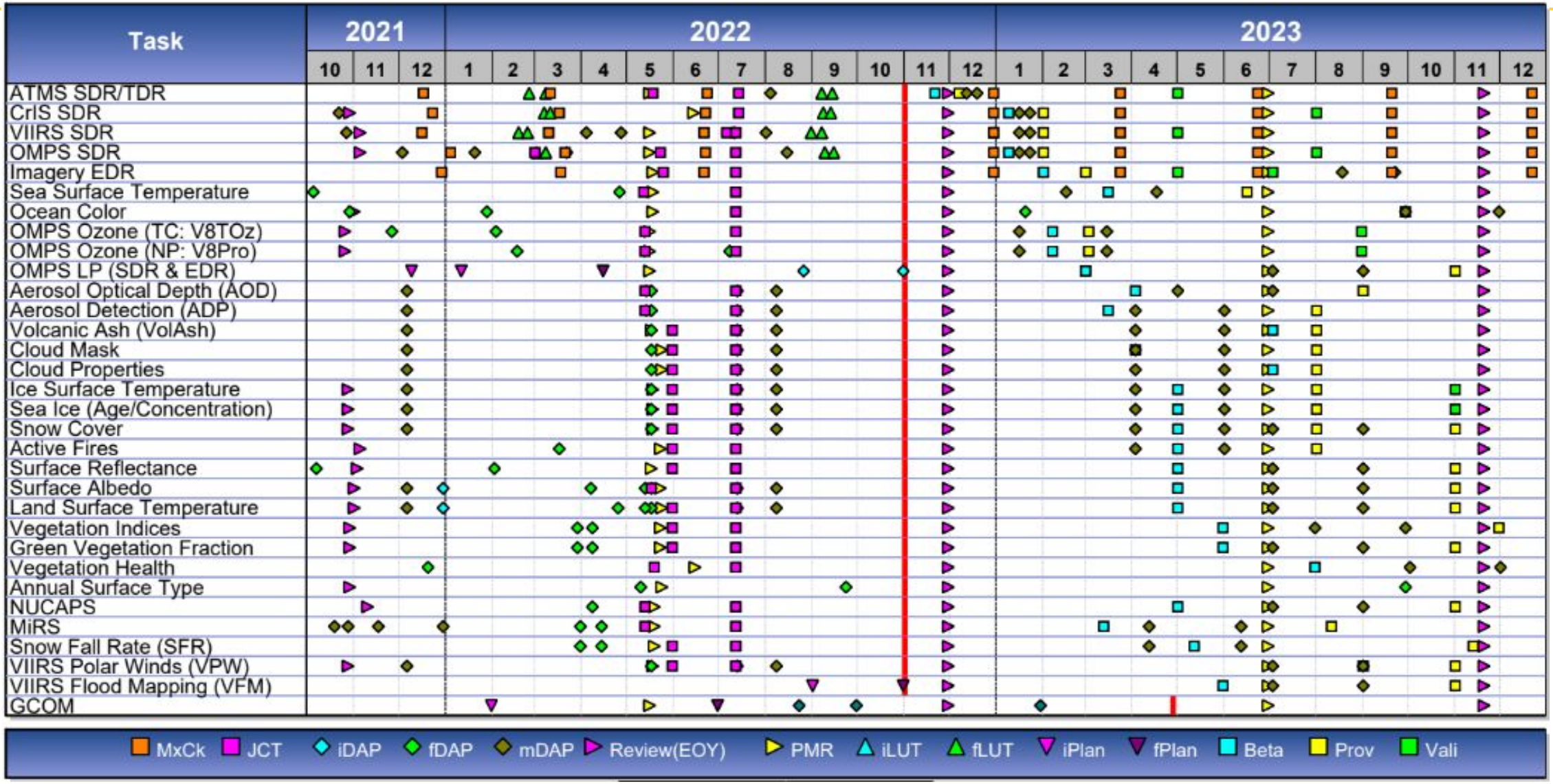
Instrument	First Light	First Light	Beta Date	Beta Review	Provisional Date	Provisional Review	Validated Date	Validated Review
ATMS			11/30/2022		12/16/2022	12/16/2022	06/14/2023	06/14/2023
CrIS	Doors Open	02/08/2023	2/24/2023	**02/23/2023** OR 3/2/2023	03/23/2023	3/30/2023 OR **4/6/2023**	09/20/2023	09/14/2023
VIIRS	Cryo Open All Bands Commissioned	02/08/2023	3/2/2023	02/23/2023 OR 3/2/2023	04/15/2023	3/30/2023 OR **4/6/2023**	07/13/2023	07/13/2023
VIIRS EDR Imagery (KPP)			3/2/2023	02/23/2023 OR 3/2/2023	04/15/2023	3/30/2023 OR **4/6/2023**	07/13/2023	07/13/2023
Non-KPP Imagery EDRs			04/10/2023	04/06/2023	05/15/2023	5/18/2023	09/10/2023	09/14/2023
OMPS	Doors Open	**02/09/2023**	03/01/2023	3/2/2023*	03/25/2023*	**4/6/2023***	09/10/2023	09/14/2023

*OMPS Team: Beta **03/02**, **P:04/14** or **04/20**
CrIS Team: Beta: Science team will shoot for **02/23.** If not Beta Review would be on **03/02**
VIIRS Team: Beta Will shoot for **02/23**. If not Beta Review would be on **03/02**

FY23 STAR JPSS Milestones

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

STAR JPSS Schedule: TTA Milestones



- Chart not updated for status as of end November 2022 ~ onboarding Quality Assurance (QA) Analyst.

Color code:

Green: Completed Milestones

Gray: Ongoing FY23 Milestones

Active Fires

January 2023

Accomplishments / Events:

- Continued validation and cross-check against MASTER and VOLCAT detections to evaluate impact of atmospheric correction and detection sensitivity
- Gave oral presentation “An evaluation of the impact of improved fire detection and characterization from VIIRS on emission estimates in the Western Conterminous United States”, which included analysis of the baseline VIIRS products
- Participated in the Software Code Review for the Preliminary CCAP for the Enterprise Fire package that includes VIIIRS
- Worked with NCEP EMC and OAR on the transition of the operational HRRR-smoke model to using the VIIRS I-band product as input

Overall Status:

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

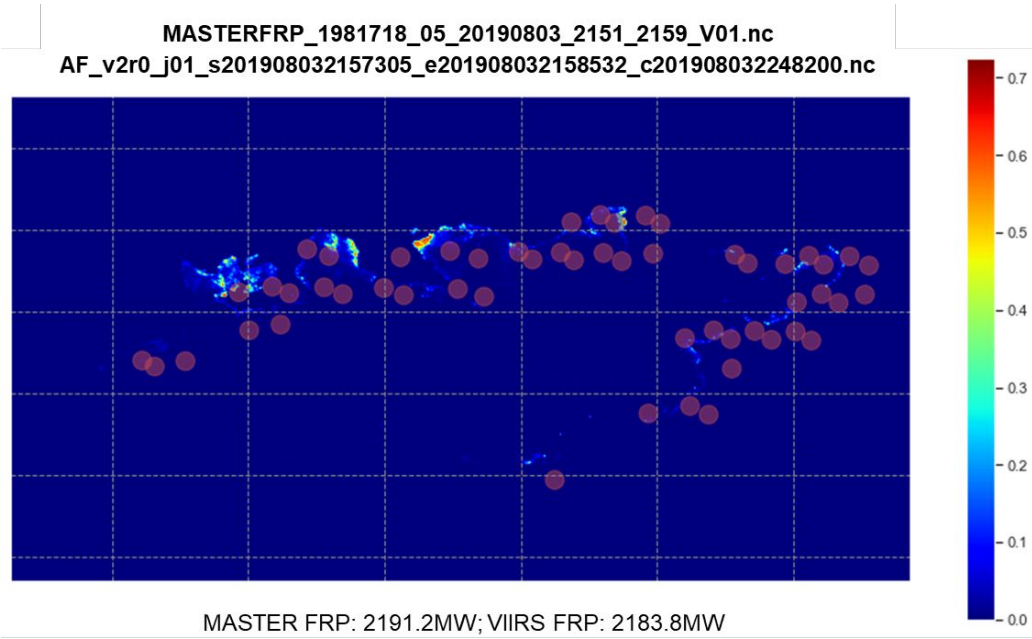
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight: VIIRS I-band active fire vs. MASTER

Suomi NPP VIIRS I-band Active Fire detections over a MASTER image of the Williams Flat fire collected during the 2019 FIREX-AQ campaign



Aerosol

December 2022

Accomplishments / Events:

- Completed revisions to the manuscript on “Markers of Economic Activity in Satellite AOD Data” submitted to Earth’s Future. Revisions included additional data analysis of VIIRS AOD product.
- Team member Amy Huff contributed to Zhou et al. paper “Observed Atmospheric Features for the 2022 Hunga Tonga Volcanic Eruption from Joint Polar Satellite System Science Data Products” published in the journal *Remote Sensing.*
- Developed a method to combine VIIRS AOD and ADP products to generate “smoke PM2.5” product to study nonattainment regions in the US due to smoke from fires.

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

Overall Status:

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

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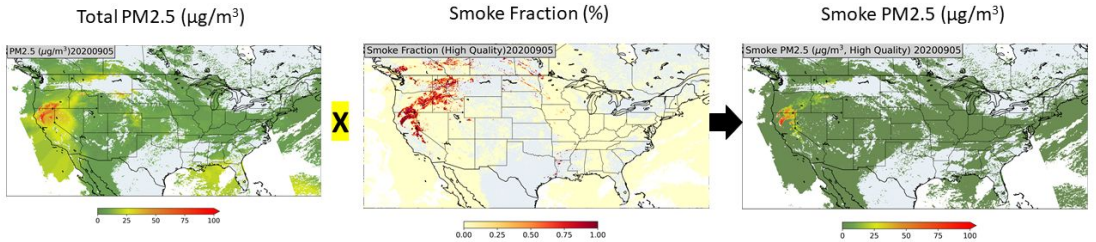
Issues/Risks:

No risks

Highlight:

PM2.5 Attributable to Smoke



- Goal is to identify the contribution of smoke from fires to PM2.5 nonattainment
- Run GWR algorithm on pixel level reprocessed VIIRS AOD to obtain PM2.5 estimates
  - Remap PM2.5 estimates to 0.05° x 0.05° lat-lon grid
- Use pixel level reprocessed VIIRS ADP to obtain smoke fraction
  - Smoke fraction is calculated using the ratio of number of *smoke pixels* to total number of *“smoke+dust+undetermined+cloud”* pixels in a 0.05° x 0.05° grid
- Determine “smoke PM2.5” by multiplying total PM2.5 with VIIRS smoke fraction

ATMS SDR

January 2023

Accomplishments / Events:

- Kept analyzing the NOAA-21 ATMS roll maneuver data sets and derived the on-orbit cold calibration correction coefficients for PCT update. Meanwhile, the study of roll maneuver data also supports a advanced dynamic cold calibration correction algorithm proposal. Further study is ongoing. A experimental prototype correction algorithm will be developed and tested to verify if there is a improvement in calibration accuracy.
- Studied the NOAA-21 ATMS HRD direct readout data from UW/SSEC and NASA/DRL sites. Comparison with operational SMD indicates that direct readout science RDR data can also be used to generate single granule science data using latest ADL successfully. The combination of SSEC and DRL HRD data can cover most of CONUS area and can be used as complementary data sets when Ka-band transmitter diagnostic activity is ongoing.
- Submitted IDPS ATMS code update to fix the ATMS health status telemetry conversion coefficients error.
- Kept working closely with MIT/LL, NASA, and NGAZ ATMS teams to propose additional NOAA-21 Post-Launch Test (PLT) items to better characterize the ATMS on-orbit performance.

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

Overall Status:

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

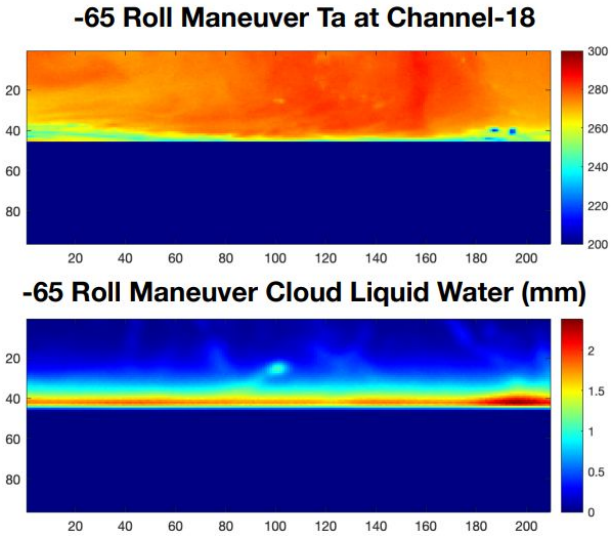
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

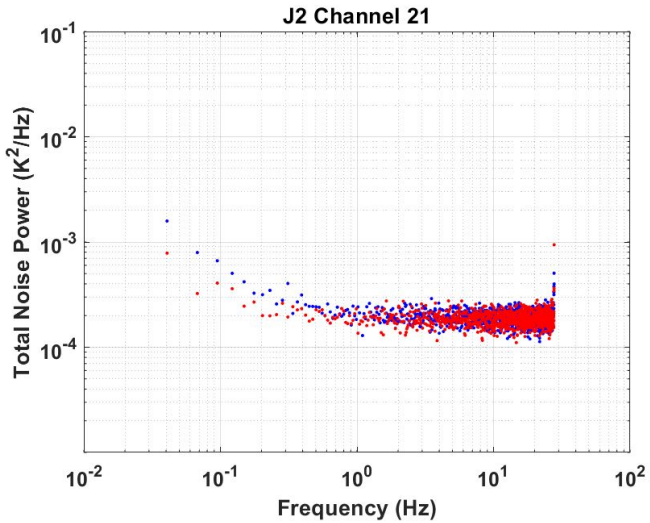
None

Highlights:

N21 ATMS roll maneuver data on 12/11/2022 for cold bias correction coefficients generation



NOAA-21 ATMS Channel 21 total noise power distribution from TVAC (blue) and on-orbit noise characterization PLT (red) data indicating an stability improvement in on-orbit data (MIT/LL)



Clouds

December, 2022

Accomplishments / Events:

- A paper titled “A Framework for Satellite-based 3D Cloud Data: An Overview of the VIIRS Cloud Base Height Retrieval and User Engagement for Aviation” has been published in *Remote Sensing* - Special Issue on “VIIRS 2011–2021: Ten Years of Success in Earth Observations” which was co-authored with CIRA researchers and NOAA collaborators (Noh et al. 2022).
- A summary of cloud cross-section product development and user engagement was provided in the 2022 NESDIS Science Report (‘Clouds’ section), and the product was introduced in the AOPA (Aircraft Owners & Pilots Assoc.) 2022 Weather Survey for pilots’ feedback. CIRA’s aviation website has been also updated for users’ evaluation.
- The Cloud team continues to prepare for evaluations from NOAA-21 for beta and provisional reviews. Dates are TBD due to N21 Ka transmitter issue.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop VIIRS/CALIOP validation tools for JPSS-2	Dec-22	TBD		Code completed but requires N21 data to test
Integrate latest Enterprise Cloud Mask (ECM) version within NDE	Dec-22	Dec-22		Cloud algorithms delivered to ASSISTT. NDE is integrating code
Prepare Cloud Base Height (CBH)/Cloud Cover Layers (CCL) algorithm transition and operation for JPSS-2	Jan-23	Jan-23		
Integrate new ECM lookup table to allow easier threshold changes	Mar-23	Mar-23		
JPSS-2 Beta Review (ECM)	Apr-23	TBD		TBD due to Ka transmitter issue
Validate CCL that was recently delivered, especially convective/supercooled layers as part of CCL Beta review	Jul-23	TBD		TBD due to Ka transmitter issue
NOAA-21 Cloud Products Beta Maturity	Jul-23	TBD		TBD due to Ka transmitter issue
NOAA-21 Cloud Products Provisional Maturity	Aug-23	TBD		TBD due to Ka transmitter issue

Overall Status:

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

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

Issues/Risks:

None

Highlights:

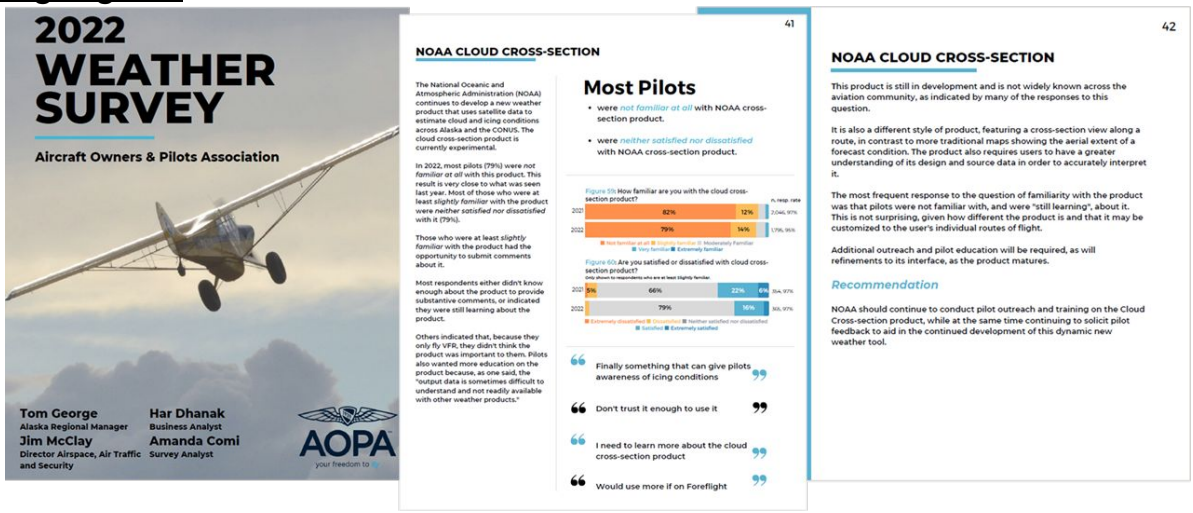


Figure 1. The Cloud Vertical Cross-section product has been introduced in the Aircraft Owners & Pilots Association (AOPA) 2022 Weather Survey for pilots’ feedback. Most pilots are “still learning", but most of those who were at least slightly familiar with the product found usefulness and wanted more outreach and training. We continue to improve the product and the website tool based on user feedback from aviation users and forecasters (e.g., NWS Cleveland, OH).

CrIS SDR

January 2023

Accomplishments / Events:

- Continue to record and monitor the timeline of the JPSS-2 CrIS commissioning and Cal/Val plan (**Fig.1**) as well as the related events associated with the satellite, e.g., the update to the activation of J2 CrIS and the OMPS maneuvers.
- Investigated the J2 CrIS HRD data from both the UW SSEC DB station (**Fig.2**) as well as Svalbard.
- Finalizing the preparations for the J2 CrIS maturity review template and readme file.
- Support to the operational algorithm update: delivered the data/code package to enhance the CrIS Neon Quality Control (QC) algorithm for all CrIS instruments including both the on-orbit and the future ones. In particular, this delivery is a critical preventive patch for the NOAA-21 CrIS to mitigate the impact of invalid Neon lamp reading if the Neon lamp failed to start on time. This delivery is associated with ADR 10151 and CCR 6287.
- Making progress on the preparation of several journal articles, including one on JPSS-2 CrIS, one on the JPSS-2 Neon Mitigation plan, and one on the JPSS CrIS Spike Anomaly Algorithm.
- Development of the CrIS instruments analysis tools: Noise Change Time Series for S-NPP and NOAA-20 (**Fig.3**); Responsivity Change for NOAA-20 (**Fig. 4**)
- Monitoring of CrIS instruments: NOAA-20 CrIS MWIR FOV4 and 7 having higher noise level compared with the end of 2022 (**Fig.5**); NOAA-20 CrIS showed many invalid observation on 1/24/2023;
- Developing an Intercomparison between the JPSS CrIS SDR data and the COSMIC-2 wetPrf data: analyzed one day O-B$^{COSMIC-2}$ for stratospheric channels (**Fig.6**) and set up the cron job to generate the daily O-B$^{COSMIC-2}$ for stratospheric channels.
- Investigated the dependence of the STAR CrIS & ABI Intercomparison results on the collocation criteria (time difference and distance) (**Fig. 7**)
- Continued to refine the new STAR CrIS SDR Cal/Val website.
- Gave four oral presentations at the 2023 AMS Annual Meeting.
- UMBC team investigated the Effect of Proposed Spacecraft Tilt on CrIS Radiances (**Fig.8**)

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

Overall Status:

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

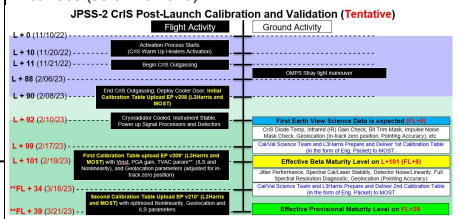
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

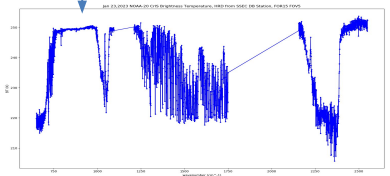
- The CrIS Team got a 100TB storage on STAR servers (data638 and data645) in May 2022. However, the CrIS Team is still in need of hardware/software resources. Presently, there is only one server dedicated to 6 CrIS Team members. We have received access to new servers, but these are shared with other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

Highlights:

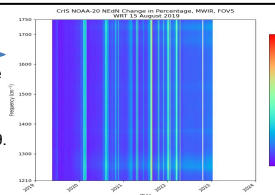
(1) The latest Timeline of JPSS-2 CrIS commissioning and Cal/Val Activities (as of 2/6/2023)



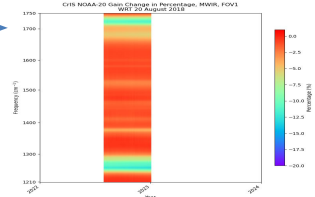
(2) Sample HRD SDR BT spectrum from SDR packet (single scan, FOR 15 FOV 5 of NOAA-20 from Jan 23,2023)



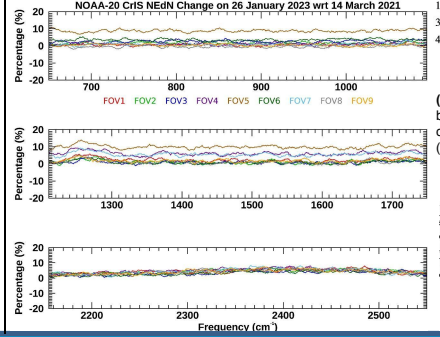
(3) NOAA-20 CrIS noise (NEdN) change in percentage with respect to 15 August 2019.



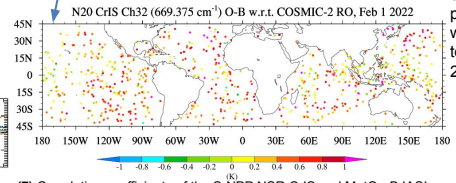
(4) NOAA-20 CrIS responsivity (or gain) change in percentage with respect to 20 August 2018.



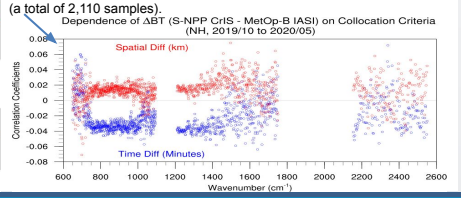
(5) NOAA-20 CrIS NEdN daily noise change in percentage on 1/26/2023 with respect to 3/14/2021. The MWIR FOV4 and FOV7 are now have higher noise level compared with the end of 2022.



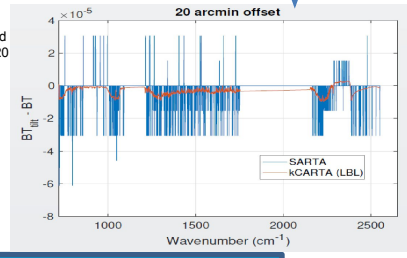
(6) Spatial distribution of O-BCOSMIC-2 for N20 CrIS Stratospheric temperature channel (669.375 cm-1) for February 1, 2022.



(7) Correlation coefficients of the S-NPP NSR CrIS and MetOp-B IASI brightness temperature difference against the collocation distance (red) and collocation time difference (blue) for the NH from October 2019 to May 2020 (a total of 2,110 samples).



(8) Comparison of the impact of 20 arcmin offset on radiances with respect to two radiative transfer algorithms, SARTA and kCARTA



Cryosphere

December, 2022

Accomplishments / Events:

Snow extent anomaly in Europe as seen in blended VIIRS and SSMIS snow products. We continue generating blended snow cover products based on combined snow retrievals from VIIRS and SSMIS data. Synergy of optical and microwave data allows for generating spatially continuous, gap-free maps of the snow cover distribution on a daily basis. The blending algorithm applied to VIIRS and SSMIS data is similar to the algorithm implemented in the GMASI system where Metop AVHRR data are used instead of VIIRS. The blended VIIRS and SSMIS snow product is generated offline. An example of the global daily blended ap is shown in Figure 1 (left). Figure 1 shows the results of comparison of daily blended VIIRS and SSMIS snow maps with snow cover charts produced within the IMS system over the last seven years. As seen from the plot, the daily rate of agreement of the two products on the spatial distribution of snow cover in the Northern Hemisphere generally range within 85 to 95% and averages at about 90%. Larger discrepancies between the products occurred during the winter season of 2019-2020 due to poor performance of the cloud mask implemented in the VIIRS operational retrieval system.

Overall Status:

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

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

Issues/Risks:

None

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

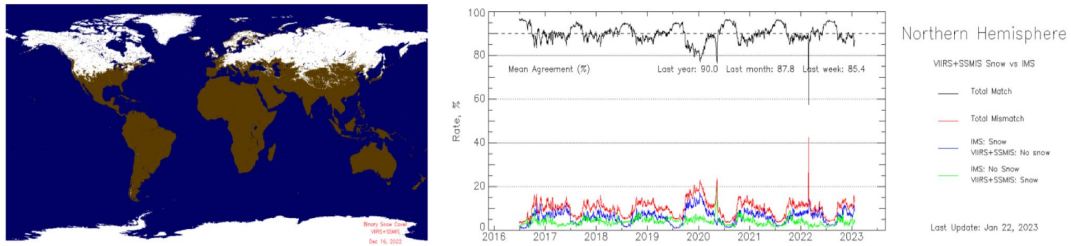


Figure 1. Left: example of a daily blended snow cover maps produced by combining snow retrievals from VIIRS and DMSP SSMIS sensors. Right: Daily statistics of agreement on the snow cover distribution between daily blended VIIRS+SSMI snow maps and snow cover charts produced interactively within the IMS system.

JSTAR Mapper and NPROVS

January, 2023

Accomplishments / Events:

- JSTAR Mapper staff FTE % were re-allocated to a Bipartisan Infrastructure Law (BIL) project aimed at improving fire web services for fire and coordination with the planned NESDIS-level fire storefront for the STAR Environmental Mapping System (STEMS) for NOAA-21
- NPROVS team briefings at NUCAPS All-Hands and JPSS User Initiatives meetings included NUCAPS case studies for the recent Buffalo Lake Effect and Ohio (Jan 19) severe storm outbreaks.
- Work continues to reprocess the NPROVS Special datasets from the GCOS Reference Upper Air Network (GRUAN) data products (GDP) for Vaisala RS41 and Mesei IMS-100 radiosondes.
- NPROVS team received radiosonde data from recently completed AEROSE campaign, including descending radiosonde data observations and are working to ingest and collocate with NUCAPS and other NOAA and international sounding product suites **(Highlight)**

Overall Status:

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

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

Issues/Risks: None

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

Highlights

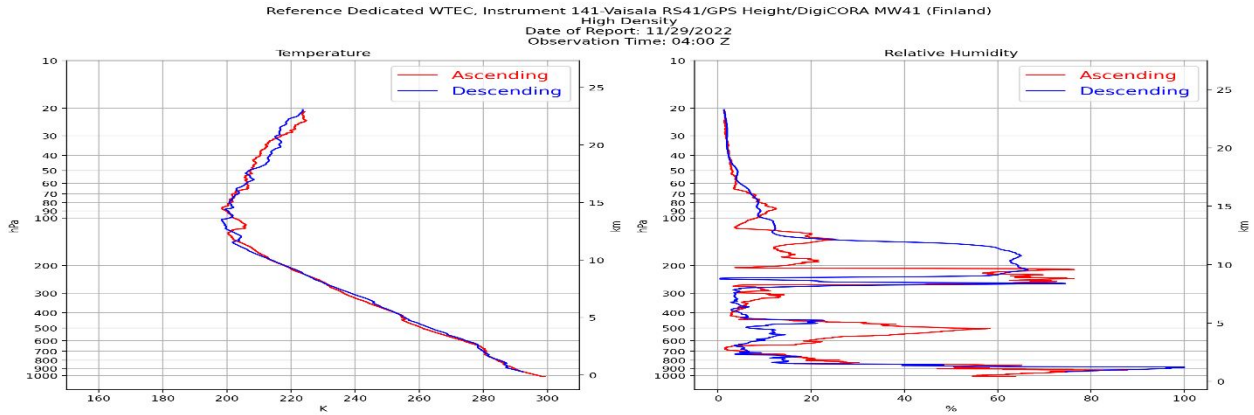


Figure 1: The above panels show Temperature (left) and Relative Humidity (right) profiles for **ascending (red)** and corresponding **descending (blue)** radiosonde profiles on 11/29/22 during the recent Aerosols and Oceanographic Science Expeditions (AEROSE) campaign from November 4 to December 6, 2022. The JPSS dedicated radiosonde program provided Vaisala RS41 radiosondes for synchronized launch with NOAA-20 and MetOp-C polar satellite overpasses, up to 4 launches per day. The inclusion of descending radiosonde data is an added feature for this campaign and required modifications of both on-board (NOAA science vessel RHB) and NPROVS procedures. Combined ascending/descending radiosonde data are will add value to NUCAPS assessments particularly in the context of spatial / temporal sensitivity studies.

GCOM-W

Accomplishments / Events:

A validation study of NOAA-20 VIIRS and AMSR2 Sea Ice Concentration (SIC) over the Drift Ice Zone (DIZ) and Marginal Ice Zone (MIZ) in the Arctic using six-month (April-September 2022) Landsat imagery has been completed. The results show the VIIRS SIC product has better performance than AMSR2 in the DIZ and MIZ areas. The Landsat SIC has spatial resolution of 100 m, while the VIIRS and AMSR2 SICs have spatial resolution of 0.75 km and 10 km respectively. So that the aggregated Landsat SIC at 1 km is a good reference data set to validate the VIIRS and AMSR2 SICs. NOAA-20 Enterprise VIIRS, NASA Team-2 AMSR2 and Landsat SICs were remapped to the same 1-km EASE2 grid. Only scenes with solar zenith angles of less than 80° are used in the validation study. Furthermore, in this study, generally low SIC within 50 km from the ice/water interface is referred to as sea ice edge or MIZ, while dispersed high SIC with intermittent low SIC (<50%) at least 50 km away from ice/water interface is referred to as DIZ.

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

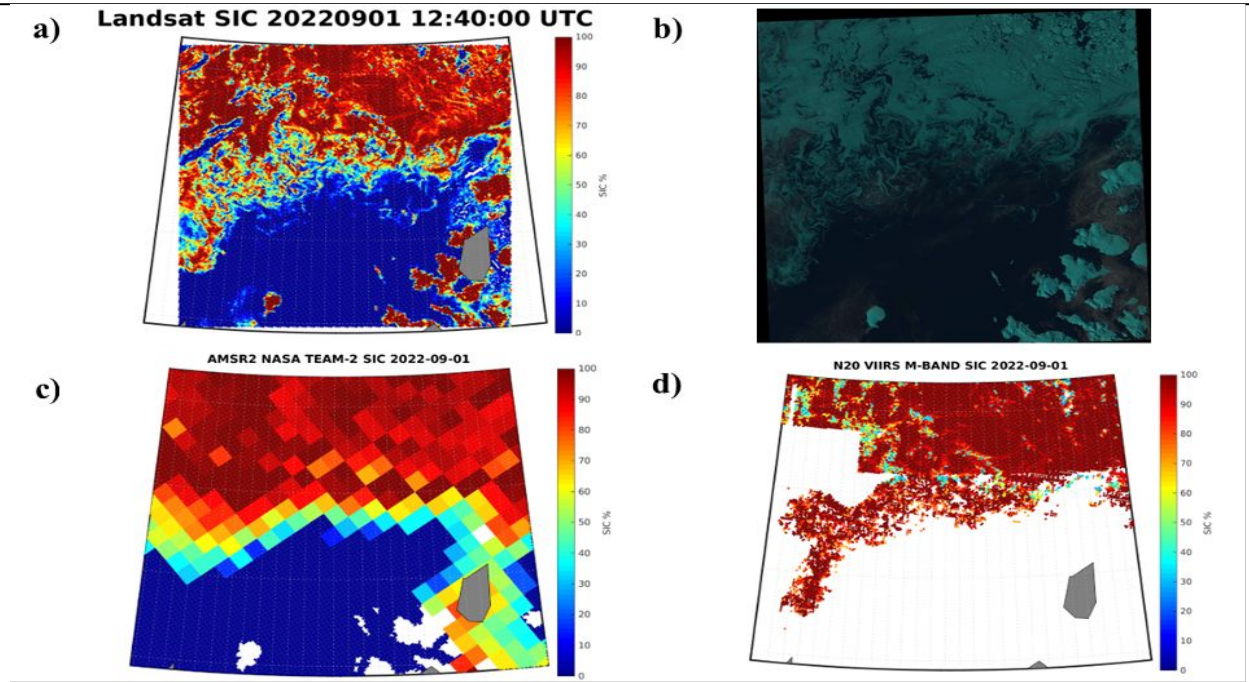
Overall Status:

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

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

Issues/Risks:

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



ICVS

January 2023

Accomplishments / Events:

- Provided NOAA-21 ATMS/VIIRS/OMPS/CrIS instrument status and science data quality monitoring support for SDR team post-launch (PLT) calibration/validation activities.
- Submitted N20 CrIS FOV7 noise anomaly, SSM position count error, and NPP CrIS scan level anomaly report to support CrIS SDR team cal/val activities.
- Provided a S-NPP ATMS compensate motor current anomaly report to support NASA flight team ATMS scan drive working group study to extend S-NPP ATMS lifetime.
- Worked with VIIRS SDR team to improve current VIIRS geolocation quality flag and missing data/scan monitoring with high resolution polar view maps due to the unique feature of VIIRS reflective solar band.
- Transitioned the OMPS geolocation accuracy monitoring package to pre-operational mode and post monitoring figures in ICVS-beta web site for stability testing.
- Supported the publication of a peer reviewed manuscript titled “Hunga Tonga Volcano Eruption Observed by JPSS”, as part of the coauthors.
- Kept updating S-NPP/NOAA-210 OMPS-NM and VIIRS inter-sensor comparison products.
- Kept revising the manuscript about ATMS AI manuscript per reviewers’ comments.
- Kept developing the GOES-18 vs. CrIS SNO inter-sensor comparison package for CrIS DQ monitoring.

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:

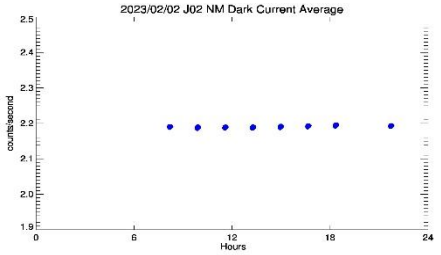
None

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

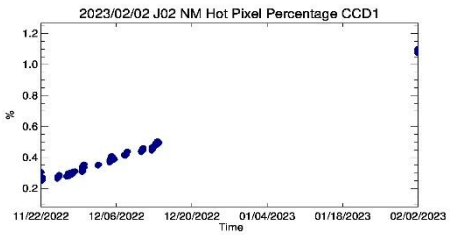
Highlights:

Significantly contribute to STAR SDR Teams

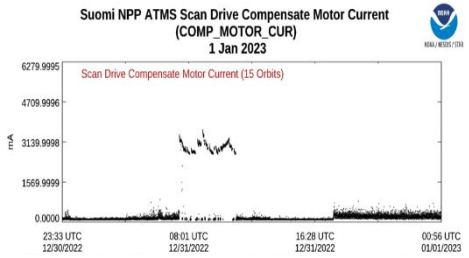
(a) Monitoring J2 OMPS NM dark current daily performance



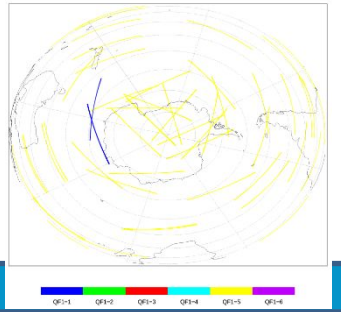
(b) Monitoring J2 OMPS NM CCD hot pixel trend



(c) NPP ATMS Scan Drive Compensate Motor Currant Anomaly Happened on December 31, 2022



(d) NOAA-20 VIIRS Polar View Geolocation QF Over Antarctic



VIIRS Imagery

January 2023

Accomplishments / Events:

- Continued collection and analysis of NOAA-21 VIIRS Imagery
  - VNIR bands only with cryo doors still closed; No issues to note with Imagery
- McIDAS-V updated to include additional VIIRS EDR RGBs and to fix several bugs related to the display of VIIRS imagery.
- CIRA hired a programmer to support the VIIRS Imagery project, including to understand the ADL code that is used to process VIIRS Imagery in IDPS, among other tasks
- J. Torres (CIRA) led a VIIRS NCC teletraining session for the Aviation Weather Center
- Recent VIIRS Imagery Presentations
  - Bill Line, AMS Annual, “Operational Applications of VIIRS Imagery Products”
  - Bill Line, Virtual Alaska Weather Symposium, “Applications of NOAA Satellite Imagery at High Latitudes”
- Recent VIIRS Imagery Social Media Posts
  - VIIRS RGB Imagery differentiating snow and clouds
  - VIIRS RGB Imagery capturing iceberg breaking off Brunt Ice Shelf
  - VIIRS RGB Imagery helps to differentiate snow cover

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
Deliver NOAA-21 VIIRS “First Light” EDR Imagery	Dec-22	Dec-22	Dec-22	
Participate in N-21 VIIRS EDR Imagery Maturity Reviews (B:Feb-23, P:Mar-23, V:Jun-23)			Review scheduled modified due to KATX-1 failure	
FY23 Program Management Review	Jun-23	Jun-23		
NCC LUT Development Capability	Sep-23	Sep-23		
New Imagery products or product enhancements (display on SLIDER)	Sep-23	Sep-23	continuing	
Realtime Imagery monitoring and display systems (SLIDER, etc.)	Sep-23	Sep-23	continuing	
Interesting VIIRS Imagery to Social Media and Blogs	Sep-23	Sep-23	continuing	
McIDAS-X/V Enhancements for processing/display of VIIRS Imagery	Sep-23	Sep-23	continuing	
Block 2.3 Mx builds deploy regression review/checkout (Mx8:Apr-23, …)				

Highlights: Image of the Month

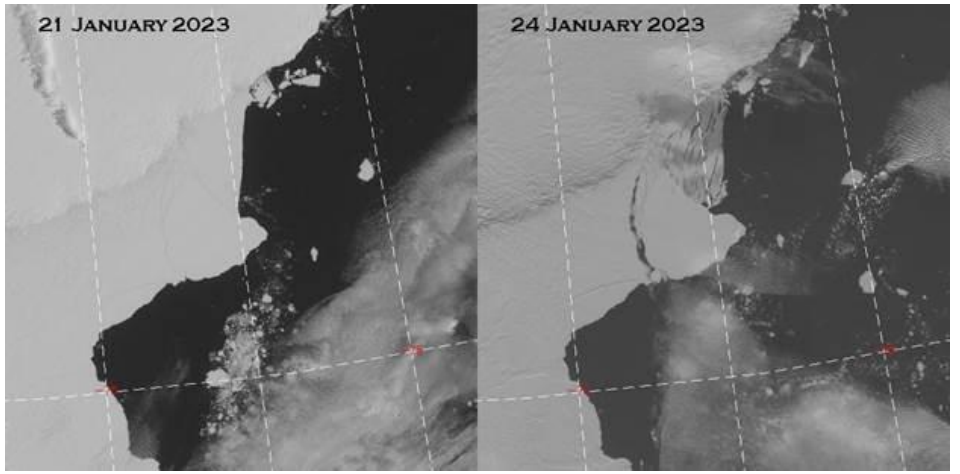


Figure: VIIRS Band I-01 images before (left) and after (right) the January 2023 Brunt Ice Shelf calving event. Near-realtime global VIIRS imagery is available on Polar SLIDER at the following URL: https://rammb-slider.cira.colostate.edu/?sat=jpss

Leaf Area Index

January 2023

Accomplishments / Events:

- Optimized the gridding tool and experimental level 3 global gridded SR, try to accelerate the processing.
- Investigated the historical data in AWS, explore the method to replace current training data with the reprocessed NOAA surface reflectance data.
- Prepared the LAI code in both python and C version for the upcoming code delivery.
- Evaluate the current algorithm/training data, try to improve the LAI performance for the dense vegetation area.

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			

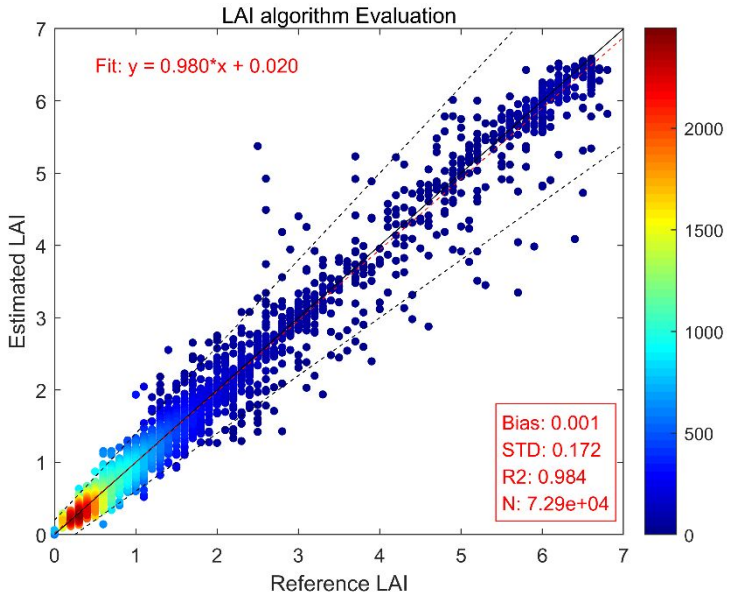
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:

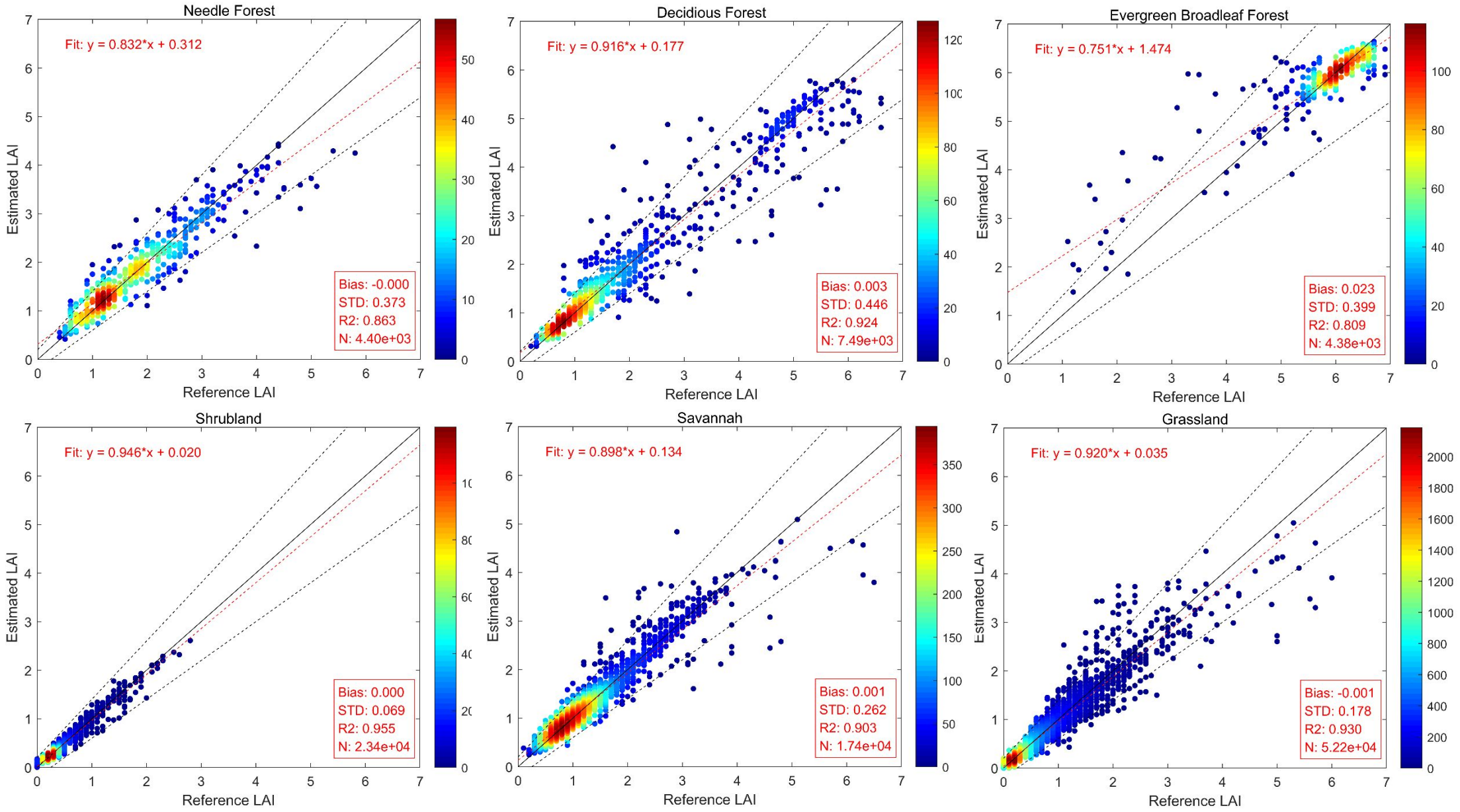


LAI algorithm Evaluation

Algorithm test using trained random forest regression model, the results indicate the model with good performance, with most data within the requirements (20%)

LAI Algorithm Test For Each Biome Type

January 2023



Land Surface Temperature

January, 2023

Accomplishments / Events:

- Updated the code for mean LST calculation to improve flexibility. Investigated the winter heatwave occurrence around new years days through the comparison with the same period last year. Regional winter heatwaves are observed over Northeast Europe, North America, and the Tibetan area. (slide 2 & 3)
- Completed the JSTAR proposal for the JPSS LST project
- Finalized and submitted the abstract titled “Global Daily VIIRS LST Product Quality Evaluation and Applications” to IGARSS 2023.
- Updated the python code for the L3 VIIRS LST plot. Fixed some issues in the software package. Fulfilled the request on the LST image using recent data.
- Fulfilled the VIIRS LST data request from Evapotranspiration (ET) product team. Provided help on data access, download, and related questions.(slide 4)
- Explored AWS data inventory and installed Command Line Interface (CLI) for AWS data access. Started to work on the radiance-based LST validation using GDAS data in AWS. (slide 5 shows the overall flowchart)

Overall Status:

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Technical / Programmatic		x			
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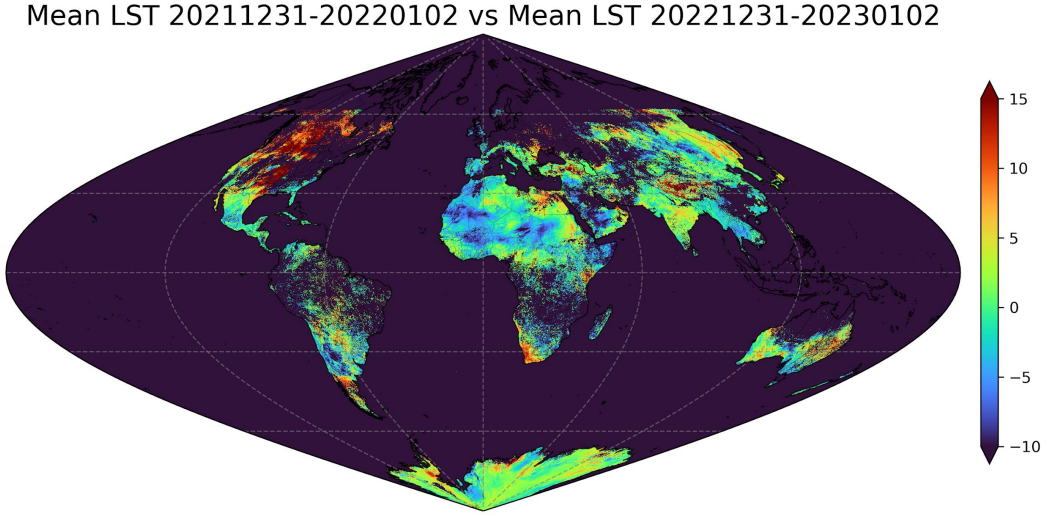
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Annual products performance report for L2 and L3 VIIRS LST	Dec-22	Dec-22	Dec-22	
Beta review of the NOAA-21 LST	Mar-23	Mar-23		
All weather LST update	May-23	May-23		
FY24 Program Management Review	Jun-23	Jun-23		
Routine monitoring tool and its update	Jul-23	Jul-23		
DAP for NOAA-21 if needed	Aug-23	Aug-23		
Provisional review of the NOAA-21 LST	Sep-23	Sep-23		

Highlights:



Recent heatwave occurrence monitoring. Major winter heatwaves are observed in North America, the Tibetan area, and Northeast Europe. More details are provided in Slide 2.

Land Surface Temperature

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Overall Status:

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Technical / Programmatic		X			
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Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
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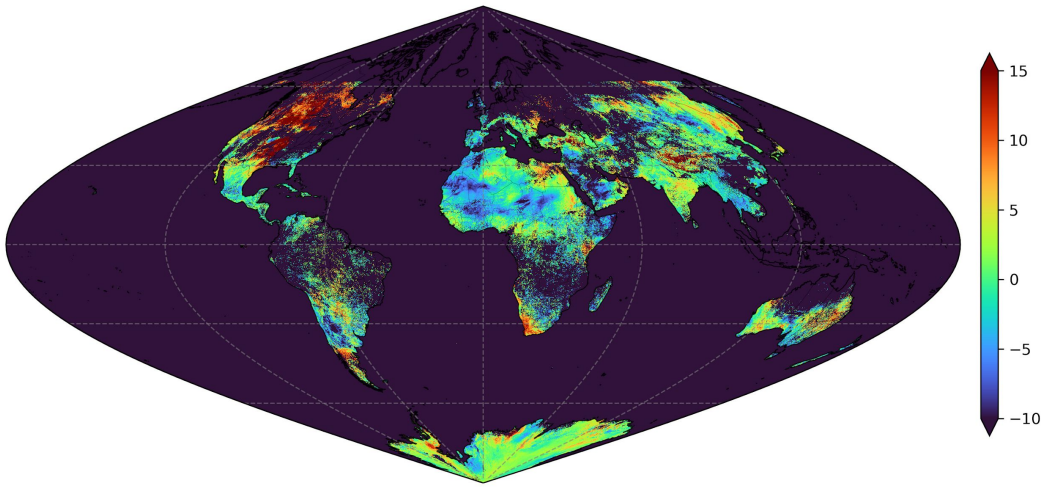
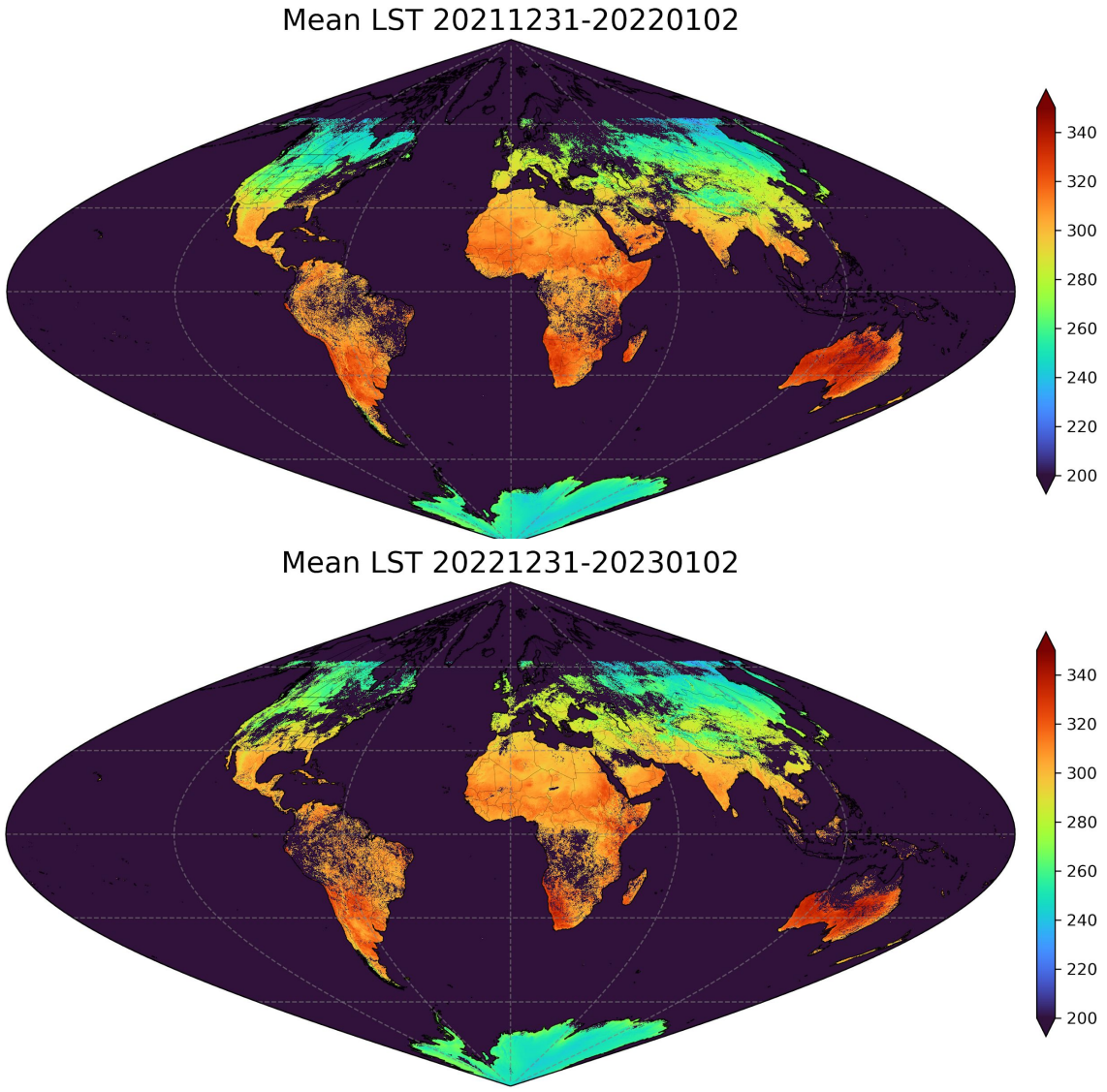
All weather LST update	May-23	May-23		
FY24 Program Management Review	Jun-23	Jun-23		
Routine monitoring tool and its update	Jul-23	Jul-23		
DAP for NOAA-21 if needed	Aug-23	Aug-23		
Provisional review of the NOAA-21 LST	Sep-23	Sep-23		

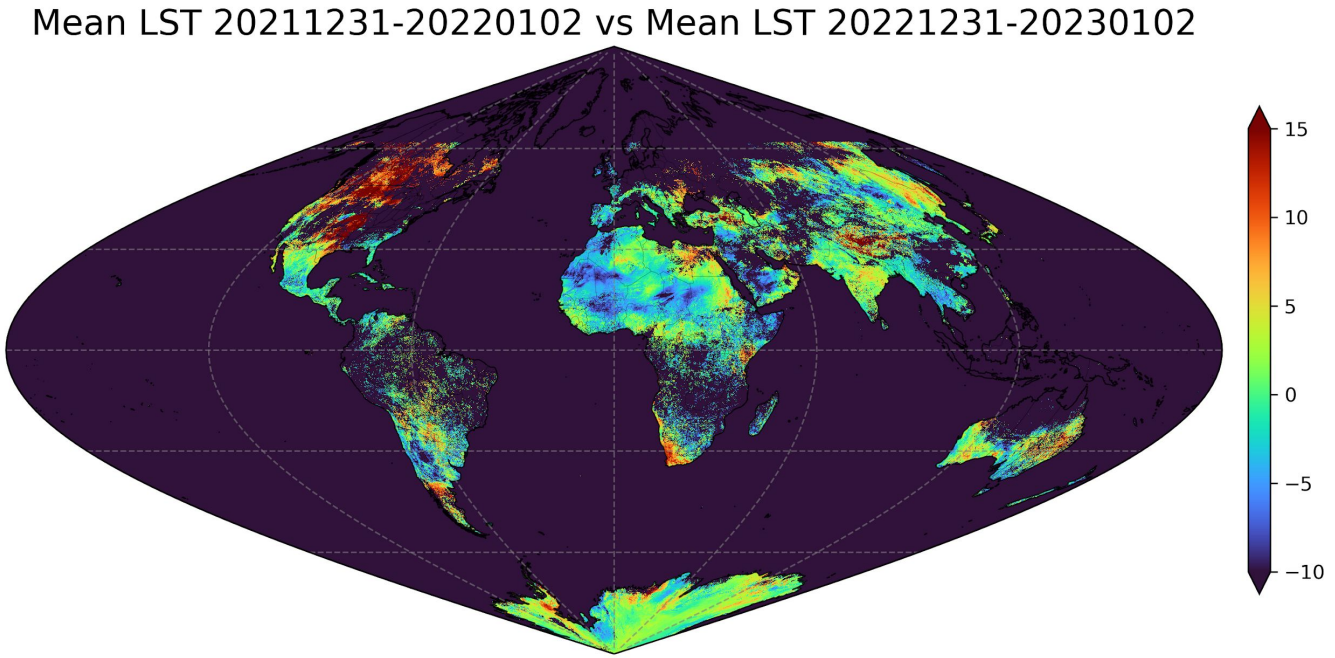
Highlights:



Recent heatwave occurrence monitoring. Major winter heatwaves are observed in North America, the Tibetan area, and Northeast Europe. More details are provided in Slide 2.

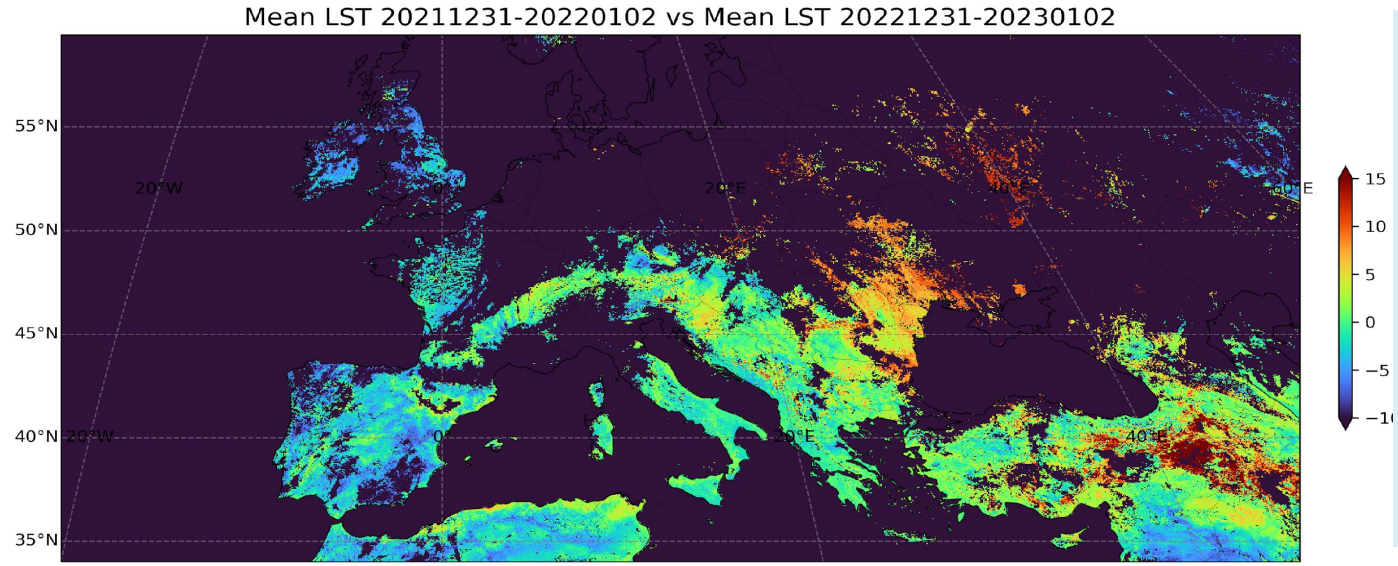
Winter Heatwave : Dec. 31st - Jan. 2nd, 2023



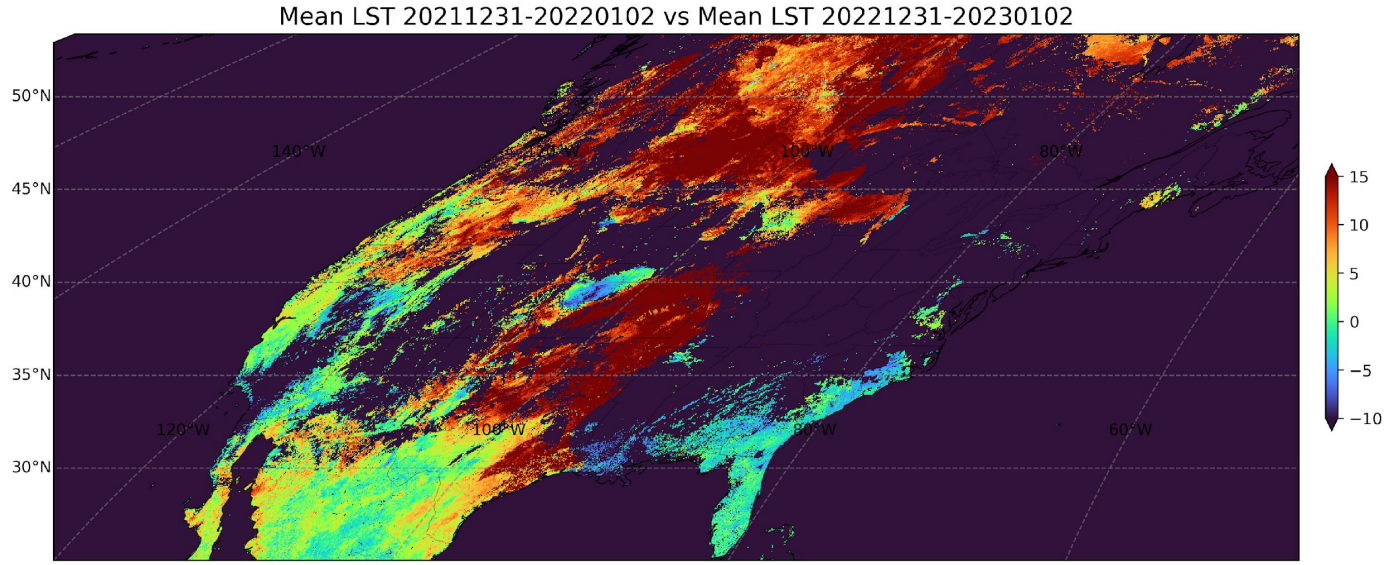


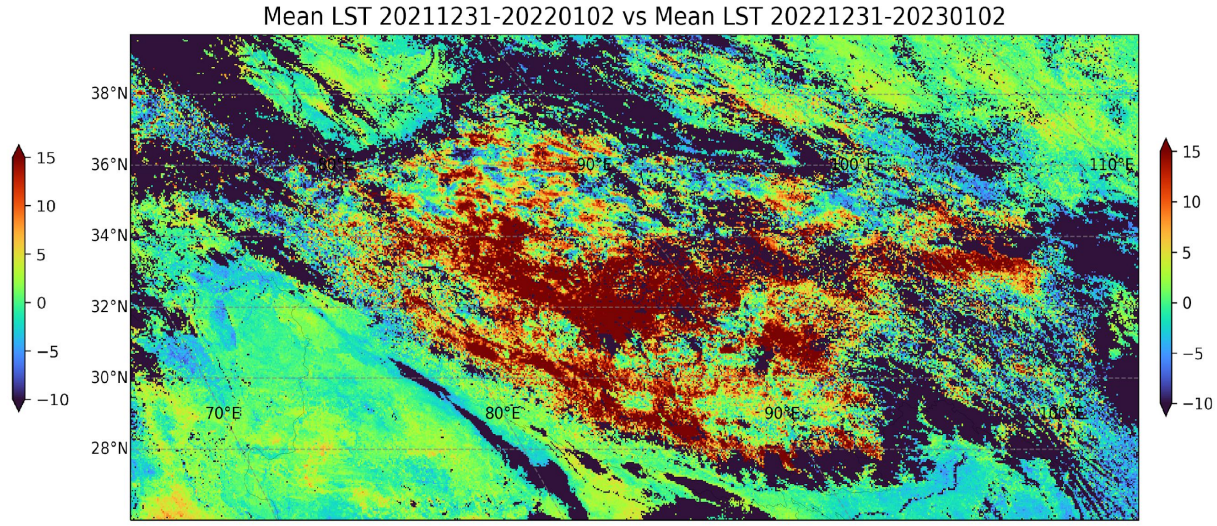
- Recent heatwave occurrence is monitored using L3 VIIRS LST data during the period between Dec. 31 to Jan. 2, 2023
- Three day mean LST is calculated: top left is mean LST in 2022 and bottom left is mean LST in 2023; right figure is the LST difference between 2023 and 2022. Major heatwaves are observed in North America, the Tibetan area and Northeast Europe.

Regional winter heatwave



- Top left figure is the LST difference over Europe. It indicates a heatwave occurrence mainly over Northeast Europe at a magnitude of about 10 K warmer than last year.
- Bottom left figure is the LST difference over North America. The intense winter heatwave occurs in middle and north America at a magnitude of about 15 K warmer than last year.
- Right figure is over Tibetan area. The winter heatwave is at a magnitude of above 10 K warmer than last year.





L3 VIIRS LST User request

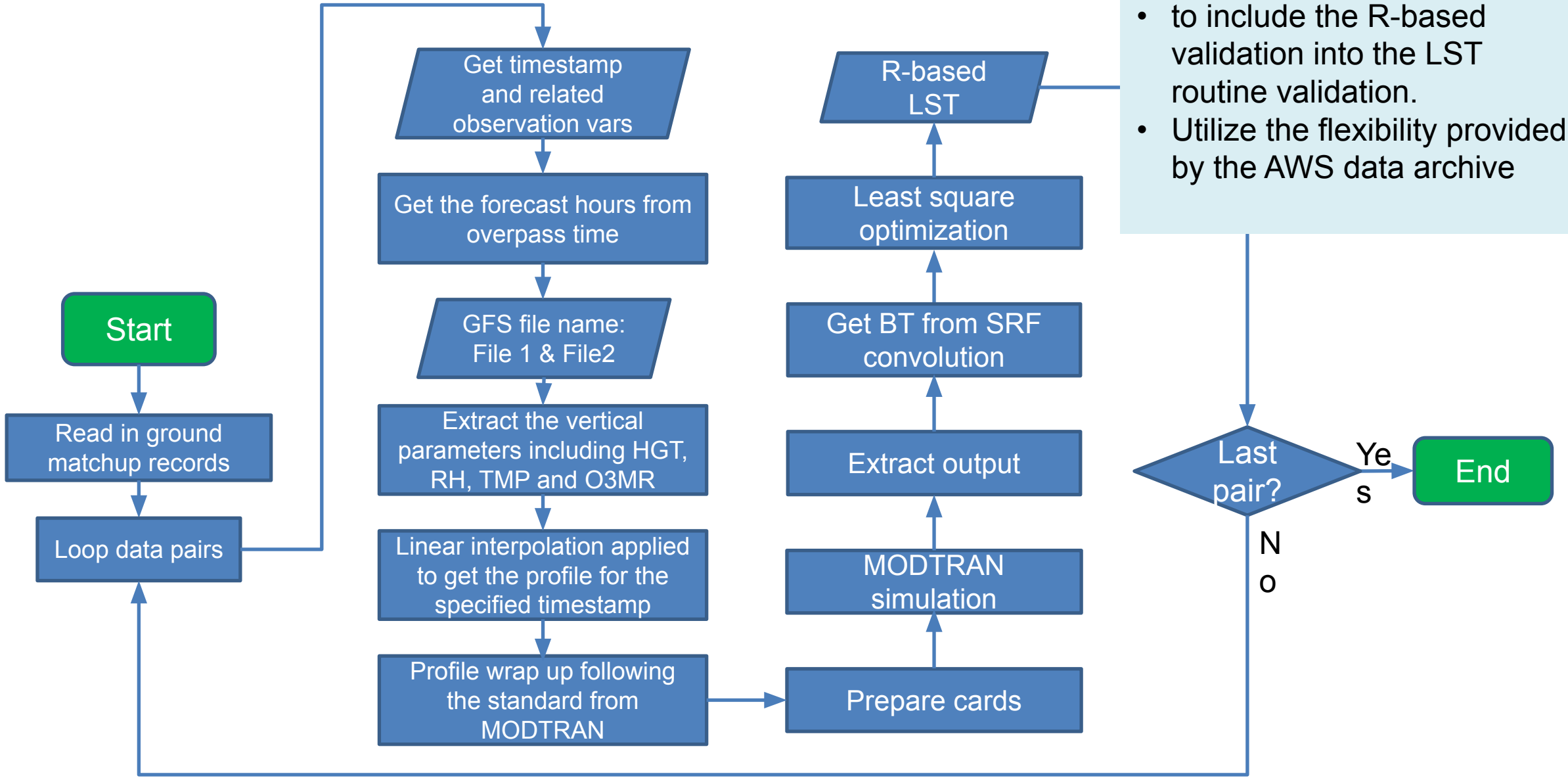
❖ Purpose:

It is planned to extend GOES-LST based Evapotranspiration product from the CONUS domain to global coverage supported by an IIJA project. The polar-orbiting satellite in consideration is VIIRS.

❖ L3 VIIRS LST is requested.

- Besides the central achieve of NOAA CLASS, the local achieve is provided, including sinusoidal projection and lat/lon projection data.
- The lat/lon projection data with a spatial resolution of 0.009 degree is requested since GET-D is on a regular lat/lon grid.

Overall Flowchart



Objective:

- to include the R-based validation into the LST routine validation.
- Utilize the flexibility provided by the AWS data archive

Radiance-based LST validation flow chart

MiRS Products

January 2023

Accomplishments / Events:

- MiRS version 11.9 was delivered to ASSISTT in August 2022, and ASSISTT has now implemented the containerized package at NCCF. One week of outputs for a number of satellites were saved at NCCF and made available to the STAR science team for verification of outputs based on runs at STAR. Verification for all satellites showed very high agreement between STAR and NCCF runs (see example in highlights), indicating that the package was successfully transitioned to operations.
- The NOAA-21 Ka transmitter issue has interrupted global data transmission since 16 December. Beta and provisional maturity milestones will be affected depending on how long the data interruption continues.
- Discussions with ASSISTT and JSTAR management have concluded that the planned milestone for delivery of MiRS v11.10 in July 2023 should be delayed to February 2024 to synchronize with the ASSISTT schedule for transition to operations (i.e. a DAP delivery in July would not be worked on by ASSISTT until early 2024.) The table below has been updated to reflect this change.

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

Overall Status:

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

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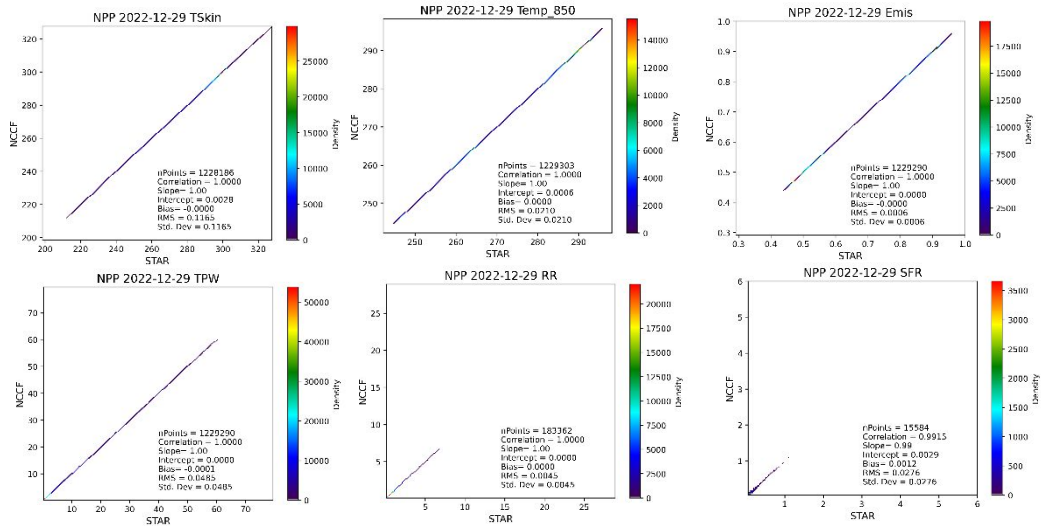
Issues/Risks:

None

Highlights:



Verification of MiRS v11.9 SNPP/ATMS outputs generated at STAR and NCCF. Products compared are Tskin, 850 hPa temperature, surface emissivity, TPW, rain rate, and snowfall rate.

NUCAPS Products

January 2023

Accomplishments / Events

- Continued preparations of validation data for the upcoming NUCAPS (JPSS, MetOP) NCCF Operational Readiness Review. These include sanity checks of the NUCAPS offline version runs with the ASSISTT integrated HEAP version runs, and validation of the NUCAPS NOAA-20 and MetOp-B/C products using a compilation of 12 focus day runs and matched ECMWF, TROPOMI/OCO, and TCCON in-situ measurements.
- Continued preparations to run J2-Ready algorithms assuming CrIS first light image on 02/08. To support the Beta maturity review for the CrIS SDR, the NUCAPS team is planning to run the J2-Ready algorithm to yield NOAA-21 NUCAPS products, and produce statistical metrics for temperature, water vapor, and ozone retrievals.
- Coordinated the NUCAPS all-hands meeting and discussed aspects of questionnaire and additional data sets for the AWIPS WFO interface, recent updates and validation efforts, and one-day slide summary discussions of the AMS-2023 NUCAPS team presentations (two oral and two posters). Future collaboration with the NPROVS team members on the use of recent AEROSE-2022 data sets was also addressed during the meeting.
- The NUCAPS team continued working on the recent Arctic Blast event (December 20-26,2022) with additional analysis from the HYSPLIT model. Intercomparison of NUCAPS and HYSPLIT model trajectory analysis indicated that the NUCAPS products effectively captured the evolution of the baroclinic zone over the eastern U.S. on 22-23 December associated with rapid frontogenesis.

Overall Status:

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

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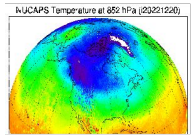
Issues/Risks:

None

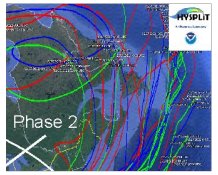
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
DAP Delivery with updates related damping factor, surface corrections, MetOp-B/C Averaging Kernels	Oct-22	Oct-22	11/04/22	
NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs,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

Time series of NUCAPS 850 hPa temperature retrievals depicting the Arctic Blast of cold air (2022/12/22-2022/12/25), and HYSPLIT Model Analysis.

- Phase 1, 20-22 December: Polar air mass is channeled southward over the Great Plains on the eastern periphery of a Great Basin anticyclone.
- Phase 2, 23-24 December: Polar air mass is advected east-southeastward over the eastern 1/3 of CONUS on the southern periphery of a bomb cyclone over the Great Lakes/S.E. Canada region. Rapid and intense frontogenesis as post-frontal westerly flow and resultant zonal temperature gradient (baroclinicity) increased.
- The NUCAPS products effectively captured the evolution of the baroclinic zone over the eastern U.S. on 22-23 December associated with rapid frontogenesis.



Phase 1



Ocean Color

January 2023

Accomplishments / Events:

No January update

Overall Status:

	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
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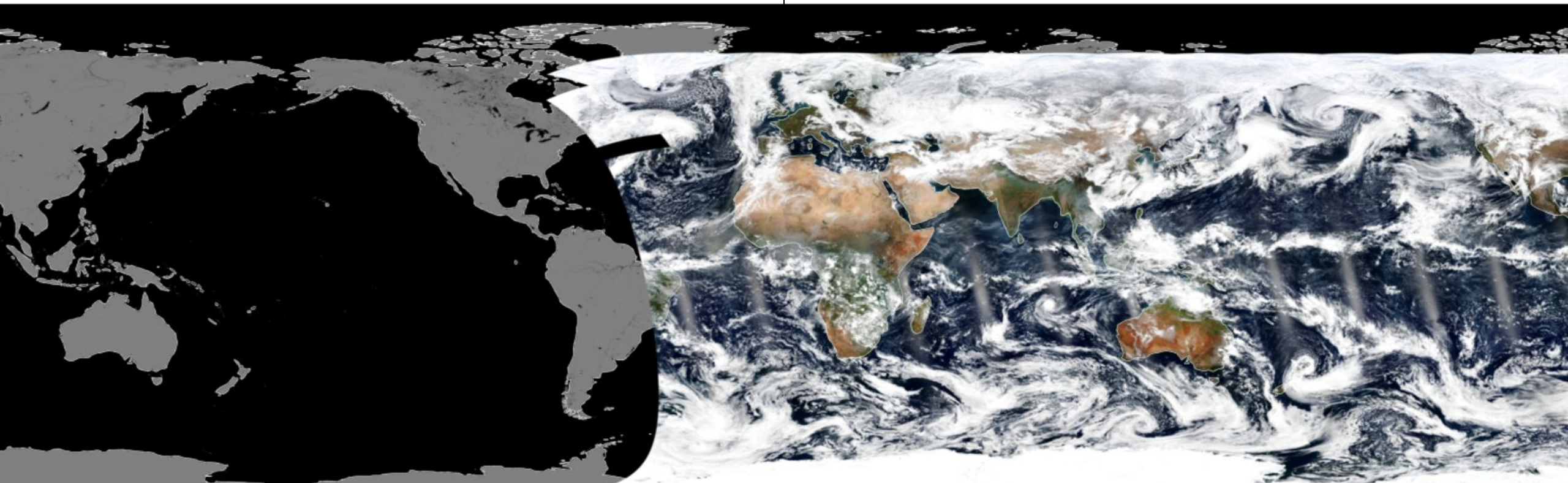
Issues/Risks:



Vegetation Index and Green Vegetation Fraction

January 2023

Accomplishments / Events:

- Poster presentation at American Meteorological Society meeting in Denver, Colorado on ABI vs. VIIRS NBAR VIs
- Evaluated the operational GVF v3r0 which became operational on Dec 14, 2022 and found the GVF time series was abnormally noisy
- Investigated the GVF intermediate data and found the phase 2 smoothing (weekly moving average) was not implemented in the operational run
- Identified potential improvements to gridding module in NVPS processing.
- Continued investigation of reasons for differences between VIIRS and ABI NBAR-based vegetation indices

Overall Status:

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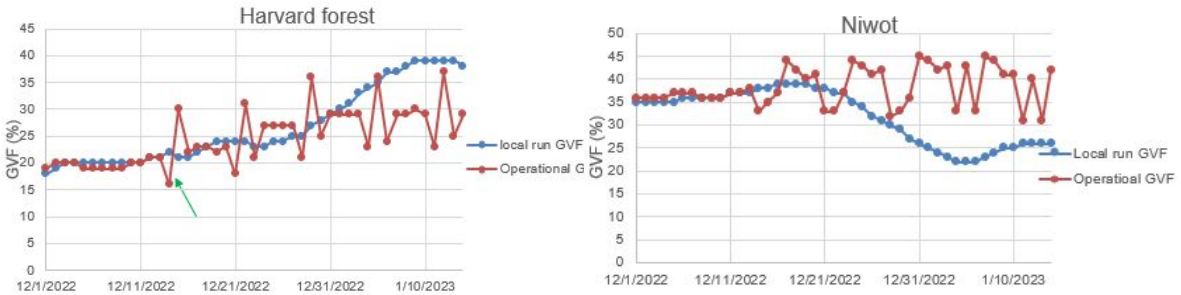
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
1km global VIIRS VI and GVF code ready for delivery	Dec-22	Dec-22		
Report on methods for improving consistency between ABI and VIIRS VI	Feb-23	Feb-23		
FY24 Program Management Review	Jun-23	Jun-23		
Annual algorithms/ products performance report	Aug-23	Aug-23		
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-23	Sep-23		
Ongoing support for JPSS-2 pre- and post-launch testing	Sep-23	Sep-23		

Highlights:

Error in operational GVF found: Omission of second step of smoothing in operational processing leads to greater GVF variability relative to local test runs

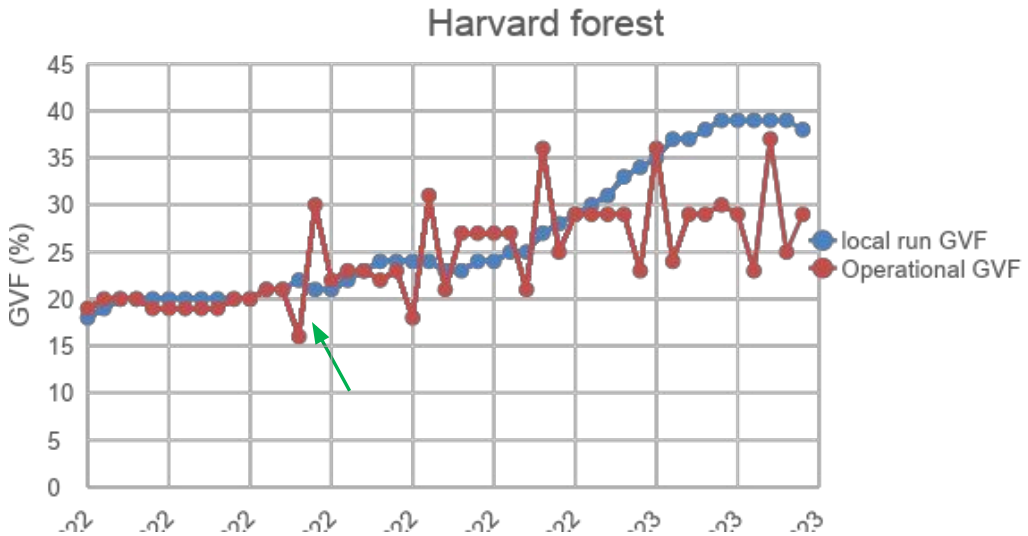


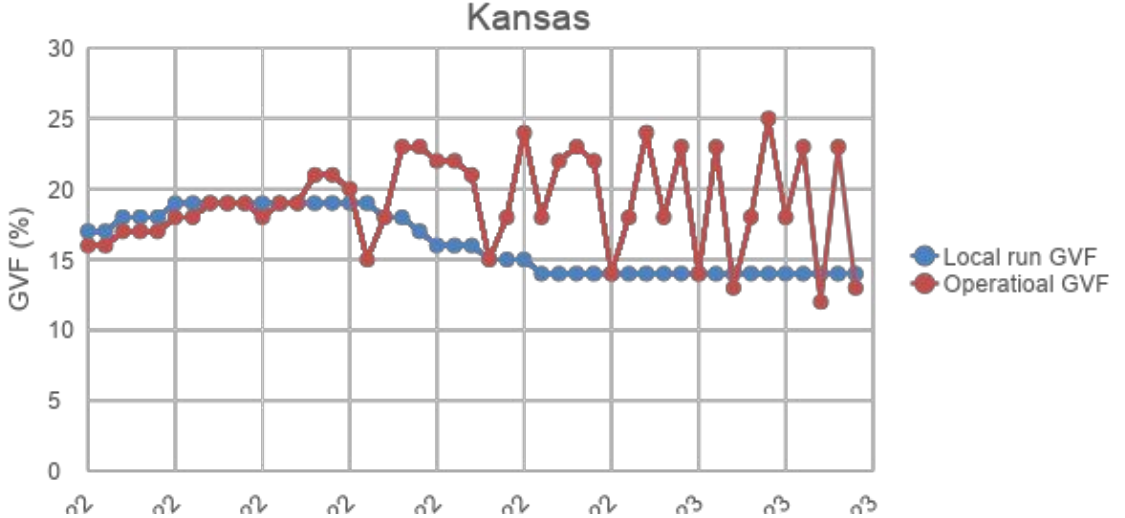
Red: Operational GVF
Blue: Local test run GVF

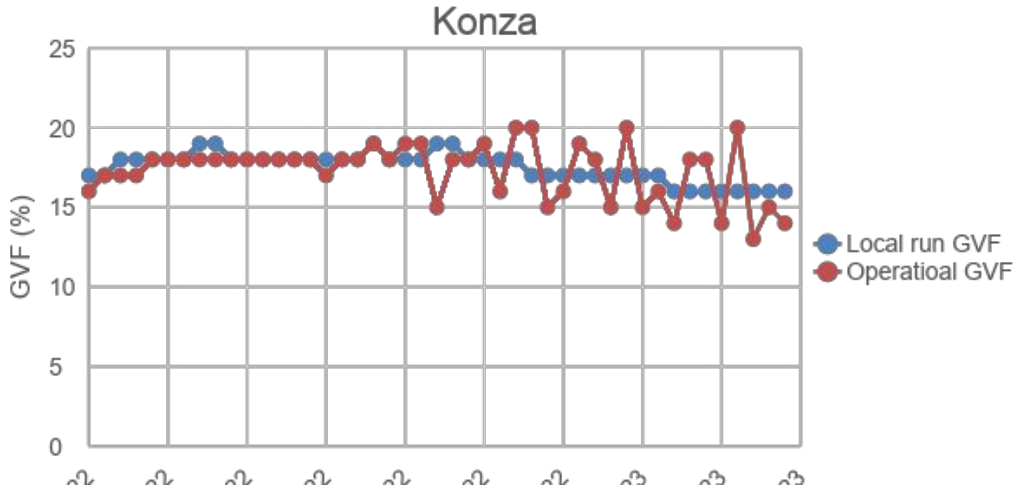
Evaluation of the operational GVF v3r0

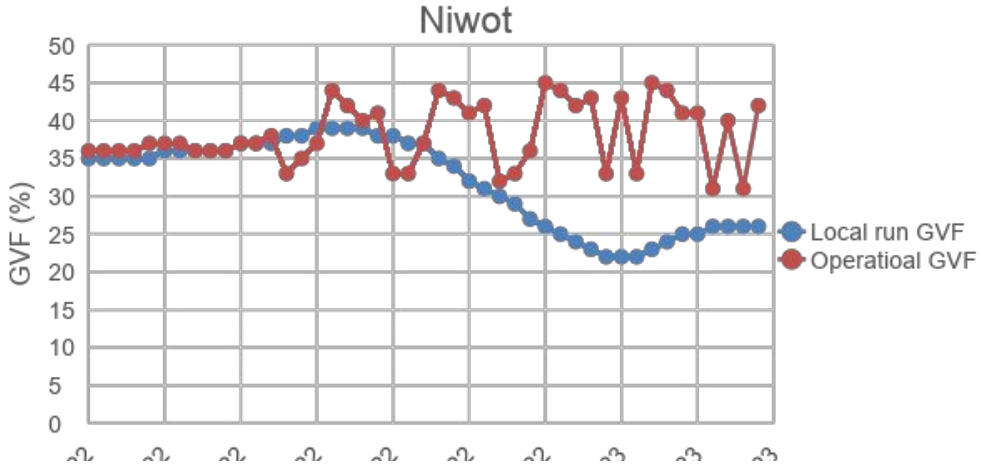
- The previous version of operational GVF (v2r3) ended on 12/13/2022
- The new version of GVF (v3r0) became operational on 12/14/2022
- The previous version of operational GVF (v2r3) and the new version of GVF (v3r0) are compared with the local run version of GVF (v2r2) to evaluate the consistency of the new version of GVF
- The time series of the new version of GVF (v3r0) were found to be abnormally noisy in comparison with the local run GVF time series
- After investigation, it was found that the phase 2 smoothing was not implemented in the operational run

Evaluation of GVF time series (operational vs. local)





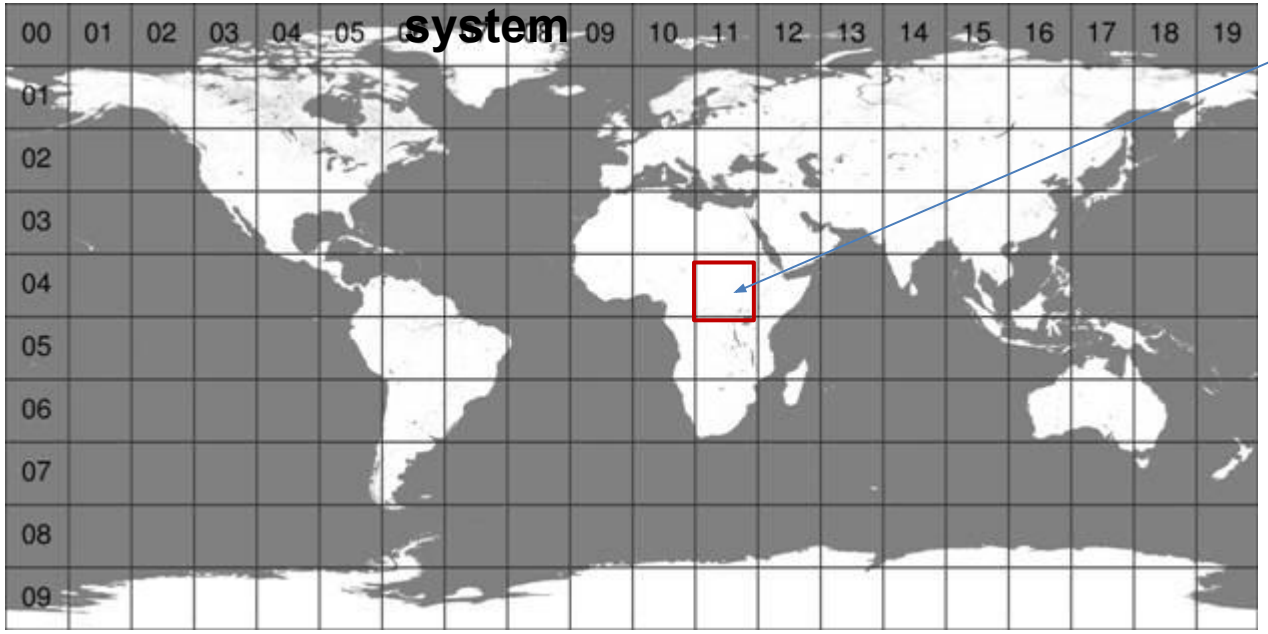




- The previous version of operational GVF (v2r3) (before Dec 14, 2022) was consistent with the local run GVF
- The time series of the new version of GVF (v3r0) were abnormally noisy
- To identify the source of the problem, the GVF intermediate data, EVI, were obtained from OSPO and calculated GVF from them

Investigation of GVF v3r0 intermediate testing data

GVF tile system



- A land tile at H11V04 is selected for testing
- A week of NPP and J01 GVF intermediate data (after smoothing EVI) were obtained from OSPO

GVF-ASEVI-P1-J01_s20230106_e20230112_h11v04_c202301130557130
GVF-ASEVI-P1-J01_s20230107_e20230113_h11v04_c202301140548140
GVF-ASEVI-P1-J01_s20230108_e20230114_h11v04_c202301150559030
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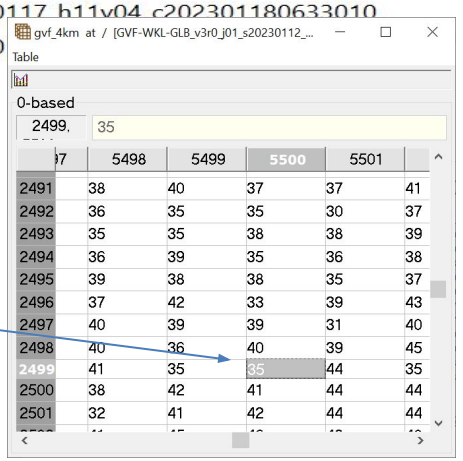
GVF-ASEVI-P1-J01_s20230111_e20230117_h11v04_c202301180555020
GVF-ASEVI-P1-J01_s20230112_e20230118_h11v04_c202301190538530
GVF-ASEVI-P1-NPP_s20230106_e20230112_h11v04_c202301130634150
GVF-ASEVI-P1-NPP_s20230107_e20230113_h11v04_c202301140616530
GVF-ASEVI-P1-NPP_s20230108_e20230114_h11v04_c202301150609320
GVF-ASEVI-P1-NPP_s20230109_e20230115_h11v04_c202301160604570
GVF-ASEVI-P1-NPP_s20230110_e20230116_h11v04_c202301170654330
GVF-ASEVI-P1-NPP_s20230111_e20230117_h11v04_c202301180633010
GVF-ASEVI-P1-NPP_s20230112_e20230

1. A GVF value at the tile was selected and found it was identical to the GVF value that calculated without phase-2 smoothing

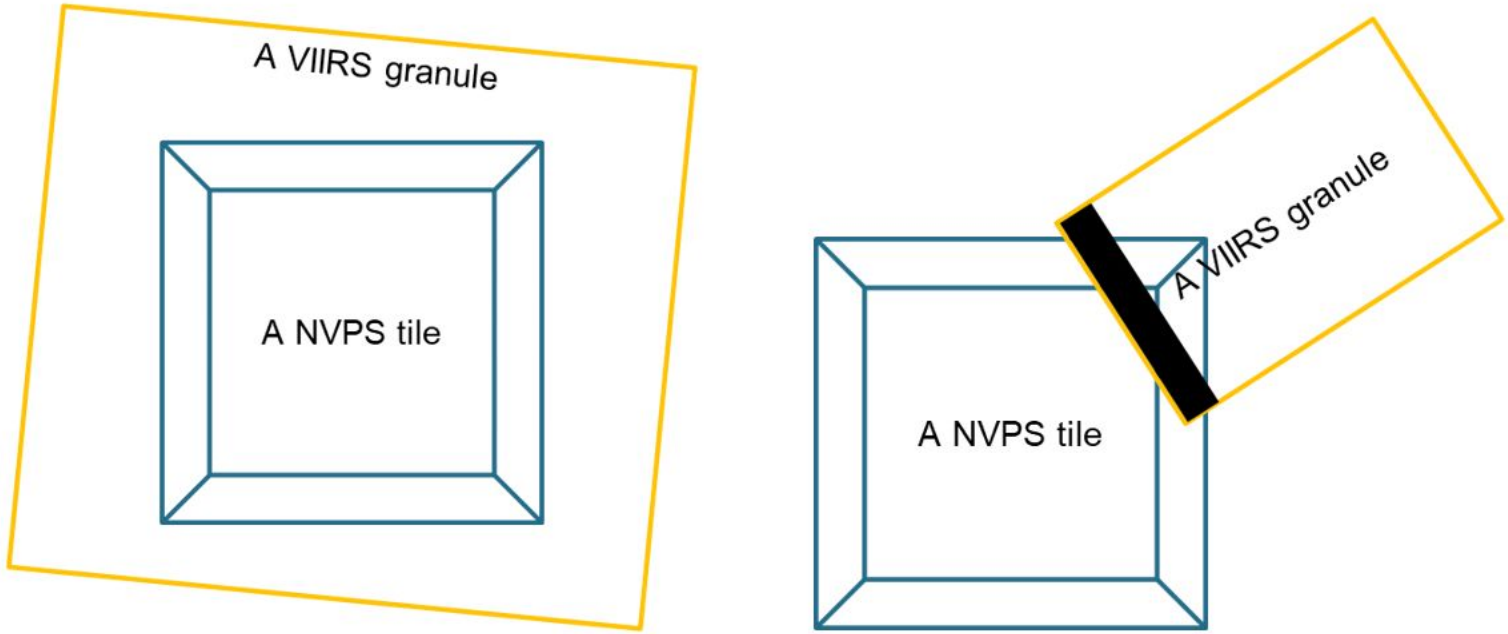
   Aggregated GVF=0.35

2. However, If phase 2 smoothing was applied, then the aggregated GVF should be 0.62.
3. It implies that the phase 2 smoothing was not implemented in the operational run
4. Reported this problem to OSPO



Resolution of potential errors in tile/ granule mapping

- Current approach to tile-granule mapping: Test every edge pixel in each granule for location in target tile
- This approach produces errors if granule encompasses entire tile or missing values occur on the granule edge
- These potential error conditions are illustrated below:



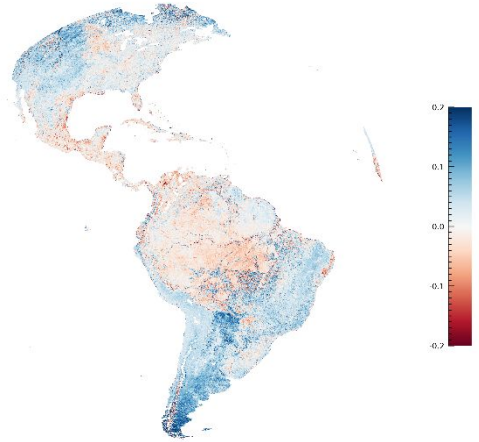
- Use of the shapely.geometry module in Python resolves these issues

Potential improvement in gridding efficiency

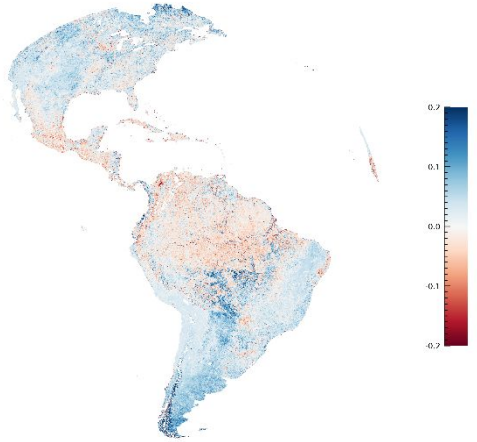
- Current gridding process consists of two steps:
  - Check each tile and granule to generate a list of granules overlapping each tile
  - Do forward mapping for each tile
- Proposed gridding process:
  - For each granule, find tiles that are covered by that granule
  - Do row, column index forward mapping
  - For each tile and mapped granule, get row/ column indexes and select data value
- Results of granule-based gridding for a single tile using data from April 8, 2020 are shown below, illustrating the granules remapped to the tile:

GOESR ABI minus VIIRS NBAR VI and associated band differences

NDVI difference

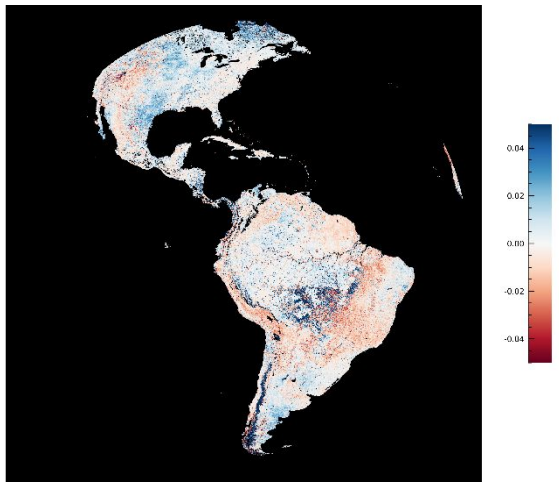


EVI difference

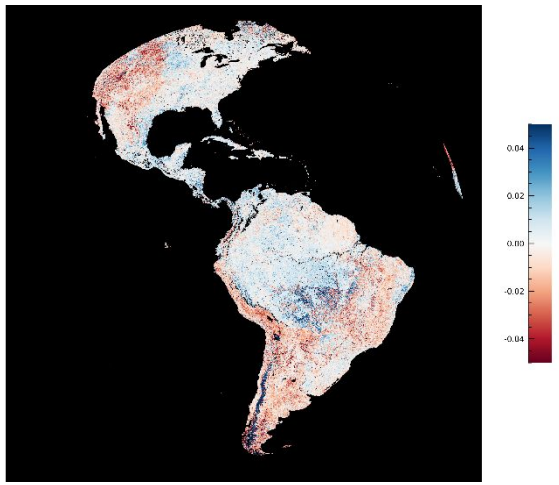


- Red band difference pattern is consistent in geographic pattern and sign with differences seen in NDVI and EVI.
- NIR band difference could also explain some of the VI difference in and around the Amazon.

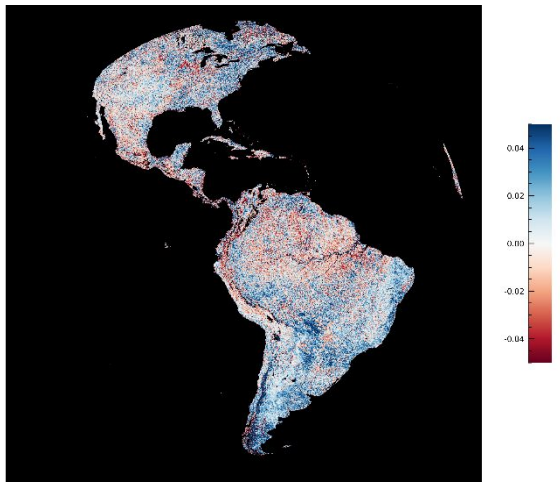
Blue band difference



Red band difference



NIR band difference



OMPS SDR

January 2023

Accomplishments / Events:

- Derived and delivered OMPS biweekly NP solar irradiance bi-weekly LUTs.
- Support to the J2 OMPS functional test and early-orbit data analysis, including but not limited to the following activities.
  - Finalized the algorithms to calculate the OMPS CCD gain and dark rate in support of J2 OMPS. The results show that the J2 OMPS nadir sensors have a nonlinearity with lower than 0.6%.
  - Delivered the first dark rate table for each of the J2 OMPS NM/NP, which significantly reduces the anomalous features in the door-closed earth view radiance data (see the images in Fig. 1).
  - Examined NOAA-21 bandpass data and generated synthetic solar spectrum data based on the results
  - Continued the algorithm development for J2 OMPS NM/NP synthetic solar spectrum convolved with instrument bandpass.
  - Plotted the image of original J2 OMPS NM door-open diagnostic SDR data (courtesy of the NASA SIPS) (see Fig. 2). In addition, collected corresponding OMPS RDR data to regenerate the SDR data by using an off-line ADL code and a variable sample table.
  - Updated SNR analysis codes for both OMPS NP and NM to work with NOAA-21 data along with preliminary analyses.
  - Prepared for the NOAA-21 OMPS SDR flight light regional image using NOAA-20 as proxy data.
- Delivered the package of the ADR10039 code change to address errors in dark binning for NOAA-21.
- Conducted a simulation about OMPS TC simulations among three JPSS missions.

Overall Status:

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

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

Issues/Risks:

None

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

Impact of Newly Derived Post-Launch Dark LUT on IDPS (ADL) J2 OMPS NM/NP SDR Data Quality

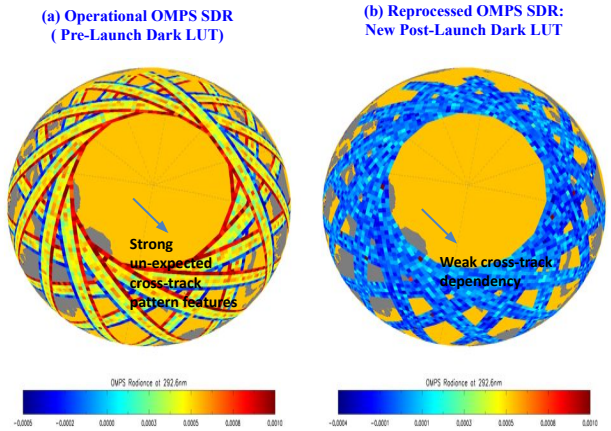


Figure 1. (a) current IDPS output of NOAA-21 OMPS NP door-closed radiance values at 292.6nm; (b) the updated reprocessed values after implementing the new dark values. The strong cross-track bias seen in the IDPS version of the data has been reduced significantly in the reprocessed version.

Initial Image of A Diagnostic J2 OMPS NM at 380nm (Non-nominal IDPS product: using a variable sample table)

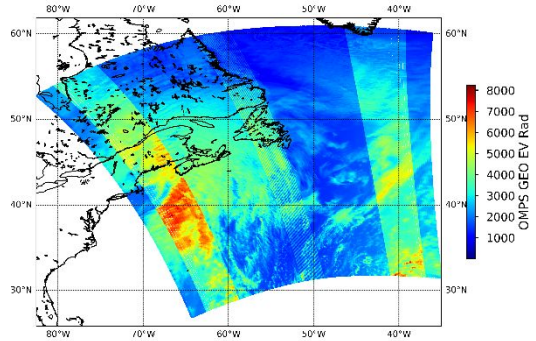


Figure 2. Image of J2 door-open OMPS NM diagnostic earth view radiance at 380nm on 01/26/2023, before the variable sample table is applied to the ground processing. The data used a variable sample table instead of an operational nominal sample table. A further reprocessing will be done by the STAR OMPS SDR team to remove stripping pattern. However, subtle feature of clouds can be seen due to a higher spatial resolution than the NOAA-20 NM.

OMPS Ozone (V8Pro, V2Limb & V8TOz)

January 2023

Accomplishments / Events:

- R. Lindsay continued work to use the new V2.7Limb Level 1 codes as input for the Level 2. We have test orbits from NASA for the S-NPP processing for new and old versions of the codes. We will need to provide some new tables for the Level 1 processing as delivered..
- J. Niu is on a second iteration for the soft calibration of the Metop-B GOME-2 V8TOz. This should bring it into very good agreement with the S-NPP OMPS V8TOz
- The UVN Spectrometer Subgroup.will meet at NCWCP on February 28th. The agenda includes presentations by most of the calibration teams for satellite instruments used to compare to OMPS including the GEMS and TEMPO teams.
  https://umd0-my.sharepoint.com/:x:/g/personal/mbali_umd_edu/EcY0X2xaaQxMucRT6vn42mkBRQLolGpNrcbi7nAu-qNz1g?rtime=aEIhyC8F20g
- Z. Zhang continued reprocessing for the S-NPP and NOAA-20 ozone products following reprocessing by the SDR Team. He also has new RT tables using the the NOAA-21 bandpasses but will wait to deliver them together with soft calibration adjustment tables.
- E. Beach continued to work on the monitoring figure for NOAA-21. He has started to work with NASA to get the ancillary files we will need to process the NOAA-21 OMPS Limb Profiler. He is capturing the NOAA-21 OMPS data that arrives at SCDR.
- The NOAA-21 transmitter anomaly will push all J02 validation activities to the right.

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

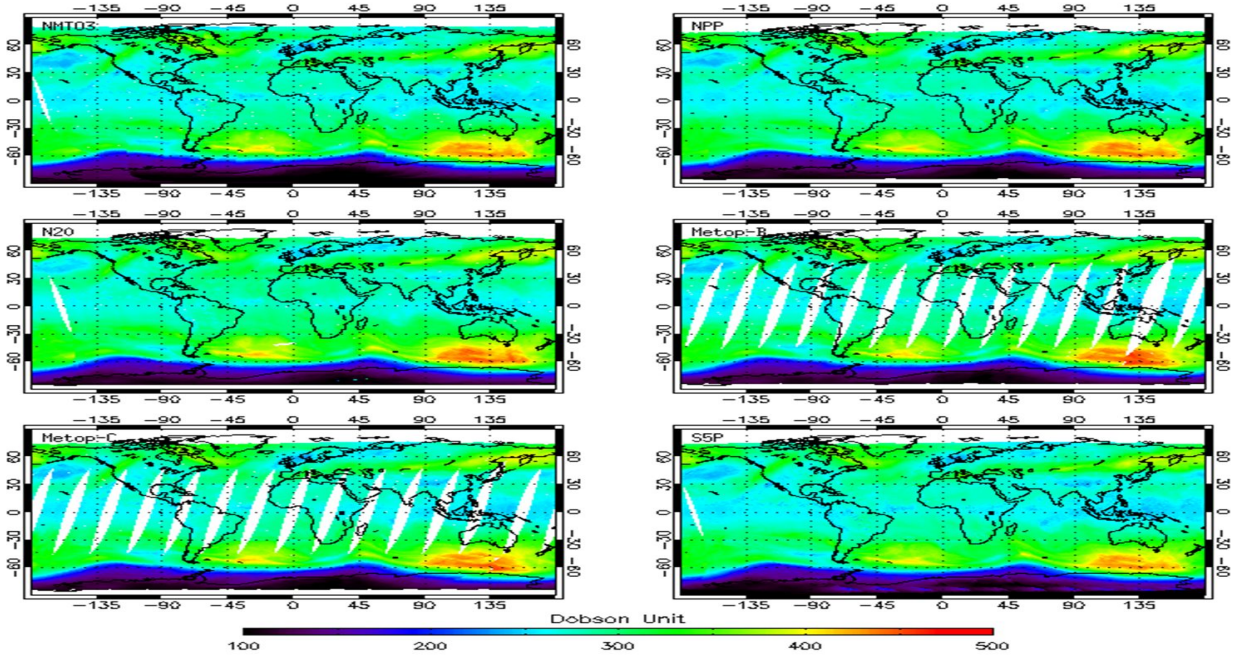
Overall Status:

	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

Six maps demonstrate consistent retrievals of baseline products and EV8TOz products from measurements made by OMPS NPP & NOAA-20, GOME-2 Metop-B & -C, and TROPOMI S5P for a test day on the 7th of October 2021.



SDR and EDR Reprocessing

January 2023

Accomplishments / Events:

- The official transition of the reprocessed SNPP SDRs to CLASS/NCEI started on December 1, 2021.
- The transition of the reprocessed SNPP ATMS (V1 and V2), CrIS, and OMPS (V1 and V2) data was completed in December 2021, February 2022 and March 9, 2022, respectively. These data are available at CLASS website now.
- The transition of the reprocessed SNPP VIIRS started on March 15, 2022.
- The VIIRS data transition is ongoing with 6 parallel jobs with data volume control of a stable daily data transition speed of ~2.97 T/day
- The reprocessed SNPP VIIRS SDR data from 1/2/2012 to 12/17/2016 (**949.3T, 58.78%** of total) has been completed as of Jan. 31, 2023.
- It's expected that the VIIRS data transition will complete in October 2023.
- A new staff has get on board to support the VIIRS EDR reprocessing from Jan. 18, 2023

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Complete transition of reprocessed SNPP VIIRS SDR to CLASS	03/2022	10/2023		1 month
Complete VIIRS EDR reprocessing for Clouds, polar wind, Ice Concentration; Ice Thickness; Snow Cover; and Ice Surface Temperature	02/2023	10/2023		1 month

Overall Status:

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

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

Issues/Risks:

None

Highlights: Status of the Reprocessed SNPP Data Transition

Sensor	Data Type (name)	Period	Notes	Volume (Tb)	Status
ATMS	TDR (TATMS)	2011-11-08 to 2019-10-15	V2	0.406	Completed on Dec. 20, 2021
	SDR (SATMS)	2011-11-08 to 2019-10-15	V2	0.431	
	GEO (GATMO)	2011-11-08 to 2019-10-15	V2	0.420	
ATMS	TDR (TATMS)	2011-11-08 to 2017-03-08	V1	0.273	Completed on Dec. 30, 2021
	SDR (SATMS)	2011-11-08 to 2017-03-08	V1	0.289	
	GEO (GATMO)	2011-11-08 to 2017-03-08	V1	0.283	
CrIS	GCRSO	2012-02-20 to 2020-01-29	V2	0.369	Completed on Feb. 25, 2022
	SCRIS	2012-02-20 to 2020-01-29	V2	67.994	
	SCRIF	2014-12-04 to 2020-01-29	V2	74.455	
OMPS	TC (SOMTC, GOTCO)	2012-01-30 to 2018-09-30	V1	1.2	Completed on Mar. 4, 2022
	NP (SOMPS, GONPO)	2012-01-25 to 2017-03-08	V1	0.134	
OMPS	NP (SOMPS, GONPO)	2012-01-25 to 2021-06-30	V2	0.246	Completed on Mar. 9, 2022
	TC (SOMTC, GOTCO)	2012-01-30 to 2021-06-30	V2	1.695	
VIIRS	VIIRS ALL SDR	2012-01-02 to 2020-04-30	V2	1615	Completed **58.78**%
Total				1764.65	

Sea Surface Temperature

January 2023

Accomplishments / Events:

- SST cluster hardware refresh submitted to SOCD. Coordination with JSTAR I. Guch and GOES-R AWG J. Daniels for funding allocation.
- Replacement of two ProTech/GST Inc billets underway. Foreign National paperwork submitted for two new hires, Alamgir Hossan and Ruiyao Chen. These will replace two departures, resignation (Alexander Semenov) and long-term disability (Dean Hinshaw).
- Special Issue of the Remote Sensing Journal "VIIRS 2011–2021: Ten Years of Success in Earth Observations" https://www.mdpi.com/journal/remotesensing/special_issues/VIIRS_10years is a success. Total 12 papers published, including 10 Articles, 1 Technical Note, and 1 Review. Special issue submissions will remain open through 31 March 2023, and several more SST submissions are planned.
- Work is underway with JSTAR to adjust the new dates for the N21 Beta and Provisional Reviews, to July and October 2023, respectively.
- All tasks and milestones are on schedule

Overall Status:

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

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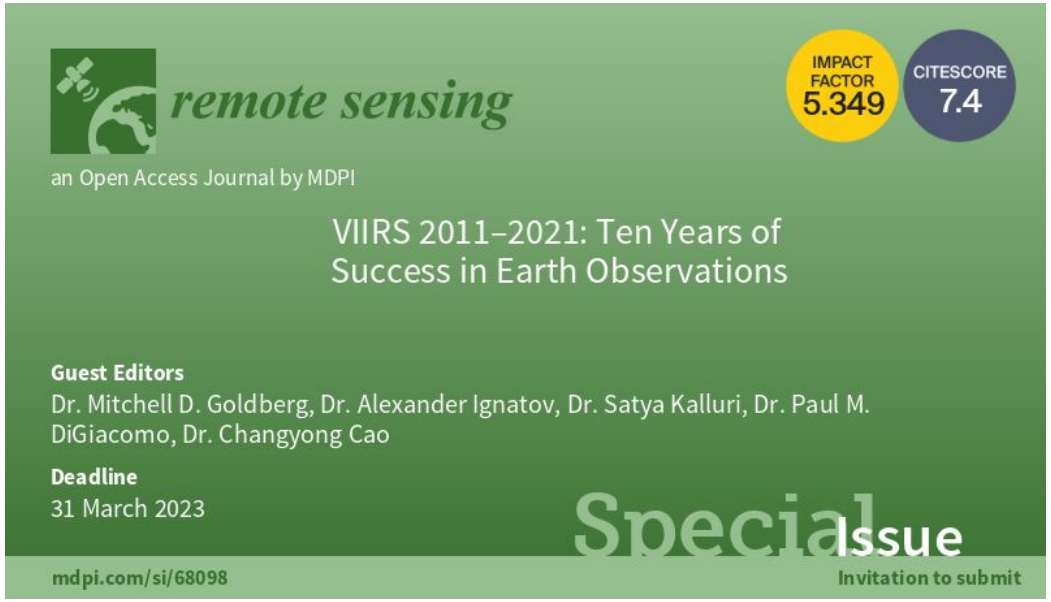
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 SST product Beta Maturity	Jul-23	Jul-23		
NOAA-21 SST product Provisional Maturity	Oct-23	Oct-23		
Product consistency and validation activities w/NPP/N20, non-JPSS LEO SSTs (AVHRR GAC/FRAC & MODIS).	Sep-23	Sep-23		

Highlights: Special Issues of Remote Sensing Journal "10 years of VIIRS"



Special Issues of Remote Sensing Journal ". "VIIRS 2011–2021: Ten Years of Success in Earth Observations" has published 12 papers and will remain open for new submissions through 31 Mar 2023.

Snowfall Rate

January 2023

Accomplishments / Events:

- Completed building the SFR processing system on a virtual machine at GINA. Currently, SFR is producing using the direct broadcast data received at GINA including S-NPP, NOAA-20, NOAA-19, Metop-B, and Metop-C. GINA has started to distribute the data to Juneau, AK Weather Forecast Office.
- The team is updating the metadata for the standalone SFR system to support ASSISTT and OSPO's needs for product monitoring.
- Jun Dong (CISESS) attended the AMS Annual Meeting and gave an oral presentation about 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.*
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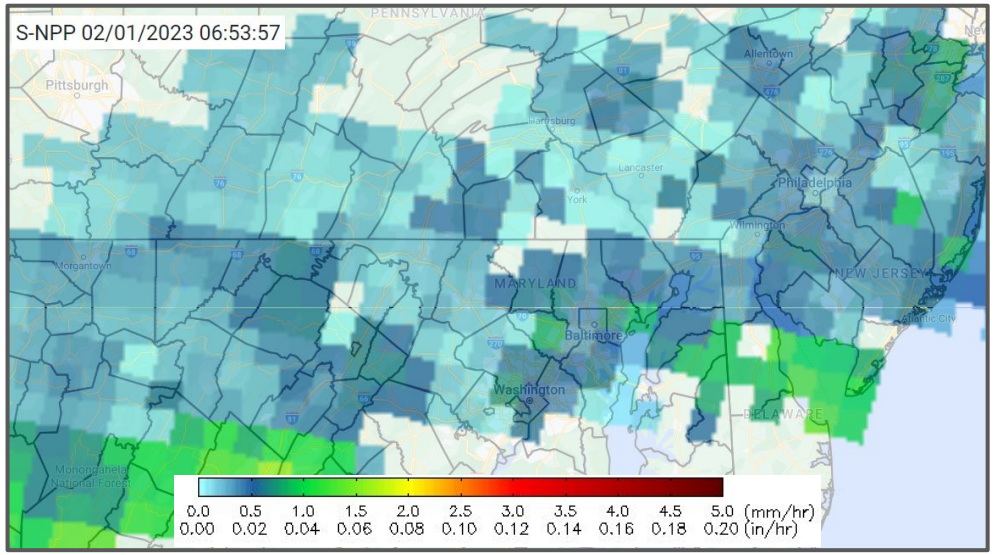
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights: SFR captures Snowfall in the DC Metro Area



SFR captures the first measureable snowfall in the DC Metro area on 1/31/2023 – 2/1/2023

Snowfall Rate

December 2022

Accomplishments / Events:

Snowfall Rate Product Captures Two Winter Storms in Dec. 2022: Two almost back-to-back winter storms hit the United States in Dec. 2022. The first winter storm hit the U.S. in mid Dec. during the week of Dec. 12. A very broad upper trough system slowly traveled across CONUS during the week, resulting in considerable snowfall and widespread winter weather impact in the Northern US. The second winter storm, unofficially named Winter Storm Elliott by The Weather Channel, hit the US in late Dec., just prior to the Christmas holiday. A strong shortwave trough accompanied by a sharp cold front quickly swept CONUS in four days, causing significant snowfall and record breaking cold to the Northern US. For example, Cheyenne, Wyoming saw a record-breaking temperature drop of 40°F (22°C) in 30 minutes; Malta, Montana, reported the wind chill reached as low as -72°F (-58°C). The NOAA NESDIS Snowfall Rate (SFR) product captured the winter storms with retrievals form a constellation of passive microwave (PMW) sensors onboard S-NPP, NOAA-20, NOAA-19, Metop-B and Metop-C. A case study was conducted to compare SFR with three NOAA datasets: the Stage IV hourly radar and gauge combined precipitation, the SNODAS snowfall analysis, and the NOHRSC hourly snow precipitation.

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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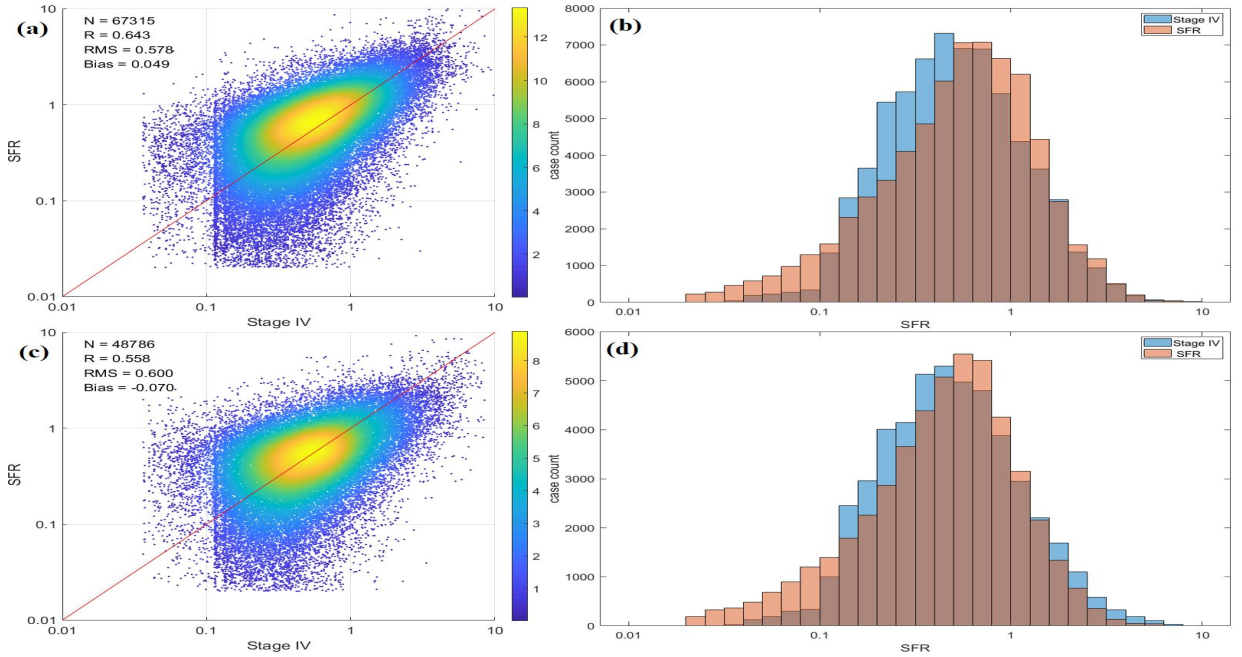
Issues/Risks:

None

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



Surface Albedo

January 2023

Accomplishments / Events:

- Attended the **AMS 2023 meeting** and presented '*Multi-parameter analysis of interannual land surface change using satellite products*'
- Finished the cross-comparison between **python version and C++ version of VIIRS BRDF algorithm**
  - Most retrieval path receive consistent output
  - Minor pixels show difference due to ill-posed condition
  - Further improving C++ version code efficiency
- Understanding the relationship and **teleconnection** pattern between **ocean-** and **atmospheric-** circulation with land parameter **anomaly**
- Submitted **NESDIS annual report** about albedo project
- Keep checking the **J2 SURFALB** product availability

Overall Status:

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

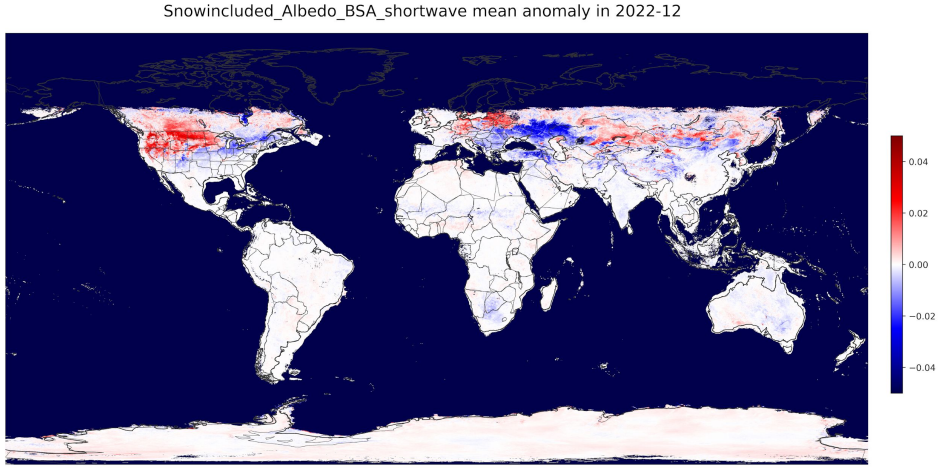
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

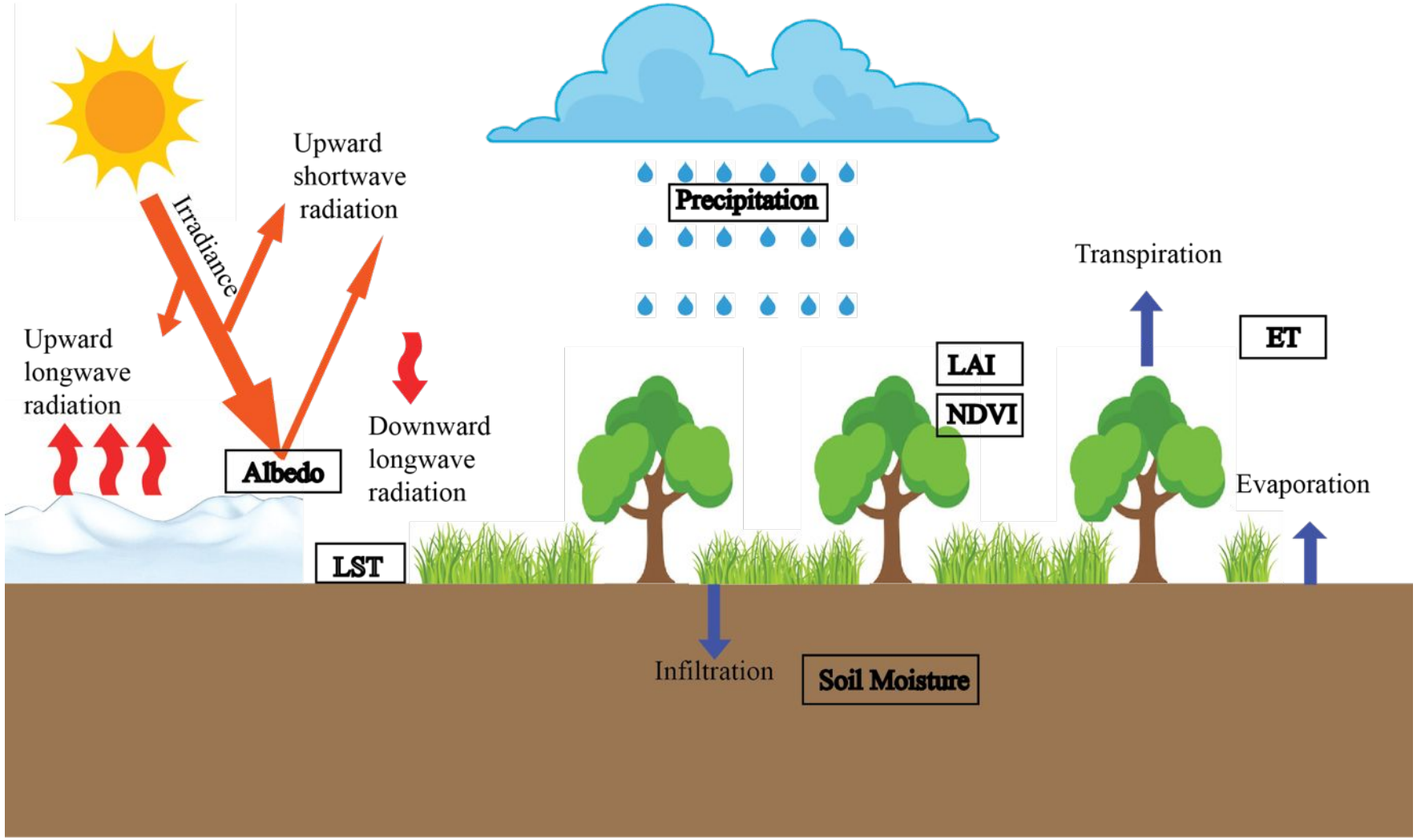
Highlights:

Albedo anomaly in December 2022



The albedo anomaly in North America is closely related to the Pacific–North American Pattern (PNA). The albedo in the tropical and south hemisphere reflects the land response to the ENSO's impact.

Study about surface dynamic anomaly correlation (considering patterns such as ENSO)

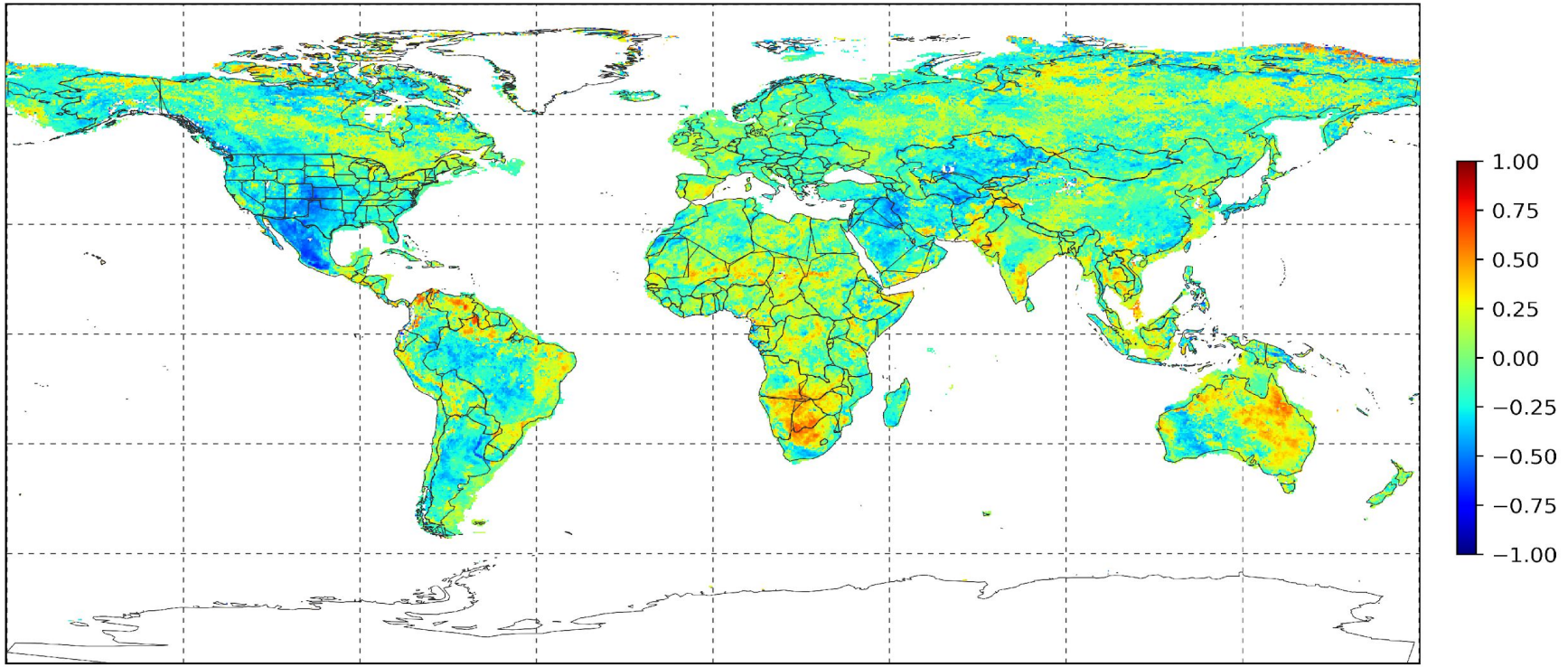


- Presented in AMS 2023
- More than six parameters involved
- Except soil moisture, recent two decades' data was used
- Monthly-based anomaly was calculated based on a climatology 2003-2021
- Temporal correlation analysis was conducted for interested areas

Contributed to Routine Global Monitoring of the Land Surface Anomaly System

We have monitored the anomaly of several key parameters linked to the hydrological cycle, the carbon cycle, and the energy balance, including precipitation, land surface temperature (LST), land surface albedo (LSA), vegetation index (VI) and Evapotranspiration (ET). Multi-variable anomaly analysis demonstrates the relationship among the variables and provided understanding of the surface response to climate pattern and extreme weather change.

Max correlation between ONI and Snow-free Albedo



- *Correlation between Oceanic Niño Index (ONI) and snow-free albedo, which denotes the influence of El Niño-Southern Oscillation climate pattern (ENSO) on LSA. Red color denotes positive correlation and blue color corresponds to negative correlation.*

Surface Reflectance

January 2023

Accomplishments / Events:

- Collaborate with NASA science team, generated whole package of the new LUTs for SNPP, NOAA20 and JPSS-2, test the LUT using global AERONET data and NASA VNP09 product.
- Investigated the performance and uncertainty of the aerosol product, learn the dust aerosol model setting and the validation error from the aerosol team.
- Update the aerosol model default setting in current algorithm, tested the new update performance and prepared for the upcoming delivery.
- Summarized long term SR validation results and analyzed the issues and tried to improved the algorithm.
- Continue the SR long-term monitoring and follow up the status of the JPSS2 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			

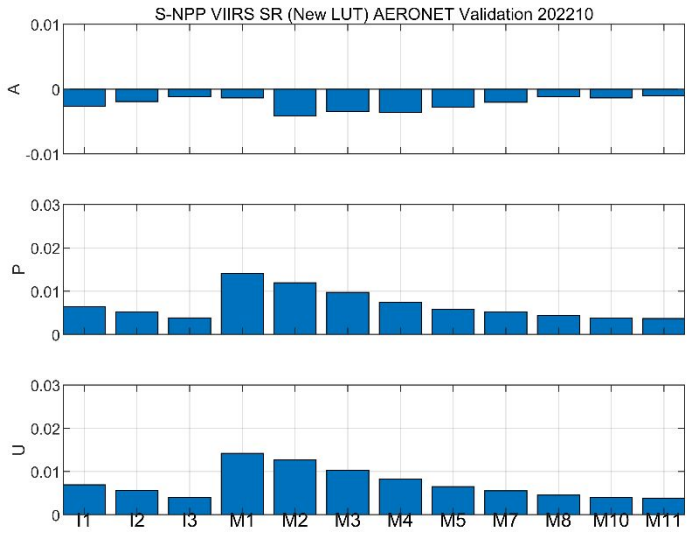
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

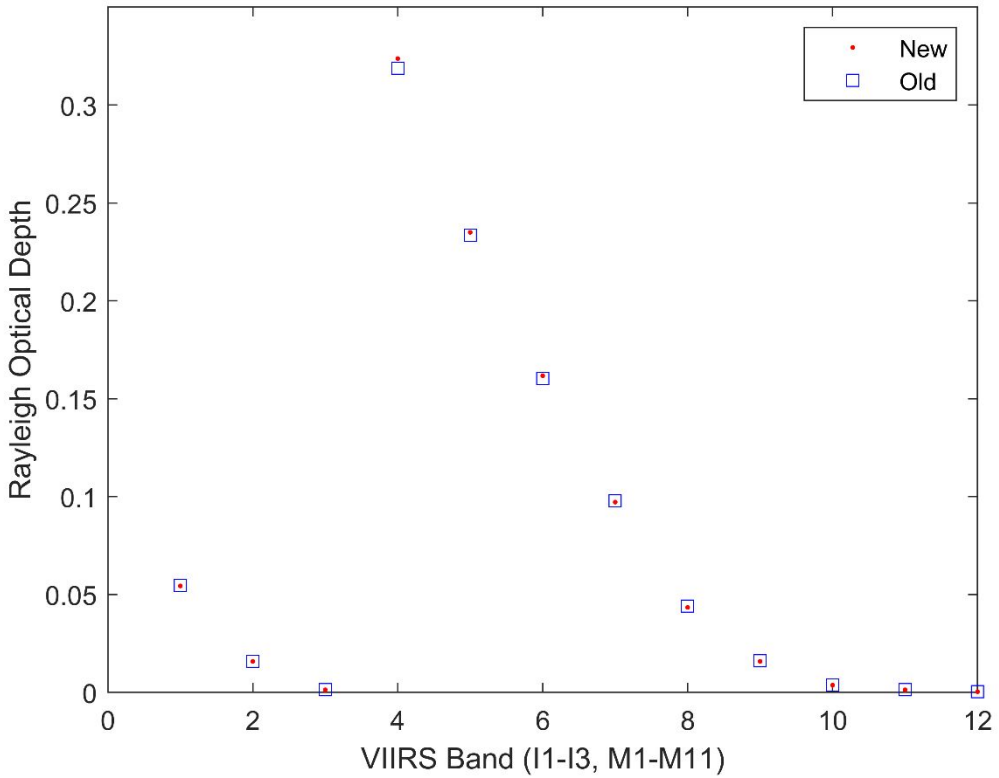
Highlights:

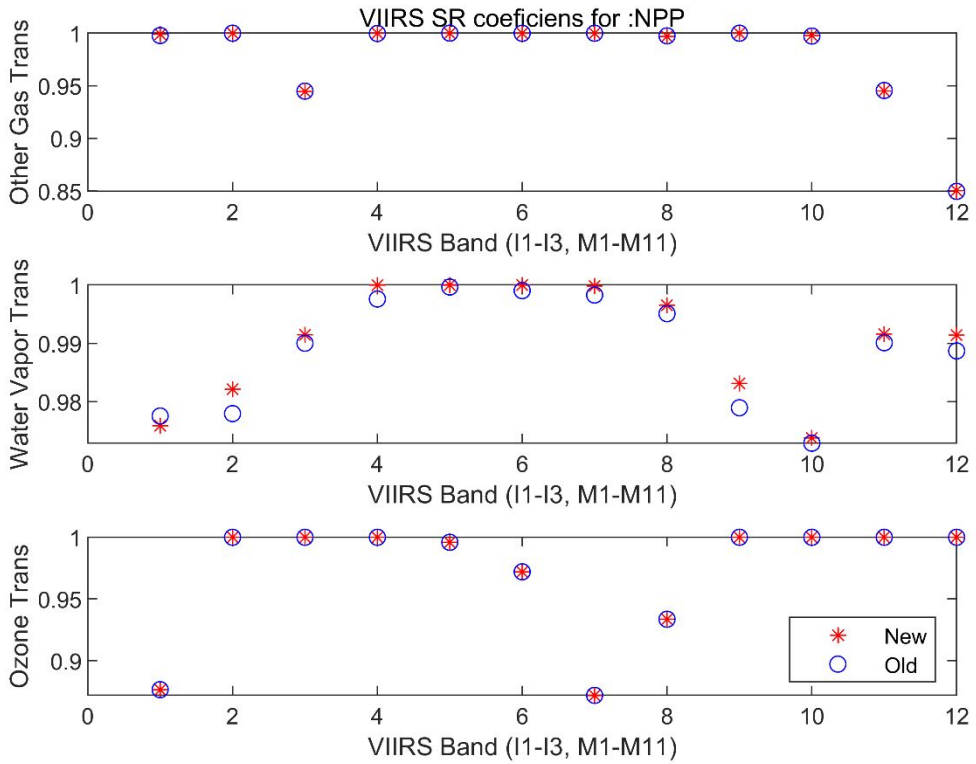


The new LUT for both SNPP and NOAA20 have a good agreement with AERONET based SR.

The Rayleigh and Gases coefficients Update

For SNPP, the current coefficients (old LUT) and new ones comparison.

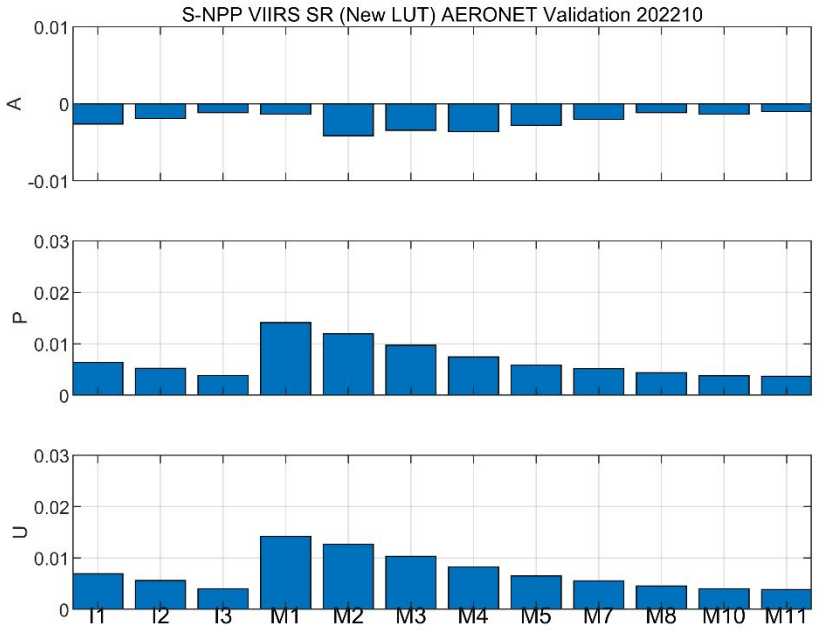




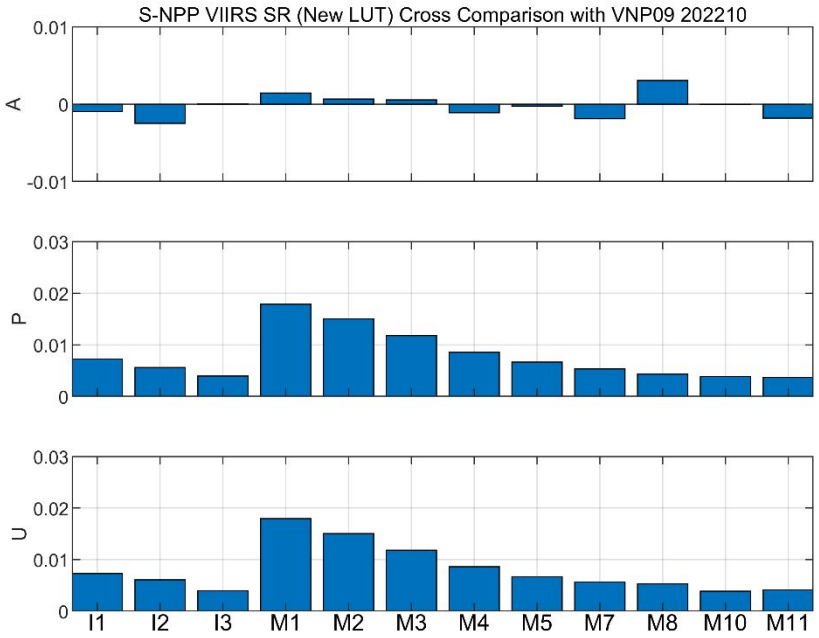
Water vapor coefficients have a little bit larger difference, due to the update of the 6S, overall the update will not bring big difference on SR.

New LUT Performance for SNPP and NOAA20

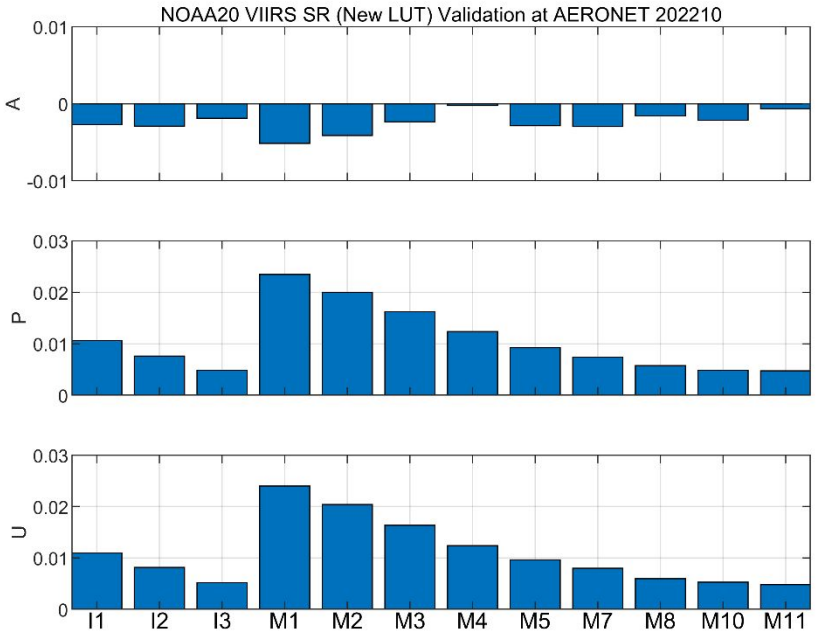
To Evaluate the new LUT performance, AERONET based SR and NASA VNP09 SR are used, the AERONET validation results shows both SNPP and NOAA20 have good agreement with AERONET SR and improved consistency, the intercomparison with VNP09 shows the two product are comparable.



SNPP SR Validation at AERONET

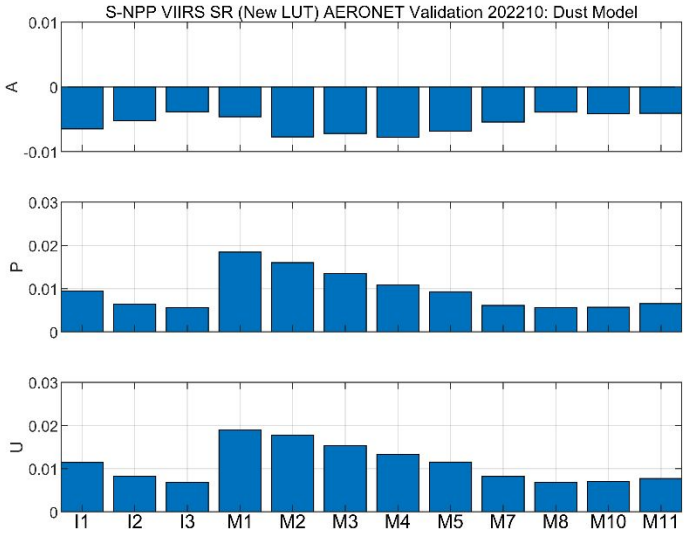


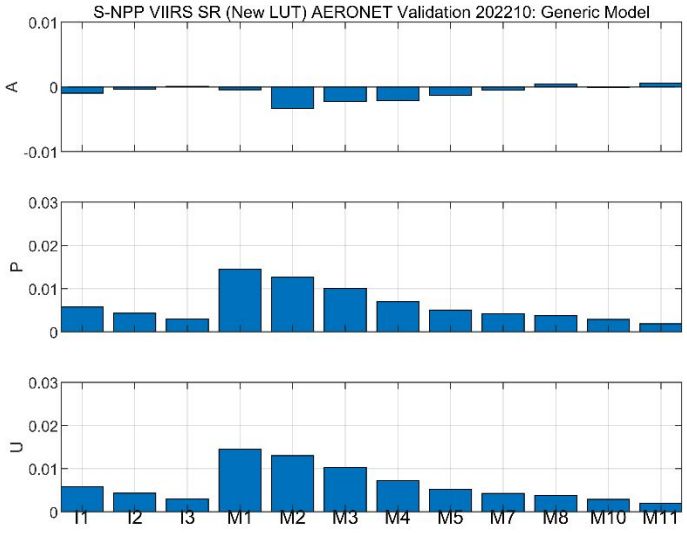
SNPP SR Compared with NASA VNP09

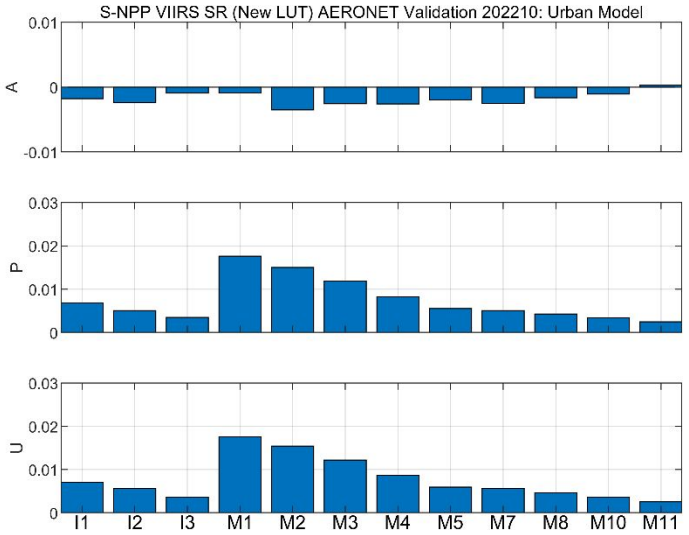


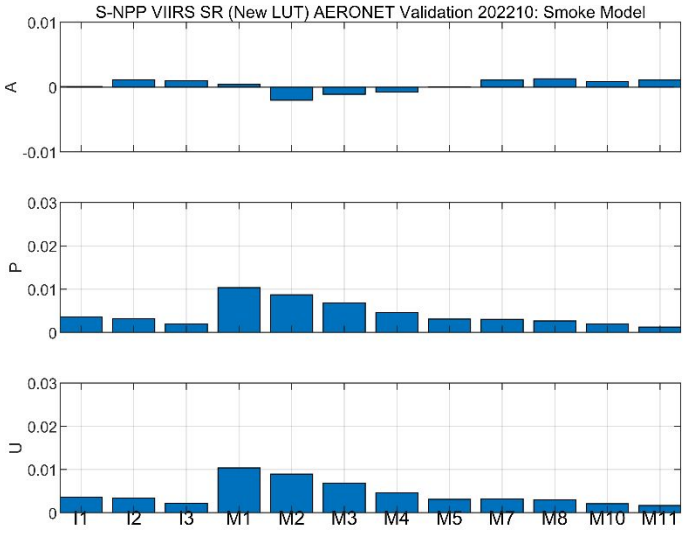
NOAA20 SR Validation at AERONET

Investigate the SR performance of Dust Aerosol Model







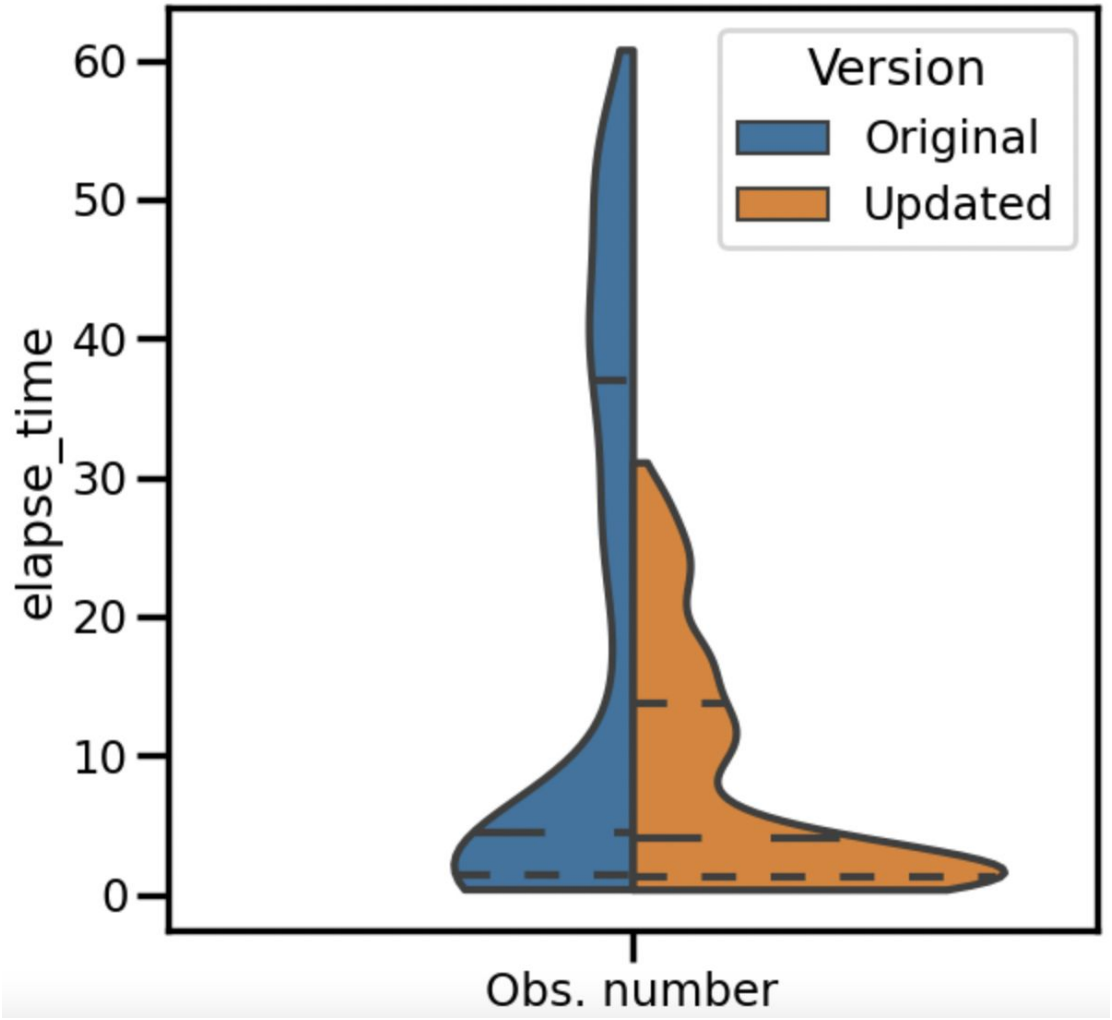


In the validation dataset, the dust model are dominate type, and when perform the SR validation for each type, the dust model with significant negative bias compared with AERONET SR.

A resolution is under exploration to mitigate the SR uncertainty for the pixels classified as dust model.

VIIRS BRDF code package efficiency improvement

- The C++ version of the BRDF retrieval program has been updated.
- The output values of BRDF parameters for all bands are same as the original version.
- The code efficiency has been largely improved.
  - Correction includes the rearrangement of the estimation processes of the observations
  - The modification of variable types (from short to float).
  - Several redundant processes have been eliminated to speed up the program.
- The efficiency of the updated program is more than 2 times that of the original one. The following figure shows the distribution of the time used between the original and updated BRDF programs (the minimum, 25%, medium, 75%, and maximum values have been given).



VIIRS SDR

January 2023

Accomplishments / Events:

- The Global Regional Validation Site system (GReVS) at NOAA STAR was adapted to interface with the NOAA-21 VIIRS direct broadcast (DB) data to continue assessing NOAA-21 VIIRS sensor health and SDR data quality while waiting for the NOAA-21 Ka-band transmitter anomaly resolution
- Downloaded and processed NOAA-21 VIIRS RDR files created at Univ. Wisconsin-Madison and NASA GSFC from DB data acquired during the Ka-band transmitter anomaly: generated extra OBC IP granules in addition to the ones downloaded from GRAVITE that were produced by IDPS from the DB data acquired at Svalbard: verified that no unexpected changes in VIIRS temperatures or OBC measurements were observed in the data snapshots available through the DB (X-band) transmissions
- Assisted in scheduling and analyzed data from NOAA-20 (N20) and Suomi NPP (NPP) VIIRS lunar calibration with spacecraft roll maneuvers on 1/2/2023: shown that radiometric calibration LUT update is still not needed
- Created and delivered for deployment in the IDPS operations updated N20 and NPP VIIRS DNB offset (DN0) and gain-ratios LUTs generated using the new moon calibration data from 1/21/2023

Overall Status:

	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule			X		N21 KaTX anomaly

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

Issues/Risks:

None

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

Highlights:

NOAA-21 VIIRS SDR true color image (M3, M4, M5 band composite) of the Gulf of Mexico region on Jan. 6, 2023, generated by the NOAA/STAR GReVS system from the direct broadcast data

Volcanic Ash

January, 2023

Accomplishments / Events:

- Routine validation of existing JPSS volcanic ash EDRs from current sensors and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.
- The VIIRS volcanic ash plume detection and extraction will be improved utilizing an additional machine learning layer (on top of existing ML layers). One necessary step toward achieving this goal is to have manual expert classification of VOLCAT candidate ash plumes both scenes containing volcanic ash and scenes not containing volcanic ash. A web/database-based tool was developed to allow for efficient creation of the manual expert classifications. An example of the user-interface of the classification tool is highlighted in the figure in the bottom right of this slide.
- 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. In the coming month we plan on testing (and modifying where needed) validation tools using JPSS-2 proxy 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			

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Issues/Risks:

None

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

Highlights: Manual expert scene classification tool developed for improving VOLCAT VIIRS ash plume detection and extraction. (Note this is an internal tool used by the science team.)