NOAA JPSS Monthly Program Office

AMP/STAR
FY22 TTA

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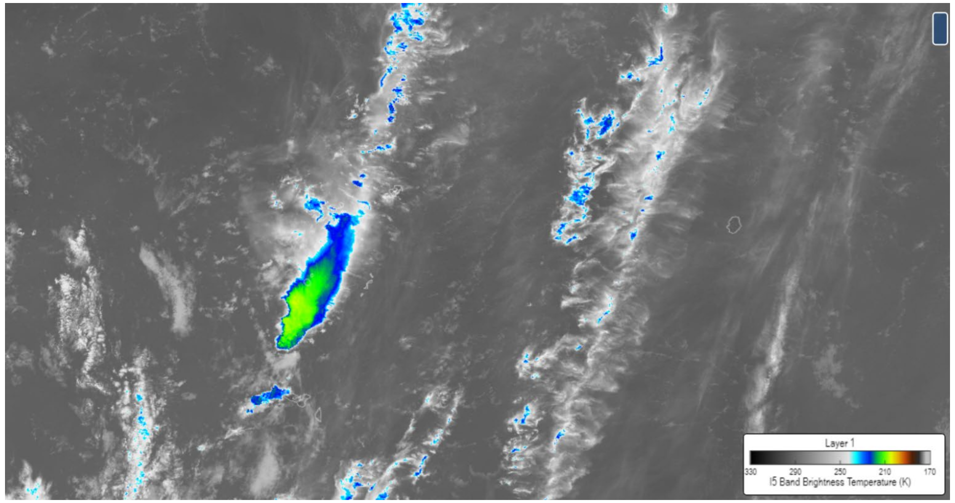
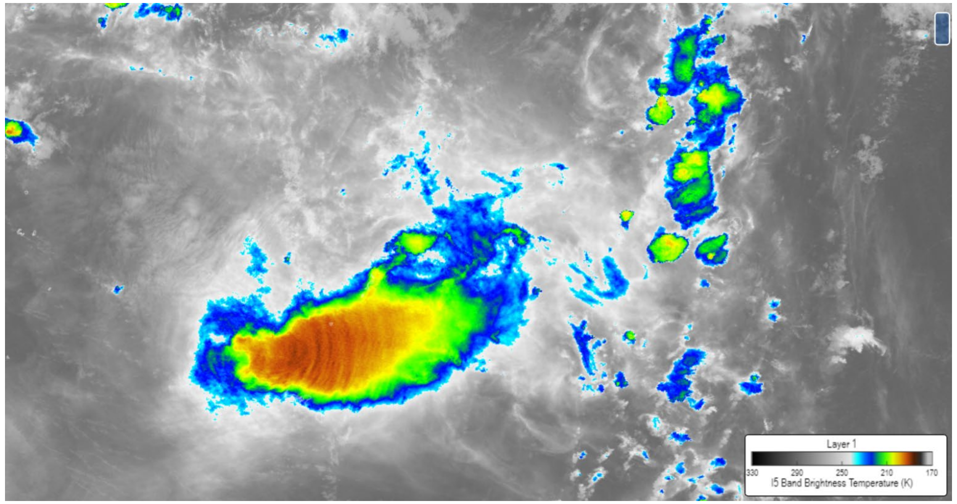
February, 2022

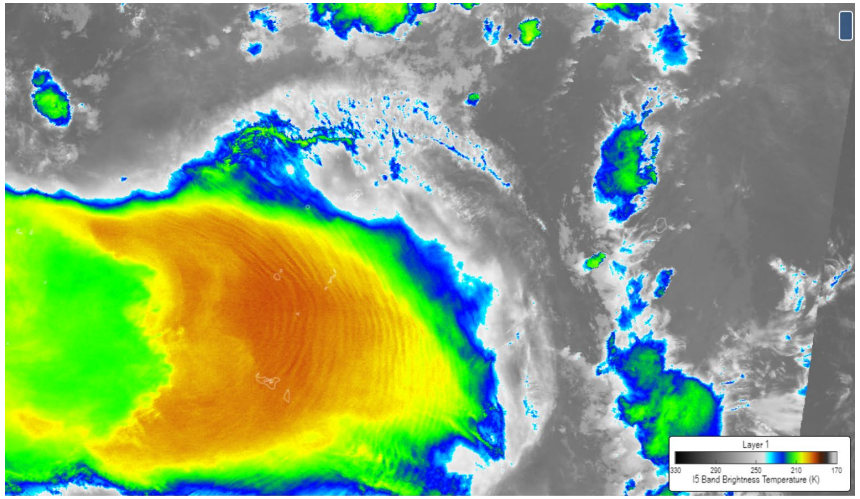
Highlights from the Science Teams (January)

Volcanic Eruption in Tonga (Part 1)



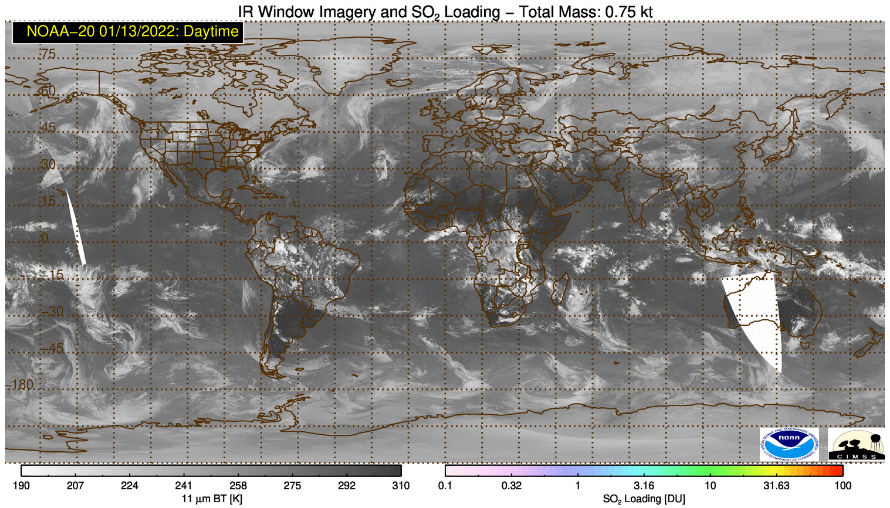
In late December 2021 an subsurface volcano in Tonga began erupting. The smaller initials eruptions (upper left, Dec 21) were followed by a much larger eruption on Jan 14 2022 (lower left), then a historically large eruption the next day (lower right). Various JPSS platforms were able to capture these eruptions, including the VIIRS I5 band seen in the images.



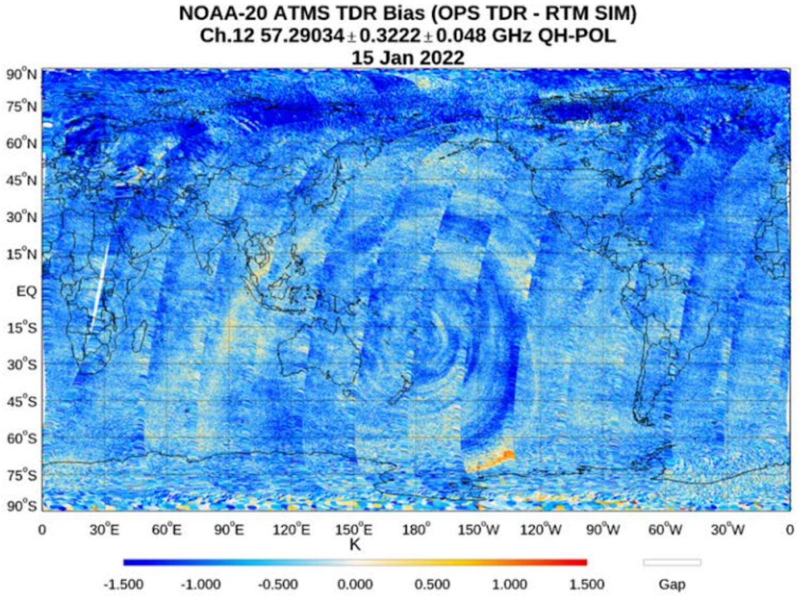


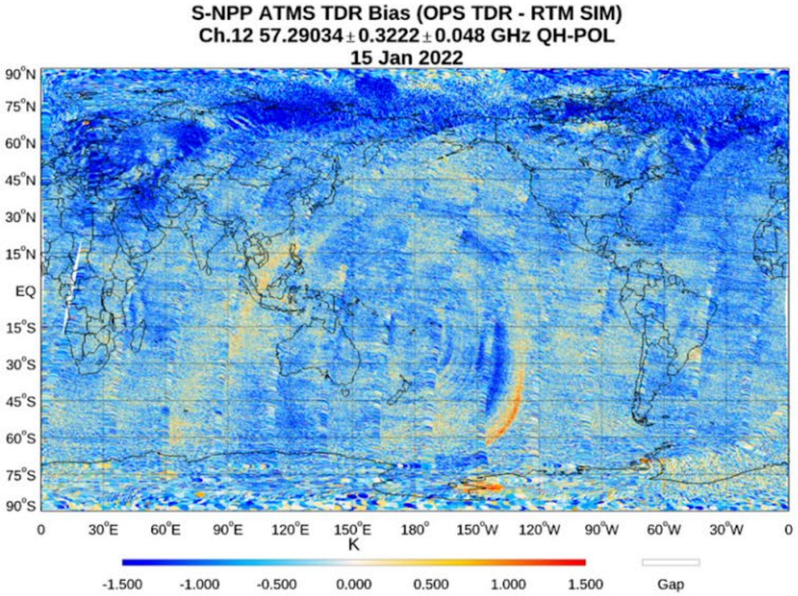
Highlights from the Science Teams (January)

Volcanic Eruption in Tonga (Part 2)

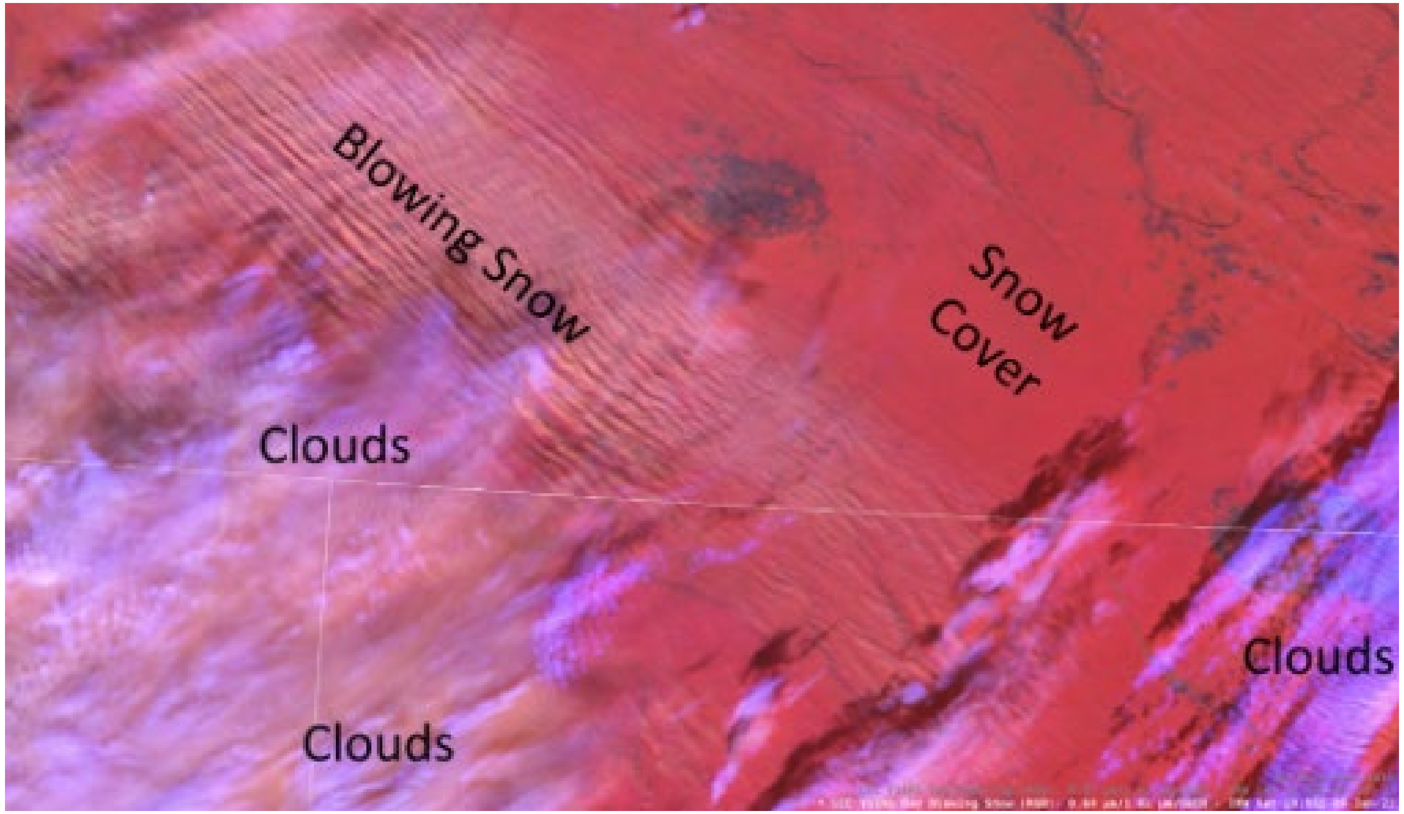


The Jan 15 eruption was so powerful that it released shockwaves that travelled around the world, causing pressure and temperature changes that were observable among other things, but comparing the ATMS TDR to EMCWF model output (below) where the shock wave showed up as concentric rings. It also released a large amount of sulfur dioxide which can be seen with the Volcat tool (using CrIS/VIIRS – see animation at left)





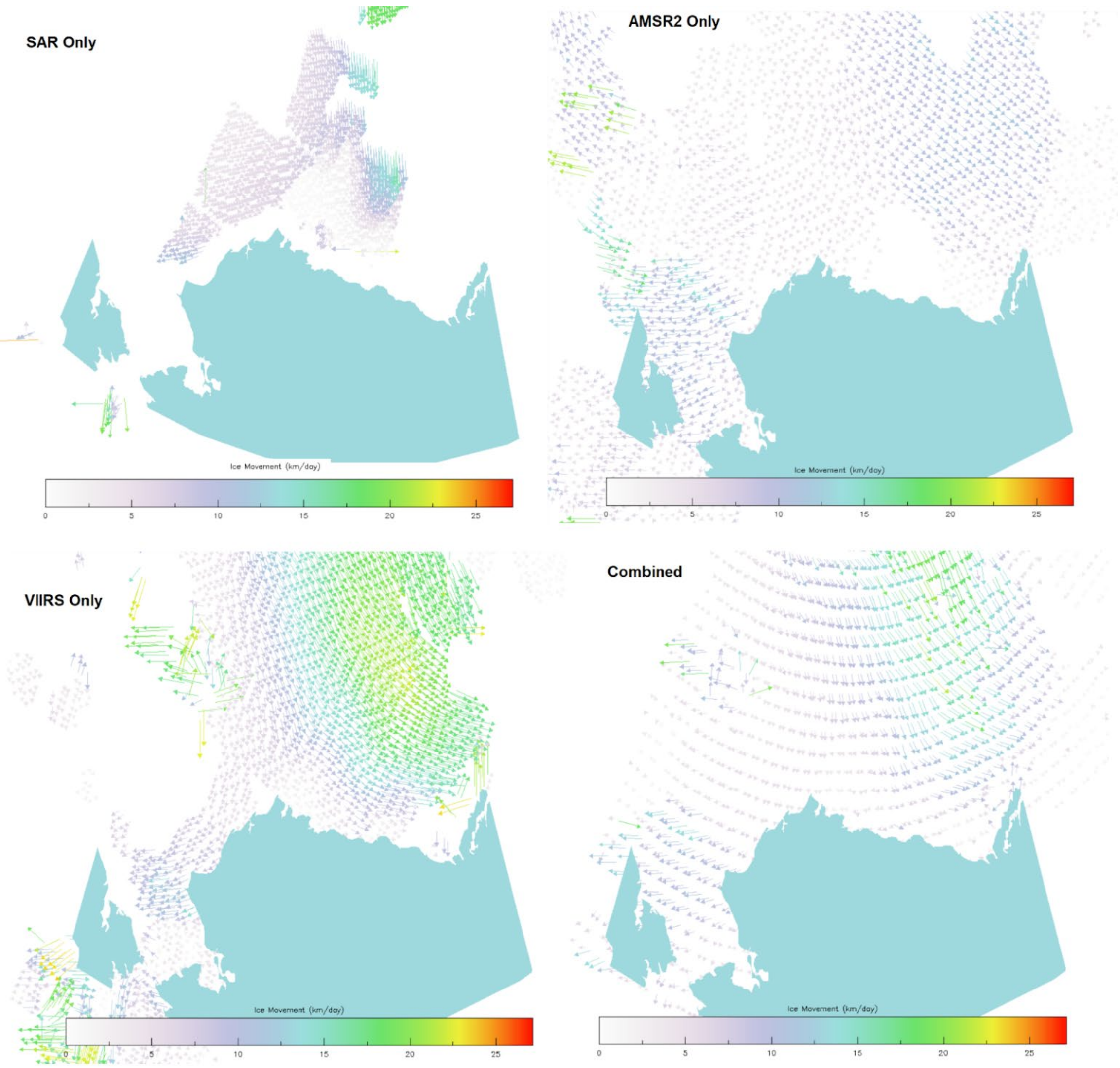
Detecting blowing snow with VIIRS



On Jan 8 a blowing snow even hit southern Canada and the Dakotas. The Imagery team at CIRA has developed an experimental product that can help forecasters distinguish blowing snow from clouds and ground based snow cover. The product, available for both GOES and VIIRS is show above (for VIIRS). The blowing snow appears as a pale yellow to whiteish color compared to the red background snow and the light purple clouds.

Highlights from the Science Teams (January)

Multisatellite Ice Motion Comparison



Recent ice motion in the Beaufort Sea derived from different satellite instruments was combined to generate an experimental "AMSR2+VIIRS+SAR" ice motion output during January 7-8, 2022.

These dates were chosen based on low cloud cover in the area, which is a limiting factor for the VIIRS ice motion product. In this case, all vectors within 0.5° latitude by 0.5° longitude box were averaged together (U- and V- components were added and then divided by the number of reporting sensors), but more advanced combination techniques will be considered.

This work supports the research milestone "**Explore new blending methods based on statistical analysis for incorporating SAR data in a daily product**" for the JPSS Risk Reduction Ice Motion

Accomplishments

- Delivery Algorithm Packages (DAPs) - Mission Unique Products:
  - 1/20/2022: STAR re-delivered OMSP SDR DAP (ADR9633/ CCR5577 OMPS Nadir Mapper geolocation code change for off-nadir geolocation error correction) to DPMS (with updated J2 test data outputs)

- DAPs – Enterprise Products:
  - 1/03/2022: Vegetation Health team delivered updated ATBD
  - 1/12/2022: STAR science team delivered updated V8TOz LUT/code to ASSISTT team
  - 2/02/2022: STAR delivered J2 Final Patch DAP for Surface Reflectance (v1r2) to NDE (maintenance delivery for NPP and N20)

    List of Code Changes: Removed the \0 characters from meta files; Changed NDE GFS file pattern in configuration file; Reverted the day_night_data_flag from 0/1/2 back to night/day/both
  - 2/03/2022: STAR delivered J2 Final DAP for V8TOz (v4r2) to NDE (maintenance delivery for NPP and N20)

    List of Scientific Changes: Added process of medium/high resolution OMPS J02 retrievals; The retrieval algorithm is switched from using narrow bandpass radiance/irradiance to using broader bandpass for the six longest channel wavelengths, and the LUTs are updated in accordance with this bandpass switch; New radiance adjustments (soft-calibration) are applied to both OMPS NPP and N20 retrievals to make the retrieved ozone and aerosol index be in agree with each other between NPP and N20; Solved the dimension issue when SDR data switches from Mx3 to Mx4; Added 4 corners geo-location information in the product outputs; Added timestamp and SDR source info in lookup tables and output file names
  - 2/03/2022: STAR delivered J2 Final DAP for V8TOs (v5r0) to NDE (maintenance delivery for NPP and N20)

    List of Scientific Changes: Variables/attributes/metadata name changes; One line code change to call the subroutine WT_NCDF_V8TOZSO2 with additional arguments CTIME and input V8TOZ file; Added POSTPROCESS directory (with new fortran code for the postprocessing of V8SO2 files); Modified testing scripts to test the postprocessing Fortran code

- IDPS Builds Checkouts /JPSS-2 Pre-Launch Testing events:
  - 1/06/2022: JSTAR submitted Block 2.3 Mx5 I&T review/checkout report to DPMS/RTN/OSPO
  - 1/26/2022: JSTAR submitted data request for Mx6 SOL review/checkout (no data required, skip the SOL review/checkout)

Accomplishments – JPSS Cal Val Supports

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	01/04/22, 01/11/22, 01/18/22, 01/25/22, 02/01/22, 02/08/22
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	01/04/22, 01/11/22, 01/18/22, 01/25/22, 02/01/22, 02/08/22
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	01/04/22, 01/18/22, 02/01/22
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	01/04/22, 01/11/22, 01/25/22, 02/08/22
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	01/11/22, 02/08/22
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	01/11/22, 02/08/22

- ***9/27/2021: VIIRS Global Annual Surface Type (AST-2020***): The new VIIRS Annual Surface Type 2020 product (AST-2020, spatial resolution: 1km) based on 2020 whole year surface reflectance data is now ready for users to download at STAR FTP sites. There are three products:
  - 2020 AST IGBP types in Sinusoidal projection
  - 2020 AST IGBP types in Lat/Long
  - 2020 AST 20 types in Lat/Long

- 01/06/2022: NDE release 2.0.29 operational, includes: RHEL6 to RHEL7 for AF_Iband, SR (to v1.2), VPW, and VH

- Jan-2022: STAR JPSS science teams participated and presented in AMS 2022 annual meeting (Jan. 23-27, 2022)

- Recent VIIRS imagery blog posts:
  - 1/12/2022: Blowing Snow Plumes in ABI and VIIRS Imagery
  - 1/20/2022: Use of Satellite Imagery During Blowing Snow Event

Upcoming Milestones/Deliveries

- JSTAR Code/LUT/Product Deliveries:

DAP to DPMS:

- May-22: Final launch-ready JPSS-2 PCT/MM-coef DAP (ATMS & CrIS)
- May-22: Final launch-ready JPSS-2 LUTs/MM-coef DAP (VIIRS & OMPS)
- Sep-22: NOAA-20 NCC LUT update (VIIRS Imagery)

NOAA-20/JPSS-2 Algorithm DAP to NDE/CoastWatch:

- Feb-22: Final J2 NUCAPS DAP (include NPP/N20 updates)
- Feb-22: Final NVPS J2 DAP (VI & GVF)
- Feb-22: Final J2 Active Fires DAP (include NPP/N20 updates)
- Feb-22: Final J2 Super DAP (Clouds, Aerosol, Volcanic Ash, Cryosphere, VPW, LST, LSA)
- Feb-22: Final J2 Global Gridded LST/LSA DAP (Prelim J2 DAP delivered to NDE on 12/30/2021)
- Feb-22: Final MiRS J2 DAP (include SFR)
- Mar-22: Final OMPS Ozone V8Pro DAP
- Mar-22: J2-ready Ocean Color DAP to ASSISTT (CoastWatch □ ASSISTT)
- Jun-22: J2-ready Ocean Color DAP to Cloud (ASSISTT □ NCCF)

FY22 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Algorithm Updates DAPs				
Final launch-ready JPSS-2 ATMS PCT/MM-coef DAP	May-22	May-22		
Final launch-ready JPSS-2 CrIS PCT/MM-coef DAP	May-22	May-22		
Final launch-ready JPSS-2 VIIRS LUTs/MM-coef DAP	May-22	May-22		
Final launch-ready JPSS-2 OMPS LUTs/MM-coef DAP	May-22	May-22		
Final J2 ready Super DAP (include NPP/N20 updates), Clouds/Aerosol/VolcanicAsh/Cryosphere/LST/LSA/VPW	Feb-22	Feb-22	**12/06/21 v3.1 patch**	
Final J2 ready Active Fires DAP (include NPP/N20 updates, I-Band)	Feb-22	Feb-22		
Surface Reflectance: Final J2 ready DAP	Oct-21	Oct-21	10/07/21 **02/02/22 (patch DAP)**	
NVPS (VI & GVF): Final J2 ready DAP	Feb-22	Feb-22		
Vegetation Health: Initial/Final (combined) J2 ready DAP	Dec-21	Dec-21	12/20/21	
SST: Final J2 ready DAP (ACSPO 2.80)	Dec-21	Dec-21	Initial/Final DAP: 09/16/21 EUM & SMM doc: 12/15/21	No final DAP delivery needed
NUCAPS: Final J2 ready DAP	Feb-22	Feb-22		
MiRS & SFR: Final J2 ready DAP	Feb-22	Feb-22	**12/30/21 v11.6 patch**	
OMPS Ozone V8Pro: Final J2 ready DAP	Mar-22	Mar-22		
OMPS Ozone V8TOz: Final J2 ready DAP	Jan-22	Jan-22	02/03/22 V8TOZ: v4r2; V8TOS: v5r0	11/26/21 to ASSISTT
L3 Global Gridded LST/LSA (J2 DAP)	Feb-22	Feb-22	**12/30/21 Prelim J2 DAP**	
Reformatting Toolkit	Feb-22	Feb-22		
AMSR-3 ready DAP (include AMSR-2 updates)	Sep-22	Sep-22		

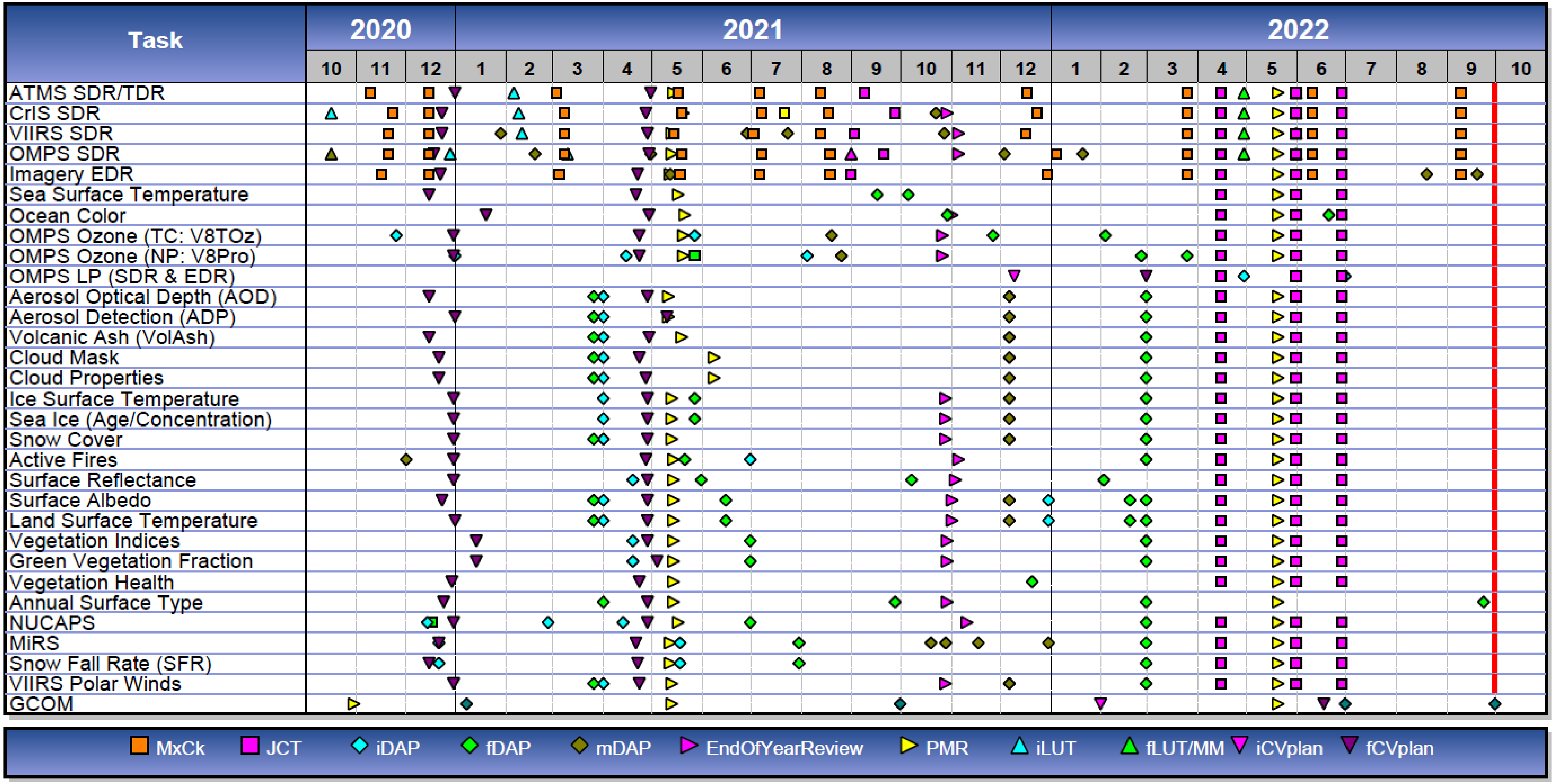
FY22 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
Algorithm Cal/Val/LTM				
FY21 End of Year Science Team Presentations (all teams)	Oct-21	Oct-21	Oct/Nov-2021	
FY23 Program Management Review (all teams)	Jun-22	Jun-22		
Enterprise Cal/Val plan for J2 OMPS LP SDR & EDR	Dec-21	Dec-21	12/09/21	
GCOM: AMSR-3/Enterprise Cal/Val Plan - draft delivery	Jan-22	Jan-22	Jan-22	
GCOM: AMSR-3/Enterprise Cal/Val Plan - final delivery	Jun-22	Jun-22		
AST-2021 (VIIRS Annual Surface Type)	Sep-22	Sep-22		
Support Alaska Demo (JPSS Aviation Initiative)	Sep-22	Sep-22		
JPSS-3 pre-launch test data review/analyze (SDR teams)	Sep-22	Sep-22		
Update J2-ICVS prototype to support J2 ICVS readiness(for JCT-3 test)	Feb-22	Feb-22		
Maintain / expand existing EDR LTM web pages and JSTAR Mappers	Sep-22	Sep-22		
Images of the Month	Monthly	Monthly		

FY22 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	10/05/21, 10/13/21, 10/19/21, 10/26/21, 11/02/21, 11/09/21, 11/16/21, 11/23/21, 11/30/21, 12/07/21, 12/14/21, 12/21/21, **01/04/22, 01/11/22, 01/18/22, 01/25/22, 02/01/22, 02/08/22**
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/13/21, 10/26/21, 11/09/21, 11/23/21, 12/07/21, 12/21/21, **01/04/22, 01/18/22, 02/01/22**
S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	10/12/21, 11/09/21, 12/14/21, **01/11/22, 02/08/22**
NOAA-20: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	10/05/21, 10/13/21, 10/19/21, 10/26/21, 11/02/21, 11/09/21, 11/16/21, 11/23/21, 11/30/21, 12/07/21, 12/14/21, 12/21/21, **01/04/22, 01/11/22, 01/18/22, 01/25/22, 02/01/22, 02/08/22**
NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/05/21, 10/19/21, 11/02/21, 11/16/21, 11/30/21, 12/14/21, 01/04/22, **01/11/22, 01/25/22, 02/08/22**
NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	10/12/21, 11/09/21, 12/14/21, **01/11/22, 02/08/22**
Block 2.3 Mx builds deploy regression review/checkout (**Jan-22 Mx5**; Mar-22 Mx6; Jun-22 Mx7; Sep-22 Mx8. SDRs and VIIRS Imagery teams)	Sep-22	Sep-22	**Mx5 SOL: 11/23/21; Mx5 I&T: 01/06/22**
Participant/support JPSS-2 pre-launch testing events (Feb-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22	

STAR JPSS Schedule: TTA Milestones



NOAA JPSS Monthly Program Office

DPMS/STAR
FY22

Lihang Zhou, DPMS Deputy
Bonnie Reed, DPMS Algorithm Sustainment

Feb 2022

Accomplishments - Transition to Operations and Algorithms

- **SNPP/N20**
  - Mx5 DP-TE data checkout by STAR; STAR provided GO on 1/4/2022
  - NDE release 2.0.29 occurred JAN 06
    - This release focused on algorithms that have yet to switch from RHEL6 to RHEL7
  - Algorithm Integration Team (AIT) worked with the OMPS JPSS Algorithm Manager (JAM), Algorithm Scientific Software Integration and System Transition Team (ASSISTT) and OMPS Science to ensure smooth testing of DR9633 OMPS Code Change and delivered Algorithm Sustainment Package to Raytheon for Mx7 inclusion.
  - AIT produced 2021 metrics of ADRs worked by the Algorithm Change Process - 301 ADRs in 2021.
- **J2 and Beyond**
  - Meeting was held on 1/14 with JPSS Ground, Flight, STAR and Spacecraft Vendor representatives to continue discussion of JPSS-2 alignment measurement needs
    - STAR provided information on what measurements are needed for their mounting matrix calculations
    - Northrop Grumman will provide a pre-dynamics measurement dataset and report by Feb. 14
- **Satellite Product Management (Legacy Migration, non-NOAA, MetOp-C) DACS PPM**
  - Continued supporting weekly meeting - drafted JPSS TTA

JPSS Project Milestones

Product Name	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Product Monitoring Phase V				
-- CDR	Dec-16	May-17	May 2017	Completed
-- SRR	Jun-19	Mar-22		TK: The schedule is aligned with the operational implementation of the products in the NCCF. Monitoring capabilities will be phased in starting in fall 2021 as each algorithm. This will begin with AVHRR clouds, winds, and SST.
-- ORR	Aug-19	Mar-22		
-- Operations	Sep-21	Mar-22		
NOAA-20: Hurricane Intensity and Structure Algorithm (JPSS-1 HISA)				
-- CDR	Oct-16	-	10/27/2016	Completed
-- SCR	Apr-19	--	4/2/19	Completed
-- ARR	Oct-19	No Update		
-- ORR	Dec-19	No Update		
-- Operations	Feb-20	No Update		
Enhanced TOAST with S-NPP OMPS Limb Profiles				
-- CDR	Jan-17	NA		No longer required
-- SCR	Apr-17	NA		No longer required
-- ORR	NA	NA		
-- Operations	Jun-17		2/2021	Completed
S-NPP and N-20 Flood Mapping Product				
-- CDR	Dec-19	Dec-19	Dec 2019	Completed
-- ARR	Mar-21	Feb-21	2/26/2021	Completed
-- ORR	May-21	Feb-22		
-- Operations	Jun-21	Mar-22		

JPSS Project Milestones

Product Name	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
S-NPP/N20 SST - ACSPO L3SST				
-- CDR	Dec-21	Mar-22		
-- ARR	Dec-22	Dec-22		
-- ORR	Jun-23	Jun-23		
-- Operations	Aug-23	Aug-23		
Advected Layer Precipitable Water (Blended TPW)				
-- CDR	Dec-21	-	12/16/2021	Completed
-- ARR	Oct-22	Oct-22		
-- ORR	Feb-23	Feb-23		
-- Operations	May-23	May-23		
Global Biomass Burning Emissions with VIIRS I-Band Fire (GBBEPx V5)				
-- CDR	Jan-21	-	1/27/21	Completed
-- ARR	Dec-22	Dec-22		
-- ORR	Apr-23	Apr-23		
-- Operations	Oct-22	May-23		
Ocean Color - OKEANOS SNPP and N-20 Legacy Migration				
-- CDR	Oct-20	-	1/27/21	Completed
-- ARR	Dec-21	Apr-23		ARR and ORR will be combined
-- ORR	Mar-22	Apr-23		Based on latest Red Team LM schedule
-- Operations	Apr-22	May-23		
J2 Algorithm Updates Completed				
Delivered to IDPS and NDE	Nov-21	Jan-22		Final DAPs to NDE scheduled for Jan-22 except for GCOM (FY23), VIIRS OC/C (Jun-22 to NCCF), OMPS NP, and OMPS LP

JPSS Risk Summary
Top Risks

Status as of: 02/01/2022

Rank Risk ID	Summary	LxC Trend	Aprch	Status
1 AMP-19-003	Some IDPS and STAR algorithms cannot use APIDs with 10Hz sample freq	3x2 ⇔	M	10/18/2021: No update, awaiting results of JCT3 TVAC data analysis.

LIKELIHOOD	1	2	3	4	5
5					
4					
3		1			
2					
1					
	CONSEQUENCES				

No Updates to the one AMP Risk
- awaiting JCT3 TVAC data analysis

Criticality
HIGH
MED
LOW

Approach
A – Accept
M – Mitigate
W – Watch
R – Research

LxC Trend
⇩ – Decreasing (Improving)
⇧ – Increasing (Worsening)
⇔ – Unchanged
NEW – Added this month

JPSS Top Risks

Rank	Risk ID	Risk Statement	Approach	Status
1 ⇔ Some IDPS and STAR algorithms cannot use APIDs with 10Hz sample freq	AMP-19-003	**Given that:** APID 11 (S/C Attitude and Ephemeris) and 30 (S/C Telemetry) sampling frequencies are at 10Hz on JPSS-2 **There is a possibility that:** Some IDPS and STAR algorithms will not be able to use any science products that has APID 11 and 30 or any APIDs with a sampling frequency of 10Hz **Resulting in:** Delays since IDPS geolocation algorithms cannot use 10Hz APIDs. During JCT3 IDPS has to geolocate J2 RDRs with J2 S/C Diary and if the geolocation algorithm is not compatible with the 10hz freq, it will affect IDPS's ability to geolocate J2 RDRs. STAR needs to consider the effect 10Hz APIDs will have on their GEO and sensor product algorithms.	**Mitigate**	10/18/2021: No update, awaiting results of JCT3 TVAC data analysis. 08/31/2021: JCT2A DSE flowed. About 3 orbits of JPSS-2 S/C diary and ATMS/CrIS/VIIRS to CLASS, GRAVITE, and NDE. All mission partners successfully received the JPSS-2 products. GRAVITE has ingested and made them available to users. 08/06/2021: JCT3 TVAC analysis resulted in the science team wanting an IDPS geolocation software code change. Which cannot be implemented and deployed to operations prior to the launch freeze (Launch - September 2022, launch freeze minus 60 days, roughly June 2022). Science teams will not know if an IDPS geolocation code change is desired, until after JCT3 TVAC data has been processed thru IDPS and analyzed. JCT3 TVAC is scheduled for end of February/March 2022. A code change can take 7 to 10 months from ADR/CCR inception - to operations. Below are two examples: CCR 5364 initiated Jan 2021 - in operations with Mx3 - July 2021 CCR 5165 initiated July 2020 - in operations with Mx1 - March 2021 With launch freeze ~60/90 days after receipt of JCT3 TVAC data, it is highly unlikely IDPS could be 'emergency' patched with a code change (tested in factory, and assess all JPSS-2 products) prior to launch freeze. Changes to code would have to be post JPSS-2 launch. 06/03/2021: IDPS expected to provide all sensor RDR data during JCT-2 DSE event, which will occur towards the end of August. The analysis performed on this data should provide the final results needed to confirm the geolocation data which will influence the closure of this risk. <See Previous slides for earlier status updates>

Color code:

Green:	Completed Milestones
Gray:	Non-FY22 Milestones

ATMS SDR

January, 2022

Accomplishments / Events:

- Kept discussing the potential uncertainties observed in the transition of ground test antenna beam measurements to on-orbit processing coefficients due to the transfer of multiple coordinates during the calculation.
- Discussed the expected delivery of JPSS-2 ATMS mounting measurement data sets from NG-Gilbert. Due to the change of the spacecraft vendor, the derivation of ATMS mounting coefficients for on-orbit geolocation calculation may change because of the discrepancy of mounting measurements. Communications with NG-Gilbert engineer suggested that a testing measurement data sets will be delivered to STAR ATMS cal/val team before the official delivery. Following-up discussed with NG-Gilbert and NG-Azusa, the ATMS vendor, will be scheduled to ensure the accuracy of operational coefficients.
- Discussed the preparation of upcoming JPSS-2 ATMS observatory level thermal vacuum testing. Reviewed the verification objectives and procedures previously applied in S-NPP and JPSS-1 ATMS spacecraft TVAC. Sample data sets from JPSS-1 and JPSS-2 ATMS observatory TVAC testing were revisited and ensure data analysis packages are ready.
- Kept updating JPSS-2 spacecraft telemetry and diary RDR data decoder using the latest format change with NASA Flight Project POC. Tested the updated J2 spacecraft telemetry data decoding program using JCT2a DSE data to verify ATMS related spacecraft telemetry parameters

Overall Status:

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

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

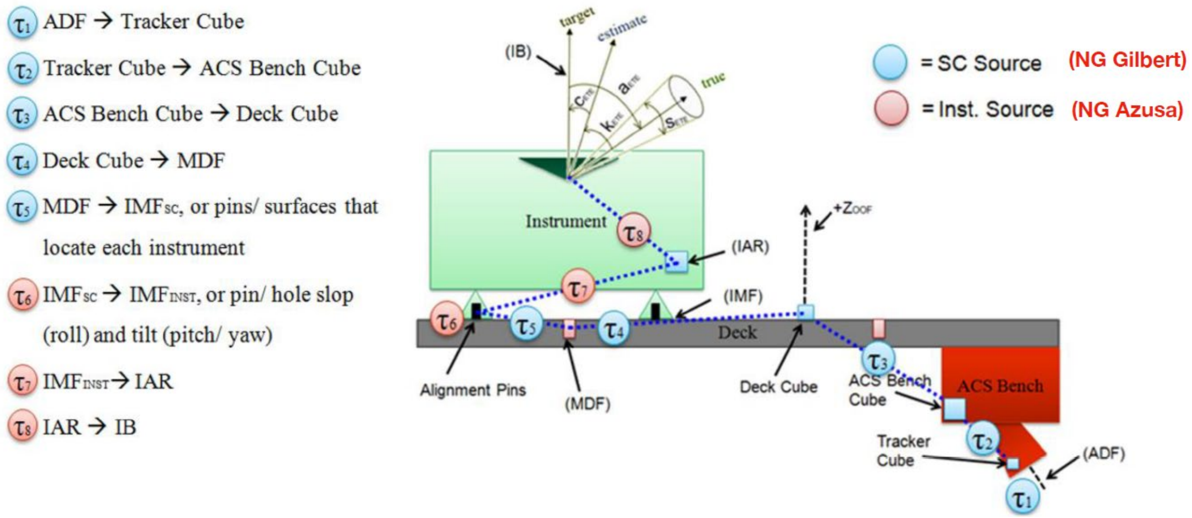
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Generate JPSS-2 ATMS mounting matrix coefficients (MM-coef) based on the JPSS-2 pre-launch instrument interface alignment measurements report	Mar-22	Mar-22		
Update of ATMS non-linearity correction coefficients after applying TVAC target thermal gradient correction	Mar-22	Mar-22		
Verify and finalize JPSS-2 ATMS processing coefficients table (PCT) using JPSS-2 pre-launch JCT data (JCT-3 satellite TVAC data)	Mar-22	Mar-22		
Deliver final launch-ready JPSS-2 ATMS PCT/MM-coef DAP to ASSISTT	Apr-22	Apr-22		
Deliver final launch-ready JPSS-2 ATMS PCT/MM-coef DAP to DPMS	May-22	May-22		
FY23 Program Management Review	Jun-22	Jun-22		
Improvement of ATMS lunar calibration algorithm by updating lunar temperature estimation model	Aug-22	Aug-22		
Analyze ATMS reprocessing data. Cooperate with EUMETSAT for ATMS reprocessing data application in climate study	Sep-22	Sep-22		
JPSS-3 ATMS pre-launch measurement and test data review/analyze	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Jan-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		
Block 2.3 Mx builds deploy regression review/checkout (Dec-21 Mx5; Mar-22 Mx6; Jun-22 Mx7; Sep-22 Mx8)	Sep-22	Sep-22	12/17/21 Mx5	

Highlights:

Coordinates Transformation from Spacecraft Deck to ATMS for the Generation of On-orbit Mounting Coefficients



CrIS SDR

January, 2022

Accomplishments / Events:

- SNPP CrIS celebrated 10 years of continued high science impact data this month. The long-term radiometric comparison between SNPP and NOAA-20 CrIS highlights that SNPP CrIS continues to provide high quality hyperspectral observation data even after major sensor anomalies **(Fig. 1)**.
- Four presentations were presented by the CrIS SDR team at the 2022 AMS annual meeting.
- Developing enhancements to the CrIS cloud detection algorithm by providing slat-path atmospheric profiles to CRTM. It has been shown that the slant-path model correction has a relatively large impact on the channels with the peak weighting function reaching the upper troposphere **(Fig. 2)**.
- The Neon mitigation plan is continuing to be developed and documented. An initial assessment of the spectral impact of extending the interval between neon lamp activations has been conducted **(Fig. 3)**.
- NOAA-20 CrIS saw an end of a 15th noise event on Jan 13, and a 16th noise evet starting on Jan 20, and ended on Jan 21.
- Progress was made in the development of the PC score using the classic approach combined with the hybrid methodology, consisting of utilizing a global set of eigenvectors and an additional set of local eigenvectors within a single granule. The reconstructed radiance was computed using this hybrid approach **(Fig.4)**.
- Investigated the CrIS observations over the Tonga Volcano Eruption that took place on January 15. Although many cloudy data points were screened out, the brightness temperature changes due to the gravity wave in the atmosphere can still be detected and observed in the O-B plots.
- Supported the creation of ADR9850 associated with an update of the xml files to change the ambiguous descriptions and the inconsistent data range with the associated data type. The update will ensure the CrIS PCT look up table can be properly edited by the designated editor called EBX.

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		See Issues/Risks

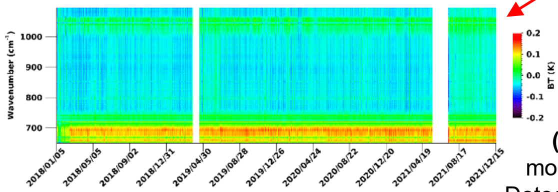
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

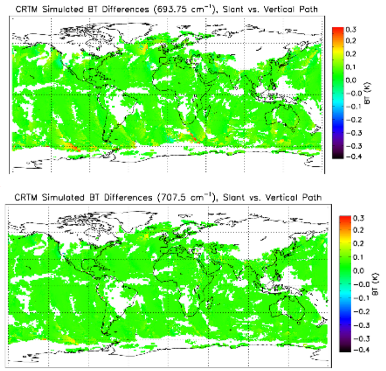
Dr. Zhipeng (Ben) Wang left the CrIS SDR team to work at NASA, he was mainly focused on the spectral calibration and CrIS/ABI intercomparison work. **Dr. Lin Lin has joined the CrIS Team to provide support at 0.8 FTE starting on Jan 24, 2022.** Dr. Erin Lynch left the CrIS SDR team to work for NOAA/OPPA as a federal employee. She was mainly focused on the Geolocation calibration and the CrIS/IASI intercomparison work. **The team is working on finding the corresponding support.**

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	10/29/21	
Deliver the engineering packet v42 with new mapping parameters for SNPP CrIS	Oct-21	Oct-21	10/22/21	
Report the comparison assessment of CrIS radiometric nonlinearity correction formalism	Feb-22	Feb-22		
Support and participate in the J3 CrIS Pre-ship Review	Mar-22	Mar-22		
Generate JPSS-2 CrIS mounting matrix coefficients (MM-coef) based on the JPSS-2 pre-launch instrument interface alignment measurements report	Mar-22	Mar-22		
Verify and finalize JPSS-2 CrIS processing coefficients table (PCT) using JPSS-2 pre-launch JCT data (JCT-3 satellite TVAC data)	Apr-22	Apr-22		
Deliver final launch-ready JPSS-2 CrIS PCT/MM-coef DAP to ASSISTT	Apr-22	Apr-22		
Deliver final launch-ready JPSS-2 CrIS PCT/MM-coef DAP to DPMS	May-22	May-22		
JSTAR CrIS Website upgrade	Aug-22	Aug-22		
Demonstrate the functionality of the methods planned to be used to mitigate the failure of the J2 CrIS neon calibration system	Sep-22	Sep-22		
New developments and studies (working on the CrIS principal components generation, enhance the infrared cloud detection algorithm for radiometric assessment)	Aug-22	Aug-22		
FY23 Program Management Review	Jun-22	Jun-22		
JPSS-3 CrIS pre-launch measurement and test data review/analyze	Sep-22	Sep-22		
JPSS-3 CrIS Pre-launch evaluation tools development	Sep-22	Sep-22		
JPSS-3 Flight/Ground support	Sep-22	Sep-22		
Radiometric inter-comparison of S-NPP and NOAA-20 CrIS SDR data against other IR observations, including MetOp/IASI, AQUA/AIRS and GOES/ABI	Jun-22	Jun-22		
Perform regular RDR and SDR data analysis for instrument and data health	Sep-22	Sep-22		
Support investigation and resolution of anomalies from CrIS sensors including potential intensive Cal/Val activities	Sep-22	Sep-22		
Participate/support JPSS-2 pre-launch testing events (Jan-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		
Block 2.3 Mx builds deploy regression review/checkout (Dec-21 Mx5; Mar-22 Mx6; Jun-22 Mx7; Sep-22 Mx8)	Sep-22	Sep-22	12/23/21 Mx5	

Highlights:

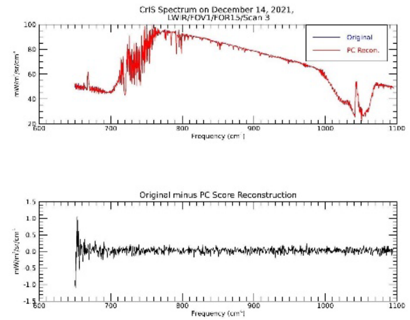


(1)Radiometric Intercomparison between SNPP and NOAA-20 CrIS highlighted for the 10 year Anniversary of SNPP-CrIS

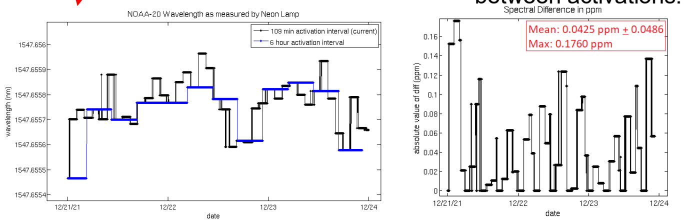


(2) Impact of the slant-path model correction on the cloud Detection algorithm used by the CrIS team for the (Top) 697.75 cm^{-1} the and (Bot.) 707.5 cm^{-1} channels

(4) (Top) Computed reconstructed radiance using new hybrid approach. (Bot.) Difference between original and reconstructed radiance



(3) (Left) Time Series of the Laser Wavelength measured by the neon lamp using two different activation period intervals. (Right) Spectral impact of increasing the interval between activations.



VIIRS SDR

January, 2022

Accomplishments / Events:

- Processed with ADL and analyzed JPSS-2 VIIRS data acquired during JCT-3 Ambient test that included simulated VIIRS calibration maneuvers
- Created and delivered for deployment in the IDPS operations updated NOAA-20 and Suomi NPP DNB offset and gain ratios LUTs generated using the new moon calibration data from January 1-2, 2022
- Assisted in scheduling NOAA-20 and Suomi NPP roll maneuvers for VIIRS lunar calibration on January 13, 2022, and analyzed the collected data to monitor radiometric response of the reflective solar bands
- Participated in AMS annual meeting (Jan. 23-27, 2022) with the following oral presentations focusing on the calibration/validation of VIIRS:
  - "Stable Ocean Site for Thermal Emissive Band Inter-Calibration"
  - "Mitigating NOAA-20 VIIRS Thermal Emissive Bands Scan Angle and Scene Temperature Dependent Biases in the NOAA Operational Processing"

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			

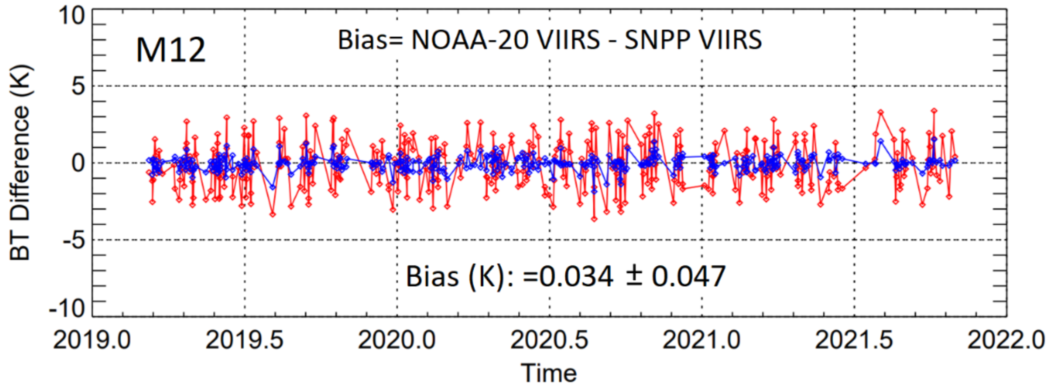
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/05/21	
DAP delivery (ADR9760/CCR5724, N20 VIIRS-SDR-F-PREDICTED-LUT Update #7)			10/27/21	
Generate JPSS-2 VIIRS mounting matrix coefficients (MM-coef) based on the JPSS-2 pre-launch instrument interface alignment measurements report	Mar-22	Mar-22		
Verify and finalize JPSS-2 VIIRS lookup tables (LUTs) using JPSS-2 pre-launch JCT data (JCT-3 satellite TVAC data)	Mar-22	Mar-22		
Deliver final launch-ready JPSS-2 VIIRS LUTs/MM-coef DAP to ASSISTT	Apr-22	Apr-22		
Deliver final launch-ready JPSS-2 VIIRS LUTs/MM-coef DAP to DPMS	May-22	May-22		
FY23 Program Management Review	Jun-22	Jun-22		
NOAA-20 VIIRS TEB RVS and Offset change testing and validation	Dec-21	Dec-21	Nov-21	
RDR code change to handle anomalous packets(similar to DB anomaly over Mexico)	Mar-22	Mar-22		
Develop VIIRS Global Area Coverage (VGAC) production capabilities in collaboration with NCEI to meet user needs (ISSCP, EUMETSAT, and others)	Sep-22	Sep-22		
OnDemand reprocessing delivery to CLASS (SNPP recalibrated & reprocessed VIIRS SDR)	Sep-22	Sep-22		
NOAA-20 VIIRS recalibration & reprocessing (on CLOUD)	Sep-22	Sep-22		
Delivery of VIIRS RSB calibration LUTs to mitigate degradation, as needed	Sep-22	Sep-22		
Delivery of VIIRS DNB straylight LUTs, as needed	Sep-22	Sep-22		
NOAA-20 VIIRS as GSICS reference	Mar-22	Mar-22		Report 1
Absolute calibration using CEOS RadCalNet Sites	Jun-22	Jun-22		Report 2
Offline RSB/DNB/TEB Cal/Val analyses	Jun-22	Jun-22		Report 3
Continue cross-calibration and monitoring between NOAA-20 and SNPP VIIRS	Sep-22	Sep-22		Report 4
JPSS-3 VIIRS pre-launch measurement and test data review/analyze	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Jan-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		
Block 2.3 Mx builds deploy regression review/checkout (**Dec-21 Mx5**; Mar-22 Mx6; Jun-22 Mx7; Sep-22 Mx8)	Sep-22	Sep-22	**12/16/21 Mx5**	
Operational Support: VIIRS LUT update of DNB Offsets and Gains (S-NPP & NOAA-20)	Monthly	Monthly		

Highlights:



Identified an ocean site (30N/113W) over Gulf of California with least diurnal variation suitable for inter-sensor calibration of emissive bands: Derived Brightness Temperature (BT) bias between NOAA-20 and SNPP VIIRS (N20 - SNPP VIIRS) before (Red) and after (Blue) correcting the view zenith angle differences over the stable ocean site

OMPS SDR

January, 2022

Accomplishments / Events:

- Delivered OMPS biweekly NP solar irradiance bi-weekly LUTs.
- Continued studying in depth the J2 OMPS characterization at the prelaunch in order to prepare the J2 launch-ready OMPS LUTs.
- Continued the OMPS NM/NP x-sensor comparison code development via the VCRTM
- Further updated the SNR PCA (EOF) analysis methods to support J2 OMPS NM SDR data analysis by using the NOAA-20 medium data as proxy
- Prepared and presented 3 talks at the 102nd AMS meeting. Time series of SNPP OMPS NM radiance are given next slide.
- Completed the versification of the SNPP OMPS SDR reprocessing by checking over hundreds of LUTs. A new reprocessing for one month of the data is in progress to resolve the anomalous LUT issue (see the following bullet)
- Derived the updated NP solar wavelength LUTs by using the V02 reprocessed SNPP OMPS-NP SDRs to verify the quality of the used LUTs for the V02 reprocessing. Two anomalous solar LUTs were discovered (see the figure on the right lower panel). The reprocessing of the data during this period (one month) is needed.

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
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/05/21	
DAP (ADR9633/CCR5577 OMPS TC geolocation code change for off-nadir geolocation error correction)			12/03/21	
Generate JPSS-2 OMPS mounting matrix coefficients (MM-coef) based on the JPSS-2 pre-launch instrument interface alignment measurements report	Mar-22	Mar-22		
Verify and finalize JPSS-2 OMPS lookup tables (LUTs) using JPSS-2 pre-launch JCT data (JCT-3 satellite TVAC data)	Mar-22	Mar-22		
Deliver final launch-ready JPSS-2 OMPS LUTs/MM-coef DAP to ASSISTT	Apr-22	Apr-22		
Deliver final launch-ready JPSS-2 OMPS LUTs/MM-coef DAP to DPMS	May-22	May-22		
FY23 Program Management Review	Jun-22	Jun-22		
OMPS SDR Calibration ATBD (update)	Jun-22	Jun-22		
Development/Update (Internal delivery):				
ADL-OMPS offline processing code update (with flexible NM resolutions)	Jul-22	Jul-22		
ADL-OMPS diagnostic (>380 nm) offline code development for geolocation	Aug-22	Aug-22		
OMPS polarization impact and mitigation algorithm development	Aug-22	Aug-22		
1) J2 OMPS SNR calculation algorithm code update 2) J2 OMPS SDR solar intrusion detection code prototype	Jan-22	Jan-22	Jan-22	
1) J2 OMPS NM/NP Day-1 solar analysis code prototype using NOAA-20 as proxy 2) OMPS NM/NP x-sensor comparison code development (e.g., RTM/DCC methods)	Feb-22	Feb-22		
1) J2 OMPS geolocation error assessment code update using JCT3 OMPS SDR data and J2 mounting matric coef. 2) OMPS dark and solar raw flux processing code update 3) Inter-sensor code prototype development (e.g., SNPP/NOAA-20/J2 OMPS, OMPS-GOME-2)	Apr-22	Apr-22		
1) OMPS Wavelength registration change investigation from ground to flight 2) J2 High resolution risk mitigation algorithm development update in support to J2 3) J2 OMPS pre-launch straylight correction analysis 4) OMPS SDR quality validation baseline tool prototype developments (e.g., RTM-DD, SNO-DD, NM (VIIRS)-DD, 32D-AD) 5) NM/NP SDR re-processing and data stability analysis update 6) Assess impact of a new solar reference data on OMPS NM/NP SDR data quality	Sep-22	Sep-22		
Sustainment, monitoring, maintenance S-NPP & NOAA-20 in flight performance	Sep-22	Sep-22		
JPSS-3 OMPS pre-launch measurement and test data review/analyze	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Jan-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		
Block 2.3 Mx builds deploy regression review/checkout (**Dec-21 Mx5**; Mar-22 Mx6; Jun-22 Mx7; Sep-22 Mx8)	Sep-22	Sep-22	**01/04/22 Mx5**	
Operational Support: Weekly updates darks for NM and NP (S-NPP & NOAA-20)	Weekly	Weekly		
Operational Support: Bi-weekly update NP Wavelength and solar flux (S-NPP & NOAA-20)	Bi-Weekly	Bi-Weekly		

Verification of Spectral Wavelength Shift LUTs for Newly Reprocessed OMPS NP Data: Life-Time SNPP OMPS NP SDR Spectral Wavelength Shift Time Series Using 4 Versions of Solar LUTs

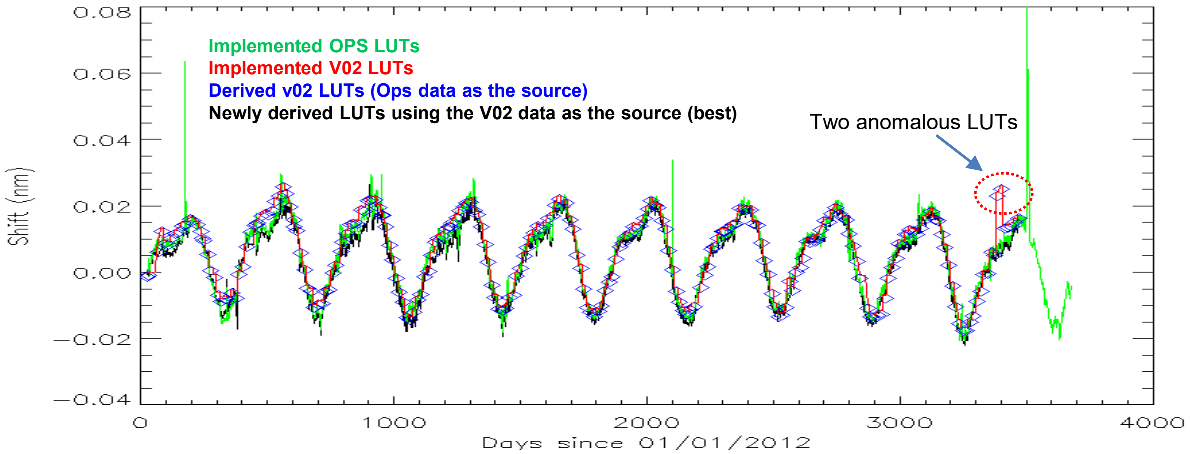
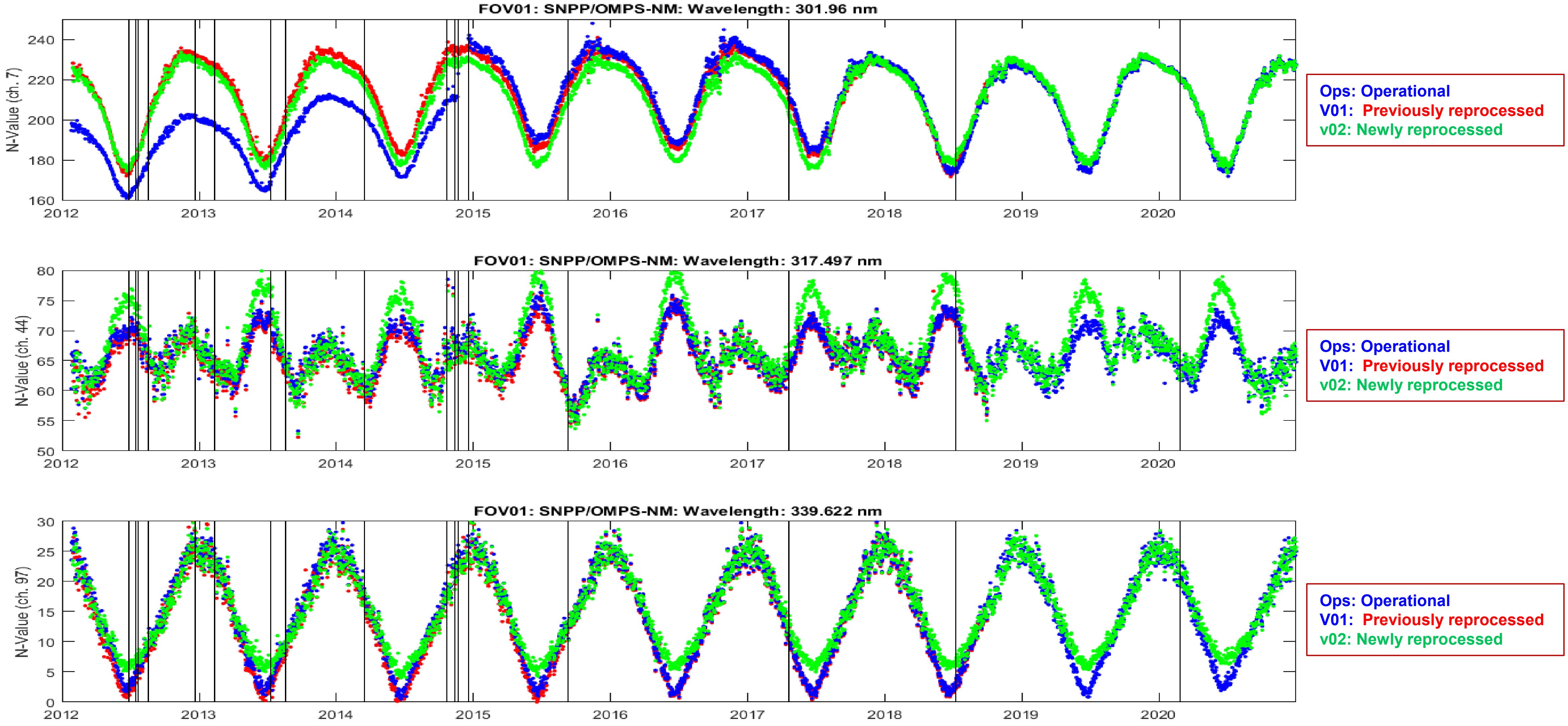


Fig. Life-time SNPP OMPS NM SDR spectral wavelength shift time series by using four version of Solar LUTs, i.e., the operational (green), the implemented LUTs in the v02reprocessing (red), the derived LUTs for the v02 reprocessing (blue) using operational SDR data, the newly derived LUTs (black) by using the v02 SDR data. This cross-validation leads to the discovery of two anomalous LUTs in the version 2 reprocessed SNPP OMPS-NP SDRs. Reprocessing of SNPP NP SDR data by using the two corrected LUTs (black color) are currently under development.

Life Time (LT) Performance of SNPP OMPS NM Data at 3 Wavelengths: the newly reprocessed data show the best quality-consistent performance

SNPP NM Off-Nadir (FOV1) Nvalue Time Series between 3 Versions over Antarctic 59°S ~ 61°S



The new reprocessed data demonstrate a quality-consistent LT performance, showing the largest impacts on short wavelengths.

SDR Reprocessing

January, 2022

Accomplishments / Events:

- The official transition of the reprocessed SDRs to CLASS/NCEI started on December 1, 2021 and the transition of the reprocessed SNPP ATMS V1 and V2 data was completed in December 2021.
- The transition of the reprocessed SNPP CrIS data to CLASS/NCEI started on January 3, 2022.
- 77.38 TB of the reprocessed SNPP CrIS data has been transitioned (as of 1/31/2022).
- It's expected that the transition of the reprocessed SNPP CrIS data will be completed by the end of February 2022.
- The transition of the reprocessed SNPP OMPS V1/V2 and VIIRS data to CLASS/NCEI is scheduled to follow the completion of the CrIS data transition.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY23 Program Management Review	Jun-22	Jun-22		
Complete planning and testing on transition of S-NPP reprocessed SDR data to CLASS	Oct-21	Oct-21	Oct-21	
Complete transition of 1000 Tb of reprocessed S-NPP SDR data to CLASS	Sep-22	Sep-22		

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	54.18% Completed
	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	
	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	
	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	
Total				1764.65	

ICVS

January, 2022

Accomplishments / Events:

- Started updating ICVS JPSS instrument life time performance statistics to provide life time maximum and minimum values for selected monitoring parameters to monitor the JPSS instrument specification performance.
- Reported the NOAA-20 CrIS 15th MWIR FOV5 noise anomaly trending.
- Provided Hunga Tonga volcano eruption status by using JPSS satellite direct observations. Generated high resolution VIIRS image to demonstrate the gravity waves produced by the eruption.
- Developed the function to monitor the ICVS OMPS NM and NP radiance differences to support the OMPS SDR.
- Recovered the ICVS NOAA-20 vs. S-NPP ATMS double difference w.r.t. ECMWF simulations and RO simulations missing images to support JPSS science data quality monitoring. The ATMS 32-day running mean direct bias package was also updated to generate figures for comparison purpose.
- Continued supporting the VIIRS SDR reprocessing data quality verification Python code development and update.
- Drafted multiple ICVS related journal manuscripts including the overview of ICVS, general double difference products in ICVS, and CrIS-ABI double difference products.
- Provided near real time S-NPP and NOAA-20 spacecraft and instrument status and data quality monitoring report to support SDR team activities.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Update ICVS JPSS-2 modules to support J2 pre-launch JCT verification (Jan-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE) and on-orbit NRT monitoring	Sep-22	Sep-22		
Maintain the ICVS for SNPP and NOAA-20 including ICVS-GSICS Portal and provide anomaly reports	Sep-22	Sep-22		
Work closely with JPSS cal/val teams to facilitate the evaluations of SDR anomaly events	Sep-22	Sep-22		
Initialize a NRT geolocation accuracy monitoring module for SNPP/NOAA-20 OMPS NM in coordination with OMPS SDR team together	Nov-21	Nov-21	Nov-21	
Improve the ICVS SDR data quality evaluation testbed with more sensors	Dec-21	Dec-21	Dec-21	
Update the following sub-systems within the ICVS towards operations a) SNPP and NOAA-20 ICVS-Vector (dynamic visualization information) b) Git repository for ICVS software package version control	Feb-22	Feb-22		
Update the following sub-systems within the ICVS towards operation a) ICVS-Anomaly Impact Watch Portal (AWP) b) SNPP/NOAA-20 inter-sensor bias monitoring tool via the 32D-AD method	Mar-22	Mar-22		
Upgrade the ICVS-Vector (dynamic visualization information) for J2 using JCT as proxy data	May-22	May-22		
Initialize the instrument and data anomaly detection development using AI methods	Jun-22	Jun-22		
Initialize the S-NPP vs NOAA-20 ATMS inter-sensor bias trending product using double difference through RO profiles	Jul-22	Jul-22		
Initialize the cloud mask module for ICVS-OMPS (beta version)	Aug-22	Aug-22		
FY22 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/01/21	
FY23 Program Management Review	Jun-22	Jun-22		

Overall Status:

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

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

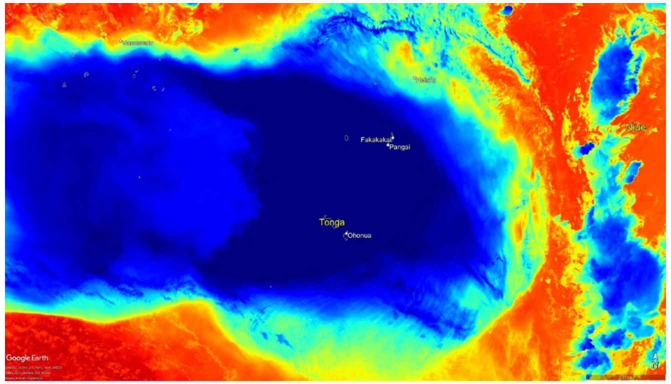
Issues/Risks:

None

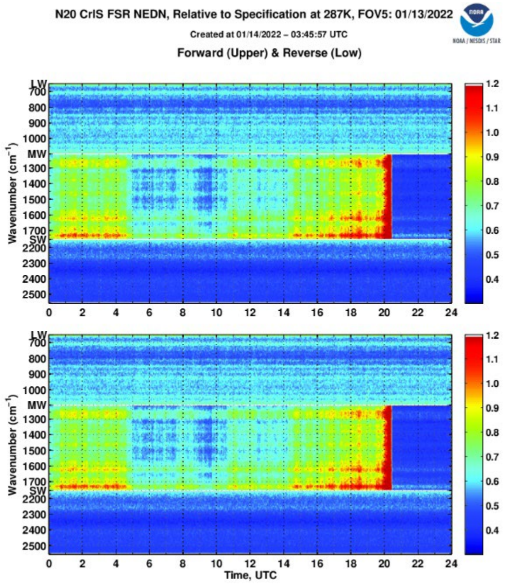
Highlights:

Significantly contribute to STAR SDR Teams

S-NPP VIIRS I5 band brightness temperature map over google earth for Hunga Tonga Volcano Eruption, showing gravity waves after the eruption east of volcano, on December 15th, 2021



NOAA-20 CrIS FSR NEDN, relative to spec., at MW FOV5, showing the sudden disappear of the anomaly



VIIRS Imagery

January, 2022

Accomplishments / Events:

- Bill Line took over as StAR Imagery (ABI and VIIRS) Team Lead on 1 Jan 2022. Don Hillger, previous team lead, retired, and is now available part-time at CIRA.
- The team reviewed a proposed change to the VIIRS EDR pixel quality flag.
- Bright pixels in SNPP M-6: The EDR Imagery Team has interacted with SDR team about this issue for a potential fix on the SDR level.
- Members of the team from CIRA and GINA met to discuss best practices and strategies for sharing VIIRS imagery on social media and increasing the reach of VIIRS imagery
- Team members presented at the AMS Annual Meeting, including “VIIRS EDR Imagery Changes and Improvements”
- Recent blog posts containing VIIRS imagery:
  - Blowing Snow Plumes in ABI and VIIRS Imagery,
  - Use of Satellite Imagery During Blowing Snow Event

Overall Status:

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

Code-change solution for NCC banding over Antarctica and Greenland for both NPP and J01 will be followed thru into operations.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
N20 NCC LUT update DAP (to ASSISTT)	Aug-22	Aug-22		
N20 NCC LUT update DAP (to DPMS)	Sep-22	Sep-22		
New Imagery products or product enhancements (display on SLIDER)	Sep-22	Sep-22	continuing	
Realtime Imagery monitoring and display systems (SLIDER, etc.)	Sep-22	Sep-22	continuing	
Images of the Month to STAR JPSS Program/website and interesting Imagery to Social Media outlets	Monthly	Monthly	continuing	
Participant/support JPSS-2 pre-launch testing events (Jan-22 JCT3-Ambient; Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		
Block 2.3 Mx builds deploy regression review/checkout (**Dec-21 Mx5**; Mar-22 Mx6; Jun-22 Mx7; Sep-22 Mx8)	Sep-22	Sep-22	11/23/21 Mx5 SOL 12/29/21 Mx5 I&T	

Highlights: Image of the Month

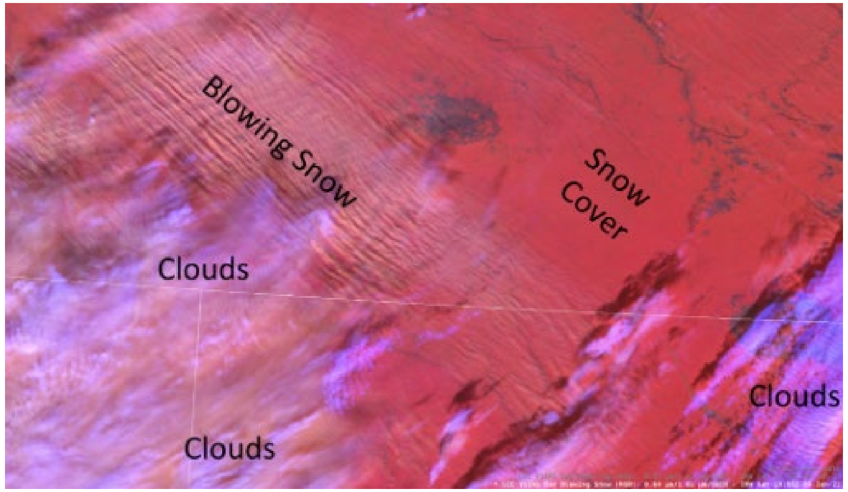


Figure: 08 Jan 2022 VIIRS experimental Blowing Snow RGB captures plumes of blowing snow across the MT/ND/Canada border.

Clouds

January, 2022

Accomplishments / Events:

-
- CBH products were evaluated using ARM ceilometer/lidar data for an extended period (Jan 2019-Dec 2021, NSA & SGP sites).The CIRA team is developing translation functions of the machine learning model transition from ABI to VIIRS for improved low cloud detection in multilayer cloud scenes, which translate VIIRS observations into ABI-like data from overlapping channels using a histogram matching approach.
- CIMSS cloud team is investigating cases provided by the CIRA and University of Alaska, where ECM1 is performing poorly (false clouding) over the very cold cloud-free night-time land. It is also the case for the ECM2. Figure 1 shows 11um Brightness Temperature, ECM1 and ECM2 from NOAA-20 over the Northern Alaska. Over the land there are false clouds marked as Probably Cloudy (red - ECM1) and Confidently Cloudy (white - ECM2). The team is searching for the ways to improve the performance of ECM2 by adding the new classifiers (tests) or restricting the current with some limits.

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:

- ***See next slides***

Highlights:

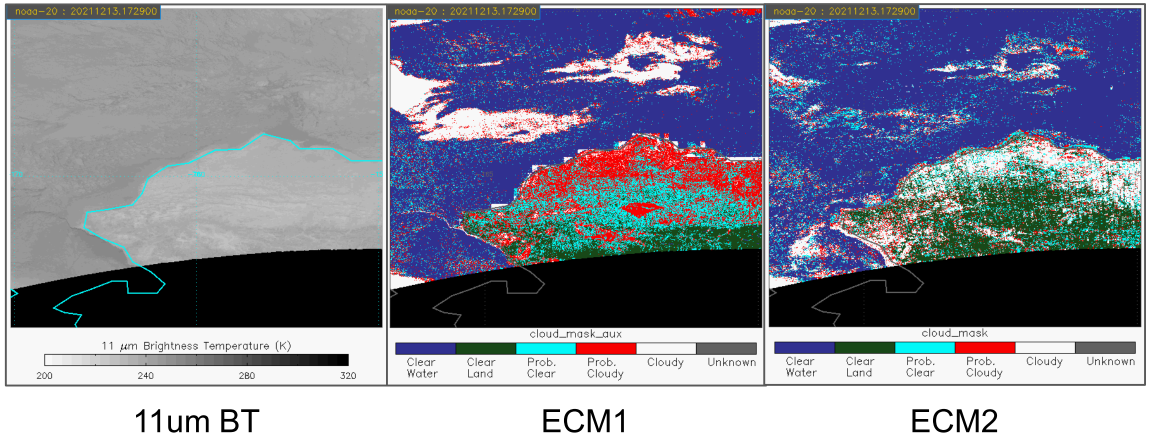


Figure 1. shows VIIRS NOAA-20, 2021-12-13 17:20 - 17:30 UTC, 11um BT (left), ECM1 (middle) and ECM2 (right). False clouds are marked over the land as Probably Cloudy (red) on the ECM1 image and Confidently Cloudy (white) on the ECM2 image.

Clouds (Cloud Mask)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Verify DNB and new ECM implementation within STAR Algorithm Processing Framework (SAPF) and adjust LUT based on feedback from teams	Jan-22	Apr-22		SAPF run delayed
Verify ECM LUT against J2 simulated data prior to J2 launch	Aug-22	Aug-22		
Support Alaska Demo and ESRL usage and reviews	Aug-22	Aug-22		
Work with NCEP on All Sky Radiance (ASR) assimilation. Adjust mask as necessary	Sep-22	Sep-22		
Apply CALIPSO tools to NDE Mask with Lunar Ref	Sep-22	Sep-22		
Continue collaboration wtith OAR/ESRL/GML on use of RadFlux Cloud Fraction for Verification including high-latitude sites	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Clouds (Cloud Phase/Type)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Optimize cloud phase thresholds for NOAA-21 and maintain code consistency with GOES-R deliveries	Aug-22	Aug-22		
Modify phase as needed based on height/winds interaction and development from GOES-R	Aug-22	Aug-22		
Support S-NPP and NOAA-20 EDR monitoring	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Clouds (ACHA)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Support NCEPs use for ASR assimilation	Jan-22	Sep-22		Making consistent with ECM date
Continue improving multilayer ACHA by analysis of CALIPSO and AEOLUS lidars and extend to level of best fit of Polar Winds	Jan-22	Sep-22		This is ongoing work
Verify extending the treatment of scattering to support 3.75 micron. Needed for NCOMP replacement	Aug-22	Aug-22		
Continue work on ACHA COMP and begin JPSS-2 ACHA COMP validation plan	Aug-22	Aug-22		
Continue working with FAA to adopt ACHA products instead of simplistic NCAR cloud heights. Continue support of Alaska Demo CTH requests	Aug-22	Aug-22		
Support Polar AMVs as needed including use of CrIS	Aug-22	Aug-22		
Continue to display ACHA products in CIMSS and STAR LTM site	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Clouds (DCOMP)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Improve the performance of thin ice clouds by using ACHA COD and will work with the ACHA team on development and validation	Aug-22	Aug-22		
Validate DCOMP at night using DNB	Aug-22	Aug-22		
Incorporate method to identify pixels with potentially incorrect phase within DCOMP DQFs	Sep-22	Sep-22		
Inter-sensor calibration studies by using visible reflectance and cloud optical thickness from GOES, JPSS and MODIS. Use this to adjust VIIRS M5 and M7 as needed	Sep-22	Sep-22		
Consistency checks for day and night retrievals	Sep-22	Sep-22		
Continuous use of microwave-based LWP data for validation	Sep-22	Sep-22		
Develop collaboration with OAR/ESRL/GML on use of RadFlux Cloud Optical Depth for Verification	Sep-22	Sep-22		
Improving the near real-time monitoring tools with (simple) web application	Sep-22	Sep-22		
Support several projects (i.e., processing of data, visualization tools, & ATMS/VIIRS precip for Alaska Demo)	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Clouds (NCOMP)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Consistency checks for day and night retrievals	Sep-22	Sep-22		
Continuous use of microwave-based LWP data for validation. (coordinate with DCOMP)	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Clouds (Cloud Base Height)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Verify DCOMP nighttime COD (DNB) improvement in Cloud Base for performance over NWP or IR-only	Jan-22	Apr-22		SAPF run delayed
Apply fix for SZA expansion of daytime DCOMP to 82º (degraded between 75-82º SZA)	Jan-22	Jan-22	Jan-22	
Implement low layer cloud confidence flags for multi-layer cloud systems, leveraging GOES-RR	Jan-22	Apr-22		This is ongoing work
Develop gridded products for vertical cross-sections and AWIPS-2	Sep-22	Sep-22		
Develop a new aviation website and incorporate feedback from NWS/AWC	Sep-22	Sep-22		
Support Alaska Demo and any necessary reviews	Sep-22	Sep-22		
Validate products from SAPF and continue data analysis using ARM, METAR, PIREPs, and CloudSat/CALIPSO	Sep-22	Sep-22		
Implement an updated lunar irradiance model in CLAVR-x for nighttime COD and compare products	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Clouds (CCL)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Continue CCL visualization and demo for the Aviation Weather Center, with focus on Alaska Region and Hawaii. Work directly with respective POC's and use feedback to improve CCL	Sep-22	Sep-22		
Support Alaska Demo and any necessary reviews	Sep-22	Sep-22		
Validate NDE CCL output, supercooled/convective probability layers for nighttime cases with lunar DCOMP included for Base	Sep-22	Sep-22		
Support ASSISTT update to NESDIS Data Exploitation (NDE) at appropriate time(s)	Sep-22	Sep-22		
Support consistency validation of products from CSPP	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Aerosol

January, 2022

Accomplishments / Events:

2022 AMS Conference Presentations:

- Development and Evaluation of the RRFS/CMAQ Inline System at NOAA. Jianping Huang, IMSG at NOAA/NWS/NCEP/EMC, College Park, MD; and R. Montuoro, B. Baker, X. Zhang, R. Schwantes, C. H. Jeon, C. H. Jeon, C. H. Jeon, C. H. Jeon, H. M. Lin, E. Strobach, H. C. Huang, C. R. Martin, S. McKeen, S. Wang, R. Ahmadov, Y. Tang, P. C. Campbell, B. Hughes, J. McQueen, F. Yang, I. Stajner, S. Kondragunta, and G. Grell
- Training and Outreach on NOAA Satellite Products for Atmospheric Smoke, Blowing Dust, and Urban Pollution Using Python Amy K. Huff, IMSG at NOAA/NESDIS/Center for Satellite Applications and Research, College Park, MD; and S. Kondragunta, I. Laszlo, H. Liu, M. Zhou, and P. Ciren
- Integrating Aerosols Observations from LEO and GEO to Create High-Frequency Global Datasets Pawan Gupta, Universities Space Research Association, Huntsville, AL; Universities Space Research Association and NASA MSFC, Huntsville, AL; and R. C. Levy, S. Mattoo, Z. Zhang, J. Wei, L. Remer, R. E. Holz, M. Oo, V. R. Sawyer, and S. Kondragunta
- Near-Real-Time Global Aerosol Data Assimilation and Forecasting Using the JEDI-Based Data Assimilation System and the CCPP Version of the GEFS-Aerosols Model at NOAA/OAR/GSL Bo Huang, CIRES and NOAA/OAR/GSL, Boulder, CO; and M. Pagowski, S. Trahan, S. Kondragunta, C. R. Martin, A. Tangborn, D. T. Kleist, and I. Stajner
- Air Quality and Atmospheric Composition Development at NOAA for the Unified Forecast System. Ivanka Stajner, NOAA, College Park, MD; and G. Frost, J. T. McQueen, R. Montuoro, C. R. Martin, J. Huang, H. M. Lin, C. H. Jeon, A. Tangborn, P. S. Bhattacharjee, L. Pan, H. C. Huang, E. Strobach, A. Cheng, B. Hughes, G. Grell, S. Sun, L. Zhang, M. Pagowski, B. Huang, H. Wang, R. Saylor, B. Baker, P. C. Campbell, D. Tong, Y. Tang, S. McKeen, R. Schwantes, J. He, S. Wang, M. Bela, S. Kondragunta, X. Zhang, E. Hughes, J. Wilczak, I. V. Djalalova, C. A. Keller, and J. Sleeman

Milestones:

- ***See next slides***

Overall Status:

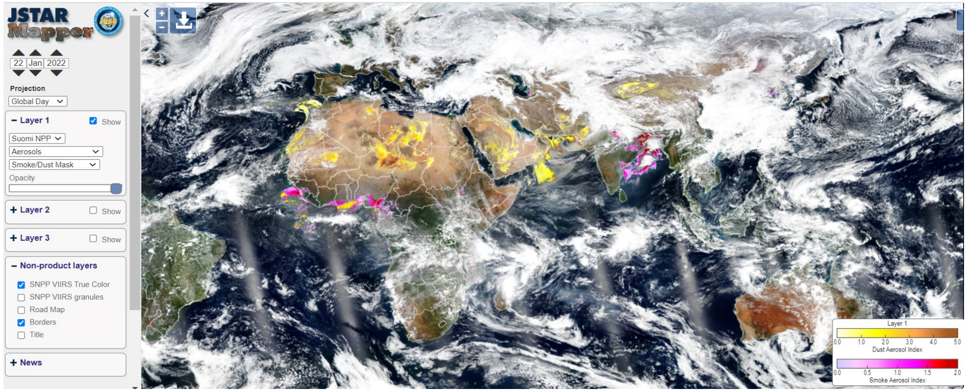
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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

Issues/Risks:

No risks

Highlights: Aerosol Smoke/Dust mask clearly shows significant dust over Arabian Sea January 22, 2022



Aerosol (AOD)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Evaluate robustness of method to determine AOD bias characteristics	May-22	May-22		
Complete implementation of AI-based surface reflectance relationship in VIIRS enterprise aerosol optical depth algorithm	Jun-22	Jun-22		
Extend record and evaluation of merged S-NPP/NOAA-20 and gridded global AOD products	Jul-22	Jul-22		
Based on latest J2 SRF update LUTs and other processing coefficients used in AOD algorithm	Aug-22	Aug-22		
Complete first assessment of multi-year VIIRS aerosol optical depth product (Summary report on accuracy and precision)	Aug-22	Aug-22		
Explore VIIRS AOD error characteristics for any relationship with aerosol model selection/residuals (Summary report identifying relationship between AOD error and retrieval residual, surface type)	Aug-22	Aug-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Aerosol (ADP)

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Exploring callback approach by including other bands for thick smoke/dust plumes, which are frequently missed due to cloud mask	Jun-22	Jun-22		
Further refining smoke detection over land in IR-Visible path by including more surface type from IGBP classifications to defining surface reflectance relationship, such as the approaches used in AOD algorithm. In addition, work will be carried out for reducing/eliminating the detected smoke plumes difference between two orbits	Jun-22	Jun-22		
Exploring regional thresholds for dust detection over land in deep-blue algorithm path	Jun-22	Jun-22		
Reprocess the entire SNPP and NOAA-20 VIIRS ADP and generate smoke and dust climatologies	Jun-22	Jun-22		
Analyze near real time aerosol optical depth and detection products for performance of quality flags and how to optimize the quality flags for a given scenario that can potentially lead to data artifacts	Jun-22	Jun-22		
Reducing false smoke detection for SO_2 plumes over ocean from volcanic eruptions by including 8.4 μm band, which is SO_2 absorption band	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Continue long-term validation of SNPP and NOAA-20 VIIRS ADP by comparisons with AERONET, CALIPSO, MISR, and IMPROVE	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Volcanic Ash

January, 2022

Accomplishments / Events:

- VOLCAT-related presentations at AMS annual meeting:
  - Volcanic Ash Forecasting Using HYSPLIT and VOLCAT Observations
    ***Allison M. Ring**, Cooperative Institute for Satellite Earth System Studies, College Park, MD; ARL, College Park, MD; and A. M. Crawford, J. Sieglaff, and M. J. Pavolonis*
  - Probabilistic Forecasting of Volcanic Ash
    ***Alice M. Crawford**, ARL, College Park, MD; and T. Chai, A. M. Ring, M. J. Pavolonis, B. Wang, and J. Sieglaff*

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			

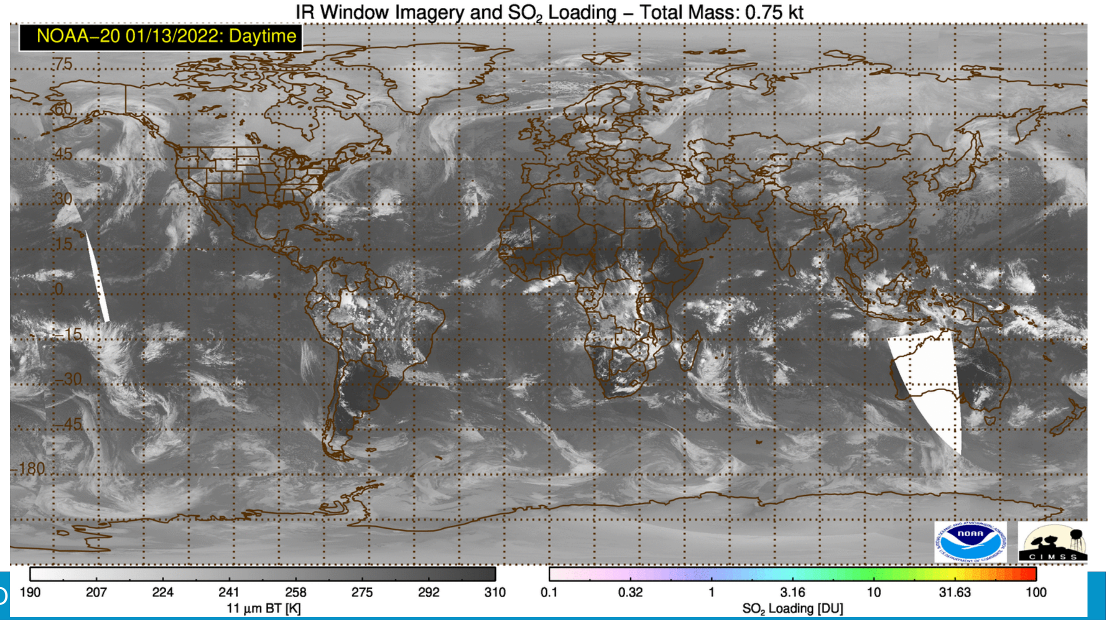
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Development activities that support transition to VOLCAT	Sep-22	Sep-22		
Software and LUT updates for J2	Sep-22	Sep-22		
Update thresholds and LUT's, if needed	Sep-22	Sep-22		
Routinely validate volcanic ash products	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights: The Hunga Tonga-Hunga Ha'apai SO_2 cloud was tracked by VOLCAT using a combined CrIS/VIIRS approach



Cryosphere

January, 2022

Accomplishments / Events:

*Recent ice motion in the Beaufort Sea derived from different satellite instruments was combined to generate an experimental "AMSR2+VIIRS+SAR" ice motion output during January 7-8, 2022.(see highlight)

* A comparison was performed between the NOAA-20 VIIRS Ice Concentration product and downward-looking airborne camera photos acquired during the Fall 2019 NASA IceBridge Antarctic campaign.For CAMBOT, the mean concentration was 85.41%; for NDE, 86.17%. Standard deviations were 10.3% and 7.0%, respectively.

* Analysis has shown a close agreement of the Global Multisensor Snow and Ice Mapping System (GMASI) snow extent in South America to snow extent derived from VIIRS data with the IDPS algorithm 2013-2019 and a much weaker correlation between GMASI and the NDE algorithm in 2017-2021. There were multiple changes of the cloud cover mask in the NDE system these years. Reprocessing needed with consistent cloud mask.

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.*

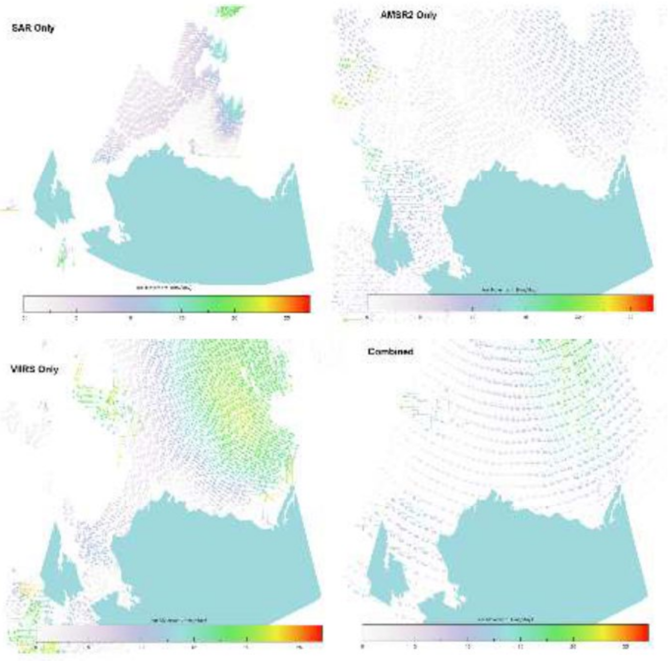
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	10/28/21	
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Incorporate passive microwave filter to improve ice products	Dec-21	Dec-21	Dec-21	
Cloud shadow flag, blended snow cover product	Sep-22	Sep-22		
New physically-based snow and snow-free land BRDF, algorithm to infer the snow fraction	Sep-22	Sep-22		
Generate new lookup tables, retrieval coefficients for JPSS-2 (all snow, and ice products)	Sep-22	Sep-22		
Weekly and monthly ice products composite	Sep-22	Sep-22		
Continuous monitoring of S-NPP and NOAA-20 products	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights

SAR Motion (top left), AMSR2 motion (top right), VIIRS motion (bottom left), and combined SAR+AMSR2+VIIRS motion (bottom right) during January 7-8, 2022.



Active Fires

January, 2022

Accomplishments / Events:

- Ivan Csiszar presented the talk "Recent enhancements to NOAA's baseline operational active fire product suite" at the 18th Annual Symposium on Operational Environmental Satellite Systems.
  - This talk included key updates to the VIIRS Active Fire product.
  - At the same symposium, Marina Tsidulko presented the poster "Algorithm Updates Toward Better Representation of Extreme Fire Events by VIIRS".
- The team identified missing granules of the VIIRS I-band product in the NDE operational processing
  - The team contacted the OSPO PAL to investigate the cause of the outages

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			

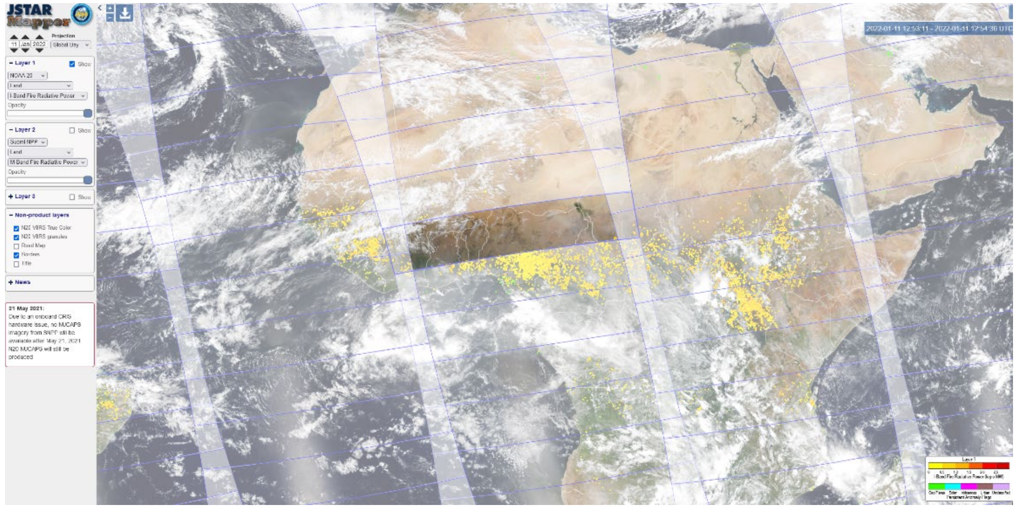
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/05/21	
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
I-band algorithm improvements for non-optimal conditions	Sep-22	Sep-22		
J2 readiness and sensor performance evaluation	Sep-22	Sep-22		
Opportunistic validation using in-situ data (Error rates and FRP APU)	Sep-22	Sep-22		More limited validation
Persistent anomaly data files updates	Sep-22	Sep-22		Less frequent updates
Suomi NPP / NOAA-20 data analysis and feedback	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlight:



A granule with missing NOAA-20 VIIRS I-band fire data on January 11, 2022. Image from JSTAR Mapper

Surface Type

January, 2022

Accomplishments / Events:

- STAR-UMD VIIRS Surface Type team has downloaded and processed S-NPP and NOAA-20 VIIRS granule surface reflectance data acquired in January 2022 for the production of AST-2022.
- The team has produced a preliminary version of the monthly composites for all 12 months of 2021 using VIIRS data acquired by both S-NPP and NOAA-20.
- The team explored the use of VIIRS monthly composites to evaluate water "phenology" for different regions of the globe (see highlights).
- In order to address a request by EMC, the team is developing a fractional water product by integrating multiple high resolution surface water datasets that have been developed based on Landsat and MODIS

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.*

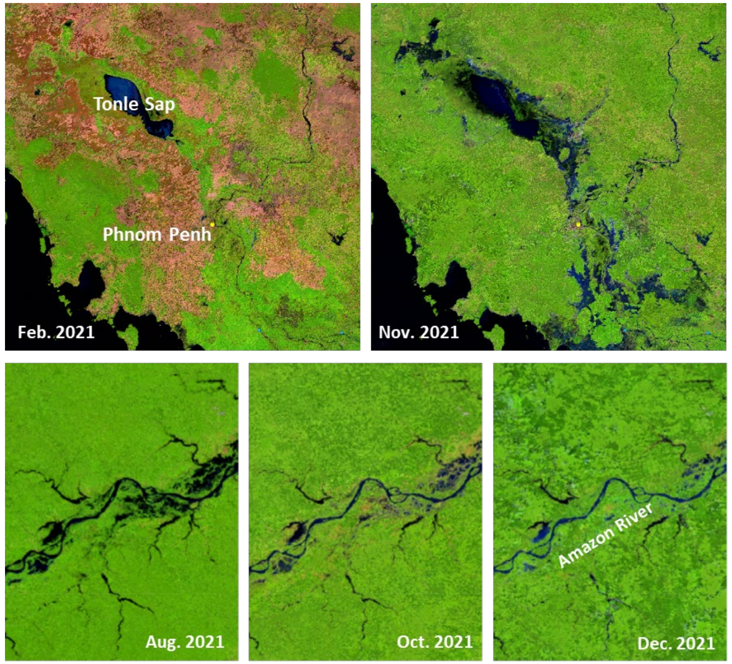
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	10/29/21	
FY23 Program Management Review	Jun-22	Jun-22		
Deliver AST-2020 to NDE (with JRR Super DAP)	Feb-22	Feb-22		
Complete global monthly composites based on 2021 VIIRS data	Apr-22	Apr-22		
Generate global annual classification metrics	May-22	May-22		
Develop approaches for using newly available high resolution global maps on urban and water	Sep-22	Sep-22		
Experiment methods for mapping surface type change	Sep-22	Sep-22		
Generate VIIRS AST21 based on 2021 VIIRS data using SVM algorithm	Aug-22	Aug-22		
Comparison of AST21 with surface type validation data	Sep-22	Sep-22		
Delivery of AST21 (made available for users through STAR FTP)	Sep-22	Sep-22		
Routinely monitor surface type changes in the training and validation data sets	Sep-22	Sep-22		
Improve and update training and validation data, ATBD and VIIRS AST web sites	Sep-22	Sep-22		

Highlights:

Water "phenology" from VIIRS: *Many aquatic ecosystems have large seasonal dynamics that are captured by clear view monthly composites created from VIIRS observations as part of the surface type algorithm. For example, inundated areas around the Tonle Sap in Cambodia more than doubled in February (wet season) than in November (dry season) (top row, area shown is about 400 km x 400 km). Many wetlands along the Amazon River that were flooded in August dried out by December (bottom row, area shown is about 250 km x 300 km). Images are shown with VIIRS M10, M7, and M5 bands in red, green, and blue. Water appears black or dark blue. Green and brown tones represent land areas with dense and sparse/no vegetation cover, respectively.*



Surface Reflectance

January, 2022

Accomplishments / Events:

- Incorporated the new aerosol model developed by NASA surface reflectance team into the AERONET based SR. Evaluate the new model results with previous method.
- Complete the AERONET validation tool improvement, and reprocessed the subset data since April, 2021 for both S-NPP and NOAA-20.
- Performed the SR validation using the new developed AERONET based SR, and routinely update the validation results, prepared for the demonstration on the website.
- Continue to monitor the SR product using daily routine monitoring tool, update the tool for quick check interested area full resolution image and SR & QF.
- Investigated the time series SR smoothing and gap filling.

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			

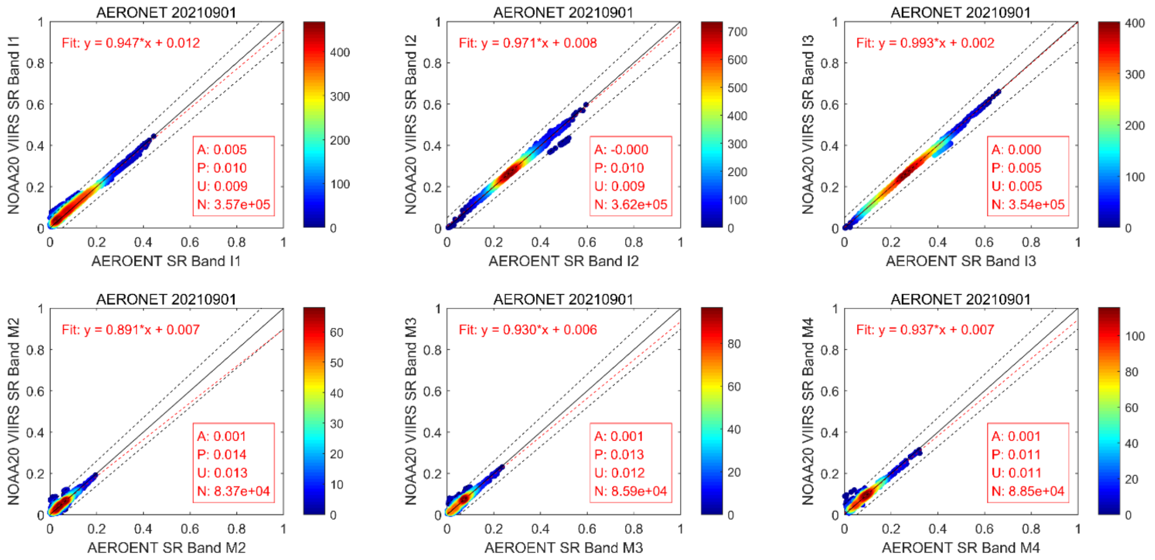
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/03/21	
Final J2 ready DAP to NDE (include NPP/N20 updates)	Oct-21	Oct-21	10/07/21	
Continue to validate against in-situ measurements and inter-comparison with other SR Products	Dec-21	Dec-21	12/15/2021	
The SR Long-term monitoring improvement and perform the time-series analysis	Mar-22	Mar-22		
FY23 Program Management Review	Jun-22	Jun-22		
JPSS-2 pre launch readiness	Jun-22	Jun-22		
Cal/Val update for SNPP and NOAA20 SR product; Collect the vegetation product feedback of the impact of SR	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

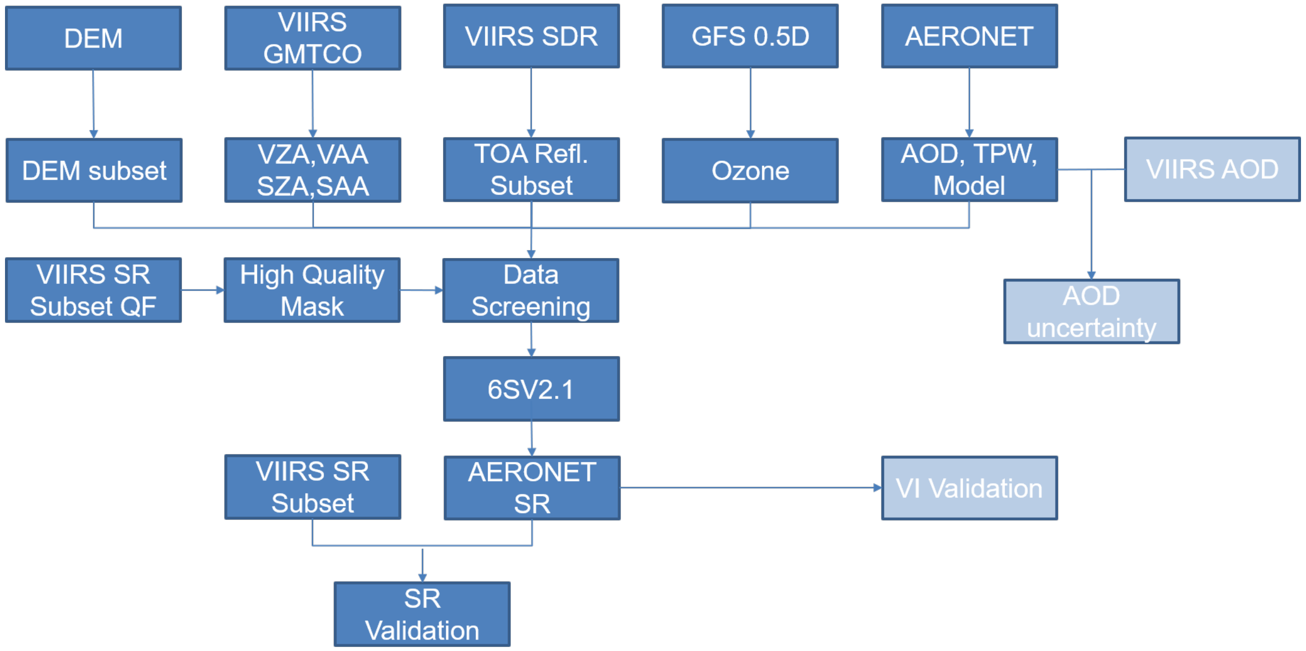
Highlights:



The updated AERONET SR validation results using new ground aerosol model

Surface Reflectance (Details)

- The flowchart of the AERONET based SR



Routinely perform the subsets and generate AERONET based SR.

- For quick evaluation (one week latency)
- For SR compressive validation. (all available AERONET sites)
- For Vegetation Index evaluation.

- The output data of the AERONET based SR

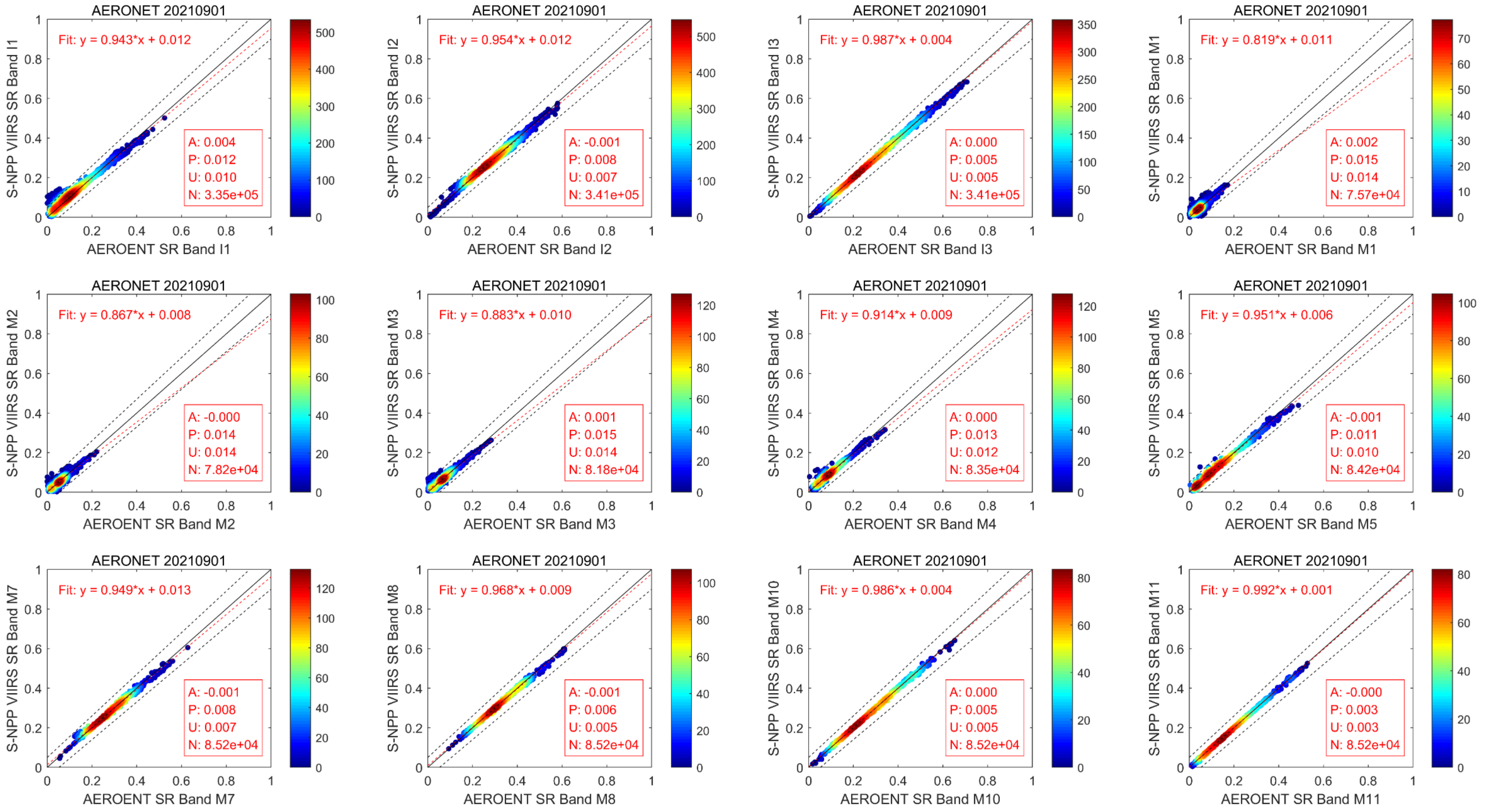
Variables	
I1-I3 SR; M1-5,7,8,10,11 SR	12 channel SR same as VIIRS SR EDR
370m/750m Lat/Lon	Lat/Lon at two resolution
QF: Cloud Mask	Bit 0-1: C. Clr, P. Clr, P. Cld, C. Cld
QF: AOD quality	Bit 2-3: Climatology, Low, Med, High
QF: Surface type	Bit 4-5: Land but no desert, Desert, Snow, Water
QF: Cloud Shadow	Bit 6: 0 -- No, 1-- Yes
QF: Cirrus	Bit 7: 0 -- No, 1-- Yes

Global Attribute	
Aerosol model	Retrieval status
AERONET data level	Lev15 or Lev20
AOD	AOD550 from AERONET
TPW	TPW from AERONET
6S Version	6SV2.1

Surface Reflectance (Details)

January 2022

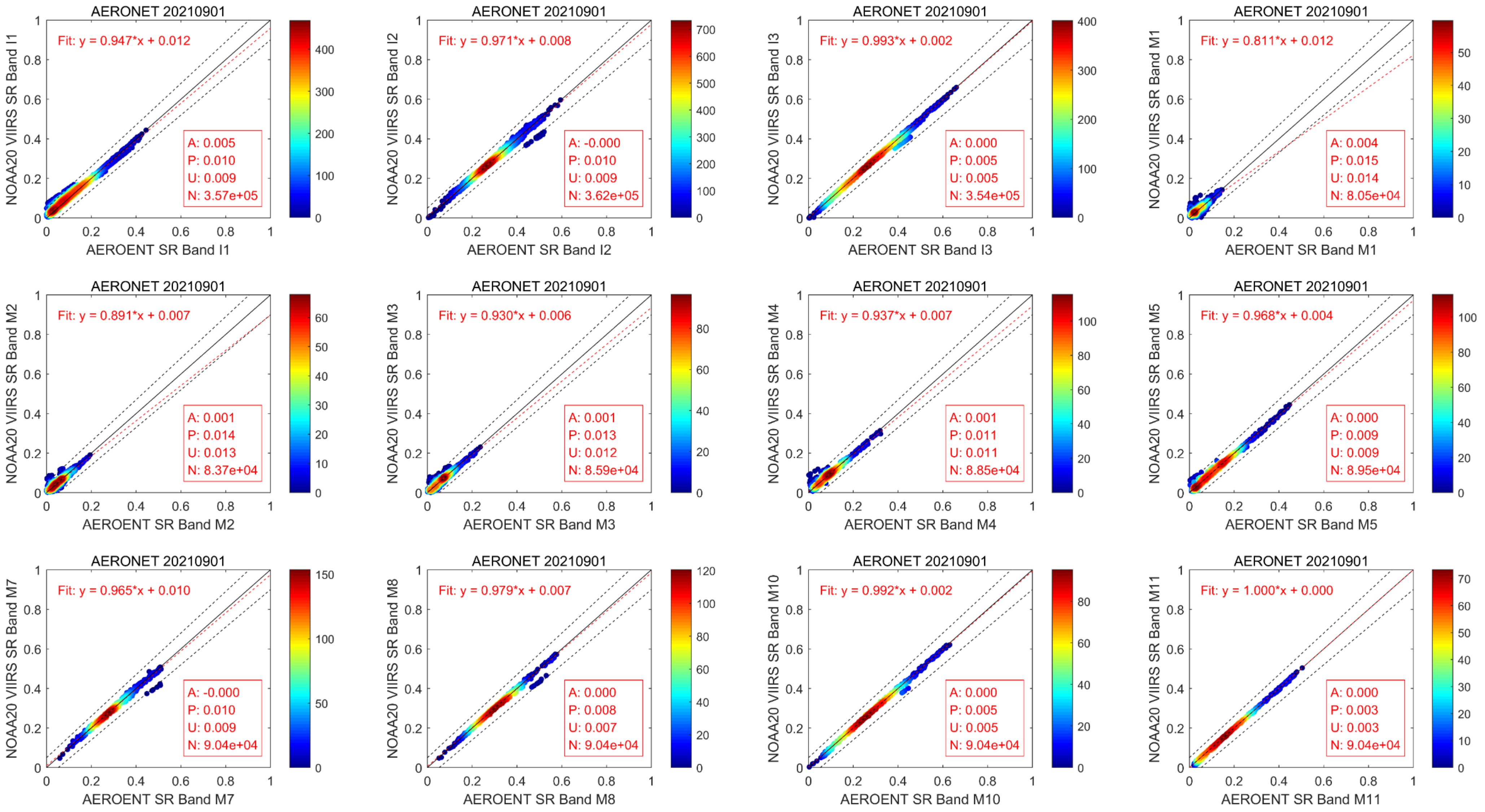
- SR evaluation results for S-NPP



Surface Reflectance (Details)

January 2022

- SR evaluation results for NOAA-20



Land Surface Temperature

January, 2022

Accomplishments / Events:

- Performed the radiance based LST validation over inland water surface. Two atmospheric sounding stations close to inland water body were selected and four months of data was used in this study. Software tool was developed to extract related satellite information and the valid observations of the vertical profile. Conducted the R-based validation results analysis.(slide 2-4)
- Finalized and submitted three proposals to ESSIC. Confirmed the budget of each proposal.
- For all weather LST development, investigated the method for MIRS LST downscaling over water body and solved related technical issues involved.
- Investigated the monthly mean LST over Colorado wildfire location. Warmer mean LST in Dec. 2021 than Dec. 2020 is found for both daytime and nighttime. (Highlights and slide 5&6)

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.*

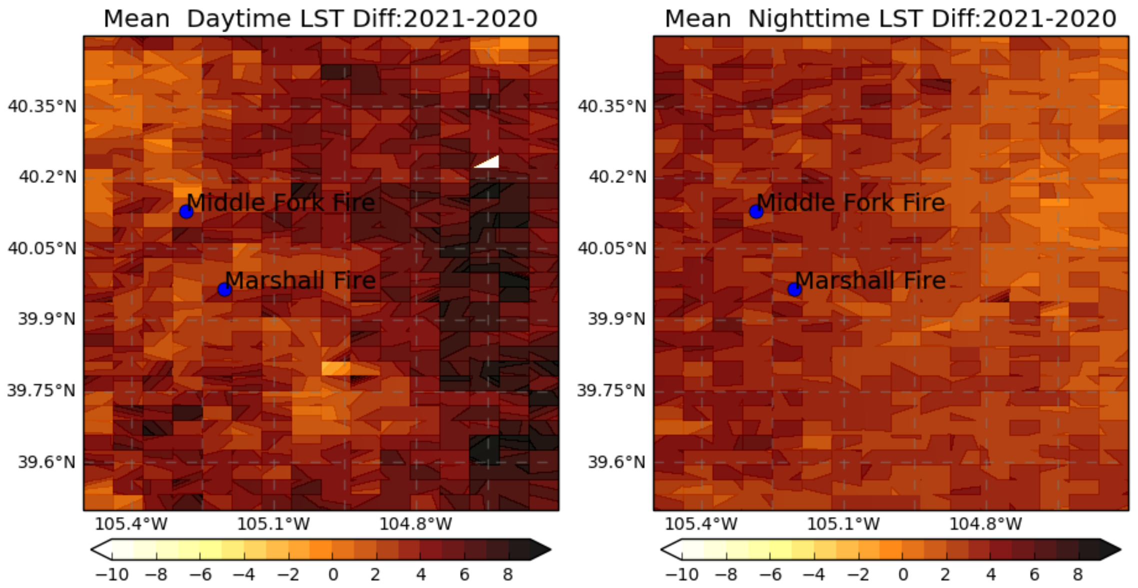
Issues/Risks:

None

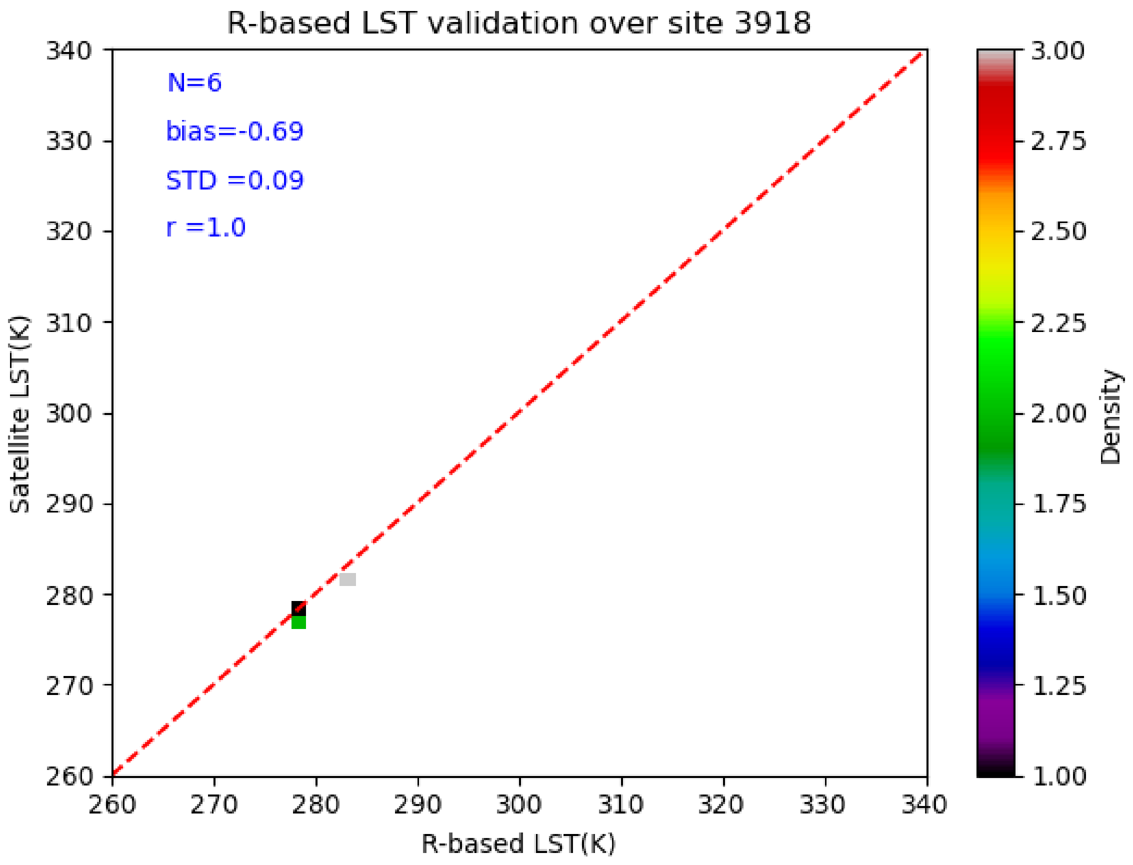
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/01/21	
ATBD update	Oct-21	Dec-21	Dec-21	
Super DAP v3.1 patch delivery			12/06/21	
L3 Global Gridded LST/LSA DAP to NDE (Prelim J2 DAP)			12/30/21	
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Manuscript ready for Remote Sensing special issue “VIIRS 2011–2021: Ten Years of Success in Earth Observations"	Apr-22	Apr-22		
All weather LST generation based on the microwave LST and VIIRS LST: methodology development and experiment	May-22	May-22		
FY23 Program Management Review	Jun-22	Jun-22		
LUT interpolation method development and test	Jun-22	Jun-22		
Routine Validation Summary/report of LST product including L2 and L3	Jul-22	Jul-22		
LST uncertainty evaluation and calibration	Aug-22	Aug-22		
Routine monitoring tool and its update	Aug-22	Aug-22		
Participant/support JPSS-2 pre-launch testing events (Feb-22 & Mar-22 JCT3-TVAC; Maybe: Apr-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

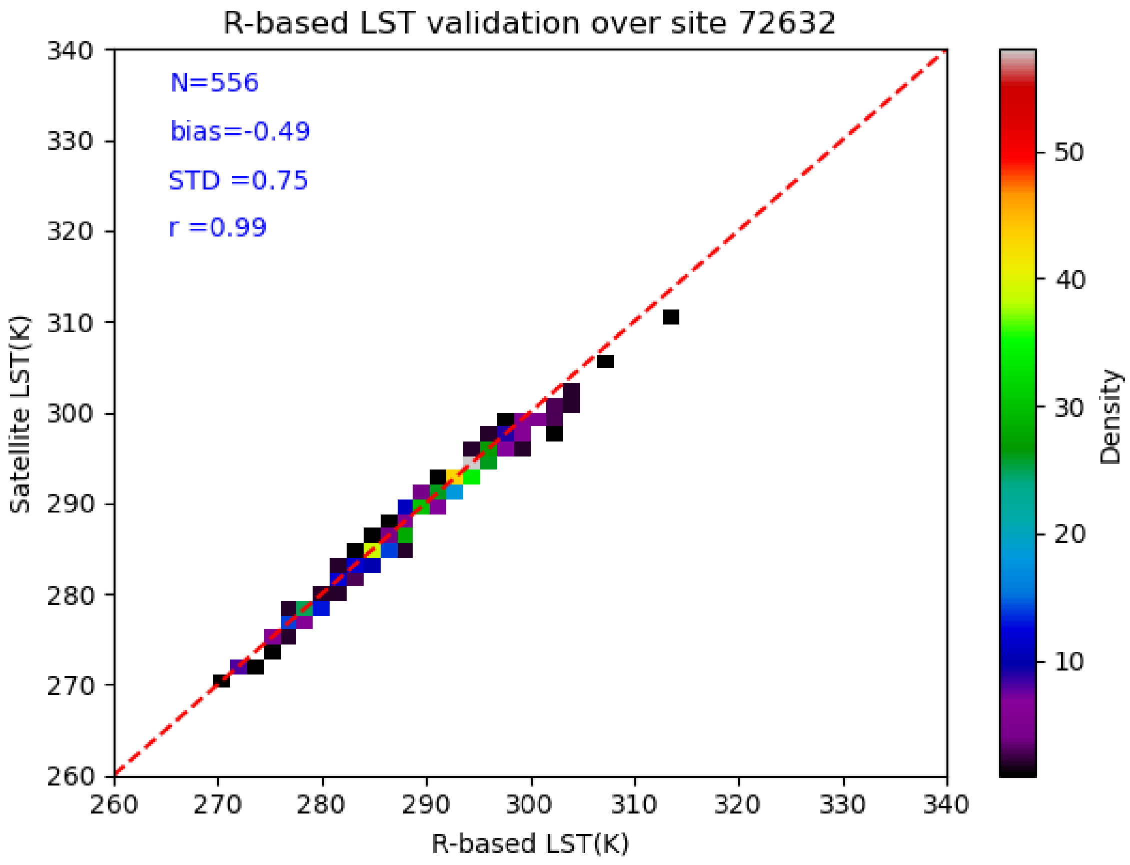
Highlights:

Mean LST investigation over wildfire occurrence area in Colorado



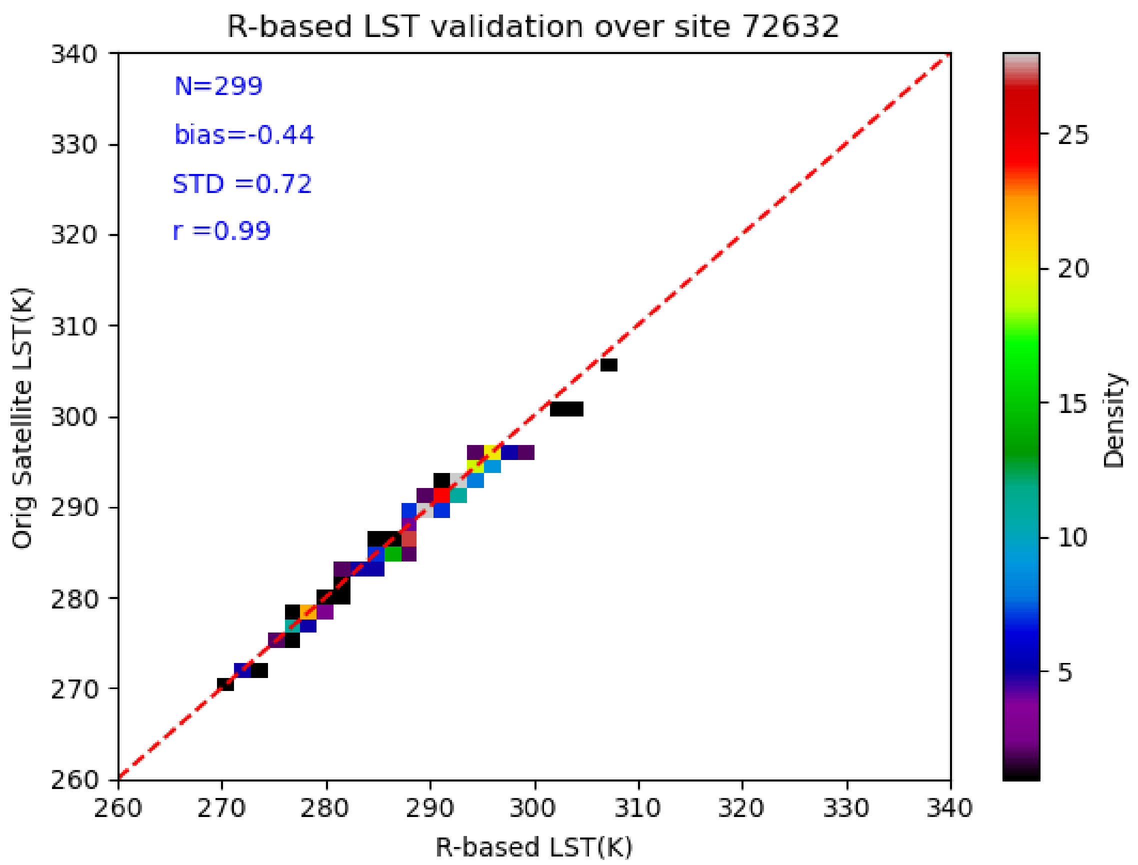
R-based validation results

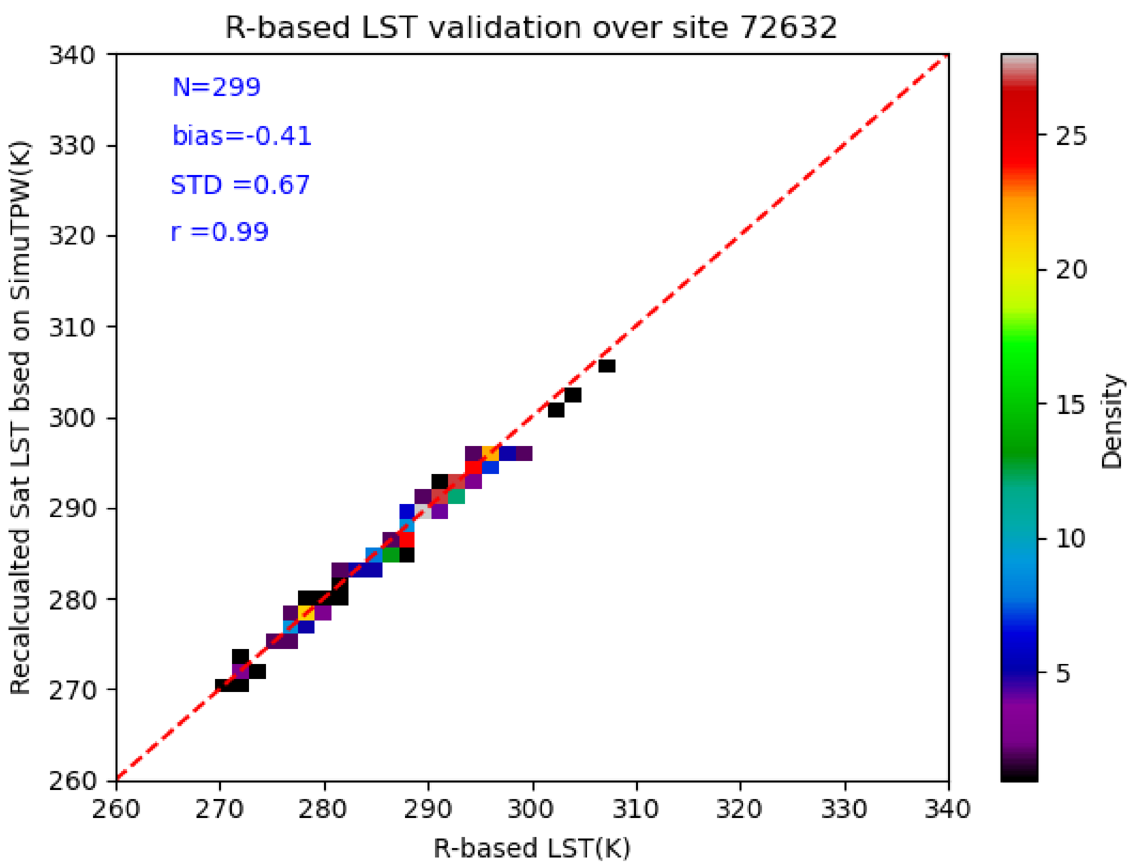




- About 4 months of data was used in the Radiance based validation(08/23/2021 ~ 12/20/2021)
- Quality control procedure: good R-based calculation status; the absolute delta BT difference between the satellite and R_Based calculation less than 0.5 K; valid TPW in use
- The validation results indicate a cold bias about 0.5K to 0.7K with a STD up to 0.8K
- The result might be affected by the profile quality and representativeness, delta BT difference, cloud contamination etc.

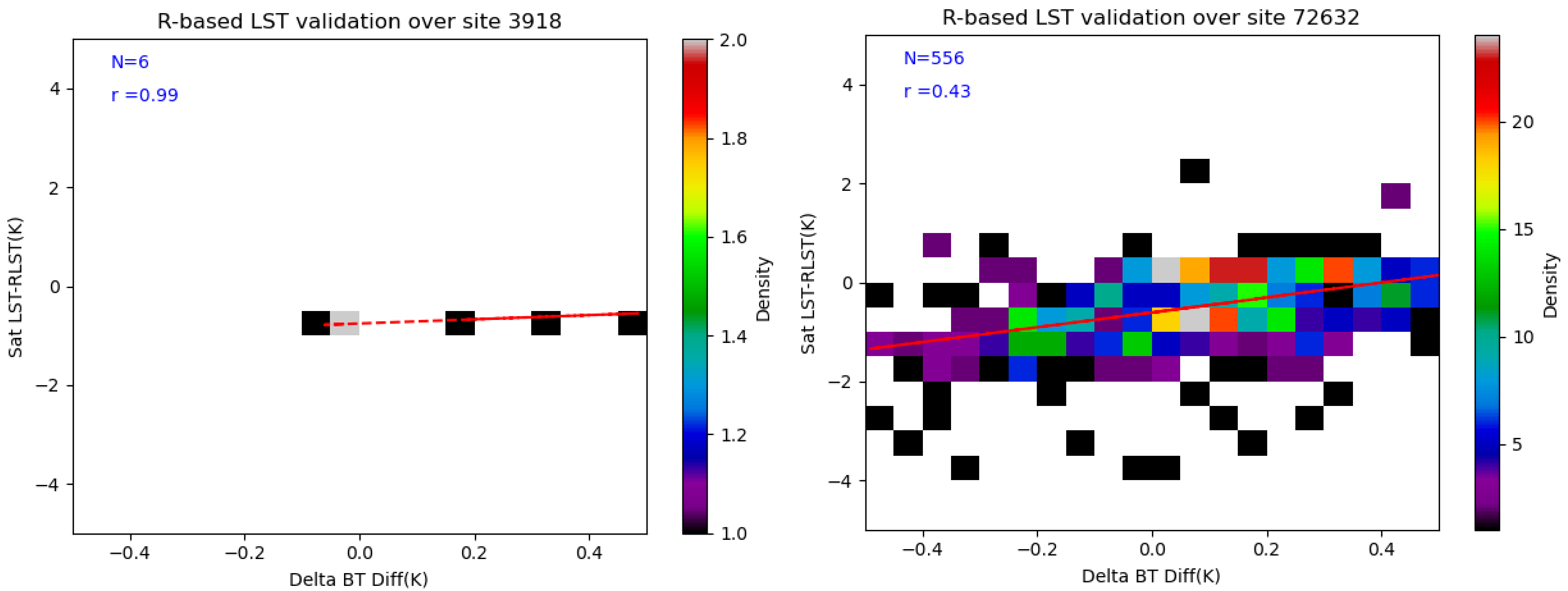
TPW Impact evaluation





- There are total 299 (among 556) matchups with GFS TPW and profile TPW not in the same class, which will affect the satellite LST calculation.
- Left figure shows the original validation results
- The satellite LST is recalculated using the profile TPW and compared with the original satellite LST based on TPW_GFS as shown in the right figure
- The result indicates a minor impact from the TPW difference.

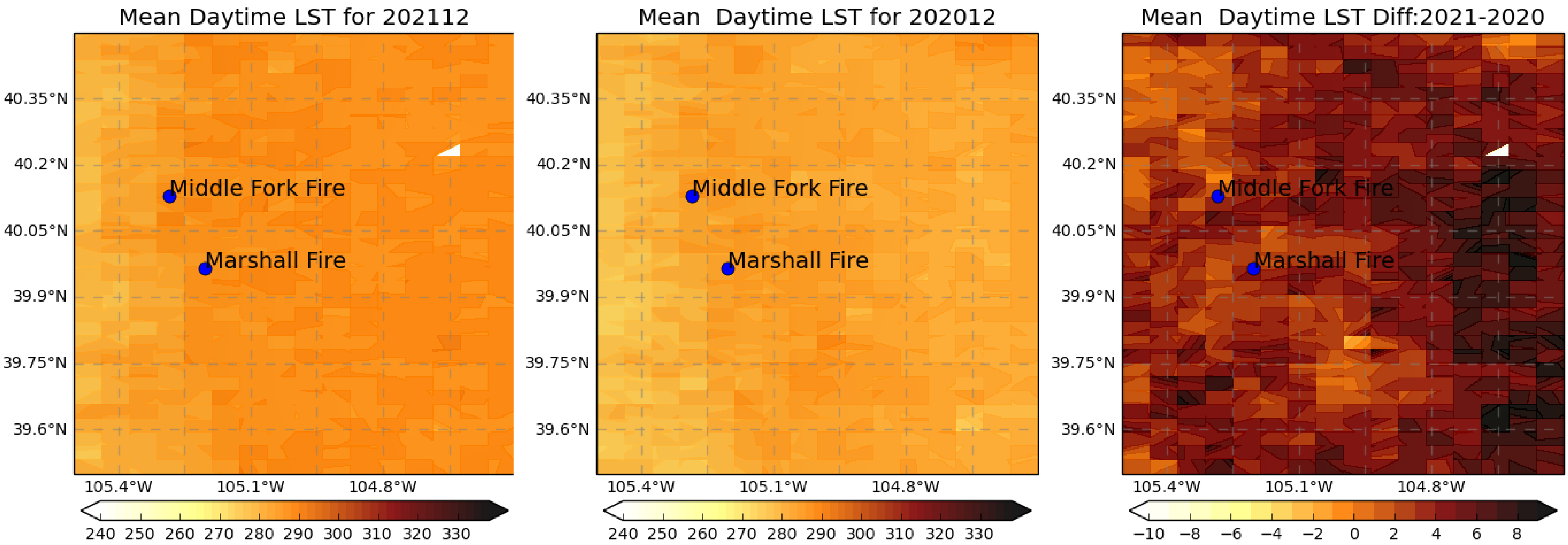
Delta BT difference Impact evaluation



- The delta BT difference represents the BT difference between the satellite and R-based validation i.e. (satellite BT11-BT12) – (simulated BT11 –BT12), which has impact on the R-based validation quality.
- A positive correlation is found between the delta BT difference and the LST difference

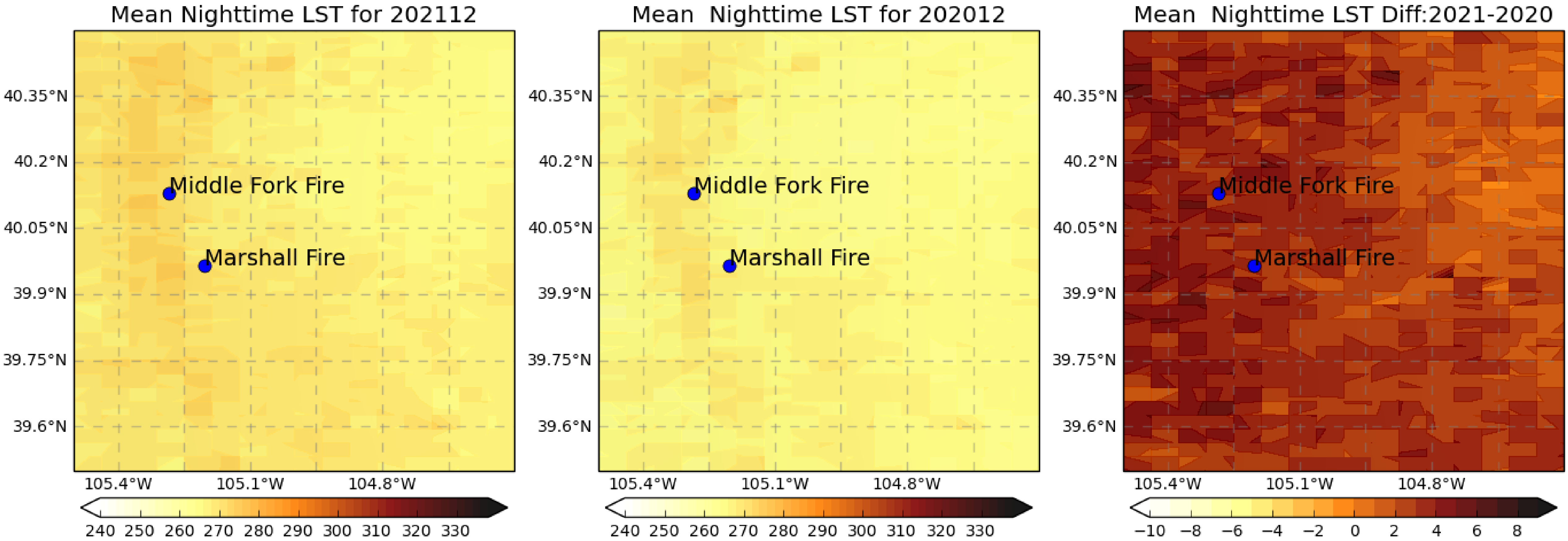
Monthly Mean Daytime LST difference

Dec.2021 vs Dec.2020



- Monthly mean LST is investigated for the area with wildfire occurrence in Colorado. The mean LST in December is compared between year of 2021 and 2020 for both daytime and nighttime. Left figure shows the mean LST for Dec. 2021 and the middle figure for Dec/2020 and the right figure shows the difference between them.
- It shows warmer daytime LST (above 2 K) in Dec. 2021 than Dec. 2020.

Monthly Mean Nighttime LST difference
Dec.2021 vs Dec.2020



- Monthly mean LST is investigated for the area with wildfire occurrence in Colorado. The mean LST in December is compared between year of 2021 and 2020 for both daytime and nighttime. Left figure shows the mean LST for Dec. 2021 and the middle figure for Dec/2020 and the right figure shows the difference between them.
- It shows warmer mean nighttime LST in Dec. 2021 than Dec. 2020

Surface Albedo

January, 2022

Accomplishments / Events:

- VIIRS BRDF test data and introductory slides ready as v1 (meet the milestone Slide #2)
- VIIRS BRDF climatology tested as good to use (meet the milestone)
  - Included in preceding monthly reports
- Keep validating the VIIRS BRDF/Albedo/NBAR using VNP43 and MCD43 (#3-17)
  - Used VNP43 and MCD43 products from NASA as reference
  - Comparison was conducted for different retrieval paths and surface types
- Submitted the two JPSS proposals of albedo and BRDF
- Attended the group discussion of fundamental research plan

Overall Status:

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

1. *Project has completed.*
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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.*

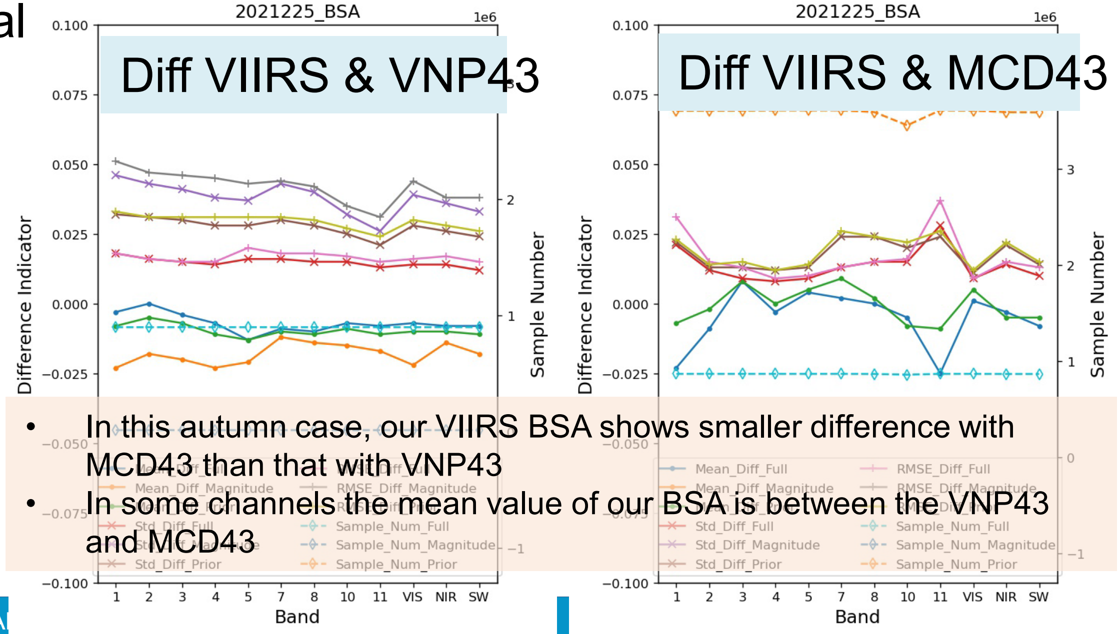
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End PMR	Oct-21	Oct-21	11/01/21	
Manuscript ready for Albedo Climatology update	Dec-21	Apr-22		More time needed
Generating the VIIRS BRDF climatology and real-time BRDF/Albedo test data generation	Jan-22	Jan-22	Jan-22	
Super DAP v3.1 patch delivery			12/06/21	
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
L3 Global Gridded LST/LSA DAP to NDE (Prelim J2 DAP)			12/30/21	
L3 Global Gridded LST/LSA DAP to NDE (final J2 DAP)	Feb-22	Feb-22		
BRDF data development plan ready	Mar-22	Mar-22		
VIIRS cloudy-sky albedo improvement	May-22	May-22		
FY23 Program Management Review	Jun-22	Jun-22		
Routine monitoring tool and its update	Aug-22	Aug-22		
NOAA-21 data test if provided	Aug-22	Aug-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights: VIIRS BSA v.s. NASA MODIS and VIIRS Counterparts

Global



- In this autumn case, our VIIRS BSA shows smaller difference with MCD43 than that with VNP43
- In some channels the mean value of our BSA is between the VNP43 and MCD43

VIIRS BRDF file naming and structure

Tile files

VIIRS_BRDF_LSA_NBAR_2021225_h40v24.nc

Sensor: VIIRS

Product type: BRDF_LSA_NBAR

Date: {YYYYDOY}

Tile ID: h{**}v{**}

Global files

VIIRS_2020336_BRDF_Parameter_Band1_1km.nc

Sensor: VIIRS

Date: {YYYYDOY}

Parameter: BRDF_Parameter_{Band ID}

BRDF output	Albedo output		NBAR output	Ancillary output
BRDF_Parameter_Band1	Albedo_BSA_Band1	Albedo_WSA_Band1	Nadir_Reflectance_Band1	BRDF_QC
BRDF_Parameter_Band2	Albedo_BSA_Band2	Albedo_WSA_Band2	Nadir_Reflectance_Band2	Local_Noon_SZA
BRDF_Parameter_Band3	Albedo_BSA_Band3	Albedo_WSA_Band3	Nadir_Reflectance_Band3	NumObs
BRDF_Parameter_Band4	Albedo_BSA_Band4	Albedo_WSA_Band4	Nadir_Reflectance_Band4	Retrieval_Age
BRDF_Parameter_Band5	Albedo_BSA_Band5	Albedo_WSA_Band5	Nadir_Reflectance_Band5	RMSE
BRDF_Parameter_Band7	Albedo_BSA_Band7	Albedo_WSA_Band7	Nadir_Reflectance_Band7	WoD_NBAR
BRDF_Parameter_Band8	Albedo_BSA_Band8	Albedo_WSA_Band8	Nadir_Reflectance_Band8	
BRDF_Parameter_Band10	Albedo_BSA_Band10	Albedo_WSA_Band10	Nadir_Reflectance_Band10	
BRDF_Parameter_Band11	Albedo_BSA_Band11	Albedo_WSA_Band11	Nadir_Reflectance_Band11	
BRDF_Parameter_VIS	Albedo_BSA_VIS	Albedo_WSA_VIS		
BRDF_Parameter_NIR	Albedo_BSA_NIR	Albedo_WSA_NIR		
BRDF_Parameter_shortwave	Albedo_BSA_shortwave	Albedo_WSA_shortwave		

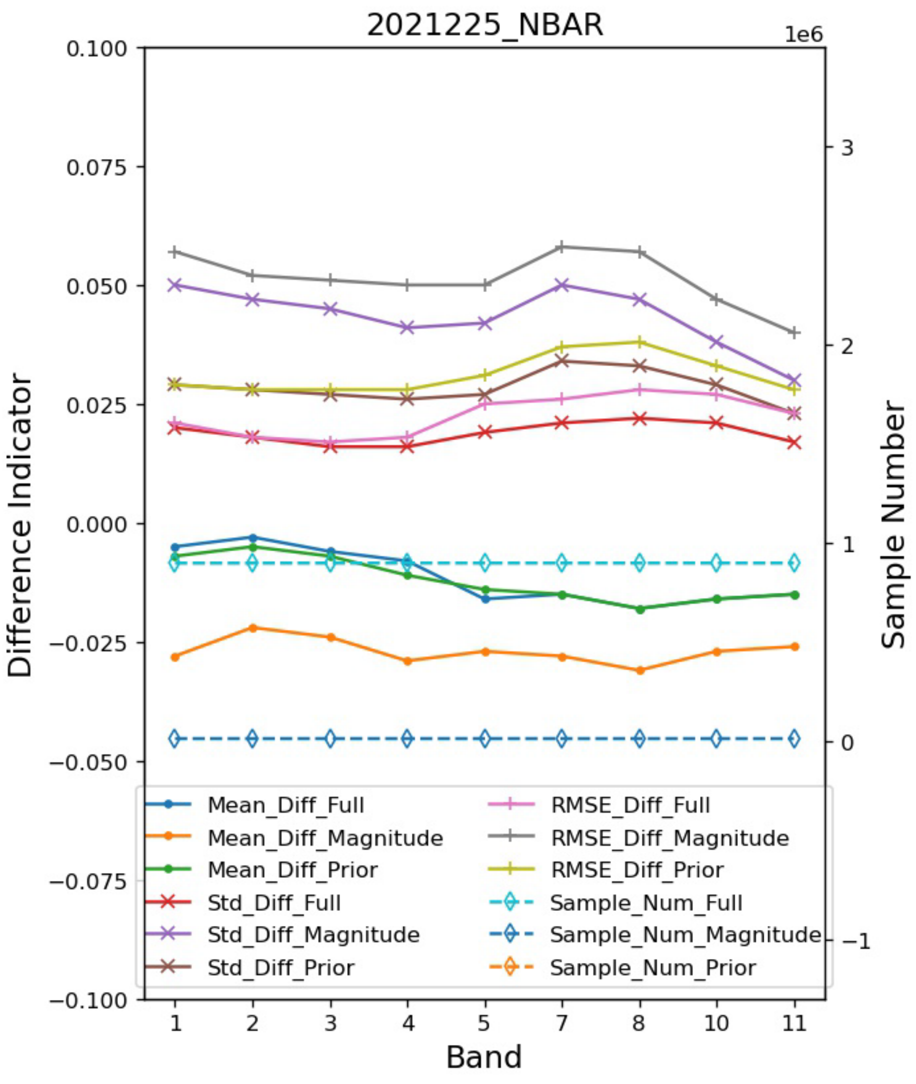
NBAR Validation– Comparison in different Retrieval path with VNP43

DOY: 2021 225

Full Inversion

Band_
NBAR_Band1_Al
NBAR_Band2_Al
NBAR_Band3_Al
NBAR_Band4_Al
NBAR_Band5_Al
NBAR_Band7_Al
NBAR_Band8_Al
NBAR_Band10_Al
NBAR_Band11_Al

Band_
NBAR_Band1_A
NBAR_Band2_A
NBAR_Band3_A
NBAR_Band4_A
NBAR_Band5_A
NBAR_Band7_A
NBAR_Band8_A
NBAR_Band10_A
NBAR_Band11_A



Prior Knowledge

Band_Name	HighObs_Size	HighObs_Accuracy	HighObs_Precision	HighObs_Uncertainty
NBAR_Band1_All_Type	3907605	-0.007	0.029	0.029
NBAR_Band2_All_Type	[illegible]	[illegible]	0.028	0.028
NBAR_Band3_All_Type	[illegible]	[illegible]	[illegible]	0.028
NBAR_Band4_All_Type	[illegible]	-0.011	0.026	0.028
NBAR_Band5_All_Type	[illegible]	[illegible]	[illegible]	0.031
NBAR_Band7_All_Type	3912188	-0.015	0.034	0.037
NBAR_Band8_All_Type	3912188	-0.018	0.033	0.038
NBAR_Band10_All_Type	3912183	-0.016	0.029	0.033
NBAR_Band11_All_Type	3912140	-0.015	0.023	0.028

- The comparison between VIIRS and VNP43 NBAR was conducted over different retrievals groups from various retrieval paths.
- The full inversion and prior inversion methods (for relatively sufficient observation cases) shows very small mean difference in visible bands and acceptable result in NIR bands with VNP43 with a mean_diff and std_of_diff < 0.05
- The magnitude inversion results shows larger difference but is still comparable with VNP43 with a bias within ± 0.03 and std_of_diff < 0.075
- The VNP43 product is not gap-filled at 1-km scale thus there is none matchups from the gap-filled method.

Gap-filling

Band_Name	HighObs_Size	HighObs_Accuracy	HighObs_Precision	HighObs_Uncertainty
NBAR_Band1_All_Type	1	[illegible]	[illegible]	0.014
NBAR_Band2_All_Type	1	0.012	0.0	0.012
NBAR_Band3_All_Type	1	0.010	0.0	0.010
NBAR_Band4_All_Type	1	0.019	0.0	0.019
NBAR_Band5_All_Type	1	0.014	0.0	0.014
NBAR_Band7_All_Type	1	-0.003	0.0	0.003
NBAR_Band8_All_Type	1	-0.008	0.0	0.008
NBAR_Band10_All_Type	1	[illegible]	0.0	0.026
NBAR_Band11_All_Type	1	0.012	0.0	0.012

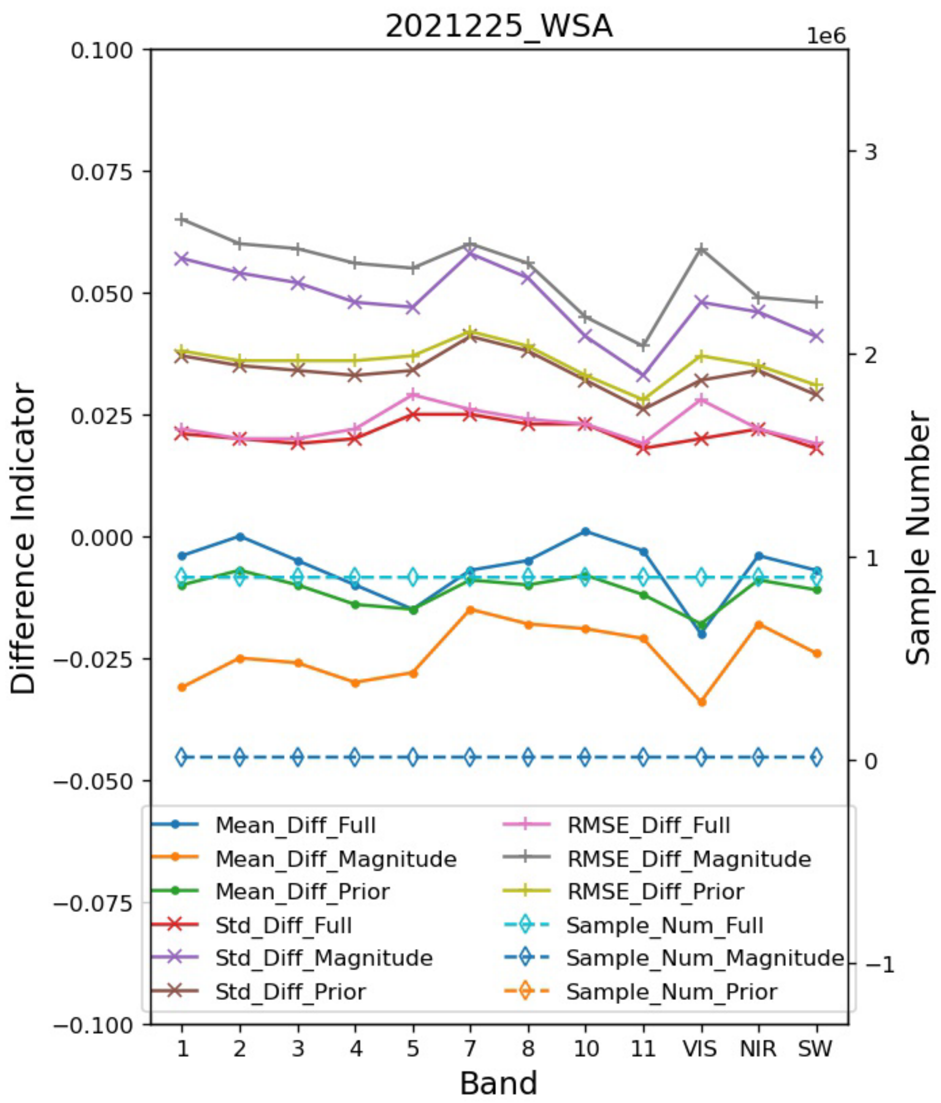
WSA Validation– Comparison in different Retrieval path with VNP43

DOY: 2021 225

Full Inversion

Band_Name	HighObs_Size	HighObs_Accuracy	HighObs_Precision	HighObs_Uncertainty
WSA_Banc				
WSA_Banc				
WSA_Banc				
WSA_Banc				
WSA_Banc				
WSA_Banc				
WSA_Banc				
WSA_Band1				
WSA_Band1				
WSA_V				
WSA_N				
WSA_shortwav				

Ba				
WSA_Band1				
WSA_Band2				
WSA_Band3				
WSA_Band4				
WSA_Band5				
WSA_Band7				
WSA_Band8				
WSA_Band10				
WSA_Band11				
WSA_VIS				
WSA_NIF				
WSA_shortwave				



Prior Knowledge

Band_Name	HighObs_Size	HighObs_Accuracy	HighObs_Precision	HighObs_Uncertainty
WSA_Band1_All_Type	3908902	-0.010	0.037	0.038
WSA_Band2_All_Type	3909961	-0.007	0.035	0.036
WS				
WS				
WS				
WS				
WS				
WSA				
WSA				
WSA_s				

WS				5
WS				9
WS				5
WSA_Band4_All_Type	1	0.000	0.0	0.000
WSA_Band5_All_Type	1	0.001	0.0	0.001
WSA_Band7_All_Type	1	0.326	0.0	0.326
WSA_Band8_All_Type	1	0.167	0.0	0.167
WSA_Band10_All_Type	1	0.062	0.0	0.062
WSA_Band11_All_Type	1	0.009	0.0	0.009
WSA_VIS_All_Type	1	0.001	0.0	0.001
WSA_NIR_All_Type	1	0.202	0.0	0.202
WSA_shortwave_All_Type	1	0.102	0.0	0.102

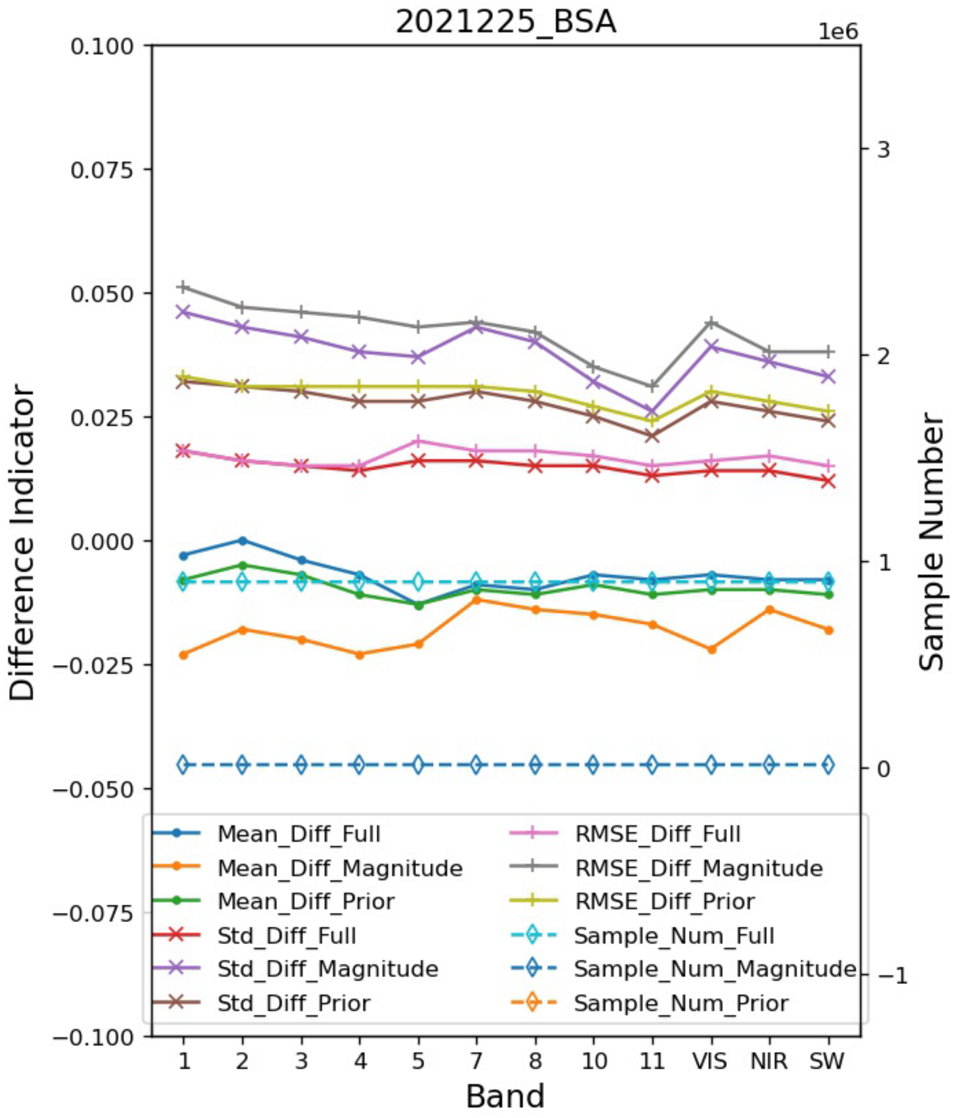
- The comparison between VIIRS and VNP43 WSA was conducted over different retrievals groups from various retrieval paths.
- The full inversion and prior inversion methods shows very small mean difference with VNP43
- The magnitude inversion results shows larger difference but is still comparable with VNP43 with a mean_diff within $\pm$ 0.025 and std_of_diff < 0.075

BSA Validation– Comparison in different Retrieval path with VNP43

DOY: 2021 225

Full Inversion

Band_Name	HighObs_Size	HighObs_Accuracy	HighObs_Precision	HighObs_Uncertainty



Prior Knowledge

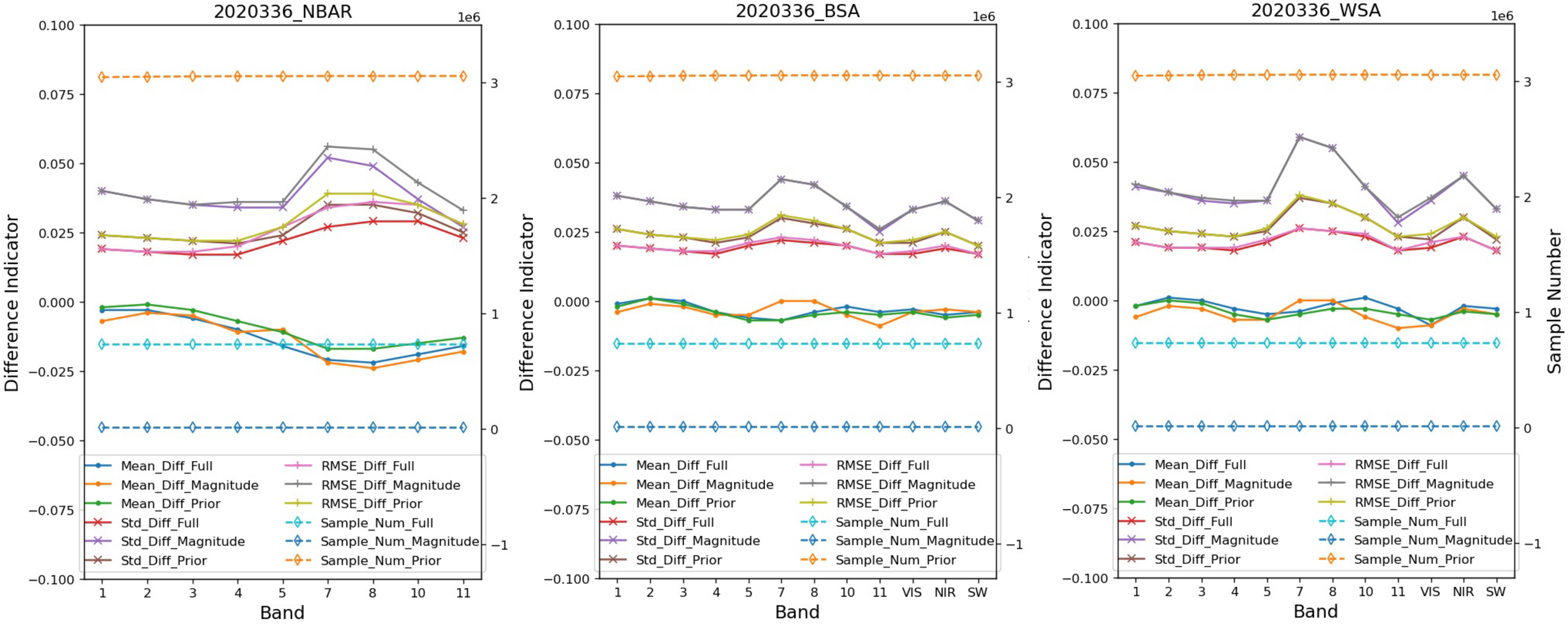
Band_Name	HighObs_Size	HighObs_Accuracy	HighObs_Precision	HighObs_Uncertainty
BSA_Band1_All_Type	3908656	-0.008	0.032	0.033

- The comparison between VIIRS and VNP43 BSA shows similar and smaller difference than WSA result.
- The full inversion and prior inversion methods shows very small mean negative difference close to 0, but with a std of difference within 0.05
- The magnitude inversion results is still comparable with MODIS with a bias within ±0.025 and std_of_diff < 0.075

BSA_Band2_All_Type	1	0.016	0.0	0.016
BSA_Band3_All_Type	1	0.011	0.0	0.011
BSA_Band4_All_Type	1	0.013	0.0	0.013
BSA_Band5_All_Type	1	0.010	0.0	0.010
BSA_Band7_All_Type	1	0.123	0.0	0.123
BSA_Band8_All_Type	1	0.072	0.0	0.072
BSA_Band10_All_Type	1	0.043	0.0	0.043
BSA_Band11_All_Type	1	0.015	0.0	0.015
BSA_VIS_All_Type	1	0.012	0.0	0.012
BSA_NIR_All_Type	1	0.085	0.0	0.085
BSA_shortwave_All_Type	1	0.047	0.0	0.047

BRDF Seasonal Validation – Comparison in Retrieval paths

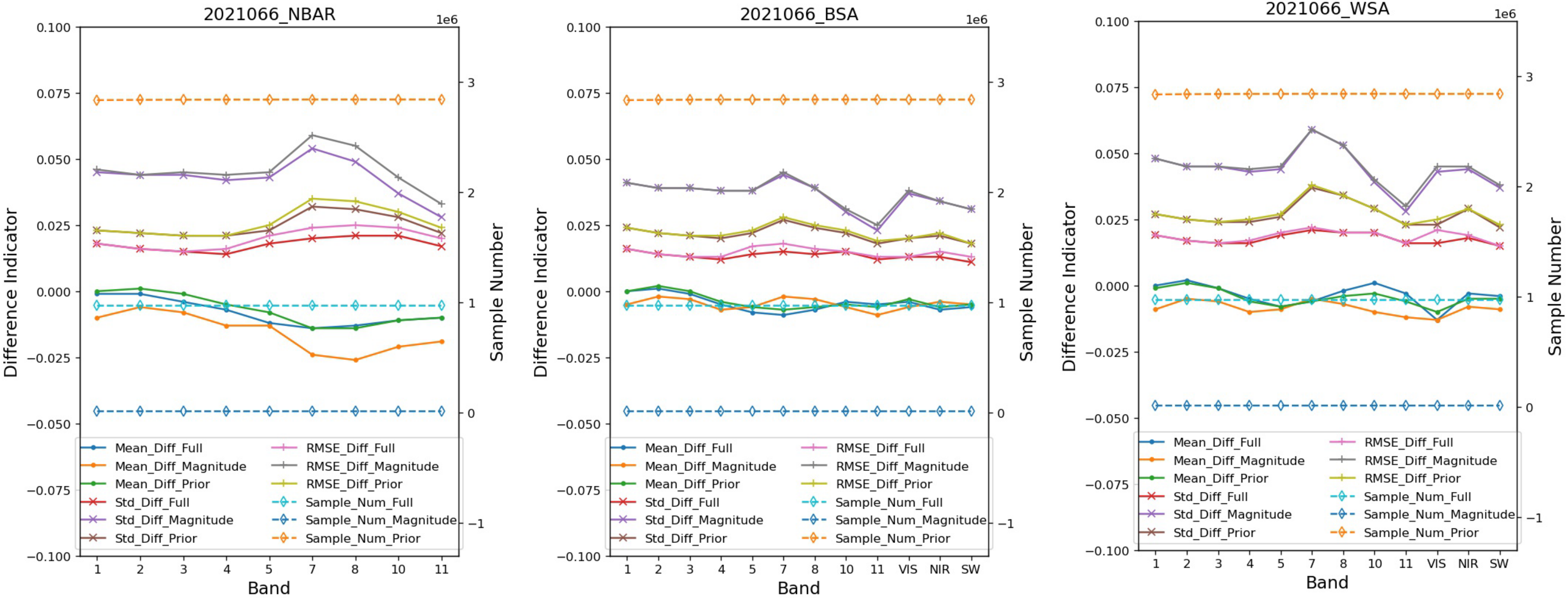
DOY: 2020 336 **(Comparable with the figures in preceding three slides)**



- **<u>The December case</u>** shows smaller mean_diff and std_of_diff in all variables and bands than previous August case.
- The mean_diff of the magnitude method is similar as the full inversion methods in this winter case.

BRDF Seasonal Validation – Comparison in Retrieval paths

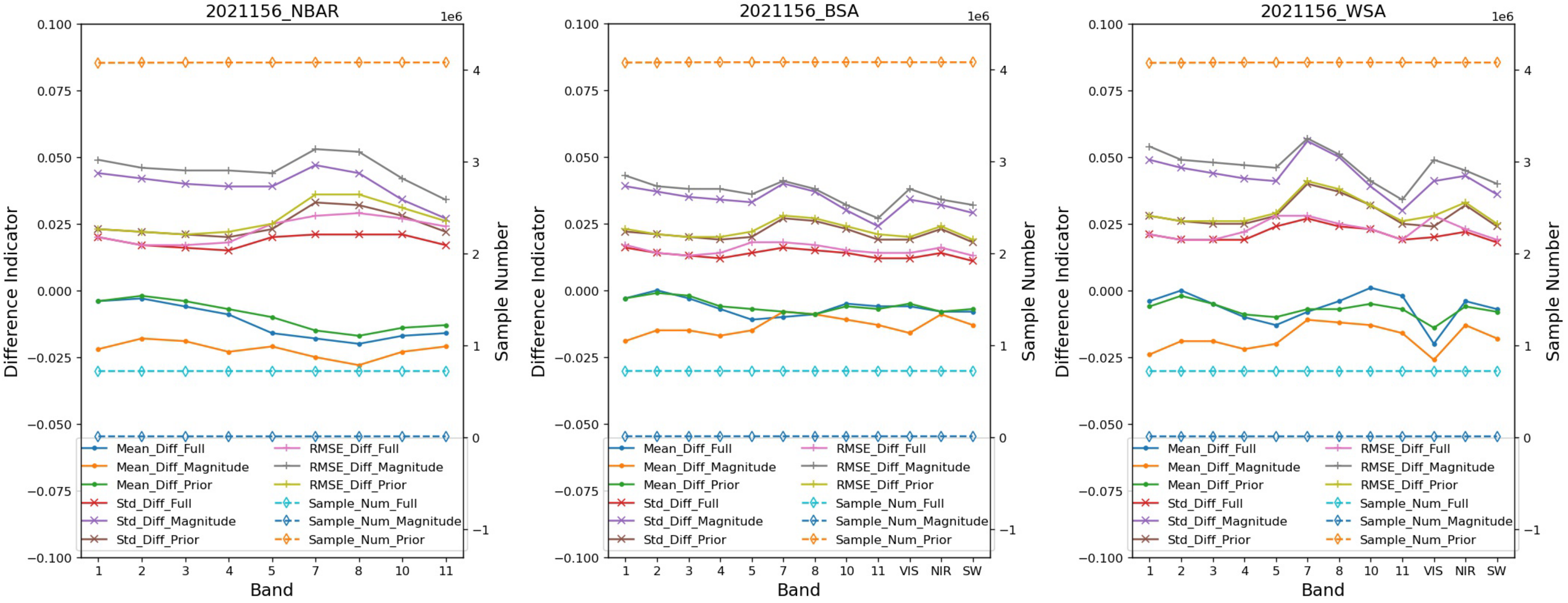
DOY: 2021 066



- **The March case** shows small mean_diff in albedos and visible NBARs, but the mean_diff of NIR NBARs is close to -0.025.
- The std_of_diff is similar to the August case

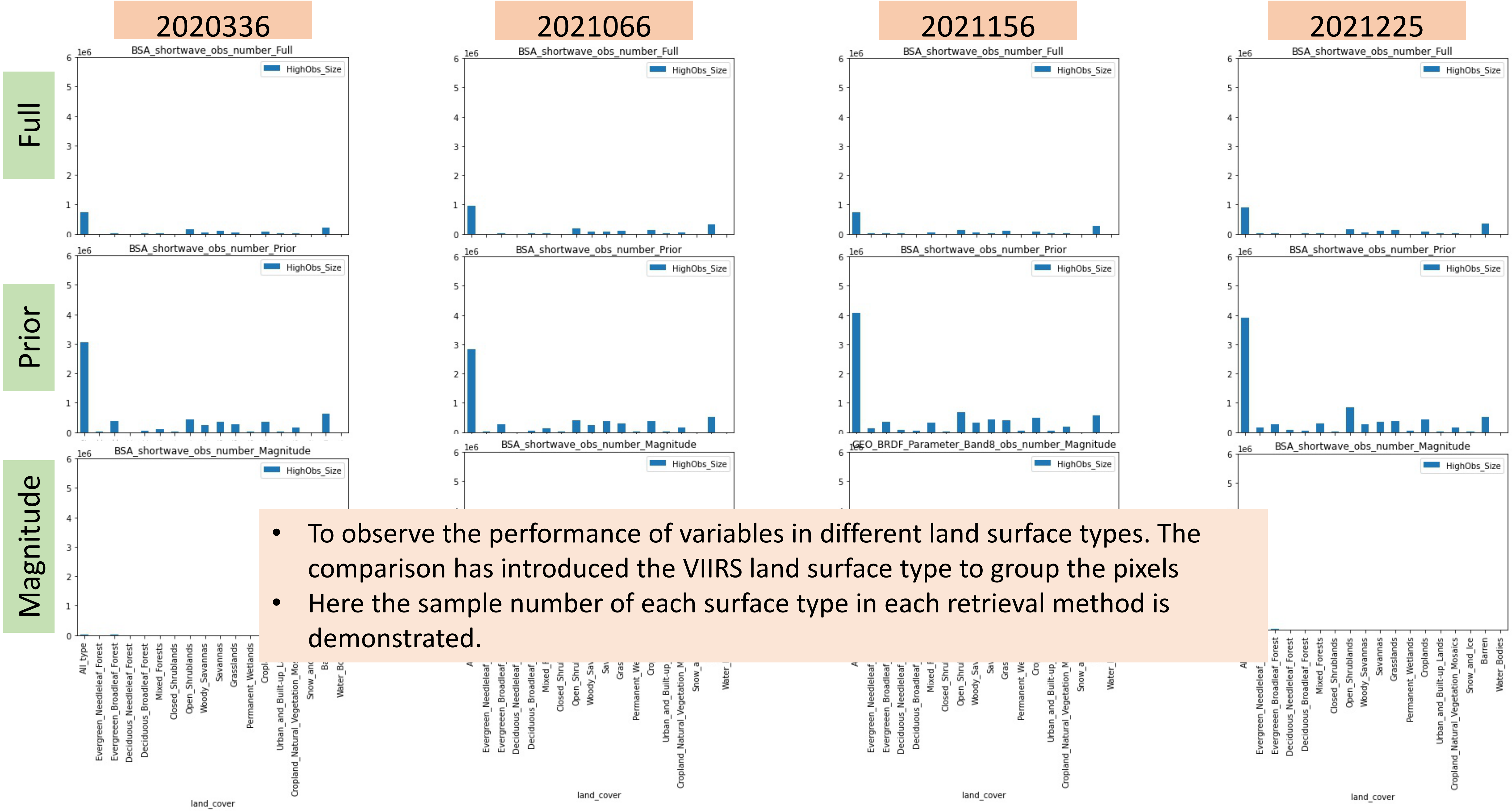
BRDF Seasonal Validation – Comparison in Retrieval paths

DOY: 2021156



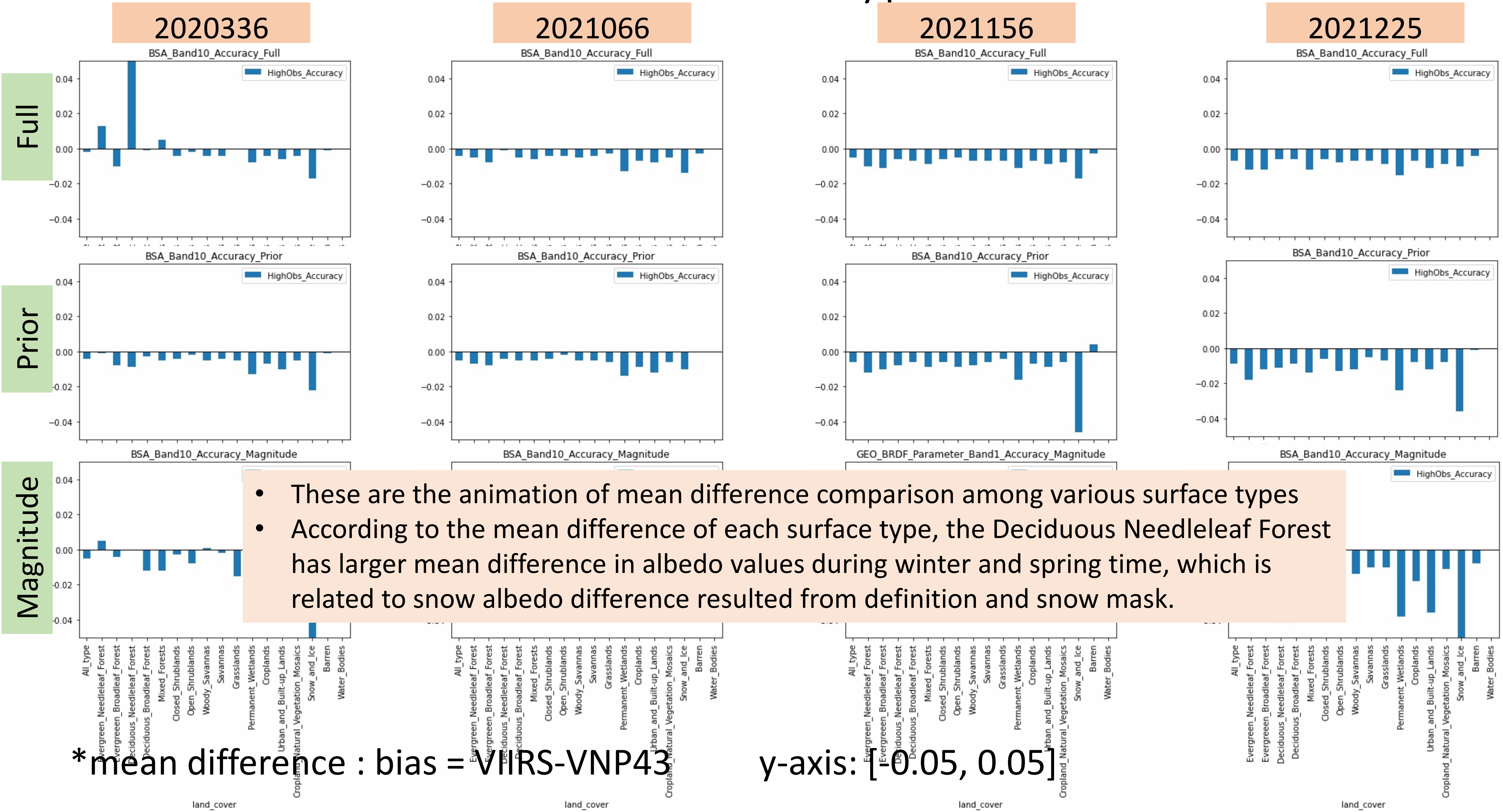
- **The December case** shows smaller mean_diff and std_of_diff in all variables and bands than previous August case.
- The mean_diff of the magnitude method is similar as the full inversion methods in this winter case.

BRDF validation in different surface types – Number of Obs



- To observe the performance of variables in different land surface types. The comparison has introduced the VIIRS land surface type to group the pixels
- Here the sample number of each surface type in each retrieval method is demonstrated.

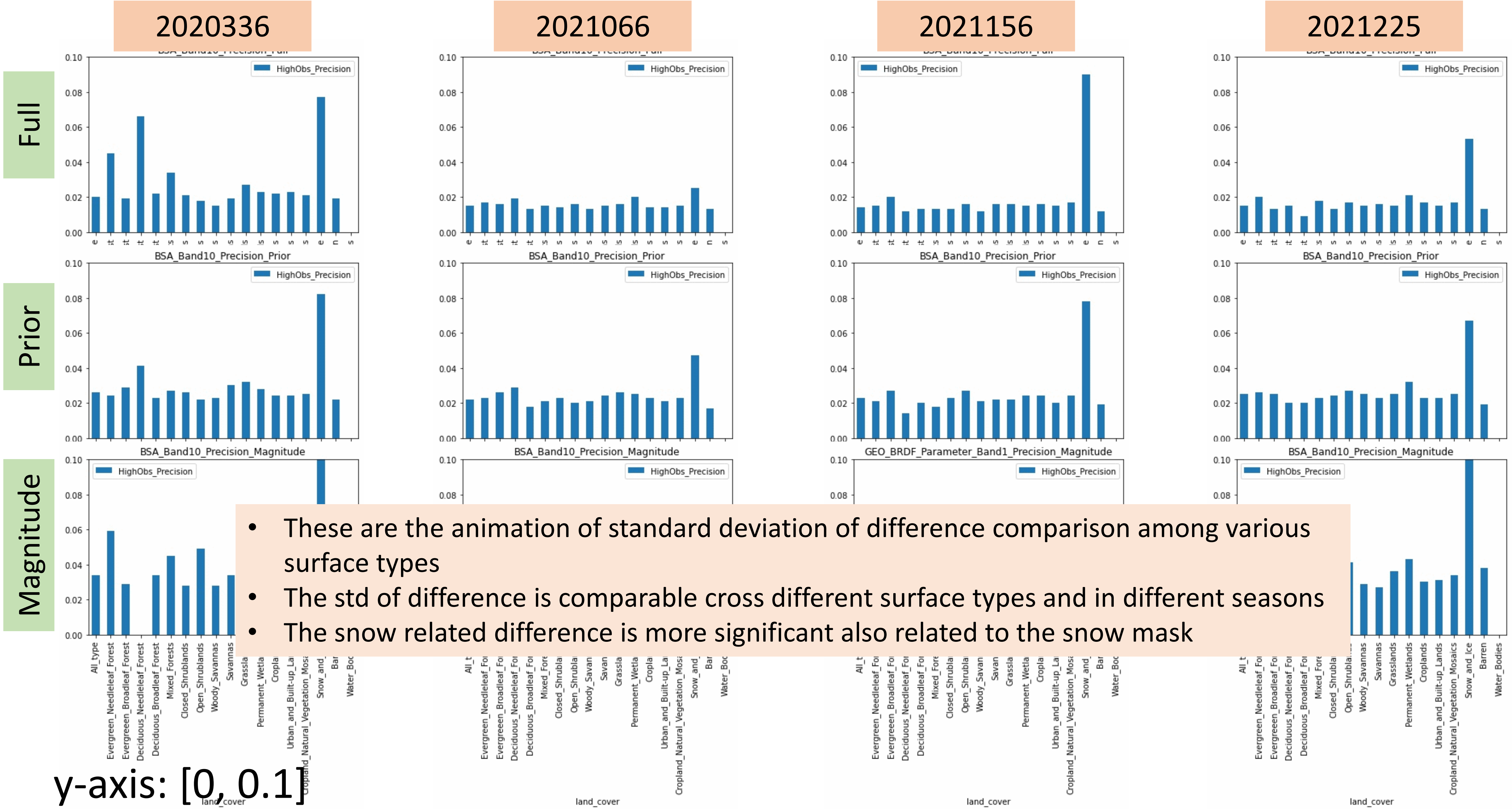
BRDF validation in different surface types– mean difference



- These are the animation of mean difference comparison among various surface types
- According to the mean difference of each surface type, the Deciduous Needleleaf Forest has larger mean difference in albedo values during winter and spring time, which is related to snow albedo difference resulted from definition and snow mask.

*mean difference : bias = VIIRS-VNP43 y-axis: [-0.05, 0.05]

BRDF validation in different surface types– STD of difference

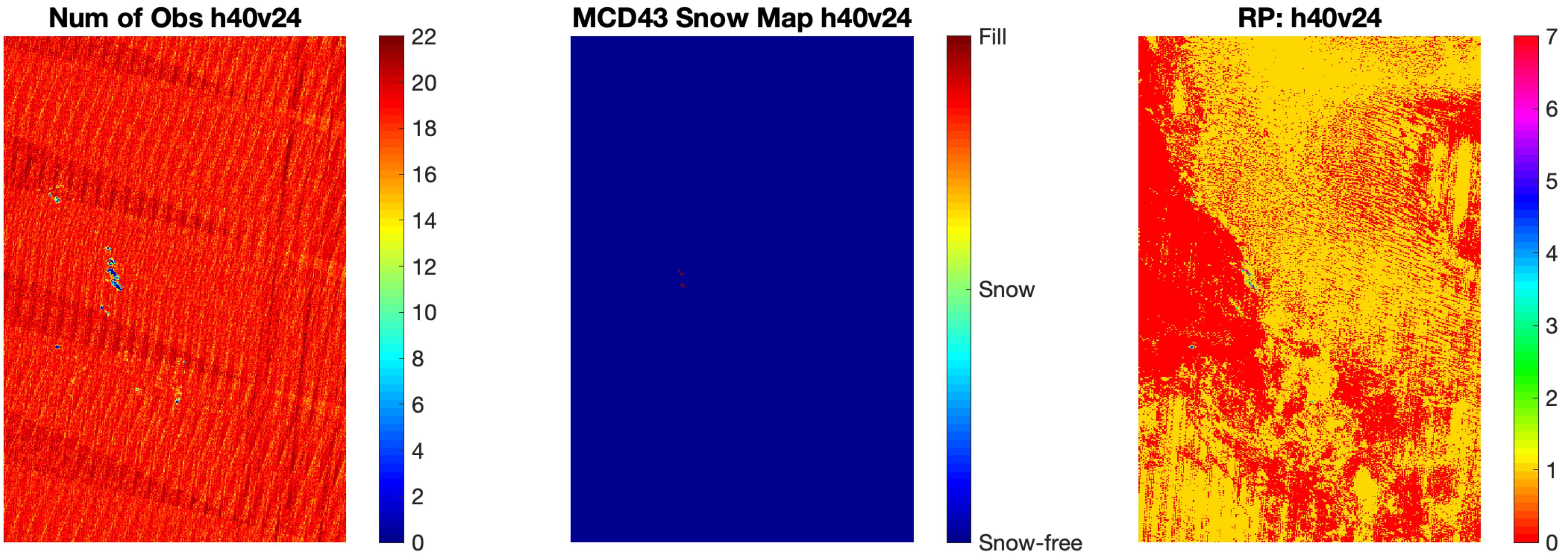


- These are the animation of standard deviation of difference comparison among various surface types
- The std of difference is comparable cross different surface types and in different seasons
- The snow related difference is more significant also related to the snow mask

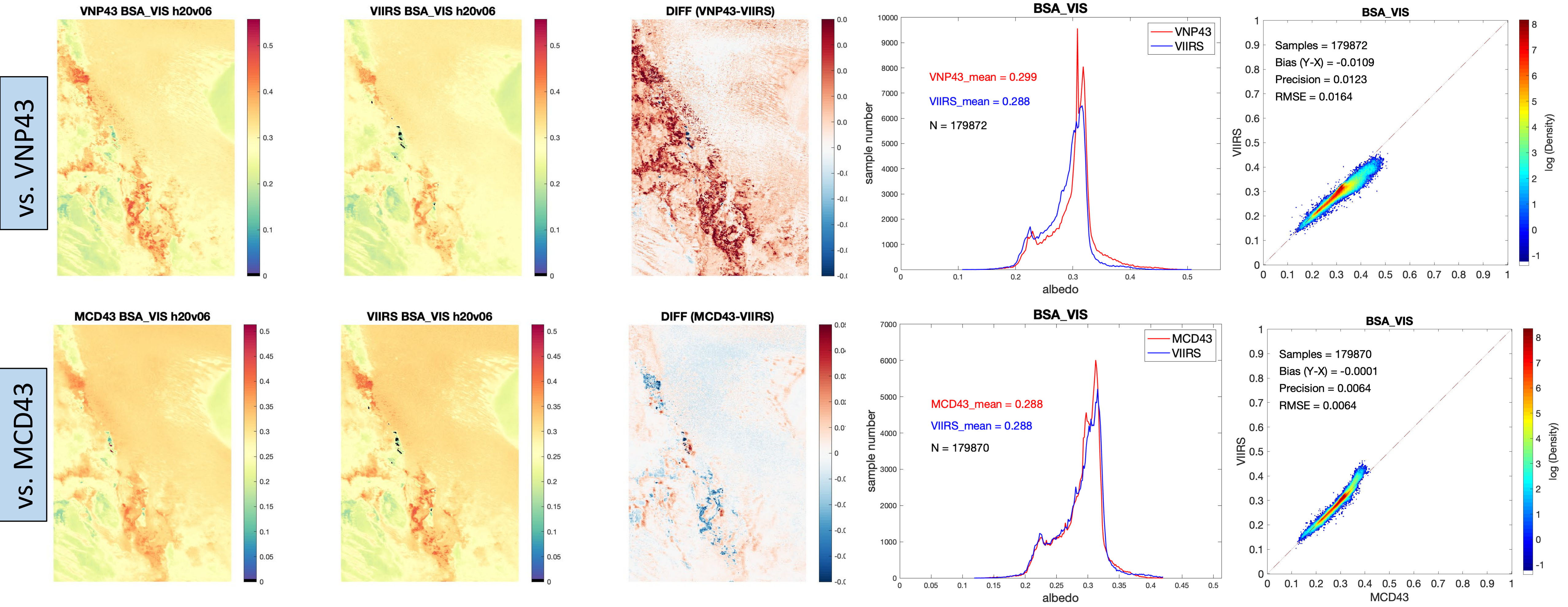
y-axis: [0, 0.1]

Case Study 1

h40v24 in Egypt, mostly clear-sky, abundant observations



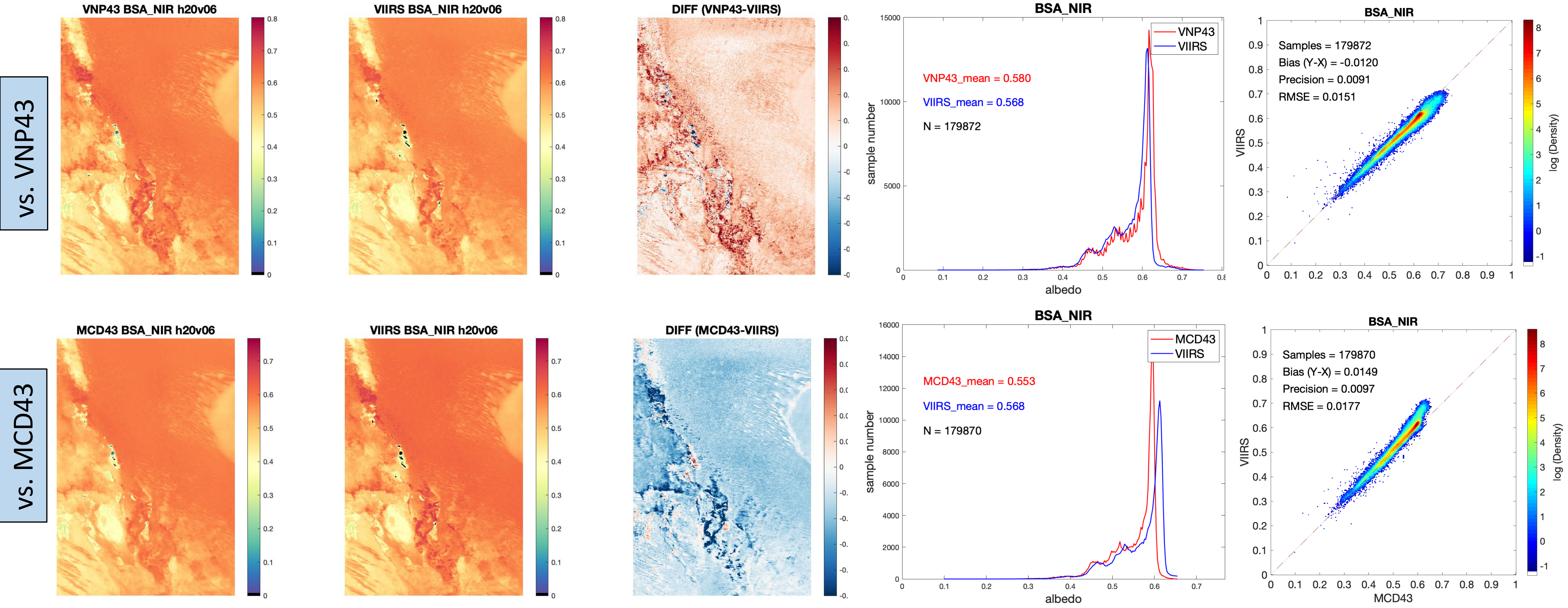
h40v24 **BSA_VIS**



Background: The VIIRS albedo appears larger in some barren area in global comparison. Thus tile-to-tile comparison was conducted by introducing MCD43 Albedo. The above images is for visible (VIS) black-sky-albedo (BSA).

Conclusion: The VIIRS BRDF-based VIS albedo is smaller than VNP43 product, but closer to MCD43 magnitude. In larger value regions, the VIIRS albedo is between VNP43 and MCD43.

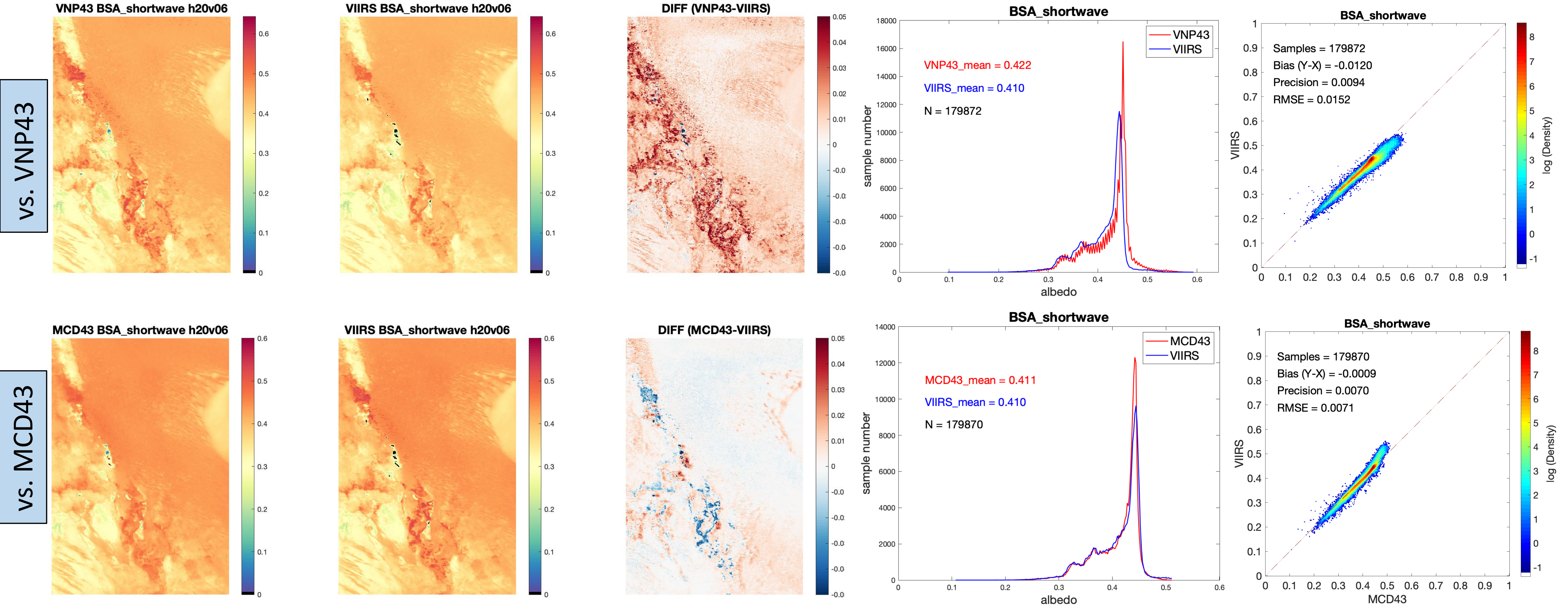
h40v24 BSA_NIR



Background: The VIIRS albedo appears larger in some barren area in global comparison. Thus tile-to-tile comparison was conducted by introducing MCD43 Albedo. The above images is for near-infrared (NIR) black-sky-albedo (BSA).

Conclusion: For NIR albedo, the VIIRS albedo is between VNP43 and MCD43 apparently.

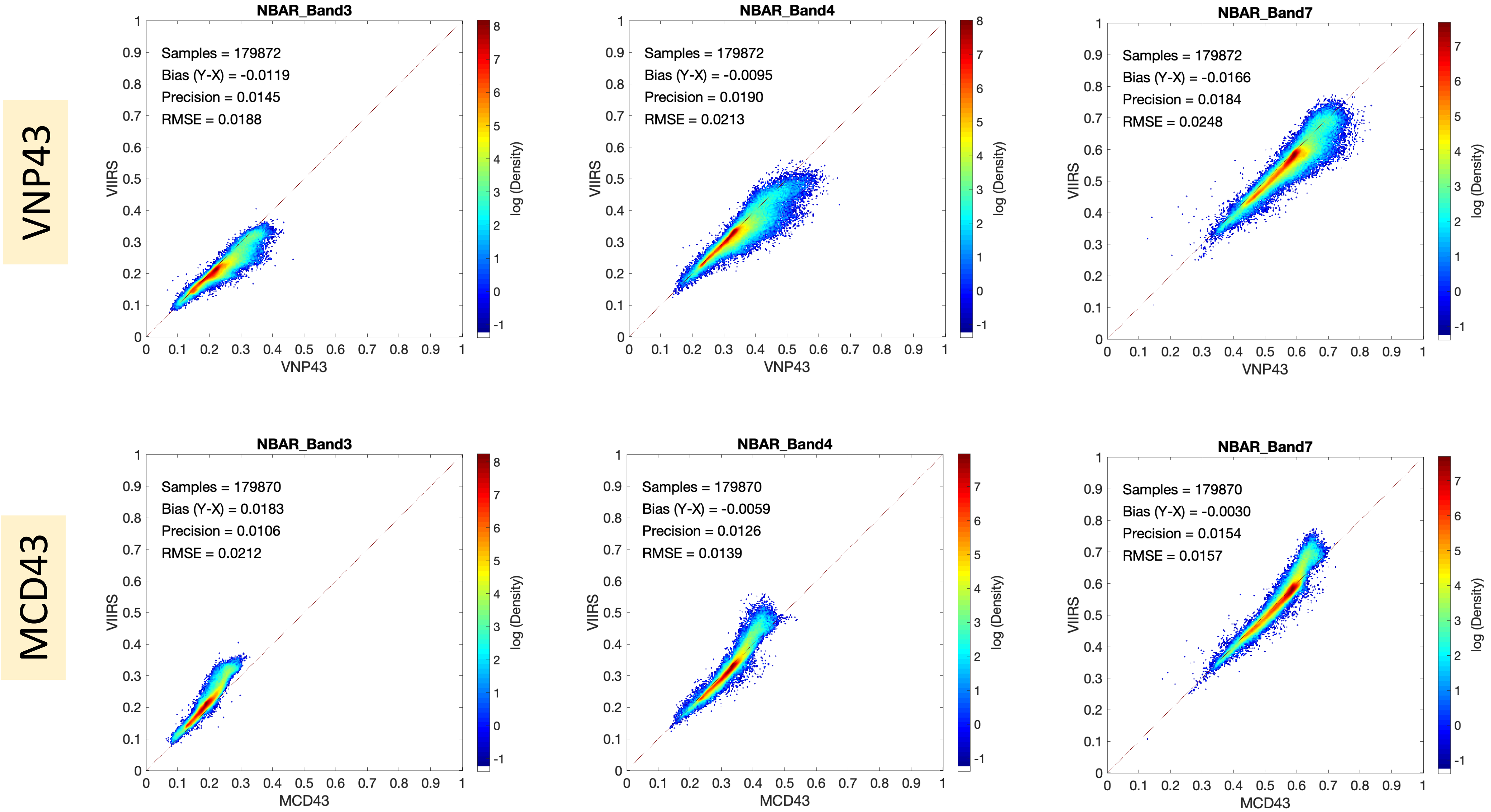
h40v24 **BSA_SW**



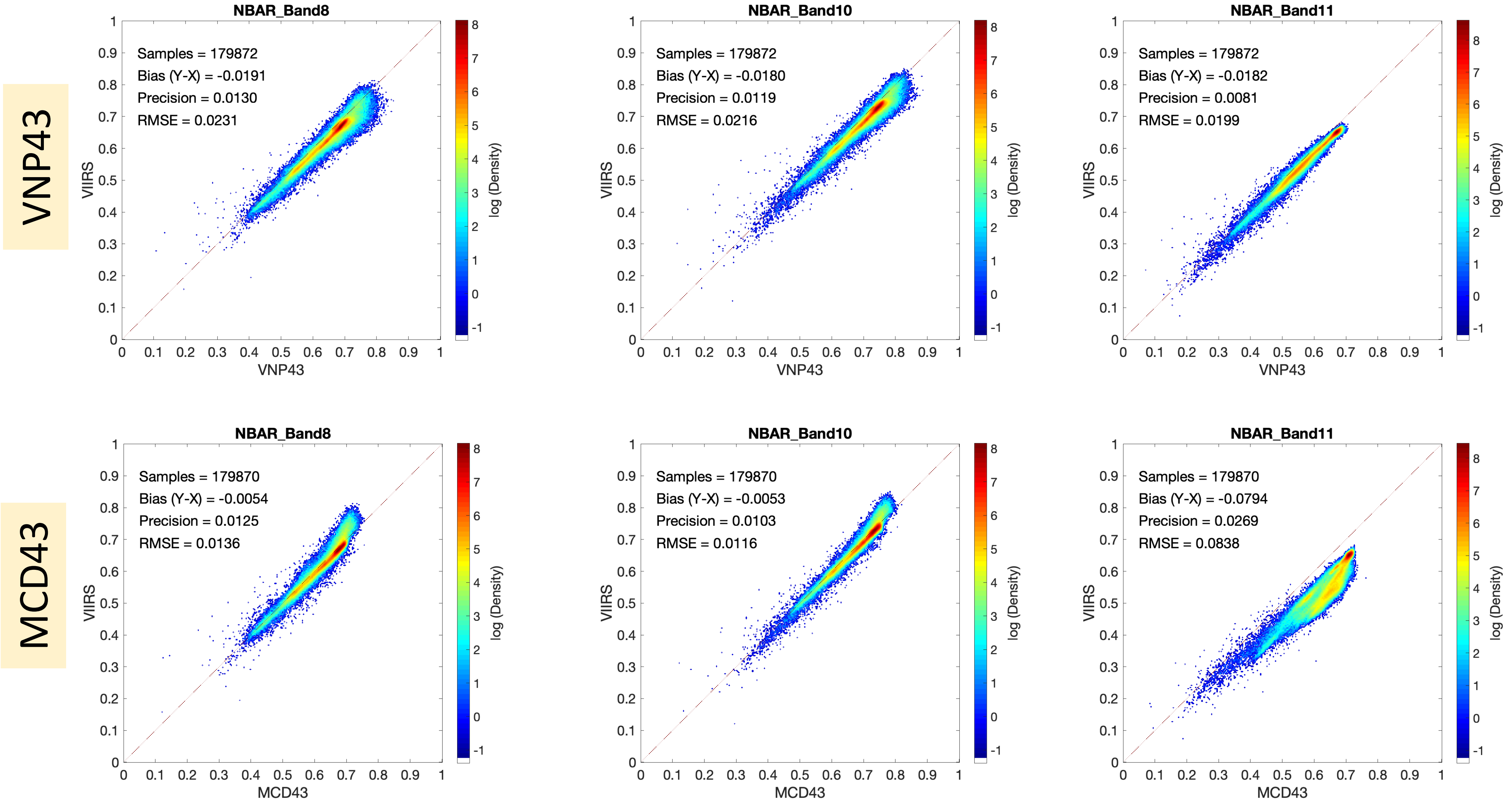
Background: The VIIRS albedo appears larger in some barren area in global comparison. Thus tile-to-tile comparison was conducted by introducing MCD43 Albedo. The above images is for shortwave (SW) black-sky-albedo (BSA).

Conclusion: The VIIRS BRDF-based SW albedo is smaller than VNP43 product, but closer to MCD43 magnitude. In larger value regions, the VIIRS albedo is between VNP43 and MCD43.

NBAR


VNP43
MCD43
NBAR_Band3
Samples = 179872
Bias (Y-X) = -0.0119
Precision = 0.0145
RMSE = 0.0188
VIIRS
VNP43
log (Density)
NBAR_Band4
Samples = 179872
Bias (Y-X) = -0.0095
Precision = 0.0190
RMSE = 0.0213
VIIRS
VNP43
log (Density)
NBAR_Band7
Samples = 179872
Bias (Y-X) = -0.0166
Precision = 0.0184
RMSE = 0.0248
VIIRS
VNP43
log (Density)
NBAR_Band3
Samples = 179870
Bias (Y-X) = 0.0183
Precision = 0.0106
RMSE = 0.0212
VIIRS
MCD43
log (Density)
NBAR_Band4
Samples = 179870
Bias (Y-X) = -0.0059
Precision = 0.0126
RMSE = 0.0139
VIIRS
MCD43
log (Density)
NBAR_Band7
Samples = 179870
Bias (Y-X) = -0.0030
Precision = 0.0154
RMSE = 0.0157
VIIRS
MCD43
log (Density)

NBAR


VNP43
MCD43
NBAR_Band8
Samples = 179872
Bias (Y-X) = -0.0191
Precision = 0.0130
RMSE = 0.0231
NBAR_Band10
Samples = 179872
Bias (Y-X) = -0.0180
Precision = 0.0119
RMSE = 0.0216
NBAR_Band11
Samples = 179872
Bias (Y-X) = -0.0182
Precision = 0.0081
RMSE = 0.0199
NBAR_Band8
Samples = 179870
Bias (Y-X) = -0.0054
Precision = 0.0125
RMSE = 0.0136
NBAR_Band10
Samples = 179870
Bias (Y-X) = -0.0053
Precision = 0.0103
RMSE = 0.0116
NBAR_Band11
Samples = 179870
Bias (Y-X) = -0.0794
Precision = 0.0269
RMSE = 0.0838
VIIRS
VNP43
MCD43
log (Density)

Vegetation Index and Green Vegetation Fraction

Accomplishments / Events:

- Modified the regional weekly GVF code in GVF v3r0 system into the global weekly GVF code, called GVF v3r1, with spatial resolution of 1km. Tested GVF v3r1 with NOAA-20 observations in two periods (April 10-16, 2020 and July 9-15, 2021 – see highlight illustration).
- Produced global (resolution of 1km) GVF climatology data for GVF v3r1 system.
- Evaluated the impact of OSPO system upgrade on VI data and found that the I&T daily and weekly VIs were extremely close to the operational daily and weekly VI (R=0.999)
- Evaluated the impact of OSPO system upgrade on GVF data and found that the I&T GVF was very close to the operational GVF
- Work on VI validation using Aeronet data continued with expanded data set. Results are not yet complete.

Overall Status:

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

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

Issues/Risks:

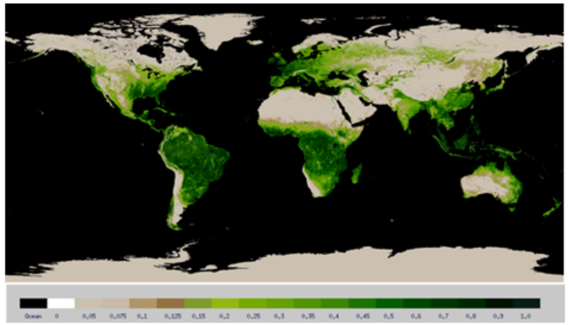
None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	10/29/21	
Prototype code of 1km global GVF product	Oct-21	Dec-21	Dec-21	
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Prototype of VI generation using ABI data	Feb-22	Feb-22		
LAI data development plan ready	Mar-22	Mar-22		
Technical readiness of 1km GVF development	May-22	May-22		
Operational support readiness of J2 VI and GVF products	Jun-22	Jun-22		
FY23 Program Management Review	Jun-22	Jun-22		
Ground measurements collection and processing. LAI experimental product preliminary in-situ validation and cross-comparison with other products.	Sep-22	Sep-22		
Calibration/Validation update for SNPP and NOAA20 VI and GVF products	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Feb-22 & Mar-22 JCT3-TVAC; Maybe: Apr-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

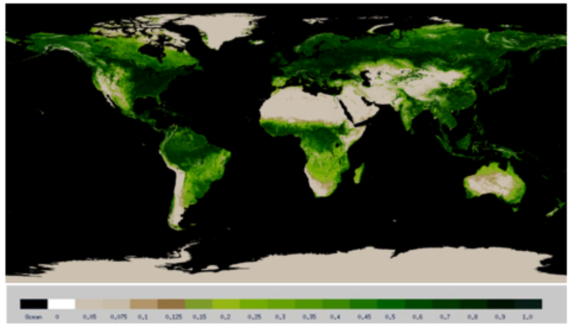
Highlights:

Sample Results of 1km-Resolution Global Weekly GVF v3r1

1km-Resolution Global GVF with NOAA-20 observations in the period April 10 – 16 of 2020



1km-Resolution Global GVF with NOAA-20 observations in the period July 9 – 15 of 2021

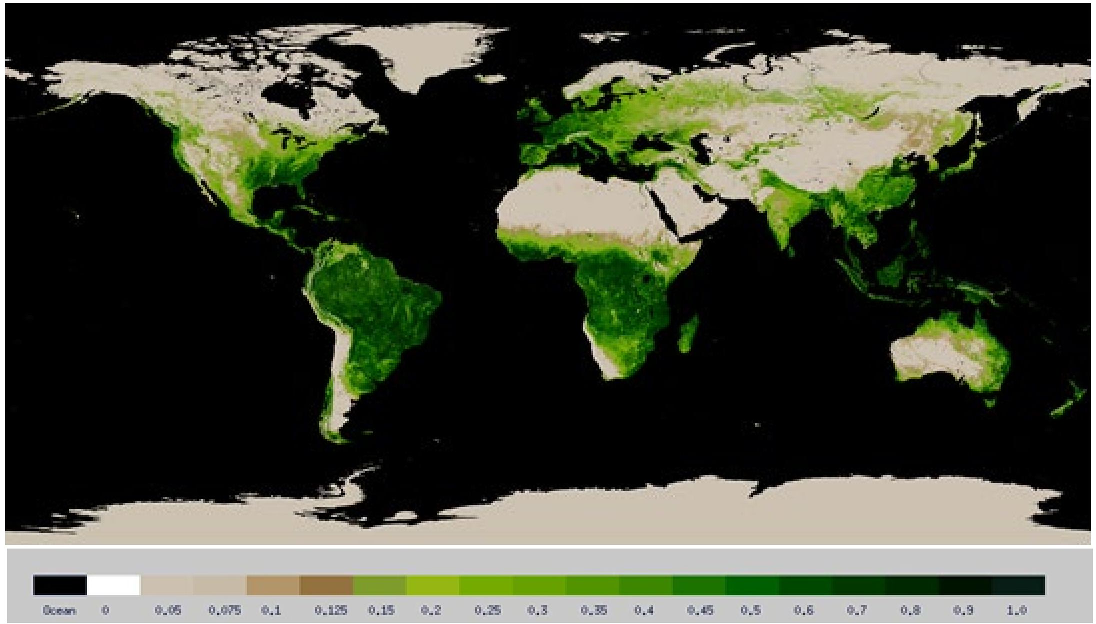


1km-Resolution Global Weekly GVF v3r1 versus GVF v3r0 & v2r3

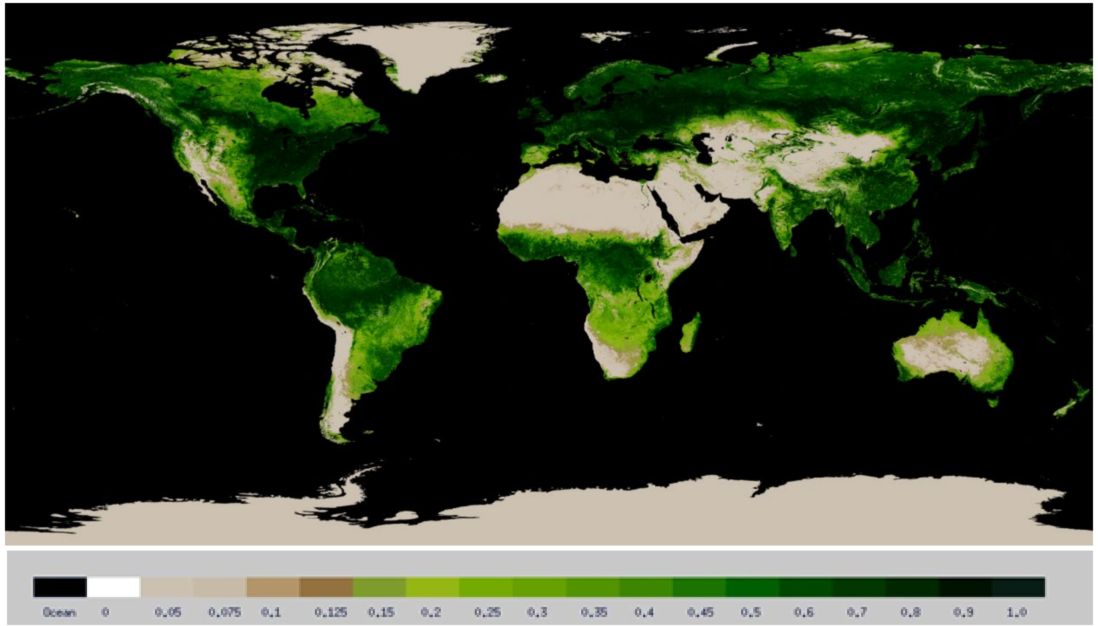
- GVF v3r1 changes relative to GVF v3r0 (currently delivered):
  - Modified GVF algorithm to produce the 1km-resolution data on global domain (longitude: 180W eastward to 180E, latitude: 90N southward to 90S) instead of on the regional domain (longitude: 130E eastward to 30E, latitude: 90N southward to 7.5S).
  - Generated 1km global GVF climatology data for GVF v3r1.
  - Running time increases about 3 minutes
  - Output storage increases about 80 MB
- GVF v3r1 changes relative to GVF v2r3 (currently operational in NDE):
  - The GVF algorithm is now ingesting an intermediate product (IP) of the daily gridded surface reflectance products of the VI system rather than granule-based geolocation and surface reflectance. This modification can save around 2 hours of processing time.
  - Merging the original EVI calculation unit into the weekly compositing unit removes I/O of weekly composited surface reflectance data.
  - Moving the weekly average process in the original time smoothing unit into the GVF calculation unit removes I/O of weekly average smoothed EVI data.
  - Changed original single-thread implementation into multi-thread implementation.
  - Total running time decreased from about 4.5 hours (GVF v2r3) to about 1.5 hours.

Sample Results of 1km-Resolution Global Weekly GVF v3r1

1km-Resolution Global GVF with NOAA-20 observations in the period April 10 – 16 of 2020

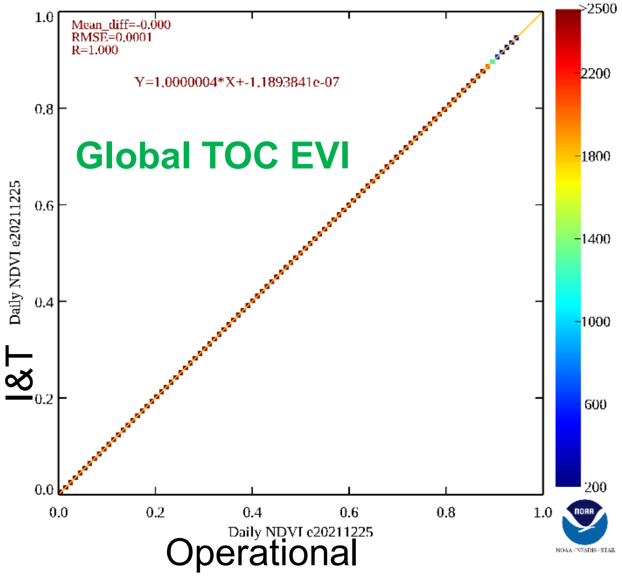


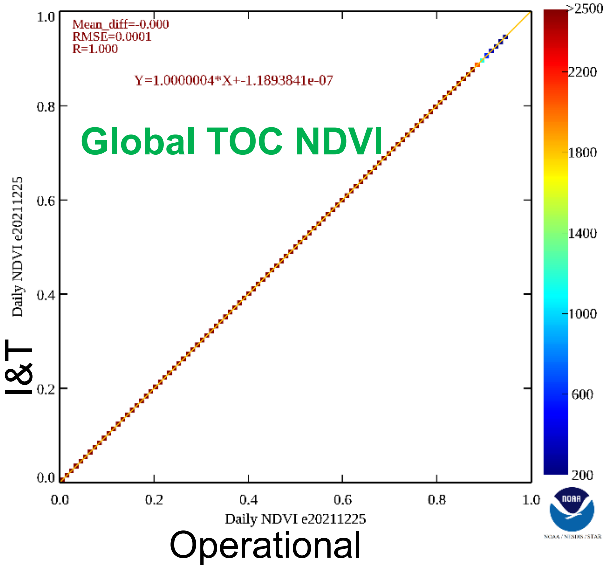
1km-Resolution Global GVF with NOAA-20 observations in the period July 9 – 15 of 2021

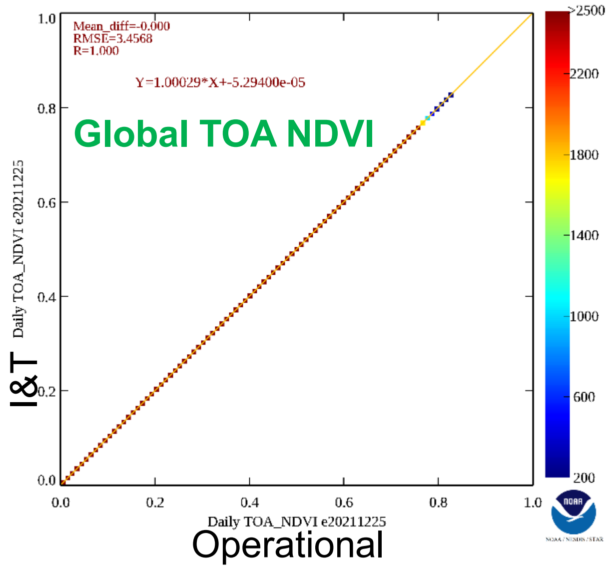


Evaluation of impact of OSPO system upgrade on daily VI

- OSPO recently upgraded the OS from Redhat 6 to Redhat 7
- It was suggested that surface reflectance end users are impacted
- A brief verification of VI and GVF is needed for the upgrade
- VI and GVF jobs have been run on I&T test machine since Dec 16, 2021
- Operational VI data were compared with the I&T test data

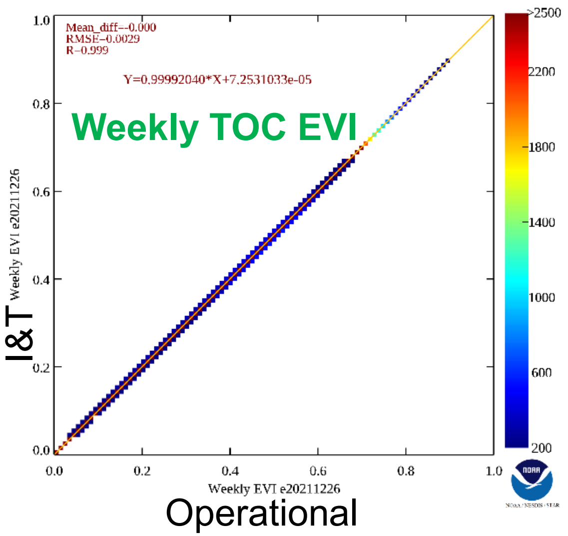


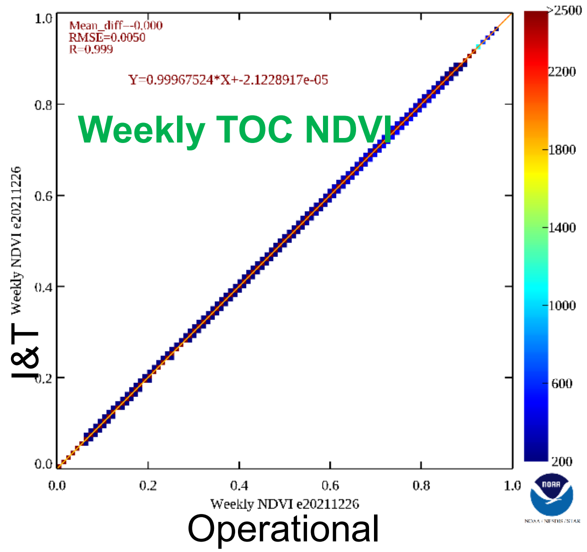


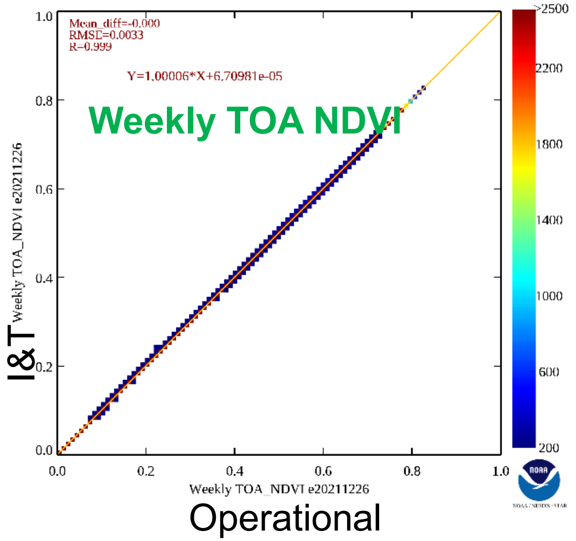


- I&T daily VIs are exactly the same as the operational daily VI on the same day

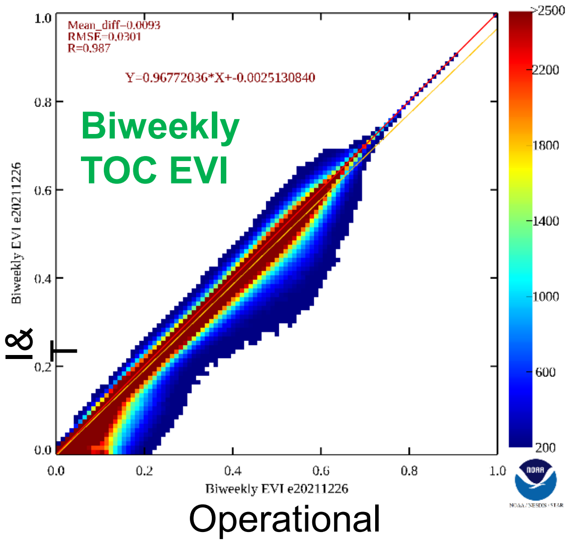
Evaluation of impact of OSPO system upgrade on weekly and biweekly VI

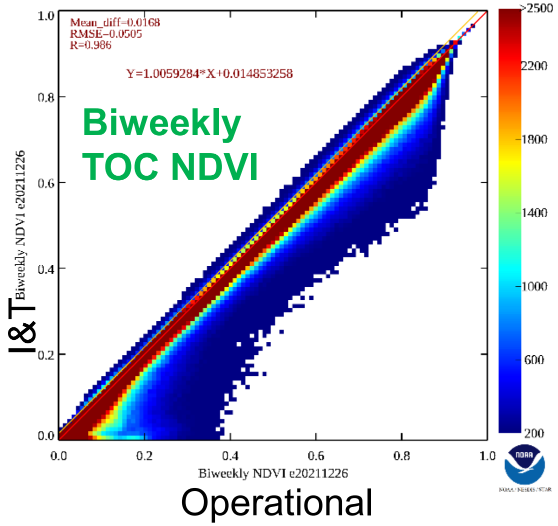


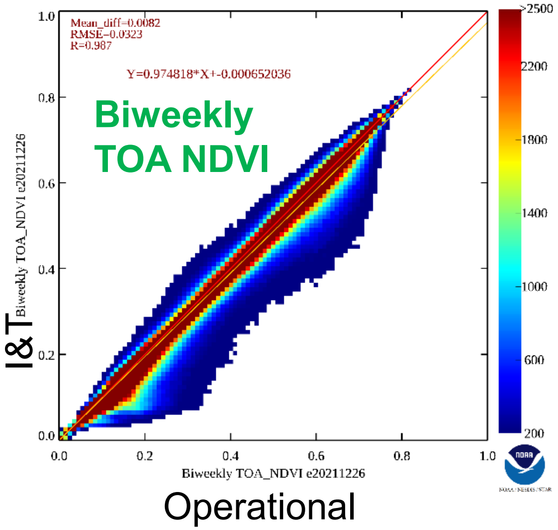




I&T weekly NPP VIs are extremely close to the operational weekly VI (R=0.999)

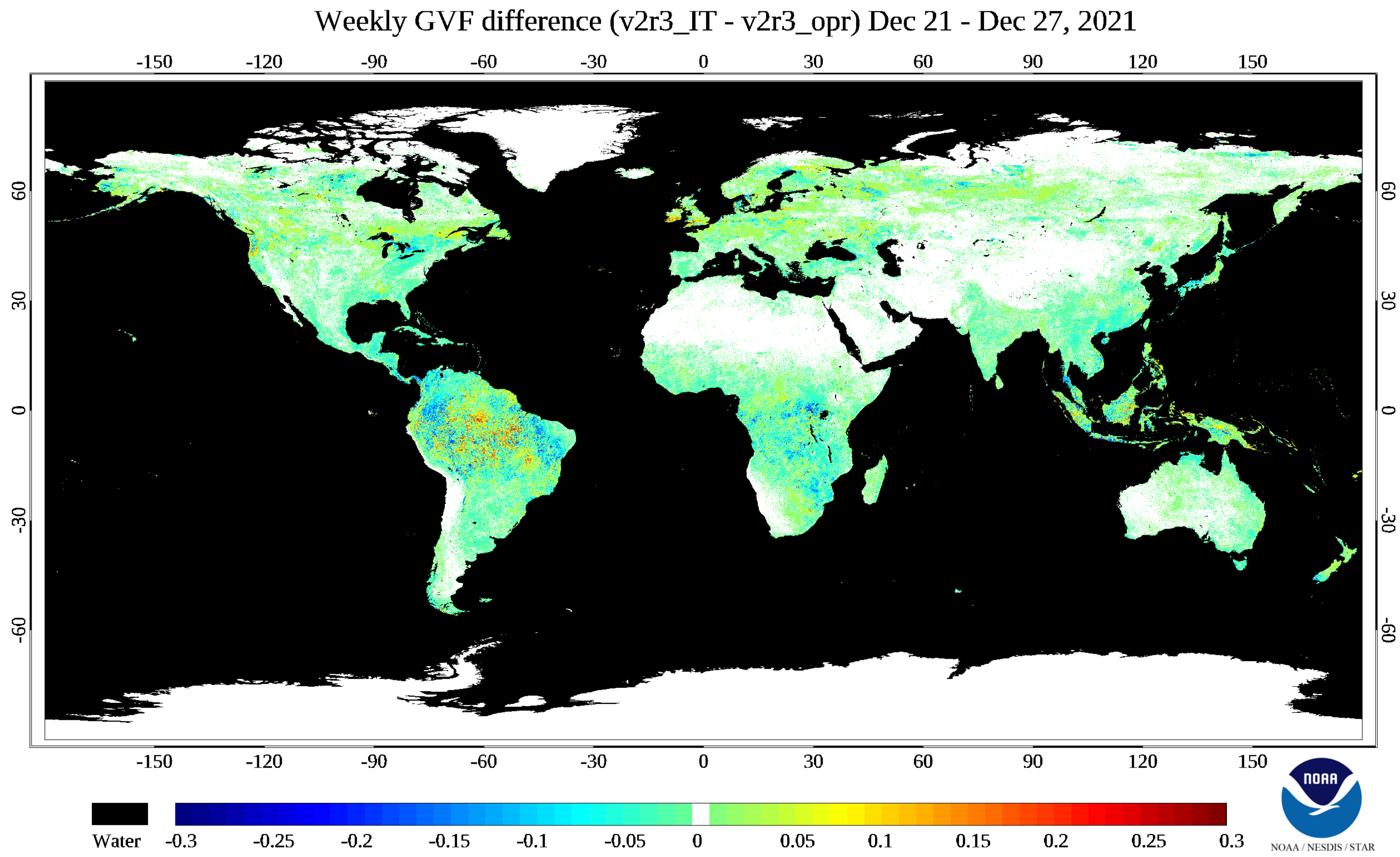


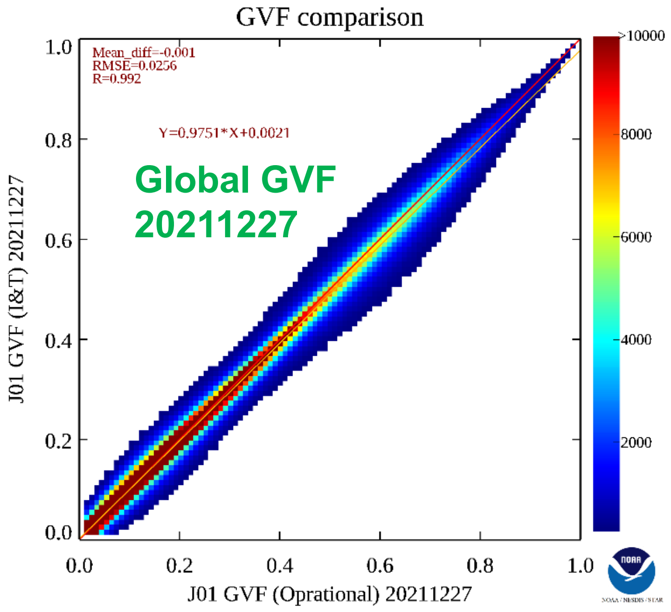


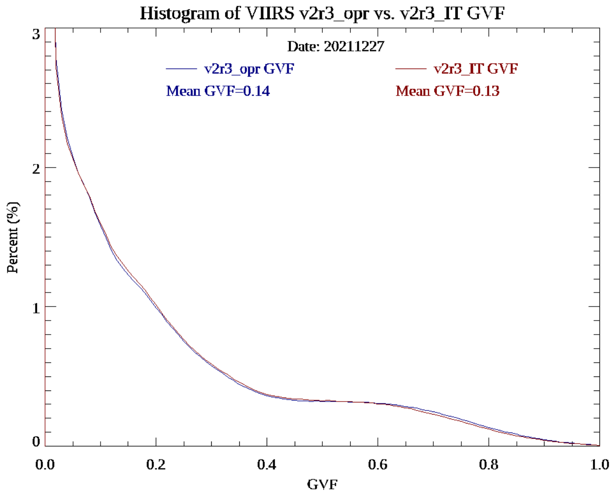


I&T Biweekly VIs are different from the operational weekly VI since the I&T biweekly VI has limited (10 days) input data

Evaluation of impact of OSPO system upgrade on weekly GVF







- The J01 GVF difference map and scatter plot comparison showed very small GVF difference globally
- The histograms of the two GVF datasets matched very well
- The small GVF difference is due to the limited (12 days) input data for I&T GVF, whereas the operational GVF requires 15 weeks of intermediate EVI data for time series smoothing

JPSS NOAA NASA

Vegetation Health

January, 2022

Accomplishments / Events:

- Applied the techniques correlating VH indices with crop yield to newly developed RCI and newly downloaded crop yield data, include wheat and corn of 9 selected countries;
- Compared the correlation results between crop yield and RCI with correlations between crop yield and VH indices (VCI/TCI/VHI) (Highlighted), and generated a report;
- Finished processing FAO locust activity vs VH indices in 2021, including weekly comparison and monthly comparison;
- Communicated with users on various queries relating to utilizing VH Products;
- Generated a series of data and figures of VIIRS/VHP-1 and -4, -16 km resolution products, covering January 2021;

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			

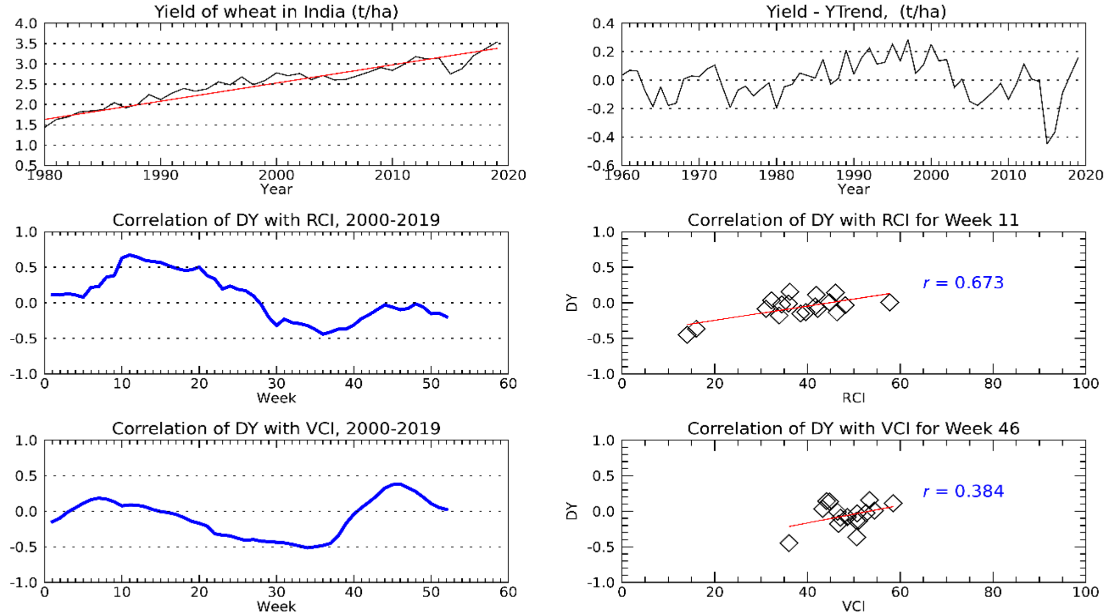
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		Not needed
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates, initial/final DAPs combined)	Dec-21	Dec-21	12/20/21	
Algorithm: VHindices-Malaria (South America)	Sep-22	Sep-22		
VIIRS-0.5 km SMN & SMT (8-year Max-Min Climatology)	Sep-22	Sep-22		Not needed
40-year Vegetation Greenness (NDVI) & Global warming	Sep-22	Sep-22		
Climate warming & temperature (SMT) in agricultural regions	Sep-22	Sep-22		
FAO locust activity vs VHindices in 2021	Sep-22	Sep-22	01/12/22	
NDVImax/min & BTmax/min: 0.5 and 1 km correlation	Sep-22	Sep-22		
Regional drought and global warming trends	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights: Correlation of RCI and VCI with Wheat Yield in India



Ocean Color

January, 2022

Accomplishments / Events:

- Moby Refresh pre-deployment characterization
- Preparations for March 2022 NOAA CalVal cruise support at the Hawaii MOBY site (See highlight)
- Evaluated the performance of NOAA MSL12 SNPP and N20 VIIRS at the Venise, Italy AOC site between June and December of 2021 – Very good agreement
- .

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.*

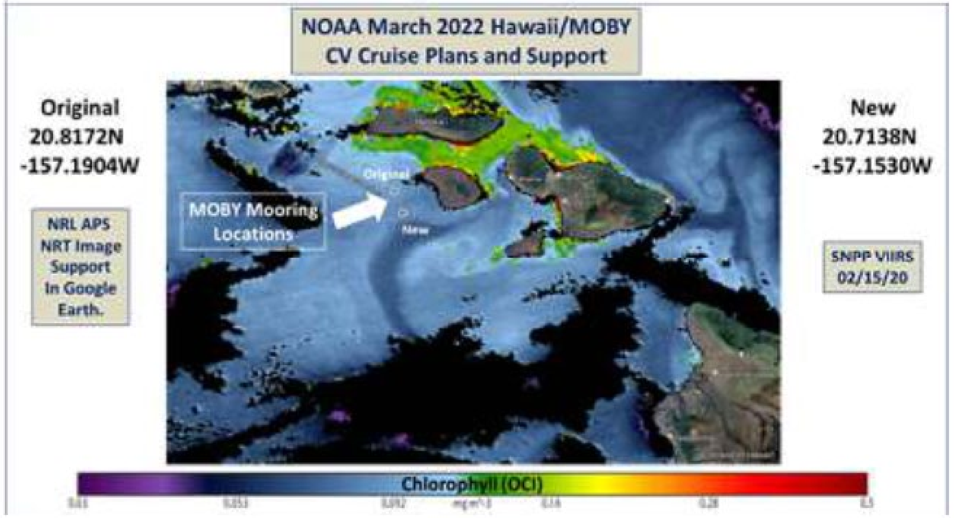
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/01/21	
FY23 Program Management Review	Jun-22	Jun-22		
J2 ready DAP to CoastWatch (include NPP/N20 updates)	Dec-21	Dec-21	10/29/21	cc ASSISTT
J2 ready DAP to ASSISTT (include NPP/N20 updates)	Mar-22	Mar-22		CoastWatch delivery
J2 ready DAP to Cloud (include NPP/N20 updates)	Jun-22	Jun-22		ASSISTT delivery
Support CoastWatch/ASSISTT for J2 OC MSL12 testing/verification, if needed	Sep-22	Sep-22		
J2 OC data processing (MSL12) ready for J2 launch	Sep-22	Sep-22		
Start mission-long VIIRS OC data reprocessing	Mar-22	Mar-22		
Evaluation of MSL12 ver 1.51 performance over global ocean	Sep-22	Sep-22		
Producing consistent VIIRS SNPP and NOAA-20 ocean color products	Sep-22	Sep-22		
Cal/Val team complete the 7th VIIRS ocean color dedicated cruise	Jul-22	Jul-22		
Improvement of the OCView tool or web presentation	Aug-22	Aug-22		
Continue working on improvement of the ocean color data processing system (MSL12), particularly over global coastal and inland water regions	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights: Upcoming 2022 Cal/Val Cruise

Example chlorophyll image in Google Earth that NRL will generate in near real time to support the upcoming March 2022 NOAA CalVal cruise off the Hawaii Coasts mainly near the MOBY mooring sites illustrated on the image.



Sea Surface Temperature

January, 2022

Accomplishments / Events:

- On 14-15 Jan 2022, Tonga volcano erupted.
- According to https://en.wikipedia.org/wiki/2022_Hunga_Tonga_eruption_and_tsunami "Preliminary data indicate that the event was probably the largest volcanic eruption in the 21st century and the largest since the 1991 eruption of Mt Pinatubo".
- The Volcanic Explosivity Index https://en.wikipedia.org/wiki/Volcanic_Explosivity_Index is 6 for Mt Pinatubo and 5 for El Chichon and Hudson.
- Eruption occurred in 2 phases: above water (14 Jan) and below water (15 Jan). The 2nd phase warmed the ambient waters, and resulted in SST warming by up to 2°C (see Figure).
- However, the major concern for SST is that cloud of stratospheric aerosol was lifted as high as 20km in the atmosphere, and may eventually cause cold biases in satellite SST due to current atmospheric correction algorithms being tuned to aerosol-free atmosphere. Three similar eruptions in satellite era (El Chichon in 1982, and Mt Pinatubo and Mt Hudson in 1991 led to cold biases.
- SST Team is watching the evolution of the event and will take corrective actions as needed.

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			

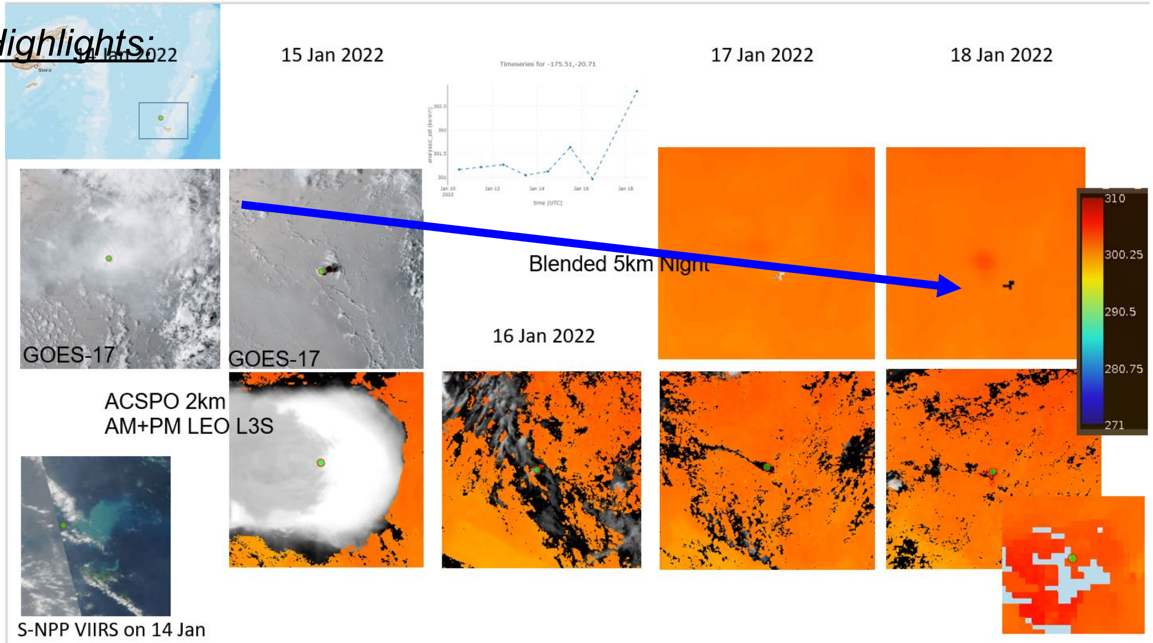
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

Tonga volcanic eruption may result in cold SST biases of unknown magnitude.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (no science code update: initial/final combined)	Dec-21	Dec-21	12/15/21 SPSRB docus (EUM, SMM)	if needed (e.g., update for Intel 19.0.5, filename change, etc)
Continue development of ACSPO 2.90. Improve Clear-Sky Mask & SST Algorithms. Focus on NPP/N20 SST consistency	Aug-22	Aug-22		
Integrate in ACSPO. Test in STAR environment. Include N21 functionalities in NOAA Match-Up code/Monitoring	Aug-22	Aug-22		
Continue NOAA SQUAM and ARMS monitoring & validation against iQuam. Provision for N21 infrastructure	Aug-22	Aug-22		
Maintain ACSPO, SQUAM, iQuam, ARMS, match-up & RAN infrastructure & codes. Improve/optimize/add N21	Sep-22	Sep-22		
Monitor SST performance online. Identify anomalies. Work w/SST Algorithms & SDR Team and archives to address	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights:



Courtesy NOAA CoastWatch Team, Michael Soracco and Veronica Lance.

VIIRS Polar Winds

January, 2022

Accomplishments / Events:

- Parallax correction reduces biases in VIIRS tandem winds.
  - Correcting the locations of the retrieved polar winds in the VIIRS tandem winds product significantly reduces the speed bias when compared to ERA5 (ECMWF reanalysis) winds.
  - The parallax correction reduces both fast and slow speed biases (Figure in HIghlights), especially in the upper troposphere.

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
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	10/28/21	
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Super DAP v3.1 patch delivery			12/06/21	
Implement VIIRS tandem winds	Mar-22	Mar-22		
Generate new lookup tables, retrieval coefficients for JPSS-2	Sep-22	Sep-22		
Continuous monitoring of S-NPP and NOAA-20 products	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights:

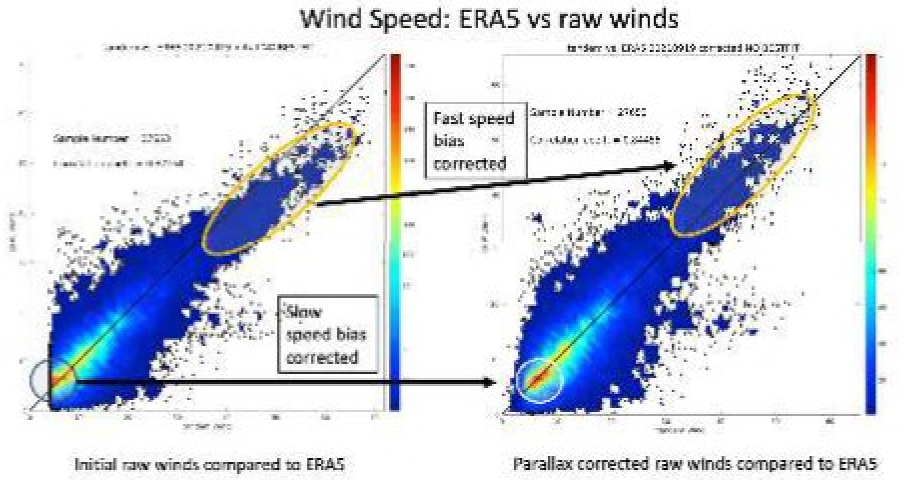


Figure 1. Scatterplot of wind speed from VIIRS tandem winds (horizontal axis) and ERA5 winds (vertical axis) for the parallax-corrected retrievals (right) and the uncorrected data (left). The circled areas indicate areas of significant improvement.

NUCAPS Products

January, 2022

Accomplishments / Events

- NUCAPS team members attended the AMS-2022 annual meeting and presented oral and poster presentations. All of the NUCAPS presentations were well received.
- Initiated NUCAPS product evaluations in support of MetOP-B/C Operational Readiness Review. Downloaded MetOp-B/C NUCAPS products for a set of focus days from the NCCF implementation, and initiated evaluations with the offline science products, and the products generated by the ASSISTT NRT implementation.
- Evaluated MetOp-B/C NUCAPS trace gas products with the EUMETSAT derived products. Preliminary results indicate that the NUCAPS products match sufficiently well with the TROPOMI and OCO-2 matches in comparison to the EUMETSAT operational products.
- Continued work on the NUCAPS implementation for the NCIS Cloud infrastructure; Continued work on three major updates, (a) averaging kernels, (b) ozone climatology improvements, and (c) surface corrections to the NUCAPS V3.1 for mission long reprocessing.
- Continued work on NUCAPS implementation on the NCIS Cloud infrastructure.
- Continued work on the Elsevier reference book on Field Measurements.

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
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	11/10/21	
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates)	Jan-22	Jan-22		
NUCAPS Averaging Kernels (AK) and improved stability indices. S-NPP Mission long reprocessing version (NUCAPS v3.1)	Dec-21	Feb-22	Working on change request process.	Planned for 02/28/2022
Addition of Ammonia product to NUCAPS operational retrievals (NUCAPS v3.2)	May-22	May-22		
NUCAPS augmentation for EPS-SG (NUCAPS v3.3)	Jul-22	Jul-22		
NUCAPS IR-only retrieval for risk mitigation and conceptual GEO-CrIS retrieval products (NUCAPS v3.4)	Jan-22	Jan-22	Results published in a joint paper with the CrIS SDR team	No plans yet for an operational DAP
Land, Snow/Ice and Ocean Spectral Emissivity Improvements	Mar-22	Mar-22		
Reactive maintenance and Improvements to surface emissivity first guess using CAMEL, temperature lower-tropospheric bias improvements over land, optimized cloud clearing and Local Angle Corrections (LAC) for S-NPP/NOAA-20 NUCAPS	Sep-22	Sep-22		
NOAA-GML Theme 1: NUCAPS trace gas product validation with corroborative data sets and collaboration with GML and other stakeholders in support of NOAA/NESDIS initiatives	Mar-22	Mar-22		
NOAA-GML Theme 2: NUCAPS ozone and water vapor products validations with CLIMCAPS and O3SNDS, and collaboration with GML and other stakeholders in support of NOAA/NESDIS initiatives	Mar-22	Mar-22		
Routine monitoring of trace gas products, T(p) and q(p) bias improvements	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC: Maybe; May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights: NUCAPS MetOp-IASI vs. EUMETSAT Trace Gas Products

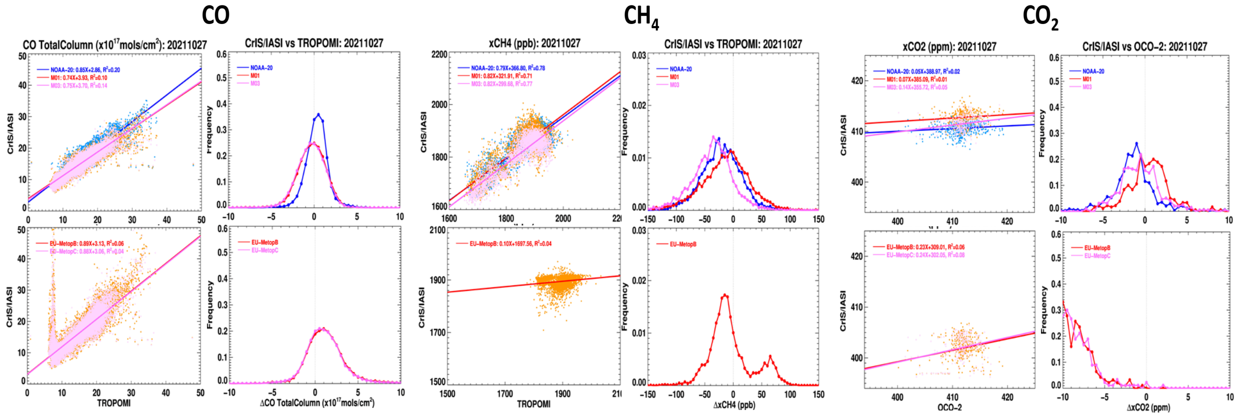


Figure: Evaluation of NUCAPS MetOp-B/C IASI trace gas products with EUMETSAT products for 10/27/2021. TROPOMI products are used as the reference to compare NUCAPS and EUMETSAT CO and CH4 products..OCO-2 CO2 product is used as the reference to evaluate NUCAPS and EUMETSAT IASI CO2. Preliminary results of evaluation reveal that the NUCAPS trace gas retrievals (CO, CH4, and CO2) show better match to the TROPOMI (CO and CH4), and OCO-2 CO2 observations)
Top row: NUCAPS - NOAA-20 CrIS (blue), IASI MetOp-B (red), IASI MetOp-C (magenta) products.
Bottom row: EUMETSAT - IASI MetOp-B (red), IASI MetOp-C (magenta).

MiRS Products

January, 2022

Accomplishments / Events:

- Completed generation of collocation data set comprised of MiRS operational retrievals, experimental MiRS-TC retrievals, and ECMWF analyses for all of 2021. Data set is global (all ocean basins) and contains all cyclones with category 1 intensity and higher. Initial analysis complete for the North Atlantic basin. Results were stratified by hurricane intensity. For all intensities (categories 1-4) the experimental MiRS-TC temperature soundings within 100 km of the storm center show a significantly smaller bias than the operational version of MiRS. The difference standard deviation of MIRS-TC temperatures is also improved for category 3 and 4 storms, but slightly larger for weaker storms. Further analysis is ongoing to determine performance in other ocean basins and at other distances from the TC center. Additional sensitivity tests with MIRS-TC are also planned. See highlights.
- A manuscript titled "In-Depth Evaluation of MiRS Total Precipitable Water from NOAA-20 ATMS Using Multiple Reference Data Sets" was accepted for publication in Earth and Space Science. It is currently in press, but the URL is 10.1029/2021EA002042.

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			

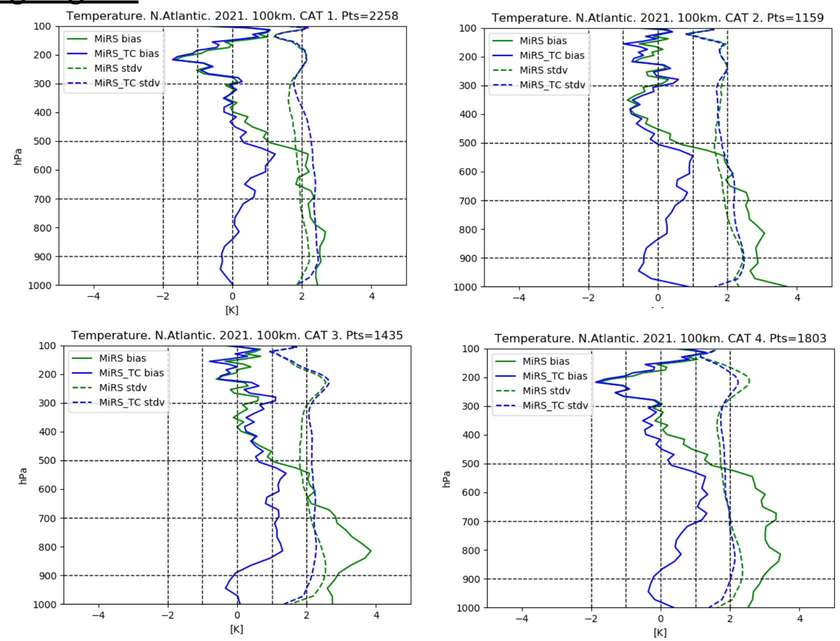
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required
FY23 Program Management Review	Jun-22	Jun-22		
Patch DAP delivery (to ASSISTT)			V11.6 10/19/21 V11.8 10/28/21 V11.8 11/17/21	
MiRS 11.6 Patch Delivery (Patch DAP for MiRS (J1, J2, S-NPP)			12/30/21	To NDE
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Complete collocation and evaluation of experimental MiRS-TC version for one year of Atlantic and Pacific basin TCs in 2020	Jan-22	Jan-22	Jan-22	
Update snow and ice emissivity catalogs (look-up tables) for EPS-SG/MWS to account for polarization differences at 23 and 31 GHz	Apr-22	Apr-22		
Develop AI (post processing) approaches to precipitation retrieval in MiRS, leveraging the collocated MiRS-MRMS datasets for training and validation	Jun-22	Jun-22		
MiRS DAP (v11.9 or v11.10): integrate SFR algorithm updates, code/science improvements, final pre-J2 launch delivery	Jul-22	Jul-22		
Begin reprocessing entire JPSS mission data for both SNPP and N20 using latest version of MiRS. Complete reprocessing for SNPP for the period 2011-2015	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights:



Bias and difference standard deviation of MiRS operational (green) and experimental MiRS-TC (blue) temperature retrievals relative to collocated ECMWF analyses. Results are stratified by hurricane intensity. For all intensities, the MiRS-TC temperature bias is significantly smaller than the operational bias below 500 hPa. For the standard deviation, MiRS-TC retrievals are slightly improved below 700 hPa for category 3 and 4 storms, but slightly worse for weaker storms.

Snowfall Rate

January, 2022

Accomplishments / Events:

- Implemented the XGB machine learning snowfall detection (SD) algorithms globally in the direct broadcast data-based SFR processing system maintained by CISESS. This algorithm will be delivered to MiRS in September 2022.
- Study is ongoing to improve snowfall rate estimation using machine learning technique.
- The SFR team gave an oral presentation and showed a poster about the SFR product in the AMS meeting. The CISESS PI also gave a talk at the January JSTAR Science Lead meeting and the JPSS Hydrology Initiative meeting.

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			

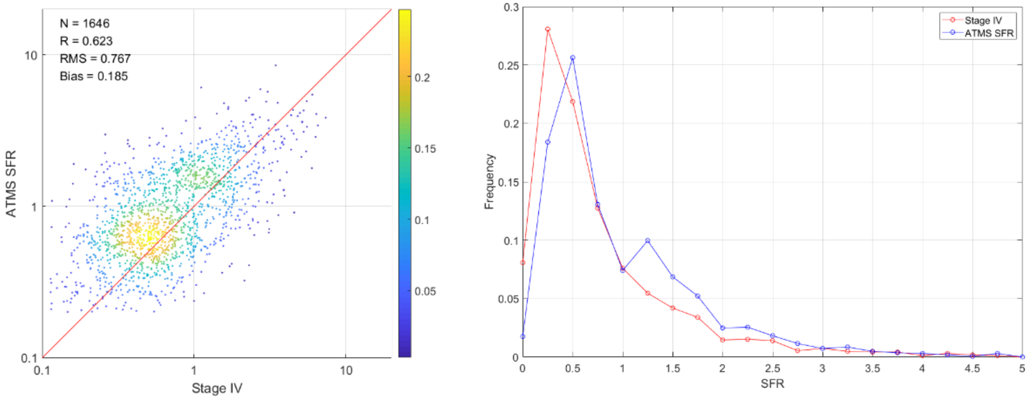
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
Final J2 ready DAP to NDE (include NPP/N20 updates)	Feb-22	Feb-22		
Patch DAP delivery (to ASSISTT)			V11.6 10/19/21 V11.8 10/28/21 V11.8 11/17/21	
MiRS 11.6 Patch Delivery (Patch DAP for MiRS (J1, J2, S-NPP)			12/30/21	To NDE
FY23 Program Management Review	Jun-22	Jun-22		
Develop NOAA-20 ML Snowfall Detection model. Improve SFR algorithm through ML	Jun-22	Jun-22		
NOAA-20 and S-NPP cross-calibration & comparison after algorithm update	Aug-22	Aug-22		
NOAA-20 and S-NPP stratified validation after algorithm update	Aug-22	Aug-22		
SFR near real-time webpage, operational monitoring	Sep-22	Sep-22		
Implement ML ATMS SD in the Enterprise SFR system	Sep-22	Sep-22		
Deliver ATMS SFR with ML SD to MiRS	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		

Highlights: ATMS SFR Performance from the January 2-3 Snowstorm



ATMS (S-NPP and NOAA-20) SFR performance from the January 2-3 Snowstorm: SFR vs. Stage IV gauge-corrected snowfall rate scatter plot (left), and SFR and Stage IV probability distribution (right).

OMPS Ozone (V8Pro, V2Limb & V8TOz)

January, 2022

Accomplishments / Events:

- Final J2 V8TOz and V8TOS DAPs with tables using J02 OMPS NM bandpasses delivered to ASSISST
- Version 2.5Limb DAP with new climatologies and three-slit processing delivered to NDE.
- Began reprocessing V8Pro record with interpolated bandpasses.
- Provided SO2 movie for recent eruption. See below.

Overall Status:

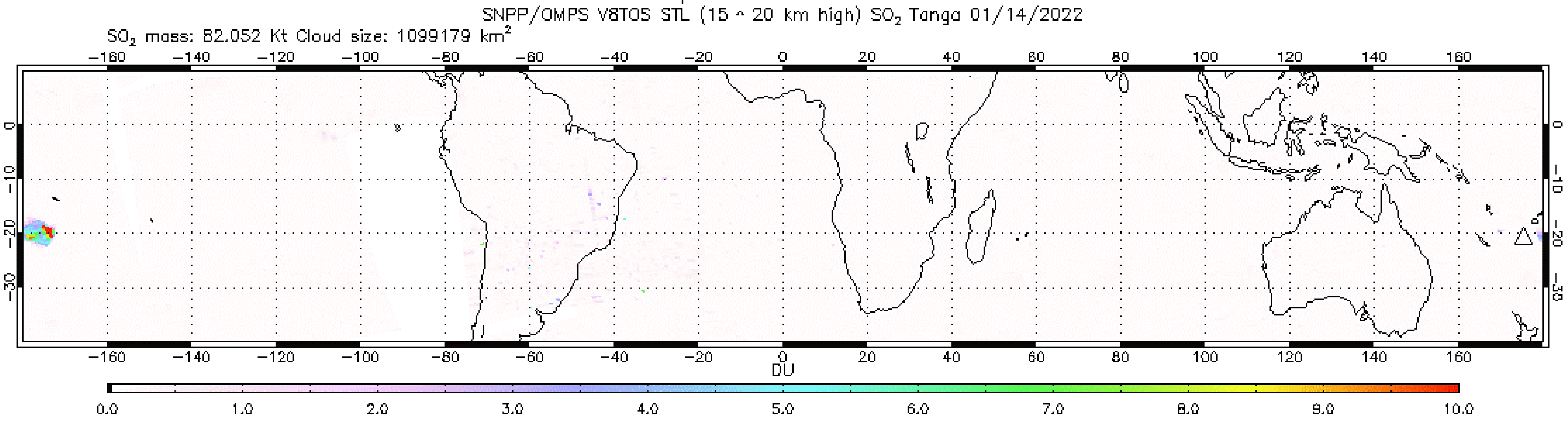
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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

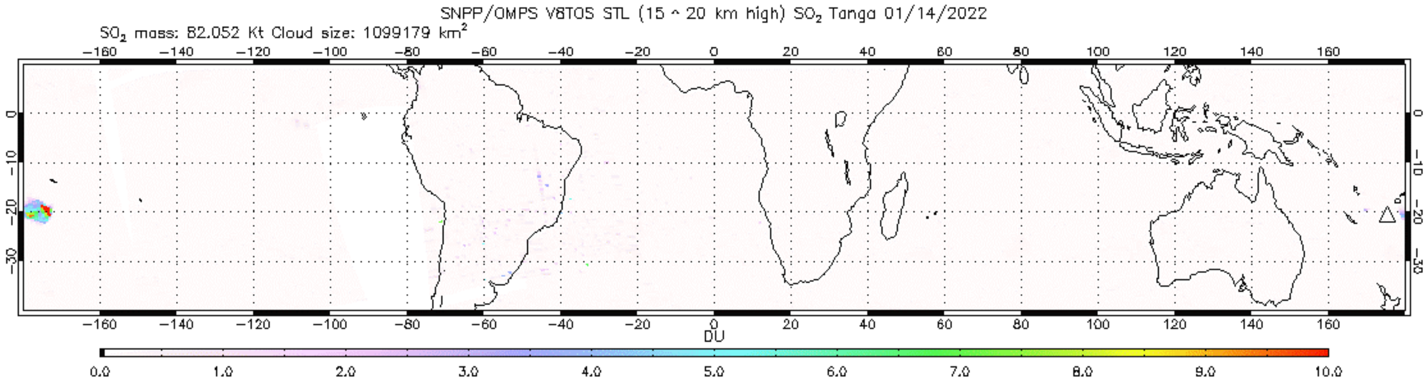
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21	10/26/21	
FY23 Program Management Review	Jun-22	Jun-22		
Final J2 ready DAP to NDE (include NPP/N20 updates), V8TOz	Jan-22	Jan-22	02/03/22	
Final J2 ready DAP to NDE (include NPP/N20 updates), V8Pro	Mar-22	Mar-22		To ASSISTT: Feb-22
Revise Cal/Val Plan to include JPSS-2 Limb and draft schedule	Dec-21	Dec-21	12/09/21	
Update Version 2.5Limb, three improved Climatologies, Cloud Top, Repaired	Jan-22	Jan-22	Jan 22*	*Cloud Top not resolved
Version 2.7 Limb Profile SDR and EDR (include J2 LP)	Sep-22	Sep-22		To ASSISTT: Apr-22
J2 Radiative Transfer & Bandpass Tables for V8Pro and V8TOz	Sep-22	Mar-22	Jan-22 (for V8TOz)	
Soft calibration adjustments and reprocessing for V8Pro & V8TOz	Nov-21 May-22	Feb-21 Apr-22	**11/26/21 (TC)**	SDR Delays
Limb Darks and Orbital Definition files: Weekly ancillary file deliveries to PDA / NDE	Sep-22	Sep-22		Ongoing
Overpass data sets and comparisons to GB and MERRA2	Sep-22	Sep-22		Ongoing
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		As Needed
Participant/support JPSS-2 pre-launch testing events (Mar-22 & Apr-22 JCT3-TVAC; Maybe: May-22 JCT4; Jun-22 JCT4-DSE)	Sep-22	Sep-22		Ongoing

Issues/Risks:None

False color movie maps of SO2 cloud from Tonga Eruption starting on January 1,4 2022.



Loop of SO2 cloud from the Tonda Eruption



GCOM-W1 Products

January, 2022

Accomplishments / Events:

- A new improved version of the Global Automated Snow and Ice Mapping System (GMASI) has been delivered to the ASSISTT team and is being transitioned to operations. The system uses synergy of satellite observations in the visible/infrared from METOP AVHRR and in the microwave from GCOM-W1 AMSR2 and GPM GMI sensors.
- The CISESS GCOM team completed initial reprocessing of AMSR2 rainfall data record. The team concluded that the long-term run confirms the readiness of the retrieval for implementation to operations.
- Finalizing AMSR3 Cal/Val Plan

Overall Status:

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

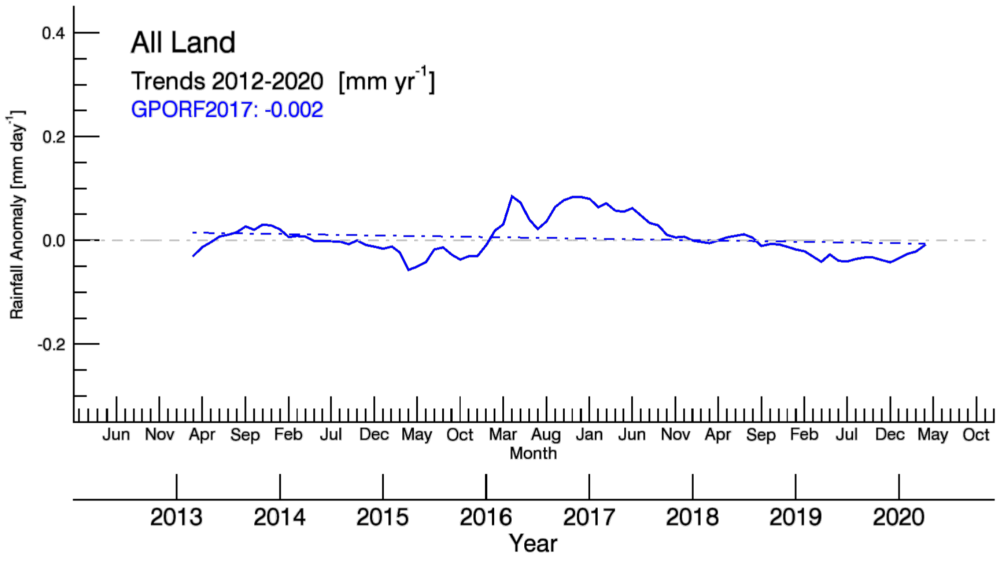
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
AMSR-3 Cal/Val Plan - draft delivery	Jan-21	Jan-22	Jan-22	
AMSR-3 Cal/Val Plan - final delivery	Jun-22	Jun-22		
AMSR-3 ready DAP to ASSISTT (include AMSR-2 updates)	Jun-22	Jun-22		
AMSR-3 ready DAP to NDE (include AMSR-2 updates)	Sep-22	Sep-22		
Algorithm Updates Review	Sep-22	Sep-22		
Assessment of new algorithms for enterprise algorithms for both AMSR2 and AMSR3	Jun-22	Jun-22		
Reprocessing of L2 EDR's (Full L2 products from launch through July 2022)	Jul-22	Jul-22		
Continue AMSR2 L1 monitoring; develop AMSR3 capabilities	Sep-22	Sep-22		
Support ASSISTT/NDE evaluation as required/needed	Sep-22	Sep-22		

Highlights:



GPROF_2017v1 AMSR2 global monthly mean rainfall rate anomaly at 0.25º grid.

NOAA Products Validation System (NPROVS) and Environmental Data Record (EDR) Long Term Monitoring (LTM)

January, 2022

Accomplishments / Events:

- NPROVS processed normally during January with over a thousand radiosonde observations collocated with satellite and nwp observations produced and archived daily.
- A. Reale provided a Satellite Book Club seminar entitled "*NUCAPS performance in winter ice, sleet and snow environments: NOAA Products Validation System (NPROVS)"* on January 13.
- Dr Bomin Sun provided a talk entitled "*Assessment of emerging Vaisala radiosonde humidity observations using satellite hyperspectral infrared measurements*" at the 22nd Symposium on Meteorological Observation and Instrumentation (16.1), held at the 102nd AMS Annual Meeting, Jan 23 to 30 (virtual).
- NPROVS staff provided an initial capability to ingest and display NWS High Resolution Rapid Refresh (HRRR) regional forecast (hourly) in a gridded format; integration into collocated radiosonde, satellite and nwp datasets is planned **(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
FY21 End of Year Science Team Presentations (PMR)	Oct-21	Oct-21		not required - no major issues
FY23 Program Management Review	Jun-22	Jun-22		
Maintain / expand existing EDR LTM web pages and JSTAR Mapper web site	Aug-22	Aug-22		
Maintain /expand NPROVS and support NUCAPS / MiRS EDR assessments for NPP, NOAA-20, JPSS-2 and MetOp-A,B,C; GNSS NESDIS-COSMIC-2	Aug-22	Aug-22		
Manage JPSS dedicated Radiosonde program (DOE-ARM), EDR/Raob collocations (Special), expand to store SDR (GSICS / GRUAN; 75TB)	Aug-22	Aug-22		
Support JPSS AWIPS (NUCAPS) and Hydrological (MiRS) Iniatives and Case Studies	Aug-22	Aug-22		

Highlight: High Resolution Rapid Refresh (HRRR) Regional Forecast

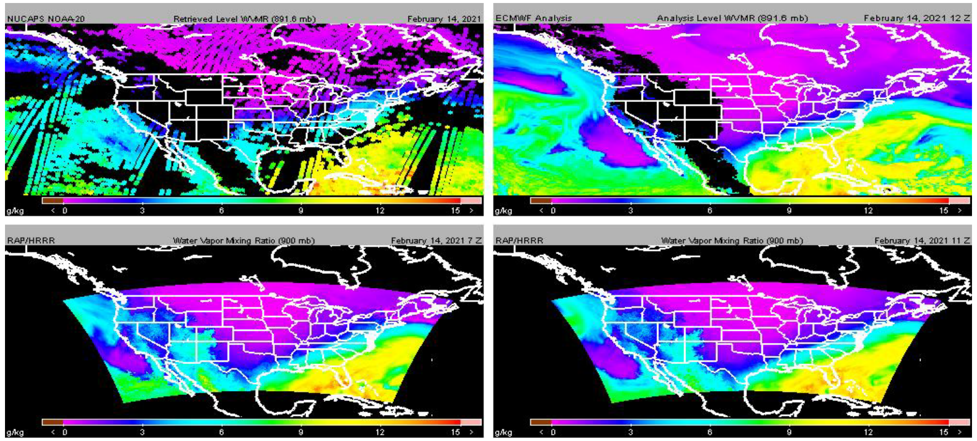
February 14, 2021

NOAA-20 NUCAPS 07Z (891 hPa)

ECMWF ANALYSIS 12Z (891 hPa)

HRRR 07Z (900 hPa)

HRRR 11Z (900 hPa)



H2O Vapor Mixing Ratio (g/kg)

The High Resolution Rapid Refresh (HRRR) is a NOAA, real time, 3km, hourly updated atmospheric model and the first regional model utilized in NPROVS. Hourly HRRR provide more concise targeting of satellite and radiosonde observations at their native times. The above panels show sequential comparisons of lower troposphere (1km) moisture fields from respective NUCAPS (up left), HRRR (lower panels) and ECMWF platforms. The period corresponds to an extended sleet event across western portions of Tennessee and Kentucky and was the topic of a NUCAPS case study presented to the Satellite Book Club (January 13) and which included the Nashville Radiosonde (at 11Z). The addition of the hourly HRRR forecast introduces observations that NWS users rely on to make predictions and opens the door for routine statistical comparisons among satellite, radiosonde, global nwp and HRRR platforms.