AMP/STAR FY23 TTA

Lihang Zhou, DPMS Deputy
Ingrid Guch, Acting JPSS STAR Program Manager

September, 2023

Highlights from the Science Teams (August)

August Maturity Reviews

NOAA-21 Product Maturity reviews took place on August 3 and August 24. Several products were found to have reached the next level of maturity.

The VIIRS SDR and Imagery EDR products were promoted to full Validated Maturity, joining ATMS and CRIS SDRs in that state.

Aerosol Detection, Volcanic Ash, Sea Surface Temperature, Flood Mapping (pending the next algorithm delivery), and the Total Column Ozone EDR were all found to have reached provisional maturity.

Meanwhile, the Cryosphere EDR products and a suite of land products (LST, Albedo, Surface Reflectance, Green Vegetation Fraction, and Vegetation Index) reached Beta Maturity.

Sensor	Algorithm	Beta	Provisional	Validated	ReadMe
ATMS	ATMS TDR	30-Nov-2022	Dec-15-2022	May-12-2023	Read me
ATMS	ATMS SDR	30-Nov-2022	Dec-15-2022	May-12-2023	Read me
CrIS	CrIS SDR	23-Feb-2023	30-Mar-2023	Sep-2023	Read me
VIIRS	VIIRS SDR	23-Feb-2023	30-Mar-2023	Jun-23-2023	Read me
OMPS	OMPS Nadir Mapper SDR	23-Feb-2023	14-Apr-2023	Dec-2023	
OMPS	OMPS Nadir Profiler SDR	23-Feb-2023	14-Apr-2023	Dec-2023	
VIIRS	KPP Imagery EDRs	23-Feb-2023	30-Mar-2023	23-Jun-2023	Read me
VIIRS	non-KPP Imagery EDRs	23-Feb-2023	30-Mar-2023	23-Jun-2023	Read me
VIIRS	Cloud Mask	30-Mar-2023	Oct-2023	Mar-2024	Read me
VIIRS	Cloud Phase/Type	Sep-2023	Oct-2023	Mar-2024	
VIIRS	Cloud Top Property and Cloud Cover Layer	Sep-2023	Oct-2023	Mar-2024	
VIIRS	Cloud Base Height	Sep-2023	Oct-2023	Mar-2024	
VIIRS	DCOMP and NCOMP	Sep-2023	Oct-2023	Mar-2024	
VIIRS	Aerosol Optical Depth and Aerosol Particle Size	10-Feb-2023	10-Feb-2023	Jun-2024	Read me
VIIRS	Aerosol Detection	11-Feb-2023	11-Feb-2023	Jun-2024	
VIIRS	Volcanic Ash	30-Mar-2023	30-Mar-2023	Mar-2024	Read me
VIIRS	Ice Surface Temperature and Ice Concentration	May-5-2023	Oct-2023	Feb-2024	Read me
VIIRS	Sea Ice Thickness/Age	May-5-2023	Oct-2023	Feb-2024	Read me
VIIRS	Binary Snow Cover	Apr-15-2023	Oct-2023	Jul-2024	Read me
VIIRS	Fractional Snow Cover	Apr-15-2023	Jan-2024	Jul-2024	Read me
VIIRS	Active Fires	25-May-2023	01-Jun-2023	Jul-2024	Read me
VIIRS	Land Surface Temperature	May-29-2023	Jan-2024	Jan-2025	Read me
VIIRS	Surface Albedo	Aug-2-2023	Jan-2024	Jul-2024	Read me
VIIRS	Global Surface Type	May-2024	Jul-2024	Sep-2024	
VIIRS	Surface Reflectance	Jul-10-2023	Jan-2024	Jan-2025	Read me
VIIRS	Green Vegetation Fraction	May-31-2023	Jan-2024	Jan-2025	
VIIRS	Vegetation Index	May-31-2023	Jan-2024	Jan-2025	Read me
VIIRS	Vegetation Health	Sep-2023	Mar-2024	Apr-2025	
VIIRS	Ocean Color	Nov-2023	Mar-2024	Jul-2025	
VIIRS	Sea Surface Temperature	20-Mar-2023	20-Mar-2023	Aug-2024	Read me
VIIRS	Polar Winds	Nov-2023	Jan-2024	Mar-2024	
VIIRS	VIIRS Flood Mapping	Jul-2023	Jan-2024	Jan-2025	
CrIS	NUCAPS: AVTP, AVMP, Ozone, OLR	3-Mar-2023	Dec-2023	Mar-2024	Read me
CrIS	NUCAPS: CO, CO2, CH4	3-Mar-2023	Mar-2024	Jun-2024	Read me
ATMS	MIRS Products	03-Dec-2022	May-12-2023	Oct-2024	Read me
ATMS	Snow Fall Rate (SFR)	27-Apr-2023	Feb-2024	May-2025	Read me
OMPS	OMPS Ozone EDR: V8Pro	30-Mar-2023	May-2023	Jan-2024	Read me

Highlights from the Science Teams (August)

Hurricane Idalia hits Florida

Hurricane Idalia became a named storm near the Yucatan Peninsula on August 27, strengthened to a Hurricane on Aug 29 near Cuba as it accelerated north toward the Gulf of Mexico, and further strengthened to a category 4 Hurricane just south of the Florida Big Bend, prior to making landfall near Keaton Beach, Florida as a category 3 Hurricane at 1145 UTC on Aug 30.

Satellite Imagery and Derived products from both GOES and JPSS satellites provided excellent details about the storm during its evolution, and were utilized by operational forecasters.

(more information can be found in a blog post titled “Hurricane Idalia” by Bill Line. The link to the post can be found here.

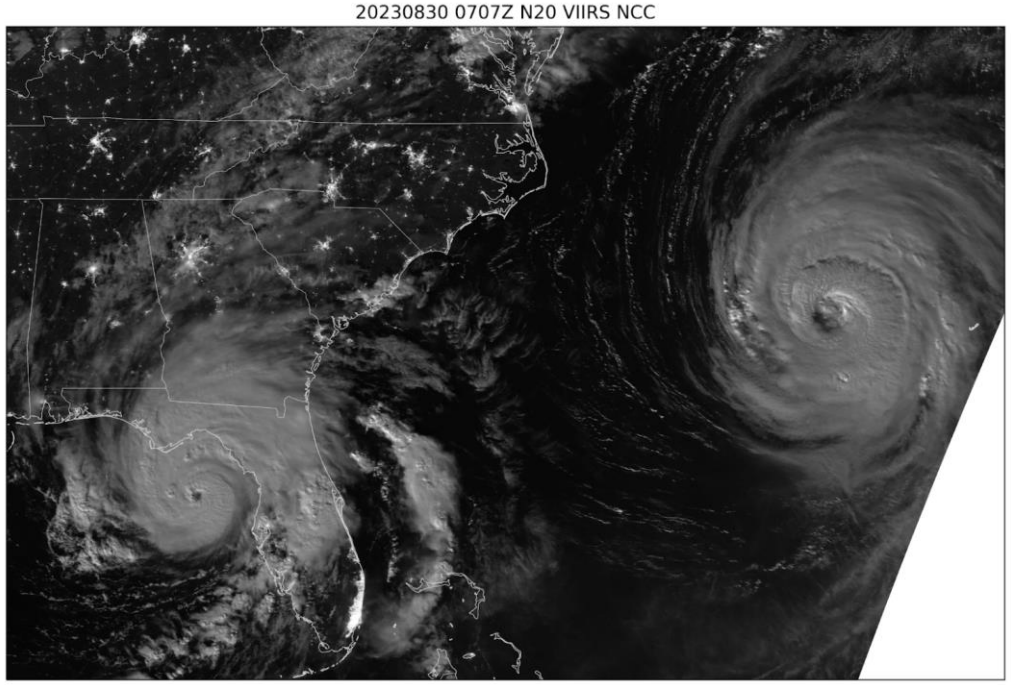
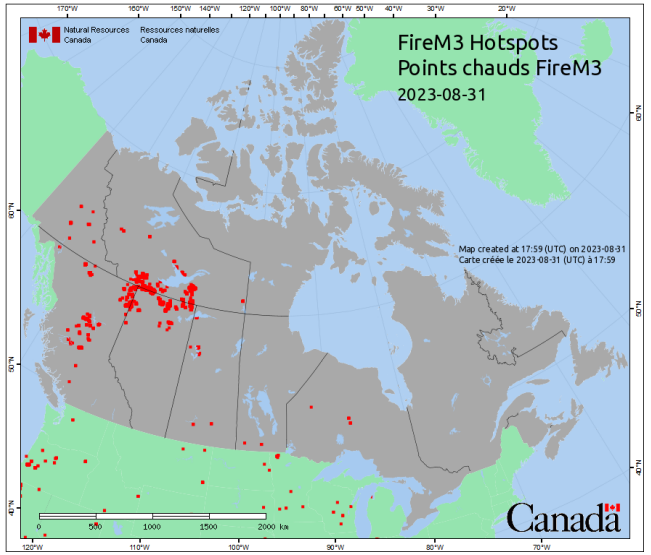


Figure. 0707 UTC 30 August 2023 NOAA-20 VIIRS DNB Near Constant Contrast product capturing details of Hurricane Idalia (left) and Hurricane Franklin (right) overnight.

Highlights from the Science Teams (August)

VHI based Fire Risk Product

The STAR Vegetation Health product team evaluated its Fire Risk Index (FRI) product against current Canadian Fire Monitoring, Mapping and Modeling (FireM3) Hotspots publication on 31 Aug 2023. As indicated in the figures, FRI high risk areas match the FireM3 Hotspots very well. FRI is computed as the number (n) of weeks when the Vegetation Health Index (VHI: 0-100) is smaller than 15 in the last 5 weeks. If n is larger than 4, the area (4 km grid for the 4 km VHI product) is marked red as “Fire Risk” area (right map). From the FireM3 hotspots (left map) are mostly in the “Fire Risk” areas. More information about FRI can be found at STAR - Global Vegetation Health Products: Browse Archived Image of selected country (noaa.gov).



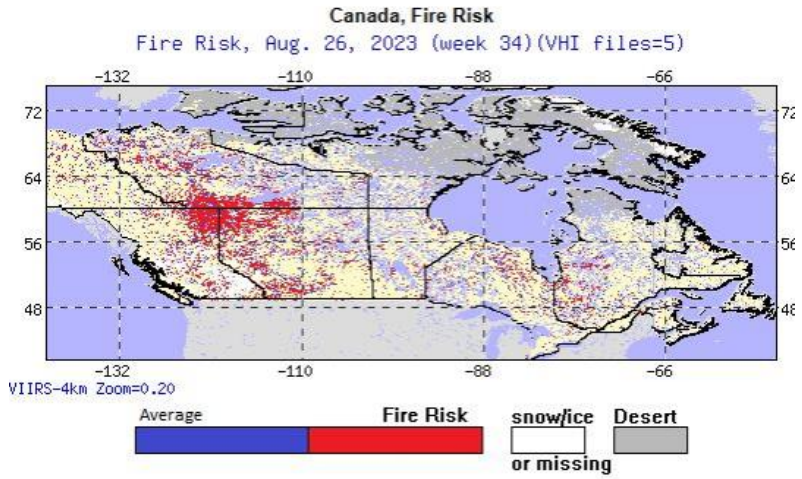
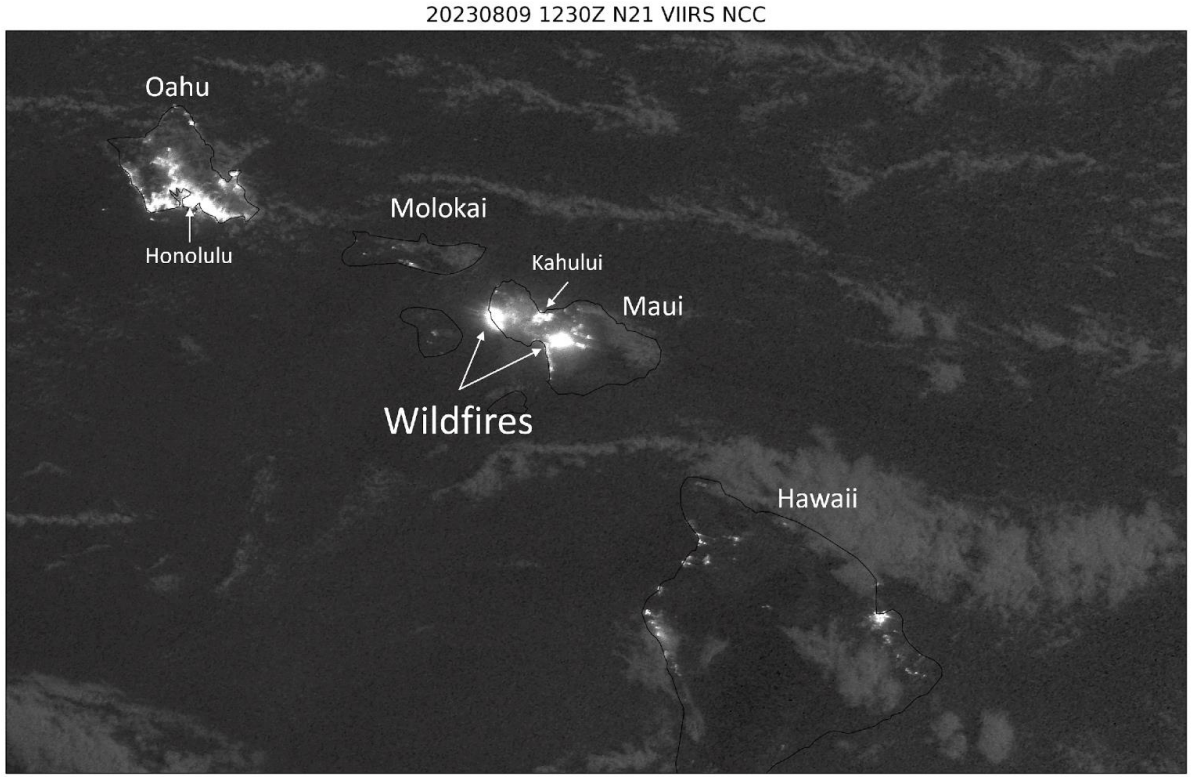


Figure. 0707 UTC 30 August 2023 NOAA-20 VIIRS DNB Near Constant Contrast product capturing details of Hurricane Idalia (left) and Hurricane Franklin (right) overnight.

Highlights from the Science Teams (August)

VHI based Fire Risk Product



In Mid-August, unusually dry air and strong winds caused ideal conditions for fast spreading wildfires in the Hawaiian Islands, particularly on Maui. The fires resulted in dozens of deaths on the island and immense loss of property. The image from the VIIRS Day/Night Band that shows the two large wild fire hot spots on the island (as well as city lights on more populated Oahu).

Imagery team lead Bill Line published a blog post titled “Hawaii Wildfires – August 2023”. The post shares GOES ABI and JPSS VIIRS Imagery and analysis from the devastating Aug 8-10 Hawaii wildfires. The link to the post can be found here.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
8/1/23	Preliminary CCAP delivery of VOLCAT for software code review by OSPO.	NCCF
8/7/23	Enterprise Flood Mapping patch CCAP that fixes the problem of "upside images at high northern latitudes" (noticed with both the VIIRS NWS001 Mosaic outputs and some VIIRS granule outputs)	NCCF
8/11/23	RAVE North America Patch CCAP v1-2 path delivery to NCCF (Regional hourly Advanced Baseline Imager and Visible Imaging Radiometer Suite Emissions, RAVE uses Active Fire Product)	NCCF
8/11/23	OSPO Code Reviews Completed for Ice Age/Concentration (8/11), eTRAP (8/03), ACSPO SST (7/7/23)	Google Drive
8/14/23	Preliminary delivery of GBBEPx v2 for SCR by OSPO.	Google Drive
8/18/23	Final delivery of the VIIRS Gridded Land CCAP (SMM, EUM delivered on 8/21)	NCCF
8/25/23	Preliminary CCAP for SCR by OSPO for Legacy Migration Coral Reef Watch (CRW, uses VIIRS also).	NCCF
8/29/23	EN-Fires v3-1 patch for integration into the NCCF.	NCCF
8/30/23	Final CCAP delivery of the VIIRS Radiance Cluster to NCCF for integration	NCCF

Accomplishments – JPSS Cal Val Support

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	8/2/23, 8/8/23, 8/15/23, 8/22/23, 8/29/23, 9/5/23
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	8/2/23, 8/8/23, 8/15/23, 8/22/23, 8/29/23, 9/5/23
NOAA-21	Weekly OMPS TC/NP Dark Table Updates	8/2/23, 8/8/23, 8/15/23, 8/22/23, 8/29/23, 9/5/23
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	8/1/23, 8/15/23, 8/29/23
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	8/8/23, 8/22/23, 9/5/23
NOAA-21	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	8/8/23, 8/22/23, 9/5/23
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	8/23/23
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	8/23/23
NOAA-21	Monthly VIIRS LUT Update of DNB Offsets and Gains	8/23/23
NOAA-21	Monthly VIIRS DNB Straylight correction update	8/23/23

NOAA-21 Cal/Val Maturity Reviews

August, 2023 Maturity Reviews		
Volcanic Ash	Provisional	Review successfully held on 8/24; Attained Provisional effective March 30, 2023
Aerosol Detection Product	Provisional	Review successfully held on 8/24; Attained Provisional effective February 11, 2023
Enterprise Flood Mapping	Provisional	Review successfully held on 8/24; Effective date will be upon successful integration of v1.1 to be delivered in September 2023.
VIIRS SST EDR	Provisional	Review successfully held on 8/24; Attained Provisional effective March 20, 2023

September, 2023 Maturity Reviews		
CrIS SDR	Validated	9/28
Vegetation Health	Beta	9/28

October, 2023 Maturity Reviews		
Clouds (Cloud Mask Beta to Provisional), Cloud Phase/Type, Cloud Cover Layer, Cloud Base Height, DCOMP, and NCOMP	Beta/Provisional	10/26
Cryosphere (Ice Surface Temperature, Ice Concentration, Ice Thickness/Age, Binary Snow Cover, Fractional Snow Cover	Provisional	10/26
Ozone NP Ozone v8 Pro	Provisional	10/26
Ozone LP	Beta	10/26

JSTAR Code/LUT/Product Deliveries

Date	DAPs to DPMS
8/10/23	ADR-10549/ CCR-6756 N21 VIIRS SDR CAL-AUTOMATE LUT Update to Automate SWIR-Band Calibration
8/18/23	ADR-10548/CCR-6753 NOAA-21 ATMS PCT update to turn off SDR QF-1 due to Mx8 TTO

Date	Remaining J2-Ready DAPs to NCCF
March, 2023 (Delayed to October)	Science team plan: delivered for SNPP, target date for Prelim CCAP to OSPO is September 29, 2023 CCAP in October J2-ready OMPS LP DAP to NCCF (ASSISTT NCCF) expected by the end of September. The CCAP will contain full package with v2.7 (L1) and v2.6 (L2) updates.
March, 2023 (Delayed to August)	J2-ready (J2-Beta) Ocean Color DAP to NCCF (ASSISTT -- > NCCF) ASSISTT team plan: SCR delivery to OSPO in June (Delivered on 6/20), and final CCAP delivery expected by September 25.

FY23 STAR JPSS Milestones

Milestones	Original Date (column I)	Forecast Date	Actual Completion Date	Variance Explanation
Algorithm Updates DAPs/CCAPs				
ATMS J2 PCT updates (as needed)	Jan-23	Jan-23	Delivered	
CrIS J2 Eng Pkg update delivery	Jan-23	02/09	Delivered on 02/09 for Beta	
VIIRS J2 LUTs update delivery	Jan-23	Jan-23	Delivered (January 26)	
OMPS J2 LUTs update delivery	Jan-23	Jan-23	Delivered	
OMPS LP J2 ready DAP (to NCCF)	Mar-23	June-23	**Delivered for S-NPP on April 14. J2 Delivery Expected in September. ASSISTT Delivery will be in October.**	
Ocean Color J2 ready DAP (to NCCF)	Mar-23	**Aug-23**	**Preliminary CCAP SCR Delivered: June 22,** and Final to September 25	
CCAP to NCCF (Aerosol AOD & ADP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (CM, Phase, Height, CBH, CCL, COMP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (VPW, Cryosphere, Volcanic Ash)	Nov-22	Nov-22	11/15/2022, 11/18/2022, **VPW: 01/06/2023**	
CCAP to NCCF (LST, LSA)	Nov-22	Nov-22	Delayed to 12/15/2022 **Delayed: 01/20/2023**	
CCAP to NCCF (VI, GVF)	Nov-22	Nov-22	11/15/2022, **1/11/2023**	
CCAP to NCCF (MiRS, OMPS NP V8Pro)	Jan-23	Jan-23	MiRS:12/31(separate delivery) **MiRS: v11.9 Final CCAP Delivered:1/26/2023** **Delivered: OMPS 12/23** **V8TOz Delivered: 3/17/23**	
CCAP to NCCF (HEAP, N4RT)	Mar-23	Mar-23	**Code delivered for SCR 2/6 Initial Delivery Completed, Final Delivery on June 30**	
CCAP to NCCF (ACSPO SST)	Apr-23	Aug-23	**Science team provided updated code to use VIIRS TC GEO on March 7, and preliminary CCAP (SCR) delivered June 5, SCR review: 7/7; final CCAP expected around September 13.**	
Enterprise Fires	Apr-23	Apr-23	ASSISTT Delivered to NCCF on 4/19	
CCAP to NCCF (VH, VOLCAT Phase 1 for Volcanic Ash, OMPS V8TOz)	May-23	May-23	**Delivered V8TOz (4/23), VH (4/14) ASSISTT** to NCCF, **VOLCAT SCR August 17**, **Preliminary CCAP delivered (8/1)** Final CCAP: 11/17	
CCAP to NCCF (Gridded Land)	Jul-23	Jul-23	VIIRS Gridded Land Preliminary CCAP for software code review, OSPO completed Review on 6/1	
CCAP to NCCF (Cloud Provisional)	Jul-23	Jul-23	Patch delivery made, No plans yet from ASSISTT	

FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
Algorithm Cal/Val/LTM				
JPSS-2 First Light Images (Nov-22: ATMS; Dec-22: VIIRS VIS/NR, Feb-2023 VIIRS TEB, Feb-2023 VIIRS DNB, Feb-2023 OMPS, Feb-2023 CrIS)	Dec-22	Dec-22	11/22/2022 ATMS 12/05/2022 VIIRS VIS/NIR 02/09/2023 VIIRS TEB 02/09/2023 VIIRS DNB 02/12/2023 CrIS SDR 02/18/2023 OMPS	
FY22 End of Year Science Team Presentations (all teams)	Nov-22	Nov-22	Not Needed	
FY24 Program Management Review (all teams)	Jun-23	Jun-23	Completed	
AST-2022 (VIIRS Annual Surface Type)	Sep-23	Sep-23		
Transfer reprocessed S-NPP SDR data to CLASS (finish by Oct-2023); Start EDR reprocessing for some products	Sep-23	Sep-23	On-going and expected by October	
JPSS-3 pre-launch test data review/analyze (SDR teams); JPSS-3/JPSS-4 activities/reviews support	Sep-23	Sep-23	On-going	
Maintain / Update ICVS (develop ICVS JPSS-2 modules to support varies activities: monitoring, inter-sensor comparison, …)	Sep-23	Sep-23	On-going	
Maintain / Expand (to include JPSS-2 products) JSTAR Mapper	Sep-23	Sep-23	On-going	
Images of the Month	Monthly	Monthly	On-going (Look into Quad Charts)	

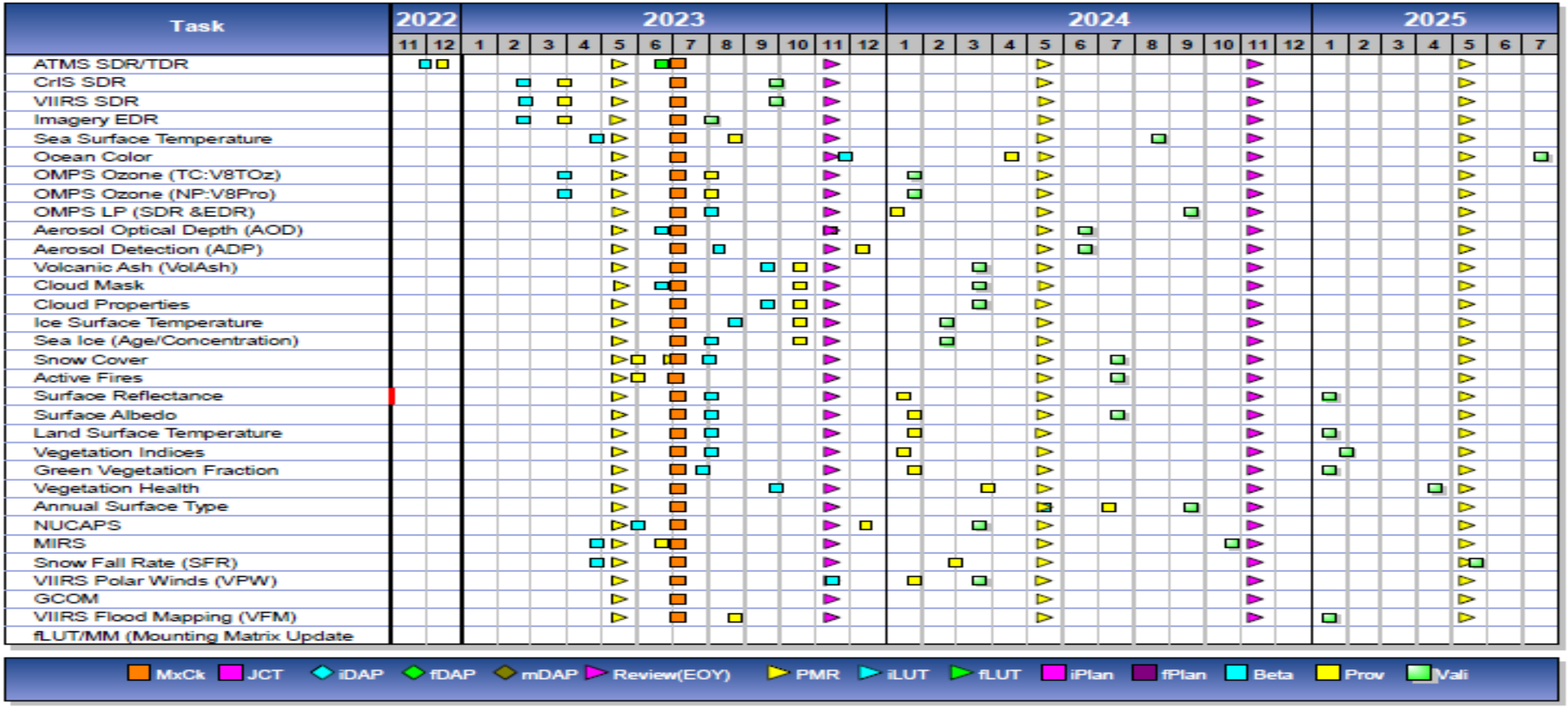
FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
NOAA-21 Cal/Val Maturity Reviews				
ATMS TDR/SDR (B/P: Dec-2022; V: May-2023)	**May-23**	**May-23**	Validated Review held 6/22; Attained Validated effective 05/12	
CrIS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	**Aug-23**	**Aug-23**	Provisional Achieved: 03/30; Validated Planned: 09/28	**Transmitter anomaly**
VIIRS SDR (B: Dec-22; P: Feb-23; V: May-23)	**May-23**	**May-23**	Provisional Achieved: 03/30; Attained Validated maturity effective June 23	**Transmitter anomaly**
OMPS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	**Aug-23**	**Aug-23**	Provisional Achieved: 03/30; Validated Planned: 01/04/24	**Transmitter anomaly**
KPP VIIRS Imagery (B: Jan-23; P: Feb-23; V: May-23)	**May-23**	**May-23**	Provisional Achieved: 03/30; Attained Validated maturity effective June 23	**Transmitter anomaly**
Non-KPP VIIRS Imagery (B: Feb-23; P: Mar-23; V: Jul-23)	**Jul-23**	**Jul-23**	Provisional Achieved: 03/30; Attained Validated maturity effective June 23	**Transmitter anomaly**
Clouds (B: CM: Apr-23; Others: Jul-23; P: Aug-23)	**Aug-23**	**Aug-23**	Provisional Planned: 10/26	**Transmitter anomaly**
Aerosol AOD (B: Apr-23; P: Sep-23)	**Sep-23**	**Sep-23**	Beta Review held: 6/22; Attained Beta effective 02/10	**Transmitter anomaly**
Aerosol ADP (B: Mar-23; P: Aug-23)	**Aug-23**	**Aug-23**	Provisional Review held 8/24; Attained Provisional effective February 11	**Transmitter anomaly**
Volcanic Ash (B: Jul-23; P: Aug-23)	**Aug-23**	**Aug-23**	Provisional Review held 8/24; Attained Provisional effective March 30, 2023	**Transmitter anomaly**
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow)	**Aug-23**	**Aug-23**	Attained Beta effective May 1; Provisional Planned: 10/26	**Transmitter anomaly**
Active Fires (B: May-23; P: Aug-23)	**Aug-23**	**Aug-23**	Beta/Provisional Review held: 6/1; Attained Provisional effective 03/30	**Transmitter anomaly**
LST/LSA/SR/GVF/VI (B: May-23)	**May-23**	**May-23**	Beta Review held: 8/03; Attained Beta effective March 30	**Transmitter anomaly**
Vegetation Health (B: Jul-23)	**Jul-23**	**Jul-23**	Beta Review Planned: 9/28	**Transmitter anomaly**
Ocean Color (B: Sep-23)	**Sep-23**	**Sep-23**	Beta Review Planned: 11/30	**Transmitter anomaly**
SST (B: Mar-23; P: Jun-23)	**Jun-23**	**Jun-23**	Provisional Review held 8/24; Attained Provisional effective March 20	**Transmitter anomaly**
VPW (B: Sep-23)	**Sep-23**	**Sep-23**	Beta Review Planned: 11/10	**Transmitter anomaly**
VFM (B: May-23)	**May-23**	**May-23**	Provisional Review held 8/24; Effective date will be upon successful integration of v1.1 to be delivered in September 2023.	**Transmitter anomaly**
NUCAPS (B: May-23)	**May-23**	**May-23**	Beta Review held on 6/1; Attained Beta effective 3/23	**Transmitter anomaly**
MiRS (B: Mar-23; P: Aug-23)	**Aug-23**	**Aug-23**	Provisional held: 6/22; Attained Provisional effective 5/12	**Transmitter anomaly**
SFR (B: May-23)	**May-23**	**May-23**	Beta Review held: 4/27; Attained Beta effective 12/3/2022	**Transmitter anomaly**
OMPS NP EDR V8Pro & V8TOz (B: Feb-23; P: Mar-23)	**Mar-23**	**Mar-23**	Beta Review held:03/30; Attained Beta: 4/3; ; Provisional maturity held on 8/3 for V8TOz, V8TOS. Effectivity upon successful implementation of soft calibration tables in August. Provisional review planned for V8Pro: 10/26	**Transmitter anomaly**
OMPS LP (B: Mar-23)	**Mar-23**	**Mar-23**	TBC	**Transmitter anomaly**

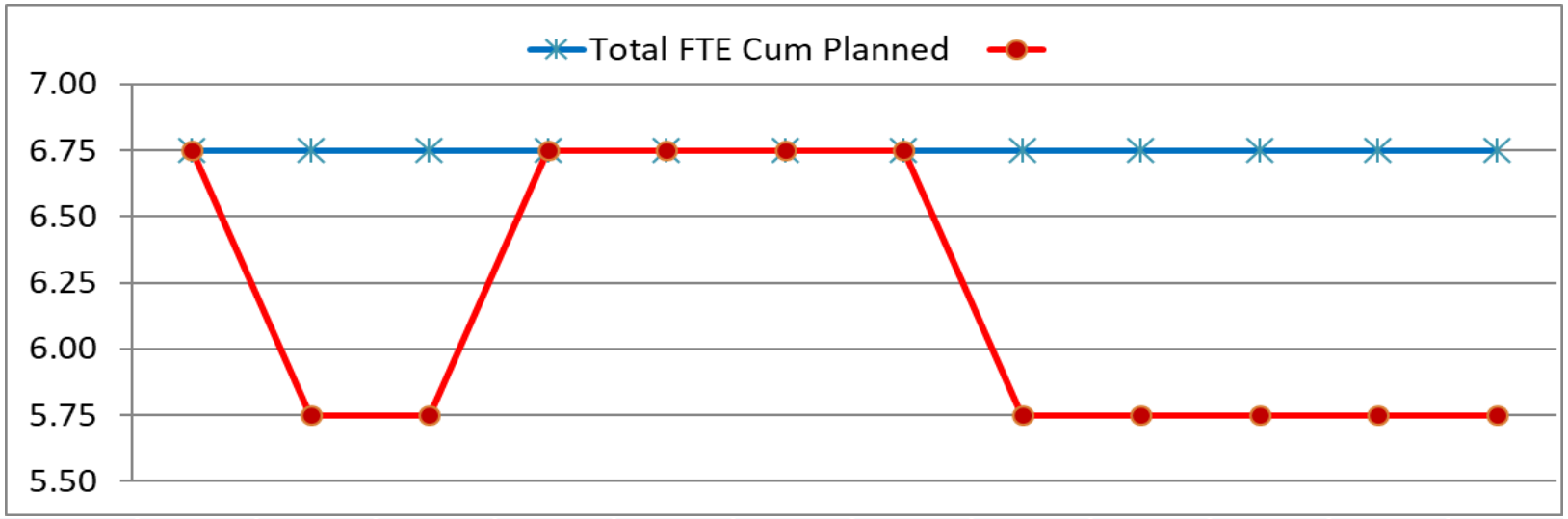
FY23 STAR JPSS Milestones

Operational/Program Support	Original Date	Forecast Date	Actual Completion Date
S-NPP: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	10/04/22, 10/12/22, 10/19/22, 10/26/22, 11/01/22, 11/08/22, 11/15/22, 11/22/22, 11/28/22, 12/06/22, 12/13/22, 12/19/22, 01/03/23, 01/10/23, 01/17/23, 01/23/23, 0131/23, 02/07/23, 02/14/23, 02/21/23, 02/28/23, 03/07/23, 03/14/23, 3/21/23, 3/28/23, 4/4/23, 4/11/23, 4/17/23, 4/25/23, 05/02/23, 05/09/23, 05/16/23, 05/23/23, 05/31/23, 06/06/23, 6/13/23, 6/20/23, 6/27/23, **8/2/23, 8/8/23, 8/15/23, 8/22/23, 8/29/23, 9/5/23**
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/12/22, 10/26/22, 11/08/22, 11/22/22, 12/06/22, 12/19/22, 01/03/23, 01/17/23, 1/31/23, 02/14/23, 02/28/23, 03/14/23, 3/28/23, 4/4/23, 4/11/23, 4/25/23, 05/09/23, 05/23/23, 06/06/23, 6/20/23, 7/5/23, 7/18/23, 7/26,23, **8/1/23, 8/15/23, 8/29/23**
S-NPP: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	10/04/22, 11/01/22, 11/28/22, 01/03/23, 01/30/23, 02/27/23, 3/28/23, 4/24/23, 05/3023, 6/26/23, 7/26/23, **8/23/23**
NOAA-20: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	10/04/22, 10/12/22, 10/19/22, 10/26/22, 11/01/22, 11/08/22, 11/08/22, 11/15/22, 11/22/22, 11/28/22, 12/06/22, 12/13/22, 12/19/22, **01/03/23,** 01/03/23, 01/10/23, 01/17/23, 01/23/23, 0131/23, 02/07/23, 02/14/23, 02/21/23, 02/28/23, 03/07/23, 03/14/23, 3/21/23, 3/28/23, 4/4/23, 4/11/23, 4/17/23, 4/25/23, 05/02/23, 05/09/23, 05/16/23. 05/23/23, 05/31/23, 06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/23, 7/11/23, 7/18/23, 7/26/23, **8/2/23, 8/8/23, 8/15/23, 8/22/23, 8/29/23, 9/5/23**
NOAA-20: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	10/04/22, 10/19/22, 11/02/22, 11/15/22, 11/29/22, 12/13/22, 01/03/23, 01/10/23, 01/24/23, 02/07/23, 02/21/23, 03/07/23, 3/21/23, 4/4/23, 4/18/23, 05/02/23, 05/16/23, 05/31/23, 6/13/23, 6/26/23, 7/12/23, 7/26/23, **8/8/23, 8/22/23, 9/5/23**
NOAA-20: Monthly VIIRS LUT update of DNB Offsets and Gains,	Monthly	Monthly	10/04/22, 11/01/22, 11/28/22, **01/03/23,** 01/30/23, 02/27/23, 3/28/23, 4/24/23, 5/26/23, 6/26/23, 7/26/23, **8/23/23**
NOAA-21: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	01/31/23, 02/14/23, 02/21/23, 03/07/23, 03/14/23, 3/21/23, 3/28/23, 4/4/23, 4/11/23, 4/18/23, 4/25/23, 05/02/23, 05/09/23, 05/16/23, 05/23/23, 05/31/23, 06/06/23, 6/13/23, 6/20/23, 6/27/23, 7/5/23, 7/11/23, 7/18/23, 7/26/23, **8/2/23, 8/8/23,** , 8/15/23, 8/22/23, 8/29/23, 9/5/23
NOAA-21: Bi-Weekly OMPS NP Wavelength & Solar Flux	Bi-Weekly	Bi-Weekly	03/07/23, 03/22/23, 4/6/23, 4/18/23, 05/02/23, 05/16/23, 05/31/23, 6/13/23, 6/27/23, 7/12/23, 7/26/23, **8/8/23, 8/22/23, 9/5/23**
NOAA-21: Monthly VIIRS LUT update of DNB Offsets and Gains	Monthly	Monthly	03/6/23, 3/28/23, 4/26/23, 5/25/23,6/26/23, **7/26/23, 8/23/23**
Mx builds deploy regression review/checkout (Mx8 - SDRs and VIIRS Imagery teams)			✔ MX8 SOL STAR 'Go/No GO' Report Delivered:4/14 ✔ MX8 I &T Data call for Go/NOGO issued (June 1-28), STAR Report due and Go/NOGO: 6/20 ✔ NCCF and NDE both performed verifications ✔ **TTO: 7/13**

STAR JPSS Schedule: TTA Milestones



J-STAR FY23 Planned v Actual Staffing Plan



J-STAR FTEs	Oct '22	Nov '22	Dec '22	Jan '23	Feb '23	Mar '23	Apr '23	May '23	Jun '23	Jul '23	Aug '23	Sep '23
Cum Planned (CS)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cum Actual (CS)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Cum Planned (WYE)	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Cum Actual (WYE)	5.75	4.75	4.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Total FTE Cum Planned	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Total FTE Cum Actual	6.75	5.75	5.75	6.75	6.75	6.75	6.75	5.75	5.75	5.75	5.75	5.75

CS: vacant (Alisa Young now with GLERL)
WYE: Qingyuan Richard Zhang (Corp)
Prasanjit Dash (SOCD)
Michael Cheeseman (SMCD)
Murty Divakarla (25%)
Tom Atkins (50%)
Jeffrey Weinrich
Wei W. Li
Tess Valenzuela (RMD)

Color code:

Green: **Completed Milestones**

Gray: **Ongoing FY23 Milestones**

Active Fires

August 2023

Accomplishments / Events:

- The team continued supporting the transition to operations process for the Enterprise Fire VIIRS I-band product in NCCF
- The team worked on developing an approach to extend the solar farm persistent anomaly database from the current Hazard Mapping System domain to global
- Significant impact on global FRP estimates form biomass burning was found on select days
- The team worked on two presentations related to the VIIRS I-band product at the 2023 EUMETSAT meeting

Overall Status:

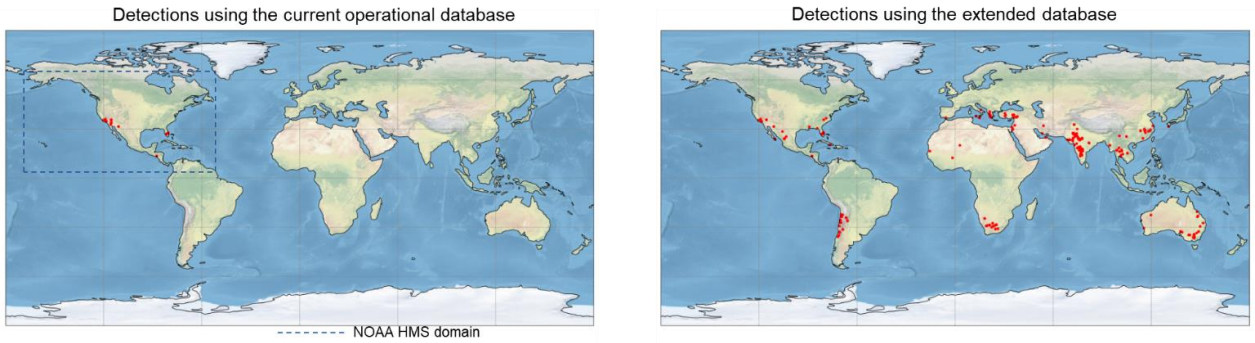
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		X			
Schedule		X			

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:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Beta Maturity	May-23	May-23	June-23	Review held on 6/1
NOAA-21 Provisional Maturity	Aug-23	Aug-23	June-23	Review held on 6/1
NOAA-21 post-launch testing towards Provisional Maturity	Mar-23	Mar-23	May-23	Delay in data availability
I-band algorithm improvements for non-optimal conditions and ATBD updates	Sep-23	Sep-23		
Science code updates to ASSIST/CSPP for eFire for NDE/NCCF	Sep-23	Sep-23		
Reactive maintenance of Suomi NPP and NOAA-20 M-band and I-band NDE products	Sep-23	Sep-23		
LTM & Anomaly Resolution (L) with Suomi NPP / NOAA-20 data analysis and feedback	Sep-23	Sep-23		

Highlight: Extending the solar farm persistent anomaly database



Solar farms detected in November 2022 by the NOAA Operational VIIRS I-band Active Fire algorithm. Left: current operational database over the Hazard Mapping System (HMS) domain. Right: experimental global database

Aerosol

August 2023

Accomplishments / Events:

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

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

Overall Status:

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

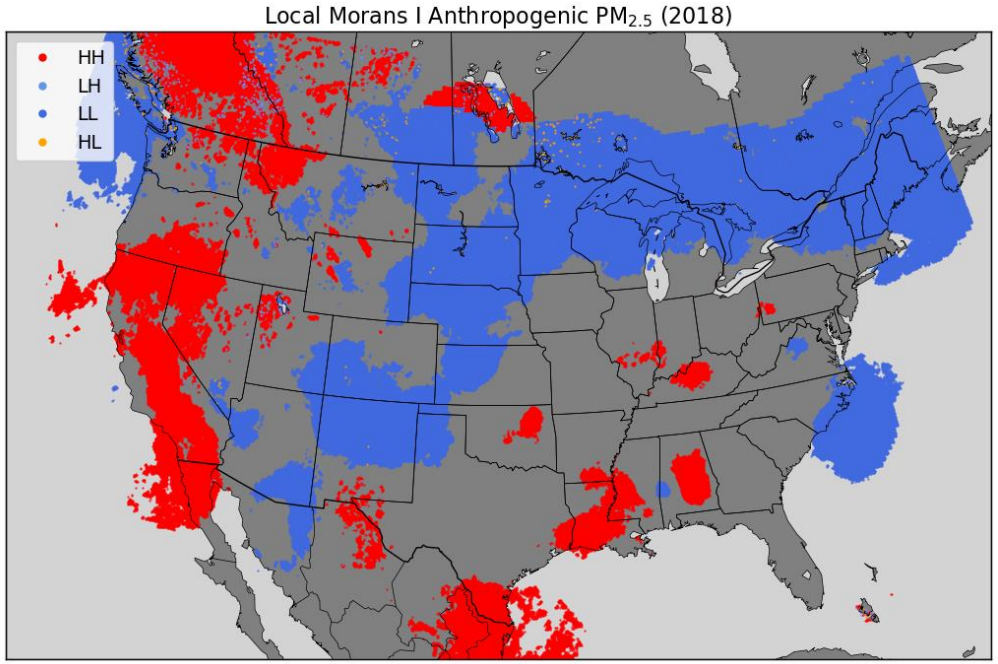
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight:

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



ATMS SDR

August 2023

Accomplishments / Events:

- Analyzed the NOAA-21 ATMS CRTM simulation impact using measured and boxcar spectral response function (SRF) coefficients. Preliminary results indicate that there are apparent systematic and angular dependent bias discrepancies between two simulations in several V-band temperature sounding channels. Because CRTM simulation results are used in several post-launch cal/val tasks, there is possibility to revisit the PLT results to estimate the impact in the analysis. **Figure 1** shows the radiometric assessment based on 1-day, which clearly shows the impact of the SRF.
- Due to the evidence that measured SRF may cause different results in CRTM simulation, ATMS SDR team has started the revisit of NOAA-20 and S-NPP ATMS SRF data. The initial check indicates that some significant correction might not be included in the transfer from raw SRF to user friendly data sets. Based on the knowledge gained in the N21 ATMS SRF analysis, ATMS team will quickly reprocess (normalize and correct) the raw SRF data to verify the data quality.
- Worked with IDPS developers and operators to verify the I&T test data of newly submitted N21 ATMS updated PCT. The new PCT has only update in instrument health status engineering limits that affect the SDR data quality (QF-1) flag (Figure 2). From NOAA-20 and following ATMS builds, three instrument health status index are changed. IDPS Mx8 has included the satellite dependent health status telemetry calculation coefficients. This PCT update will reset the upper/lower limits to their recommended values.
- The evaluation of the new NEDT algorithm is completed??. The algorithm updates are included in Mx8 TTO. The verification of NEDT update has been conducted right after the TTO.
- Worked with new ATMS SDR team PI to ensure the smooth transition of management change. Held tag-up meetings with team members to introduce previous accomplishments and near future plan in ATMS instrument cal/val activities.

Overall Status:

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

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

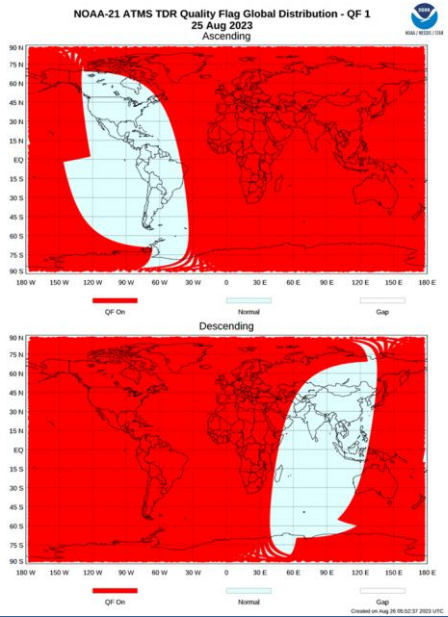
Issues/Risks:

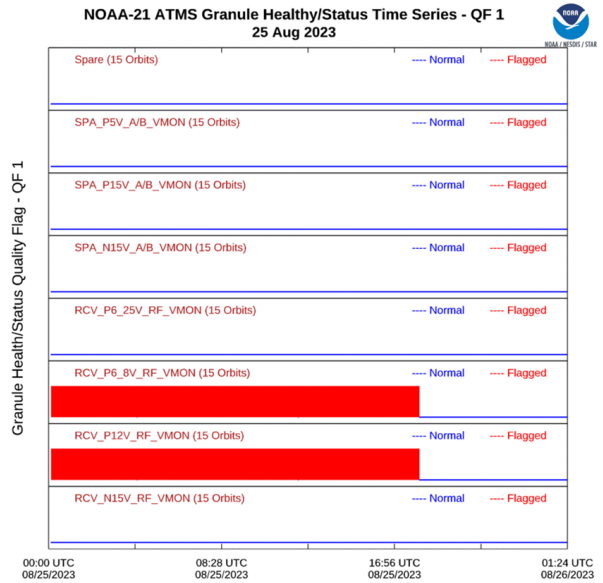
None

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

Highlights:

N21 ATMS PCT update impact in SDR operational data





Two quality indicators turned off after the TTO of new PCT on 8/25/2023

Clouds

August 2023

Accomplishments / Events:

- The Cloud team is actively working on assembling data necessary for the NOAA-21 Cloud Products Beta and Provisional reviews, which are tentatively scheduled for early October
- Work is ongoing with the replacement of NCOMP with the ACHA Cloud optical depths. Also expecting a new ECM LUT in November 2023.
- Assisted VIIRS Surface reflectance team on issue with algorithm using ECM bits. This included a reminder of ECM1 vs ECM2 bits structure

Overall Status:

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

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

Issues/Risks:

None

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

Highlights:

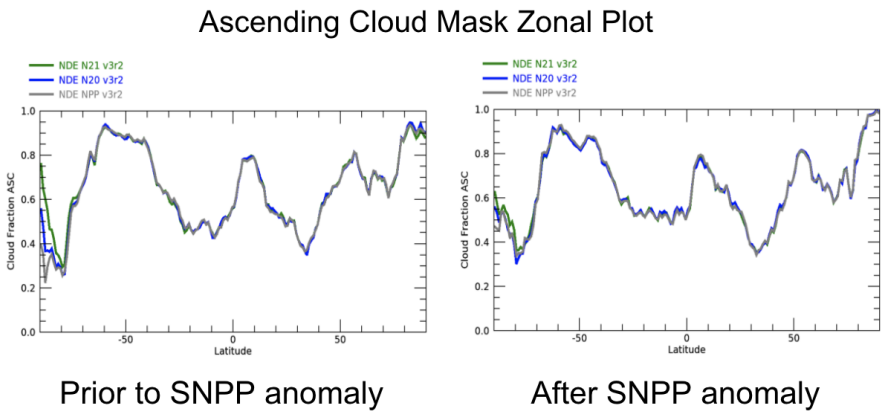


Figure 1.Ascending orbit zonal cloud fractions derived from SNPP the day before (left) and after (right) the recent SNPP anomaly that occurred on 26 July 2023.

CrIS SDR

August 2023

Accomplishments / Events:

- Continue to monitor the NOAA-21 CrIS instrument (quality flags, CrIS-ABI intercomparisons, NEdN noise monitoring, geolocation accuracy, instrument responsivity, telemetry), along with the other two sensors (NOAA-20 and S-NPP)
- The new geolocation tool is developed and tested. The new tool is common for all 3 CrIS platforms and has the option to process with or without terrain-corrected (TC) VIIRS measurements (**Fig. 1**). The new addition is the common tool with TC.
- Completed the evaluation of the SNPP CrIS CDP Reset anomaly recovery via rigorous telemetry, geolocation, noise, spectral and radiometric assessments. It is clear that SNPP CrIS recovered after July 28, 2023
- Evaluated CrIS Polarization Correction parameters and prepared/delivered a package for NOAA-21 CrIS PCT Update for turning on polarization correction (**Fig. 2**). Sent the package to the ASSIST team for further testing.
- Discovered for NOAA-21 CrIS the dependence of the periodicity of the laser wavelength oscillations being due to the accumulated/total Neon Lamp turn-on time, and created a quantitative assessment of the consistency of the laser wavelength observations as a function of neon lamp total turn-on time **(Fig. 3)**
- Updated the nonlinearity coefficient figures to include the EP v212 coefficients, added daily radiometric assessment plots to the CrIS website, completed the assessment of NOAA-21 CrIS radiometric and spectral accuracy using ADL (**Fig. 4**), and created an early draft/slide deck for the NOAA-21 validated maturity review
- Generated the deliverable calibration table v43 for SNPP CrIS side-1 and side-2 in XML format and uploaded to SharePoint
- Created new data quality flag charts, including daily counts of degraded and invalid flags by FOV, SDR quality flag daily summary, SDR quality flag daily time series of good, degraded, invalid and short qualities and new/improved daily quality flag maps and made them available on the website (**Fig. 5**)
- Successfully demonstrated that reduction of sliding window size improves the large imaginary radiances (**Fig. 6**). Demonstrated the rapid change in the DS imaginary values not captured by the operational algorithm (**Fig. 7**)
- Completed the radiometric and spectral assessment of the NOAA-21 CrIS SDR data emulated using ADL with the neon calibration interval of every seven orbits, and confirmed that the impact of the interval increasing is negligibly small (**Fig. 8**). The maximum spectral error due to increased interval is < 0.1 ppm and the mean radiometric bias is < 10 mK.
- SNPP CrIS side-1 experienced a LWIR band failure. A technical memo was drafted and delivered in order to recommend a solution for the side-1 failure. SNPP CrIS was turned back on using side-2 electronics on 8/31/2023, and monitoring tools were updated to account for the absence of the LWIR band. Prior to the side switch, we assessed side 2 so that the proxy scan baffle temperature model can be used as a backup solution if the side-2 scan baffle temperature readings were not good **(Fig. 9)**. A completed Assessments of the Side-2 Switch SNPP CrIS SDR data was completed in September

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

Overall Status:

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

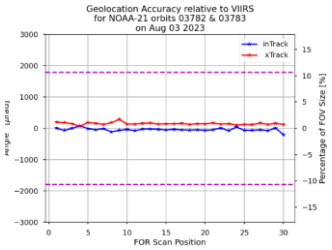
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

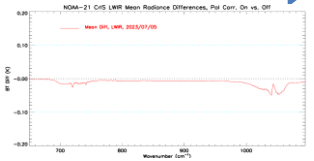
- The CrIS Team got a 100TB storage on STAR servers (data638 and data645) in May 2022. However, the CrIS Team is still in need of hardware/software resources. Presently, there is only one server dedicated to 6 CrIS Team members. We have received access to new servers, but these are shared with other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

Highlights:

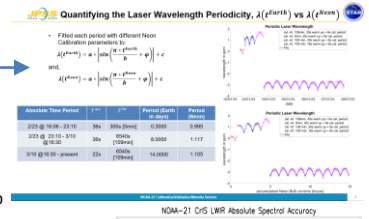
(1) The NOAA-21 CrIS geolocation accuracy on 8/3/2023 calculated with the common tool with TC.



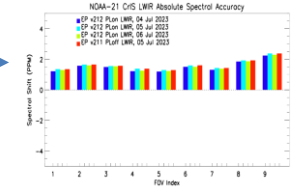
(2) Comparison of the NOAA-21 CrIS radiometric calibration performance with and without polarization correction (LWIR depicted here).



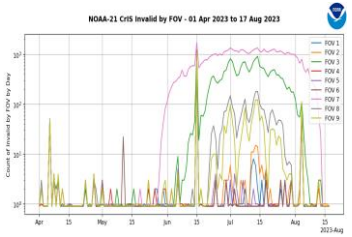
(3) Quantifying the NOAA-21 CrIS Periodic Laser Wavelength dependence on total Neon Lamp Turn-on time



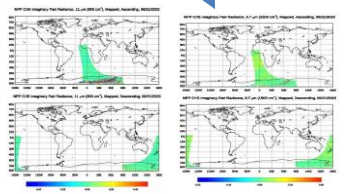
(4) Absolute spectral accuracy of NOAA-21 CrIS LWIR band within 2 ppm.



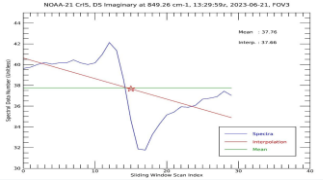
(5) NOAA-21 CrIS invalid quality flags by FOV



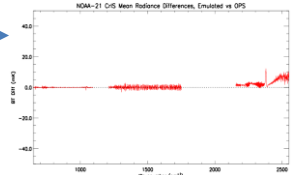
(6) MWIR imaginary part for the nominally sliding window of 30 scans (left panel) and reduced sliding window size of 6 (right panel).



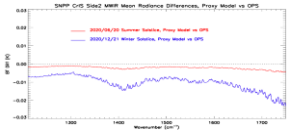
(7) DS imaginary value at 849.29 cm^{-1} on 6/21/2023 during the eclipse transition period. The mean and linearly interpolated values are indicated.



(8) Mean radiance differences due to the emulated Neon calibration interval increase for May 11, 2023.



(9) SNPP CrIS side-2 mean radiance differences for MWIR band between the emulated using the proxy model and operational SDR data



Cryosphere

August 2023

Accomplishments / Events:

A virtual poster about GCOM-W1 AMSR2 Rainfall Rate (RR) was presented at the AMS Collective Madison Meeting by Veljko Petkovic from CISESS. The AMSR2 operational retrieval package is currently being updated to accommodate NASA's latest version of passive microwave precipitation algorithm - GPROF (version 5). To prepare for a transition into the operations, the entire AMSR2 data record has been re-processed to produce global precipitation fields relying exclusively on NOAA-unique products, employing now fully parametric Bayesian scheme. The AMSR2 RR estimates were validated against the Multi Radar Multi Sensor (MRMS) and Global Precipitation Measurement (GPM) mission products. Key performance metrics indicate stability of the new retrieval version and significant improvements relative to the current AMSR2 product. The figure below is the monthly rainfall rate trend between 2013 and 2020 derived from the reprocessed AMSR2 dataset.

Overall Status:

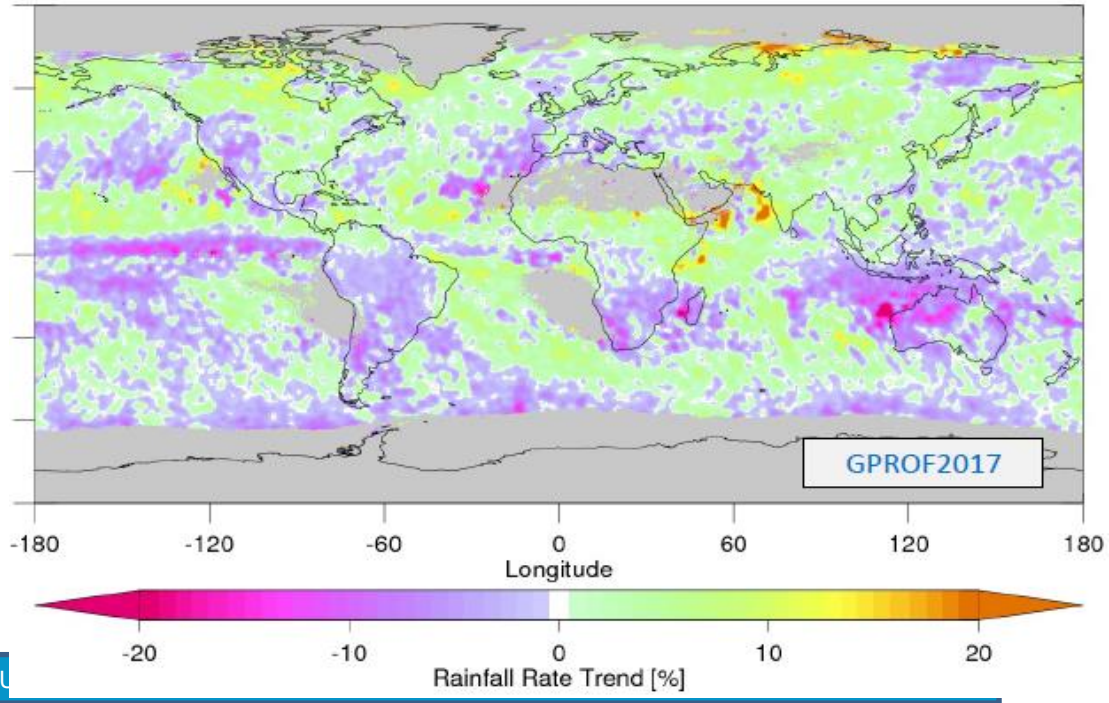
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

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

Issues/Risks:

None

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



GCOM-W

August 2023

Accomplishments / Events:

- A virtual poster about GCOM-W1 AMSR2 Rainfall Rate (RR) was presented at the AMS Collective Madison Meeting by Veljko Petkovic from CISESS. The AMSR2 operational retrieval package is currently being updated to accommodate NASA's latest version of passive microwave precipitation algorithm - GPROF (version 5). To prepare for a transition into the operations, the entire AMSR2 data record has been re-processed to produce global precipitation fields relying exclusively on NOAA-unique products, employing now fully parametric Bayesian scheme. The AMSR2 RR estimates were validated against the Multi Radar Multi Sensor (MRMS) and Global Precipitation Measurement (GPM) mission products. Key performance metrics indicate stability of the new retrieval version and significant improvements relative to the current AMSR2 product. The figure below is the monthly rainfall rate trend between 2013 and 2020 derived from the reprocessed AMSR2 dataset.

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

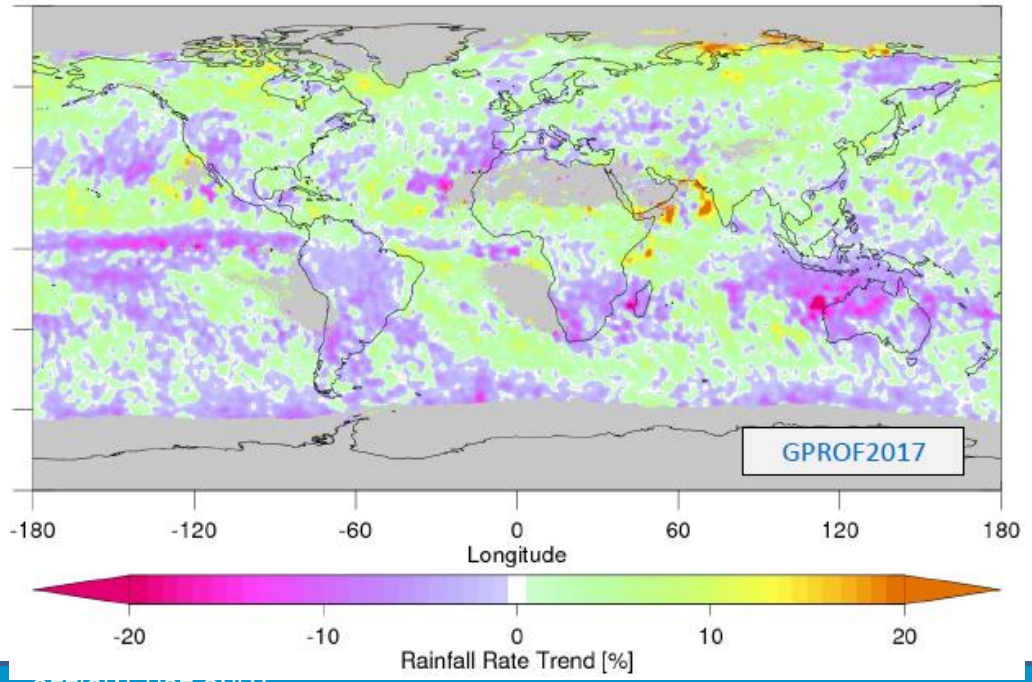
Overall Status:

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

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

Issues/Risks:

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



ICVS

August 2023

Accomplishments / Events:

- Re-evaluated the OMPS-NM DCC collocation algorithm to check the match up pixel number changes from 2013 to 2023. Developed near real time NOAA-21 & S-NPP OMPS-NM DCC reflectance long-term monitoring modules and test the system reliability in ICVS-beta web site.
- Provided near real time S-NPP CrIS instrument health status and data quality monitoring products to support instrument troubleshooting and side switch activity
- Developed new CrIS data quality monitoring product to provide orbit separated FOV dependent O-B plots to improve the monitoring precision.
- Support the deficiency in the ATMS SDR team CRTM O-B analysis by using the 32-day averaged difference results.
- Provided hurricane event monitoring products in ICVS severe event watch web pages.
- Watched the near real time N21 operational SMD data delay event due to the Ka transmitter unusual move. Provided data gap filling status for all N21 instrument operational data from ICVS web site.
- Work with VIIRS Cal/Val team to recover NPP VIIRS F-factor trending product and integrate N21 VIIRS F-/H-factor trending products to ICVS LTM VIIRS near real time monitoring container to support VIIRS cal/val activities.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Develop ICVS JPSS-2 modules to support J2 RDR/SDR PLT activities	Jan-23 (L+60)		Jan-23	
Develop ICVS modules to support the J2 SDR Beta and Provisional Reviews for the five sensors (e.g., update the SNPP/NOAA-20 SDR image/RGB/QC flags and other basic functions to J2)	Mar-23 (L+90D)		Mar-23	
Develop ICVS modules to support the J2 SDR Validated Review for the five sensors (e.g., the SNPP/NOAA-20 SDR O-B/JPSS inter-sensor functions to J2 if applicable)	May-23 (L+6m)		May-23	
Extend the existing OMPS-NM 380nm-VIIRS M1 monitoring to J2	Jun-23		Jun-23	
Develop the ICVS geolocation accuracy operational monitoring module for J2 OMPS (and CrIS if applicable) in coordination with the SDR teams	Jun-23		Jun-23	
Develop J2 ICVS LP monitoring modules (inputs are the NDE-generated LP L1B and L1G SDR data per SDR Ozone EDR group's request)	Jul-23	Dec-23		The data are not available until Nov.
Develop an ICVS DCC module for the OMPS-NM SDR quality stability monitoring	Aug-23			
Improve the existing ICVS inter-sensor modules by extending them to J2 (e.g., ATMS vs. AMUS-A, OMPS-TC vs. GOME-2, etc.)	Sep-23			
Maintain and sustain the ICVS monitoring functions for SNPP and NOAA-20 spacecraft and five sensors, including report major anomaly events as needed	Sep-23			
Maintain the ICVS ATMS 3D hurricane tool and produce an event report as needed	Sep-23			
Develop new ICVS modules per ad hoc requests from JPSS/key SDR/EDR users	Sep-23			

Overall Status:

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

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

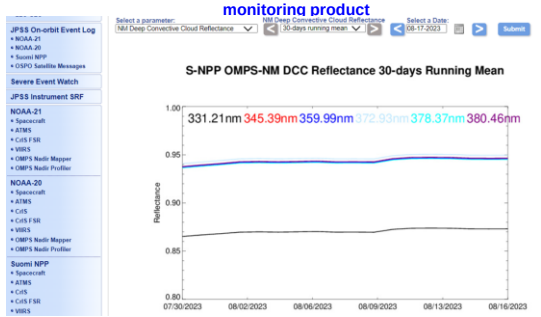
Issues/Risks:

None

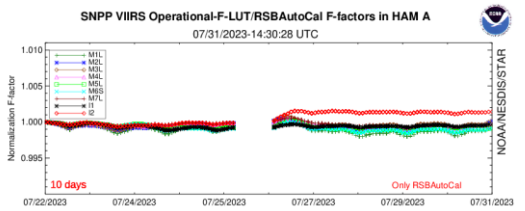
Highlights:

Significantly contribute to STAR SDR Teams

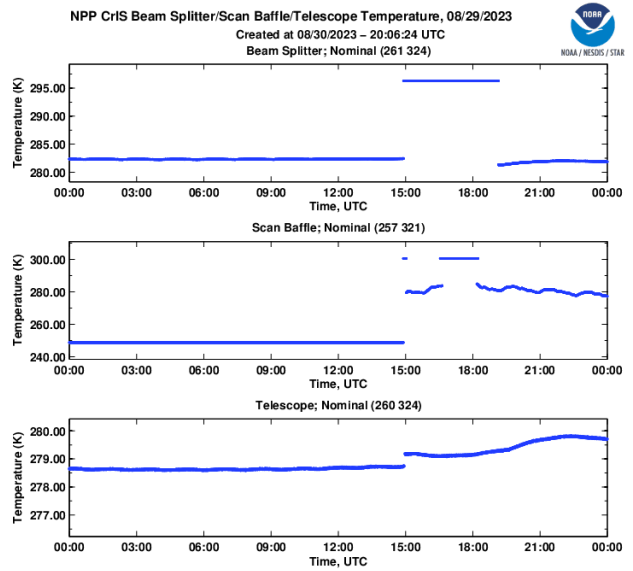
(a) ICVS web snapshot of S-NPP OMPS-NM DCC reflectance monitoring product



(b) S-NPP VIIRS F-factor monitoring product recovered



(b) NPP CrIS scan baffle temperature trending after the reactivation of sensor



NOAA Products Validation System (NPROVS) and JSTAR Mapper

July, 2023

Accomplishments / Events:

- The JSTAR Mapper/STAR Environmental Monitoring System (STEMS) team initiated the NESDIS Get-D Drought monitoring system providing 2-km resolution imagery of Evaporative Stress and Evapotranspiration (ET) indices in 2 to 12 week composite generated from GOES 16 and 17 ABI.
- The NPROVS team continued routine near-real-time ingest of NUCAPS NOAA-21 Beta sounding products for v3 and v3.1 in support of the operational implementation maturity process.
- A case study was developed on NUCAPS soundings associated with the severe storms and downburst winds that impacted Washington DC late in the day on July 29th **(HIGHLIGHT)**
- Good progress was made in the reprocessing of NPROVS Special collocations which includes multiple satellite product suites collocated with the latest versions of Global Climate Observing System (GCOS) Reference Upper Air Network (GRUAN) Radiosondes
- Activity is underway to finalize paperwork for transferring FY-23 funds to the Department of Energy in order to purchase/deploy Radiosondes in support of the JPSS Dedicated Radiosonde Program within allotted time-frames as defined by NOAA and DOE.

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

Overall Status:

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

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

Issues/Risks: None

Highlights

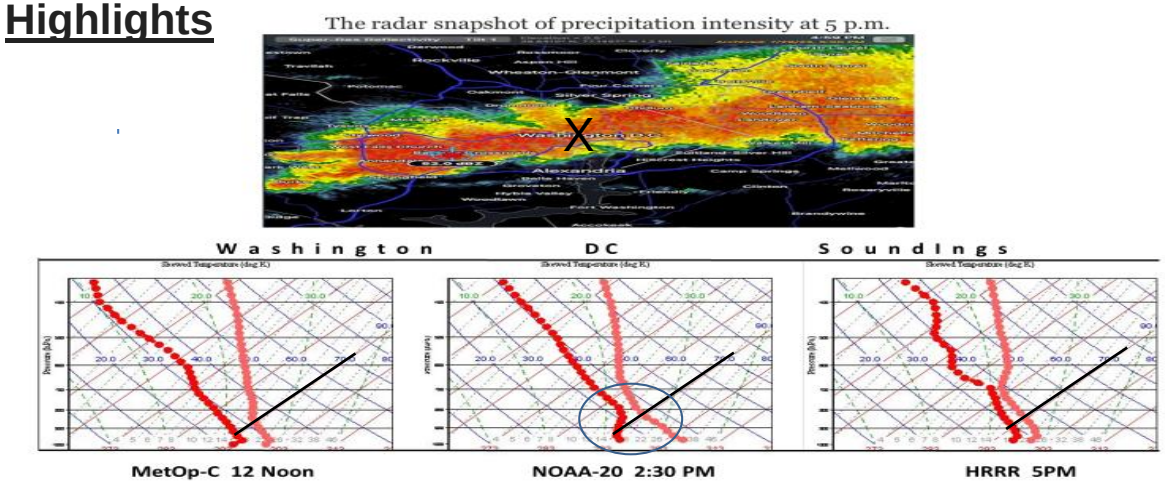


Figure 1 shows snapshots of radar imagery (top) and NUCAPS temperature (lighter red) and dewpoint (darker red) profiles from the MetOp-C (left), NOAA-20 (middle) polar satellites and associated profile from the NWS High Resolution Rapid Refresh (HRRR) analysis (right) at the location "X" foreshadowing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

VIIRS Imagery

August 2023

Accomplishments / Events:

- Presented for the NOAA-21 VIIRS EDR Imagery Validated Review on August 3
  - Resulted in Validated maturity declaration effective 23 June 2023 at 1342 UTC
- VIIRS DNB/NCC LUT table code optimization complete
  - Next step – Run code on large NPP/N20/N21 DNB datasets, create LUTs, evaluate LUTs
- Recent VIIRS Presentations
  - CIRA SLIDER: The JPSS CONUS Sector
    - Aug 3 Satellite Book Club Webinar Series
- Recent VIIRS Imagery Blog Posts
  - Hawaii Wildfires – August 2023
  - Hurricane Idalia
  - NOAA-21 VIIRS NCC Imagery Available in AWIPS via SBN
- 25 VIIRS Imagery Posts on CIRA Social Media this Month. A few posts:
  - Multi-Day evolution of arctic cyclone in VIIRS Snowmelt RGB – 55K Views
  - Hurricane Dora and Hawaii in VIIRS NCC – 41K Views
  - Kansas Thunderstorms in VIIRS I5 and NCC Comparison – 12K Views

Overall Status:

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

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

Issues/Risks:

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

Highlights: Image of the Month

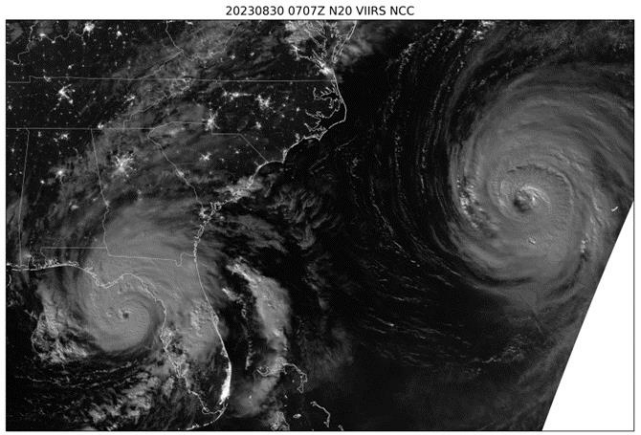


Figure: 30 August 2023 NOAA-20 VIIRS DNB NCC product over the southeast US and Hurricanes Idalia and Franklin.

MiRS Products

August 2023

Accomplishments / Events:

- As an aid to planning the next generation of NOAA passive microwave instruments, and to determine the channel selection needed for precipitation retrievals, a simulation sensitivity study was conducted. The study utilized ECMWF analysis variables of temperature, water vapor, cloud water, and ice water as atmospheric inputs. Profiles were selected in the vicinity of a Western Pacific tropical cyclone that featured significant cloud and rain. The CRTM forward model was used to simulate ATMS radiances for a range of assumed hydrometeor amounts, satellite zenith angles, and surface emissivity assumtions. The highlight graphic shows one example of the sensitivity results, containing the correlations of each channel brightness temperatures with simulated surface precipitation rate. Results are stratified by observation viewing angle (e.g. nadir vs. edge of scan), and by surface type (e.g. ocean vs. land). The results show that dependence of the channel correlations on viewing angle and surface type should be taken into account when determining the utility of each channel.

Overall Status:

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

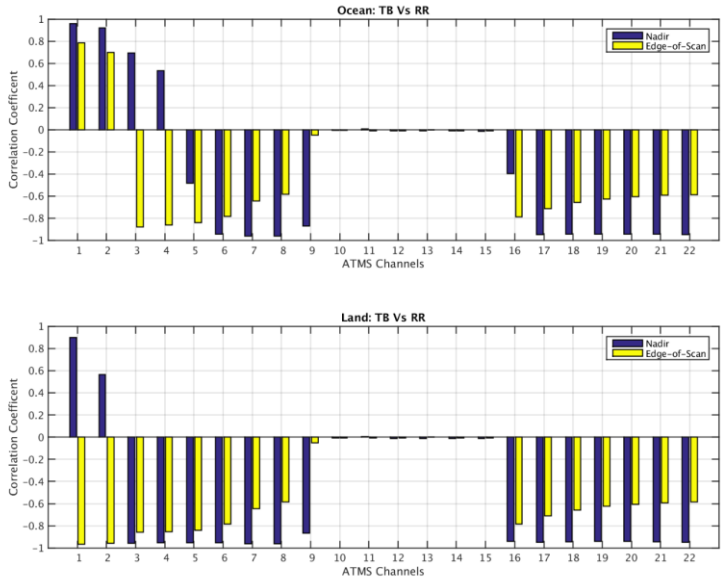
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:



Results of hydrometeor sensitivity test. Shown are correlations of simulated ATMS brightness temperatures with assumed surface precipitation rate over ocean (top) and land (bottom) and for nadir (blue) and edge of scan (yellow) observations.

OMPS Ozone (V8Pro, V2Limb & V8TOz)

August 2023

Accomplishments / Events:

- L. Flynn briefed the N21 V8TOz EDR Provisional Maturity review. The products will advance once the latest soft calibration tables are implemented at NCCF.
- R. Lindsay continued work to use the new V2.7Limb Level 1 codes to process the N21 OMPS Limb RDR and use their output as input for the Level 2. NASA has been revising tables and code. He worked with ASSISTT to run the NPP V2.7Limb codes end-to-end.
- J. Niu delivered Ev8TOz Metop-B & -C GOME-2 soft calibration. He has worked with ASSISTT and NCCF to get the EV8TOz and V8TOS successfully transitioned to NCCF.
- Z. Zhang delivered new soft calibration tables for N21 V8TOz. He is working on the N21 V8Pro tables. He worked with ASSISTT to transition V8TOz to NCCF for N21, N20 and NPP
- E. Beach continued to work on the monitoring figures for NOAA-21. He is transferring the weekly ancillary files we need to process the NOAA-21 OMPS Limb Profiler. He is capturing the NOAA-21 OMPS data and NCCF test data as they arrive at SCDR. He is providing overpass data sets for validation.

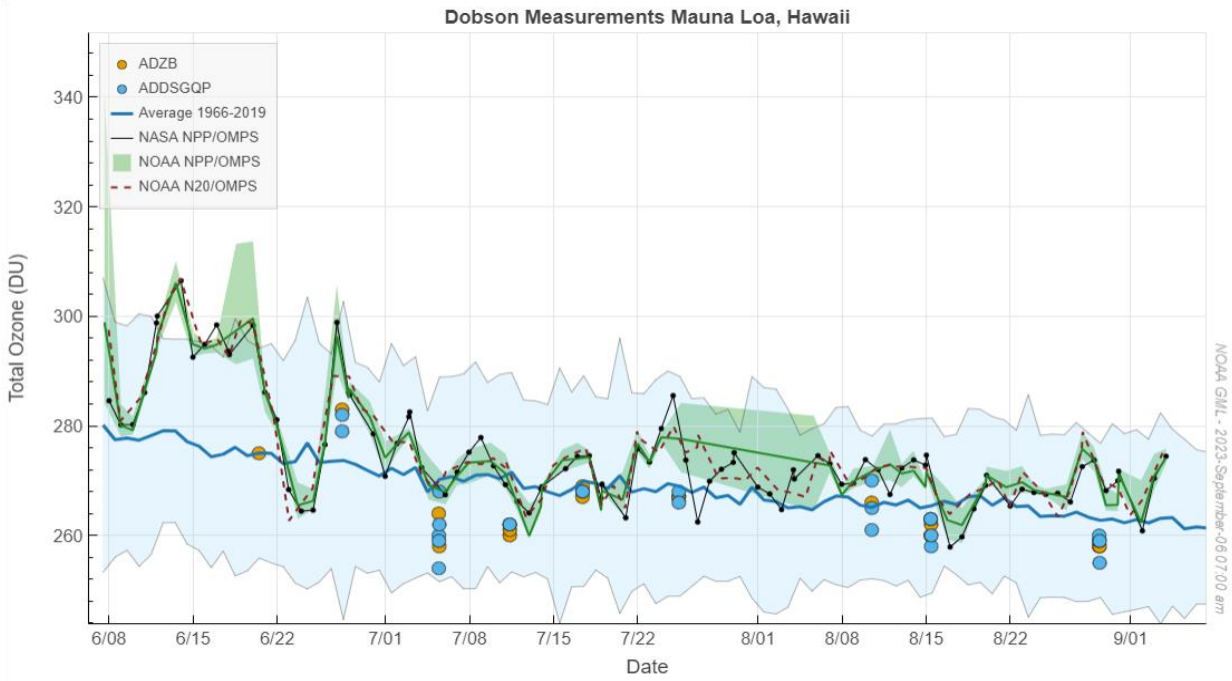
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Verify performance of V8TOz for MetOp-B & -C for GOME-2	Dec-22	Dec-22	Dec-22	
Provide new Level 1a, 1b and 1g for S-NPP OMPS V2Limb	Dec-22	Dec-22	Dec-22	
Provide Delta to Level 1a, 1b and 1g for NOAA-21 OMPS V2Limb	Jan-23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

Overall Status:

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

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

Issues/Risks: None



Overpass Comparisons of N20 and NPP V8TOz total ozone with Mauna Loa Dobson estimates. Data are updated frequently at https://gml.noaa.gov/ozwv/dobson/plots/index.php

NUCAPS Products

August, 2023

Accomplishments / Events

- Continued efforts towards the NOAA-21 NUCAPS product provisional maturity. These include, (a) tuning of ATMS and CrIS radiance tuning, (b) cloudy and clear regression LUT updates, (c) ATMS and CrIS noise file updates in the retrieval algorithms, and (d) continuation of VALAR data sets to validate temperature and water vapor. In addition, the NUCAPS team is planning to archive and process focus day data sets (one day/week) to facilitate global evaluation of NUCAPS products collocated with ECMWF and other models; correlative satellite retrieved products (AIRS, TROPOMI, OCO-2). The required tuning and regression LUTs for NOAA-21 are planned to be delivered to the ASSISTT team by November 2023 for operational implementation. The NUCAPS provisional maturity is scheduled for December 2023.
- One of the NUCAPS products, the Outgoing Longwave Radiation (OLR) has been evaluated for NOAA-20/21 and for MetOp-C on a daily basis through comparisons with broad-band OLR product available from NOAA-20 CERES and Terra CERES. The OLR product meets the provisional maturity requirement as evidence by the daily, and monthly validations (figure 1).
- NUCAPS team submitted a total of six abstracts to the AMS-2024 (28 January to 1 February) conference. These abstracts provide a overview of NUCAPS products, severe weather applications, and showcase the preparations and updates being implemented for the NOAA-21 product provisional maturity.

Overall Status:

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

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

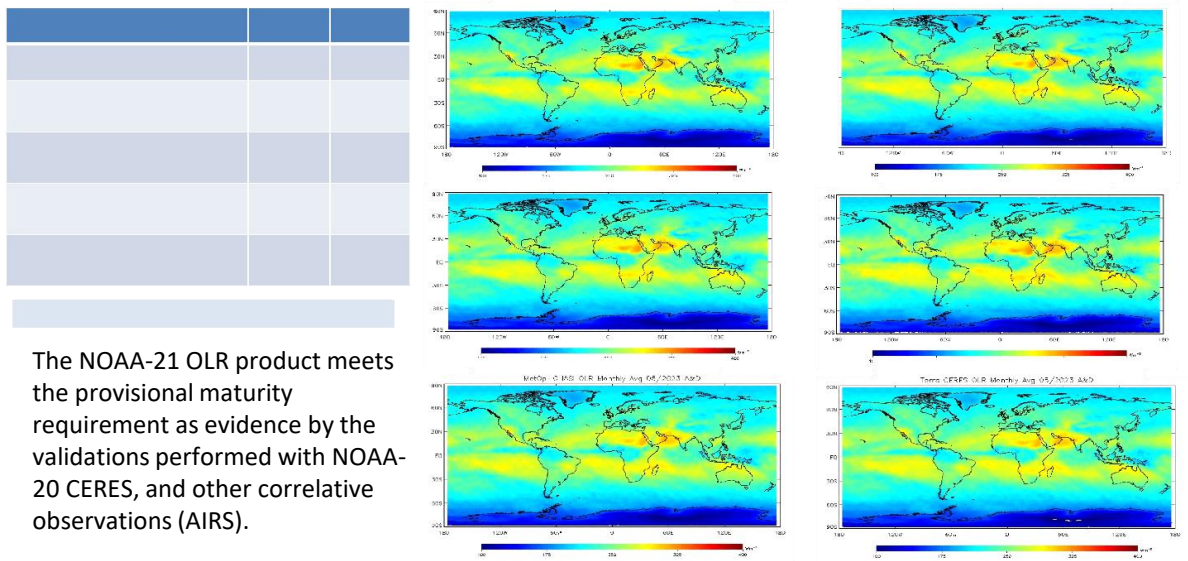
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
DAP Delivery with updates related damping factor, surface corrections, MetOp-B/C Averaging Kernels	Oct-22	Oct-22	11/04/22	
NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs, and user support for the CrIS Beta Maturity Review	Feb-23	Feb-23	02/23/23	NOAA-21 K-band transmitter swap
Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations	May-23	May-23	Initiated & Continuing	
NOAA-21 NUCAPS Product Beta Maturity	May-23	May-23	6/1/23	Beta attained effective 3/23
NOAA-21 NUCAPS T(p), q(p), O3(p) Provisional Maturity	Nov-23	Nov-23	On-time	

NOAA-20/21 and MetOp-C NUCAPS OLR product evaluations with CERES

Figure: Monthly averaged OLR product validation with CERES



The NOAA-21 OLR product meets the provisional maturity requirement as evidence by the validations performed with NOAA-20 CERES, and other correlative observations (AIRS).

SDR and EDR Reprocessing

July 2023

Accomplishments / Events:

- The official transition of the reprocessed SNPP SDRs to CLASS/NCEI started on December 1, 2021.
- The transition of the reprocessed SNPP ATMS (V1 and V2), CrIS, and OMPS (V1 and V2) data was completed in December 2021, February 2022 and March 9, 2022, respectively. These data are available at CLASS website now.
- The transition of the reprocessed SNPP VIIRS started on March 15, 2022.
- The reprocessed SNPP VIIRS SDR data from 1/2/2012 to 04/29/2019 (**1401.3T, 86.77%** of total) has been completed as of June 8, 2023.
- It's expected that the VIIRS data transition will complete in October 2023.
- The SNPP EDR algorithm package was obtained from the ASSIST team. The RWG extracted the EDR software from the docker image, setup and configured EDR software on UMD Bamboo cluster successfully. The EDR software can run on Bamboo cluster to generate selected EDR products now.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Complete transition of reprocessed SNPP VIIRS SDR to CLASS	03/2022	10/2023		1 month
Complete VIIRS EDR reprocessing for Clouds, polar wind, Ice Concentration; Ice Thickness; Snow Cover; and Ice Surface Temperature	02/2023	05/2024		1 month

Overall Status:

	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic			X		The UMD IT would not implement the docker for EDR reprocessing. The RWG is looking at the EDR package to see if it can be executed without a docker. Execution delay is expected.
Schedule			X		

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

Issues/Risks:

None

Highlights: Status of the Reprocessed SNPP Data Transition

Sensor	Data Type (name)	Period	Notes	Volume (Tb)	Status
ATMS	TDR (TATMS)	2011-11-08 to 2019-10-15	V2	0.406	Completed on Dec. 20, 2021
	SDR (SATMS)	2011-11-08 to 2019-10-15	V2	0.431	
	GEO (GATMO)	2011-11-08 to 2019-10-15	V2	0.420	
ATMS	TDR (TATMS)	2011-11-08 to 2017-03-08	V1	0.273	Completed on Dec. 30, 2021
	SDR (SATMS)	2011-11-08 to 2017-03-08	V1	0.289	
	GEO (GATMO)	2011-11-08 to 2017-03-08	V1	0.283	
CrIS	GCRSO	2012-02-20 to 2020-01-29	V2	0.369	Completed on Feb. 25, 2022
	SCRIS	2012-02-20 to 2020-01-29	V2	67.994	
	SCRIF	2014-12-04 to 2020-01-29	V2	74.455	
OMPS	TC (SOMTC, GOTCO)	2012-01-30 to 2018-09-30	V1	1.2	Completed on Mar. 4, 2022
	NP (SOMPS, GONPO)	2012-01-25 to 2017-03-08	V1	0.134	
OMPS	NP (SOMPS, GONPO)	2012-01-25 to 2021-06-30	V2	0.246	Completed on Mar. 9, 2022
	TC (SOMTC, GOTCO)	2012-01-30 to 2021-06-30	V2	1.695	
VIIRS	VIIRS ALL SDR	2012-01-02 to 2020-04-30	V2	1615	Completed **86.77**%
Total				1764.65	

OMPS SDR

August 2023

Accomplishments / Events:

- Derived and delivered OMPS NM/NP weekly dark LUTs for SNPP, NOAA-20 and NOAA-21.
- Derived and delivered SNPP/NOAA-20/NOAA-21 OMPS NP solar irradiance bi-weekly LUTs.
- Assessed the performance of a new solar intrusion correction code for NOAA-21 NP SDR data, which was developed by the NASA OMPS team.
- Presented the slides to support a new OMPS DR 10550 about the solar intrusion correction for the NOAA-21 OMPS NP.
- A continuing effort was conducted to monitor the performance of the SNPP OMPS NM and NP instrument and SDR data after the safe mode anomaly event, e.g.,
  - Assessed the OMPS dark, gain and nonlinearity characteristics and stabilities.
  - Assessed the OMPS NM and NP wavelength shift features.
  - Assessed the OMPS SDR data quality using multiple ways.
  - Delivered new dark LUTs for NM and NP and wavelength LUT for NP.
- Efforts continued to for a sensitivity study about re-centering the N21 NP bandpass data.
- Continued monitoring the NOAA-21 OMPS NM and NP dark performance and stability.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 First Light OMPS NM, NP SDR First Light and Beta Maturity	Feb-23	Feb-23	Feb-23	J2 Ka transmitter problem
OMPS NM, NP SDR Provisional Maturity	Mar-23	Apr-23	Mar-23	
Inter-sensor comparison among SNPP, NOAA-20, and NOAA-21 (OMPS NM)	Apr-23	Apr-23	Apr-23	On-going work
Inter-sensor comparison among SNPP, NOAA-20, and NOAA-21 (OMPS NP)	May-23	Oct-23		N21 OMPS NM/NP SLT analysis higher priority; SNPP recoveray
Improve the calibration accuracy of NOAA-21 OMPS SDR towards Validated Review	Jun-23		Jun-23	A new NM SL LUT; new NP solar LUTs
Inter-sensor comparison with Tropomi since the door-open	Aug-23	Oct-23		SNPP recovery assessment
OMPS NM, NP SDR Validated Maturity: Status Preview	Sept-23	Nov-23		SNPP recovery assessment; new bandpass data analysis
Delivery of weekly dark LUTs for NM and NP	Sep-23	Sep-23		
Delivery of wavelength and solar flux LUTs for NM and NP	Sep-23	Sep-23		

Overall Status:

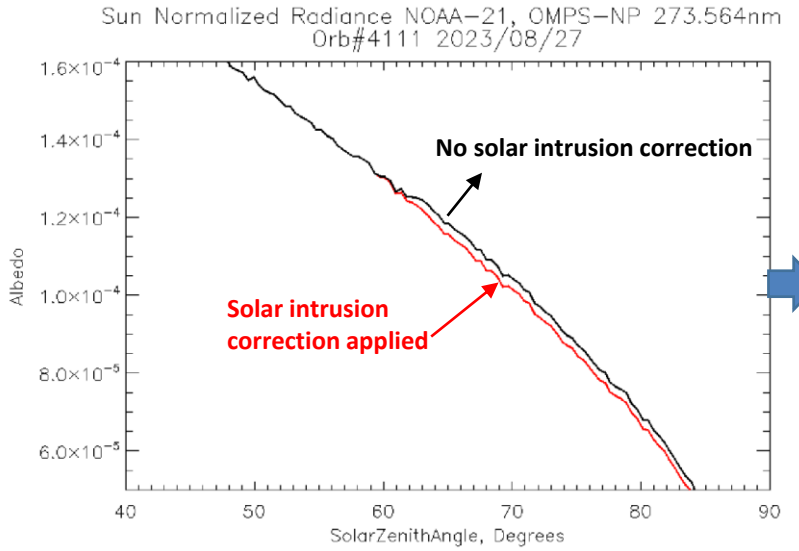
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule			x		

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

Issues/Risks:

None

Normalized Radiance at 273.56nm for NOAA-21 NP on 07/27/2023 with/without the solar intrusion correction



The impact of the solar intrusion correction is observed

Sea Surface Temperature

August 2023

Accomplishments / Events:

- N21 SST Provisional review held on 24 Aug 2023. Provisional status approved as of 20 Mar 2023. N21 SST fully meets and exceeds JPSS SST Specs for accuracy (global mean bias wrt quality controlled drifting and tropical mooring buoys should be within ±0.2K), precision (corresponding global standard deviation <0.60K), and coverage >18%. The N21 SSTs are also very closely consistent with NPP and N20 counterparts.
- Work is underway to make N21 L2P and L3U SST products publicly available on the NOAA CoastWatch system, and archive at NASA PO.DAAC and NOAA NCEI. These will be priorities for Sep-Oct 2023.
- Integrating N21 L3U SST into the global gridded Supercollated products from afternoon satellites (L3S-LEO-PM) and Daily (L3S-LEO-DY) is underway. New versions of these two products will be also archived in PO.DAAC (priority for Nov-Dec 2023)
- Reprocessing MODIS SST records and integrating into L3S-LEO products continues.

All other product consistency & validation activities w/NPP/N20, non-JPSS LEO SSTs (AVHRR GAC/FRAC & MODIS) and corresponding milestones are underway.

Overall Status:

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

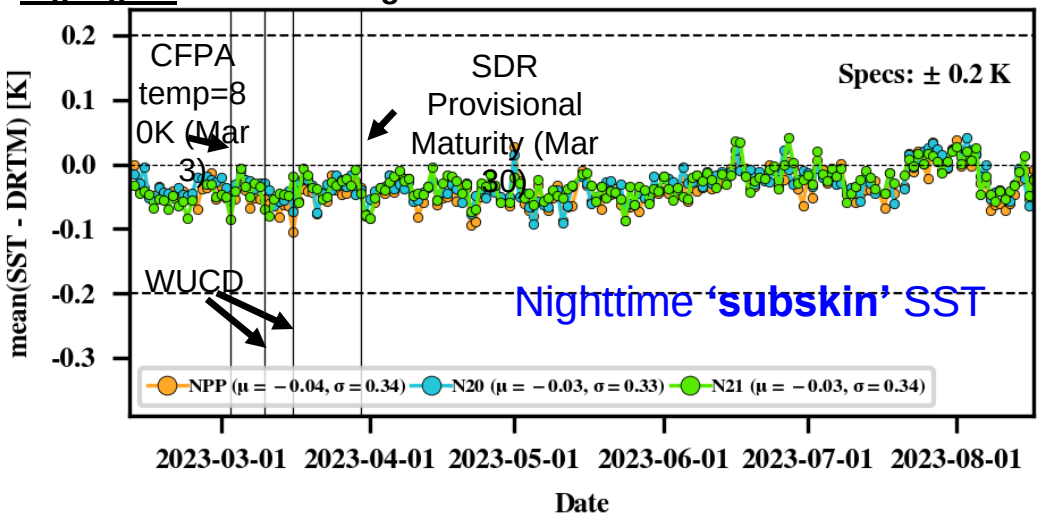
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Deliver update to ACSPO v2.80 to retire GMODO	Aug-23	Apr-23	Mar-23	
NOAA-21 SST product Beta Maturity	Jul-23	May-23	Apr-23	
NOAA-21 SST product Provisional Maturity	Oct-23	Aug-23	Aug-23	
Product consistency & validation activities w/NPP/N20, non-JPSS LEO SSTs (AVHRR GAC/FRAC & MODIS).	Sep-23	Sep-23		

Highlights: VAL Stats Against DTMs for 2 VIIRSs & 2 MODISs – Full 2019



Nighttime validation accuracy (global biases wrt QC'ed SSTs from drifters and tropical moorings) for three currently operational VIIRSs onboard NPP, N20 and N21. Note exemplary consistency between the three JPSS platforms. Provisional quality achieved on 20 Mar 2023, after completing 2 warm-up cool-down exercises and CFPA temperature reset from 82K to 80K.

Snowfall Rate

August 2023

Accomplishments / Events:

- ASSISTT has successfully run the standalone SFR system with the help of the SFR developers. Currently, the SFR Preliminary CCAP delivery is scheduled for September 15th and the Final CCAP delivery for October 10th.
- At the request of the CPC CMORPH team, a customized SFR dataset was created from the recently reprocessed SFR data. The new dataset facilitates the CPC user's applications of SFR in the CMORPH2 analysis.
- A sensitivity study was conducted to examine microwave frequencies response to precipitation. The study results was utilized to develop a microwave frequency table that has been incorporated in a NOAA Technical Report for the Workshop on Precipitation Estimation from LEO Satellites. The table is also included in a BAMS publication.

Overall Status:

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

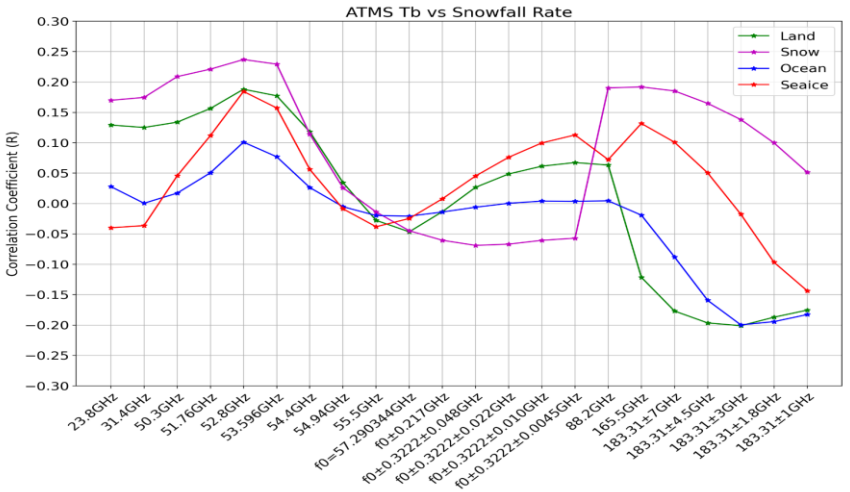
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights: Sensitivity of Microwave Frequencies to Snowfall



Correlation coefficient between microwave frequency and snowfall rate over various surface types

Surface Type

August 2023

Accomplishments / Events:

- STAR-UMD VIIRS Surface Type team has downloaded and processed S-NPP and NOAA-20 VIIRS daily granule surface reflectance data acquired in August of 2023 for the production of AST-2023.
- The team has completed the derivation of the global annual surface type map with the 17 IGBP types based on VIIRS observations acquired from January 1 to December 31, 2022 (AST22).
- Based on the AST22, The team has also produced the following global maps:
  - A 20-type map for use by EMC models (see highlight)
  - A 9-type Biome map for use by the general user community

Overall Status:

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

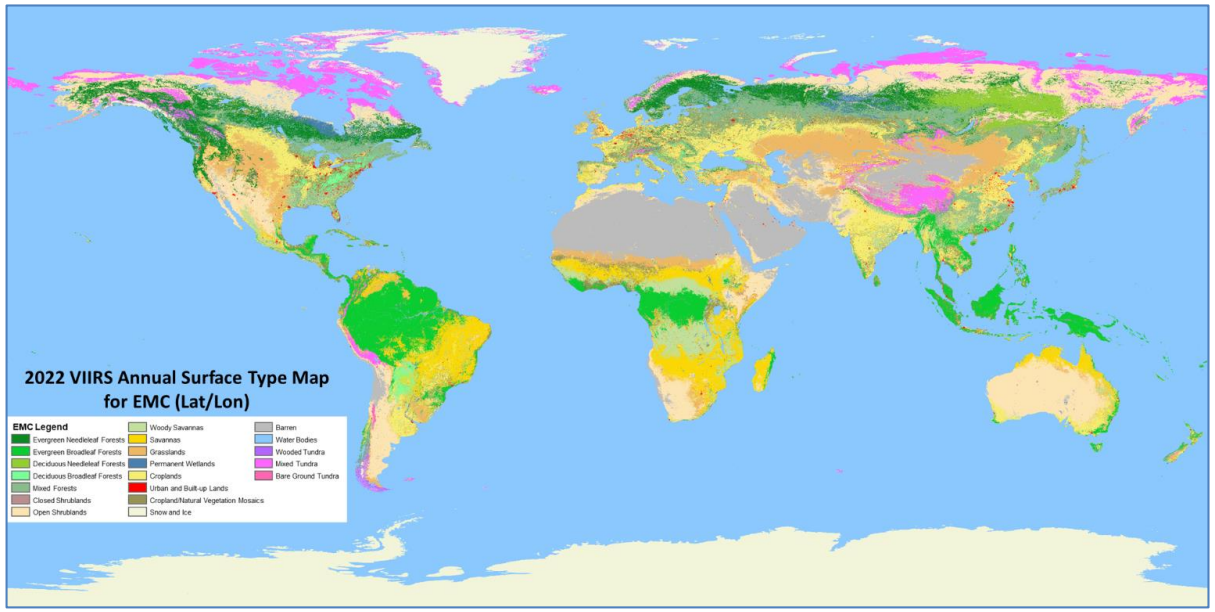
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights: ***Global Annual Surface Type Map Derived for EMC Based on VIIRS Data Acquired in 2022***



Vegetation Health

August 2023

Accomplishments / Events:

- Continued monitoring of vegetation health as indicated by publications of weekly vegetation health products (VHP) from currently operational NOAA-20 VIIRS observations via STAR webpage at https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_browse.php
- Team has been close to complete the update of the VHP climatology data of VCI, TCI and VHI using all AVHRR and VIIRS data including both VIIRS on SNPP and NOAA20 satellites.
- Vegetation Health Index data over CONUS of late June is compared with the official weekly US Drought Monitor publication. Spatial patterns of both maps (see quad 4) generally matched well. USDM is an interactive integration of more than a dozen other drought indices including VHI.

Overall Status:

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

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

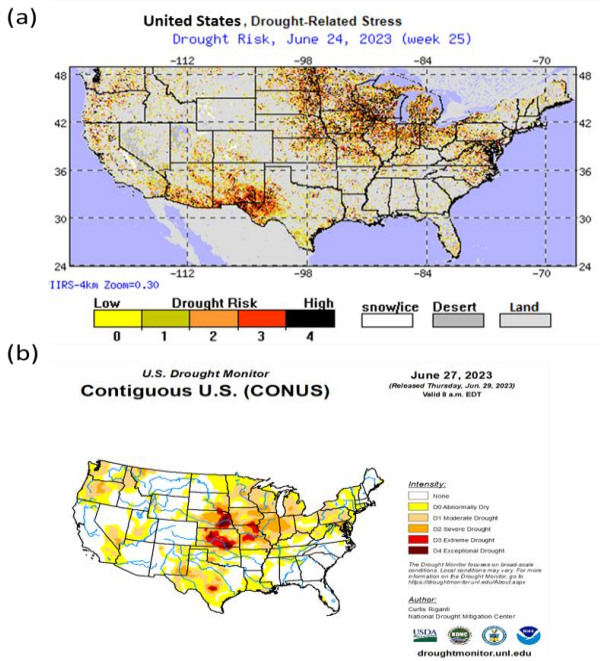
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Vegetation Health Beta Maturity	Sep-23	Sep-23		
NOAA-21 Vegetation Health Provisional Maturity	Apr-24	Apr-24		
NOAA-21 Vegetation Health Validated Maturity	Apr-24	Apr-24		

Highlight:

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



VIIRS SDR

August 2023

Accomplishments / Events:

- Presented NOAA-21 (N21) VIIRS SDR product performance during Validated Maturity Review on 8/3/2023 and achieved acceptance of the validated maturity effective 6/23/2023
- To mitigate the radiometric response degradation for N21 VIIRS SWIR bands, updated the N21 VIIRS SDR CAL-AUTOMATE LUT to enable automated calibration of the SWIR bands in the IDPS operational environment starting on 8/17/2023
- Attended 2023 SPIE conference and made three presentations on N21 VIIRS early on-orbit calibration and performance of the reflective-solar and thermal-emissive bands as well as on N21 DNB stray light correction and its comparison with Suomi NPP and NOAA-20 (N20)
- Delivered for deployment in the IDPS operations the 6th (out of 12) N21 VIIRS SDR DNB STRAY-LIGHT-CORRECTION LUT as well as the updated N21, N20 and NPP VIIRS SDR DNB DN0 and GAIN-RATIOS LUTs that were created based on data acquired around the new moon on 8/16/2023; NPP DNB scan edge striping that appeared after the CDP Reset anomaly on 7/26/2023 was corrected by this LUT update

Overall Status:

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

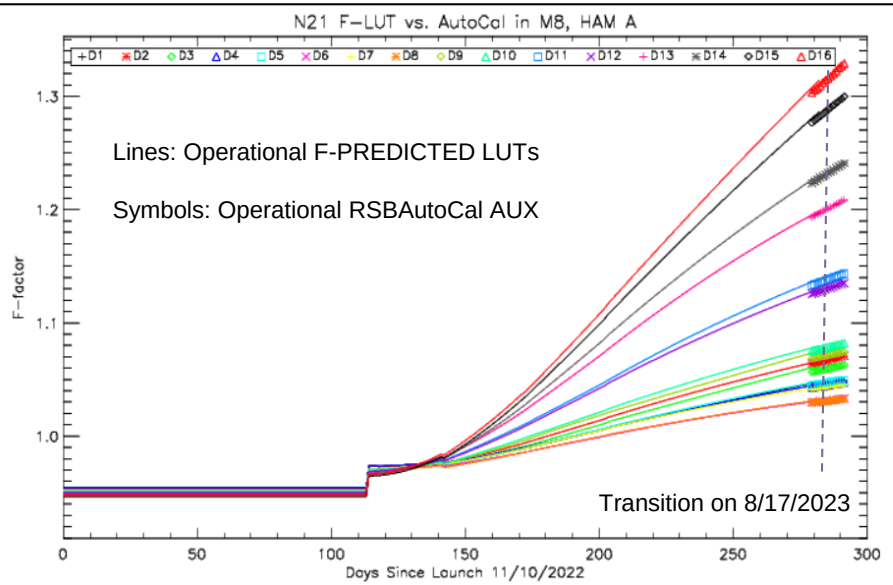
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Post-launch Cal/Val for J2 (from First light to VIIRS SDR Beta Maturity)	Dec-22	Feb-23	2/23/2023	KaTX anomaly
VIIRS SDR Provisional Maturity	Feb-23	Mar-23	3/30/2023	KaTX anomaly
VIIRS SDR Validated Maturity	May-23	Aug-23	8/03/2023	KaTX anomaly Mx8 deployment
Monthly lunar calibration (predictions and analyses)	Jul-23	Jul-23	6/30/2023	End of season
Monthly delivery of VIIRS DNB calibration LUTs	Sep-23	Sep-23		
Geolocation monitoring using CPM (for NPP, N20 and N21)	Sep-23	Sep-23		
N21 (J2) on-orbit calibration LUT development	Sep-23	Sep-23		

Highlights:



NOAA-21 VIIRS SWIR bands calibration is automated by applying the RSBAutoCal outputs after the on-orbit calibration coefficients were switched from the F-PREDICTED LUT to the automated solar calibration analysis on 8/17/2023 (with one-time differences within 0.5%)

VIIRS Polar Winds

August 2023

Accomplishments / Events:

- Realistic snow extent estimates are obtained only when compositing VIIRS NDE daily snow products. Compositing VIIRS IDPS snow products (2014-2016) resulted in an overestimated snow extent (see Figure 2). This suggests that the IDPS snow algorithm produced an excessive number of spurious snow identifications.

Overall Status:

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

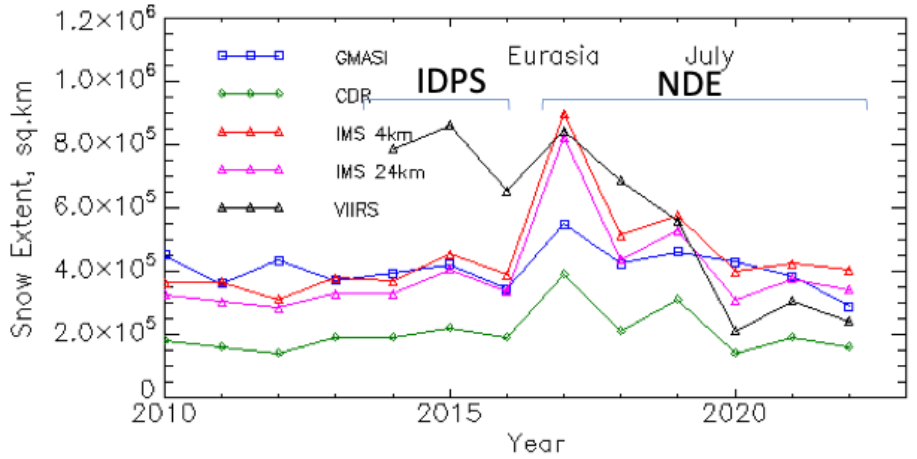
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Evaluation of VIIRS DNB winds and impact to NWP	Sep-2023	Sep-2023		
VPW Beta Maturity	Nov-2023	Nov-2023		
VPW Provisional Maturity	Jan-2024	Jan-2024		
VPW Validated Maturity	Mar-2024	Mar-2024		

Highlight: Direct Broadcast VIIRS Winds



Volcanic Ash

August, 2023

Accomplishments / Events:

- Quality/Oversight Continued to ensure high quality Volcanic Ash retrievals from EDR algorithms and VOLCAT. Routine validation of existing JPSS volcanic ash EDRs from current sensors and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.
- The volcanic ash science team has continued to identified volcanic cloud emissions observed by NOAA-21 VIIRS. The volcanic ash science team prepared a presentation for the Provisional Volcanic Ash EDR review, which was conducted on August 24, 2023. The NOAA-21 Volcanic Ash EDR was declared provisional status following the review. The provisional review material focused on validation of ash height, ash mass loading and ash detection. One example of the validation is the ash mass loading validation using advection patterns, which is shown in the figure below. The provisional presentation demonstrated the NOAA-21 Volcanic Ash EDR is meeting all specifications.
- The Volcanic Ash science team will continue to collect and analyze volcanic ash emissions as nature allows in preparation for the full maturity review, currently scheduled for early 2024.
- VOLCAT VIIRS volcanic ash plume identification and extraction work is taking longer than originally anticipated, but good progress establishing expert classified VIIRS granule database for training AI/ML approach to plume detection has been made.

Overall Status:

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

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

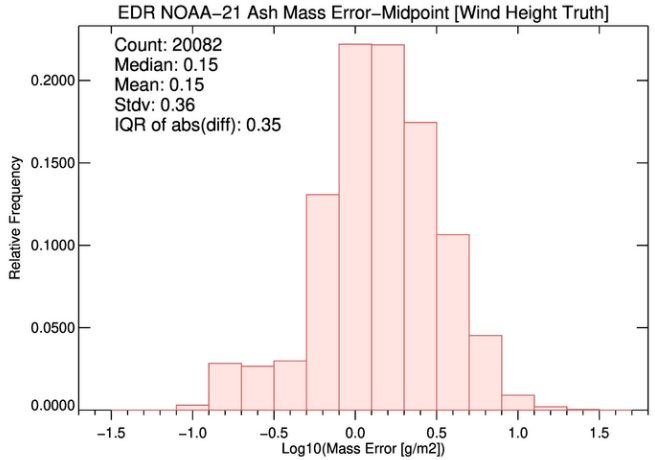
Issues/Risks:

None

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

Highlights:

NOAA-21 VIIRS EDR ash mass loading error relative to advection pattern truth data. The data is comprised of 38 volcanic clouds observed by NOAA-21 VIIRS during April - July 2023. The mean error is 0.15 log10(g/m^2), which exceeds the product specification and is consistent with the algorithm validation analysis conducted for previous instruments.



Ocean Color

August 2023

Accomplishments / Events:

NO August UPDATE

Overall Status:

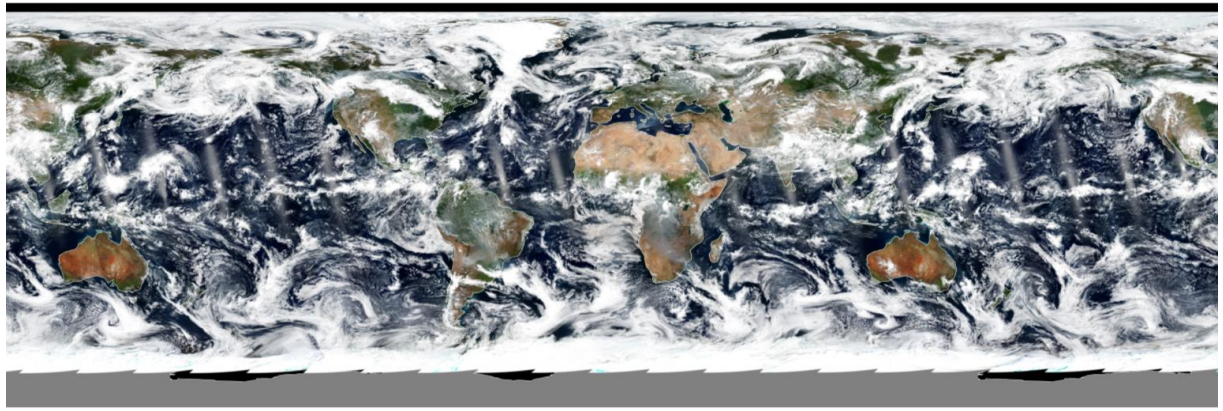
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

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

Issues/Risks:

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

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



Leaf Area Index

August 2023

Accomplishments / Events:

- Keep tracking LAI project in JIRA environment and update weekly, work with the ASSIST team for the code integration & update. Complete the DQF information, metadata, and naming convention update.
- Update the test datasets, adding SNPP and N21 to the existing N20 data.
- Have a meeting with EMC model group to introduce the LAI product progress and model requirement for LAI.
- According to the model team preference, investigate the vegetation ground coverage and the stem area index on how they works in the model, how to derive these them using satellite data.
- Complete the summer intern project to analyze the vegetation change over the past 20 years and it correlation with land surface temperature trend.

Overall Status:

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

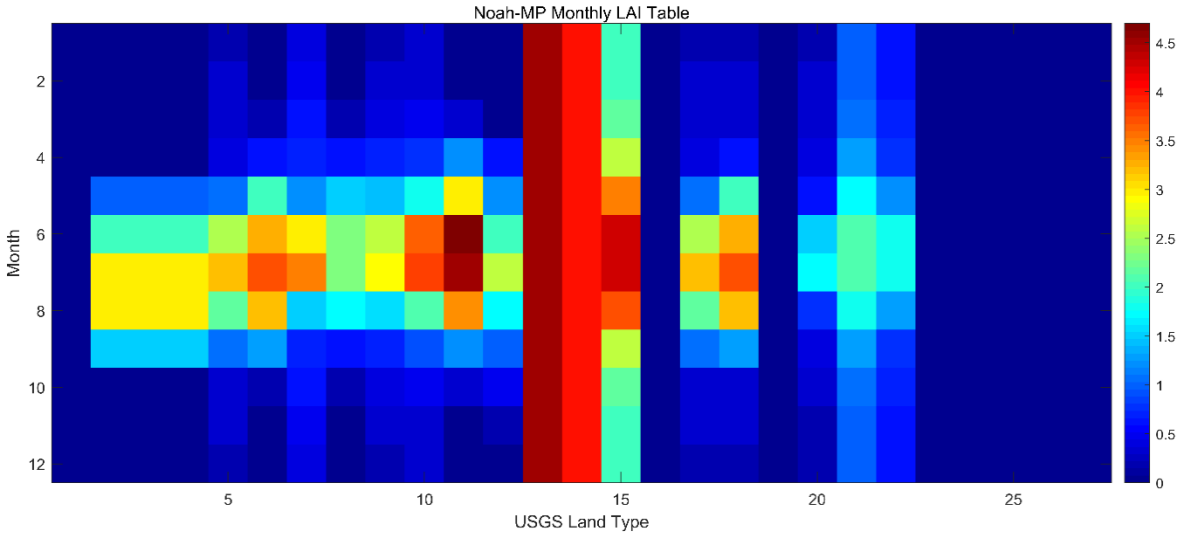
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:



Surface type dependent monthly LAI used in Noah-MP

LAI DQF and Naming Convention

- Metadata scope and information
  - Add standard metadata according to ASSIST
  - Confirm the information of the metadata

- LAI Data Quality Flag (DQF)
  - Definition: optimal retrieval percentage, sub-optimal, bad, Total number of retrieval
  - According to the data availability of the 8-day LAI.
  - ≥ 6 weeks good quality LAI: optimal, sub-optimal (1-5 weeks), bad (no observed data, using climatology).
  - Setup the monitoring item (variable) and the threshold for the LAI.

- Naming Convention update
  - WKL-LAI-GLB_v1r0_{npp|n20|n21}_sYYYYMMDD0000000_eYYYYMMDD2359599_cYYYYMMDDHHMMSSS.nc
  - The IP data name update as well, using same format to make it consistent. (SurfRefl_v1r2, DLY-LAI_v1r0, WKL-LAI_v1r0, WKL-LAI-TSGF_v1r0)

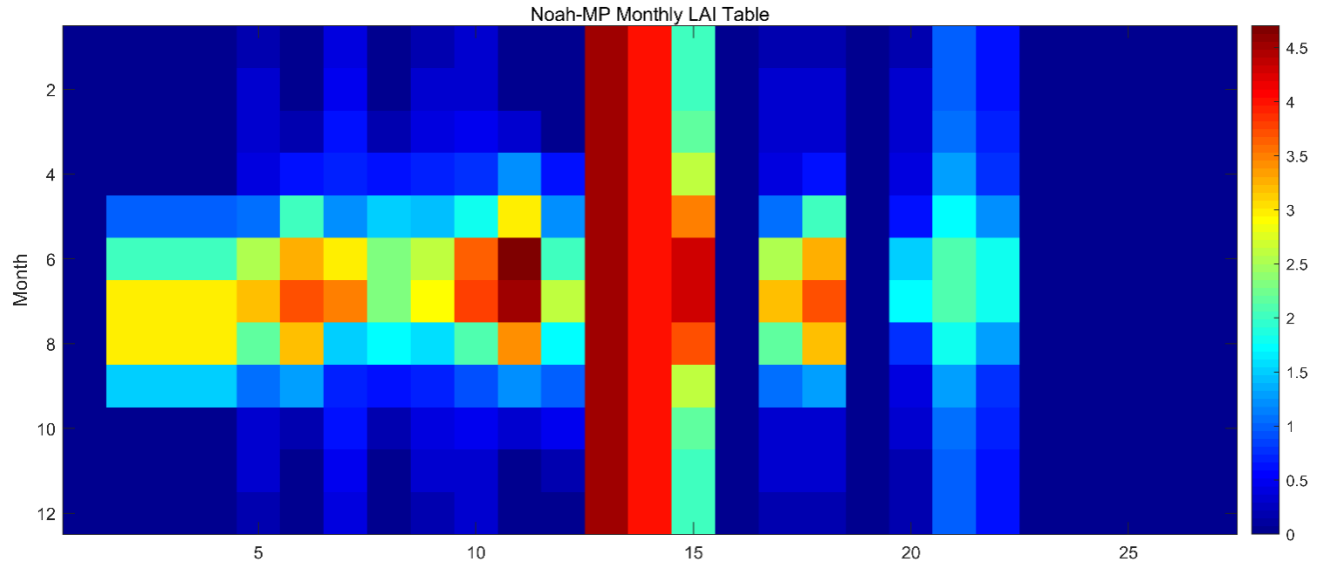
- New test data
  - Complete the test datasets for all of NPP, N20 and N21
  - Using updated naming convention, and covers whole 15 weeks for the smoothing test.

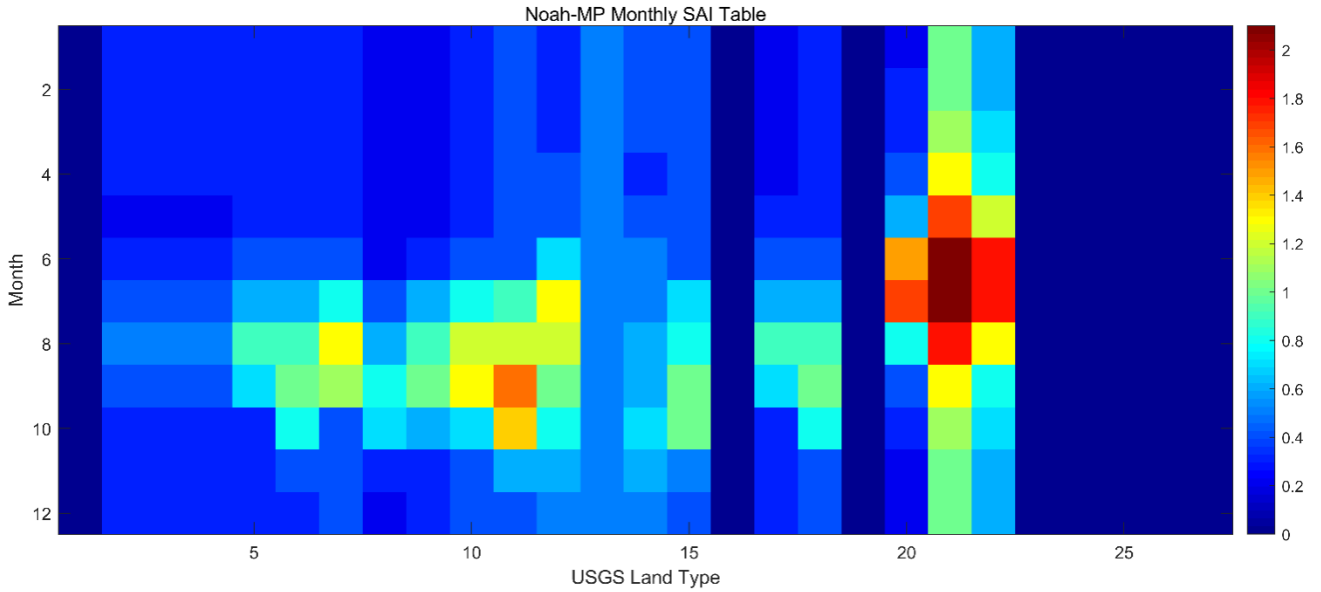
Investigation of LAI application in Noah-MP LSM

Current Noah-MP vegetation inputs (LAI & SAI):

USGS 27 land types

1: Urban and Built-Up Land
2: Dryland Cropland and Pasture
3: Irrigated Cropland and Pasture
4: Mixed Dryland/Irrigated Cropland and Pasture
5: Cropland/Grassland Mosaic
6: Cropland/Woodland Mosaic
7: Grassland
8: Shrubland
9: Mixed Shrubland/Grassland
10: Savanna
11: Deciduous Broadleaf Forest
12: Deciduous Needleleaf Forest
13: Evergreen Broadleaf Forest
14: Evergreen Needleleaf Forest
15: Mixed Forest
16: Water Bodies
17: Herbaceous Wetland
18: Wooded Wetland
19: Barren or Sparsely Vegetated
20: Herbaceous Tundra
21: Wooded Tundra
22: Mixed Tundra
23: Bare Ground Tundra
24: Snow or Ice
25: Playa
26: Lava
27: White Sand





Surface Reflectance

August 2023

Accomplishments / Events:

- Support OSPO team on the SR monitoring, choose the proper metadata and threshold for the data quality monitoring, and using the true color images for the visual check.
- Keep work on the SR consistency between SNPP, N20 and N21, including check the SDR team evaluation and validation results, using BRDF coefficients to do the angular correction.
- Verified the NCCF-DEV SR and NDE-OPS operational SR difference, and identified the source as the cloud mask version difference, investigated the new cloud mask data (ECM2) algorithm and output data changes. Start work on the code update to deal with such changes.

Overall Status:

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

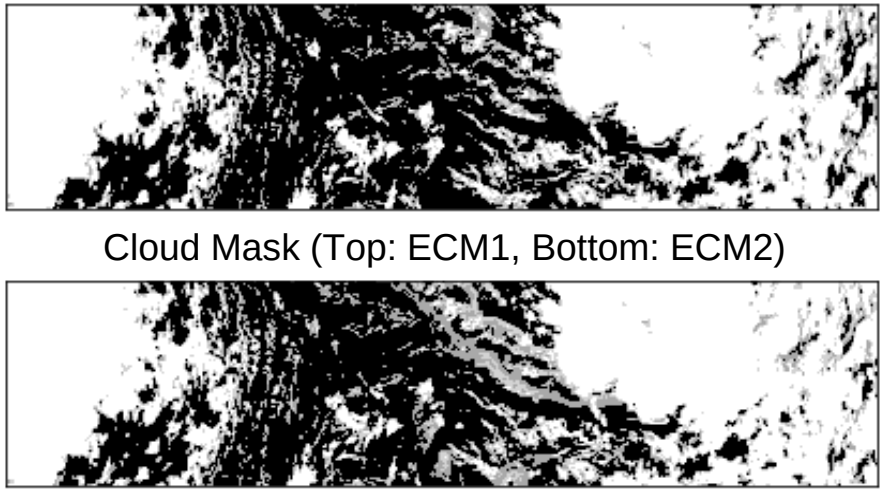
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights:

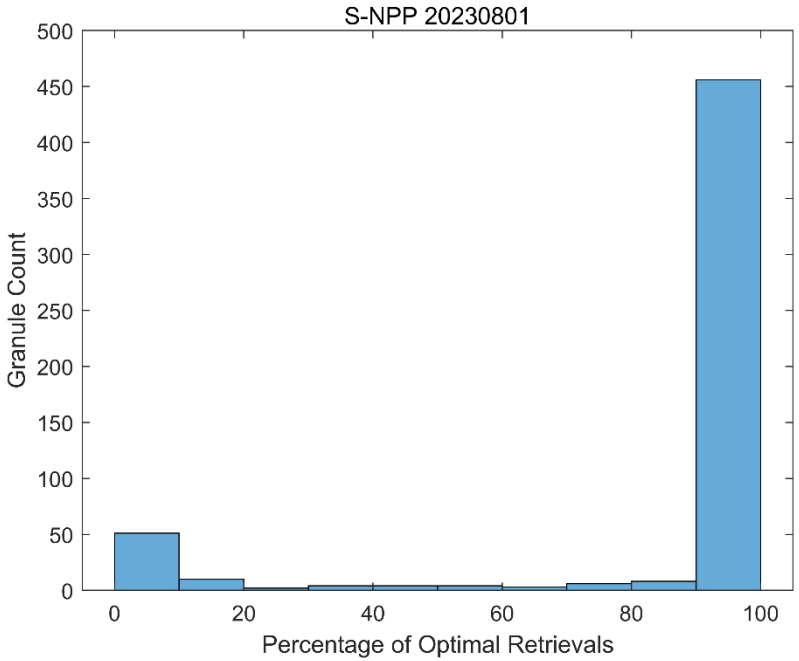


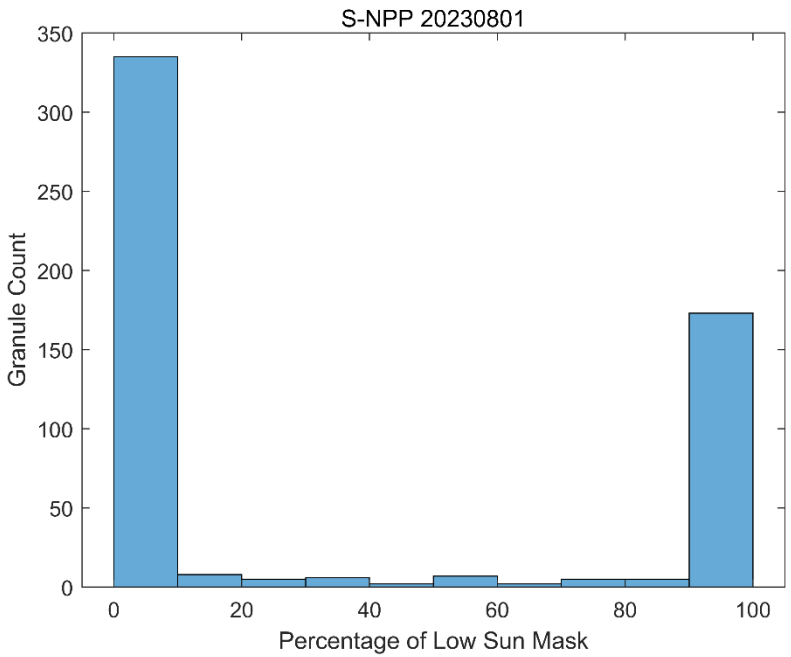
Cloud Mask (Top: ECM1, Bottom: ECM2)

Compared ECM1 (v2r3) and ECM2 (v3r2) Cloud mask data (cloud mask, cloud shadow mask, cirrus, and surface type) and evaluate the impact on SR.

SR Metadata Statistics and Monitoring usage

- **SR Bad Retrieval Definition**
  - Solar zenith angle >= 85 (night)
  - SDR Filled value or GEO Filled value (Need monitoring)
  - AOD or GFS (tpw, p0, o3) out of range. (Need monitoring)
  - Results out of range (-0.1, 1.6) (Need monitoring)
  - Moon in the sight (very rare case)





- Use optimal or bad retrieval percentage as the only variable, could misclassified the high latitude granule as a warning. So a metadata variable combination is needed for the monitoring, would suggest:
- Only monitoring the granule without low-sun pixel (SZA < 65), e.g. optimal percentage > 90%
- Combine optimal percentage and low-sun percentage

Cloud Mask data used in SR QFs

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

Red color marked the QF info from cloud mask & cloud height product

Cloud Mask Comparison (ECM1 vs ECM2)

- Cloud Mask (Confidence level)

Granules of whole day (~550), compared the Cloud mask confidence (0: confidently clear, 1: probably clear, 2: probably cloudy, 3: confidently cloudy). Col: v2r3, Row: v3r2

NPP-0601	New-0	New-1	New-2	New-3	SUM
Old-0	0.2381	0.0267	0.0102	0.0114	0.2863
Old-1	0.0167	0.0093	0.0083	0.0127	0.0469
Old-2	0.0066	0.0057	0.0087	0.0389	0.0599
Old-3	0.0023	0.0037	0.0095	0.5915	0.6070
SUM	0.2636	0.0453	0.0367	0.6544	

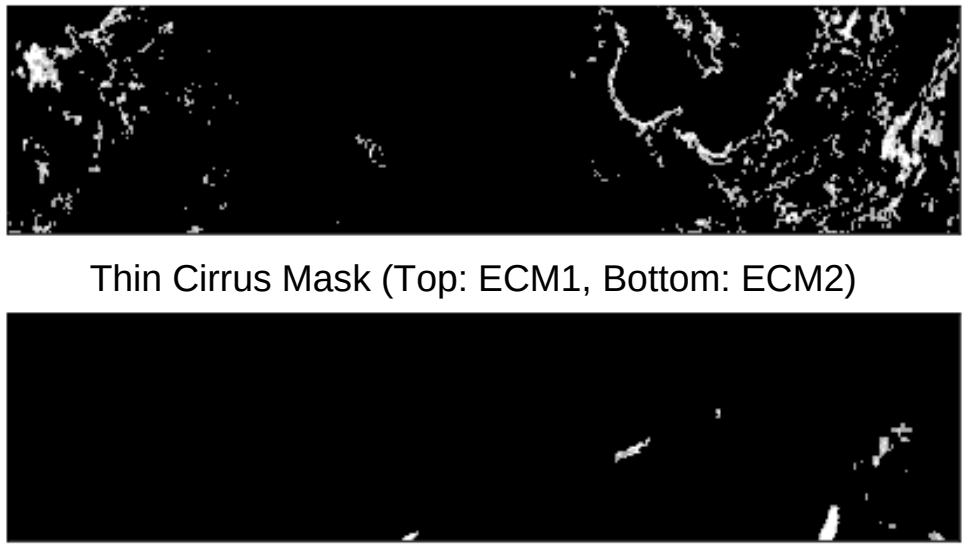
Cloud Shadow Mask (0: no, 1: yes)

NPP-06	New-0	New-1	SUM
Old-0	0.9503	0.0165	0.9668
Old-1	0.0211	0.0122	0.0332
SUM	0.9713	0.0287	

- The cloud mask has a good agreement for confidently clear and confidently cloudy.
- The correlation of probably clear/cloudy are not so good.
- Overall, the ECM2 with reduced (~2%, 28.5%□ 26.5%) confidently clear pixels compared with ECM1
- The Cloud shadow with relatively good agreement.

- Thin Cirrus Mask

- EMC2 update the threshold value
- ECM2 can be optimized for each surface type to reduce the damaging effects of classifier correlation. This should reduce issues for users of the 4-level mask
- The structure of the first 20 bits was left unchanged from ECM1. However, the rest of the bits will vary from sensor to sensor.



Thin Cirrus Mask (Top: ECM1, Bottom: ECM2)

- Impact

- The ECM2 reflective cirrus test and emissive cirrus test are changed compared with ECM1, not only the value, but also the storage location, so that cause issue for the NCCF-DEV data verification.
- A mitigation code update is under test.

Vegetation Index and Green Vegetation Fraction

August 2023

Accomplishments / Events:

- NOAA-21 VI and GVF passed beta review
- Set up routine local production of non-CONUS 1km VI product
- Testing a better way to handle the spatial response function for very high resolution VI product
- Showed that NIRv is more closely correlated to GPP than NDVI or EVI for most of 12 Ameriflux sites
- Analysis of SNPP VI and GVF data for periods including 20230726-20230731 data gap showed significant decrease in weekly VI relative to NOAA-20. After the data gap, differences were comparable to before the gap.
- Investigated the operational weekly GVF-EVI data and found the daily VI-SR data on the last day in the week is not read in the weekly composite process
- Verified the operational GVF-EVI and GVF data after NDE fixed the problem

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
1km global VIIRS VI and GVF code ready for delivery	Dec-22	Juy-22		Personnel not available for task
Report on methods for improving consistency between ABI and VIIRS VI	Feb-23	Mar-23	Mar-23	Delayed due to personnel sick leave
FY24 Program Management Review	Jun-23	Jun-23	Jun-23	
Annual algorithms/ products performance report	Aug-23	Aug-23	Aug-23	
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-23	Sep-23		
Ongoing support for JPSS-2 pre- and post-launch testing	Sep-23	Sep-23		

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			

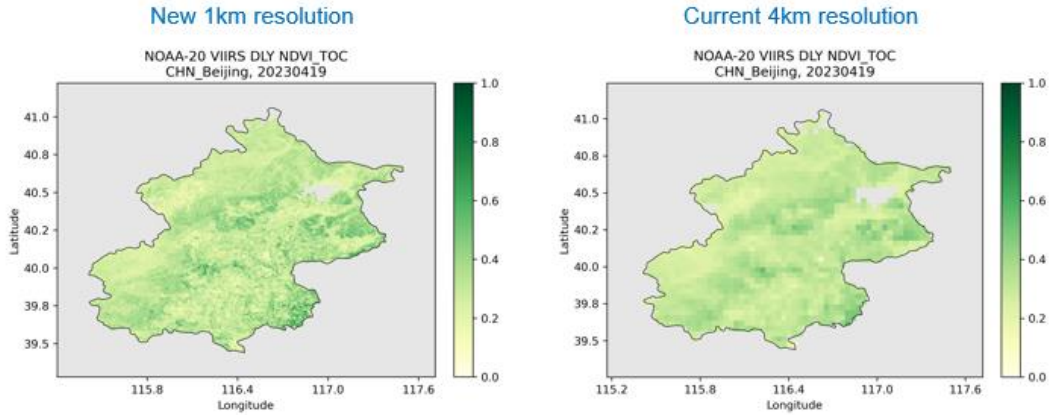
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

Highlights:

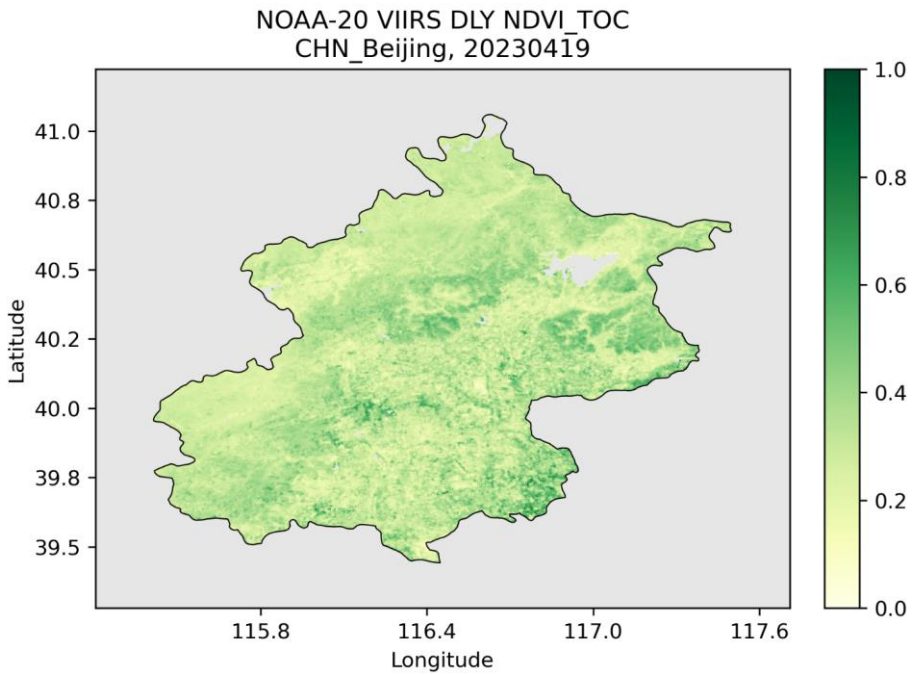
- Sample Non-CONUS 1km VI over Beijing, China



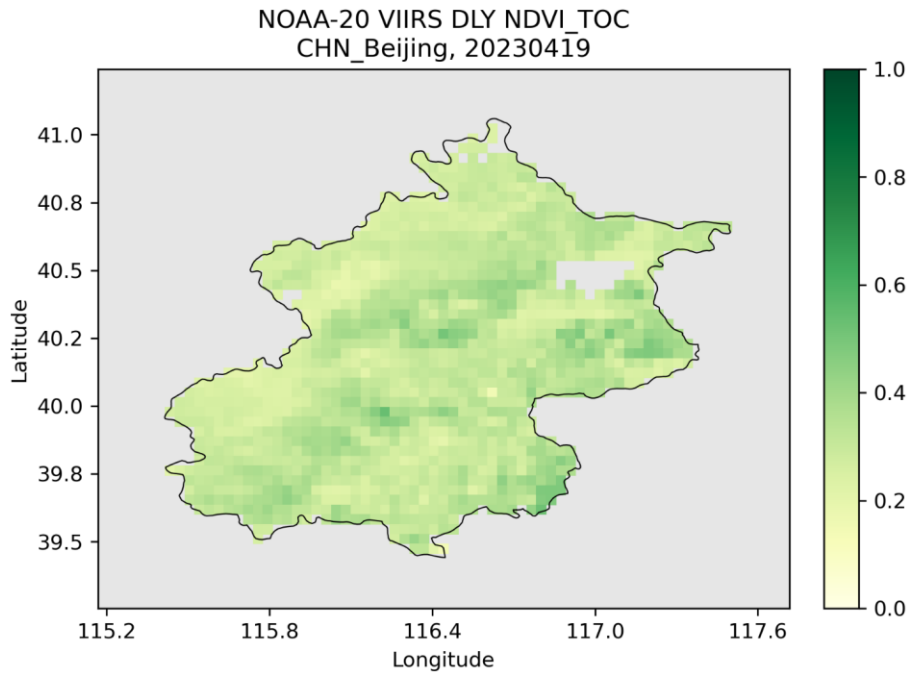
1km global VI product

- Sample Non-CONUS 1km VI over Beijing, China

New 1km resolution



Current 4km resolution

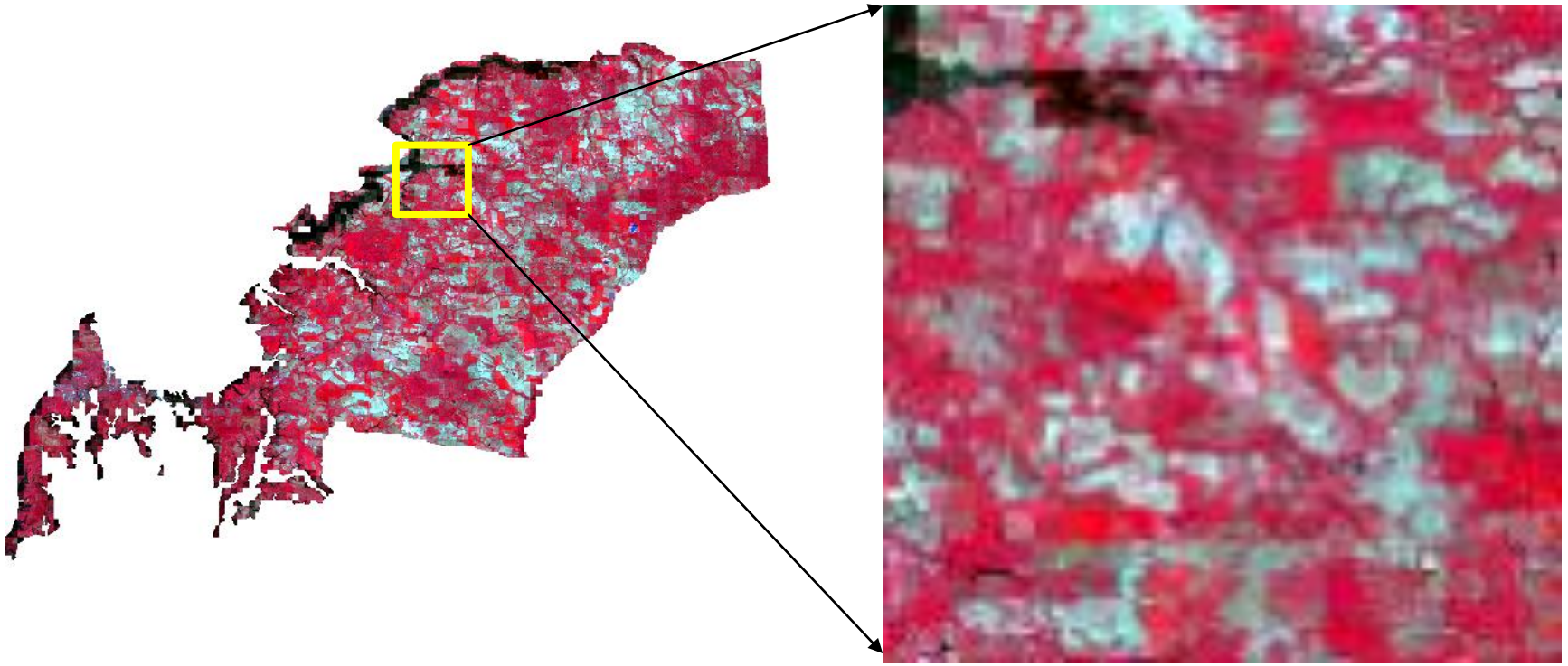


20m very high resolution VI development

- Very high resolution VI now shows blocky artifacts corresponding to lower-resolution VIIRS pixels

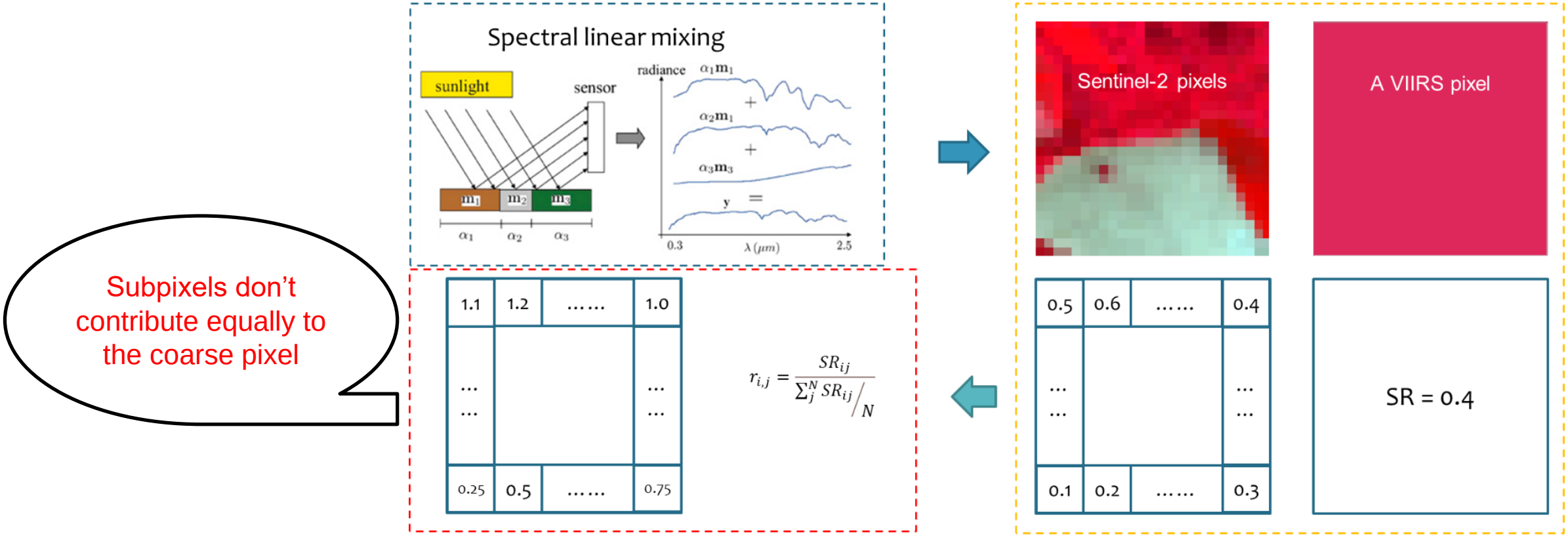
Downscaled image

Zoom-in



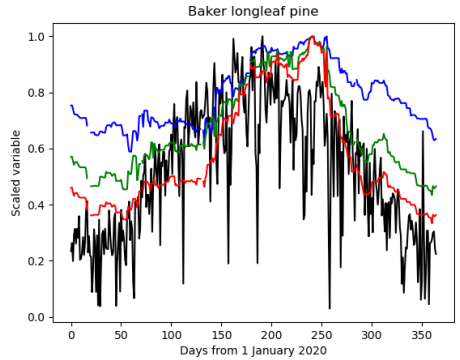
20m super-high resolution VI development

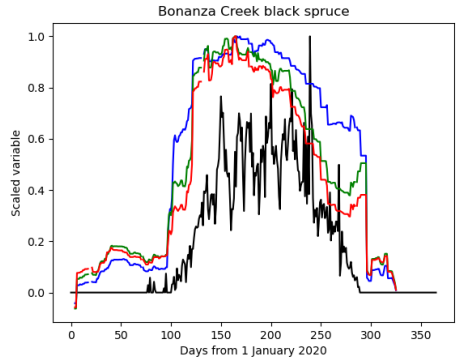
- Weighting of Sentinel-2 pixels is adjusted to account for their position relative to the VIIRS pixel.

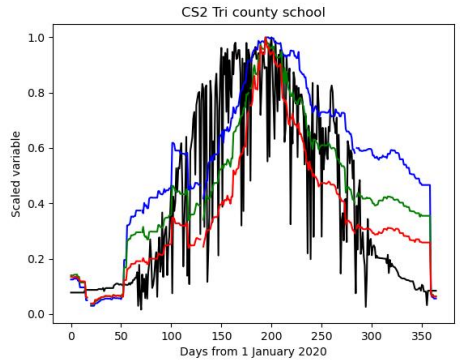


Correlations between GPP and vegetation indexes (Blue highlight indicates strongest correlation) and sample time series

	Correlation coefficient with Fluxnet GPP		
Site	**EVI**	**NDVI**	**NIRv**
Baker longleaf pine	0.541	0.711	0.693
Bonanza Creek black spruce	0.853	0.870	0.876
Bouldin Island corn	0.627	0.754	0.763
Charleston mesquite woodland	0.509	0.689	0.694
CS2 Tri county school	0.754	0.800	0.782
Lost Creek	0.718	0.859	0.886
Sherman Island restored wetland	0.161	0.400	0.430
Sylvania wilderness	0.845	0.939	0.947
Tonzi	0.328	0.417	0.420
University of Alaska Fairbanks	0.856	0.904	0.911
University of Michigan Biological Station	0.558	0.572	0.579
Vaira	0.625	0.756	0.765







GPP
EVI
NDVI
NIRv

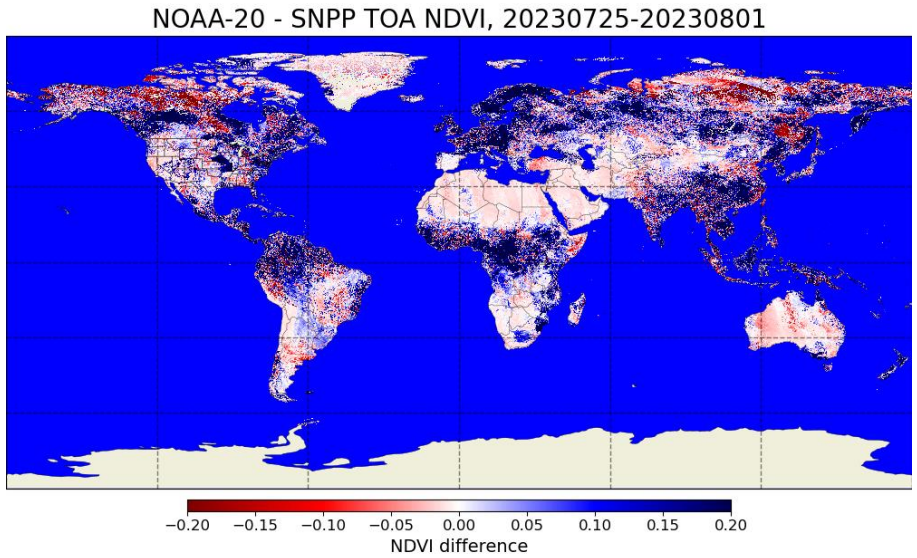
All variables are scaled to an annual maximum value of 1.0

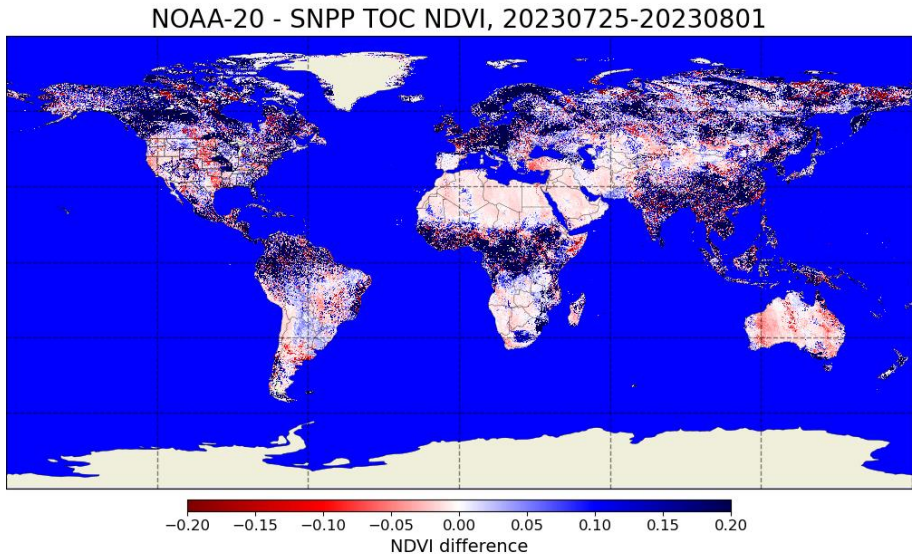
NIR_V correlations with flux tower GPP tend to be stronger than those for EVI or NDVI, mainly because NIR_V increases more slowly in the spring and decreases more quickly in the fall, which is more similar to the GPP phenology than the other VIs.

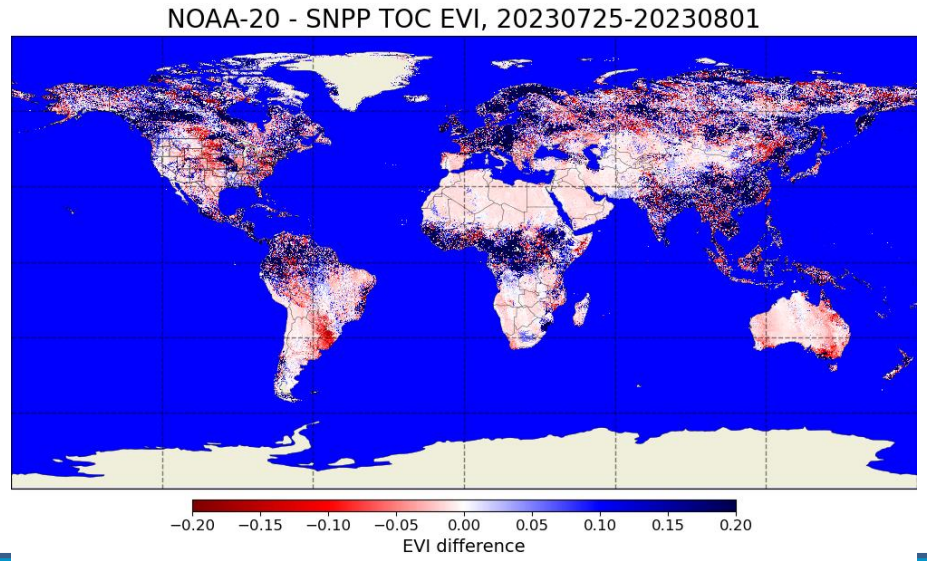
Data gap in SNPP

- There was a data gap from 20230726 to 20230731 in SNPP.
- No daily VI data were produced during this period.
- Some weekly VI, biweekly VI, and GVF data were produced for time periods that included the data gap period
- The effects of this data gap were investigated by comparing the SNPP data that included the gap period to the NOAA-20 data that did not have the gap, and comparing to SNPP/ NOAA-20 differences
- Some weekly SNPP VI data were produced for time periods including the data gap. The weekly SNPP VI data values were significantly lower than those from the same time period for NOAA-20, without missing data.
- Biweekly SNPP VI and GVF also tended lower for those periods including the data gap, but the effect was not as pronounced as for weekly VI.
- This is as expected, since the missing data represent a more significant fraction of the weekly than the biweekly compositing period for VI, and the GVF uses smoothed historical data, both mitigating the effects of the data gap.

Weekly VI NOAA-20 – SNPP differences for data period 20230725-20230801, including SNPP data gap



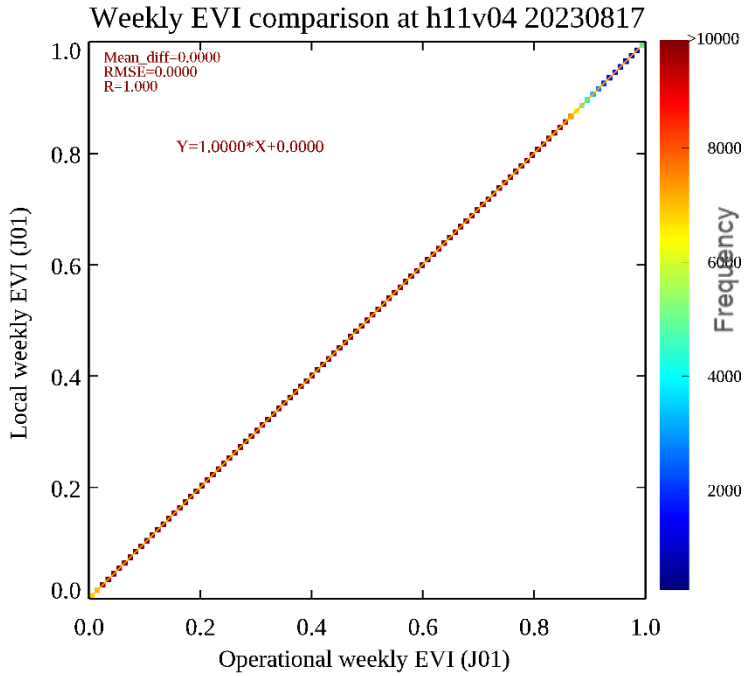


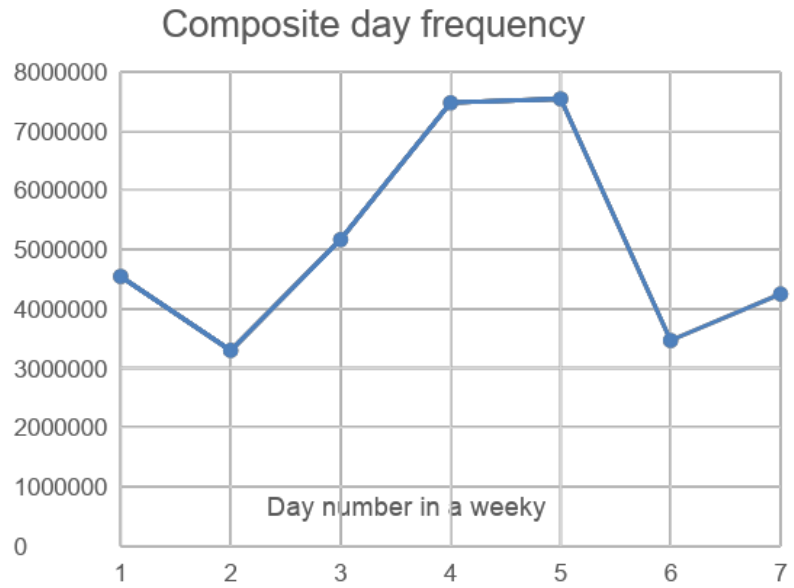


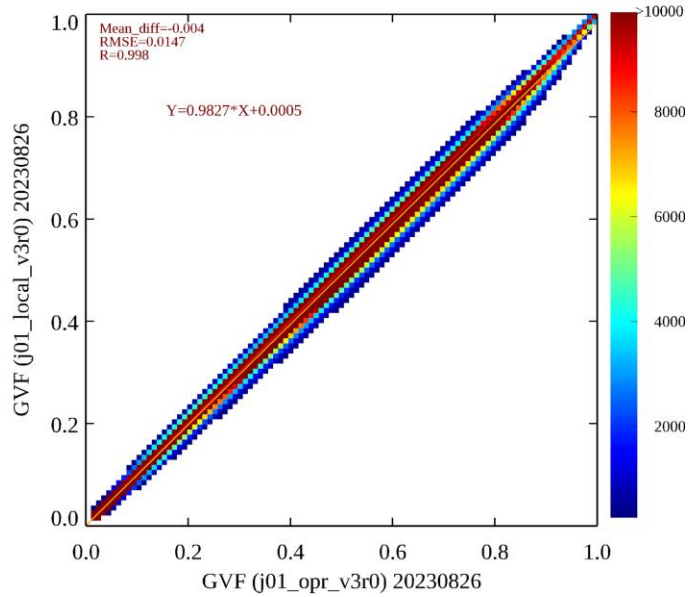
- All SNPP VIs tended to be significantly lower than NOAA-20 VIs for weekly VI period including the data gap
- Biweekly SNPP VI and SNPP GVF were also lower for data periods including the gap, but the differences were more modest.
- After the data gap period, SNPP vs. NOAA-20 VI and GVF differences were comparable to those before the data gap.

Verification of the operational GVF data after NDE fixed the problem

- We reported to OSPO the GVF error in reading in a week of VI daily SR data (only six days of daily SR is ingested to the GVF system)
- NDE fixed the problem on August 18 and OSPO sent operational GVF-EVI and GVF data to us for verification







After fixing, the operational GVF-EVI is identical to local run GVF-EVI

- The weekly EVI is selected from day 1 to day 7 in the week
- There is no missing input data

The difference between operational GVF and local run GVF became smaller after fixing

Land Surface Temperature

August 2023

Accomplishments / Events:

- Finalized the materials for NOAA-21 LST beta review and provided responses to the feedback. The NOAA-21 LST successfully achieved beta maturity.
- Summarized the summer intern's work and presented it during the UMD summer intern celebration event.
- Prepared and submitted an abstract titled "Towards Routine Radiance-Based Validation of VIIRS LST Using GDAS Profiles" to AMS 2024.
- Assembled a DAP package for the update of land surface emissivity, which is currently undergoing test.
- Regarding the development of high spatial resolution LST, we conducted the regression analysis for single channel LST algorithm using VIIRS I-5 band with a spatial resolution of 375 m. (slide 2-4). In addition, we completed the second step of single channel LST correction based on the M-band VIIRS LST. The test granule was generated and its evaluations are underway. (highlight and slide 5-7)
- For the downscaling of VIIRS LST, the methodology and data source have been reviewed and determined. (slide 8)

Overall Status:

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

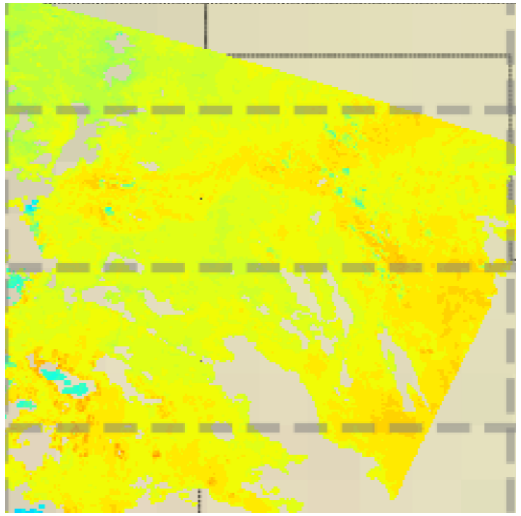
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

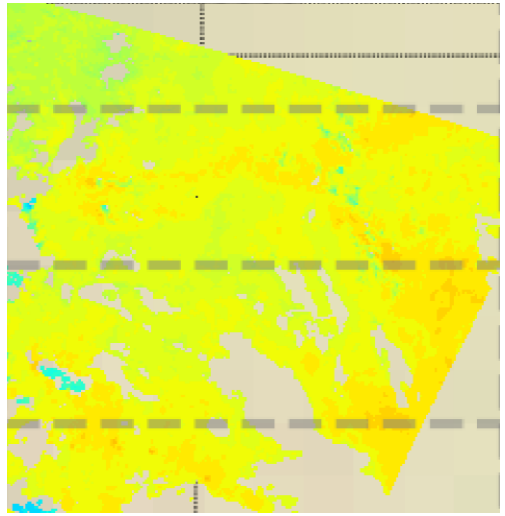
None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Annual products performance report for L2 and L3 VIIRS LST	Dec-22	Dec-22	Dec-22	
Beta review of the NOAA-21 LST	Mar-23	Aug-23	Aug-23	Postponed. Data is not available yet.
All weather LST update	May-23	May-23		Due to priority update, all weather LST update is postponed
FY24 Program Management Review	Jun-23	Jun-23	Jun-23	
Routine monitoring tool and its update	Jul-23	Jul-23	Jul-23	
DAP for NOAA-21 if needed	Aug-23	Aug-23		Postponed. Plan to have LSE update in October
Provisional review of the NOAA-21 LST	Sep-23	Sep-23		

Highlights: I-band LST development: first experiment



I-band



M-band

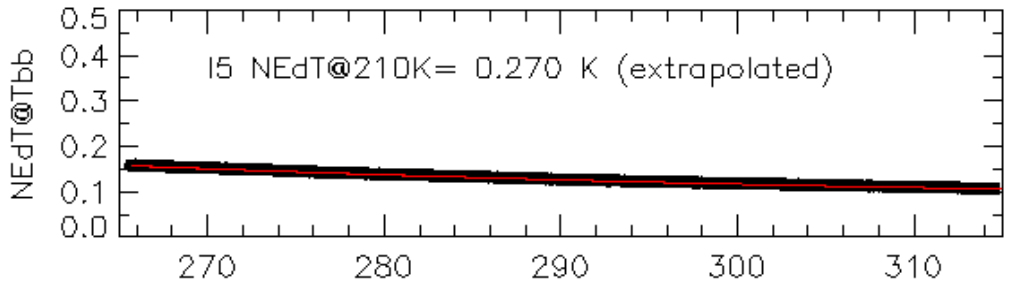
I-band LST provides more details comparing to the M-band LST while maintaining the quality of M-band LST

Single channel LST algorithm

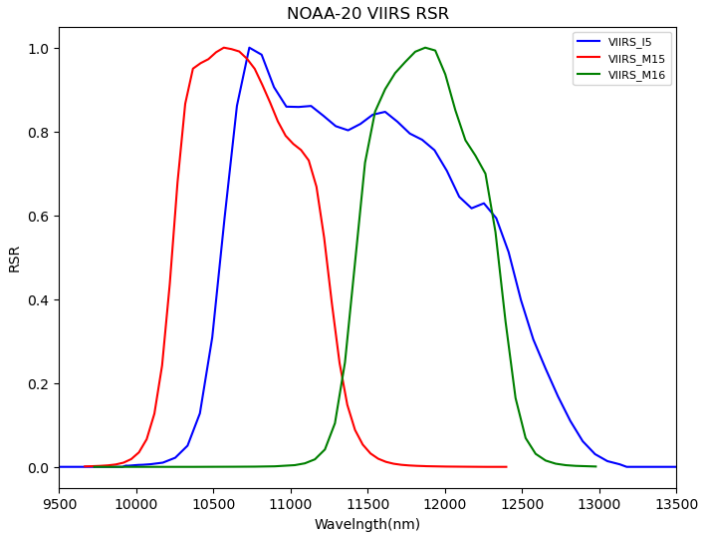
$$\text{LST} = Ai\frac{T_b}{\varepsilon} + Bi\,\frac{1}{\varepsilon} + Ci$$

*Where Tb is brightness temperature of VIIRS I5 band; ε is the emissivity for the same channel (here the mean emissivity of band 15 and band 16 are used) ; Ai, Bi and Ci are regression coefficients determined by the linear regression of radiative transfer simulation performed for 6 classes of TPW (1,2,3,4,5,6) with a step of 1cm and sensor zenith angle ranging from 0 to 75 with a step of 5 degree.

VIIRS Band	wavelength (μm)	Bandwidth (μm)	NEDT/SNR	Dynamic Ranges (W m^{-2} sr^{-1} μm^{-1})	Spatial resolution (m)
I5	11.45	10.5 - 12.4	1.500 K	190-340K	375m
M15	10.763	10.26 - 11.26	0.070 K	190-343K	750m
M16	12.013	11.54 - 12.49	0.072 K	190-340K	



NEDT change with the typical scene temperature

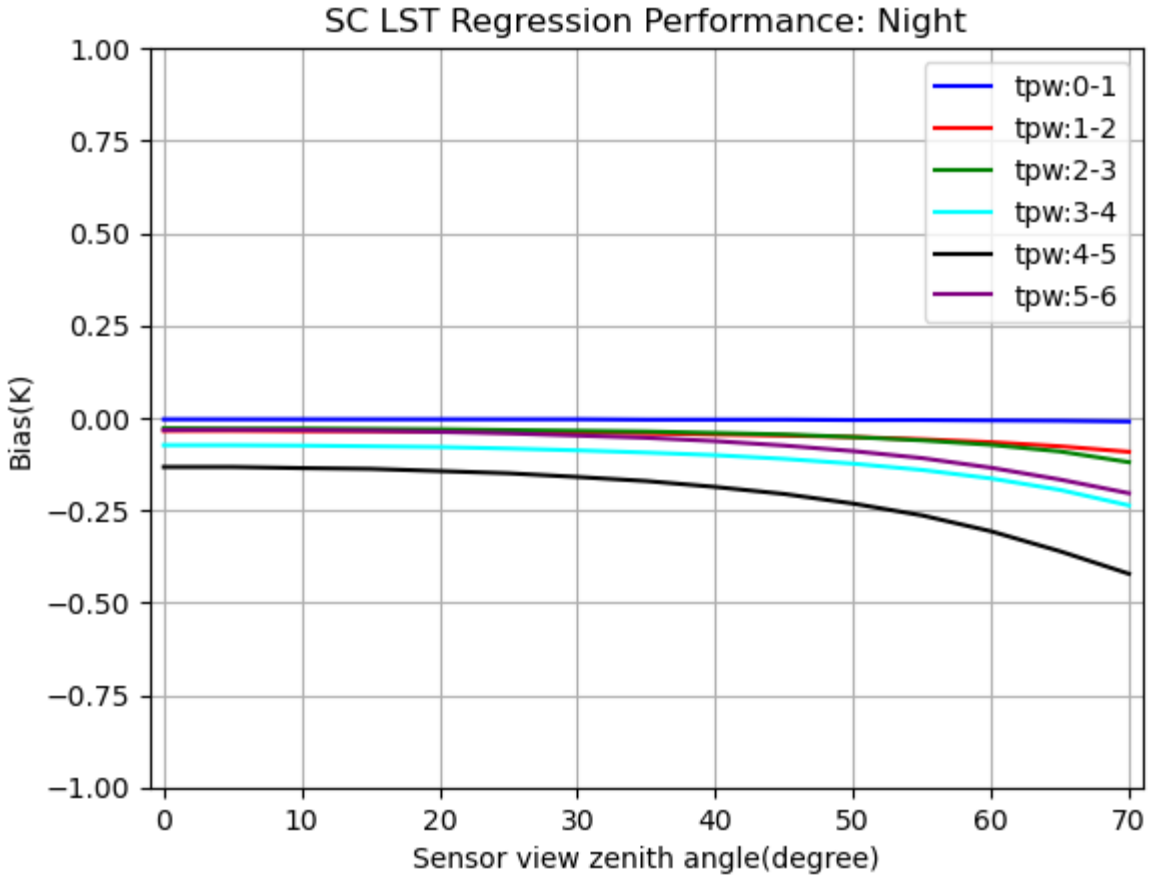


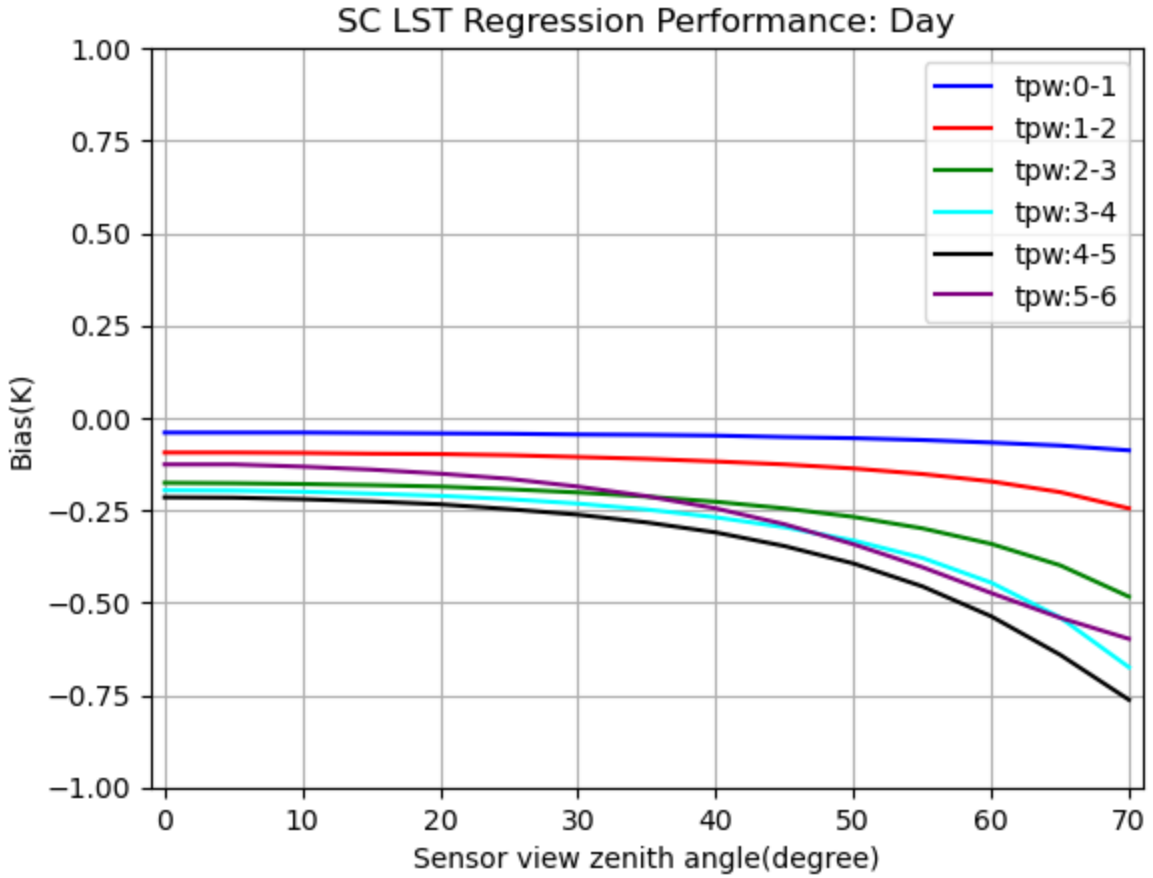
Spectral response function for VIIRS I-5, M15 and M16

- In response to the demand for high spatial resolution LST data in agriculture, we have been dedicated to developing the high spatial resolution LST. The primary approach involves using the I5 band, the only channel that possesses the suitable spectral range as shown above.
- The single channel LST algorithm is reviewed and tested.
- Regarding the high NEDT level for the I5 band, we have consulted with the SDR team. It is confirmed that the NEDT level for a typical scene temperature of 300 K is approximately 0.12 K, which is acceptable for LST derivation.

*Ermida, S.L.; Soares, P.; Mantas, V.; Göttsche, F.-M.; Trigo, I.F. Google Earth Engine Open-Source Code for Land Surface Temperature Estimation from the Landsat Series. *Remot*

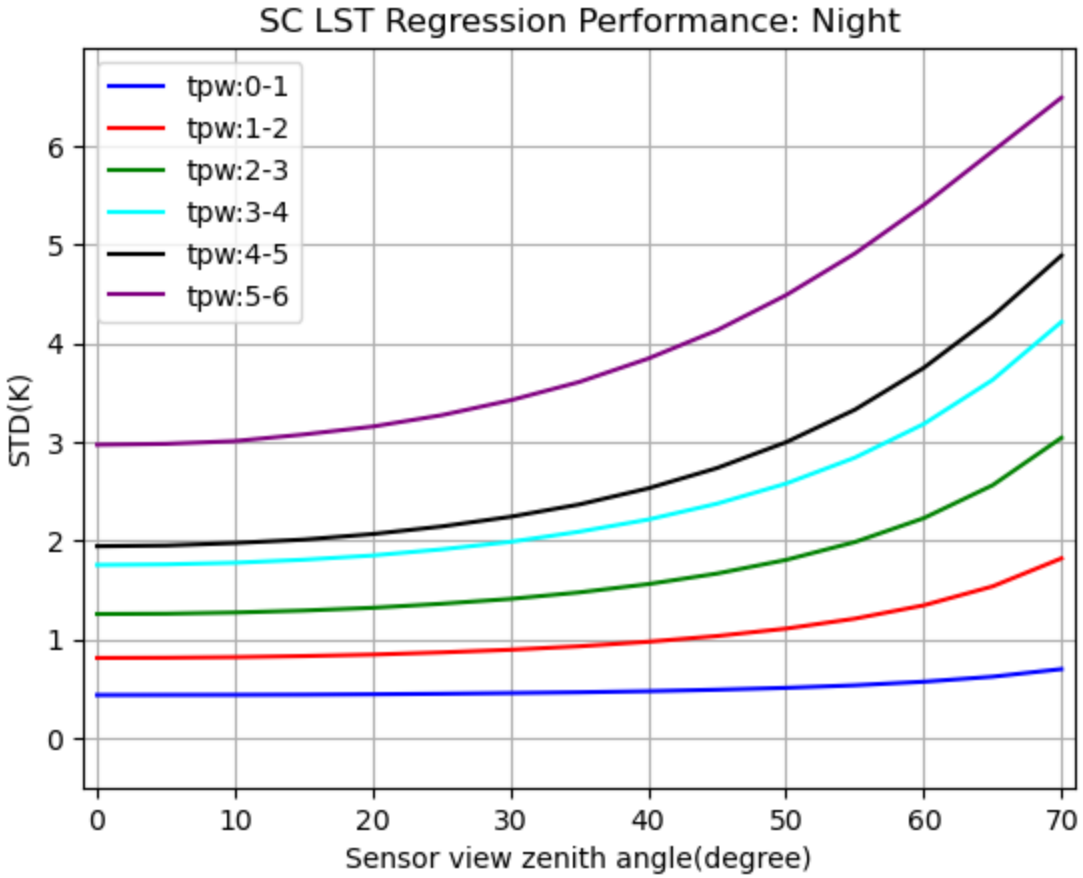
Single Channel LST Algorithm Regression Performance: bias

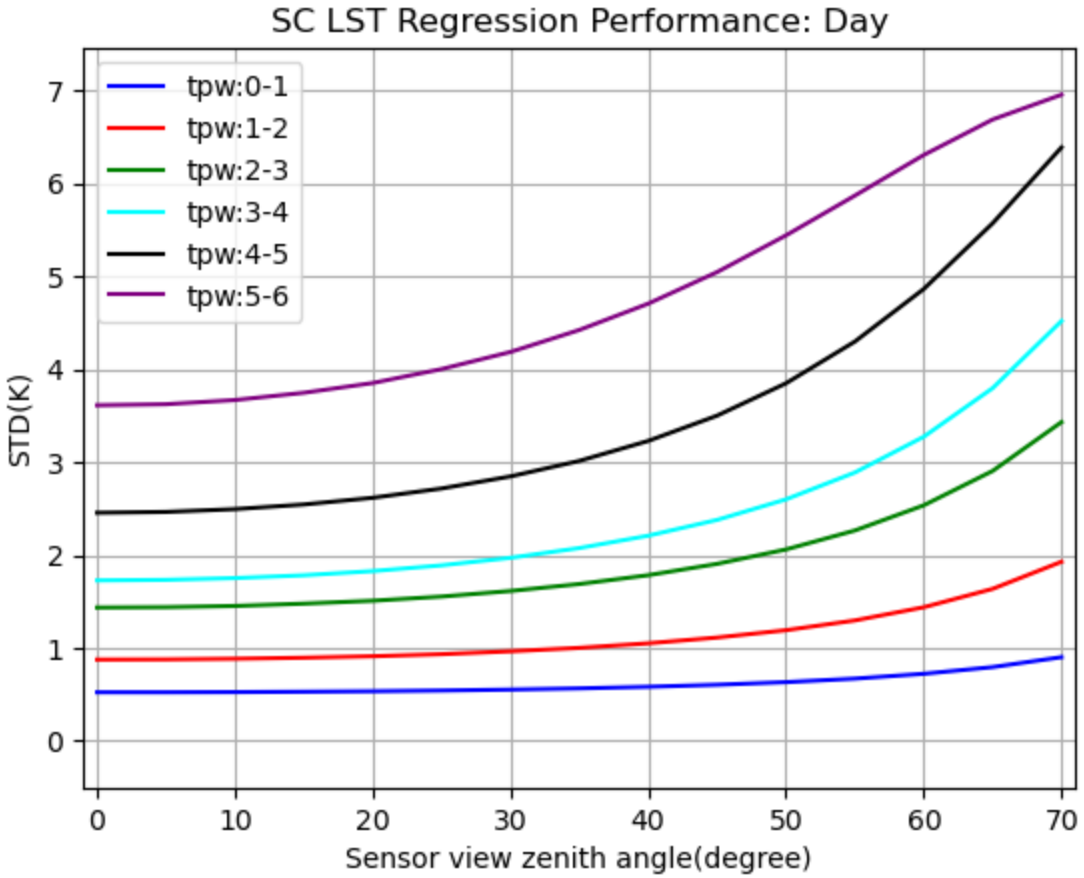




- The regression performance analysis is conducted using the extensive simulation database from SEEBOR profiles.
- The daytime bias is consistently negative with an increase in bias correlated to large angle especially when the angle exceeds 50 degrees.
- The most pronounced bias is observed within the range of tpw 4-5.
- During nighttime, the bias is generally smaller compared to daytime. Additionally the increase in bias with viewing angle is of a less magnitude.

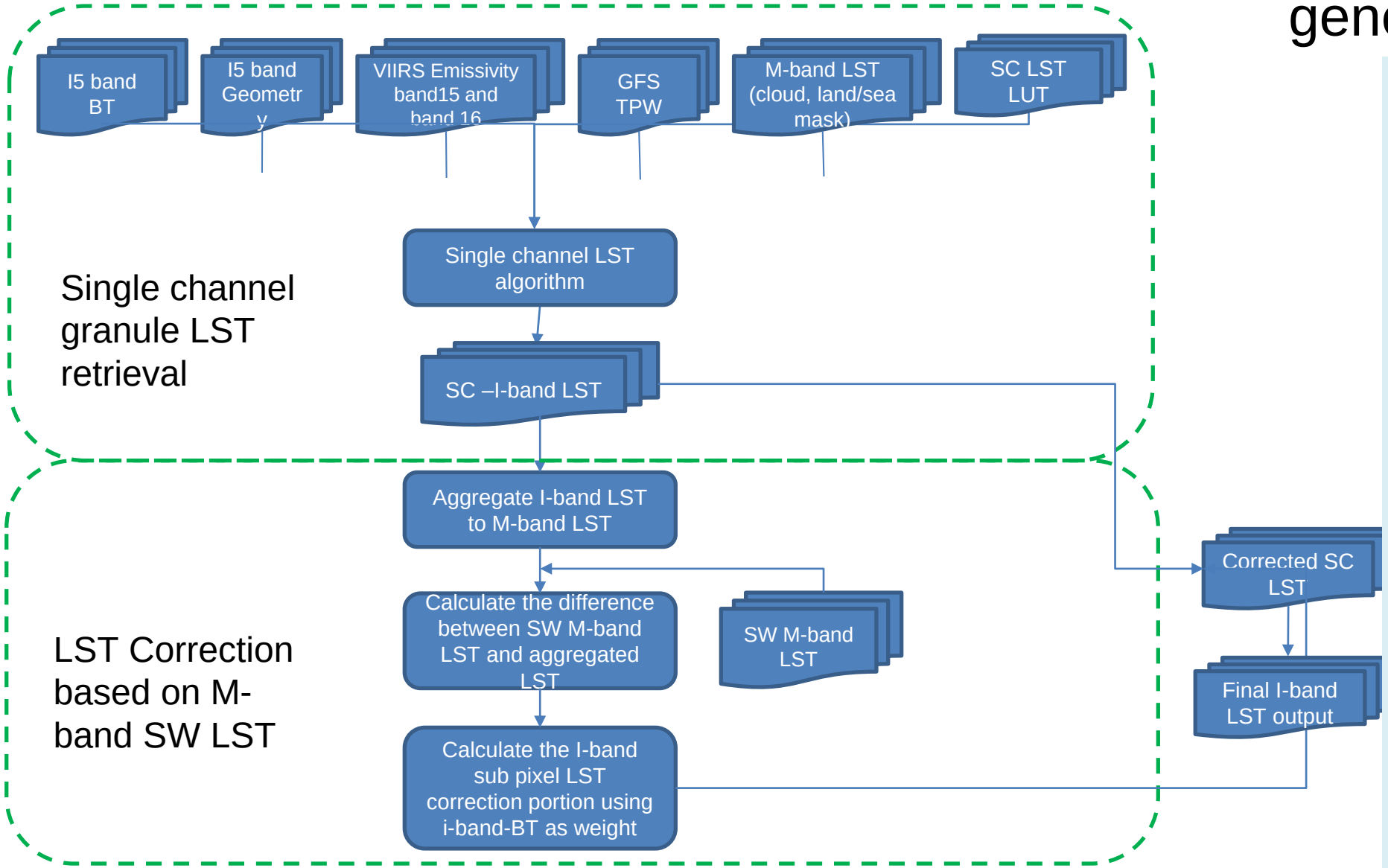
Single Channel LST Algorithm Regression Performance: STD





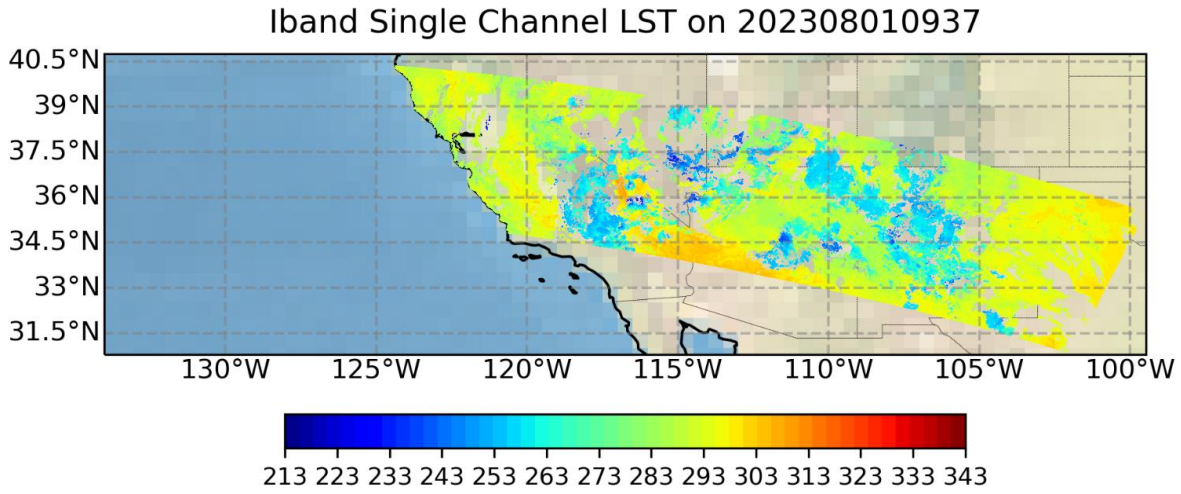
- Daytime STD increases with tpw and viewing angle. The STD remains below 2K when tpw is less than 3cm and the viewing angle is below 50 degrees. However, under combined conditions of high moisture in the atmosphere and a large viewing angle, The STD can reach around 7K.
- During nighttime, similar STD are observed as in the daytime for tpw less than 3 cm. However the STD is smaller for the cases where tpw exceeds 3 cm.

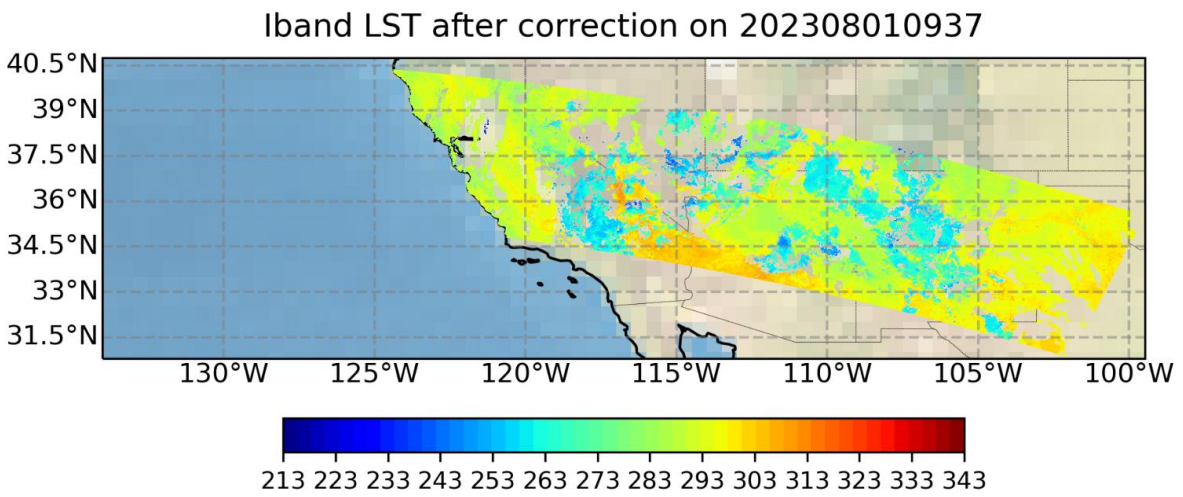
I-band LST generation flowchart

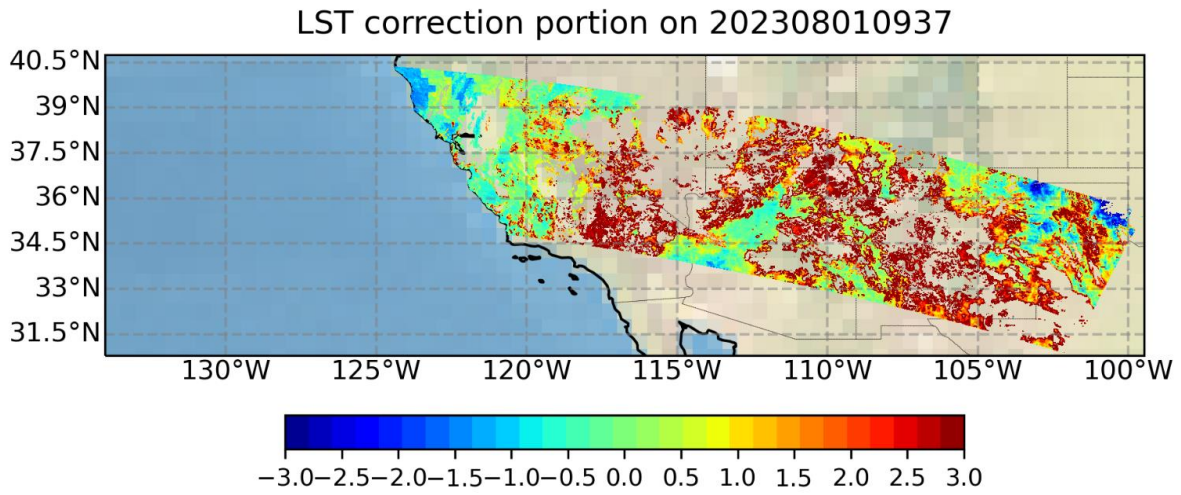


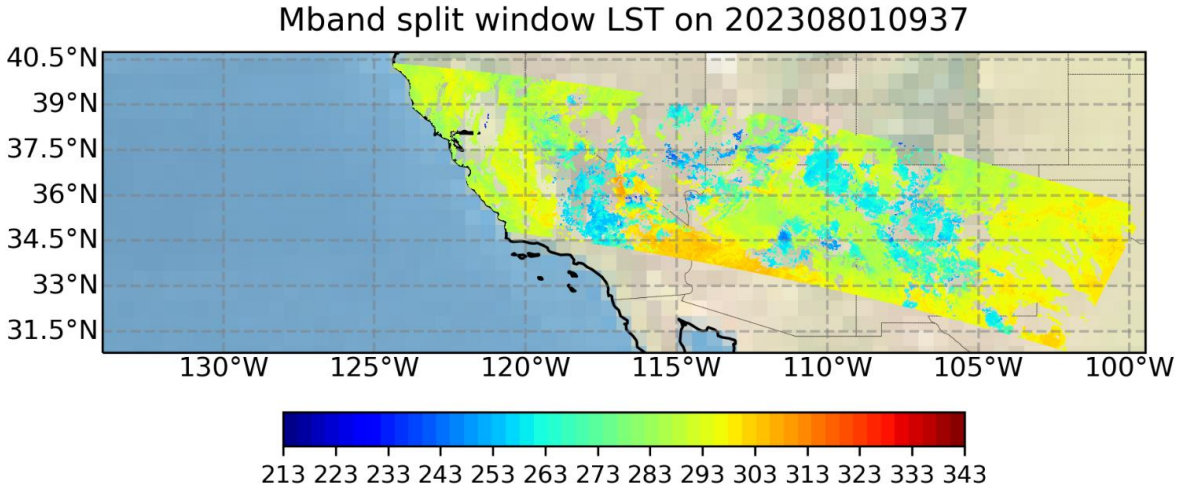
- Due to the significant errors of single channel LST algorithm under moist conditions and at large viewing angle, largely attributed to the inadequate treatment of atmospheric absorption. The M-band LST is employed to correct the LST values generated by the single channel algorithm.
- The first step is to retrieve LST through a single channel algorithm using inputs such as I5 band brightness temperature, geometry, m-band emissivity, GFS Tpw, LST LUT, and M-band LST quality flag which provides details on cloud detection and land-sea mask.
- The second step entails LST correction employing the M-band LST. Generally we first aggregate I-band LST to M-band spatial resolution; then the difference between M-band LST and aggregated LST is computed. After that, the LST correction component is determined using the I-band BT as a weighting function
- The correction value is subsequently added to the LST derived via the single channel LST to yield the final I-band LST.

Granule I-band LST-nighttime case

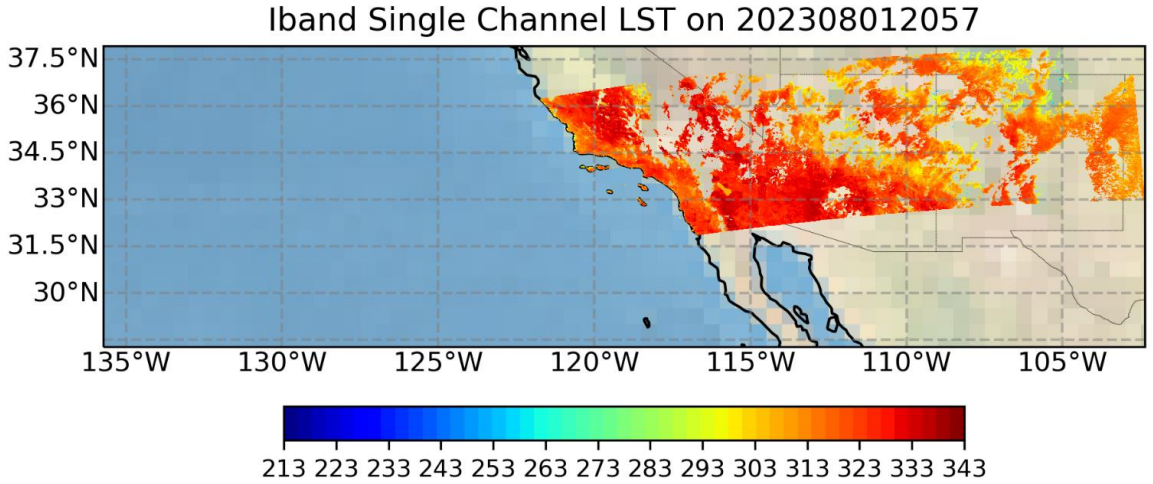


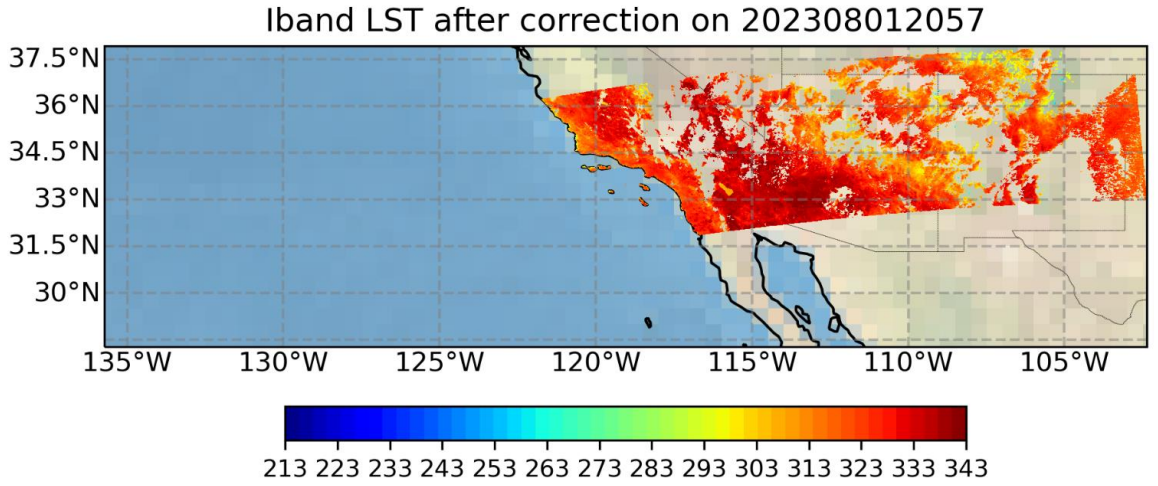


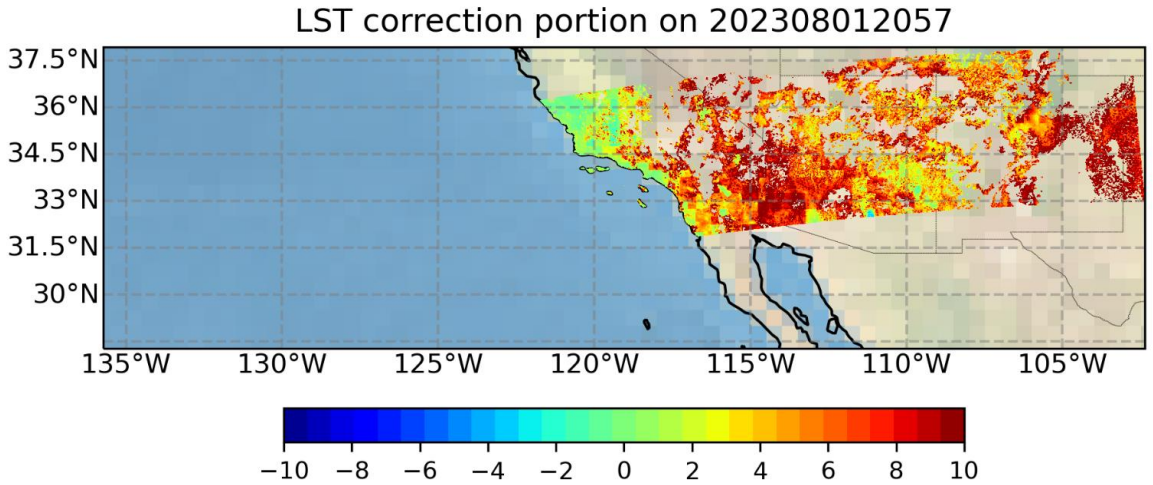


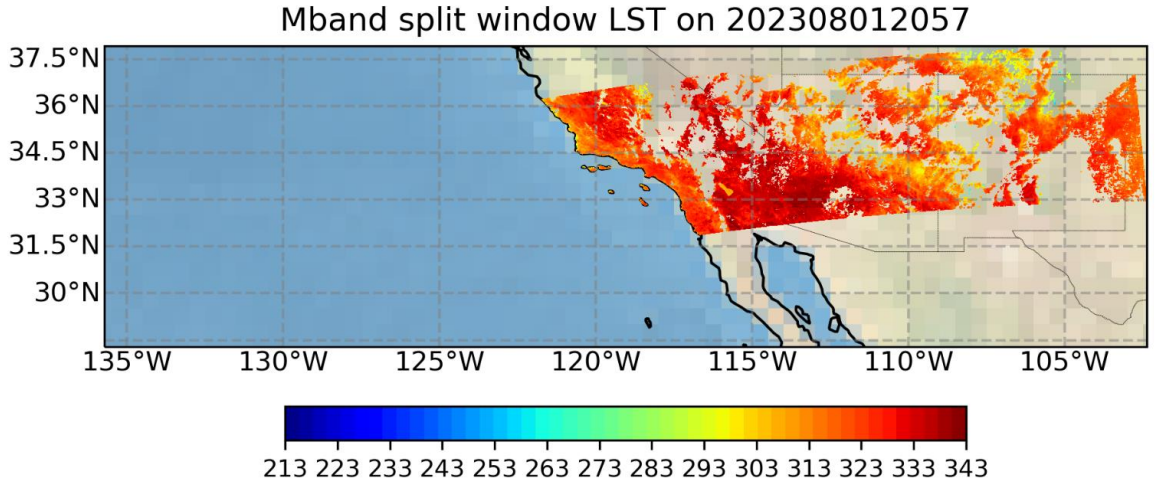


Granule I-band LST-daytime case









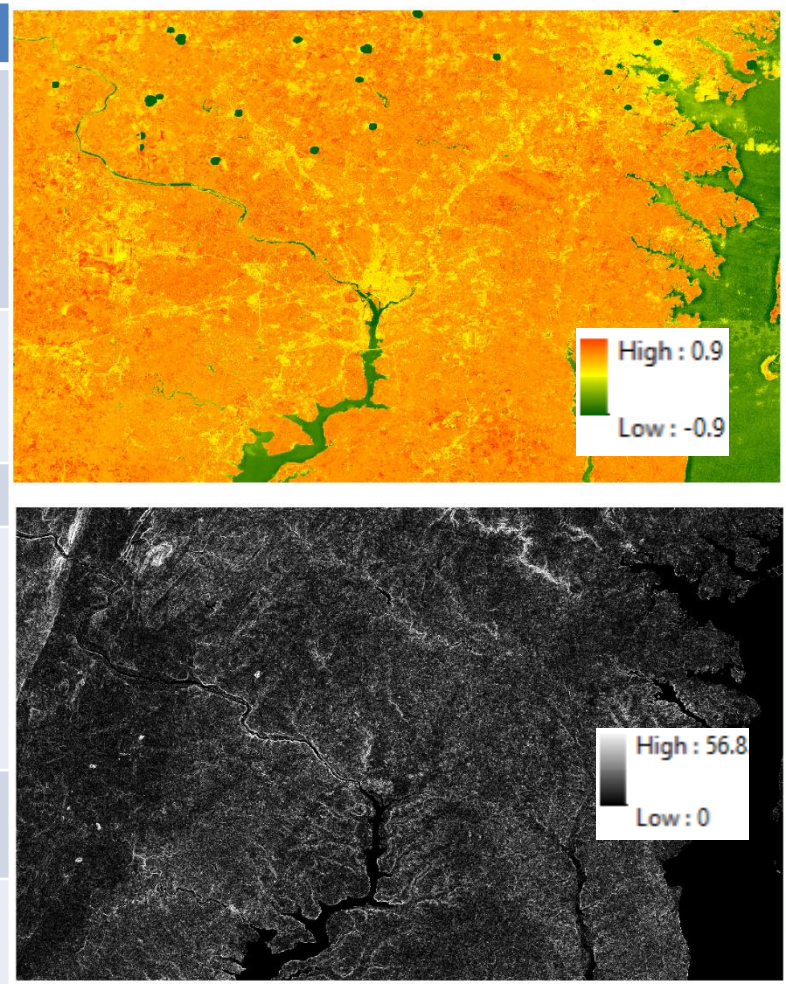
VIIRS LST Downscaling

- Conducted an exploration of downscaling technique to produce high spatial resolution LST based on VIIRS LST.
- Proposed the LST downscaling approach combining geographically weighted regression (GWR) and neural network approaches to effectively downscale VIIRS LST data.
- Downloaded and processed Sentinel-2 NDVI data and SRTM DEM data, scaling them to a spatial resolution of 30 m. The state of Maryland was chosen as the case study area.

The commonly used scaling factors and a subset of available satellite products.

Scaling factors	Products: spatial resolution < 900 m
NDVI	Sentinel-3 OLCI PROBA-V ASTER GED Calculate from Landsat bands VIIRS NDVI
fractional vegetation cover (FVC)	Modis_GLASS
emissivity	ASTER GED
land cover type	FROM_GLC10 based on Sentinel -2 FROM_GLC30 based on Sentinel -2 Esri_Land_Cover_2020_10m ESA_WorldCover10 based on Sentinel-1 and Sentinel 2
digital elevation model (DEM)	SRTM ASTER GED
SAVI, NMDI, NDWI, NDBI	Calculate from Landsat bands

*NDVI and DEM will be used as scaling factors in the downscaling test



Sentinel-2 NDVI data（top) and SRTM slope data (bottom).

Surface Albedo

August 2023

Accomplishments / Events:

- The gap issue in the v2r2 data from NDE has been fixed
- Evaluated the v2r2 data from N21 and confirmed the data is normal. Waiting for the data to be ingested to SCDR
- Introduced the soil albedo progress to the model team

Overall Status:

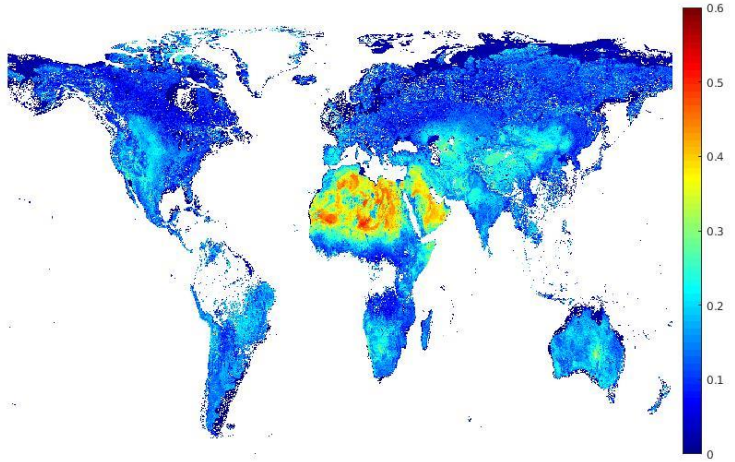
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		X			
Technical / Programmatic		x			
Schedule		X			

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

Issues/Risks:

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Beta review of the NOAA-21 albedo	Mar-23	May-23		JPSS project
PMR review	May-23	Jun-23		
mDAP for NOAA-21 if needed	Aug-23			
Provional review of NOAA-21 Albedo	Sep-23	Mar-24		

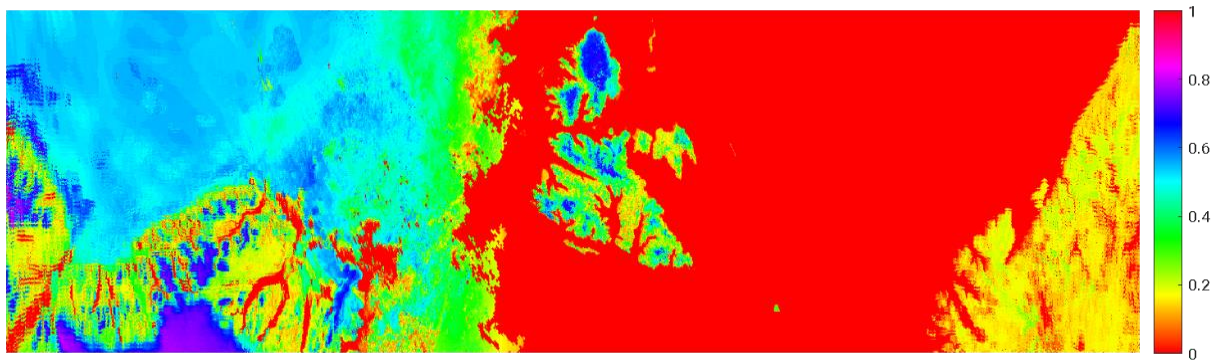
Highlights: Cross-comparison between NOAA-21 and NOAA-20



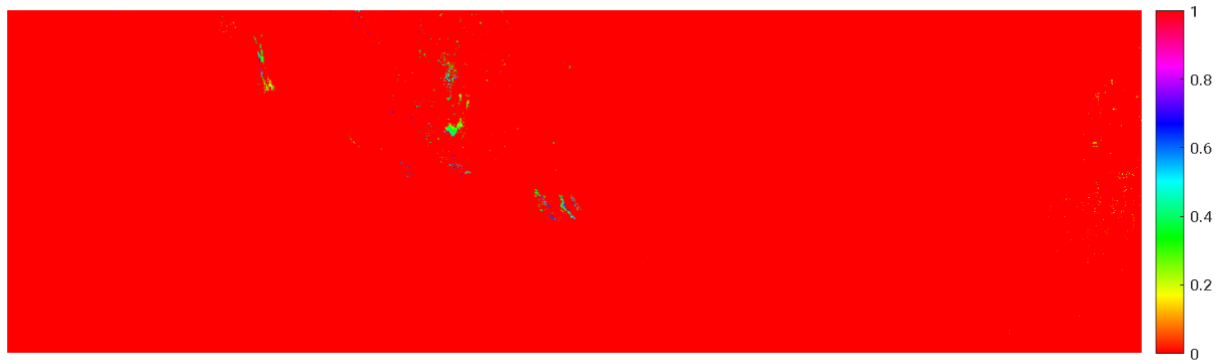
- Shortwave black-sky albedo (SW BSA) is illustrated as an example of our soil albedo dataset
- Great continuity has been achieved over non-vegetated or seasonal vegetation area

Improved v2r2 SURFALB N21 albedo from PDA_IT

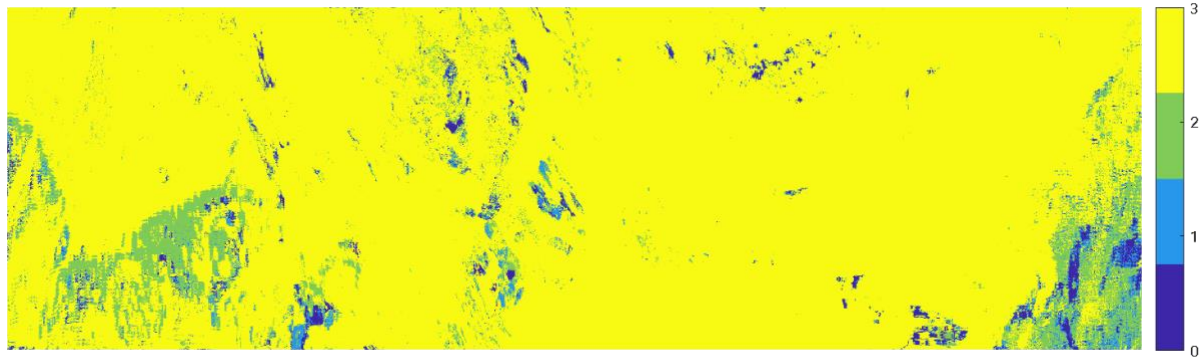
EDR albedo



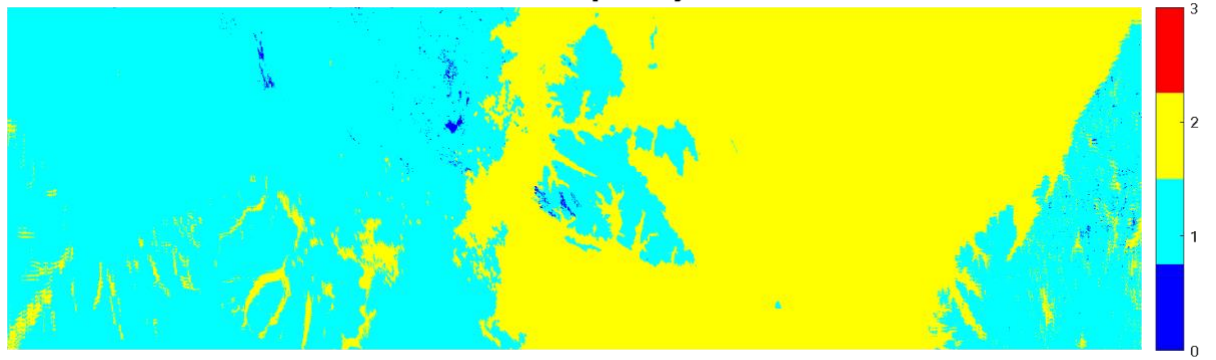
IP albedo



Cloud condition



overall quality



Data metadata:
SURFALB_v2r2_n21_s202308300358054_e202308300359301_c202308300855456.nc

- **When the data was abnormal, the EDR albedo was the same as IP albedo.**
- **After the issue was fixed, the EDR albedo shows more continuous and complete coverage.**

Regression model for bare soil albedo

Deriving soil albedo for bare soil and vegetation pixels respectively

1. For bare soil pixels

   Select bare land pixels using criteria of NDVI <=0.15 & SSI <= -0.25

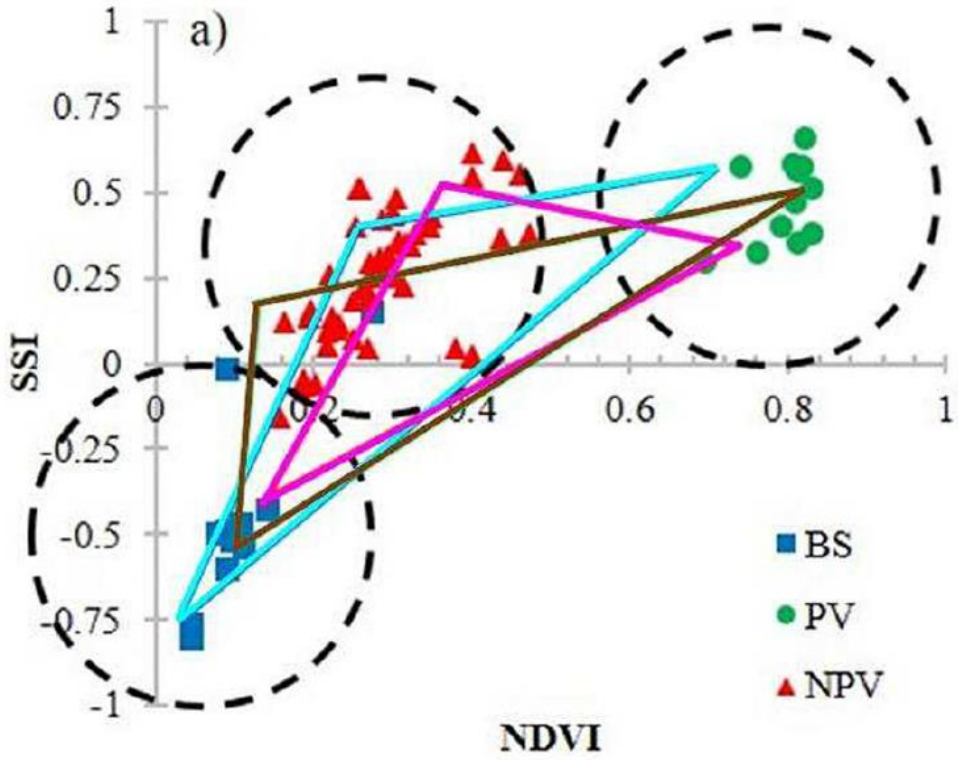
2. For vegetated pixels

   - Veg pixels: f(alb) = a * ln(**NDVI**) + b * **SSI** + c * cos(**SZA**) + d * **NMDI** + e

     Where **NDVI** represents the green vegetation cover, SSI is the Non-Photosynthetic Vegetation (NPV) cover, **SZA** is solar zenith angle, **NMDI** is water content, and e is random error;

   - Essentially, this pixel-wise regression divides the surface albedo variation captured by band reflectance to physical variables, including **vegetation**, **stem/brown foliage**, **solar angle**, and **water**.

   - Set **NDVI** = 0.15 and **SSI** = -0.25, remove the impact from green veg and stem to get soil albedo. This is an extrapolation from a linear regression model.



NPV, BS, and PV clusters (circle with dashed line) could be grouped in a feature space of SSI and NDVI

3. Calculate the means of soil albedo value in multiple years for all pixels

Advantages of our soil albedo map

1) Many details!
2) Global coverage, 500m spatial resolution
3) Compared to the previous soil albedo map used in Land surface models (e.g., CABLE), this result considers the impact of solar zenith angle (SZA), NPV, and water;
4) Visible/Near-infrared/Shortwave BSA/WSA soil maps are planned to be generated, and spectral soil albedo maps (corresponding to MODIS bands 1 - 7) can be provided upon request. *Simulations show that considering the hyperspectrally resolved soil reflectance leads to increased maximum daily temperatures (Braghiere, 2023)*

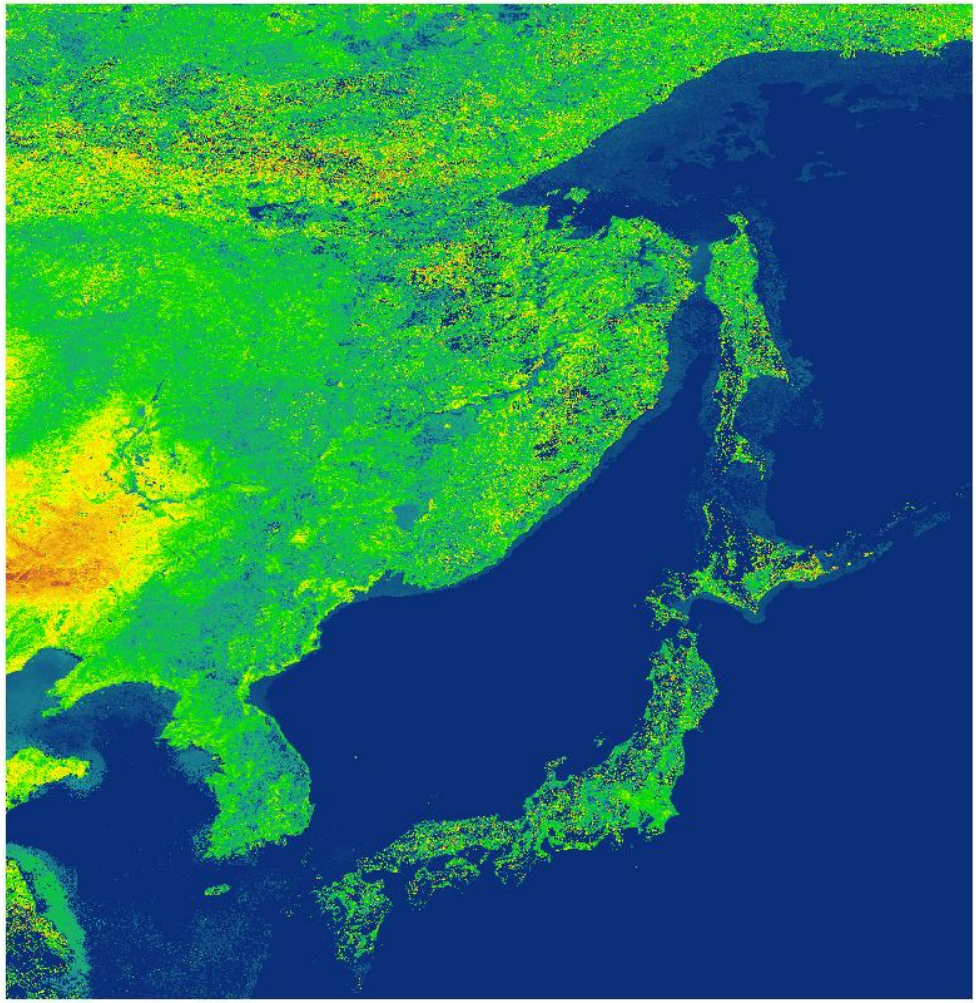
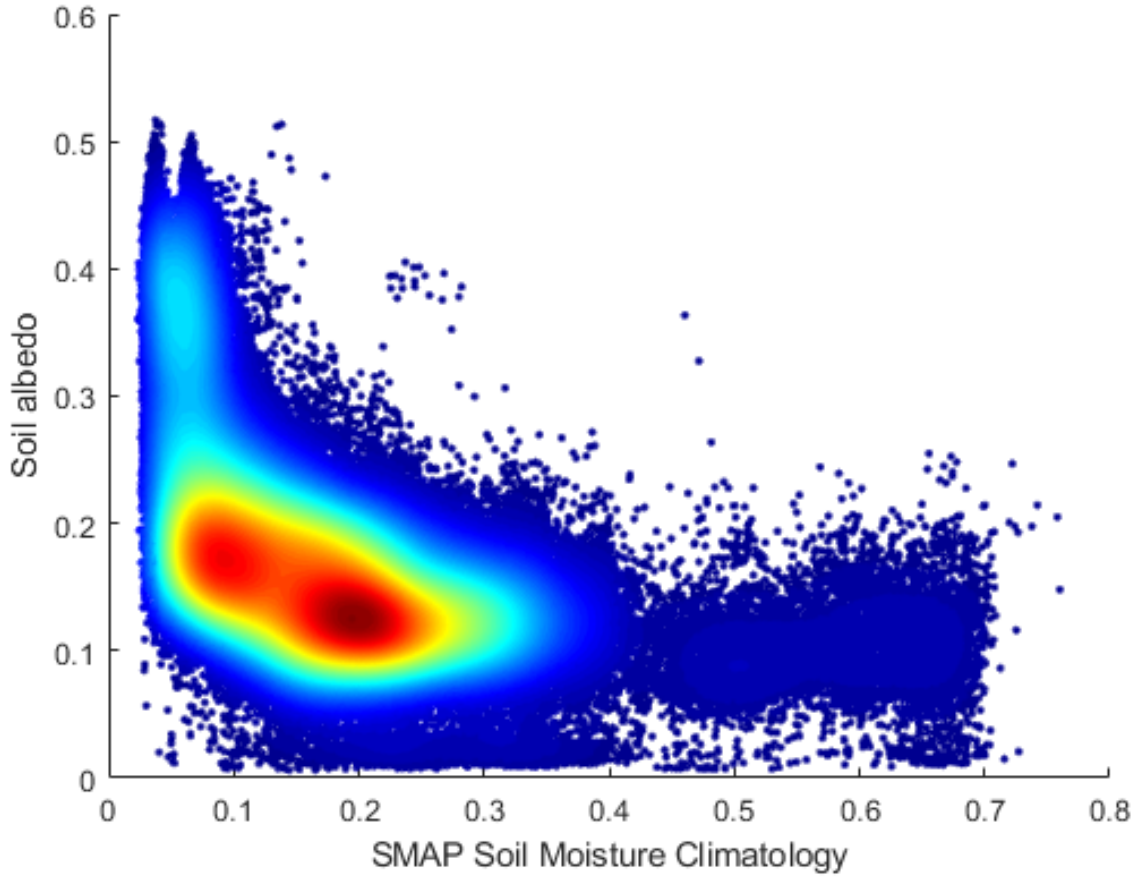


Figure Regional soil albedo map over part of northeast Asia and Far East, show great details

Global Soil albedo vs. Global Soil Moisture



Soil albedo (BSA_shortwave) shows a clear negative and non-linear correlation with soil moisture, which matches the previous regional studies.

Comparing with a linear regression model, the binary lookup table only represents two scenarios, which seems a bit too simple.