NOAA JPSS Monthly Program Office

AMP/STAR FY23 TTA

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& JPSS STAR Program Manager (on Detail)

Dec, 2022

Highlights from the Science Teams (November)

NOAA-21 Post-Launch Monitored by ICVS

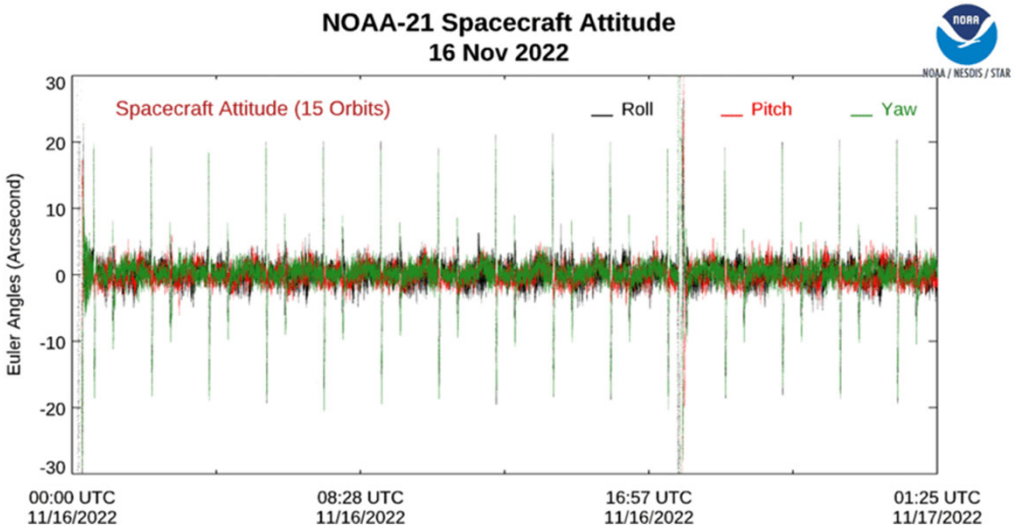


Figure. NOAA-21 satellite attitude monitoring in roll, pitch, and yaw directions on November 16th, 2022. The unusually large deviations in these values are due to pre-planned post-launch spacecraft maneuvers.

JPSS-2 was successfully launched on November 10 and officially renamed to NOAA-21 on November 16. ICVS has been updated to provide a near real time monitoring of NOAA-21 satellite spacecraft on-orbit health status and attitude monitoring service for the JPSS mission. This information may greatly help STAR JPSS instrument Cal/Val teams, the flight team and other NOAA-21 mission teams learn the satellite attitude and aboard instrument pre-activation status. Some instrument dependent temperatures, obtained from Spacecraft Telemetry RDR datasets, are also supplied in the ICVS NOAA-21 LTM password protected web site (https://www.star.nesdis.noaa.gov/icvs-beta/) to demonstrate the pre-activation status of aboard instruments including ATMS, CrIS, VIIRS, and OMPS.

Highlights from the Science Teams (November)

NOAA-21 ATMS First Light Imagery

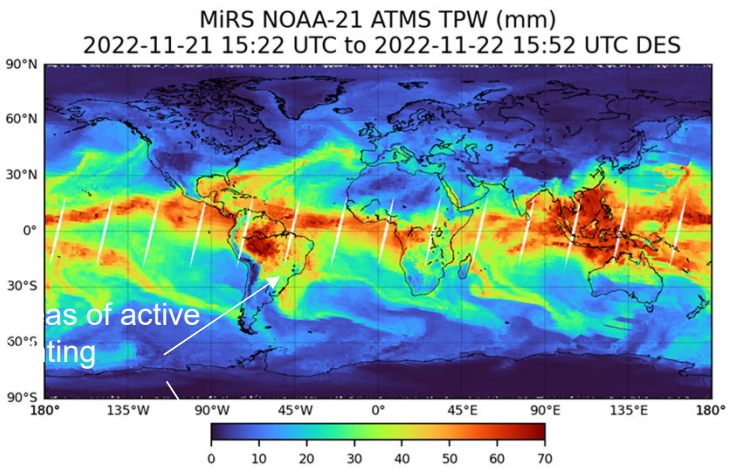


Figure. First light imagery of MIRS TPW from November 21-22, 2022.

On November 23, 2022 - 12 days after launch - the first light imagery from NOAA-21's ATMS and several derived products was released. These images, created at STAR, are the first glimpses at the high quality data from ATMS that will be used to improve numerical weather prediction among other uses. In addition to imagery of Channel 18 radiances, STAR scientists also produced first light imagery of the MIRS Total Precipitable Water and the MIRS Snowfall Rate - both of which are created using data from ATMS. In the next few weeks, STAR scientists will produce first light imagery from the VIIRS, CrIS, and OMPS as those instruments come on line

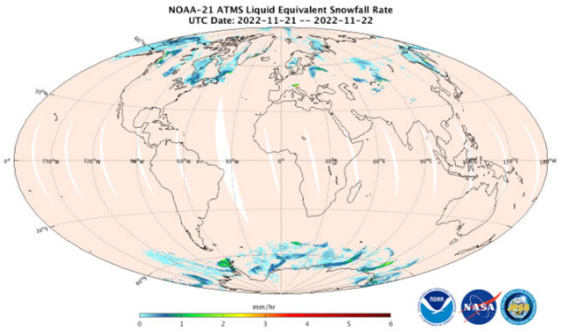


Figure. First light imagery of the ATMS derived Snowfall Rate from November 21-22, 2022.

Highlights from the Science Teams (November)

NOAA-21 ATMS declared Beta

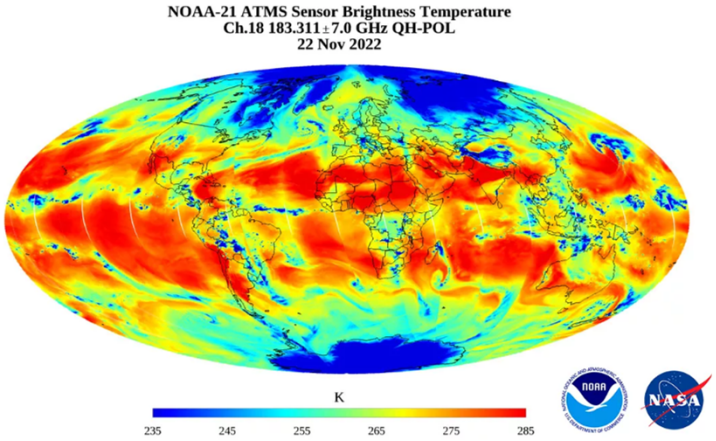


Figure. ATMS Channel 18 brightness temperature for November 22.

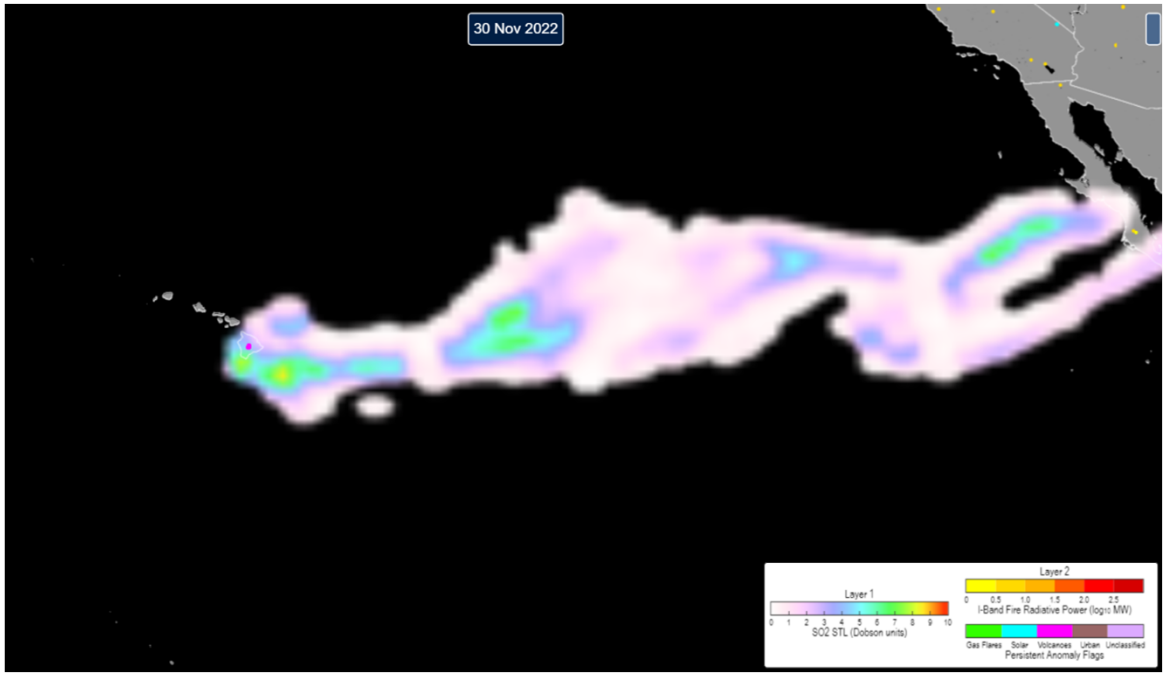
The ATMS team has worked intensively for post-launch instrument performance optimization and ATMS science data pre- and post-launch calibration and validation. The preliminary assessment of ATMS science data proves:

- On-orbit NE∆T is consistent with pre-launch analysis results and meets specification with margins;
- Channel striping noise and correlation have been assessed and are improved compared to those of previous builds;
- NOAA-21 and NOAA-20 TDR-to-TDR nadir comparisons show agreement between 0 to 0.5 K across all channels (N-21 has a slight warm bias).
- NOAA-21 has similar TDR bias as NOAA-20 when comparing against ECMWF/CRTM
- NOAA-21 MiRS is comparable with NOAA-20 MiRS

Based on the assessment results, NOAA-21 ATMS science data quality has met the Beta Maturity requirements. It has been declared that NOAA-21 ATMS TDR and SDR beta maturity effective from 20:05:01 UTC on November 22.

Highlights from the Science Teams (November)

Mauna Loa Eruption Viewed from JPSS Satellites



On November 27, Hawaii's largest volcano – Mauna Loa – began erupting. These eruptions, though not significantly explosive, have none the less released a significant amount of lava onto the slopes of the island and SO2 into the atmosphere. Both are able to be monitored from the JPSS satellites. The figure, taken from JSTAR Mapper, shows the a plume of Sulfur Dioxide being lofted over the eastern Pacific. The purple spot on the island of Hawaii is the lava flow, as seen through the Fire Radiative Power product. In this case, the hot spot is displayed in purple because it is flagged as a persistent anomaly (volcano) rather than a wild fire.

Accomplishments

Delivery Date	Delivery Algorithm Packages (DAPs) – Enterprise Products:	Recipient
11/01/2022	Offline LSA VIIRS albedo climatology LUT replacement	NDE
11/01/2022	Patch to SuperDAP to adjust valid ranges of variables	NDE
11/15/2022	NVPS VI Preliminary CCAP Delivery for SCR by OSPO	NCCF
11/15/2022	NVPS GVF Preliminary CCAP to OSPO for SCR	NCCF
11/15/2022	JPSS Cloud Base Height/Cloud Cover Layers Patch CCAP Delivery	NCCF
11/16/2022	IMS/SSMI Snow Mask Prelim CCAP to OSPO for SCR	NCCF
11/16/2022	JPSS Fractional Snow Cover Final CCAP	NCCF
11/16/2022	JPSS Ice Age/Concentration Final CCAP	NCCF
11/18/2022	JPSS Volcanic Ash Final CCAP Delivery. No scientific changes since the VIIRS “Super DAP” v3r2 delivery to NDE	NCCF
11/23/2022	MiRS v11.8 Final CCAP Patch to address GFS issues	NCCF

Accomplishments – JPSS Cal Val Support

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

S-NPP	Weekly OMPS TC/NP Dark Table Updates	11/08/22, 11/15/22, 11/22/22, 11/28/22, 12/06/22
NOAA-20	Weekly OMPS TC/NP Dark Table Updates	11/08/22, 11/15/22, 11/22/22, 11/28/22, 12/06/22
S-NPP	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	11/08/22, 11/22/22, 12/06/22
NOAA-20	Bi-Weekly OMPS NP Wavelength & Solar Flux Update	11/15/22, 11/29/22
S-NPP	Monthly VIIRS LUT Update of DNB Offsets and Gains	11/28/22
NOAA-20	Monthly VIIRS LUT Update of DNB Offsets and Gains	11/28/22

Upcoming NOAA-21 Cal/Val Maturity Reviews

- **December, 2022 Maturity Review:**
  - ATMS TDR/SDR (Provisional Maturity)

- **January, 2023 Maturity Review:**
  - VIIRS SDR (Beta Maturity, TBC)
  - VIIRS KPP Imagery EDRs (Beta Maturity, TBC)
  - CrIS SDR (Beta Maturity)
  - OMPS SDR (OMPS-NP & OMPS-TC, Beta Maturity)

- **February, 2023 Maturity Review:**
  - VIIRS SDR ((Provisional Maturity)
  - CrIS SDR ((Provisional Maturity)
  - OMPS SDR (OMPS-NP & OMPS-TC, (Provisional Maturity)
  - VIIRS KPP Imagery EDRs ((Provisional Maturity)
  - VIIRS non-KPP Imagery EDRs (Beta Maturity)
  - OMPS Ozone EDR (V8Pro & V8TOz, Beta Maturity)

Upcoming Milestones/Deliveries

- JSTAR Code/LUT/Product Deliveries:

  DAP to DPMS:
  - Jan-23: ATMS J2 PCT updates (as needed)
  - Jan-23: CrIS J2 Eng Pkg update delivery
  - Jan-23: VIIRS J2 LUTs update delivery
  - Jan-23: OMPS J2 LUTs update delivery

  NOAA-20/JPSS-2 Algorithm DAP to NCCF: (only two remainig for J2-Ready)
  - Nov-22: J2-ready OMPS LP DAP to ASSISTT (Science team yet to deliver, December)
  - Mar-23: J2-ready OMPS LP DAP to NCCF (ASSISTT ➔ NCCF)
  - Mar-23: J2-ready Ocean Color DAP to NCCF (ASSISTT ➔ NCCF)

FY23 STAR JPSS Milestones

Milestones	Original Date (column I)	Forecast Date	Actual Completion Date	Variance Explanation
Algorithm Updates DAPs/CCAPs				
ATMS J2 PCT updates (as needed)	Jan-23	Jan-23		
CrIS J2 Eng Pkg update delivery	Jan-23	Jan-23		
VIIRS J2 LUTs update delivery	Jan-23	Jan-23		
OMPS J2 LUTs update delivery	Jan-23	Jan-23		
OMPS LP J2 ready DAP (to NCCF)	Mar-23	Mar-23		
Ocean Color J2 ready DAP (to NCCF)	Mar-23	Mar-23		
CCAP to NCCF (Aerosol AOD & ADP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (CM,Phase, Height, CBH, CCL, COMP)	Oct-22	Oct-22	10/26/22	
CCAP to NCCF (VPW, Cryosphere, Volcanic Ash)	Nov-22	Nov-22	VPW not Delivered 11/15/2022, 11/18/2022	
CCAP to NCCF (LST, LSA)	Nov-22	Nov-22	Delayed to 12/15/2022	
CCAP to NCCF (VI, GVF)	Nov-22	Nov-22	11/15/2022	
CCAP to NCCF (MiRS, OMPS NP V8Pro)	Jan-23	Jan-23	MiRS:12/31; OMPS 01/31	
CCAP to NCCF (HEAP, N4RT)	Mar-23	Mar-23		
CCAP to NCCF (ACSPO SST)	Apr-23	Apr-23		
Enterprise Fires	Apr-23	Apr-23		
CCAP to NCCF (VH, VOLCAT Phase 1, OMPS V8TOz)	May-23	May-23		
CCAP to NCCF (Gridded Land)	Jul-23	Jul-23		
CCAP to NCCF (Cloud Provisional)	Jul-23	Jul-23		

FY23 STAR JPSS Milestones

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

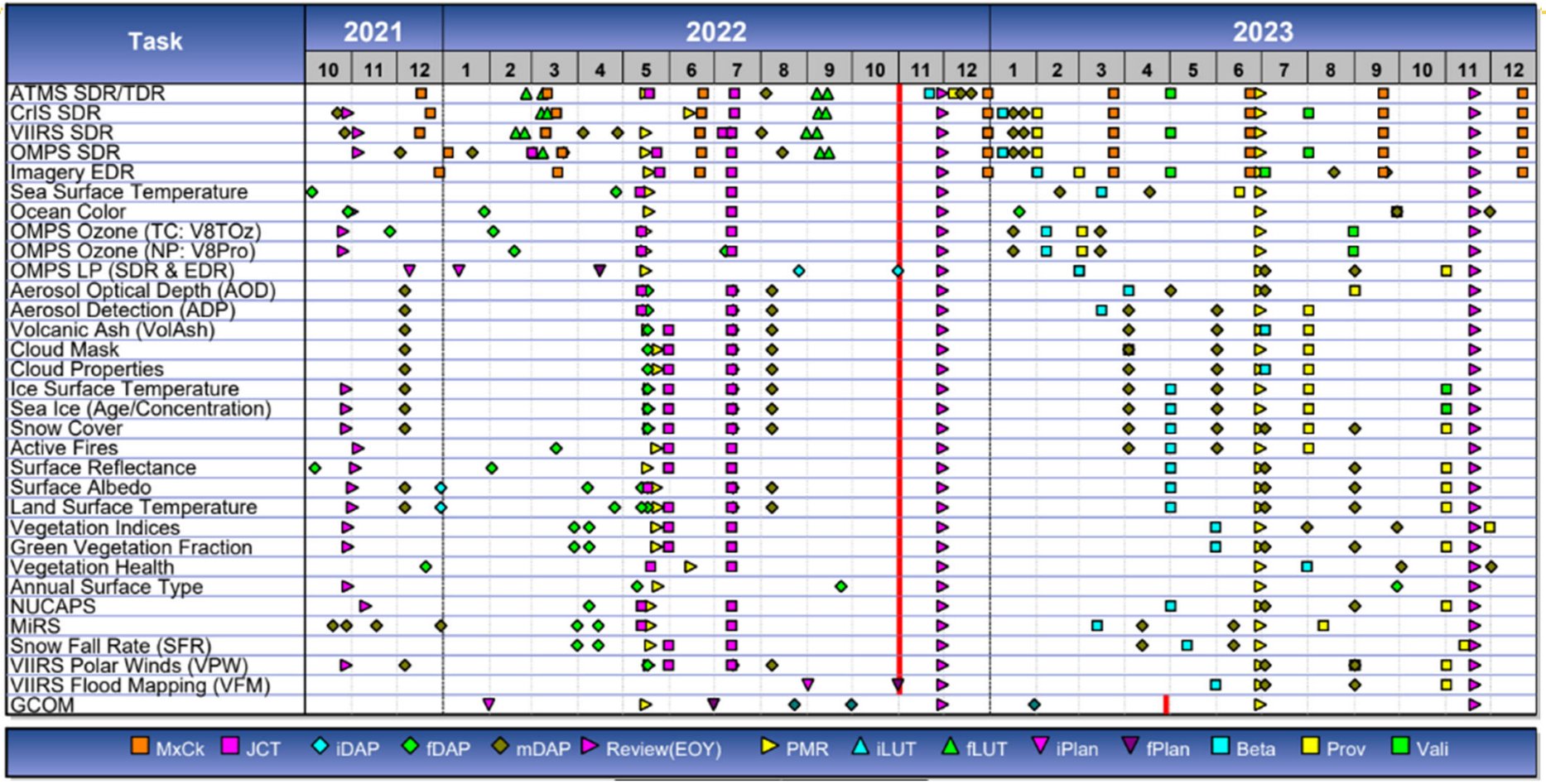
FY23 STAR JPSS Milestones

Milestones	Original Date	Forecast Date	Actual Date	Variance Explanation
NOAA-21 Cal/Val Maturity Reviews				
ATMS TDR/SDR (B/P: Dec-2022; V: May-2023)	May-23	May-23	Beta Achieved 11/30	
CrIS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	Aug-23	Aug-23		
VIIRS SDR (B: Dec-22; P: Feb-23; V: May-23)	May-23	May-23		
OMPS SDR (B: Jan-23; P: Feb-23; V: Aug-23)	Aug-23	Aug-23		
KPP VIIRS Imagery (B: Jan-23; P: Feb-23; V: May-23)	May-23	May-23		
Non-KPP VIIRS Imagery (B: Feb-23; P: Mar-23; V: Jul-23)	Jul-23	Jul-23		
Clouds (B: CM: Apr-23; Others: Jul-23; P: Aug-23)	Aug-23	Aug-23		
Aerosol AOD (B: Apr-23; P: Sep-23)	Sep-23	Sep-23		
Aerosol ADP (B: Mar-23; P: Aug-23)	Aug-23	Aug-23		
Volcanic Ash (B: Jul-23; P: Aug-23)	Aug-23	Aug-23		
Cryosphere (B: May-23; P: Aug-23 for Sea Ice & Binary Snow)	Aug-23	Aug-23		
Active Fires (B: May-23; P: Aug-23)	Aug-23	Aug-23		
LST/LSA/SR/GVF/VI (B: May-23)	May-23	May-23		
Vegetation Health (B: Jul-23)	Jul-23	Jul-23		
Ocean Color (B: Sep-23)	Sep-23	Sep-23		
SST (B: Mar-23; P: Jun-23)	Jun-23	Jun-23		
VPW (B: Sep-23)	Sep-23	Sep-23		
VFM (B: May-23)	May-23	May-23		
NUCAPS (B: May-23)	May-23	May-23		
MiRS (B: Mar-23; P: Aug-23)	Aug-23	Aug-23		
SFR (B: May-23)	May-23	May-23		
OMPS NP EDR V8Pro & V8TOz (B: Feb-23; P: Mar-23)	Mar-23	Mar-23		
OMPS LP (B: Mar-23)	Mar-23	Mar-23		

FY23 STAR JPSS Milestones

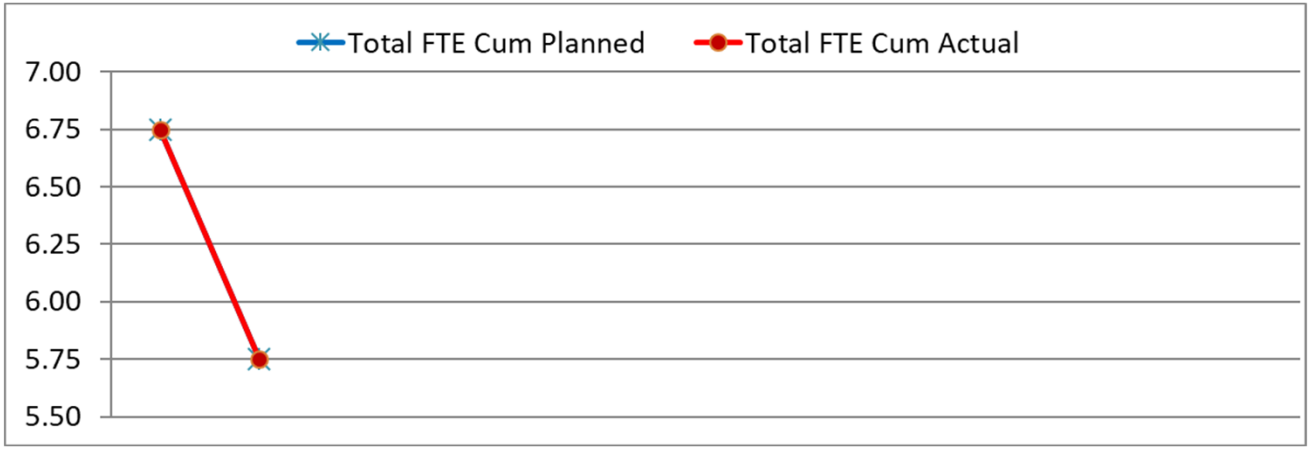
Milestones	Original Date	Forecast Date	Actual Completion Date
Operational/Program Support			
S-NPP: Weekly OMPS TC/NP Dark Table Updates	Weekly	Weekly	**10/04/22, 10/12/22, 10/19/22, 10/26/22, 11/01/22, 11/08/22,** 11/15/22, 11/22/22, 11/28/22, 12/06/22
S-NPP: Bi-Weekly OMPS NP Wavelength & Solar Flux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

STAR JPSS Schedule: TTA Milestones



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

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										
Cum Planned (WYE)	5.75	4.75										
Cum Actual (WYE)	5.75	4.75										
Total FTE Cum Planned	6.75	5.75										
Total FTE Cum Actual	6.75	5.75										

CS: Alisa Young (on detail)
WYE: Qingyuan Richard Zhang (Corp)
Prasanjit Dash (SOCD)
Michael Cheeseman (SMCD)
Murty Divakarla (25%)
Tom Atkins (50%)
Tess Valenzuela (RMD)
awaiting Quality Assurance Analyst

Color code:

Green: **Completed Milestones**

Gray: **Ongoing FY23 Milestones**

ATMS SDR

November 2022

Accomplishments / Events:

- Attended JPSS-2 User Science Workshop to present ATMS readiness status.
- Worked closely with MIT/LL, NASA, and NGAZ ATMS teams to work on NOAA-21 ATMS post-launch test (PLT) data sets for data quality evaluation.
- Produced the NOAA-21 ATMS first light image for NESDIS news room announcement.
- Prepared the NOAA-21 ATMS data beta maturity review package, including ATMS early orbit checkout (EOC) instrument health status/performance, science data quality, and related documentations.
- Presented the NOAA-21 ATMS beta maturity status report in the review meeting. The beta maturity status was approved by JPSS program based on the package provided by ATMS SDR team.
- Implemented the NOAA-21 ATMS BUFR data generation package and converted the ATMS TDR/SDR/GEO from HDF5 format to BUFR format and delivered the data to NWP users for further impact study.
- Held ATMS SDR team daily meeting to discuss and report the NOAA-21 ATMS data analysis results. Communicated with NASA team for the latest PLT schedule.
- Initiated NOAA-21 ATMS Processing Coefficients Table (PCT) update to temporarily fix the instrument health status quality flag issues.

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.*

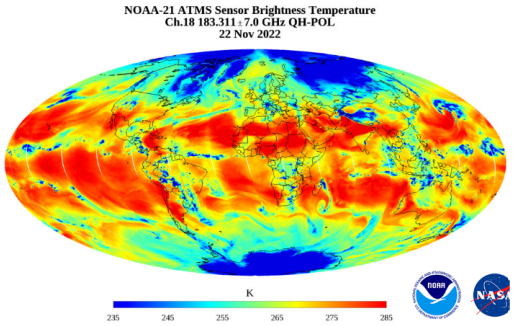
Issues/Risks:

None

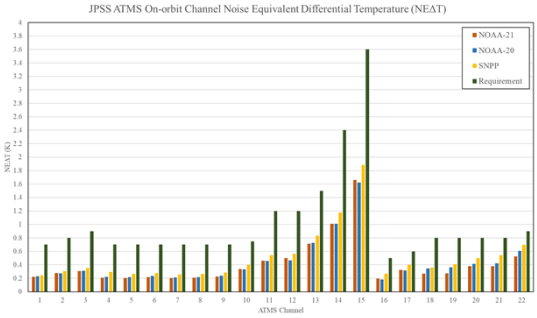
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 ATMS TDR/SDR First light and Beta Maturity	Nov-23	Nov-23	11/30/22	
NOAA-21 ATMS TDR/SDR Provisional Maturity	Dec-23	Dec-23	12/15/22	
NOAA-21 ATMS TDR/SDR Validated Maturity	May-23	May-23		
Evaluate new NEDT algorithm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

Highlights:

NOAA-21 ATMS First Light Image



NOAA-21 ATMS on-orbit NEdT comparison with S-NPP and NOAA-20



CrIS SDR

November 2022

Accomplishments / Events:

- Since the Launch of JPSS-2 CrIS on November 10, began monitoring the status of the activation of the CrIS instrument, and reported on updates and events (Fig. 1). Made further developments to the JPSS-2 CrIS Path to Provisional Plan.
- With the power-on of the JPSS-2 CrIS instrument, Science telemetry data has begun being collected (Fig. 2). Most of the telemetry values of out of range because the instrument is still in safe mode and at a high temperature, but the current values are as expected.
- Finalizing preparations for the CrIS Assessment tools for JPSS-2 CrIS, including preparing a plot format for the first Light, The noise trending for all channels, the instrument responsivity, updates to the JPSS-2 Coefficients for the CRTM.
- Making progress on the preparation of several journal articles, including one on JPSS-2 CrIS, one on the JPSS-2 Neon Mitigation plan, and one on the JPSS CrIS Spike Anomaly Algorithm.
- Developing an Intercomparison between the JPSS CrIS SDR data and the COSMIC-2 wetPrf data. Began with the collocation of NOAA-20 CrIS's stratospheric channels and COSMIC-2 with the criteria of spatial distance less than 50 km, and temporal difference less than 1.5 hours over ocean (Fig. 3)
- Working to extend the new STAR CrIS SDR Cal/Val website to the JPSS-2 CrIS instrument
- Delivered an NEdT plot for NOAA-20 CrIS to the NPROVs group (Fig. 4)
- Performed an assessment of the Tonga volcano eruption (with a focus on channels sensitive to SO2 variation) using CrIS PC reconstructed radiances (Fig. 5). The dynamic range increases are consistent with the BT differences represented in the operational SDR product for the same day.

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

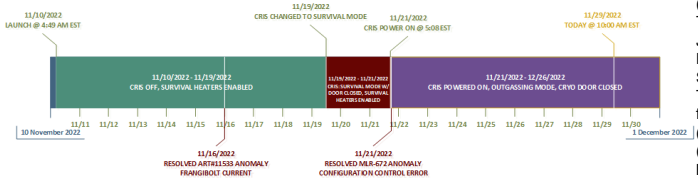
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

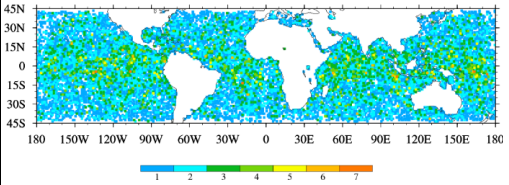
- The CrIS Team got a 100TB storage on STAR servers (data638 and data645) in May 2022. However, the CrIS Team is still in need of hardware/software resources. Presently, there is only one server dedicated to 6 CrIS Team members. We have received access to new servers, but these are shared with other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

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

Highlights:

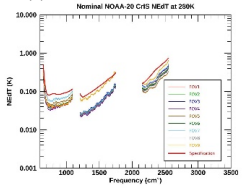


(1) Timeline of the Initial Activation of JPSS-2 CrIS as of November 29, 2022

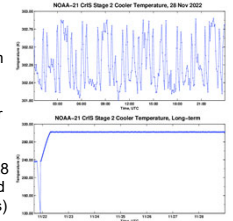


(3) Spatial distribution of NOAA-20 CrIS measurements that are collocated with COSMIC-2 ROs in 1° × 1° grid for the Stratospheric channels in February 2022. There are 20,187 pairs in total.

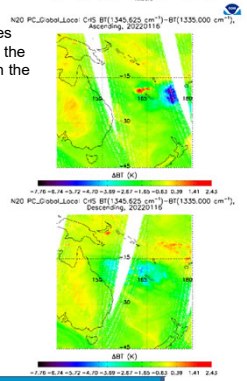
(4) NOAA-20 NEdT at 280K.



(2) Sample Telemetry from JPSS-2 CrIS RDR Packets: Stage 3 Cooler Temperature from power-on (11/21) to 11/28 (single-day and long-term plots)



(5) NOAA-20 CrIS BT differences between two MWIR channels in the CrIS PC reconstructed data with the increased number of local PC eigenvectors.



VIIRS SDR

November 2022

Accomplishments / Events:

- Updated the JPSS-2 VIIRS SDR Cal/Val timeline for the launch date of 11/10/2022
- Monitored the JPSS-2 (now NOAA-21) spacecraft attitude and ephemeris data since the successful launch and verified that the local time of the northbound equator crossings for the satellite is well within the requirements of VIIRS radiometric calibration
- Monitored NOAA-21 VIIRS activation on 11/20/2022 and confirmed that the first SDR granules were successfully processed by IDPS, including the OBC IP files: assisted in adjusting timing of the SDSM measurements; monitored VIIRS telemetry and temperature data
- Analyzed results from several JPSS-2/NOAA-21 VIIRS Post-Launch Tests in collaboration between NOAA STAR and NASA VCST Cal/Val teams
- Assisted in scheduling and analyzed data from N20 and NPP VIIRS lunar calibration with spacecraft roll maneuvers on 11/4/2022: shown that radiometric calibration LUT update is not needed yet
- Created and delivered for deployment in the IDPS operations updated N20 and NPP DNB offset (DN0) and gain-ratios LUTs generated using the new moon calibration data from 11/23/2022

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.*

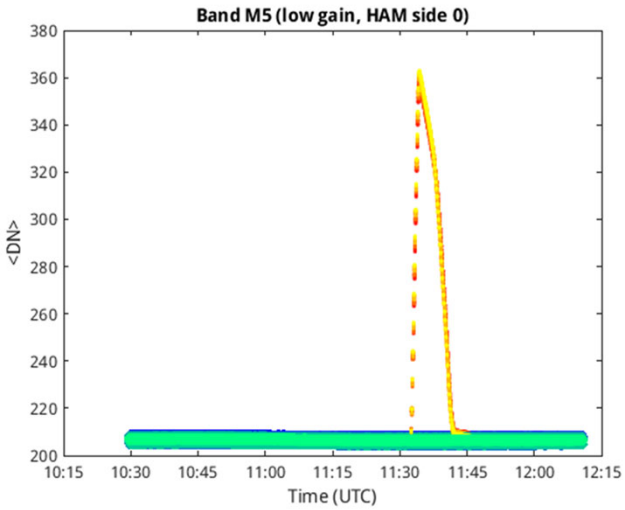
Issues/Risks:

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	Dec-22		
VIIRS SDR Provisional Maturity	Feb-23	Feb-23		
VIIRS SDR Validated Maturity	May-23	May-23		
Monthly lunar calibration (predictions and analyses)	Jul-23	Jul-23		
Monthly delivery of VIIRS DNB calibration LUTs	Sep-23	Sep-23		
Geolocation monitoring using CPM (for NPP, N20 and N21)	Sep-23	Sep-23		
J2 on-orbit calibration LUT development	Sep-23	Sep-23		

Highlights:

NOAA-21 VIIRS onboard calibrator measurements extracted from OBC IP files produced by IDPS for one orbit on 11/24/2022: the red/yellow dots show solar diffuser data required for radiometric calibration of the reflective bands; the blue/green dots and circles (overlapping) show data from space view and onboard blackbody, respectively, needed to determine dark offsets



OMPS SDR

November 2022

Accomplishments / Events:

- Derived and delivered OMPS biweekly NP solar irradiance bi-weekly LUTs.
- Delivered the OMPS NM/NP weekly dark backup LUTs using the NOAA package for test of the ASSISTT. The capability to generate weekly SNPP/NOAA-20 OMPS NM/NP dark LUTs using the NOAA code is entirely built. The replacement to the NASA delivery is in a plan.
- Continued to routinely monitor SNPP OMPS dark calibration recovery status. No anomaly was captured.
- Support to the J2 OMPS functional test and early-orbit data analysis, including but not limited to the following activities.
    - Examined the preliminary OMPS NM/NP telemetry RDR data from JPSS-02. It is captured that for the NOAA-21 OMPS NP, it is about 5°C warmer than the NOAA-20 OMPS NP CCD temperature.
    - Analyzed the JPSS OMPS LED data to determine if any wavelength dependence exists within the LED data itself (see figures).
    - Developed tools to track JPSS-02 OMPS NM/NP/LP RDR/SDR diagnostic measurement activities (e.g., LED, dark and door-closed EV radiance measurements).
    - Monitored the JPSS-02 OMPS NM/NP instrument performance in coordination with the ICVS team.
- Continued work on the implementation of ADR10039 in an offline ADL in support to the J2 OMPS SDR calibration/validation. Especially, modified the JPSS-02 NM sample and macro out LUTs to ensure the right end cross track macro pixels are binned with 4 CCD pixels. ADL was then run for the May 18, 2022 JCT3 TVAC full day data.
- Work is ongoing to run the OMPS SDR V-CRTM packages to produce time series analyses of O-B and double difference (DD) for OMPS NM SDR products (AMS presentation preparation).
- Continued analyzing the impact of adding a polarization component into the OMPS SDR VCRTM package.
- Chunhui Pan has resigned from the JPSS OMPS project, while a replacement is well set up to mitigate this impact.

Overall Status:

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

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

Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 First Light OMPS NM, NP SDR First Light and Beta Maturity	Jan-23	Jan-23		
OMPS NM, NP SDR Provisional Maturity	Feb-23	Feb-23		
OMPS NM, NP SDR Validated Maturity	Aug-23	Aug-23		
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		

Wavelength dependency Analysis of JPSS-02 OMPS NP LED Raw Counts

(a) LED count vs. Spectral Index (Spatial ID = 200)

(b) LED count distribution along Spectral and Spatial Direction

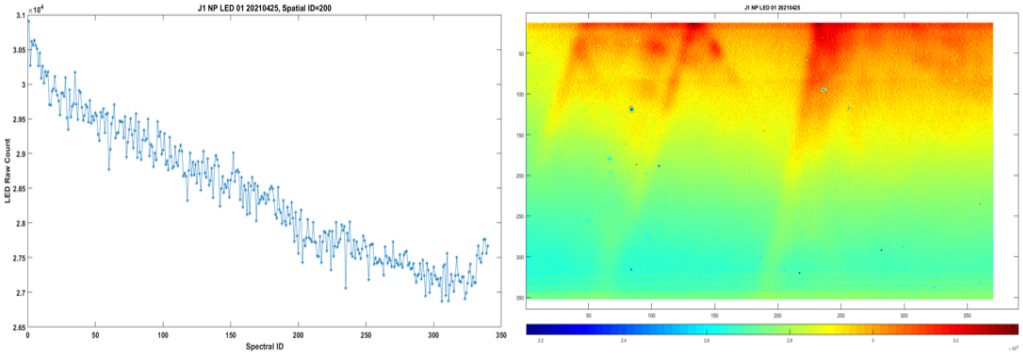


Figure: The left image (a) shows the NOAA-20 NP LED 01 Raw Counts from spatial ID 200 as a function of spectral ID. The right image (b) shows the full NOAA-20 NP LED 01 data at all spatial and spectral channels. Both sets of data are taken from April 25, 2021. A wavelength dependence can be seen in both images, where Raw Count values gradually decrease across spectral channels.

SDR Reprocessing

November 2022

Accomplishments / Events:

- The official transition of the reprocessed SNPP SDRs to CLASS/NCEI started on December 1, 2021.
- The transition of the reprocessed SNPP ATMS (V1 and V2), CrIS, and OMPS (V1 and V2) data was completed in December 2021, February 2022 and March 9, 2022, respectively. These data are available at CLASS website now.
- The transition of the reprocessed SNPP VIIRS started on March 15, 2022.
- The VIIRS data transition is ongoing with 6 parallel jobs with data volume control of a stable daily data transition speed of ~2.97 T/day
- The reprocessed SNPP VIIRS SDR data from 1/2/2012 to 1/1/201 (**765.41T**, **47.39**% of total) has been completed as of November 30, 2022.
- During September to October 2022, we completed transition of 179.59T VIIRS data
- It's expected that the VIIRS data transition will complete in October 2023.

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Complete transition of reprocessed SNPP VIIRS SDR to CLASS	03/2022	10/2023		1 month
Second millstone TBD; will be provided in Jan. 2023 report				

Overall Status:

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

1. *Project has completed.*
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Issues/Risks:

None

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 **47.39**%
Total				1764.65	

ICVS

November 2022

Accomplishments / Events:

- Created password protected NOAA-21 instrument and data quality monitoring web site for non-NOAA cal/val team members. Created unique user/password combination for each individual to support NOAA-21 post-launch cal/val activities.
- Updated ICVS LTM modules for NOAA-21 post-launch status monitoring for ATMS, CrIS, OMPS, and VIIRS. For example, produce J2VIIRS RGB true color images over google earth app to demonstrate the VIIRS SDR data quality and J2 and add the functions to monitor J2 OMPS NM/NP instrument temperature and other parameters.
- Developed NOAA-21 spacecraft telemetry and diary RDR processing packages and updated the on-orbit spacecraft telemetry health status monitoring modules to support NOAA-21 post-launch cal/val activities.
- Developed NOAA-21 OMPS limb profiler instrument health status and science data quality monitoring package and used pre-launch testing data to demonstrate the NRT monitoring ability.
- Provided intensive supports to the STAR SDR teams for various J2 SDR early-orbit analysis activities and ATMS beta maturity review.
- Developed JPSS spacecraft attitude monitoring package using spacecraft diary ephemeris and attitude packets to replace the attitude monitoring using instrument geolocation data, which is highly dependent on the instrument operational status.
- Transitioned ATMS limb corrected TDR global map production package from EDR imagery team and made both S-NPP and NOAA-21 ATMS limb corrected TDR global map generated in NRT and demonstrated in ICVS beta web site.
- Initialized the Deep convective cloud (DCC) method to monitor OMPS TC radiance long-term stability.
- Revise the manuscript about ATMS AI manuscript per reviewers' comments.

Overall Status:

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

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Issues/Risks:

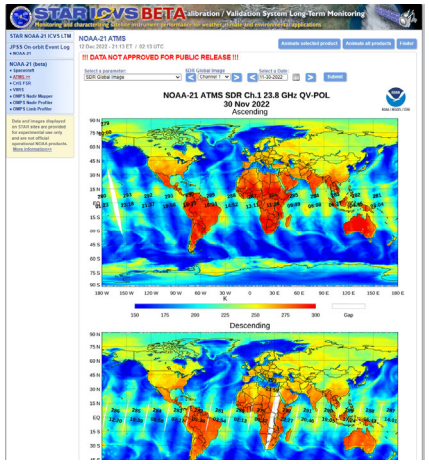
None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Support J2 Launch and PLT SDR readiness	Dec-22	Dec-22		
Develop ICVS JPSS-2 modules to support J2 RDR/SDR PCT activities for spacecraft and five sensors (ATMS, CrIS, OMPS-NM, OMPS-NP, and VIIRS)	Feb-23	Feb-23		
Develop new modules to support the J2 SDR Reviews for spacecraft and five sensors	Jul-23	Jul-23		
Develop the ICVS regional monitoring modules for five sensors to detect regional anomaly features of SDR data	Sep-23	Sep-23		
J2 ICVS integration with SNPP&NOAA-20; J2 Pre-launch, launch, and post-launch RDR/SDR readiness and PLT activities	Sep-23	Sep-23		
Update the ICVS-Anomaly Impact Watch Portal; provide timely anomaly reports	Sep-23	Sep-23		

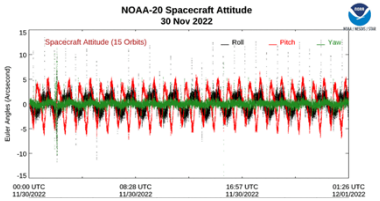
Highlights:

Significantly contribute to STAR SDR Teams

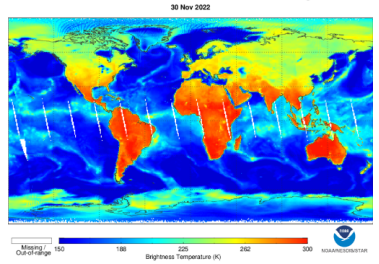
(a) Password protected NOAA-21 ICVS-LTM web site



(b) NOAA-20 spacecraft attitude monitoring from spacecraft diary RDR



(C) NOAA-20 ATMS limb corrected TDR global map at ascending node on 11/30/2022



VIIRS Imagery

November 2022

Accomplishments / Events:

- VIIRS CONUS-sector imagery files and RGB configurations delivered to NWS/FDTD for display in FDTD Cloud AWIPS
- Recent VIIRS Imagery Presentations
  - Bill Line, Satellite Book Club Webinar, “Applications of Satellite Imagery During Winter Weather Scenarios”, Link
- Recent VIIRS Imagery Blog Posts
  - Nov 2022 New York Lake Effect Snow Event
  - Mauna Loa Eruption
- Recent VIIRS Imagery Social Media Posts
  - VIIRS RGB captures CO snow cover
  - VIIRS NCC shows snow cover at night
  - VIIRS RGB shows results of LES storm in New York
- Continued efforts to develop a CONUS sector for VIIRS Imagery on Polar SLIDER
  - Images are being generated, display infrastructure work continues

Overall Status:

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

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Issues/Risks:

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

Highlights: Image of the Month

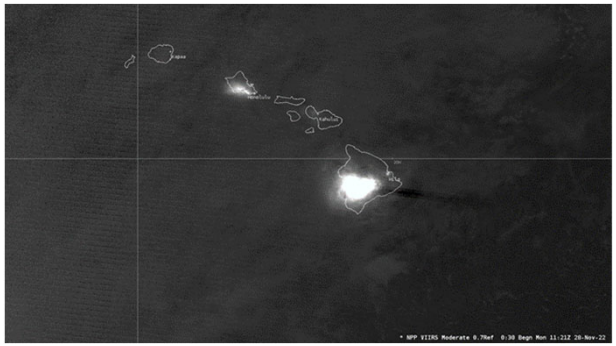

Figure: 28 Nov 2022 NOAA-20 DNB-NCC product revealed the very bright light emitted from Mauna Loa Volcano Eruption lava flow overnight.

Clouds

November 2022

Accomplishments / Events:

- The CIRA team released a new CONUS domain on the experimental aviation website with the addition of ABI, which is based on Python-coded 3D cloud data processing transitioned from VIIRS to ABI. The user quick guide has been updated accordingly with a few website updates, which will be finalized with user feedback from the Aviation Initiative participants.
- VIIRS cloud cross-sections were provided to NTSB for a fatal aircraft accident investigation occurred near Cordova, Alaska on Oct 16 at 2226 UTC (Piper PA-32-260).
- The Cloud team is preparing for evaluations from NOAA-21 for beta (March '23 or CM, June '23 for other products) and provisional (July 2023, which will be from NDE-IT

Overall Status:

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

1. *Project has completed.*
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Issues/Risks:

None

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

Highlights:

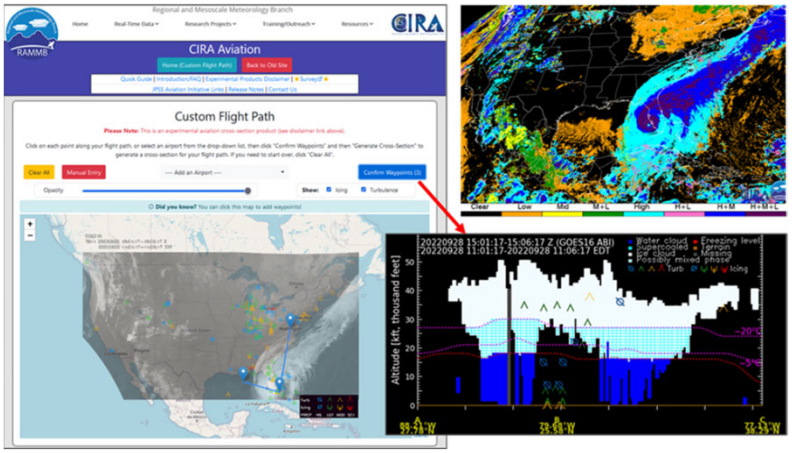


Figure 1. CIRA's experimental aviation website (https://aviation.cira.colostate.edu/) for custom cloud vertical cross-sections with a new CONUS domain using GOES-16 ABI data based on 3D cloud data processing codes transitioned from VIIRS. A cloud vertical cross-section along a sample path of New Orleans-Miami-Washington D.C. through Hurricane Ian is shown with Cloud Layers available in CIRA's SLIDER (1501 UTC 28 Sep 2022)..

Aerosol

November 2022

Accomplishments / Events:

• A Nature news story, “How a dangerous stew of air pollution is choking the United States”, (https://www.nature.com/articles/d41586-022-04333-9) used material from a paper co-authored by S. Kondragunta, who provided fire emissions for model simulation and VIIRS AOD for comparison.

• *Application of Machine learning*: Used the Amazon SageMaker Data Wrangler to evaluate training data used for deriving spectral surface reflectance relationships in a machine learning algorithm; detected outliers; ranked importance of input variables.

• Examined quality of out-of-domain AI predictions of surface reflectances for potential improvement of VIIRS AOD retrievals.

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

Overall Status:

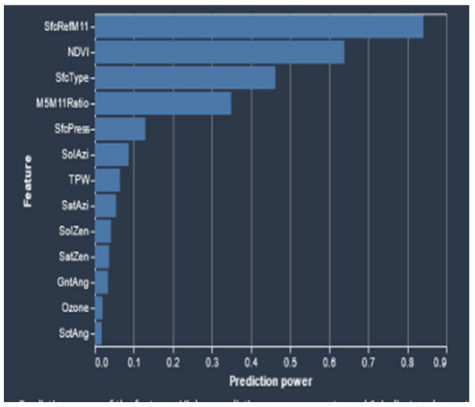
	Green[1] (Completed)	Blue[2] (On-Schedule)	Yellow[3] (Caution)	Red[4] (Critical)	Reason for Deviation
Cost / Budget		x			
Technical / Programmatic		x			
Schedule		x			

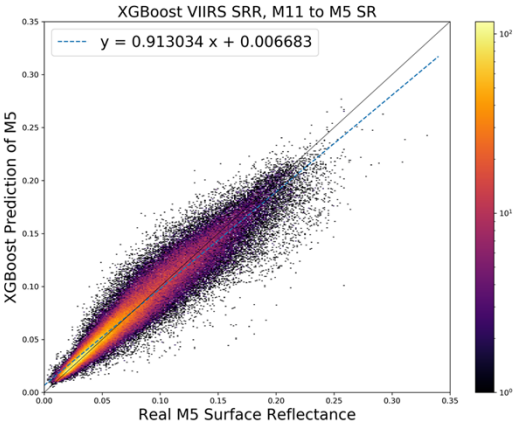
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

No risks

Highlight:





Left: Example of importance of inputs for predicting surface reflectance. *Right*: VIIRS M5 XGBoost-predicted surface reflectance vs. true reflectance; used as control in out-of-domain predictions.

Volcanic Ash

November 2022

Accomplishments / Events:

- Routine validation of existing JPSS volcanic ash EDRs from current sensors and JPSS-2 will continue as needed, including support for ASSISTT/NDE evaluations. VOLCAT is long-term plan.
- NESDIS is featuring volcano-related products, including some from JPSS, in recent press releases associated with Mauna Loa eruption
- Utility of JPSS-based Sulfur Dioxide Detections: NOAA-20 VIIRS + CrIS instruments are routinely processed experimentally at UW-CIMSS in near real-time. On November 28, 2022 the Mauna Loa volcano in Hawaii erupted for the first time since 1984 at approximately 0940 UTC (VOLCAT geostationary alerts from GOES-17 and Himawari-8 alerted the explosive cloud growth, not shown). At 1136 UTC NOAA-20 observed the volcanic cloud and the VOLCAT system produced an SO2 alert (see figure), which provided a very early estimate of the total SO2 mass loading. The VOLCAT VIIRS+CrIS based total SO2 mass loading estimate for the cloud at that time was around 24 kt. The VOLCAT products were used by the Washington VAAC and the USGS-Hawaiian Volcano Observatory.
- 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. Recently we assessed J2 DAPs Volcanic Ash EDR output run on JPSS-2 proxy data and found the output was as expected and posed no concerns moving forward.

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			

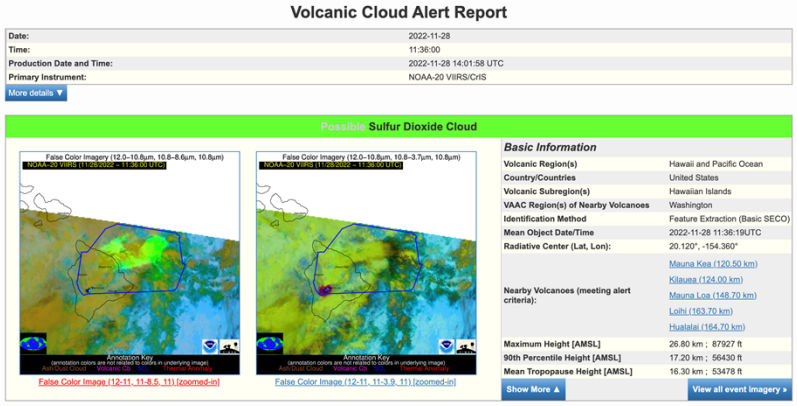
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlights: NOAA-20 VIIRS+CrIS observations near Mauna Loa at 1136 UTC on November 28 2022 provided early SO_2 mass loading estimates for the new Mauna Loa volcanic eruption.



Cryosphere

November 2022

Accomplishments / Events:

Automated system to generate and archive hi-res VIIRS images. We have implemented an automated system to generate and archive JPSS VIIRS high spatial resolution images in GeoTIFF format for both individual overpasses and daily composite over the Arctic and Antarctic regions. The JPSS VIIRS M-band Level 1B data are remapped to 1 km Equal-Area Scalable Earth (EASE) Grids version 2, and Brightness Temperature (M15), and visible reflectance (M5), and true-color RGB images are produced daily and subsequently archived for cal/val and other research applications. Future work includes adding JPSS-2 VIIRS, improvement in the composition approach for a smoother daily composite image, higher spatial resolution images at 0.5 km using VIIRS I-band data, and display of the GeoTIFF images with GIS software, e.g. RealEarth.

Overall Status:

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

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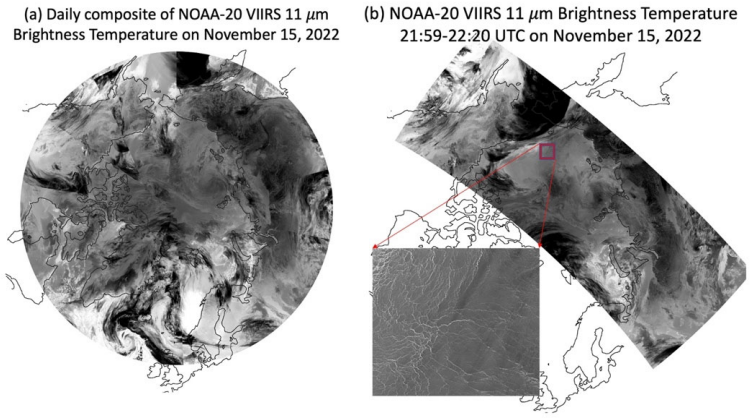
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

Highlight: Automated system to generate and archive hi-res VIIRS images



Active Fires

November 2022

Accomplishments / Events:

- Worked with JSTAR Mapper Team to ingest of NOAA-21 ready I-band product, in operations since October 18. Delivered NOAA-21 ready M-band baseline code.
- Continued the evaluation of the VIIRS active fire processing capability within the Enterprise Fire system; eFIRE V1r2.7 was delivered on 11/12/2022
- Key paper published on downstream use of the VIIRS AF product: F Li, X Zhang, S Kondragunta, X Lu, I Csiszar, C C Schmidt, Hourly biomass burning emissions product from blended geostationary and polar-orbiting satellites for air quality forecasting applications, https://doi.org/10.1016/j.rse.2022.113237.
- Presented at the JPSS-2 User Readiness Meeting on 11/9/2022
- Performed validation and cross-check against MASTER and VOLCAT detections.

Overall Status:

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

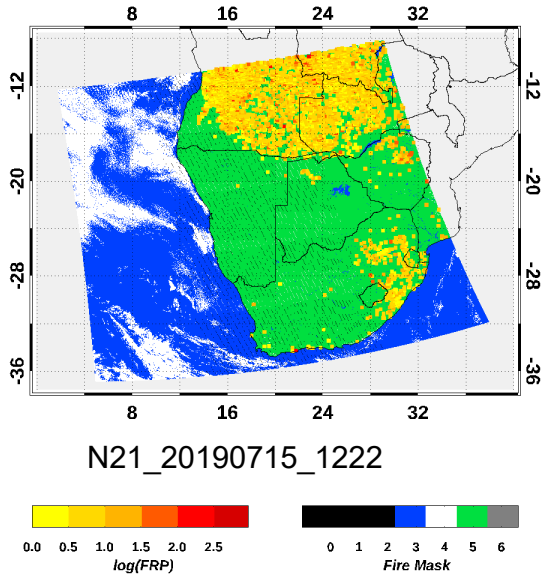
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

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

Highlight: Proxy NOAA-21 I-band Active Fire Data

Example of proxy NOAA-21 VIIRS I-band active fire mask and fire radiative power, generated by the STAR version of the code now in NDE operations



Surface Type

November 2022

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 October and November of 2022 for the production of AST-2022.
- The team is developing a 250m global surface water fraction product, whose spatial resolution will be 16 times finer than a 1km version the team produced before:
  - This finer resolution product was requested by Dr. Michael Barlage of EMC and other NOAA users
  - The team has conducted a thorough literature review to identify newly available global land cover products at 10m – 30m resolutions.
  - The team has downloaded the identified products and used them to produce a preliminary 250m water surface fraction product (see the Highlights in this slide):
    - Trillions of 10m – 30m pixels were processed to produce this preliminary product.

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.*

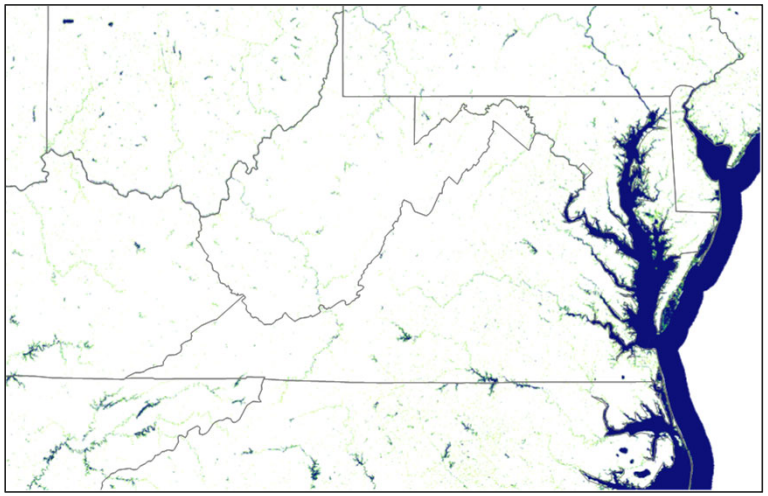
Issues/Risks:

None

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

Highlights: ***Development of A Global 250m Water Surface Fraction Product***

High resolution mapping of surface water is a key requirement for improving the capability and accuracy of many NOAA models. To address this requirement, the surface type team is developing a global 250m water sur-face fraction product. This screenshot of a pre-liminary product developed by the team shows that the product can provide much needed details on surface water distribution for rivers, lakes, and the coastal region.



Surface Reflectance

November 2022

Accomplishments / Events:

- Continue the SR monitoring and validation using the routine tools, check the recent performance.
- Got the new LUT from NASA science team, generate test SR data at AERONET using current LUT and new LUT respectively.
- Inter-comparison between two SR subsets using different LUT, validated the test data against AERONET based SR and evaluate the new LUT performance.
- Collected the matched NASA VNP09 SR data to check the consistence of the new SR data with NASA product.
- Follow up and check the JPSS2 data.

Overall Status:

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

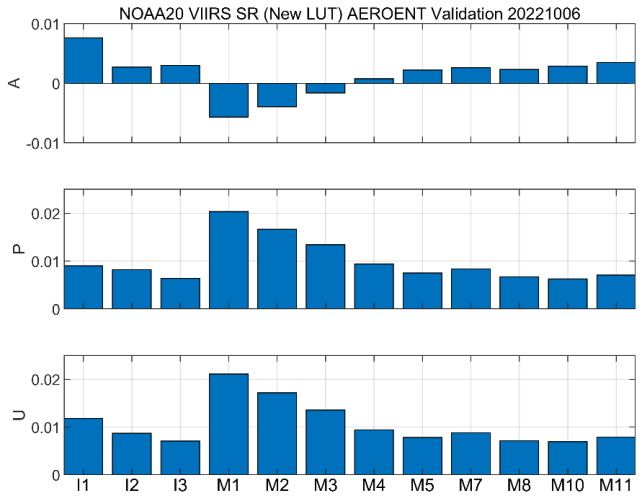
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

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

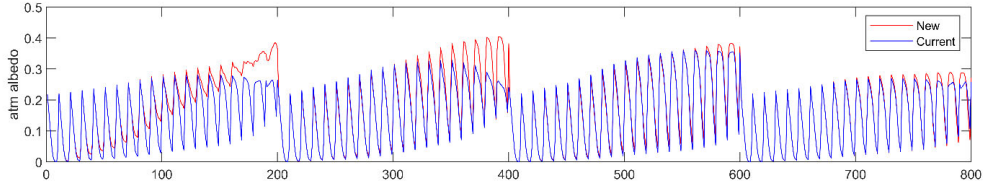
Highlights:

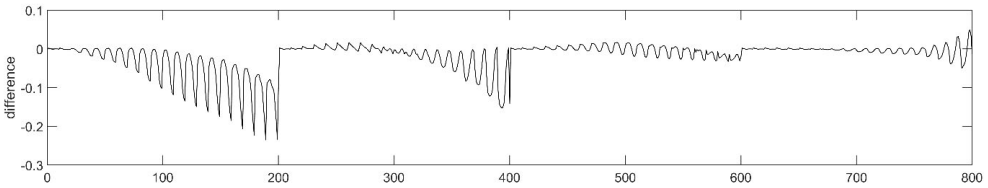


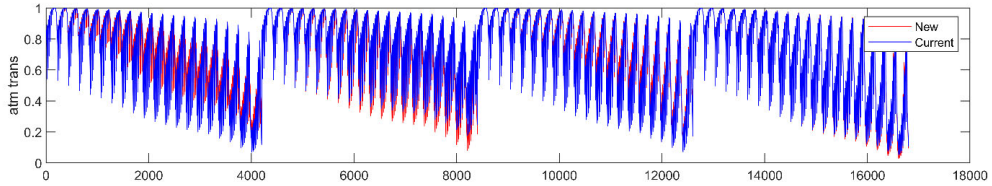
SR generated using the new LUT validated against AERONET SR: the APU statistic for each band, the precision is close to current LUT, but there is difference in accuracy.

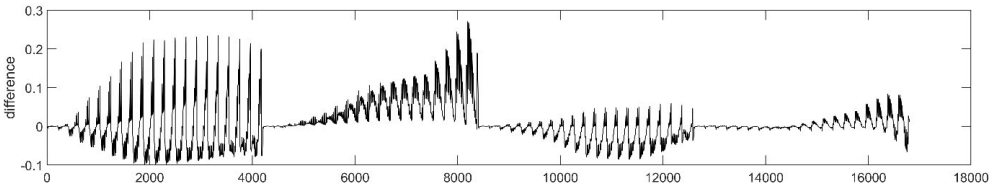
LUT parameters Comparison between Current and New LUT

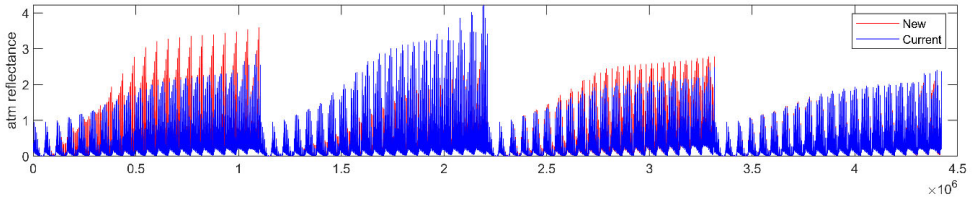
The LUT value comparison between the new and current LUT

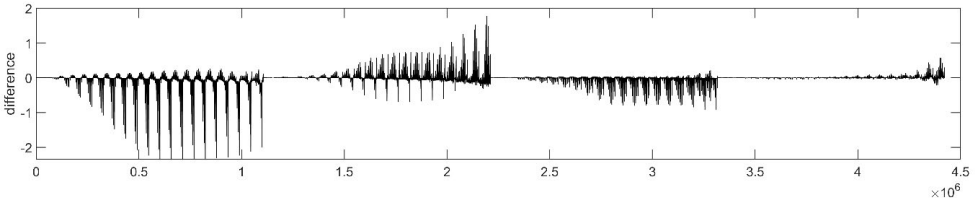








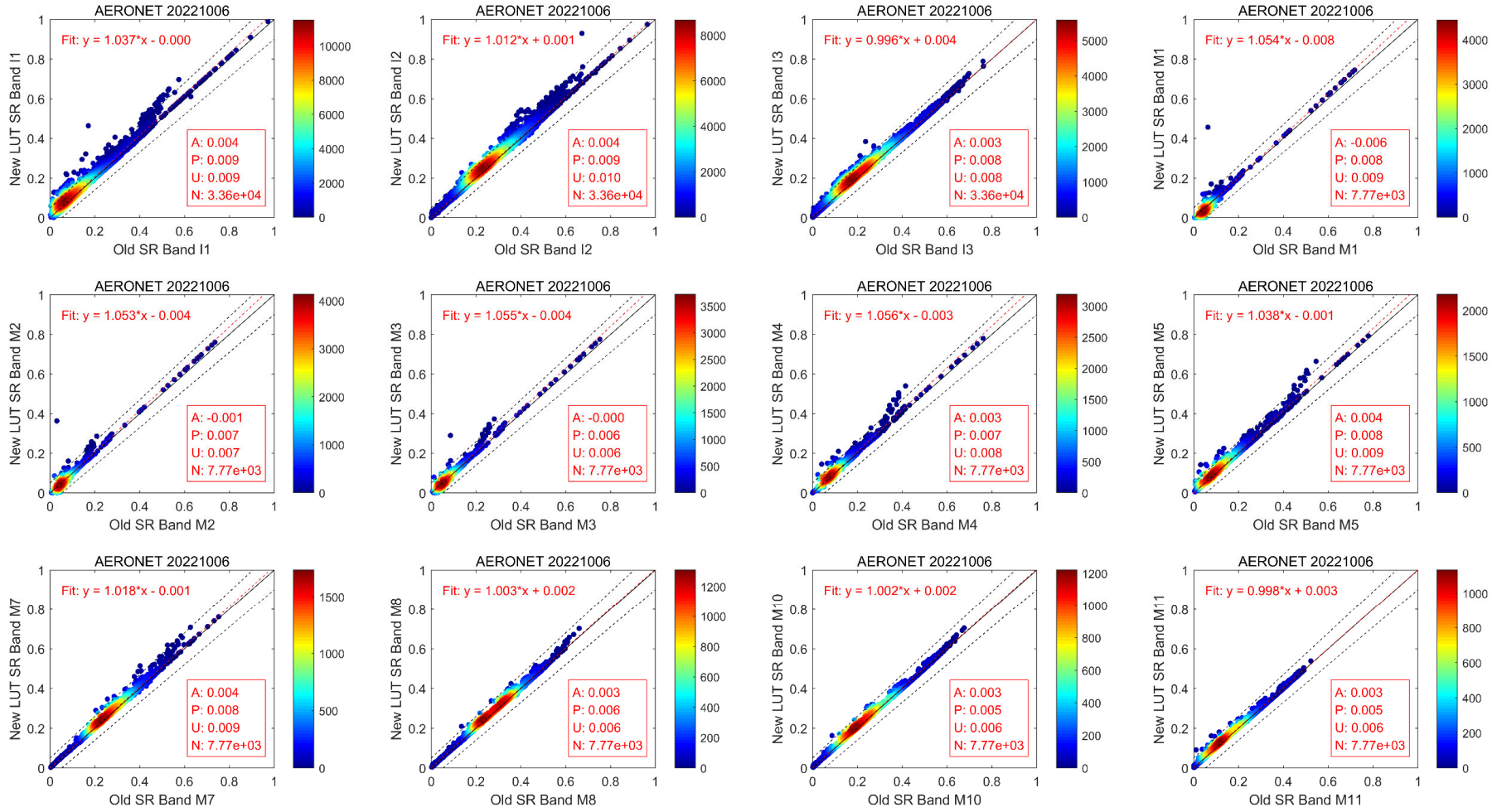




- Atmospheric albedo (top left)
- Atmospheric reflectance (top right)
- Transmittance (bottom left)

The direct comparison show the LUT value difference, particularly for the first aerosol model (Dust)

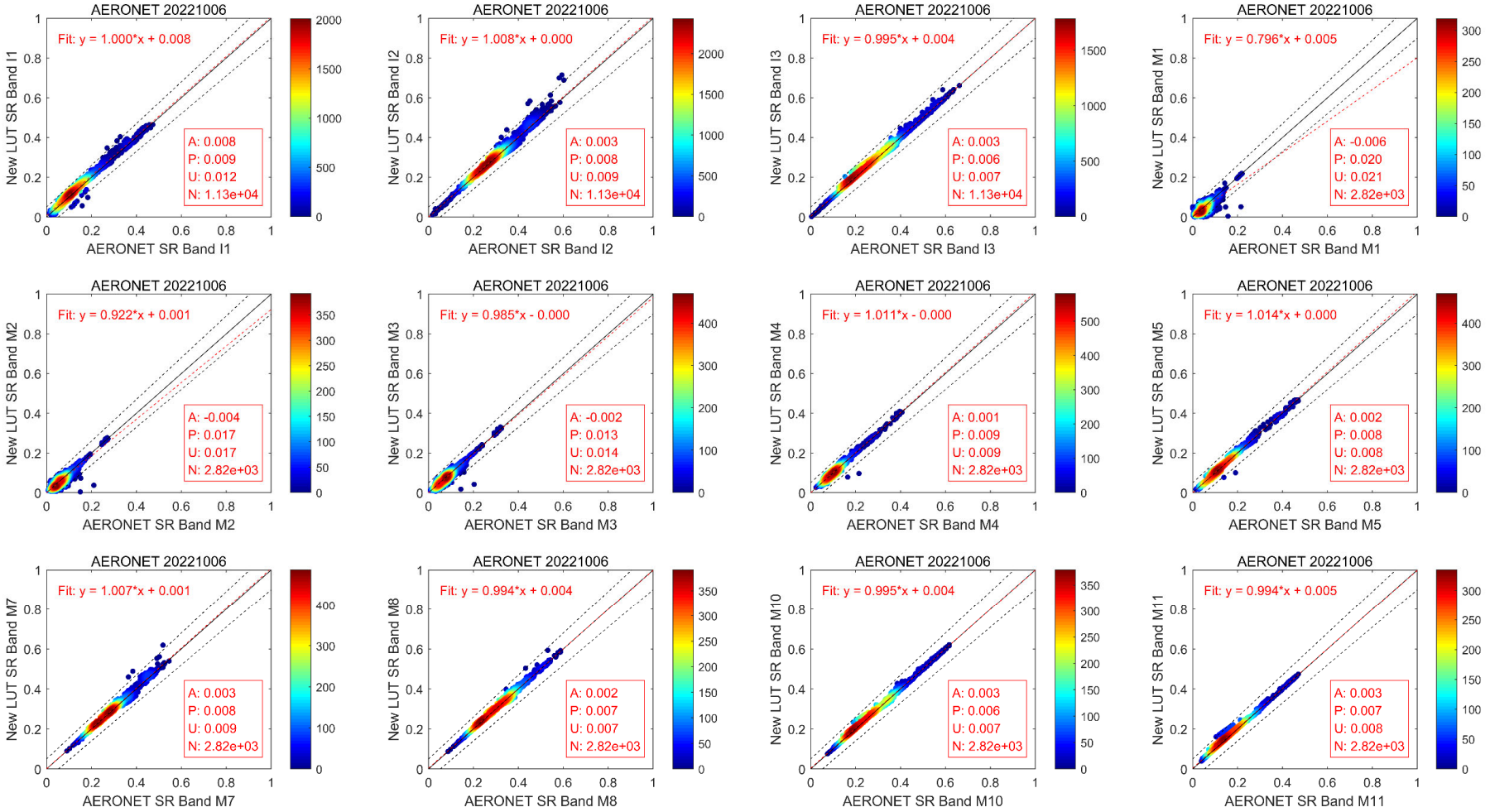
SR Comparison between Current LUT and New LUT



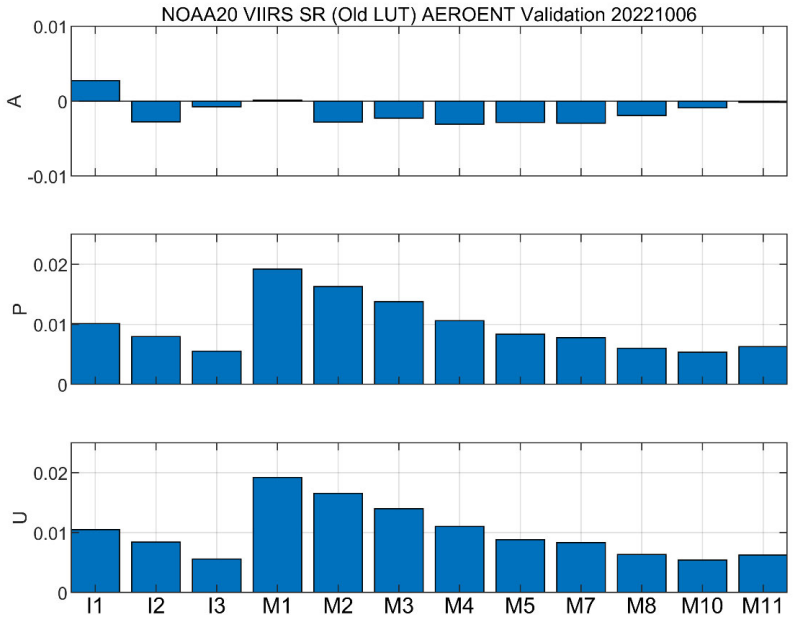
The SR direct comparison between current LUT and new LUT shows there are difference need further investigation

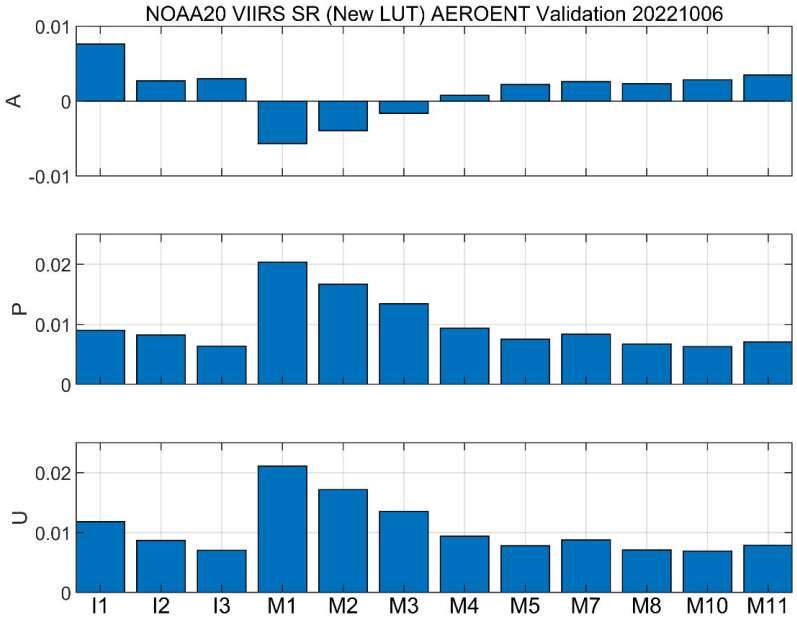
SR Using New LUT validation at AERONET

November 2022



SR Comparison between Current LUT and New LUT





The Precision is very similar, but the accuracy has obvious difference, overall the current LUT is more close to the AERONET SR.

Land Surface Temperature

November 2022

Accomplishments / Events:

- Attended the Gitlab training workshop.
- Generated the monthly mean soil moisture data and upscaled the diurnal land surface temperature range(DTR) data to be the same spatial resolution as soil moisture. Correlation analysis is conducted between upscaled monthly mean DTR and soil moisture(slide 2)
- Code preparation for J2 data digestion and comparison analysis. Updated related data plot functions, added the flexible granule merge function, inter-comparison between polar satellite LSTs(slide 3) and between GEO e.g. ABI LST and LEO e.g. VIIRS LST.(slide 4)
- Conducted the VIIRS LST validation with ARM observations. The ground data anomaly is observed and confirmed. (slide 5)
- User engagement activities
- Reviewed a manuscript on the Landsat LST validation.

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			

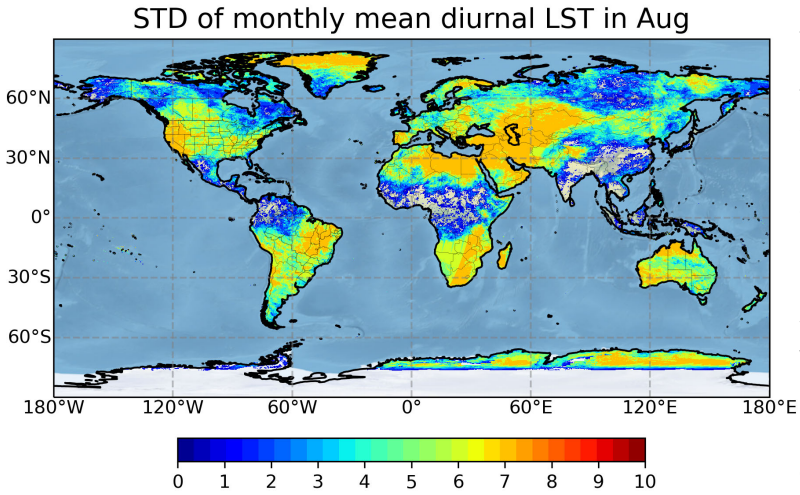
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

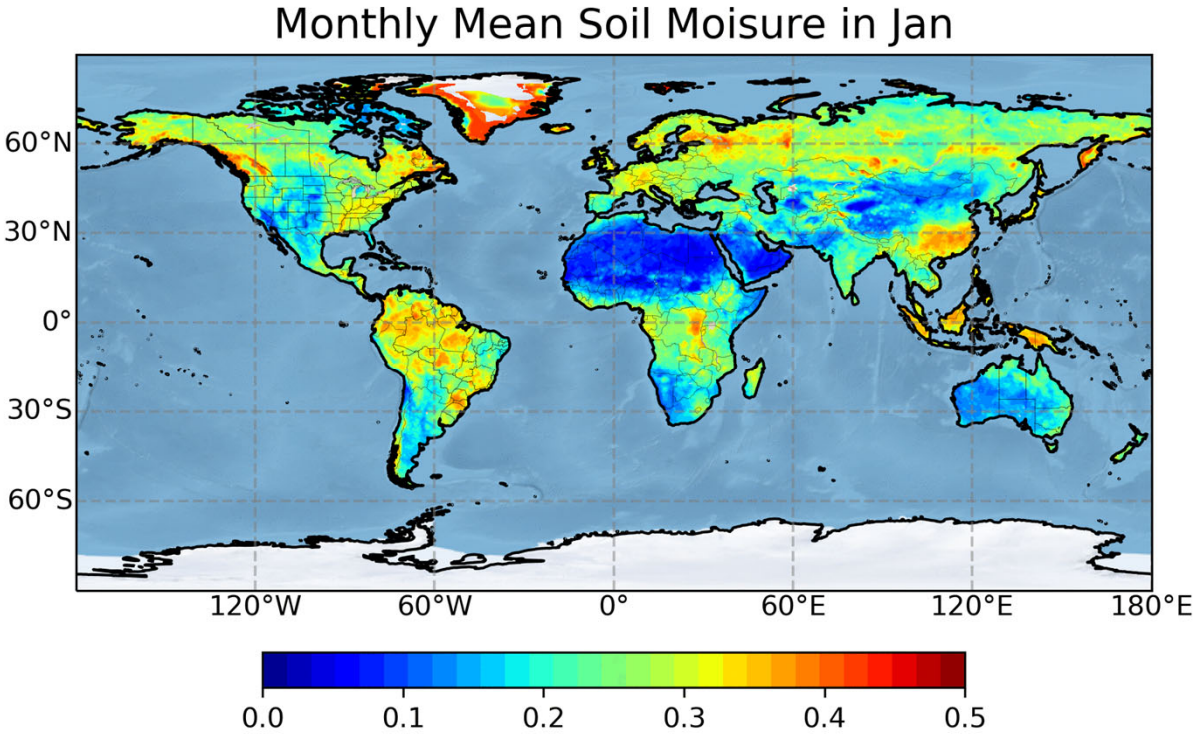
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Annual products performance report for L2 and L3 VIIRS LST	Dec-22	Dec-22		
Beta review of the NOAA-21 LST	May-23	May-23		
All weather LST update	May-23	May-23		
FY24 Program Management Review	Jun-23	Jun-23		
Routine monitoring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

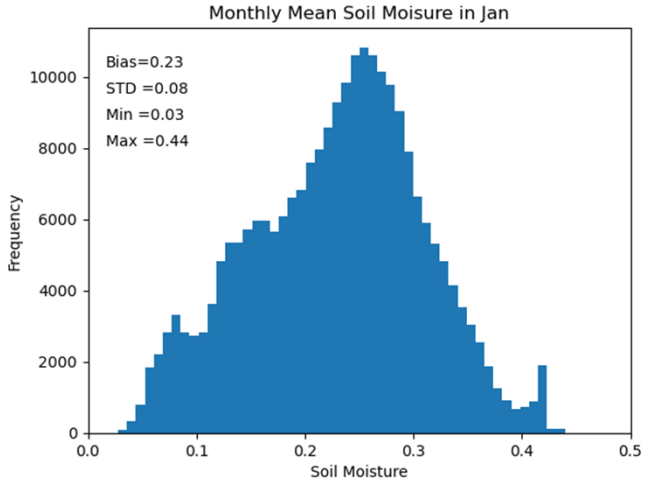
Highlights:



The STD is calculated based on the diurnal LST range data in the target month of 2022. It is affected by the data availability of the daytime and nighttime LST. It indicates a relatively large variation over western Asia, north Greenland as well as western U.S. area at a magnitude of about 7k.

Correlation between monthly mean DTR and soil moisture

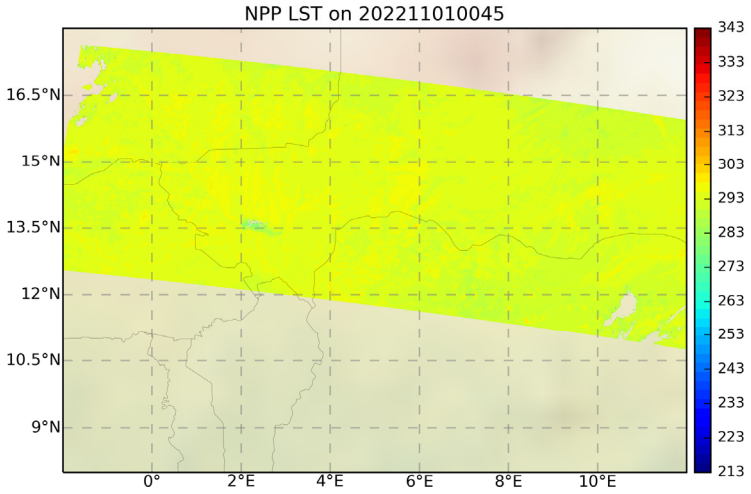


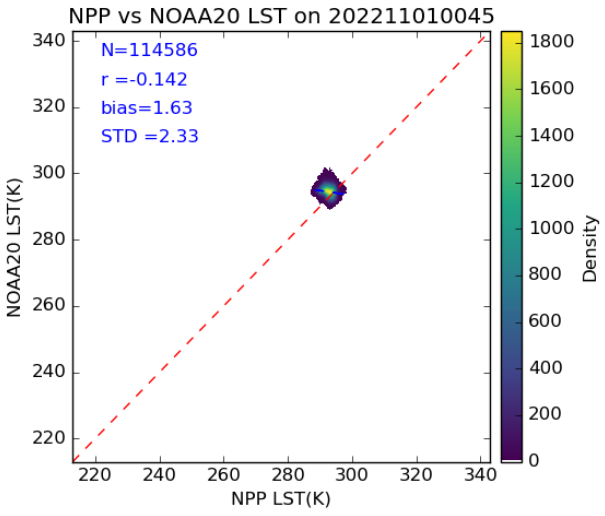


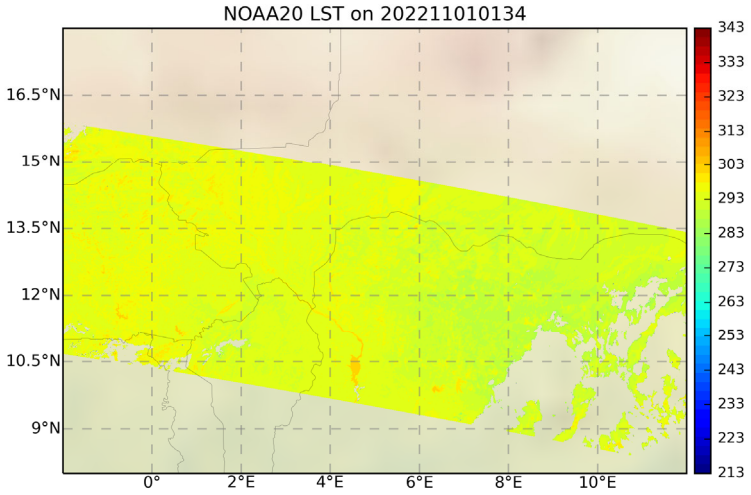
Months	Correlation
01	0.76
02	0.80
03	0.85
04	0.878
05	0.88
06	0.879
07	0.88
08	0.845
09	0.866
Average	0.85

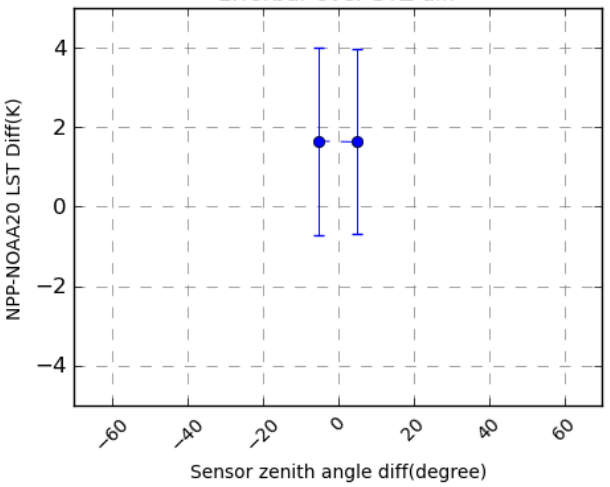
- The data in 2022 is used in this study
- Correlation is calculated based on the monthly mean Diurnal Temperature Range(DTR) DTR and soil moisture data
- Correlation coefficient is 0.85 on average, which indicates a strong positive correlation between Diurnal Temperature Range(DTR) and soil moisture (1D data)

Satellite LST inter-comparison between LEO- granule level



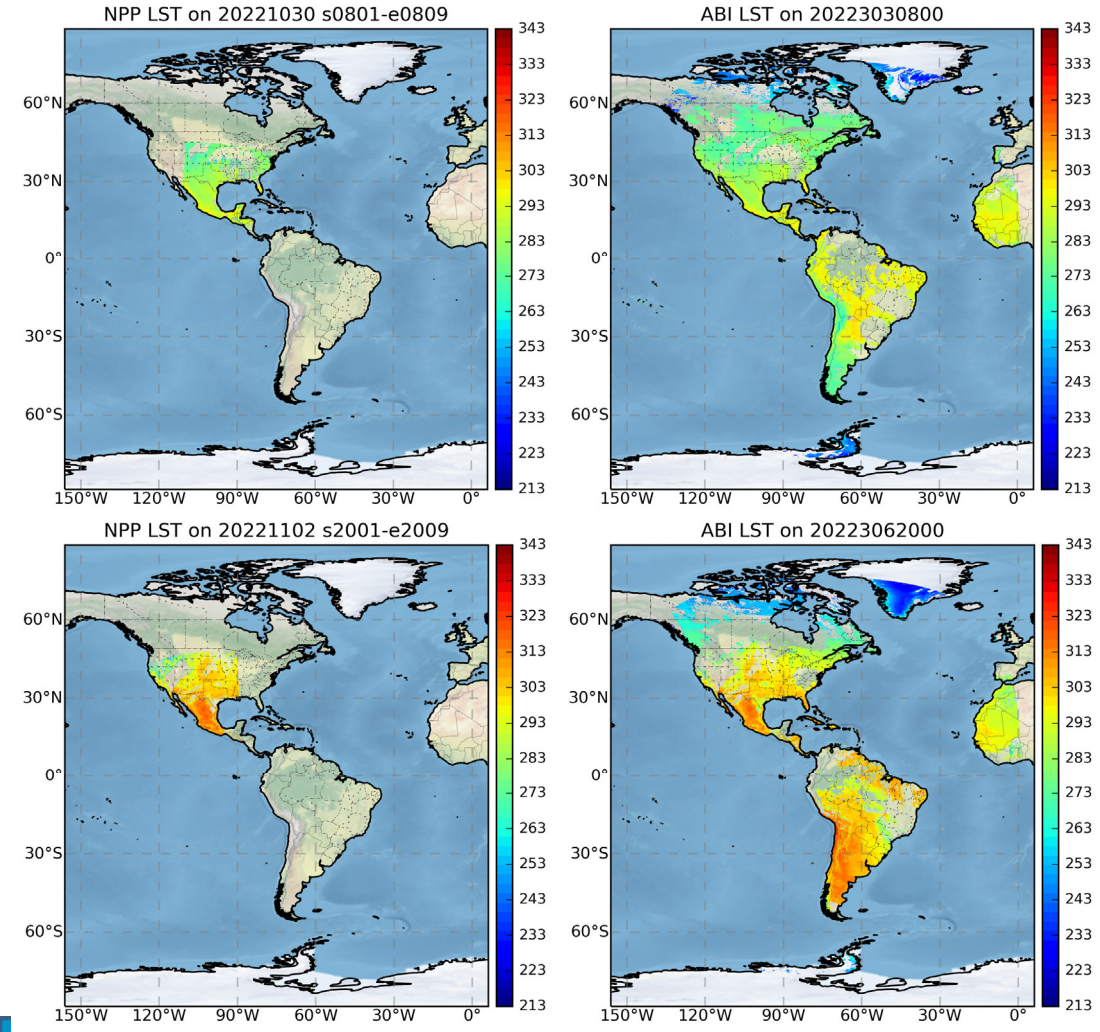


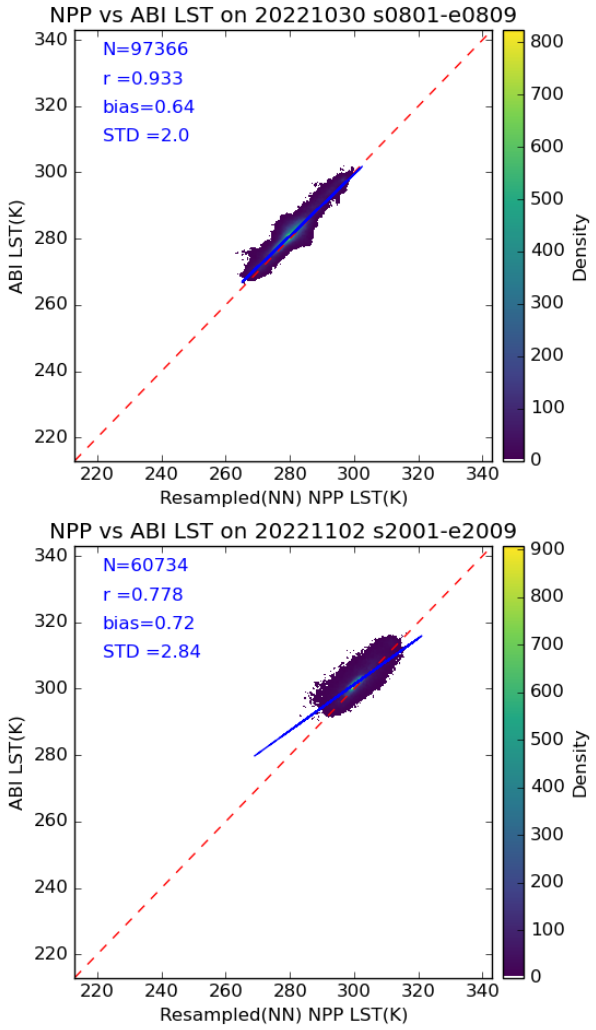




- The code is added for the inter-comparison between LEO satellite LSTs e.g. SNPP, NOAA20 and NOAA21 LST.
- The example shows the inter-comparison between SNPP and NOAA20 LST. Left figures show the granule map. The top right figure shows the difference statistics and bottom right shows the error bar over sensor zenith angle difference.

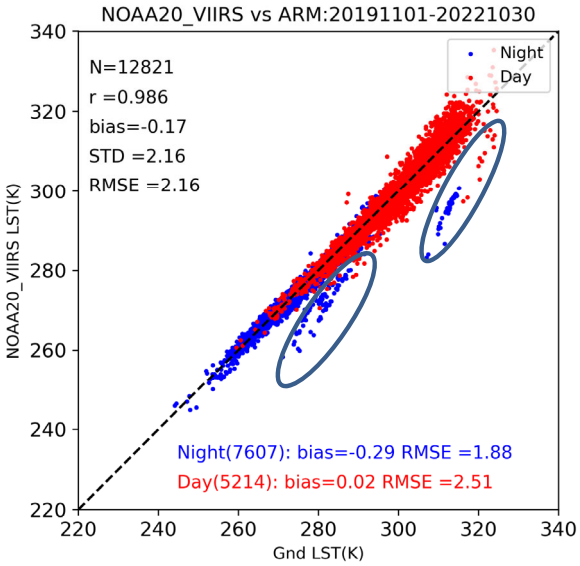
Cross-comparison between ABI LST and SNPP VIIRS LST

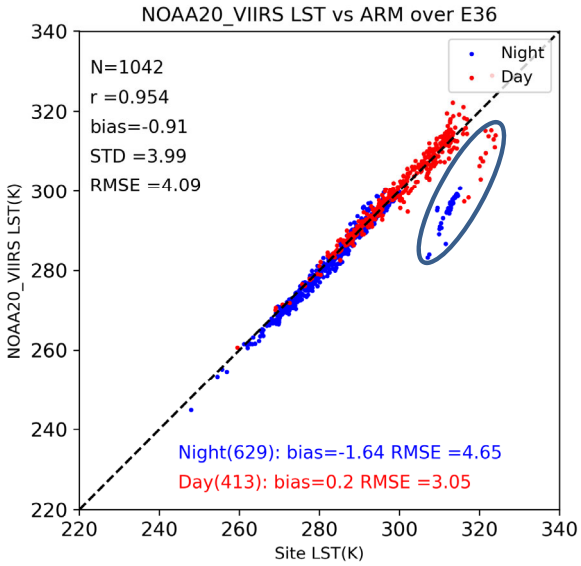


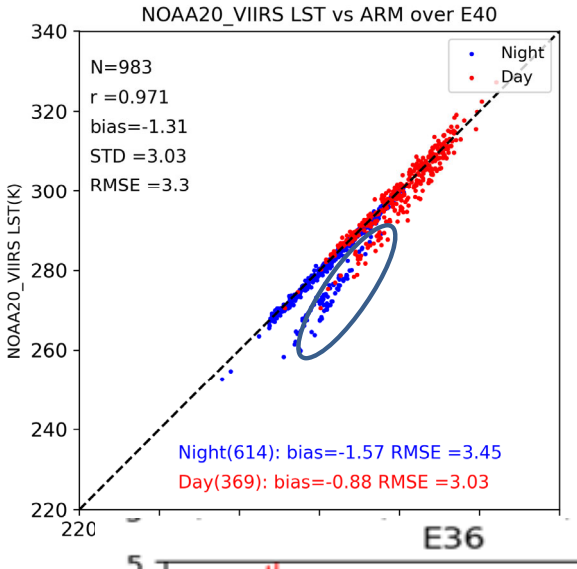


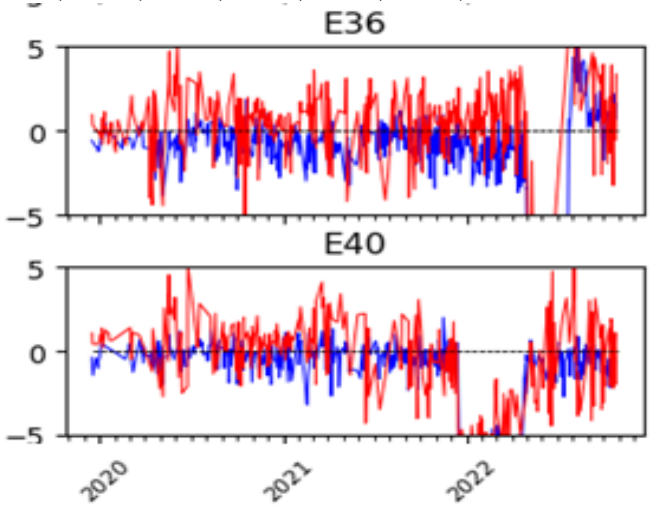
- Leo LST granule data is firstly aggregated and then resampled to GOESR full disk 2km grid
- Nearest neighbor method is used in the data resampling
- The temporal difference is within 10 minutes
- Statistical results (right) are for clear pixel only from both VIIRS and ABI data and the absolute satellite view zenith angle difference is limited to be within 5 degree for nighttime (top) and daytime(bottom) scenarios.

NOAA20 LST validation against ARM observations









- Three years of data were used in the LST validation against ARM observations from 13 stations. The top left figure shows the overall results which clearly show the outliers for both daytime and nighttime.
- The time series analysis(bottom right) indicates the period of abnormality. The ground data anomaly is confirmed from the ARM data quality record which mentioned the instrument issue between May 5, 2022, and July 22, 2022, over the E36 site and the cable connection issue between August 9, 2022, and September 2, 2022, over E40 site. However, the possible ground data anomaly at the beginning of 2022 is not reported over the E40 site.

Surface Albedo

November 2022

Accomplishments / Events:

- Supported test of VIIRS v2r2 algorithm in ASSISTT and NDE
  - VIIRS climatology data was deployed in ASSISTT and NDE
  - Achieved consistency in offline LSA output between local and ASSISTT/NDE respectively
  - Found the problem in NDE production rule and offline feeding to online process
- Generated VIIRS global NBAR data (September of 2022) to vegetation team's request
- Multi-parameter anomaly correlation analysis over CONUS

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			

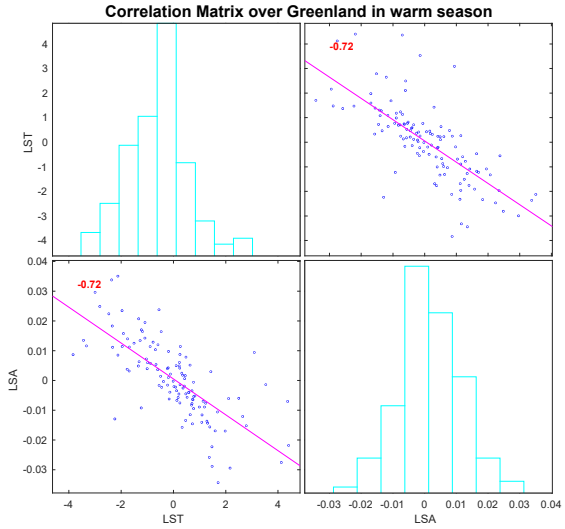
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

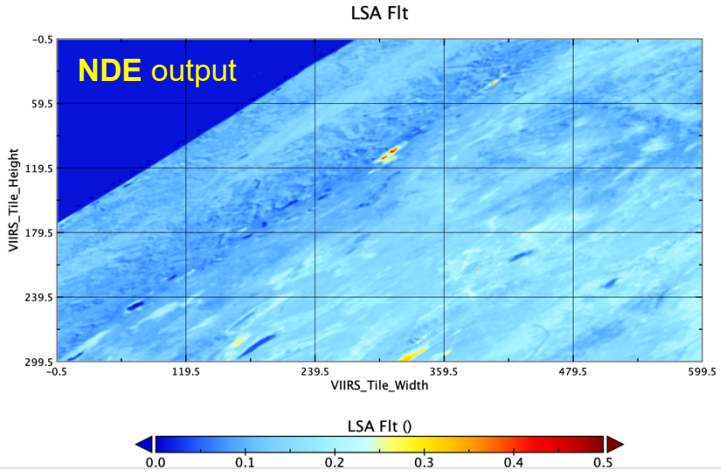
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Beta review of the NOAA-21 albedo	May-23	May-23		
DAP for NOAA-21 if needed	Aug-23	Aug-23		
Provisional review of NOAA-21 LST	Sep-23	Sep-23		

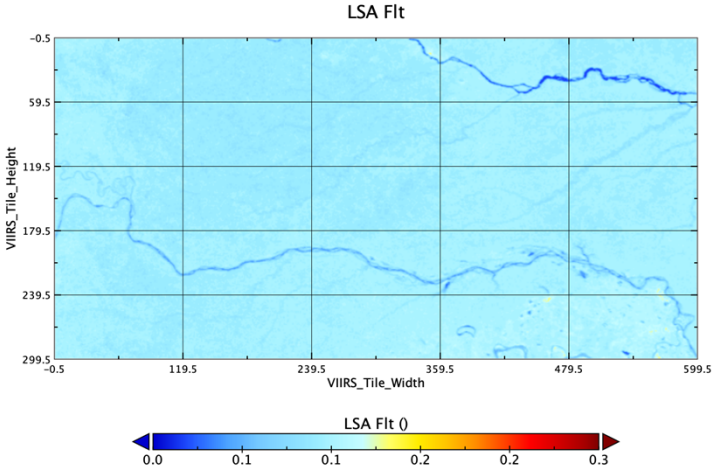
Highlights:

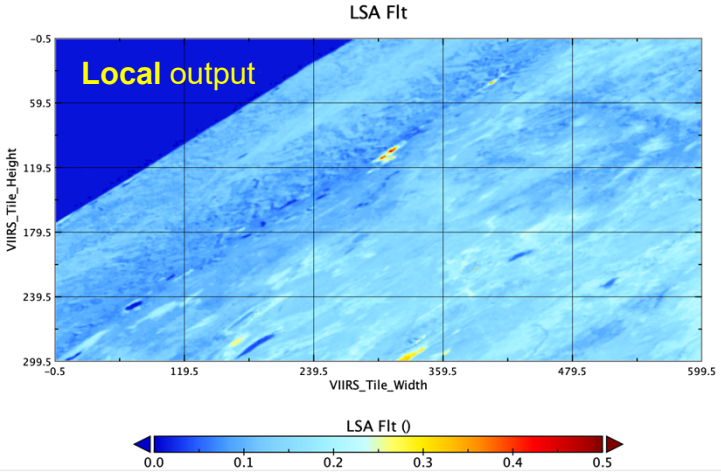
Higher temperature – more melt -- lower albedo (Ice-albedo feedback also related) in Greenland from satellite product anomaly

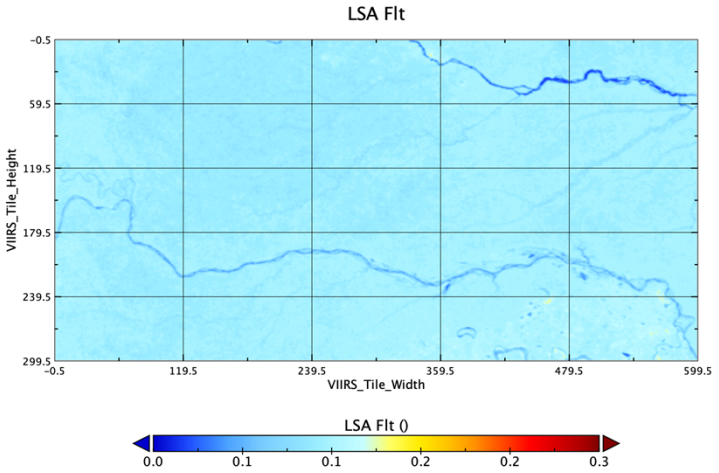


Reached consistency in offline LSA between Local and NDE after albedo climatology update

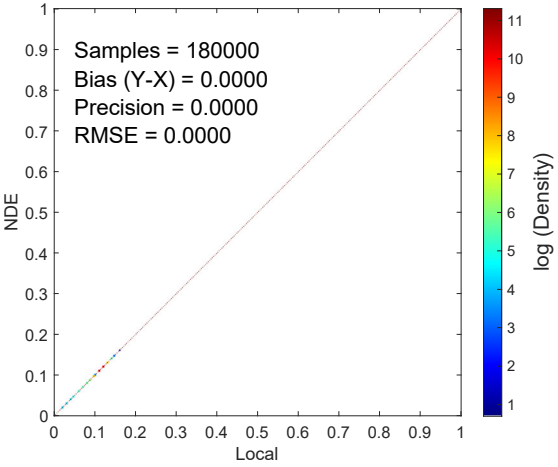




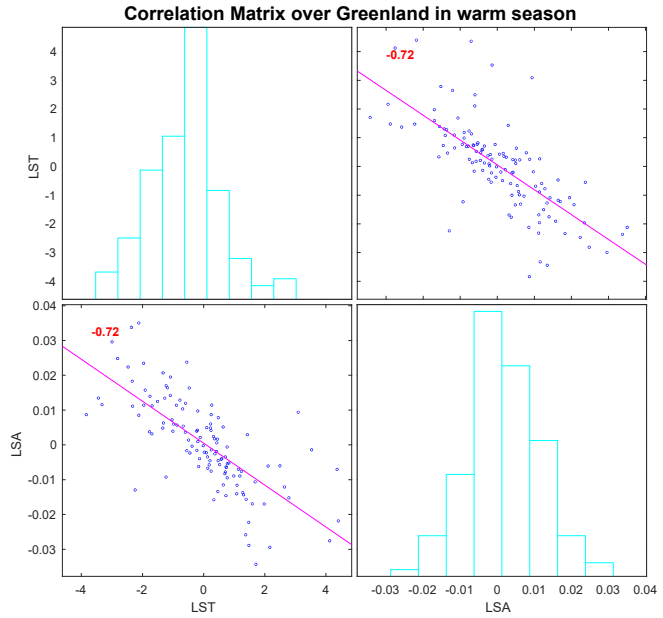


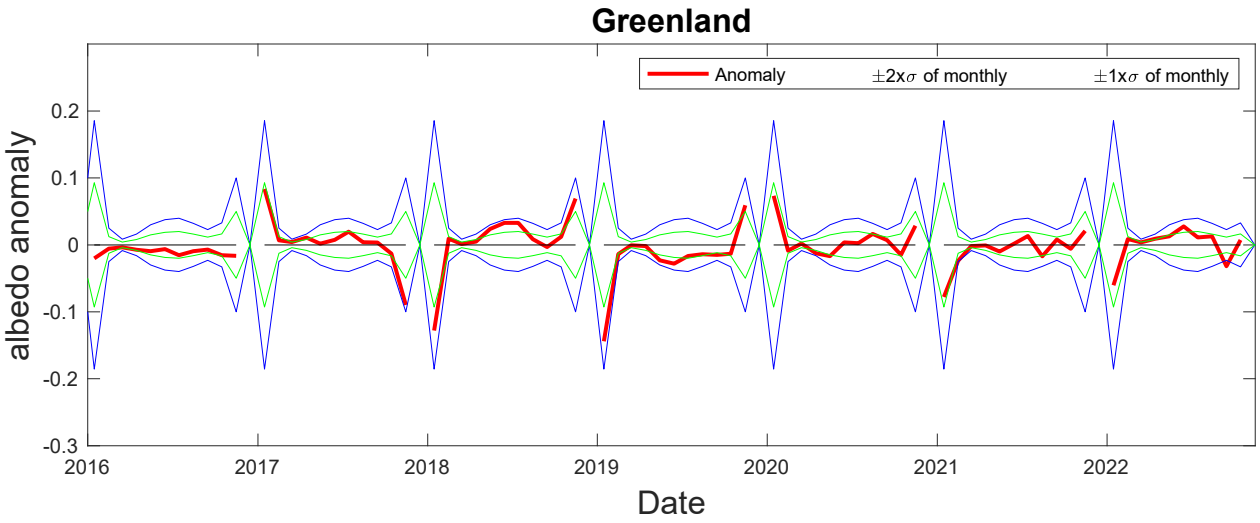


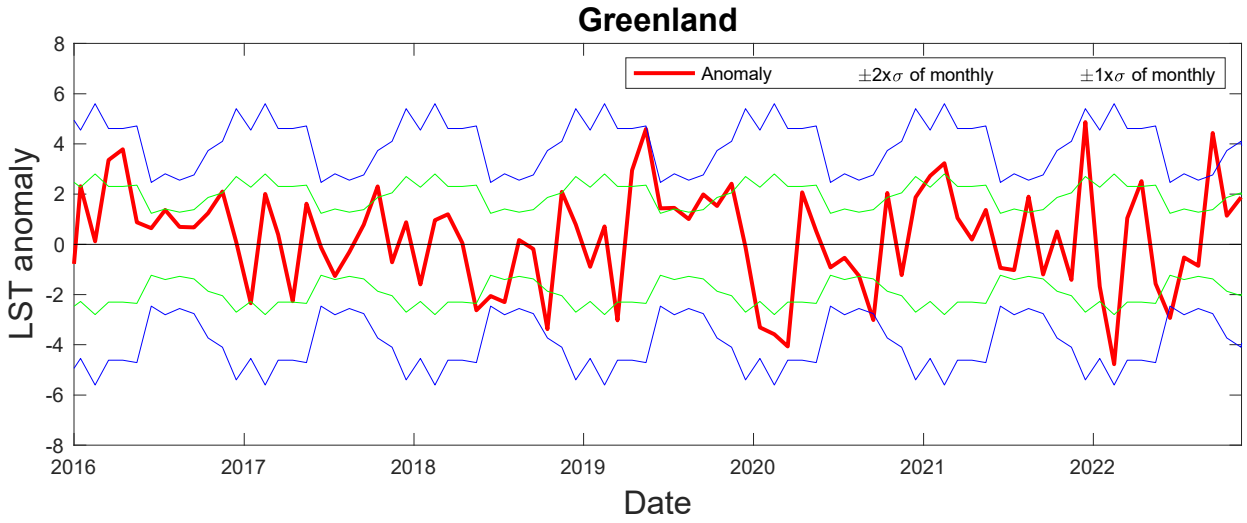
Consistency achieved in the offline LSA output



Ice-albedo feedback observed in Greenland from long-term satellite product anomaly







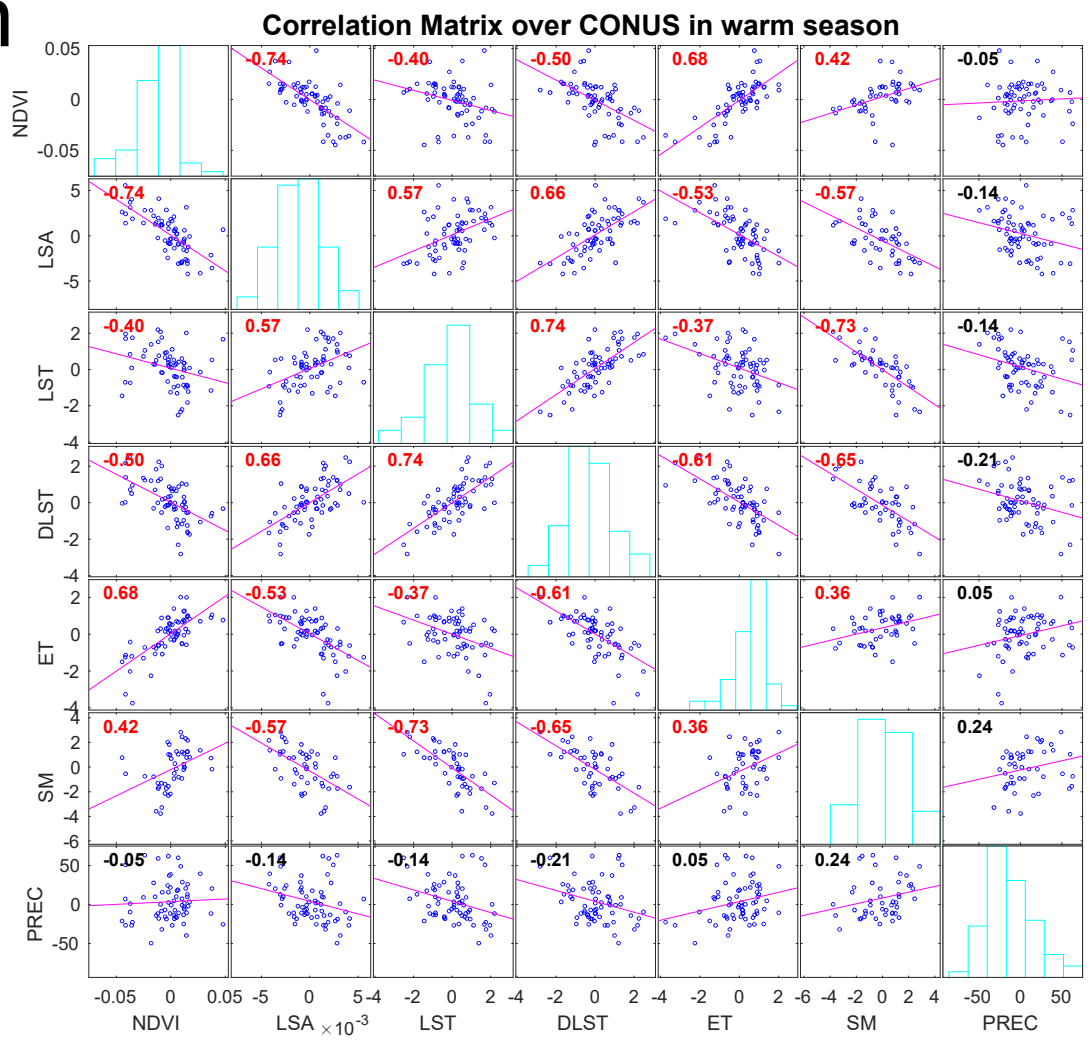
Anomaly correlation - CONUS

Dataset in the following analysis:

- Climatology of each parameter is since 2012 except soil moisture
- Anomaly used here is since 2015, restricted by availability of soil moisture

Features

- NDVI vs. LSA (reduce)
- LST vs. NDVI (suppress in warm season)
- NDVI vs. ET (increase)
- SM vs. NDVI (increase)
- Diurnal LST vs. ET (suppress)
- LST vs. SM (reduce)
- A smaller range is more recommended for precipitation analysis



Vegetation Index and Green Vegetation Fraction

November 2022

Accomplishments / Events:

- Generated 7 year climatology of top of canopy NDVI and EVI for the month of September.
- Generated September 2022 mean VIs and compared to September VI climatology.
- Produced VIIRS monthly GVF anomaly maps for October 2022 and found that GVF is lower than average year in large area of Europe and southwest of China

Overall Status:

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

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

Issues/Risks:

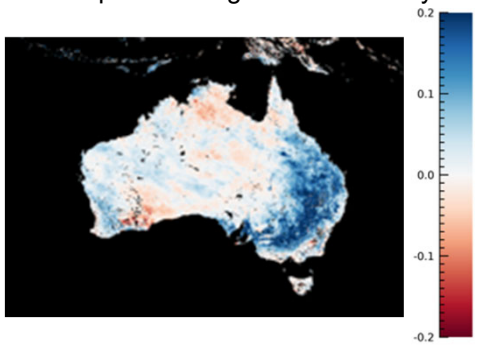
None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
1km global VIIRS VI and GVF code ready for delivery	Dec-22	Dec-22		
Report on methods for improving consistency between ABI and VIIRS VI	Feb-23	Feb-23		
NOAA-21 NVPS products Beta Maturity	May-23	May-23		
FY24 Program Management Review	Jun-23	Jun-23		
Annual algorithms/ products performance report	Aug-23	Aug-23		
Calibration/ Validation update for SNPP and NOAA20 VI and GVF products,	Sep-23	Sep-23		
Ongoing support for JPSS-2 pre- and post-launch testing	Sep-23	Sep-23		

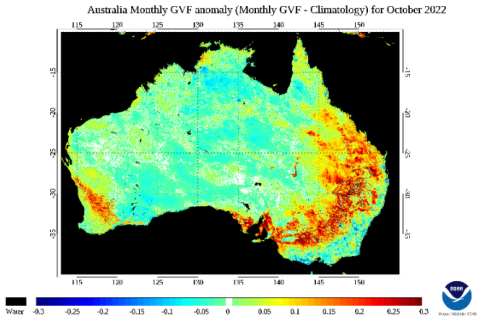
Highlights:

Effect of extended La Niña event is visible in eastern Australia in both VI and GVF anomalies. Above average vegetation is seen in both data sets in October 2022.

Blue represents high NDVI anomaly



Red represents high GVF anomaly

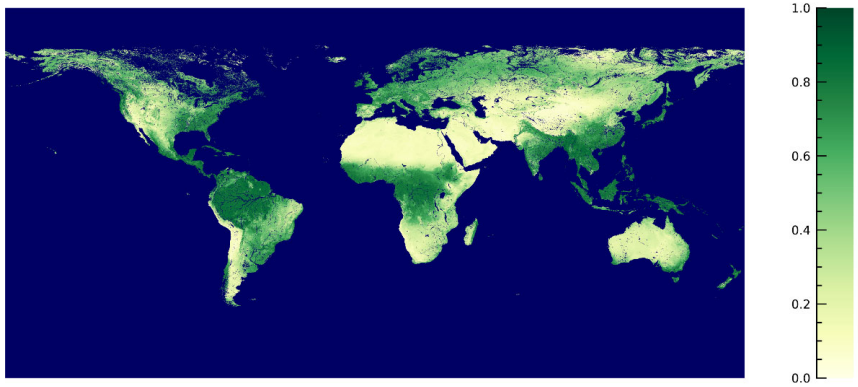


Procedure for generation of October NDVI and EVI climatology

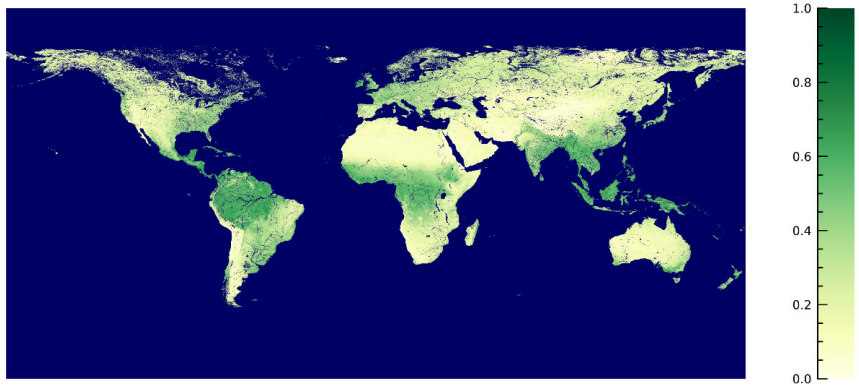
- Assemble reflectance/ VI tiles from GVF intermediate data into global weekly data sets (4 per month)
- Find mean VI values for each October of 7 previous years (2012-2019, except 2014, which was not available)
- Calculate mean of these mean values to obtain October mean climatology
- Find mean VI values from 4 weeks in October 2022 and make difference images relative to October mean climatology

October climatology (7 years)

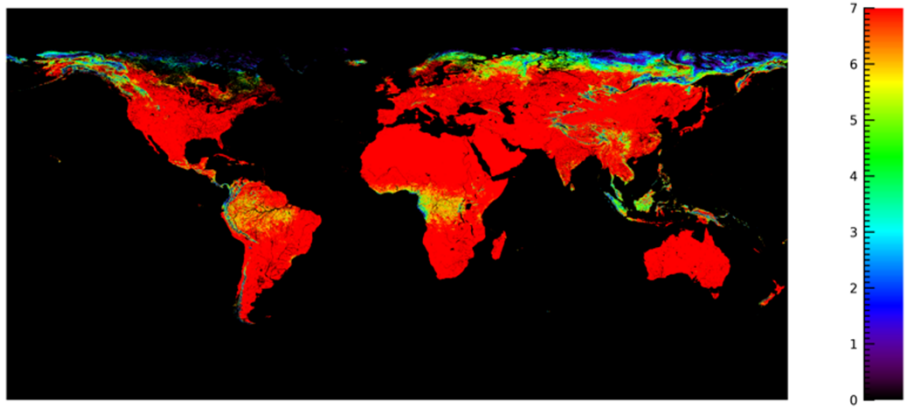
NDVI



EVI



Count of available pixels



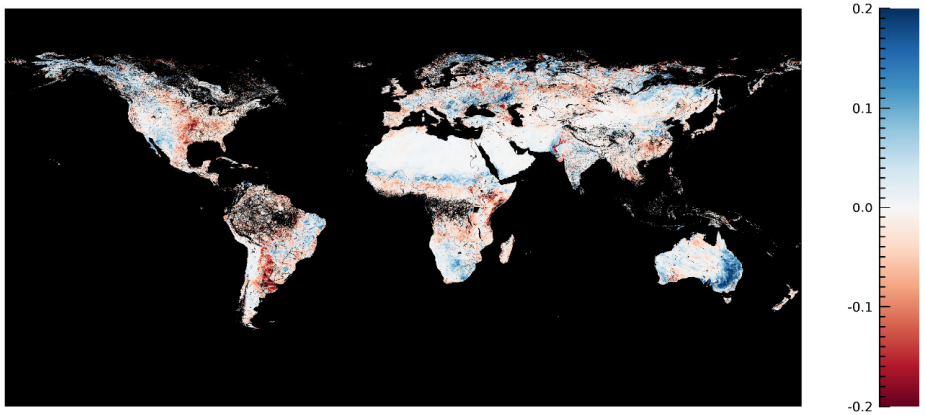
October 2022 monthly mean

NDVI

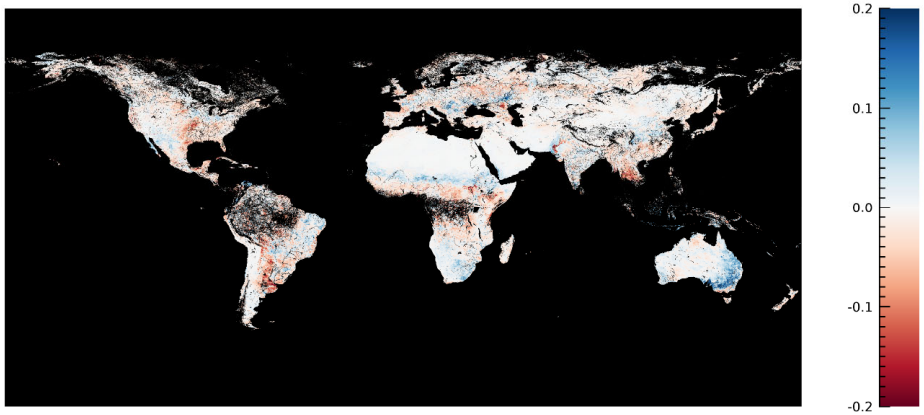
EVI

October 2022 – climatology differences

NDVI



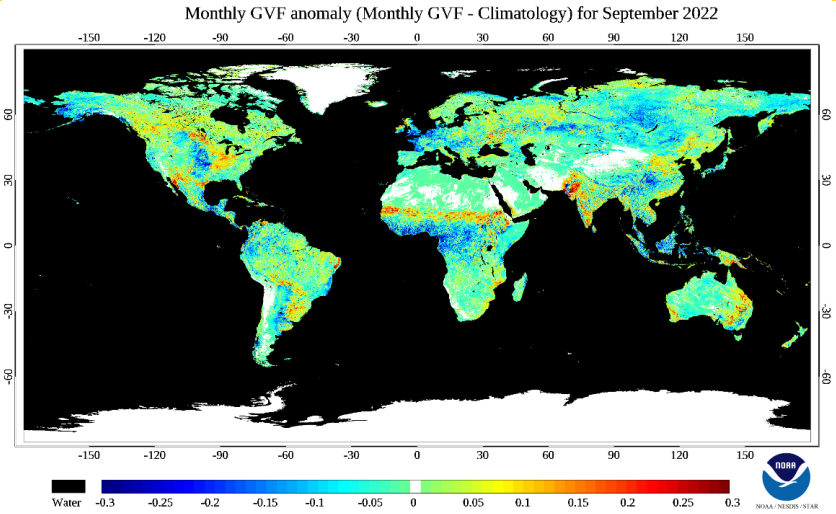
EVI



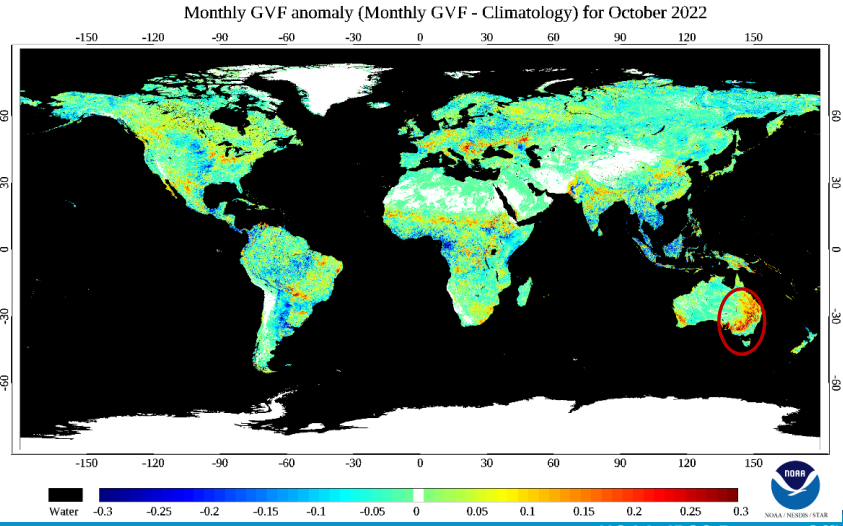
- VI greater than average in eastern Australia: La Niña
- VI less than average in central/ southern North America: heat and drought
- VI less than average in central/ southern South America: cause unknown
- VI difference pattern in Africa (high in north and south, low near equator): cause unknown

VIIRS GVF anomaly for October 2022

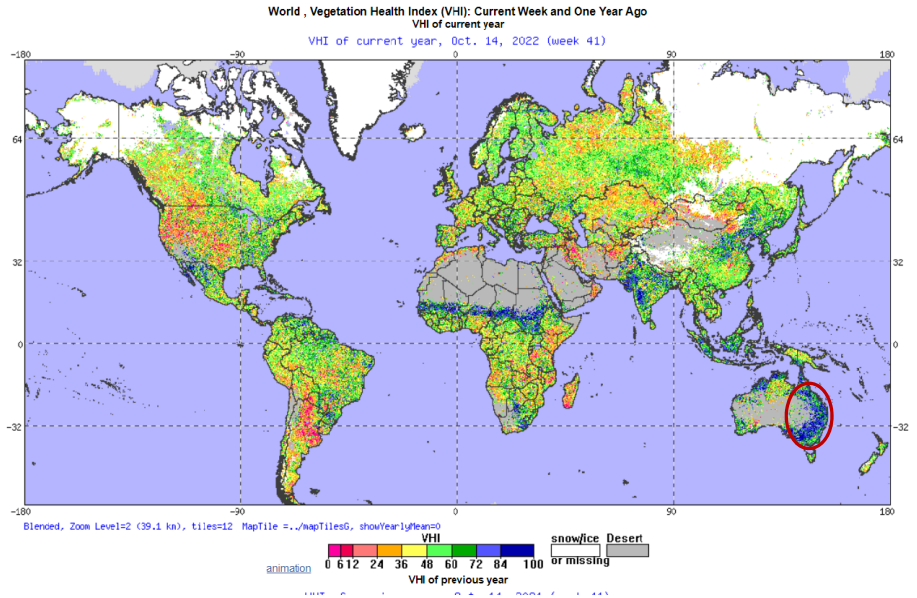
Sep 2022



Oct 2022



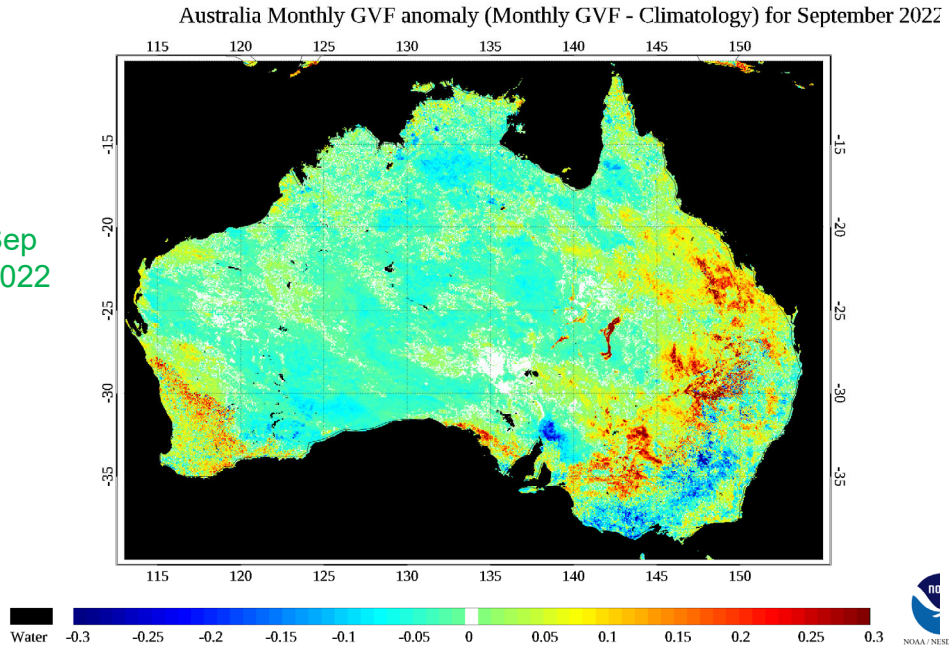
Vegetation health index (Oct 2022)



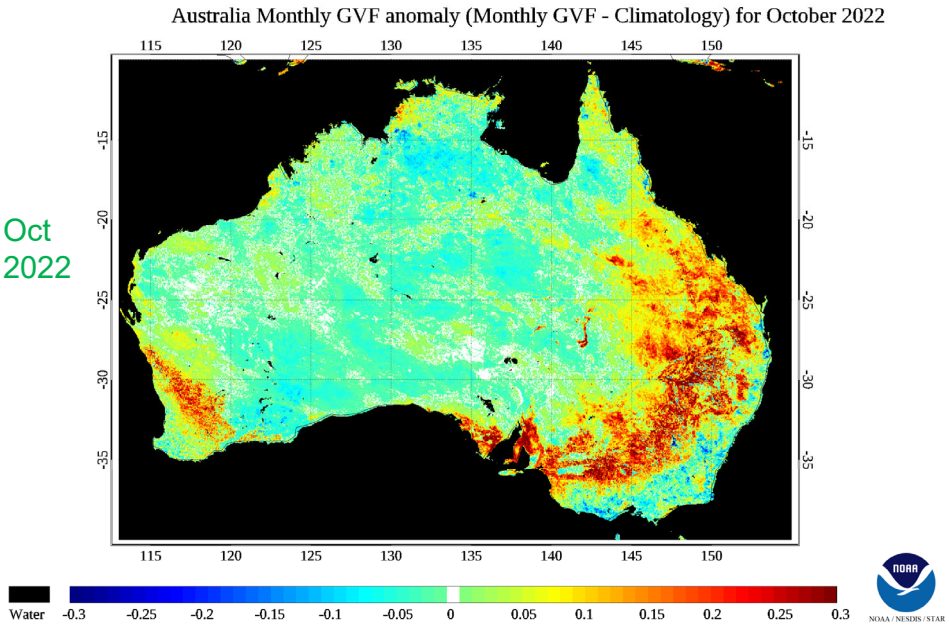
- VIIRS GVF in October 2022 is higher than average year in the east of Australia
- The Vegetation health index map also showed the favorable vegetation condition in Oct 2022 in the east of Australia

More vegetation in eastern Australia in Oct 2022

Sep 2022



Oct 2022



- The area of positive vegetation anomaly increased significantly in the east of Australia from September 2022 to October 2022
- A La Niña event has been declared for the third year in a row. Eastern and northern Australia are wetter than in normal years.
- The 3-year La Niña series resulted in lush grasslands (more green vegetation)

https://theconversation.com/lush-grasslands-higher-allergy-risks-what-hay-fever-sufferers-can-expect-from-another-la-nina-season-189982?utm_source=linkedin&utm_medium=bylinelinkedinbutton

Leaf Area Index

November 2022

Accomplishments / Events:

- Expand BELMANIP2 sites to 3*3 km area, and got more training data, apply the strict criteria to screen the suspicious data. The new dataset shows good performance compared with previous dataset, and also consistent results in k-fold cross validation.
- Define the convex hull for each biome type, to exclude the training dataset far from the cluster, and thereafter use the defined polygon to mark the input data in the hull or not.
- Improve the time series smoothing and gap filling method for real time LAI generation, use the adaptive SG to create the LAI envelop and iterate to remove the outliers.
- Prepared the LAI test data for the model test.

Overall Status:

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

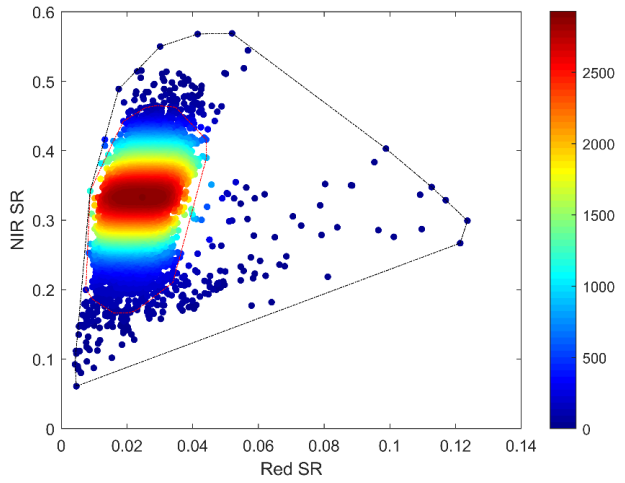
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

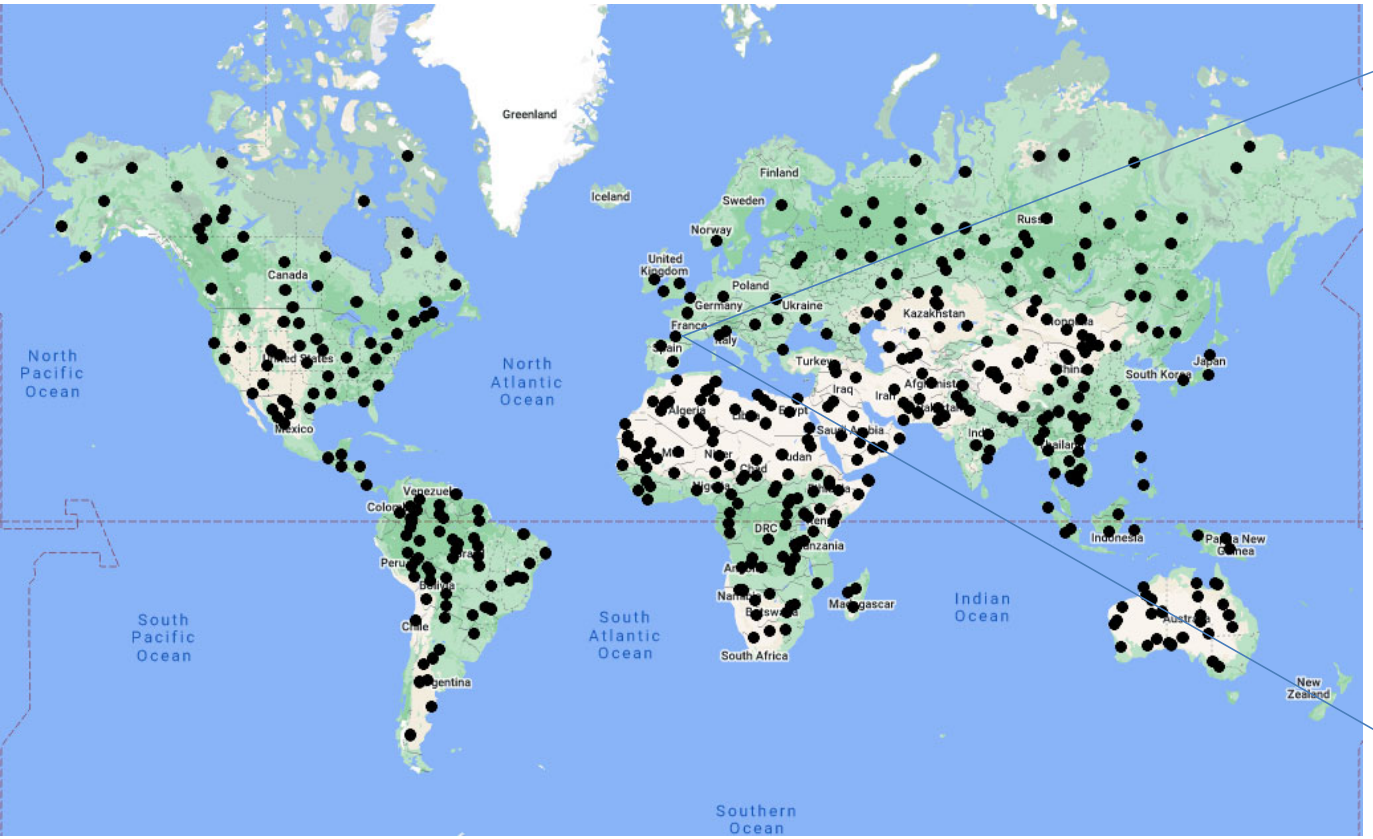
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Quality Monitoring Concept and Long-term Maintenance Concept defined	Oct-22	Oct-22	Oct-22	
Experimental dataset produced for model test	Oct-22	Nov-22		
Development processing system and Initial Information Technology (IT)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

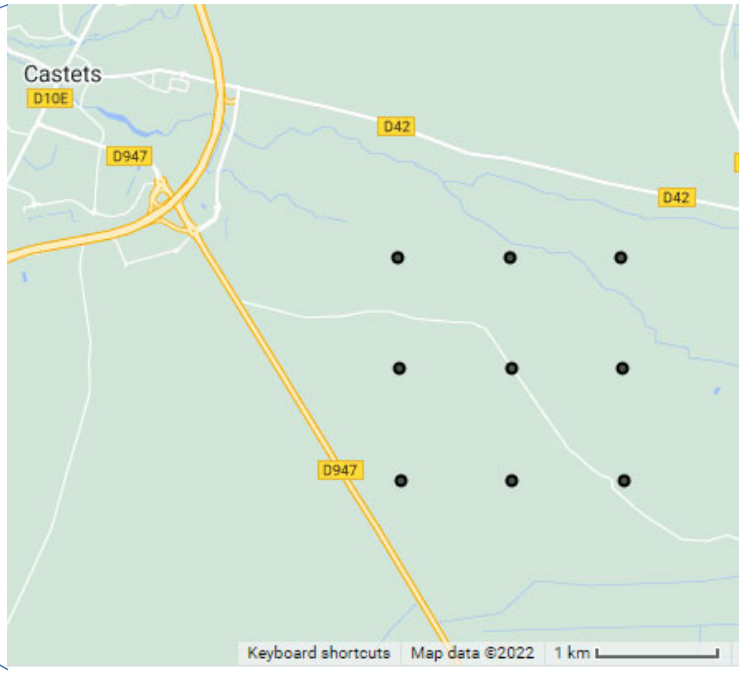
Highlights:



Expand the training dataset from single BELMANIP2 sites to 3*3 km area, and use the convex hull the refine the input data (via Red and NIR space)

Expand training data set at the BELMANIP2 3*3 km





Since the BELMANIP2 445 sites data is not enough for some biome types (e.g. evergreen broadleaf forest), expand the data from single point to 3*3 km data. So 4005 sites in 9 years (2013-2021) Total matchup > 450,000

New Dataset performance compared with the precious data

EBF performance using the new dataset.

Statistics Items	Value
Training RMSE	0.2278
Training R2	0.932
Validation RMSE	0.3157
Validation R2	0.8797

EBF performance using the previous dataset.

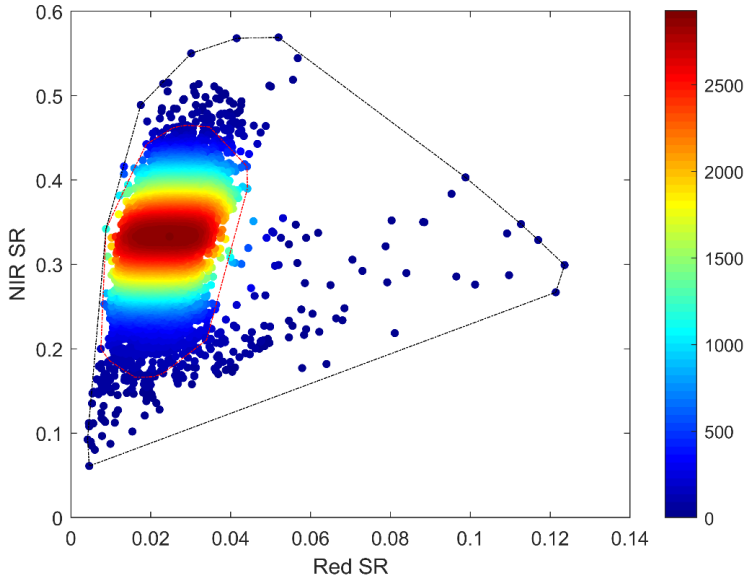
Statistics Items	Value
Training RMSE	0.3478
Training R2	0.8667
Validation RMSE	0.4142
Validation R2	0.7899

Overall performance using the new dataset.

Statistics Items	Value
Training RMSE	0.1319
Training R2	0.9908
Validation RMSE	0.1729
Validation R2	0.9842

Overall performance using the previous dataset.

Statistics Items	Value
Training RMSE	0.1864
Training R2	0.9817
Validation RMSE	0.2495
Validation R2	0.9679

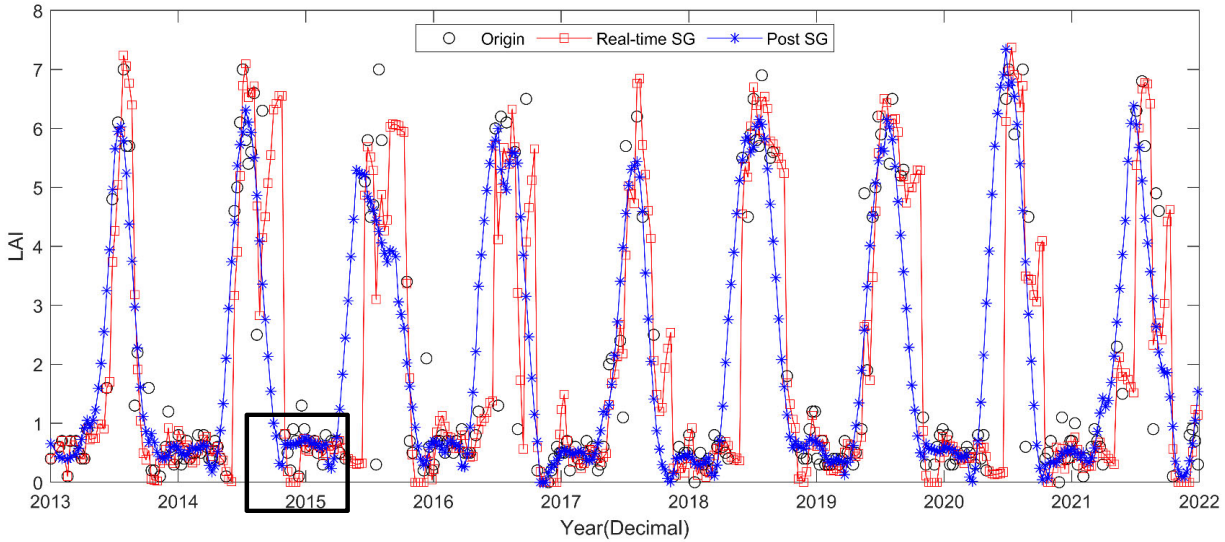


The convex hull of the input Red/NIR data (Evergreen Broadleaf Forest), the black polygon is the original one, while the red is the refine one, which will be use for QC

LAI Time Series Smoothing and Gap Filling

Pixels failed in cloud mask or heavy aerosol detection.

- Training dataset screening (both SR and LAI)
- LAI product post processing (gap filling & smoothing).
- For LAI, adaptive S-G filter is used (2 iteration to improve the filter)
  - First SG, calculate the weight, the far below the envelop, the smaller weight assigned.
  - Second SG, filtering using the weighted data
- For SR, BRDF has big impact on time series, smoothing method is not as good as vegetation.
  - Add blue band threshold according the prior knowledge. |R_Blue – R_Blue0| < K(D – D0| + L



Vegetation Health

November 2022

Accomplishments / Events:

- Preparing to add NOAA-21 vegetation health products to the suite of JPSS vegetation health product
- Vegetation Health product and GVF products are in use for synergistic applications and anomaly resolutions.

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			

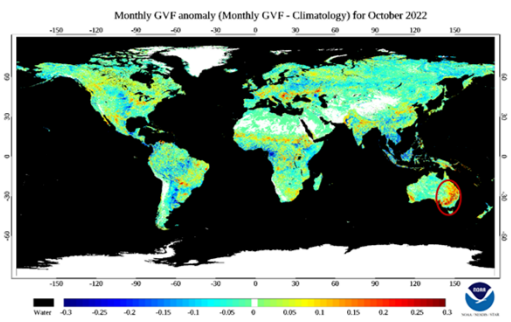
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

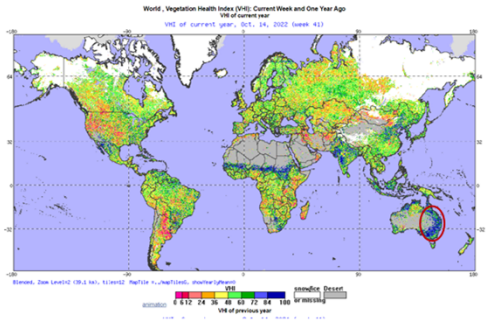
Issues/Risks:

None

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
NOAA-21 Vegetation Health Beta Maturity	Jul-23	Jul-23		

Synergistic use of Vegetation Health and GVF products





- VIIRS GVF in October 2022 is higher than average year in the east of Australia
- The Vegetation health index map also showed the favorable vegetation condition in Oct 2022 in the east of Australia

Ocean Color

November 2022

Accomplishments / Events:

- Collaborative work with CCNY on, (1) the comparison of concurrent LISCO reflectance measurements with NOAA CoastWatch satellite data products (VIIRS-SNPP, VIIRS-NOAA 20, OLCI-S3A & OLCI-S3B)
- Collaborative work with CCNY on the estimation of slope variances from polarimetric measurements

Overall Status:

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

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

Issues/Risks:

Reviewing NDE Migration/J2 Beta Deliveries to NCCF to minimize delays for end users to access J2 data as early as possible without compromising quality

Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Complete ocean color data processing flow for VIIRS-J2 for global oceans	May-23	May-23		
J2 Beta Maturity for Ocean Color	Sep-23	Sep-23		
In situ data collections from OC Cal/Val team including NOAA dedicated cruise and other opportunities, particularly for VIIRS-J2 OC validation	Aug-23	Aug-23		
Improvement of the OCView tool or web presentation, product consistency	Aug-23	Aug-23		
Mission-long VIIRS OC data reprocessing using improved MSL12	Jun-23	Jun-23		

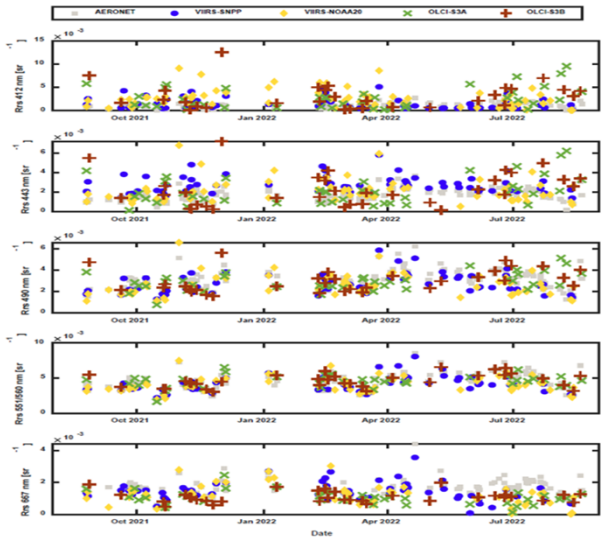


Figure Remote sensing reflectance time series for the 412, 443, 490, 551/560 and 667 nm bands.

Sea Surface Temperature

November 2022

Accomplishments / Events:

- Reviewed FY23 budget allocation for JSTAR SST. Propose reallocating some contracts funding to hardware refresh due to age of IT systems, large data volumes and FY22 IT procurement shortfall. Will provide more information in December for JSTAR consideration.
- Preparing for NOAA-21 SST products and upcoming maturity reviews.

Overall Status:

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

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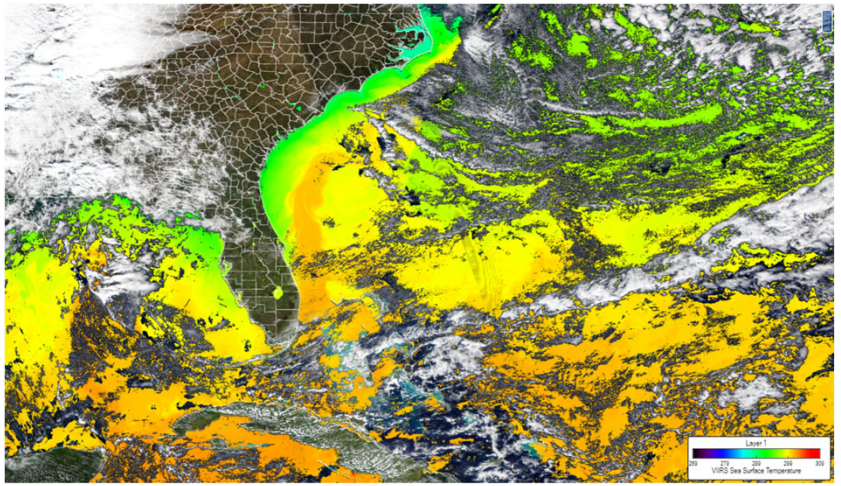
Issues/Risks:

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

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

Highlights: SST product from JSTAR Mapper, showing the Gulf Stream



VIIRS Polar Winds

November 2022

Accomplishments / Events:

- **VIIRS Tandem Winds Show Superior Quality over Single JPSS Winds:** The experimental VIIRS Tandem Winds product that uses the Enterprise framework for a triplet of M15 (IR, 11 μm) overpasses from the combination of NPP and NOAA-20 VIIRS has been running at CIMSS since April 2021. Validation of the three-satellite tandem winds with rawinsonde data winds (either NPP-N20-NPP or N20-NPP-N20) shows improved error statistics over the single-satellite winds (N20 or NPP) winds. Similar studies with two-orbit tandem winds are in progress.
- **Resolution of a VIIRS Polar Winds Remapping Issue:** The winds science team worked with the Algorithm Scientific Software Integration and System Transition Team (ASSISTT) to verify a software update that corrected an issue with the remapping of data used as input by the winds algorithm. The quality and coverage of the VIIRS wind product data generated with this fix were subsequently verified. ASSISTT delivered the software fix to NDE for operational implementation.

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.*

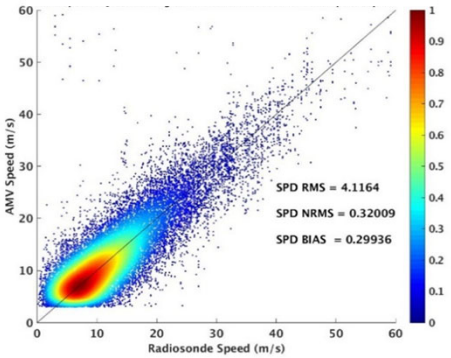
Issues/Risks:

None

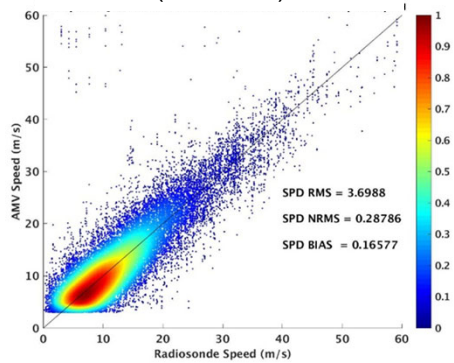
Milestones	Original Date	Forecast Date	Actual Completion Date	Variance Explanation
Transition VIIRS tandem “doublet” winds from heritage to Enterprise algorithm in FW2.x	Apr-23	Apr-23		
Evaluate the impact of VIIRS tandem winds on NWP forecasts	Jun-23	Jun-23	Partially complete	
Generate VIIRS SWIR, DNB, “doublet” tandem winds over a 1-2 month period for use in forecast impact experiments by NWP Centers	Jul-23	Jul-23		
Evaluation of VIIRS DNB winds and impact to NWP	Sep-23	Sep-23		
NOAA-21 VIIRS Polar Winds Beta Maturity	Sep-23	Sep-23		

Highlight: Single and Tandem VIIRS Winds Compared to Rawinsondes

NOAA-20 Single-Satellite Winds



Tandem (3-satellite) Winds



NUCAPS Products

Accomplishments / Events

November 2022

- NUCAPS team successfully completed the DAP delivery to the ASSISTT team, and testing of various new updates incorporated into the DAP. Updates going into the new DAP include, (1) Averaging Kernels for both JPSS and MetOp-B/C, (2) Temperature Damping factor update for JPSS (NOAA-20) to improve lower troposphere temperature bias, (3) New ozone climatology to improve O3 retrievals, (4) CO2 first guess updates, and (5) Surface corrections.
- NUCAPS team revisited NOAA-21 ready NUCAPS product generation in preparation for the upcoming first light NOAA-21 first light CrIS data. Revisited and tested the IR and microwave tuning, and first guess cloudy and clear regression methodologies in preparation for the NOAA-21 updates, and continuation of Validation Archive (VALAR) data sets.
- Completed a study and analysis of three severe thunderstorm (downburst) wind events over southern England and Wales that occurred between 23 October and 2 November 2022. Overall, as shown in the figure, the early afternoon (1222 UTC) NOAA-20 NUCAPS soundings qualitatively indicate the strongest signal for severe thunderstorm and downburst occurrence.
- Prepared initial draft presentations for a set of four NUCAPS abstracts for a presentation at the upcoming AMS-2023 conference.
- One of the NUCAPS team members, Nick Nalli participated as the as the lead AEROSE scientist on the 2022 NOAA PNE/AEROSE cal/val campaign, NOAA Ship Ronald H. Brown, Atlantic Ocean, 1 November to 9 December 2022. Dedicated radiosondes were launched for NOAA-20 and Metop-B,-C overpasses for validation of NUCAPS and other validation experiments.

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-222	11/04/22	
NOAA-21 Ready NUCAPS product evaluations with the upcoming CrIS first light data and ATMS TDRs, and user support for the CrIS Beta Maturity Review	Jan-23	Jan-23		Awaiting for the NOAA-20 CrIS first light data
Implementing Validation Archive (VALAR) and focus-day data collections for NOAA-21 NUCAPS product validations	May-23	May-23		
NOAA-21 NUCAPS Product Beta Maturity	May-23	May-23		
NOAA-21 NUCAPS T(p), q(p), O3(p) Provisional Maturity	Nov-23	Nov-23		

Overall Status:

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

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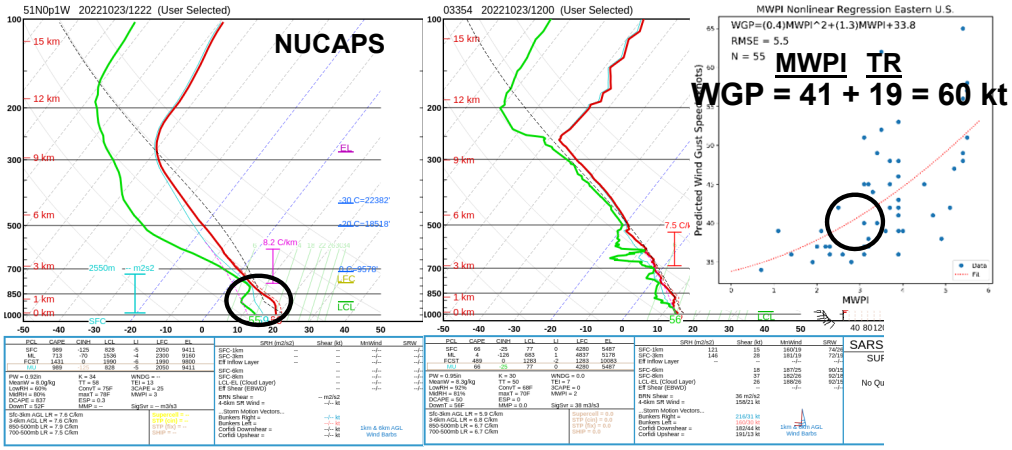
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

Issues/Risks:

None

England Downbursts Study Part 1: 23 October 2022



For the 23 October 2022 Hampshire downburst wind event, the 1222 UTC NOAA-20 NUCAPS sounding indicated a strong signal for downburst occurrence with gust potential of 60 kt. A downburst wind gust of 54 kt was recorded at Middle Wallop Airport, Hampshire (55 miles SW of London) at 1515 UTC.

MiRS Products

November 2022

Accomplishments / Events:

- Following the successful JPSS-2 launch on November 10th, ATMS data became available on November 21st. The MiRS science team began immediately processing the data with good results and produced a first light image of global retrieved TPW approximately one day later. Daily processing is continuing and the cal/val activities have begun. The highlighted images show the performance of both MiRS NOAA-21 (JPSS-2) and NOAA-20 ATMS retrieved TPW on November 24th, when the orbits of both satellites were nearly collocated, allowing for a unique opportunity to intercompare performance. Results show that the NOAA-21 retrieval performance is almost identical to that of NOAA-20, indicating that the input SDR data quality is high, and the retrieval is already processing the data correctly with no tuning.

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			

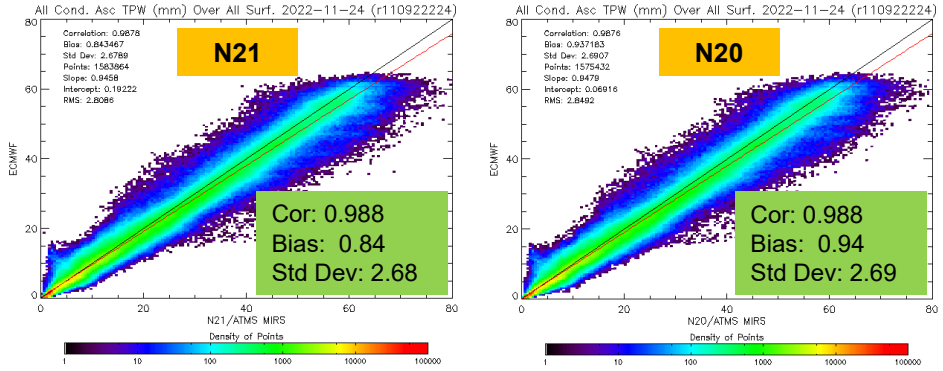
1. *Project has completed.*
2. *Project is within budget, scope and on schedule.*
3. *Project has deviated slightly from the plan but should recover.*
4. *Project has fallen significantly behind schedule, and/or significantly over budget.*

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	Mar-23		
MiRS DAP (v11.9): integrate SFR algorithm updates, code/science improvements, final J2 launch delivery	Jul-23	Jul-23		
NOAA-21 MiRS product validations, Provisional Maturity	Aug-23	Aug-23		

Highlights:



Intercomparison of MiRS NOAA-21 and NOAA-20 ATMS TPW retrieval performance relative to ECMWF analysis on 2022-11-24. Statistics show nearly identical performance.

Snowfall Rate

November 2022

Accomplishments / Events:

- A standalone Enterprise SFR system has been developed and delivered to ASSISTT. The system includes NOAA-21 (pre-launch algorithm), NOAA-20, S-NPP, NOAA-19, Metop-C and Metop-B. The SFR team worked with ASSISTT to ensure the package meets the NCCF standards.
- Generated first light NOAA-21 SFR images and submitted to the JPSS program and JSTAR.
- Completed building a new SFR website (http://sfr.umd.edu). The page is user friendly and has a range of functionalities to facilitate its use. The SFR product from five satellites is produced at the Cooperative Institute for Satellite Earth System Science (CISESS) in near real-time using direct broadcast data from University of Wisconsin. Product images are overlaid on Google Maps on the new website. Besides SFR, the website also features an experimental radar-satellite merged snowfall rate product, mSFR.

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Issues/Risks:

None

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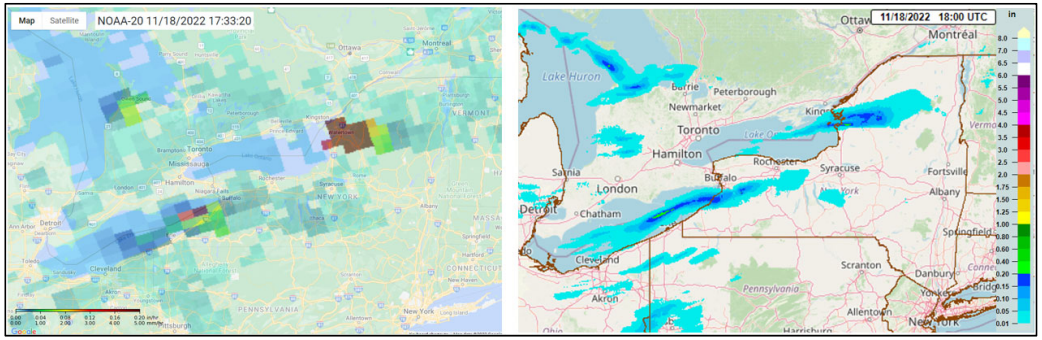
Train a new machine learning snowfall detection model using N21 observations	Apr-23	Apr-23		
Train new machine learning models for 1DVAR initialization and SFR bias correction using N21 observations	Apr-23	Apr-23		
NOAA-21 SFR beta maturity review	May-23	May-23		
Enterprise SFR science code delivery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

Highlights: SFR Captures Intense Lake Effect Snow



Lake effect snow on November 18, 2022. Left: NOAA-20 SFR at 17:33 UTC; right: gauge-corrected Multi-Radar Multi-Sensor (MRMS) precipitation analysis at 18 UTC.

OMPS Ozone (V8Pro, V2Limb & V8TOz)

November 2022

Accomplishments / Events:

- R. Lindsay delivered the new V2Limb Level 1a, 1b and 1g codes / examples to ASSISTT.
- J. Niu confirmed the performance of the ASSISTT implementation of the V8TOz algorithms to generate MetOp-A & -B GOME-2 products in the Cloud in pipeline processing mode.
- L. Flynn participated in planning meetings to prepare to host the GSICS Annual Research and Data Working Group meeting at NCWCP in March 2023.
- Team members are confirming that the codes to read, analyze, plot, monitor and create overpass matchups are ready for the NOAA-21 OMPS records.
- Z. Zhang and J. Niu are revising two submitted journal articles in response to reviewers.
- J. Niu and J Wild prepared two AGU Posters.
- J. Wild participated in the eGMAC meeting.
- E. Beach worked with IT to move the ozone product monitoring pages to an internal location.
- L. Flynn participated in the GEMS Workshop in Seoul Korea.

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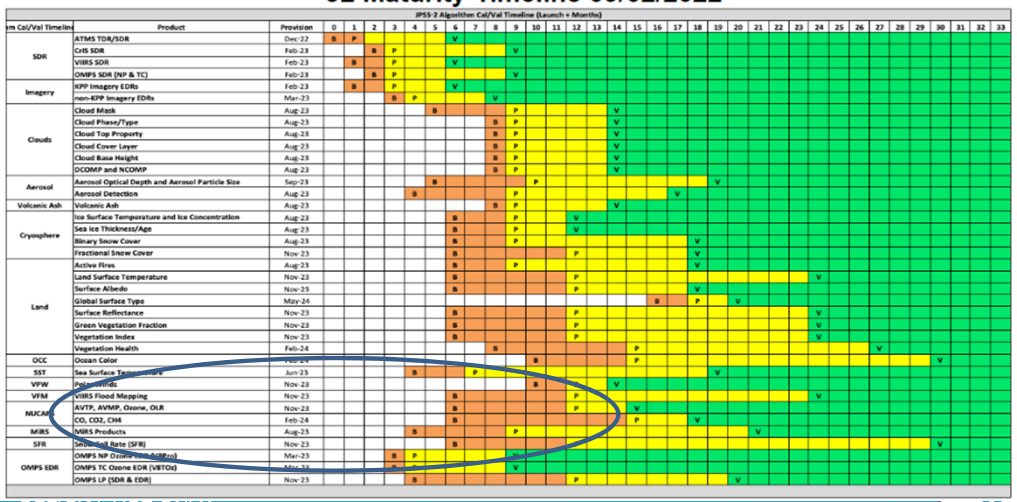
Issues/Risks: None

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	Jan-23		
Document Beta Maturity for V8TOz and V8Pro	Jan-23	Jan-23		
NOAA21 OMPS Ozone V8Pro, V8TOz Beta Maturity	Feb-23	Feb-23		
Update V8TOz and V8Pro tables for NOAA-21 Provisional	Feb-23 Mar-23	Feb-23 Mar-23		

Highlights: Key dates for J2 Ozone Provisional Status are March 2023 for NP and TC, November 2023 for LP

J2 Maturity Timeline 09/02/2022



GCOM-W

November 2022

Accomplishments / Events:

- **AMSR3 Science Team Meeting**: Walt Meier of the National Snow and Ice Data Center and a member of the Cryosphere Team, attended the JAXA GCOM-W/AMSR3 Science Team meeting in Tokyo 7-10 November 2022. Dr. Meier gave a presentation on AMSR2 activities with a focus on NOAA's sea ice products.
- Arctic basin-wide sea ice thickness retrieval paper published: A paper titled "A simple model for daily basin-wide thermodynamic sea ice thickness growth retrieval" by James Anheuser (CIMSS), Yinghui Liu (STAR), and Jeff Key (STAR), has been published in The Cryosphere. The focus of this paper is to develop a retrieval method for estimating thermodynamic sea ice thickness growth from space by linking a thermodynamic sea ice energy balance relation and retrieved snow–ice interface temperature from passive microwave satellite data. The paper is available at https://tc.copernicus.org/articles/16/4403/2022/.
- Reviewing options/schedule for GCOM-W AMSR2 and GOSAT-GW AMSR3 Continuity given funding concerns. GOSAT-GW to launch in Spring 2023 (TBC).

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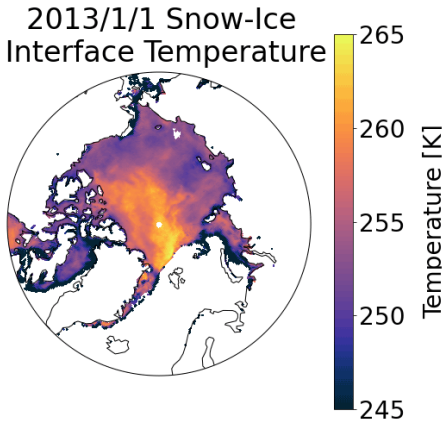
Issues/Risks:

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

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

Highlights: Arctic snow-sea ice interface temperature from AMSR2



Snow–ice interface temperatures on 1 January 2013 derived from AMSR2 radiances, used in estimating sea ice thickness.

JSTAR Mapper and NPROVS

November 2022

Accomplishments / Events:

- JSTAR Mapper Quarterly Meeting held, staff successfully setup password protected version of site to display NOAA-21 data before it becomes provisional and started creating image tiles for the first set of NOAA-21 products, for example, VIIRS, proof that the image generation system is now capable of ingesting and processing NOAA-21 data.
- NPROVS team member Dr Bomin Sun attended the 14th Global Climate Observing System (GCOS) Reference Upper Air Network (GRUAN) Implementation and Coordination Meeting (ICM-14) held in LaReunion Island; A. Reale attended virtually **(Highlight)**
- Work continues to reprocess the NPROVS Special datasets from the GCOS Reference Upper Air network (GRUAN) including a detailed first light dataset which confirmed overall scientific integrity.
- Preliminary results were generated for the NUCAPS v3.1 processing system and are under review

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

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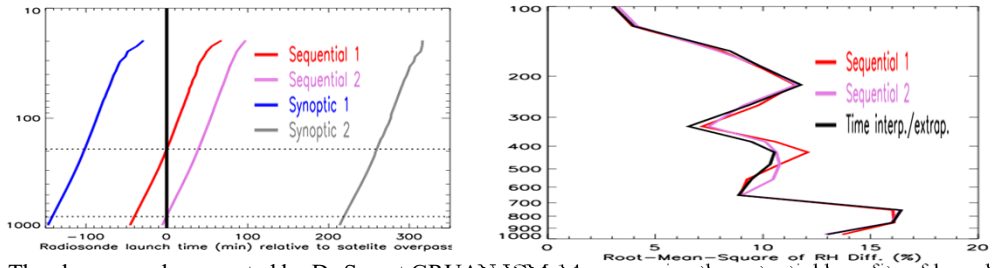
Issues/Risks: None

Highlights: ***Presentation by Dr Sun at GRUAN ICM-14***



The above panels presented by Dr Sun at GRUAN ICM-14 summarize the potential benefits of launching sequential radiosondes synchronized with satellite overpass as part of the JPSS dedicated radiosonde program. The left panel shows vertical temporal (minutes) differences of 4 sondes, the two outer plots are the routine synoptic and the two inner plots are sequential radiosondes launched 30 minutes apart; the black line is the time of satellite overpass. The right side plots are RMS differences for relative Humidity (RH) between NUCAPS soundings minus radiosondes based on each Sequential Radiosonde (Purple and Red) and the combined time interpolated radiosonde (Black) from the sequential radiosondes; sample size is 60. As can be seen the RMS differences for the time interpolated radiosonde is overall reduced signaling potential benefits from interpolating sequential radiosondes in overall satellite product (and sensor) cal/val. Such benefits are considered valuable in the context of climate application and important to promote the continuation of sequential radiosondes launches in JPSS dedicated radiosonde programs.