

***Validated Maturity Science Review
For NOAA-21 VIIRS Imagery***



***Presented by Bill Line
Date: 08/03/2023***

JPSS/GOES-R Data Product Validation Maturity Stages - COMMON DEFINITIONS (Nominal Mission)

1. Beta

- Product is minimally validated, and may still contain significant identified and unidentified errors.
- Information/data from validation efforts can be used to make initial qualitative or very limited quantitative assessments regarding product fitness-for-purpose.
- Documentation of product performance and identified product performance anomalies, including recommended remediation strategies, exists.

2. Provisional

- Product performance has been demonstrated through analysis of a large, but still limited (i.e., not necessarily globally or seasonally representative) number of independent measurements obtained from selected locations, time periods, or field campaign efforts.
- Product analyses are sufficient for qualitative, and limited quantitative, determination of product fitness-for-purpose.
- Documentation of product performance, testing involving product fixes, identified product performance anomalies, including recommended remediation strategies, exists.
- Product is recommended for potential operational use (user decision) and in scientific publications after consulting product status documents.

3. Validated

- Product performance has been demonstrated over a large and wide range of representative conditions (i.e., global, seasonal).
- Comprehensive documentation of product performance exists that includes all known product anomalies and their recommended remediation strategies for a full range of retrieval conditions and severity level.
- Product analyses are sufficient for full qualitative and quantitative determination of product fitness-for-purpose.
- Product is ready for operational use based on documented validation findings and user feedback.
- Product validation, quality assurance, and algorithm stewardship continue through the lifetime of the instrument.

VIIRS Imagery Cal/Val Team (1 slide)

Algorithm Cal/Val Team Members

Name	Organization	Major Task
Bill Line	NESDIS/StAR	Imagery Product Lead
Curtis Seaman	CIRA	Imagery/DNB expert
Steven Miller	CIRA	Imagery/DNB expert
William Straka III	CIMSS/SSEC	Imagery/DNB expert
Don Hillger	CIRA	Imagery expert
Jack Dostalek	CIRA	Imagery expert
Steve Finley	CIRA	IT/data expert
Kumar Gampa	CIRA	Programming expert
Cindy Combs	CIRA	Programming expert
Jorel Torres	CIRA	JPSS Liaison / trainer
Kim Erickson and Josh Reiter	CIRA	Imagery Production / Outreach
CIMSS McIDAS Team	CIMSS	McIDAS X/V Development for VIIRS
Many Users		Imagery Feedback

Product Overview/Requirements (2 slides)

The **VIIRS Imagery EDR** product consists of:

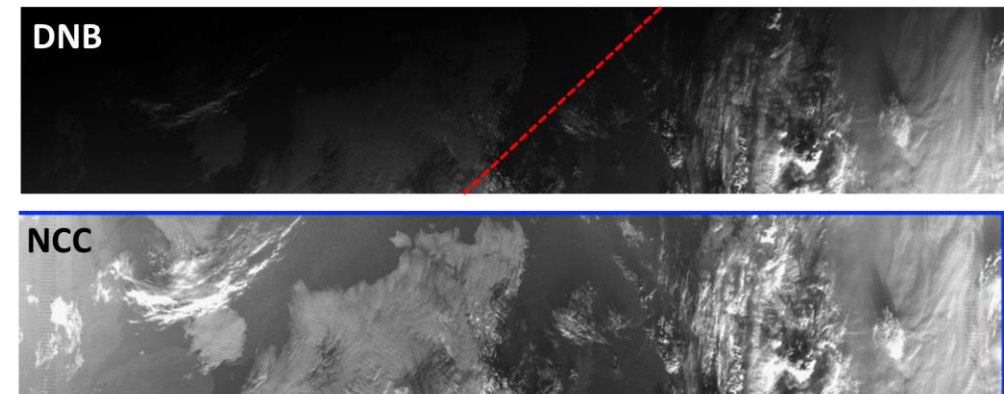
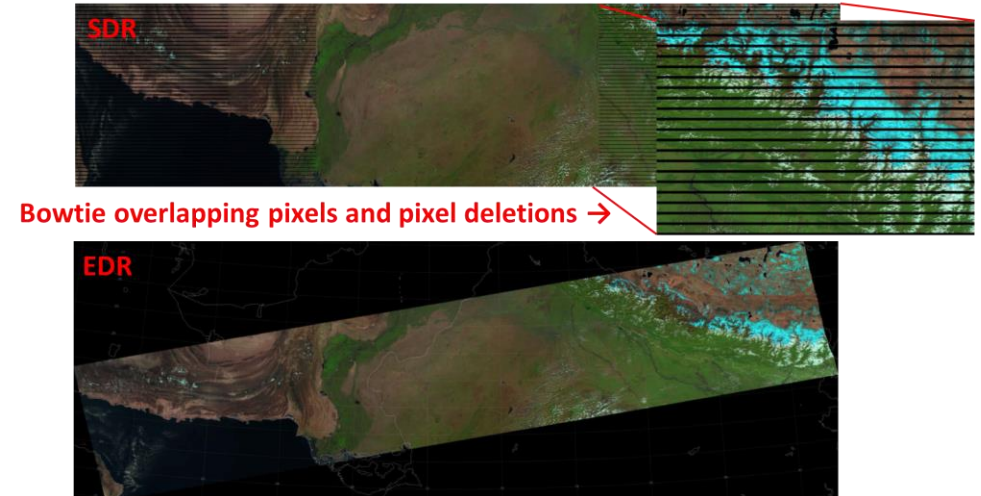
- **16 M-Bands (750 m) and 5 I-Bands (375 m)**
 - Visible and IR radiances/reflectances remapped to the Ground Track Mercator (GTM) grid, eliminating overlapping pixels and bowtie deletions seen in SDR granules.
- **NCC Imagery**
 - The goal of the NCC EDR is to reduce the dynamic range of DNB radiance values (which span 7 orders of magnitude between day and night) by converting it to a quantity with reduced dynamic range (i.e. reflectance) to create images with nearly constant contrast across a given scene.
 - Remapped to GTM

VIIRS Imagery as a **Key Performance Parameter (KPP)** reads as follows:

- VIIRS Imagery EDR for (8) bands I1, I3, I4, I5, M14, M15, M16, and NCC for latitudes greater than 60°N in the Alaskan region
- 87-Minute data latency

* There are no (quantitative) requirements that address the quality of the Imagery products, so imagery is assessed qualitatively. The Imagery user helps to decide if the Image quality is acceptable. Therefore, including the users in the Cal/Val process for Imagery is a significant task/consideration.

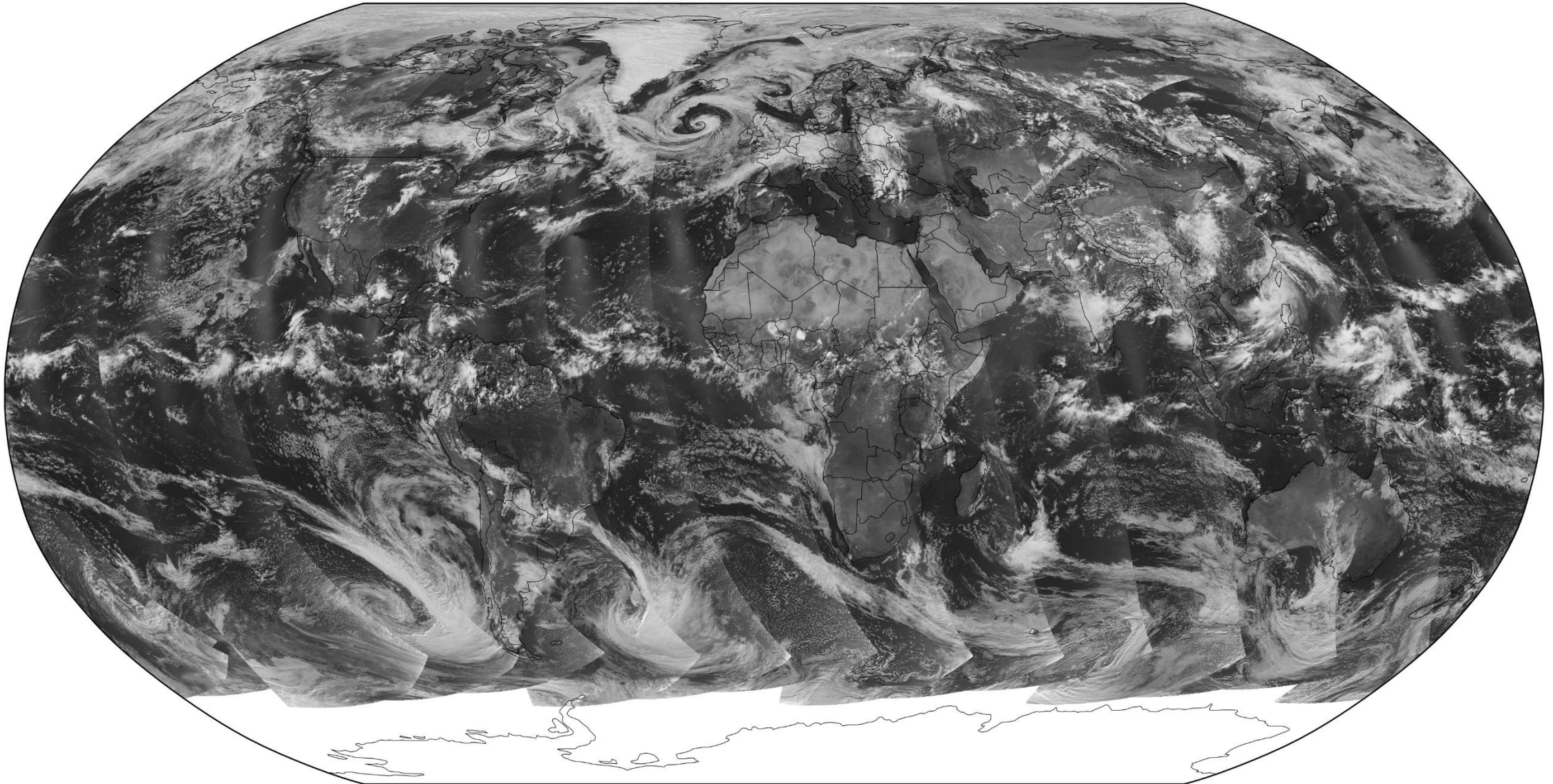
VIIRS SDR vs. EDR



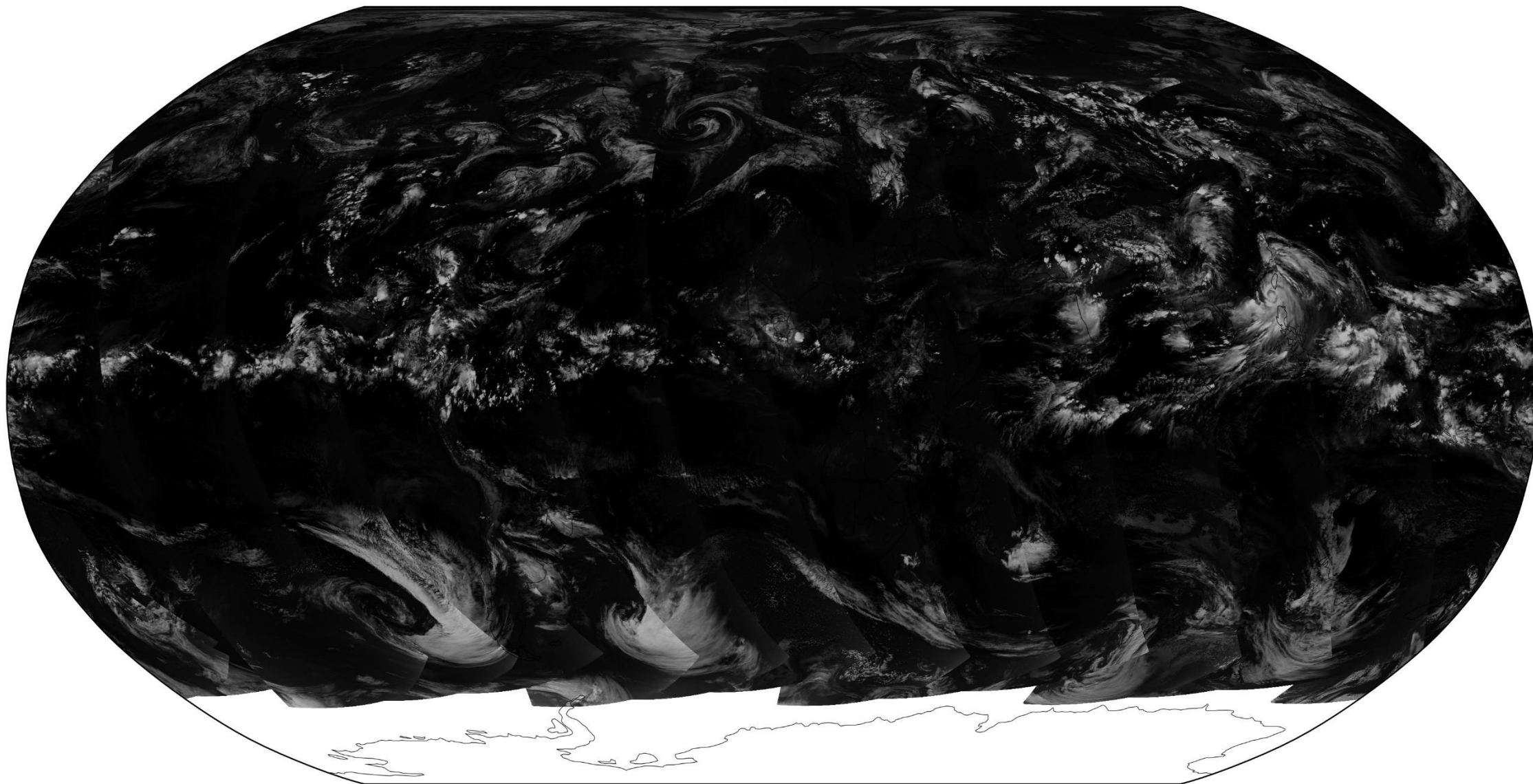
- Validation data sets (type, periods, coverage)
 - Time Period of Evaluation 7/24 – 8/3
 - All bands for EDR Imagery (KPPs and non-KPPs), Popular Multispectral Imagery Products
 - A variety of scenes
 - Ocean, Land, Coast, Ice, Deep Convection, Wildfires, Day/Night
- Validation strategies / methods
 - Qualitative Analysis of Imagery
 - Created using various software methods (PYTHON, IDL, AWIPS, McIDAS)
 - Comparison with NPP and NOAA-20
- Validation results
 - Since Provisional, have reviewed additional scenes, made more comparisons
 - Results continue to be very positive. Imagery is of operational quality, and compares well with S-NPP and NOAA-20
 - Only subtle striping observed in some channels/scenes
- Engaged users for feedback
 - GINA, CIMSS/SSEC, CIRA, NWS, Colorado SoM - EOG
- Long term monitoring readiness
 - Numerous display capabilities for real-time and archived datasets
 - CIRA Polar Slider, McIDAS-X/V, AWIPS-II, IDL, Python
 - Data collection
 - GRAVITE, DB via GINA and CIMSS, CLASS

- **Global Composites**
- All 22 bands over a few scenes
- Multispectral Imagery
- Near Constant Contrast
- User Feedback

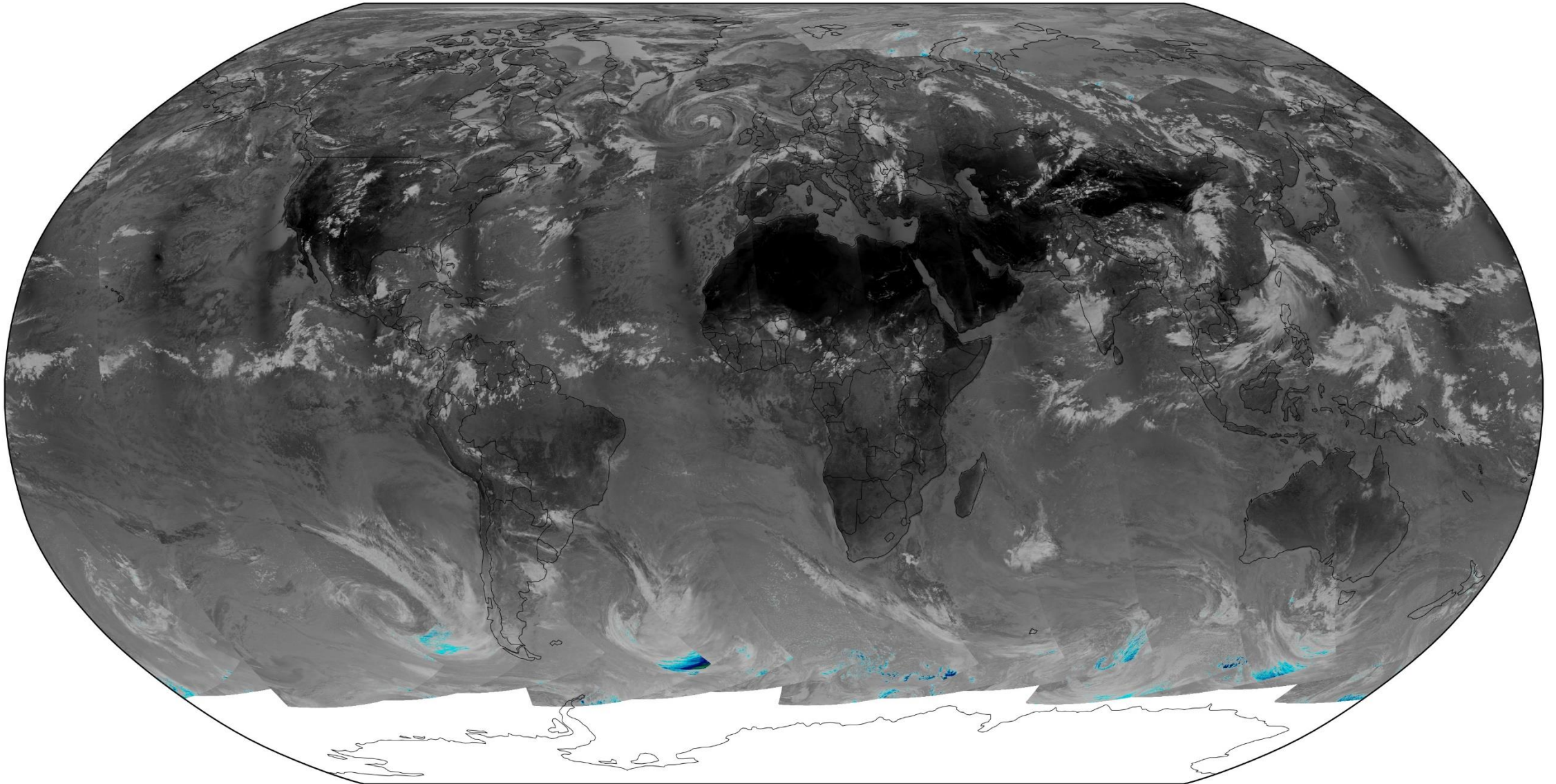
20230727 NOAA-21 VIIRS M05



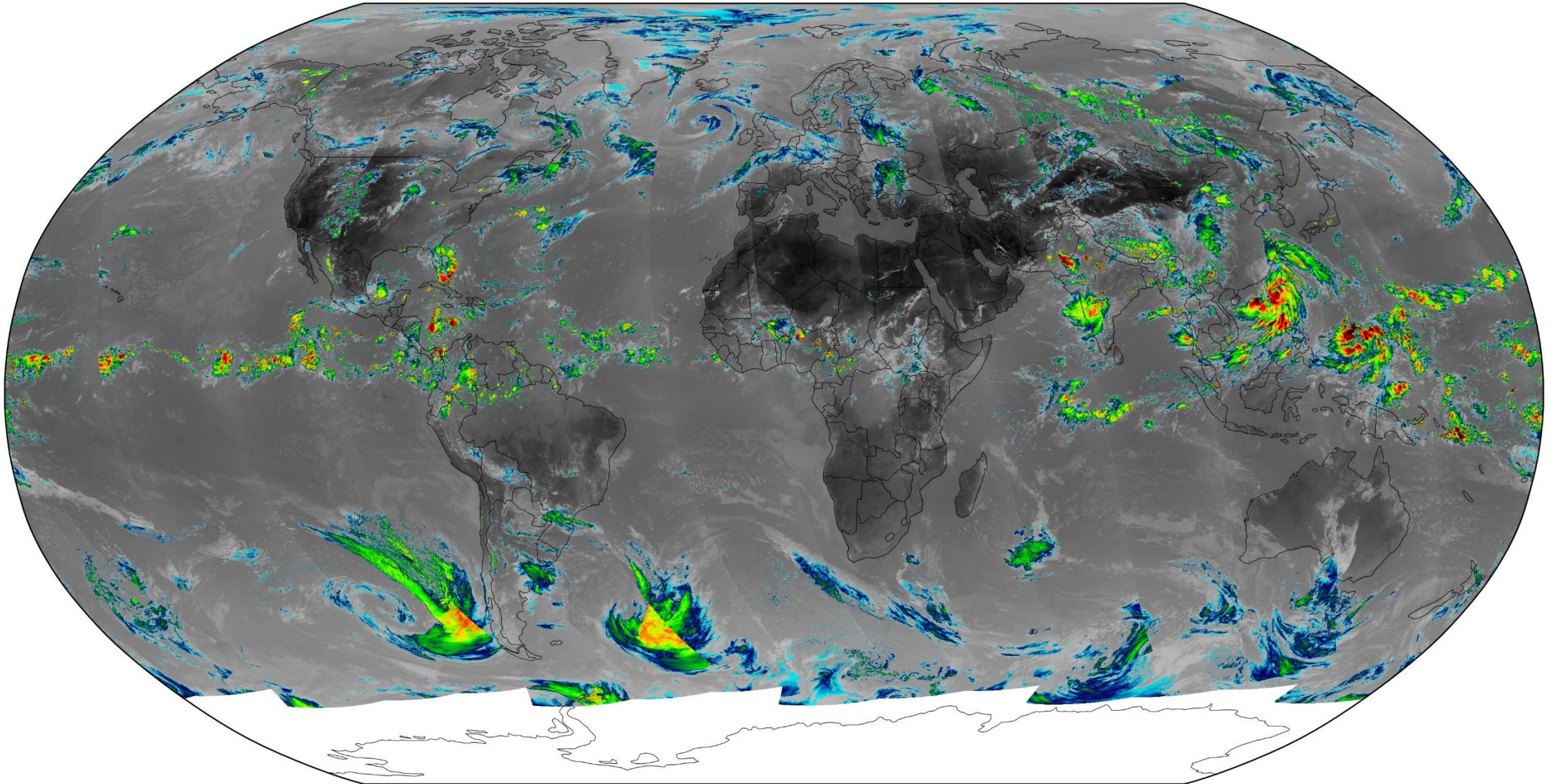
20230727 NOAA-21 VIIRS M09



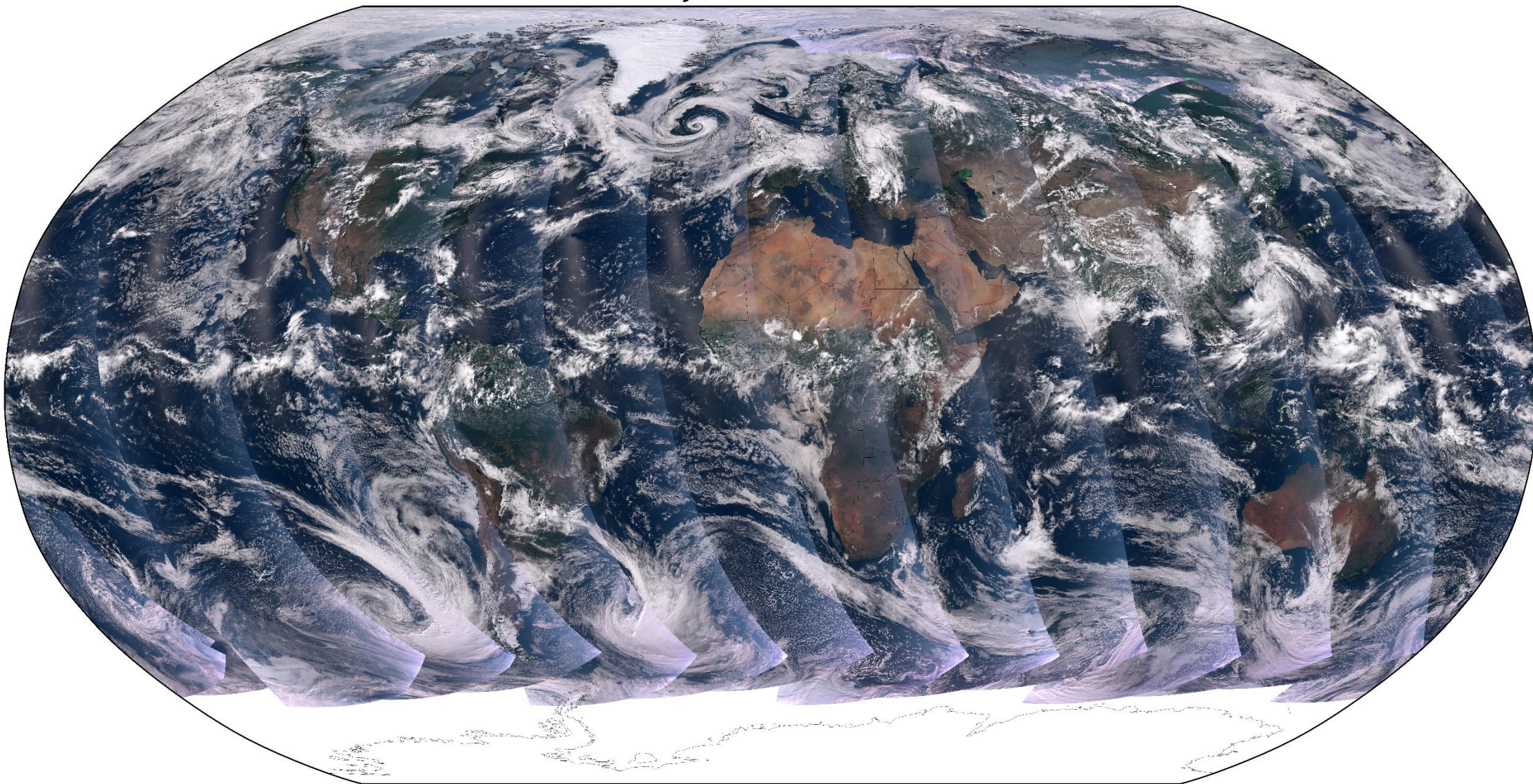
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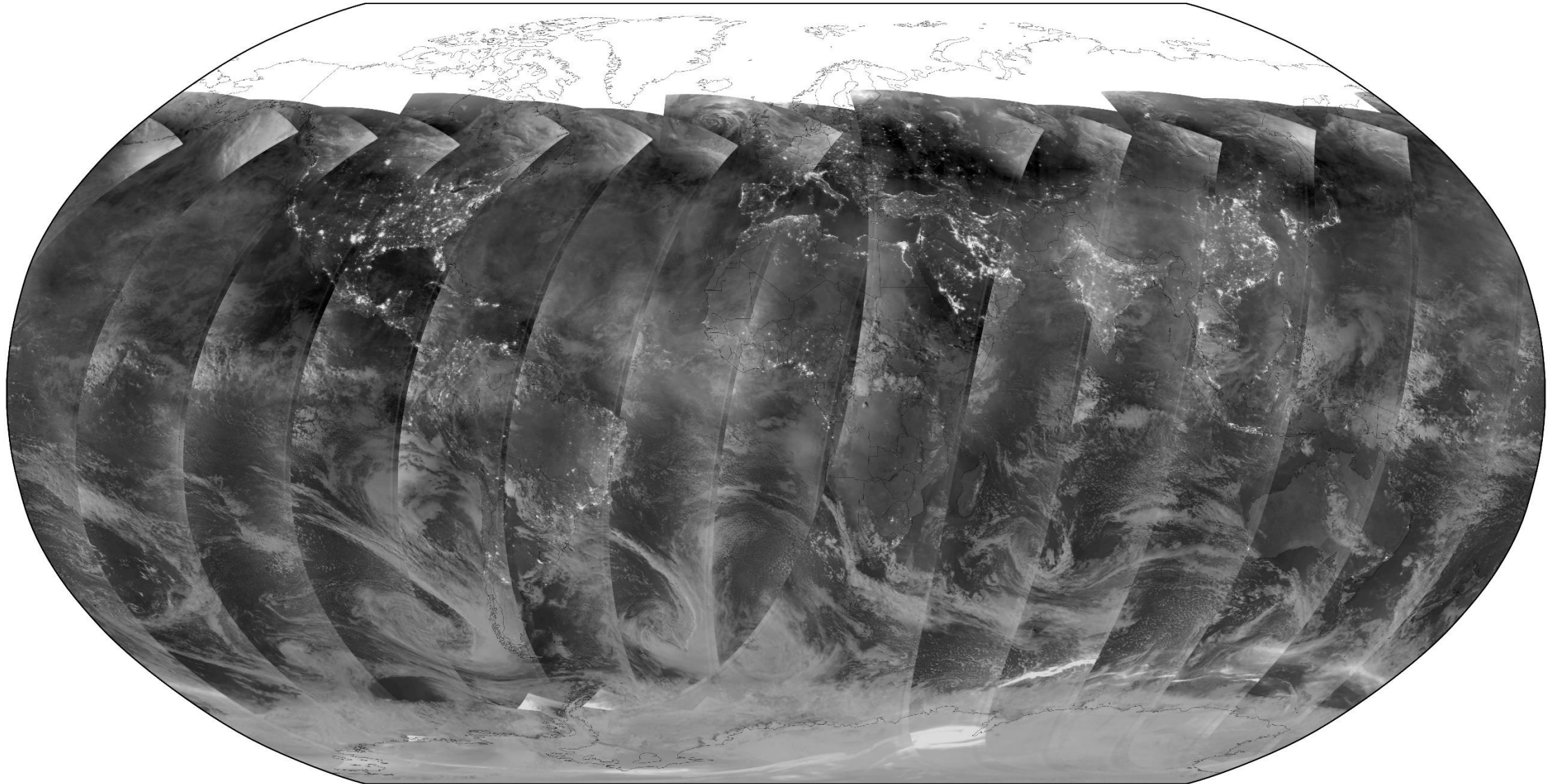
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20230727 J02 VIIRS TrueColorRGB

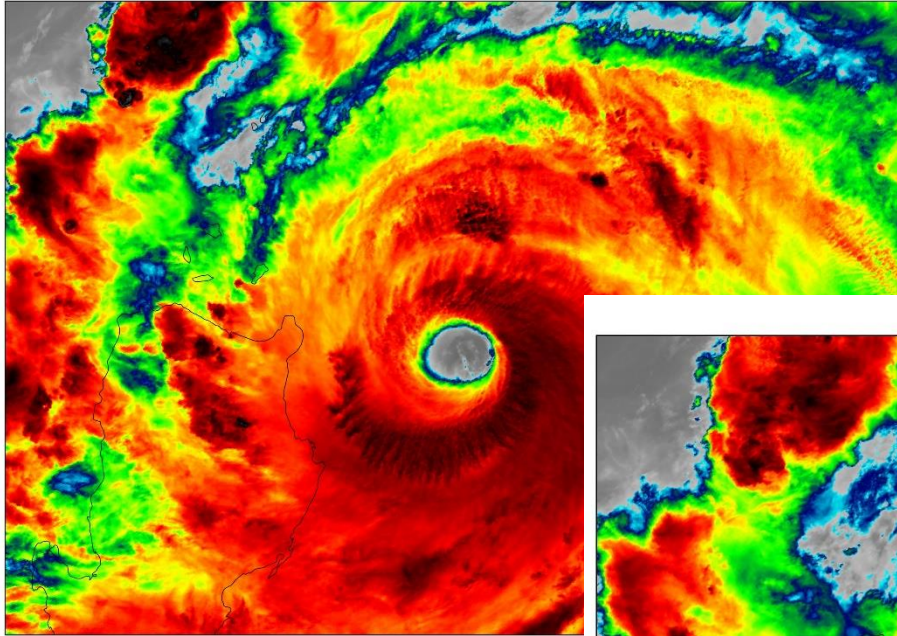


20230728 J02 VIIRS NCC

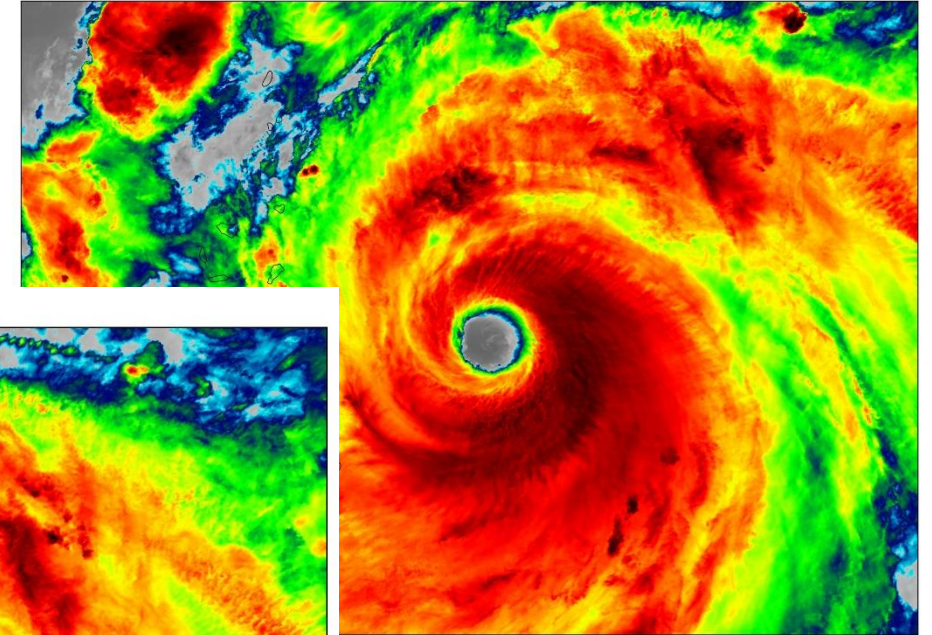


- Global Composites
- **All 22 bands over a few scenes**
 - Day Cyclone, Day Convection, Night Convection, Day Desert, Day Ice Sheet
 - Overall, compares very well with NOAA-20 and S-NPP
 - Minor striping noted in some “extreme” scenes
 - Bands M4, M8, M13
- Multispectral Imagery
- Near Constant Contrast
- User Feedback

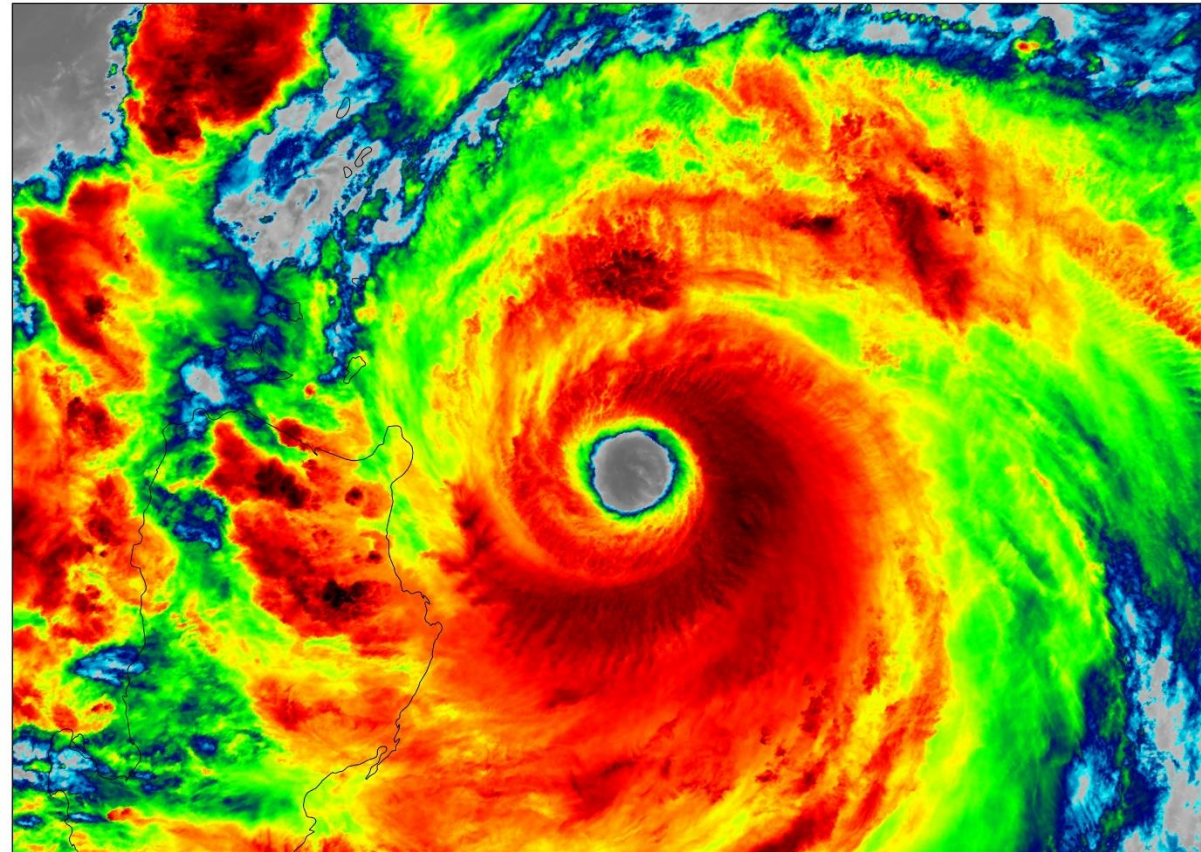
20230725 0428Z N20 VIIRS M16



20230725 0520Z NPP VIIRS M16



20230725 0451Z N21 VIIRS M16

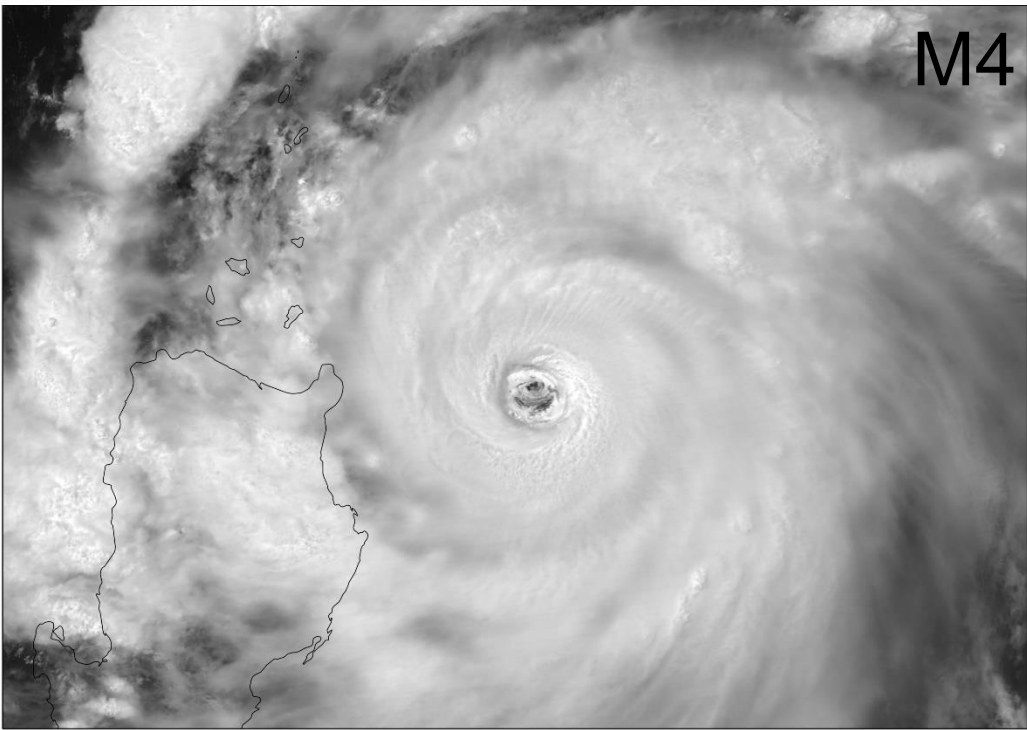


Minor striping visible in M4, M8, M13

S-NPP

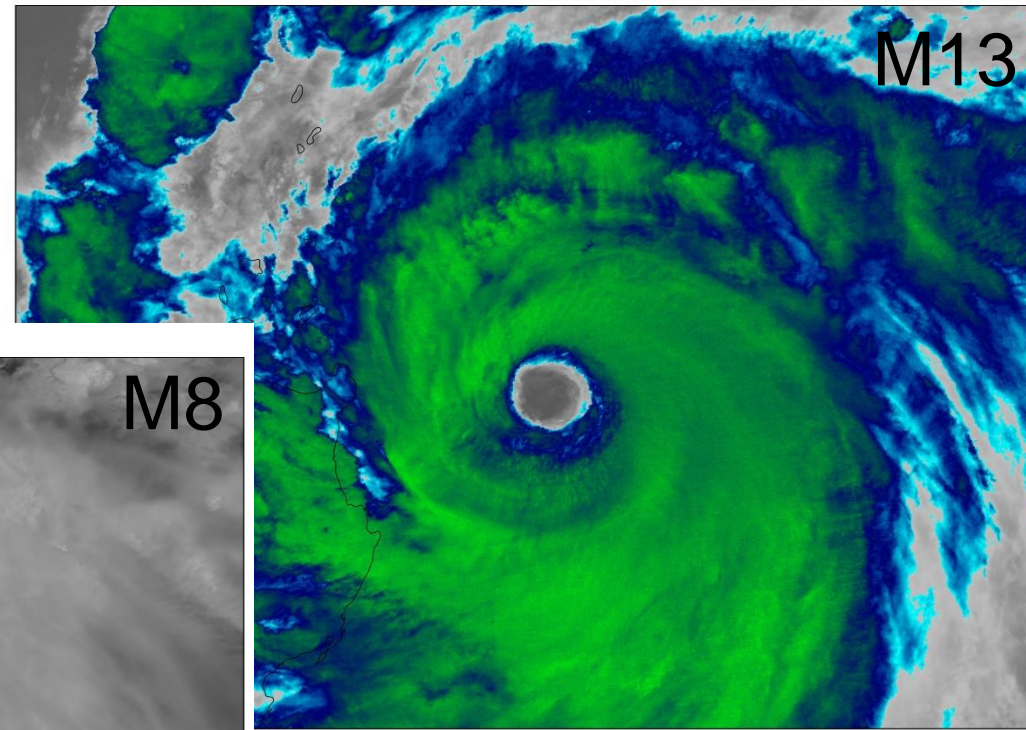
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M4



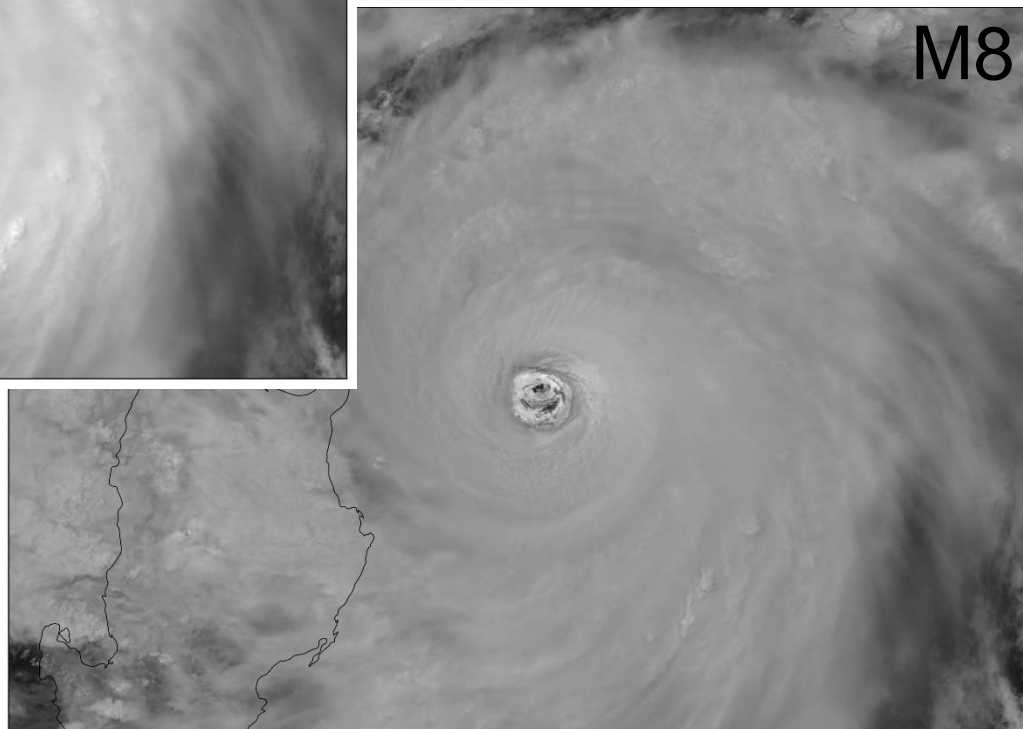
20230725 0520Z NPP VIIRS M13

M13



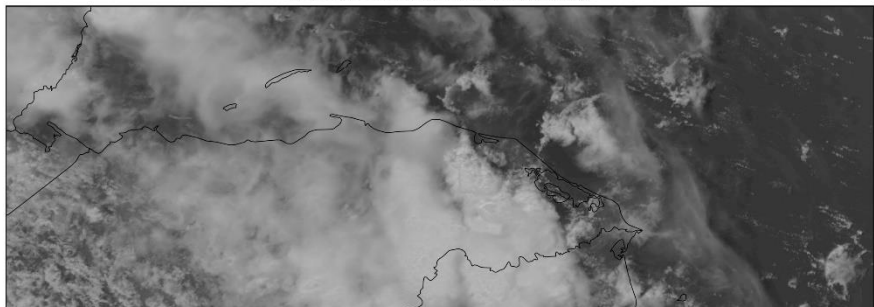
20230725 0520Z NPP VIIRS M08

M8

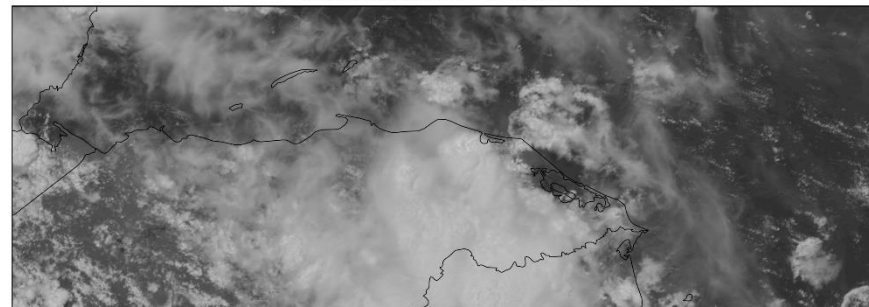


Minor striping visible in M4, M8, M13

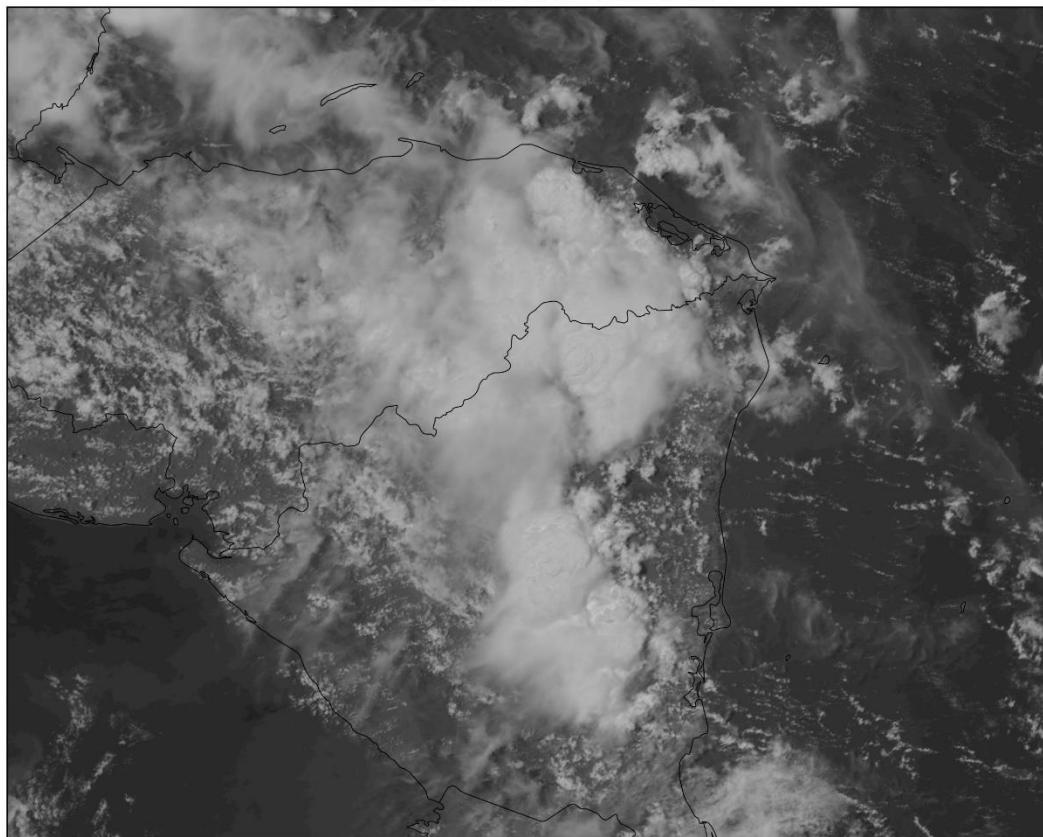
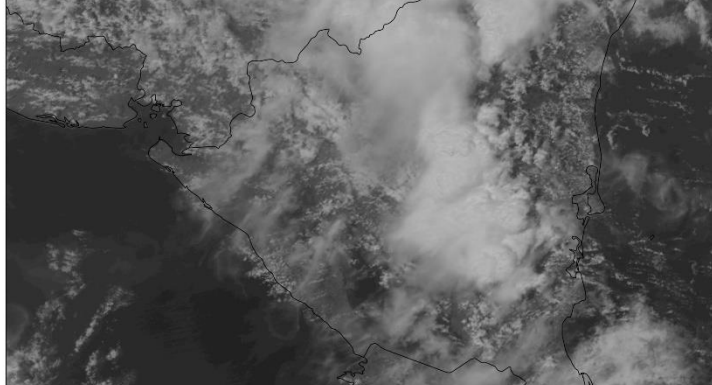
20230729 NOAA-20 VIIRS NCC



20230729 S-NPP VIIRS NCC

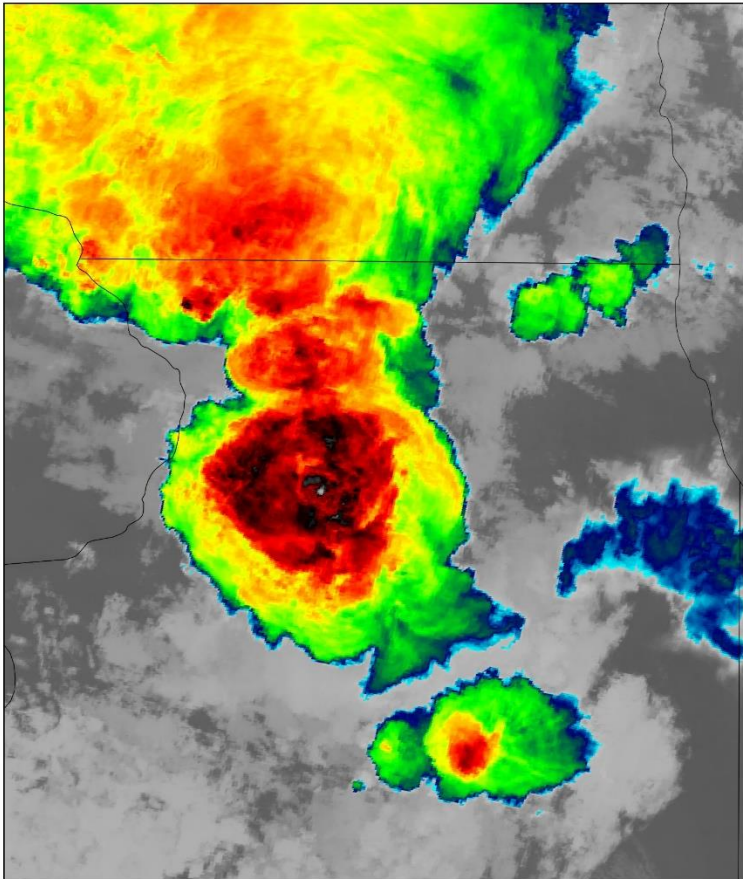


20230729 NOAA-21 VIIRS NCC

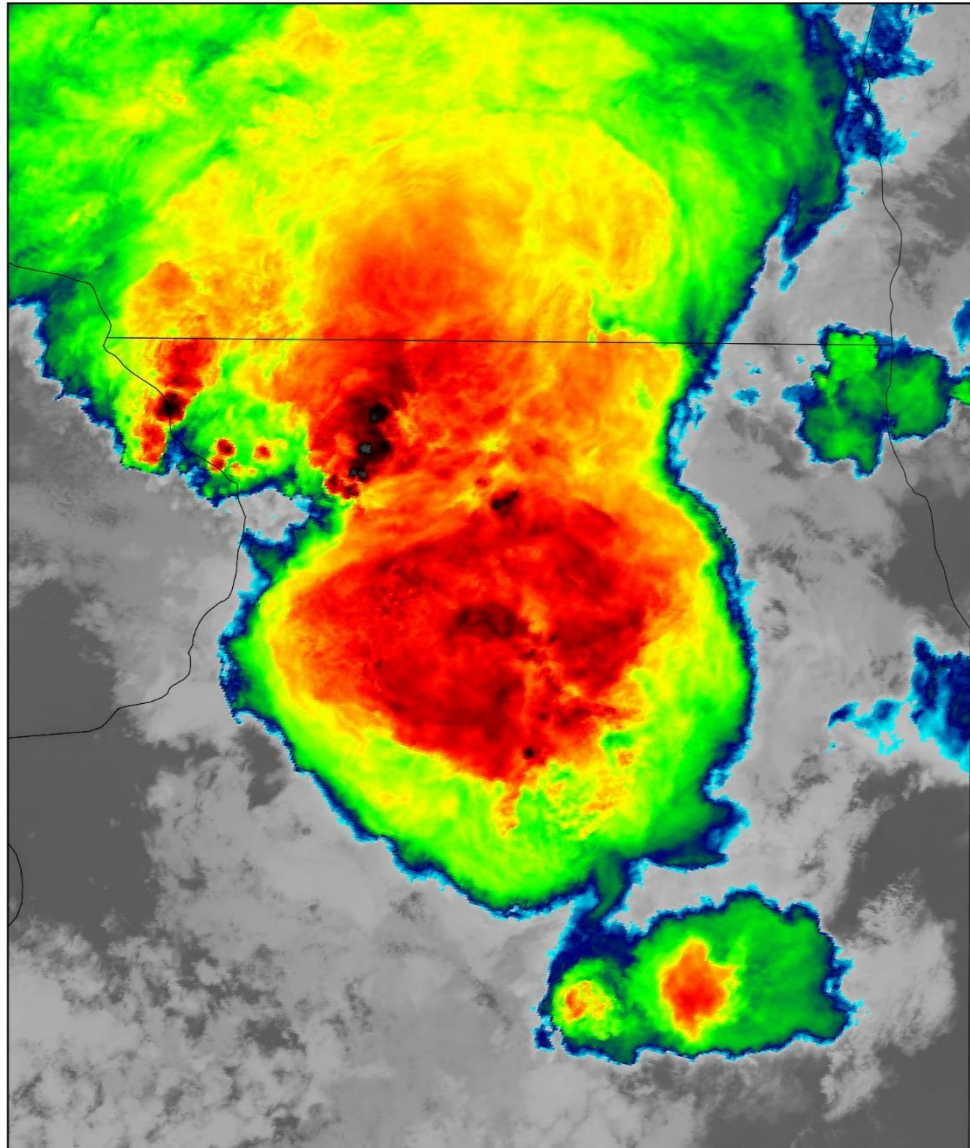


No visible artifacts

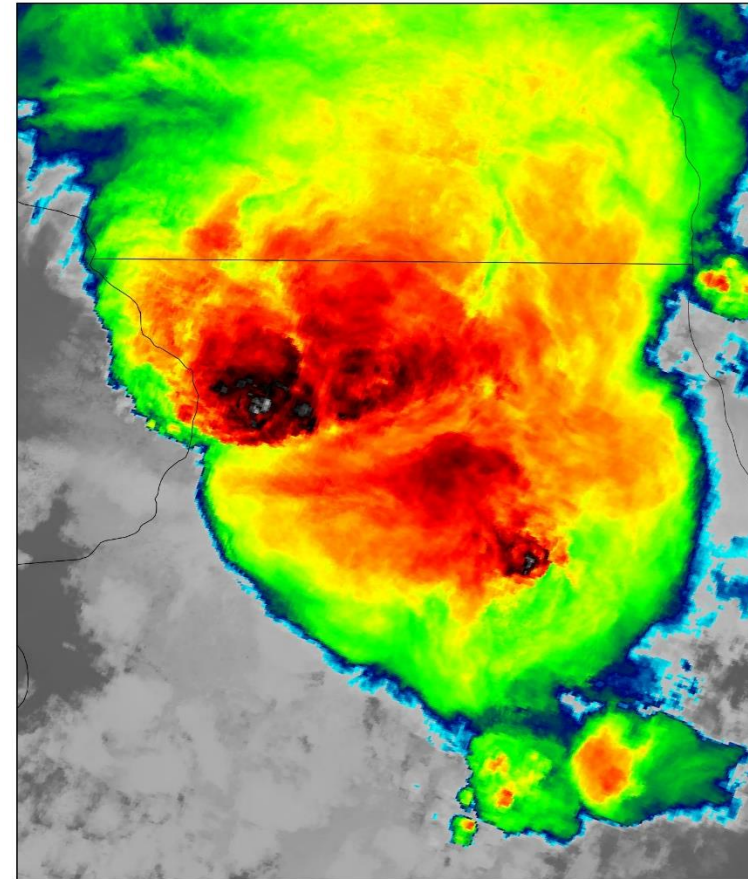
20230728 0728Z NOAA-20 VIIRS M16



20230728 0751Z NOAA-21 VIIRS M16



20230728 0818Z S-NPP VIIRS M16

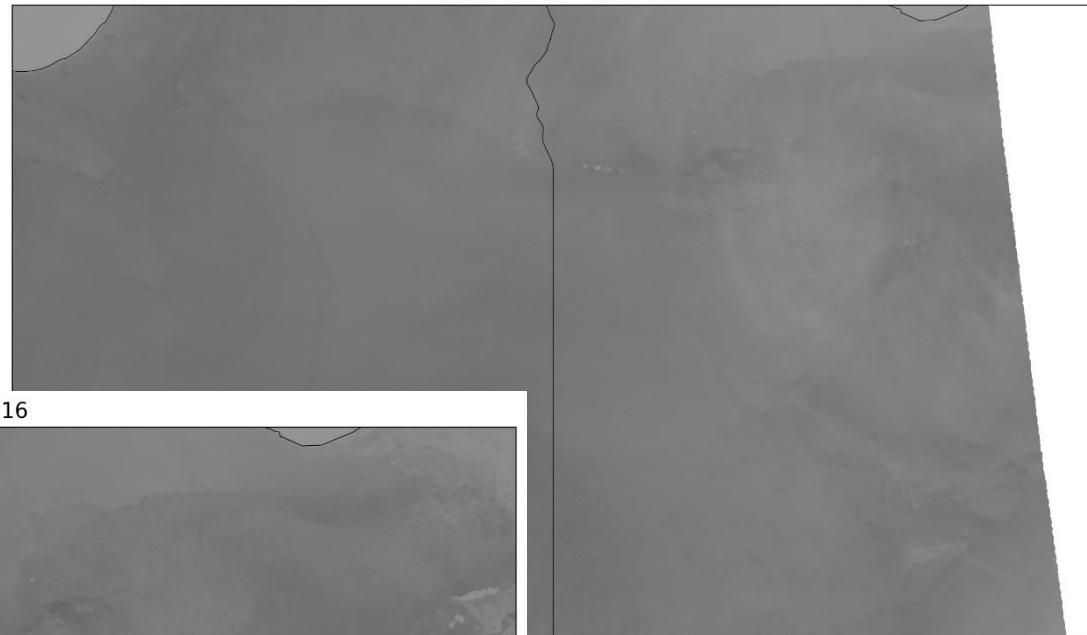


No visible artifacts

20230725 NOAA-20 VIIRS M16



20230725 S-NPP VIIRS M16



20230725 NOAA-21 VIIRS M16

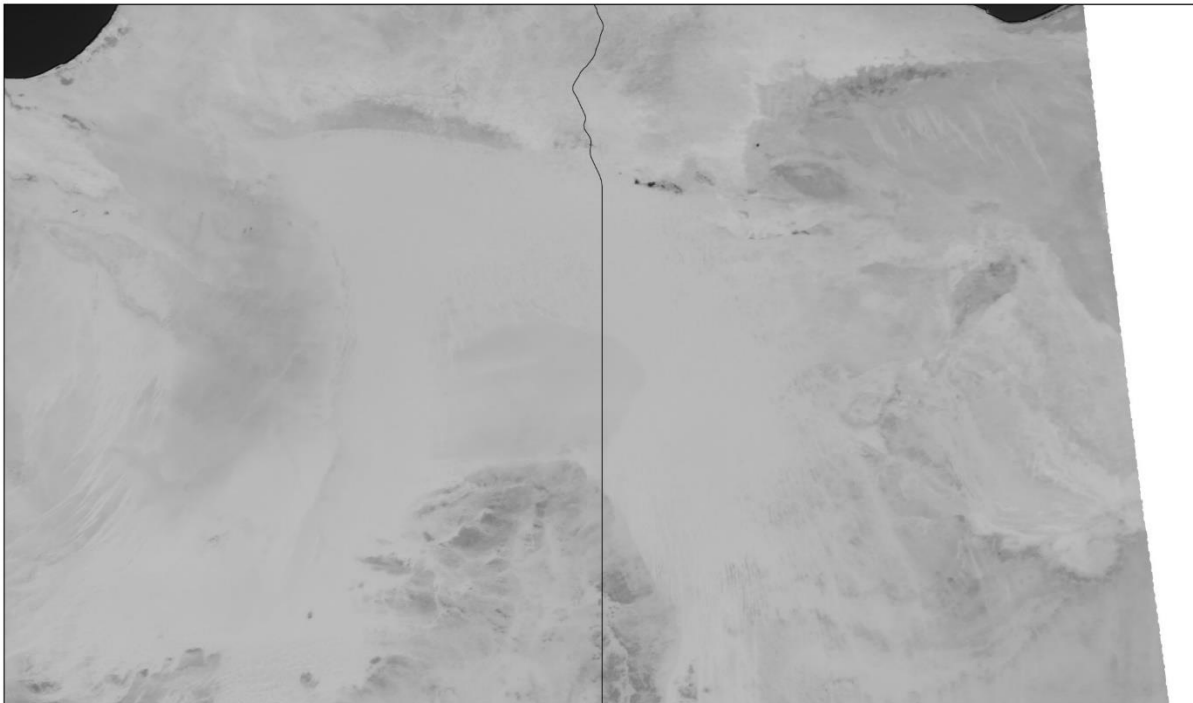


Minor striping visible in M8 and M13

S-NPP

M8

20230725 S-NPP VIIRS M08



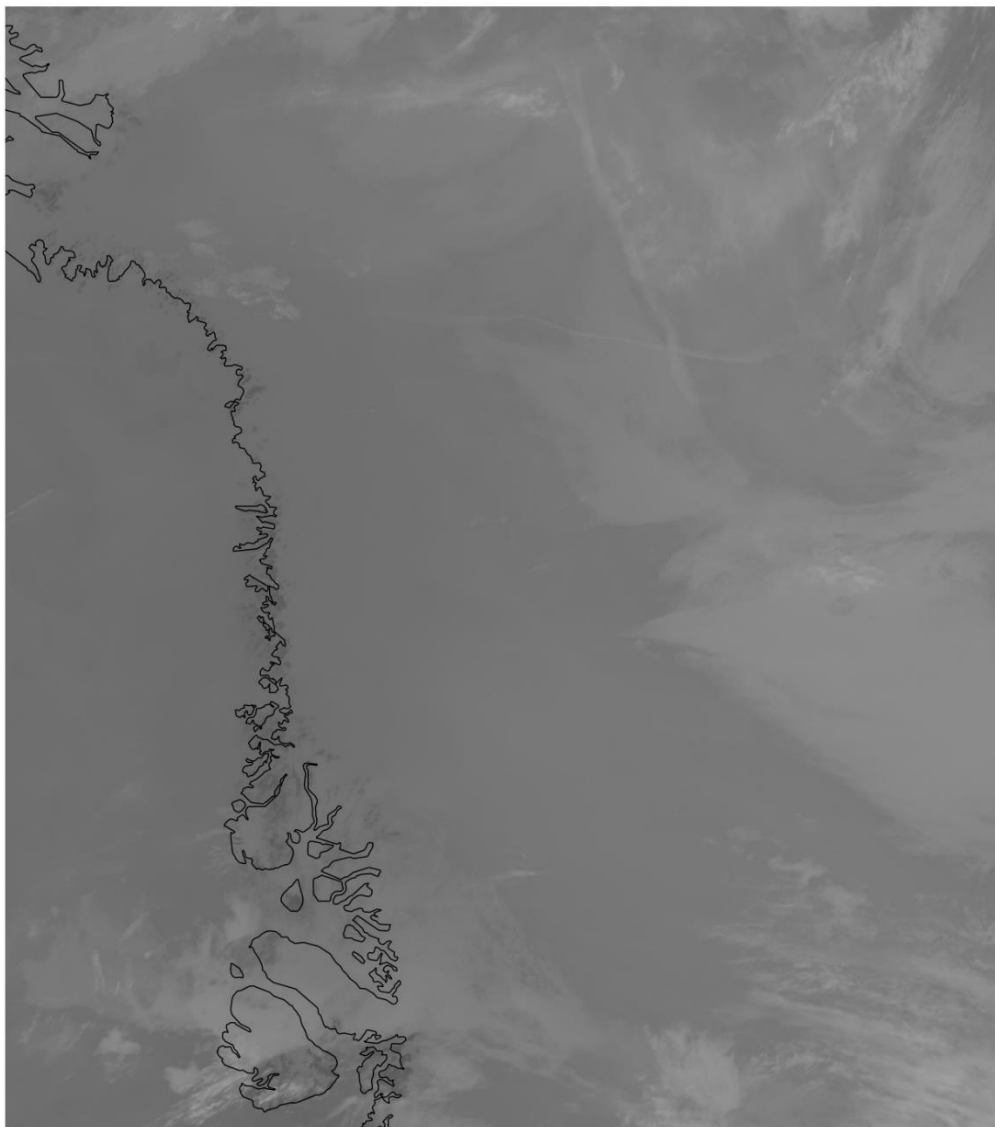
M13

20230725 S-NPP VIIRS M13

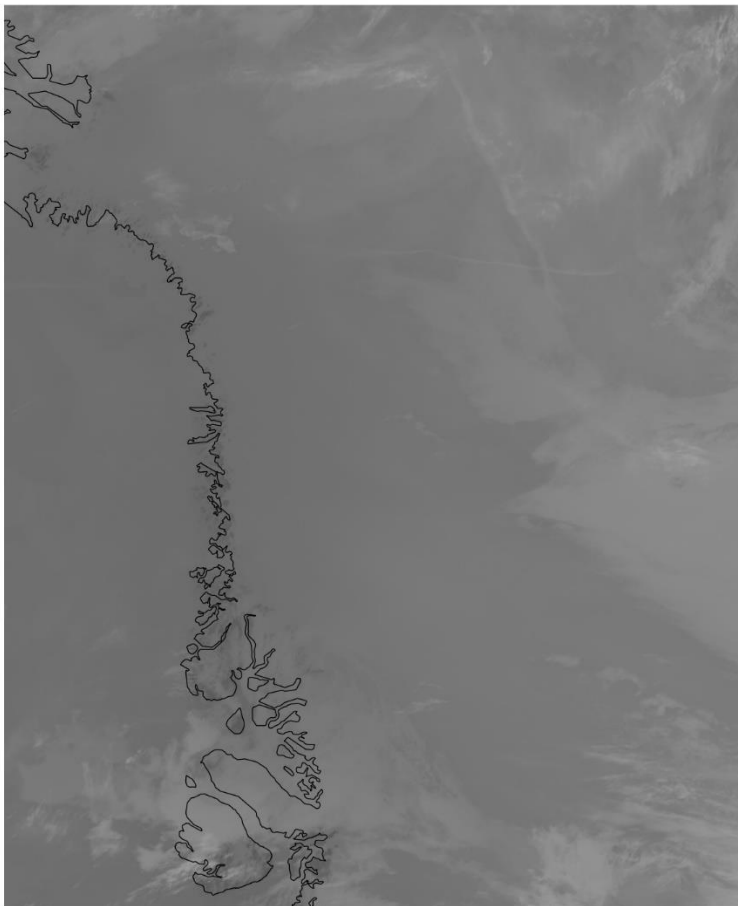


Minor striping visible in M8 and M13

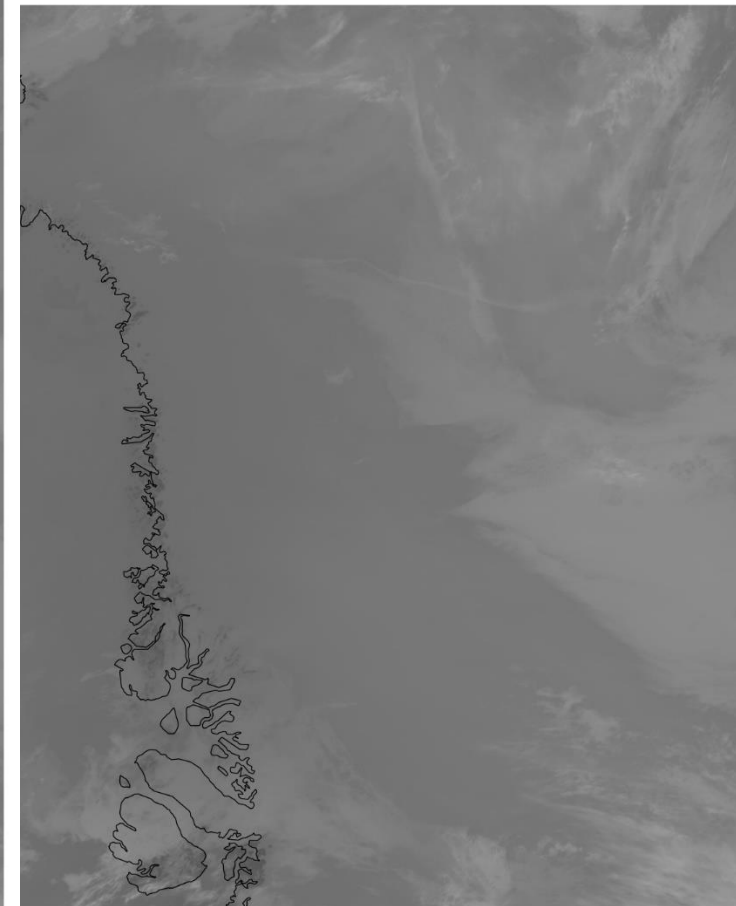
20230724 NOAA-21 VIIRS M16



20230724 NOAA-20 VIIRS M16



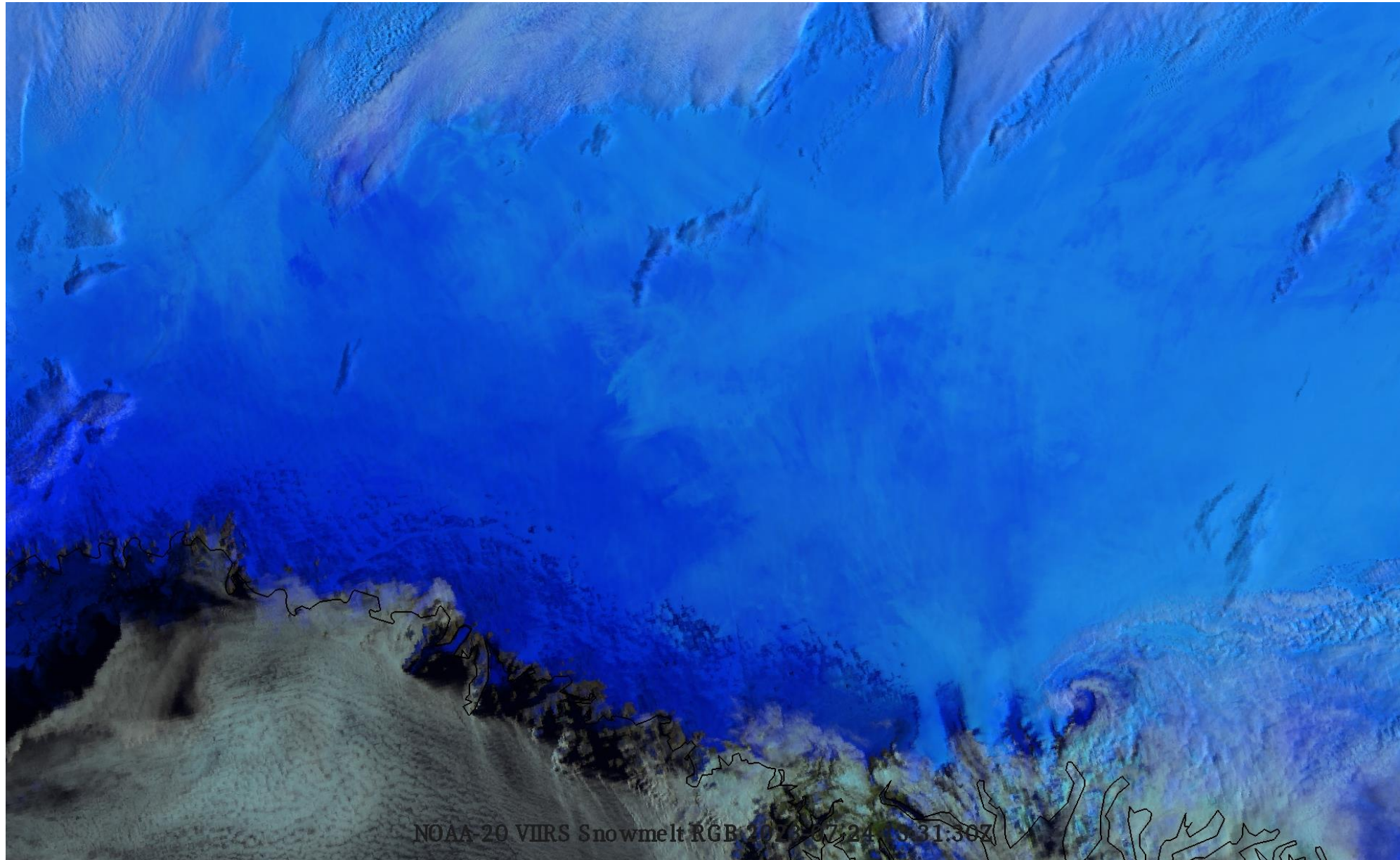
20230724 S-NPP VIIRS M16



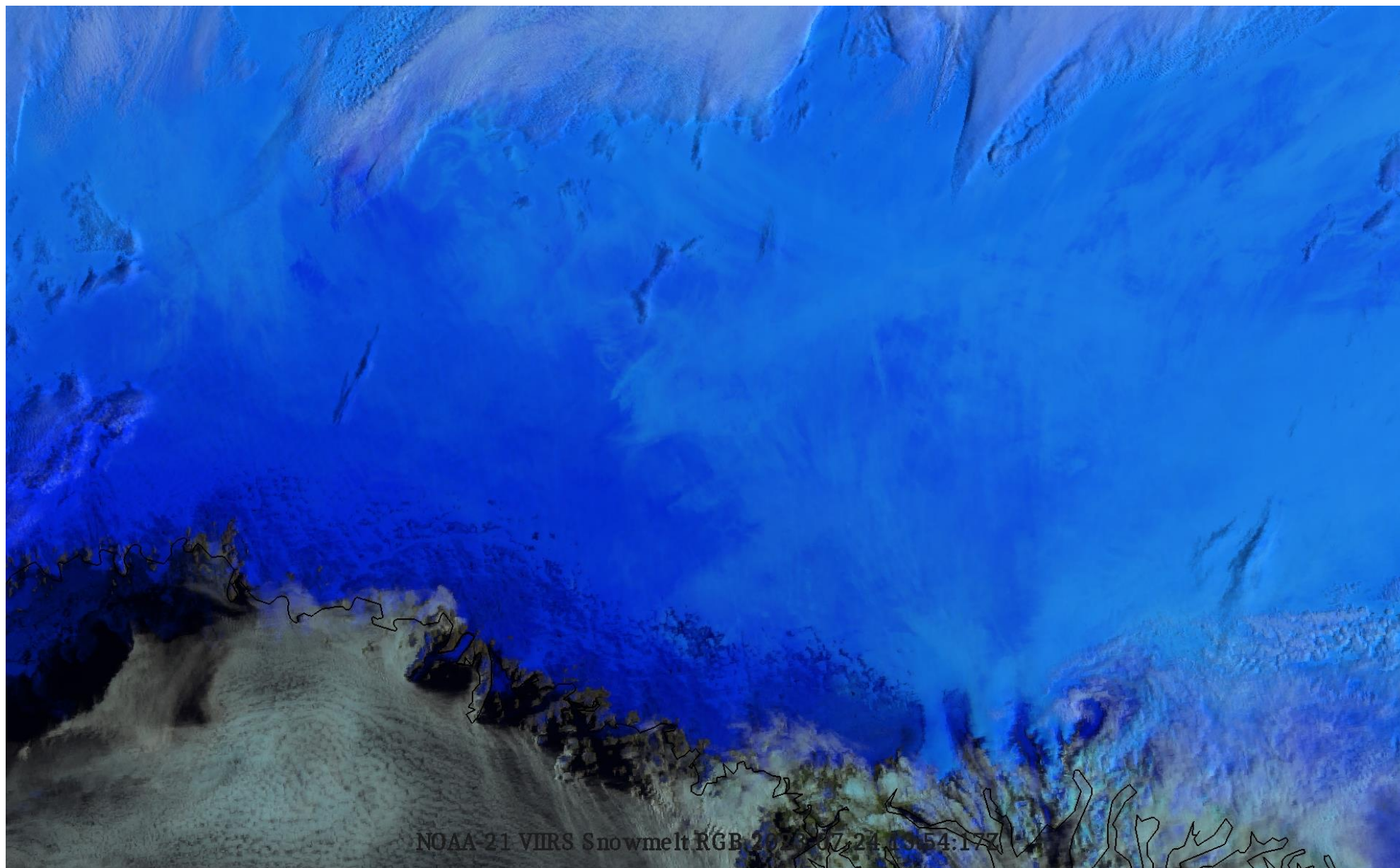
No visible artifacts

- Global Composites
- All 22 bands over a few scenes
- **Multispectral Imagery**
 - Popular products leveraged by users
 - Overall, compares very well with NOAA-20 and S-NPP
- Near Constant Contrast
- User Feedback

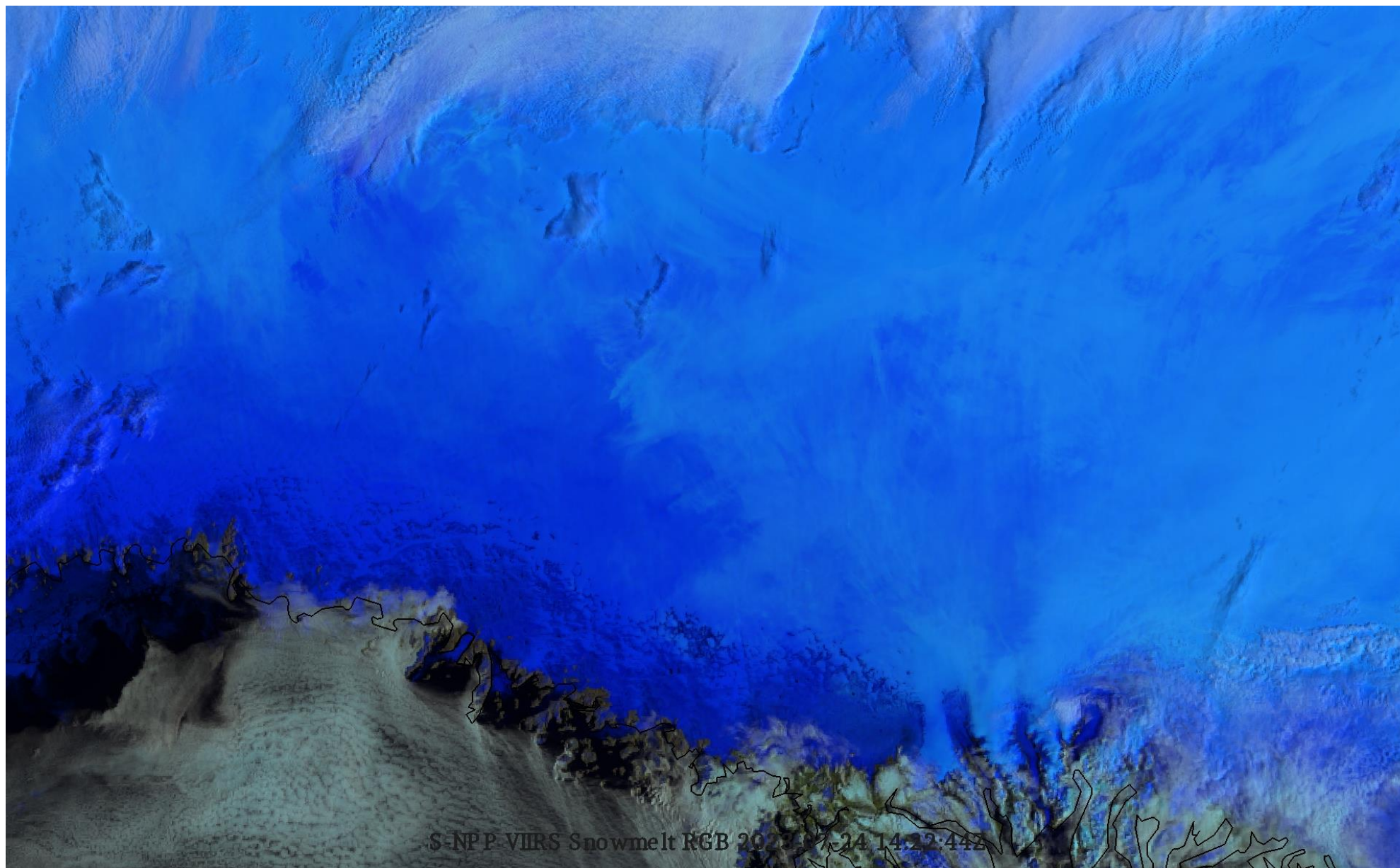
Greenland Snowpack
20230724
NOAA-20
Snowmelt RGB
(M10, M8, M5)



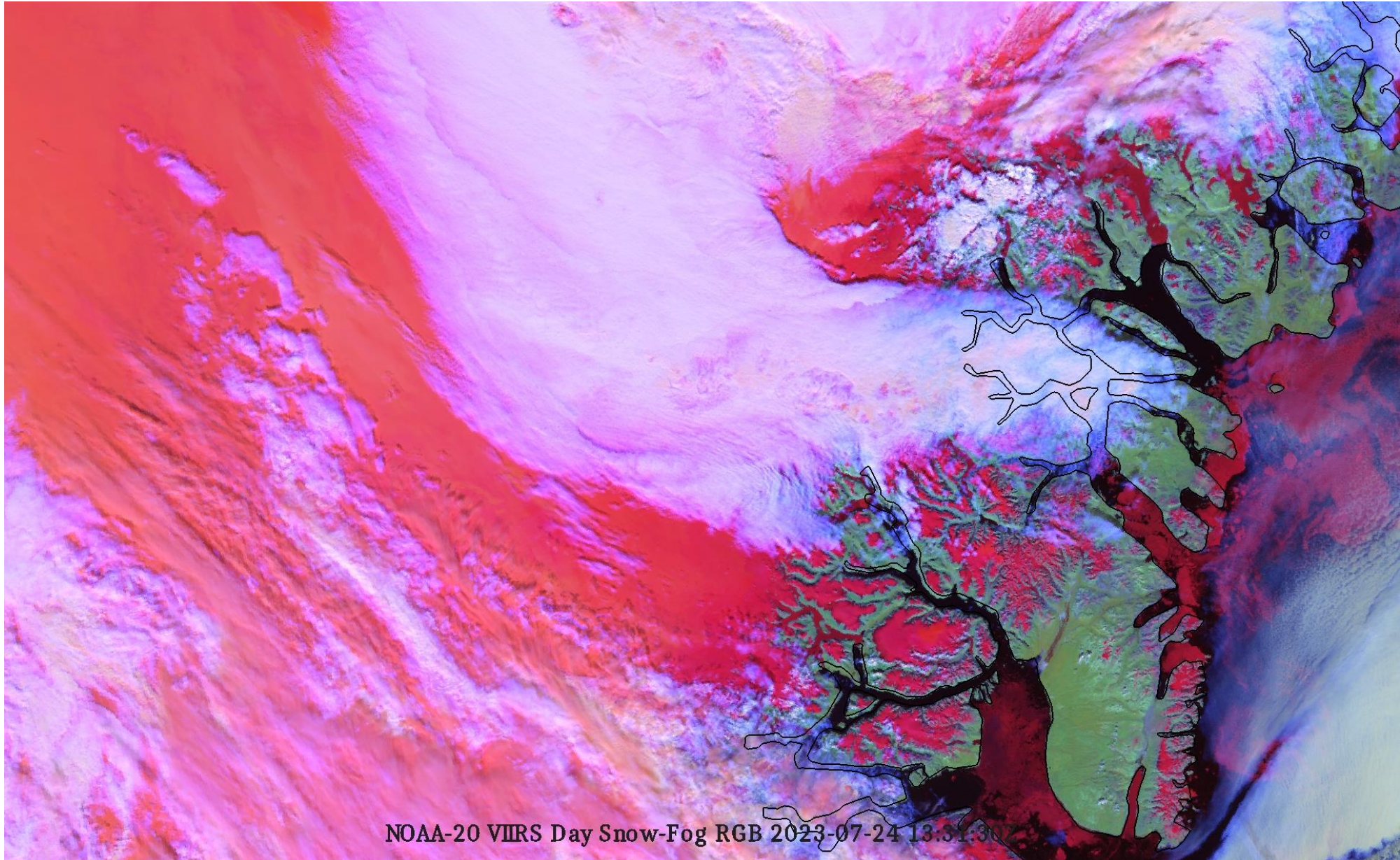
Greenland Snowpack
20230724
NOAA-21
Snowmelt RGB
(M10, M8, M5)



Greenland Snowpack
20230724
S-NPP
Snowmelt RGB
(M10, M8, M5)

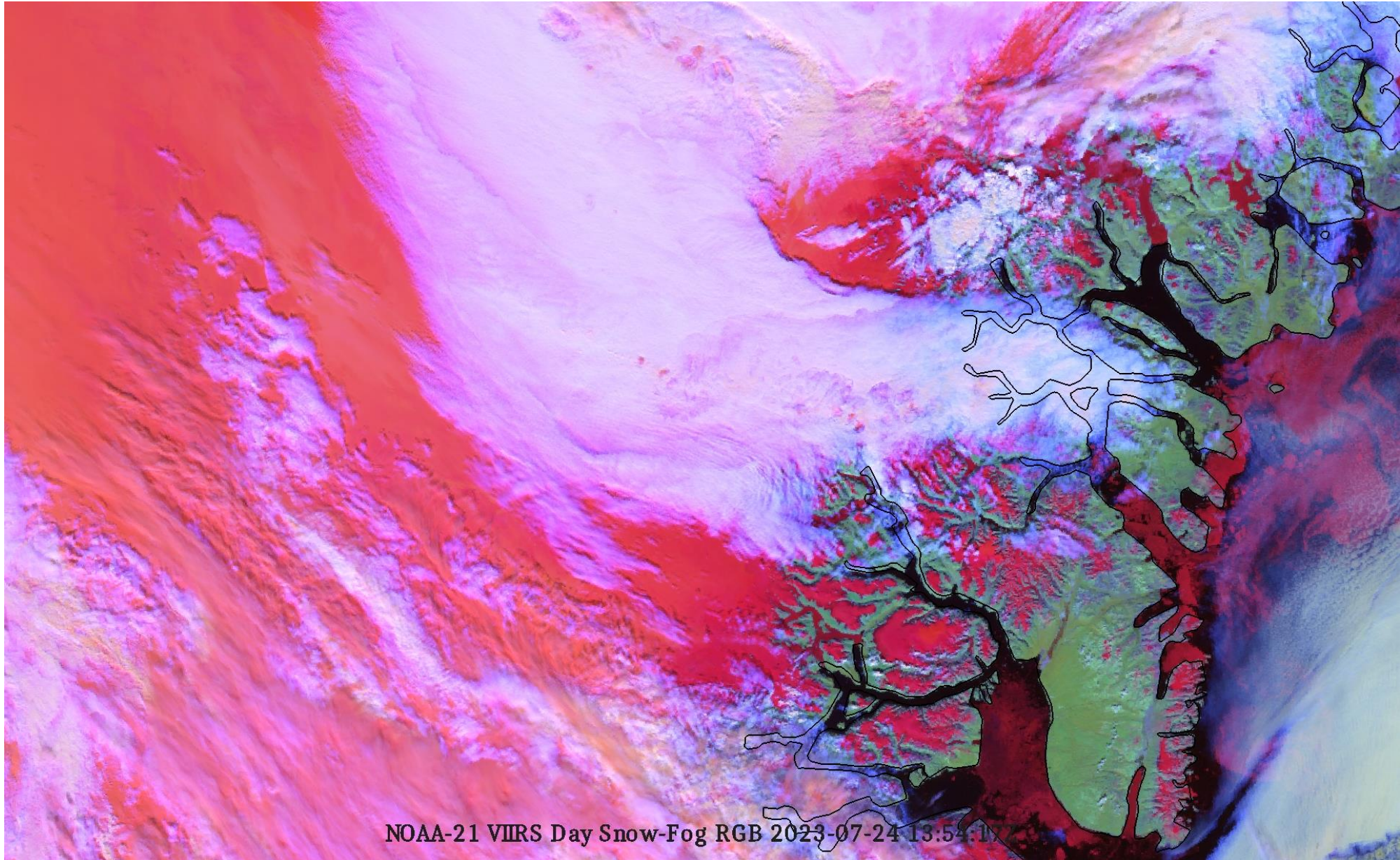


Greenland Snowpack
20230724
NOAA-20
Day Snow-Fog RGB
(M7, M10, M12 – M15)

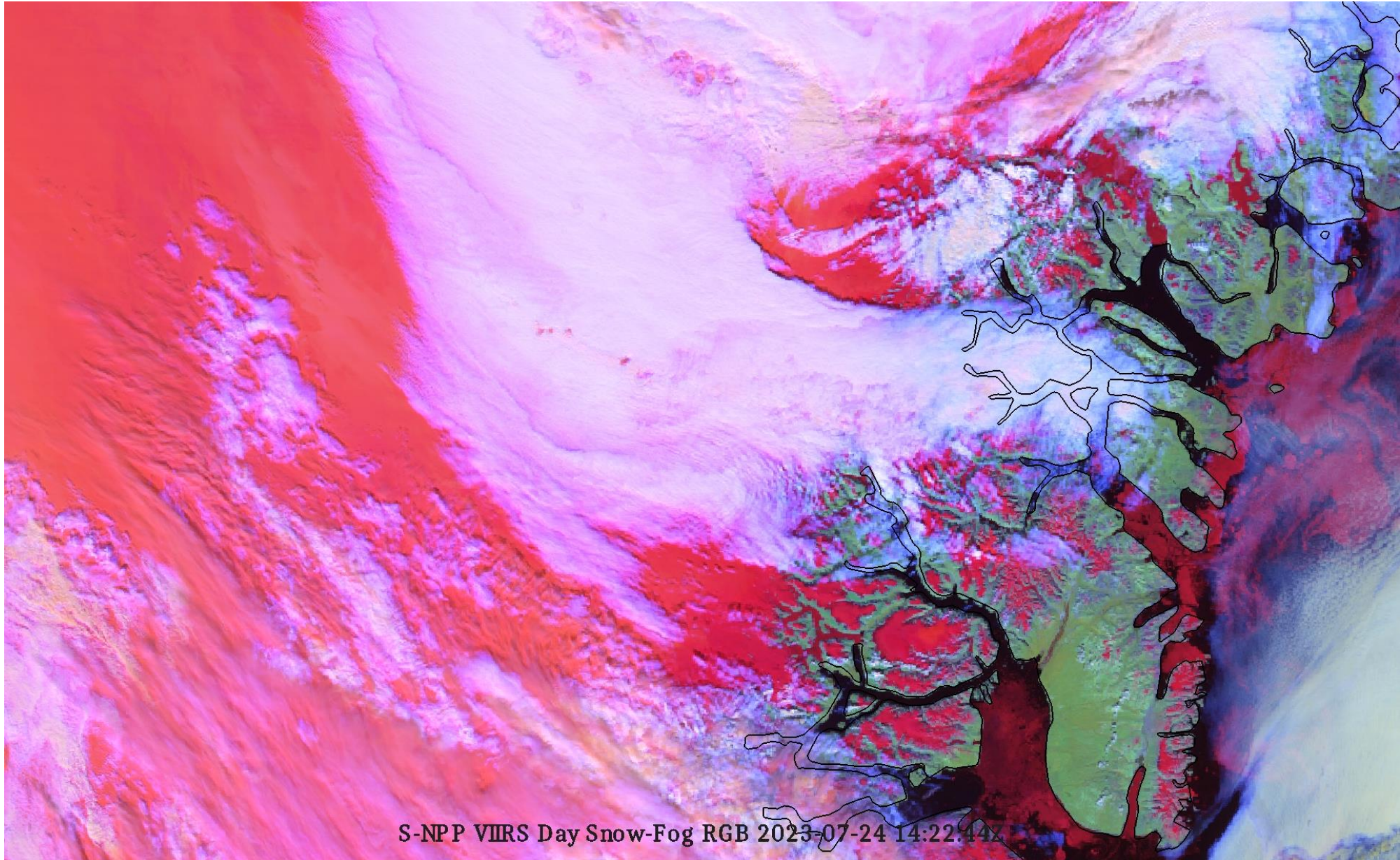


NOAA-20 VIIRS Day Snow-Fog RGB 2023-07-24 13:31:30

Greenland Snowpack
20230724
NOAA-21
Day Snow-Fog RGB
(M7, M10, M12 – M15)

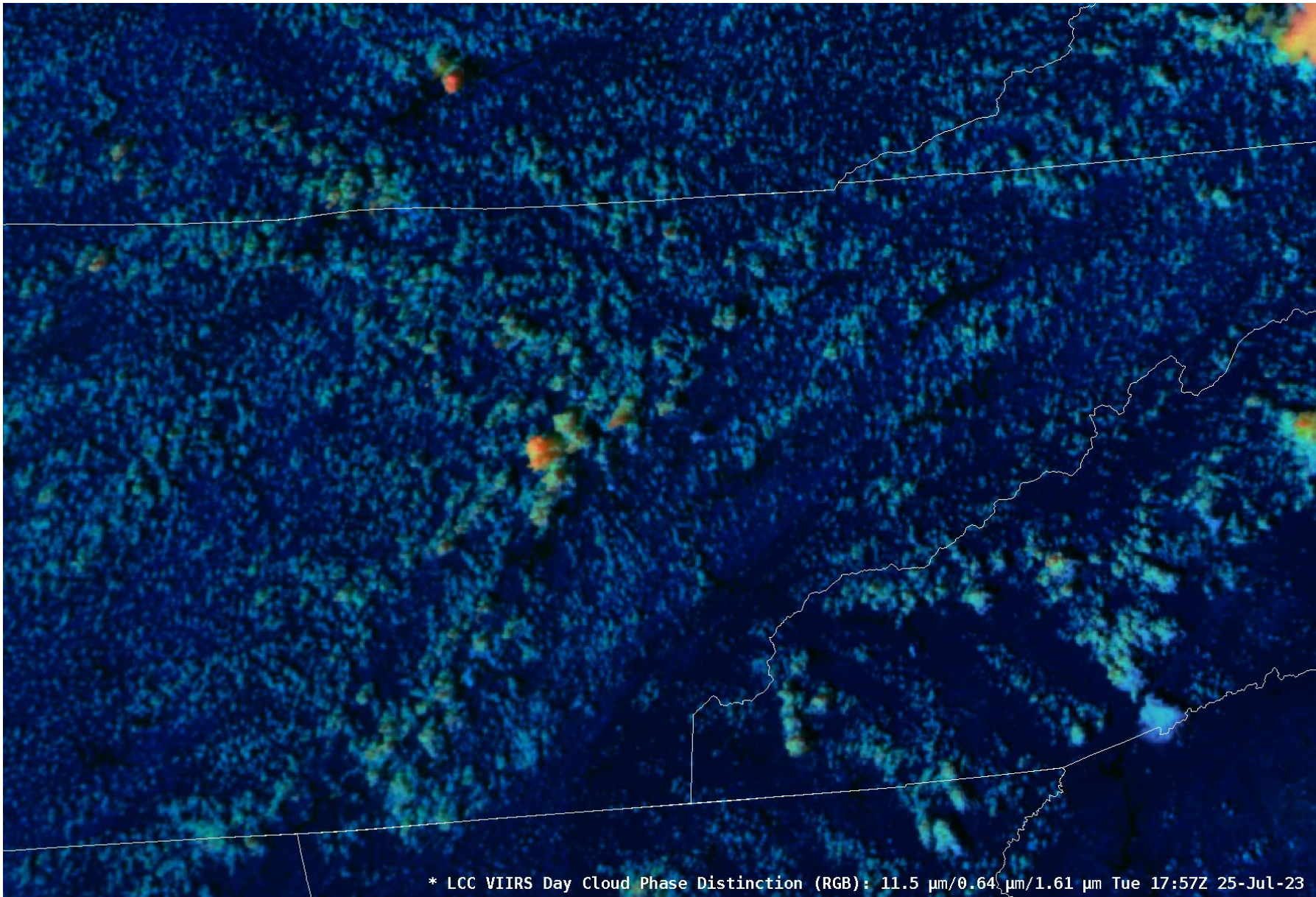


Greenland Snowpack
20230724
S-NPP
Day Snow-Fog RGB
(M7, M10, M12 – M15)



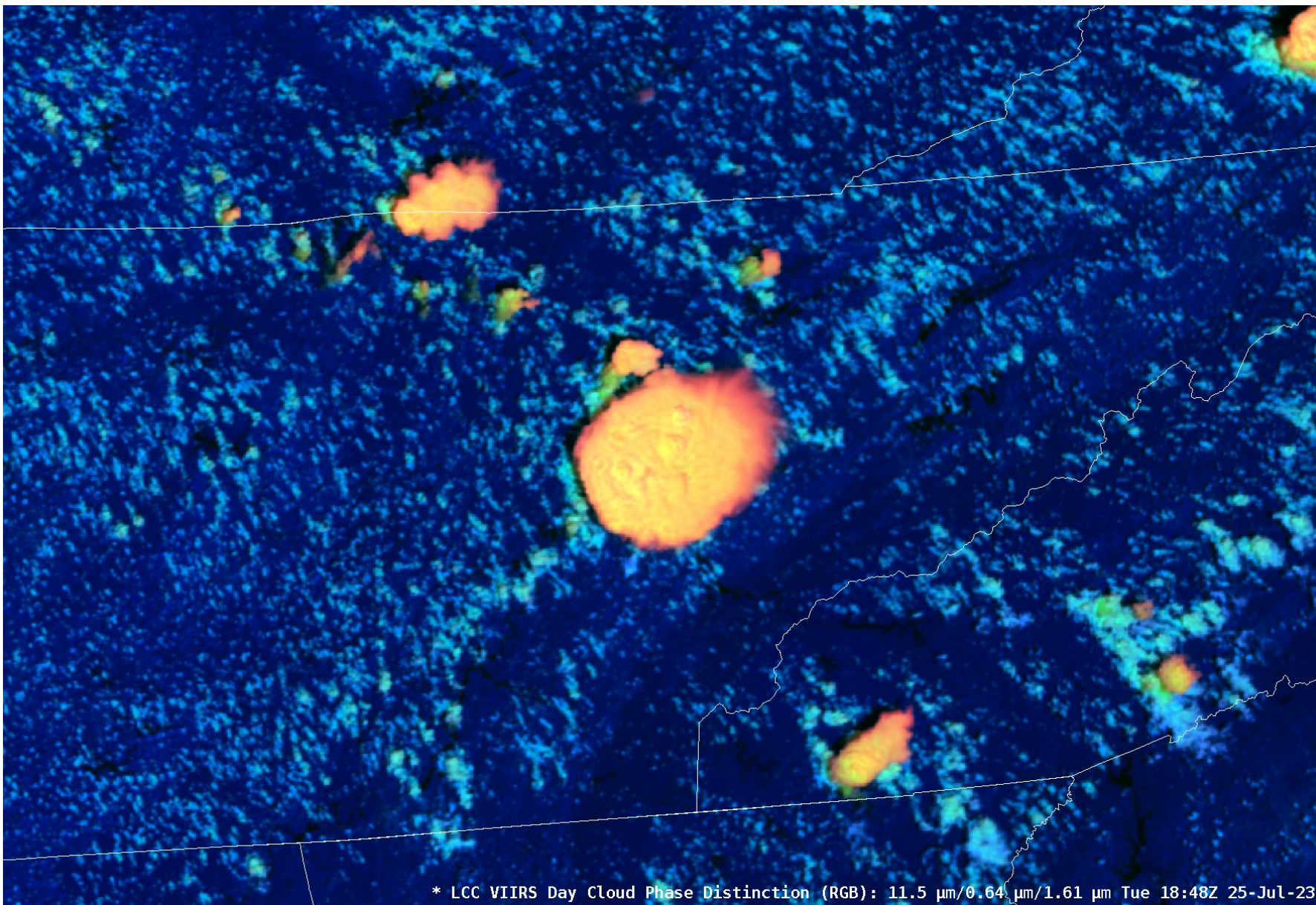
S-NPP VIIRS Day Snow-Fog RGB 2023-07-24 14:22:44Z

Tennessee Convective Initiation
20230725
NOAA-20
Day Cloud Phase Distinction RGB
(I5, I1, I3)

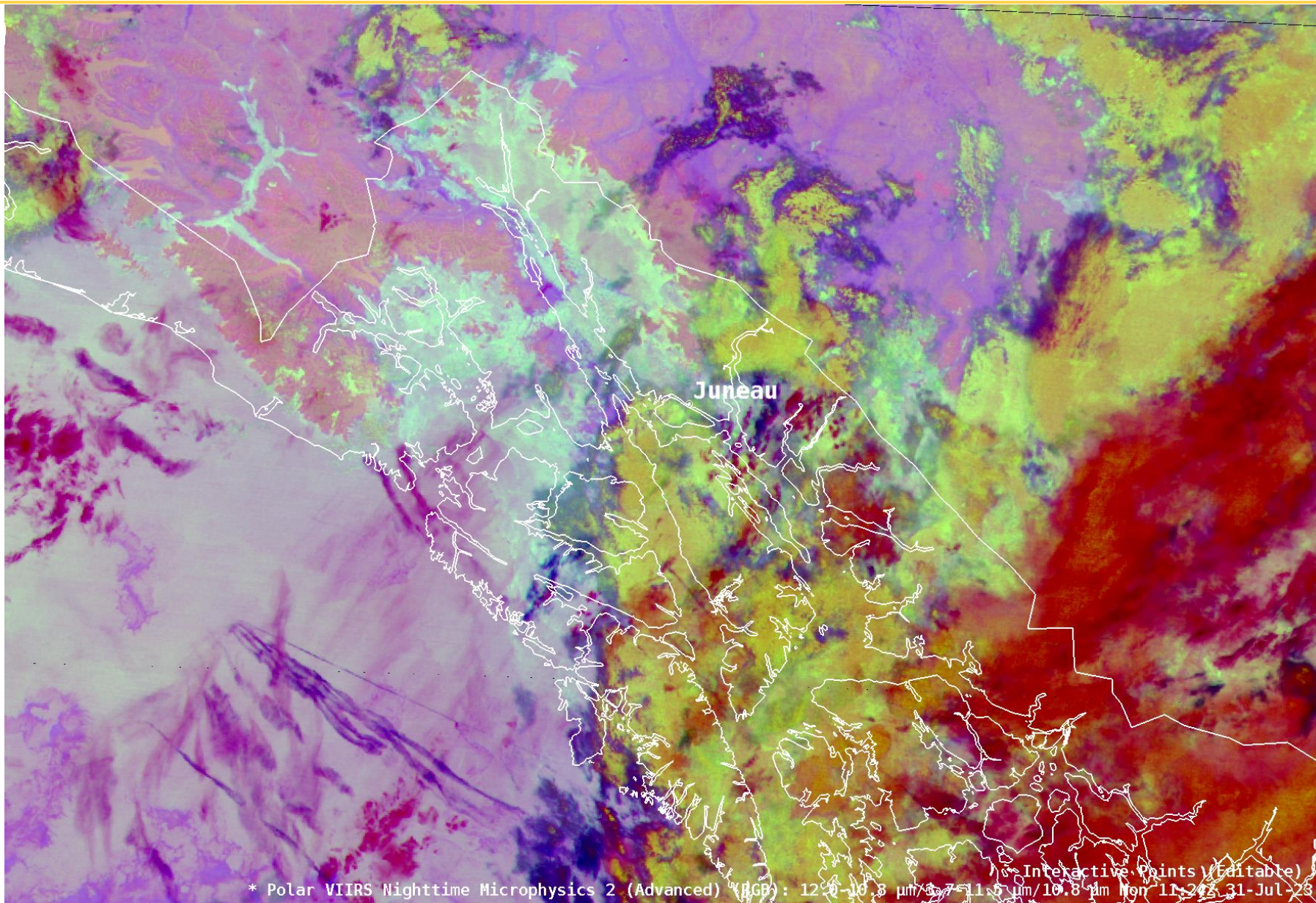


* LCC VIIRS Day Cloud Phase Distinction (RGB): 11.5 μm /0.64 μm /1.61 μm Tue 17:57Z 25-Jul-23

Tennessee Convective Initiation
20230725
S-NPP
Day Cloud Phase Distinction RGB
(I5, I1, I3)

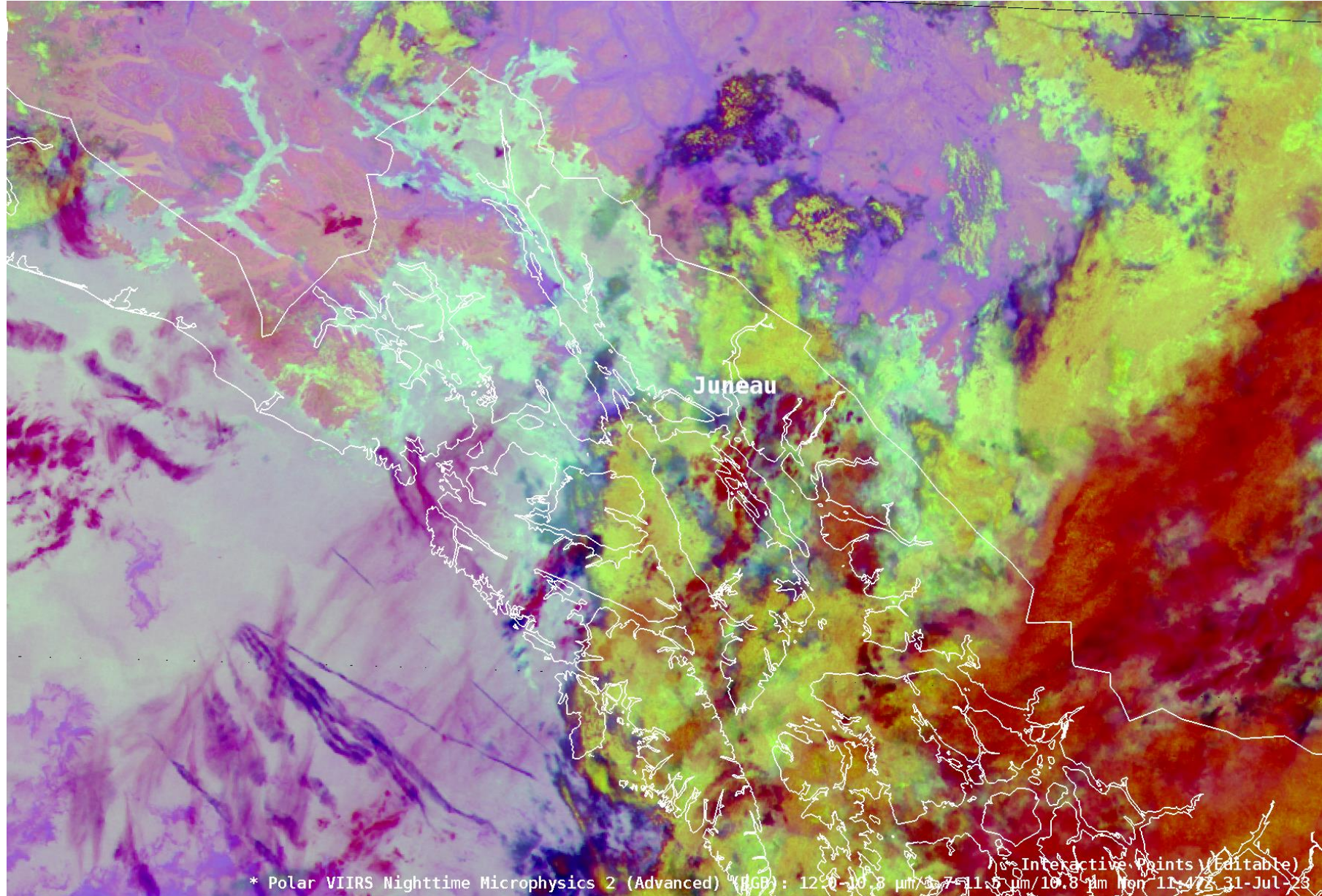


Southeast Alaska Nighttime Low Clouds
20230731
NOAA-20
Nighttime Microphysics RGB
(M16-M15, M15-M13, M15)

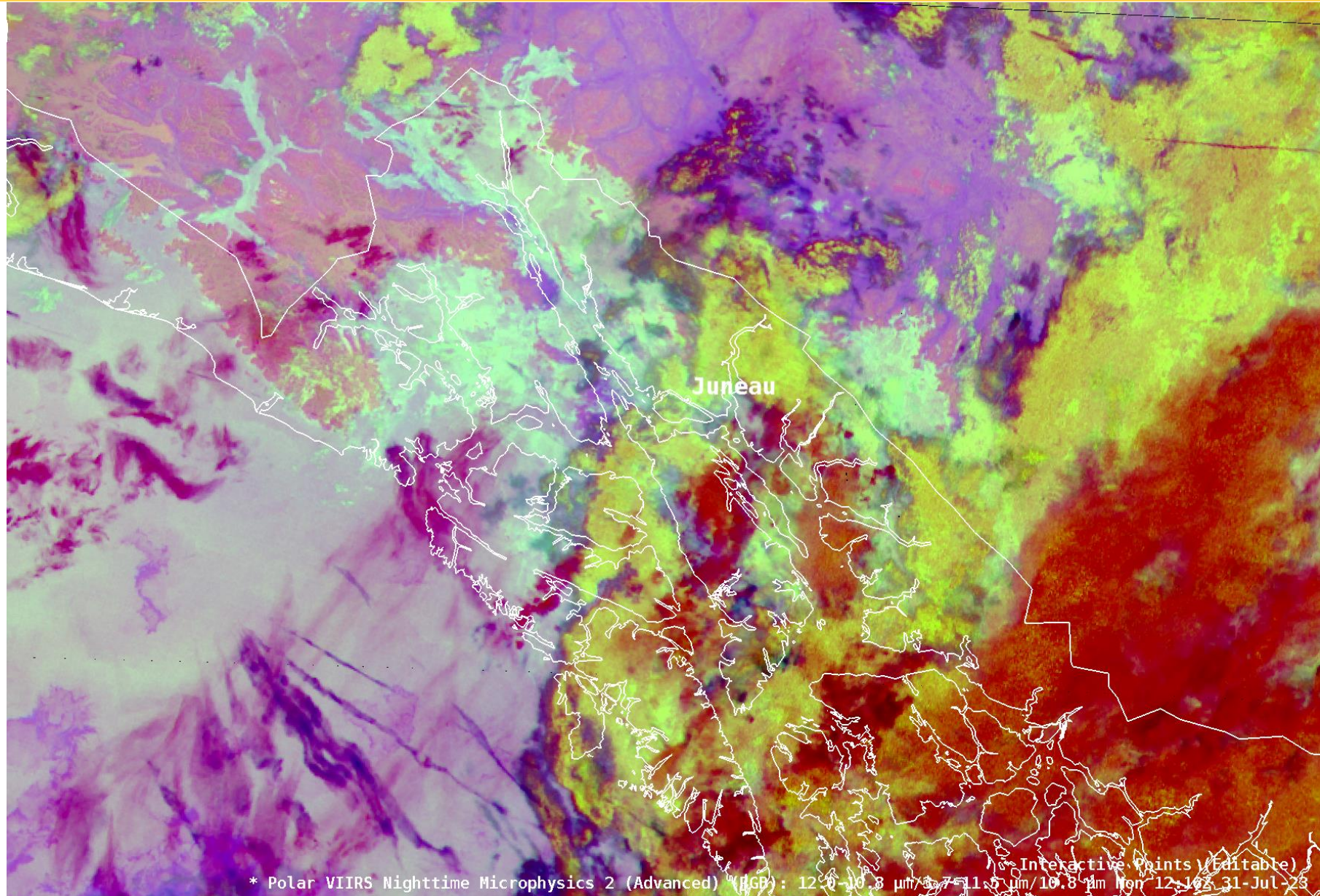


* Polar VIIRS Nighttime Microphysics 2 (Advanced) (RGB): 12.0-10.8 μm /8.7-11.5 μm /10.8 μm Mon 11-2023 31-Jul-23
* Interactive Points (Editable)

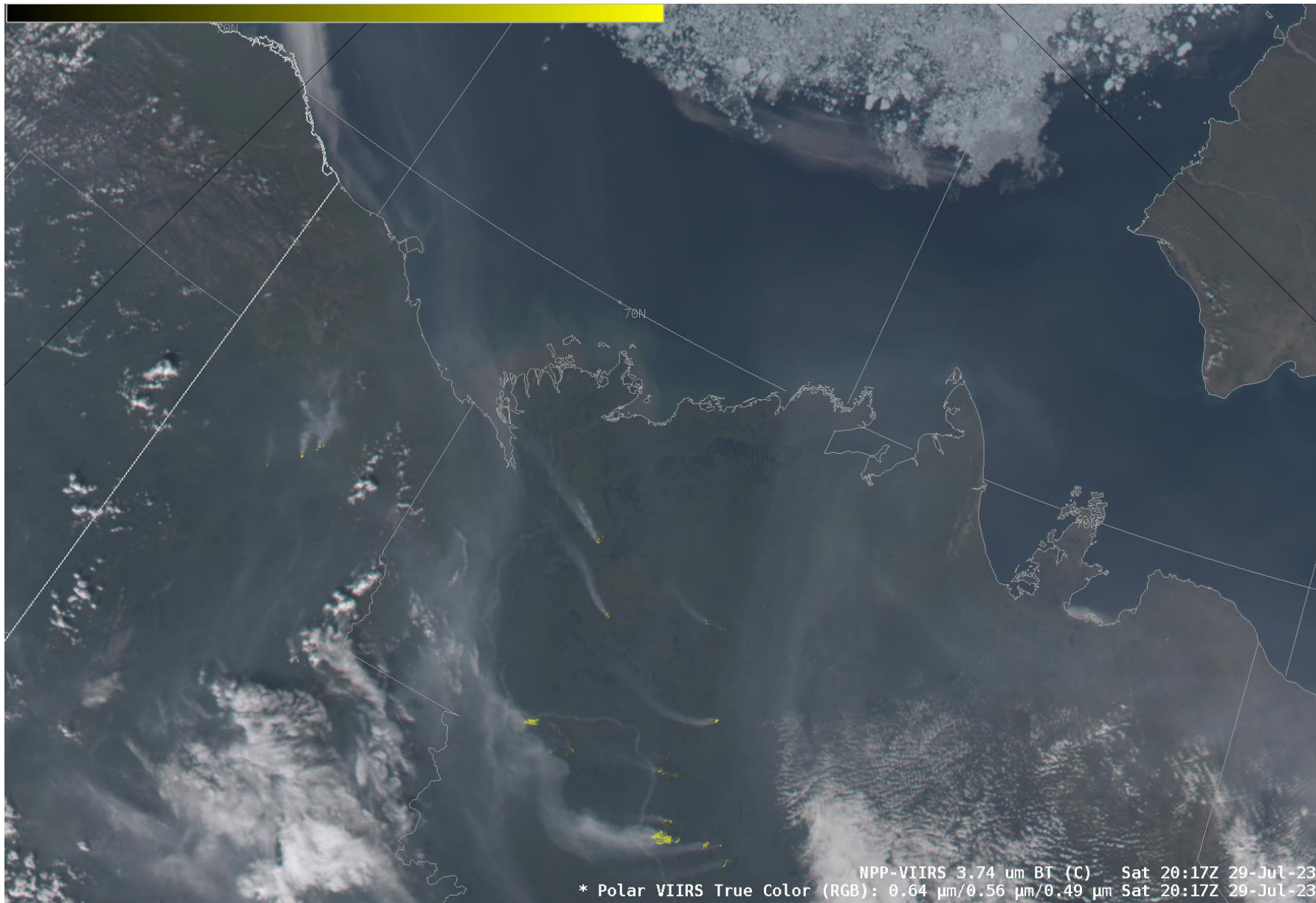
Southeast Alaska Nighttime Low Clouds
20230731
NOAA-21
Nighttime Microphysics RGB
(M16-M15, M15-M13, M15)



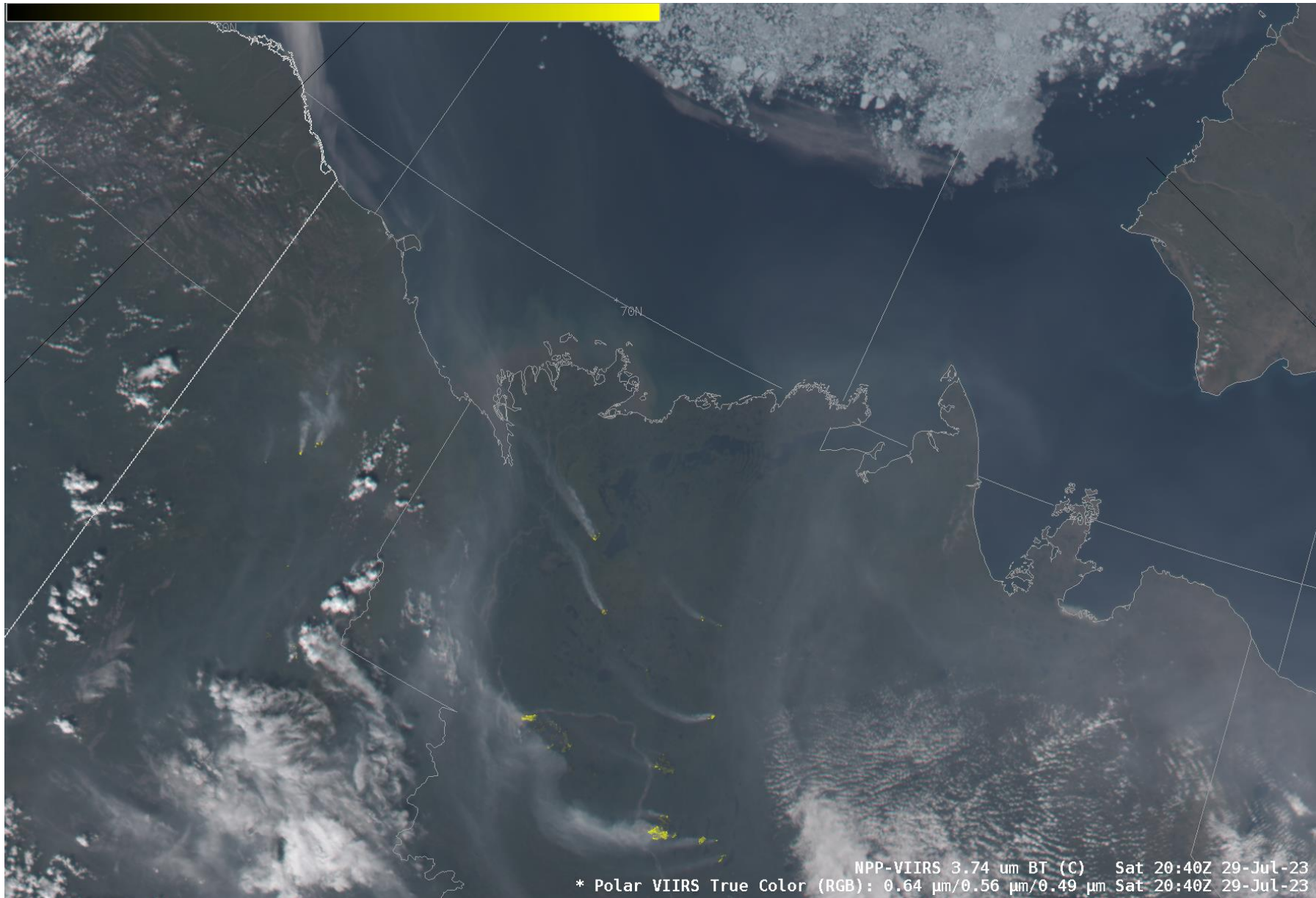
Southeast Alaska Nighttime Low Clouds
20230731
S-NPP
Nighttime Microphysics RGB
(M16-M15, M15-M13, M15)



Canada Fires, Smoke, Ice, Clouds
20230729
NOAA-20
True Color RGB and MWIR
(M5, M4, M3, I4)



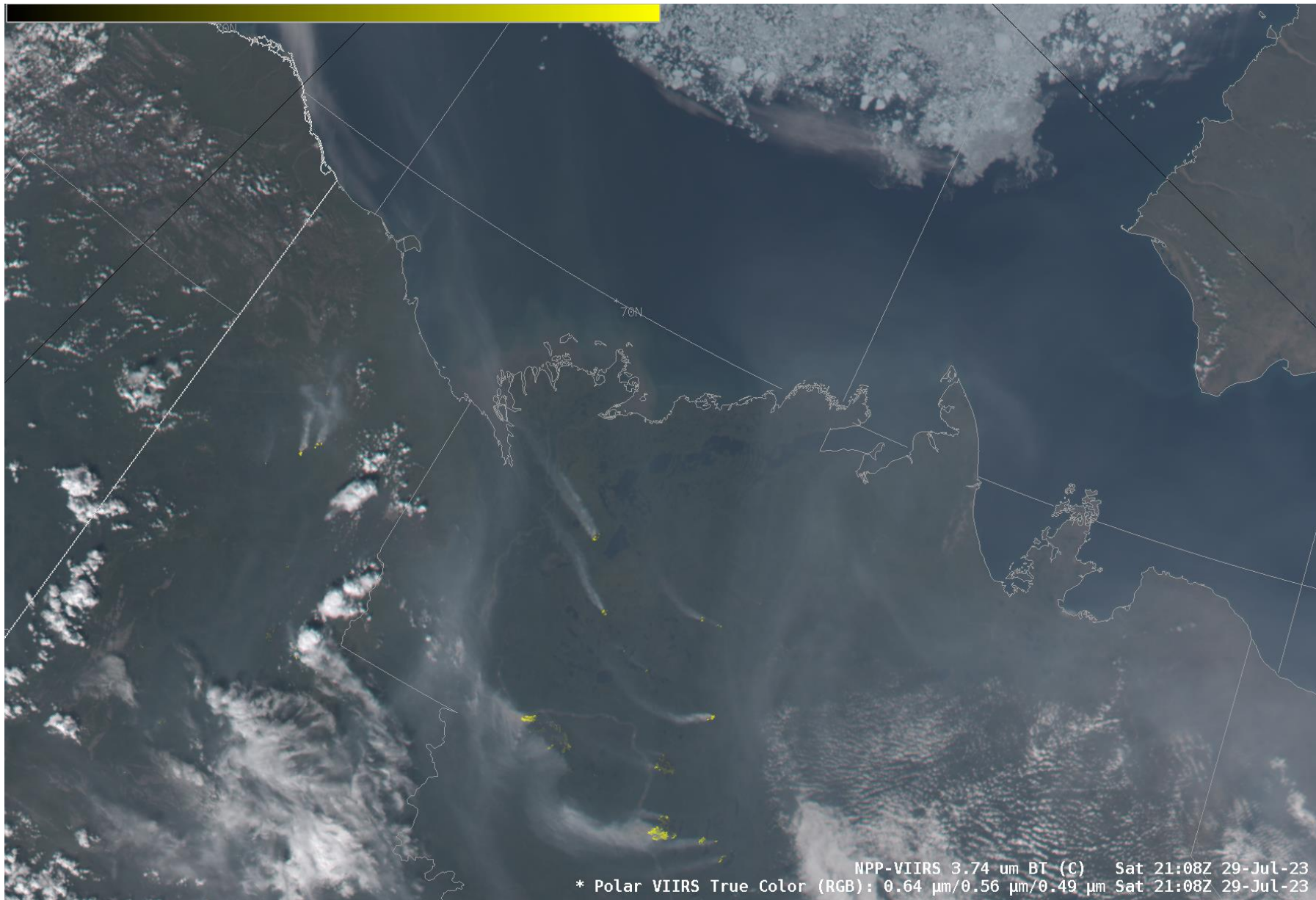
Canada Fires, Smoke, Ice, Clouds
20230729
NOAA-21
True Color RGB and MWIR
(M5, M4, M3, I4)



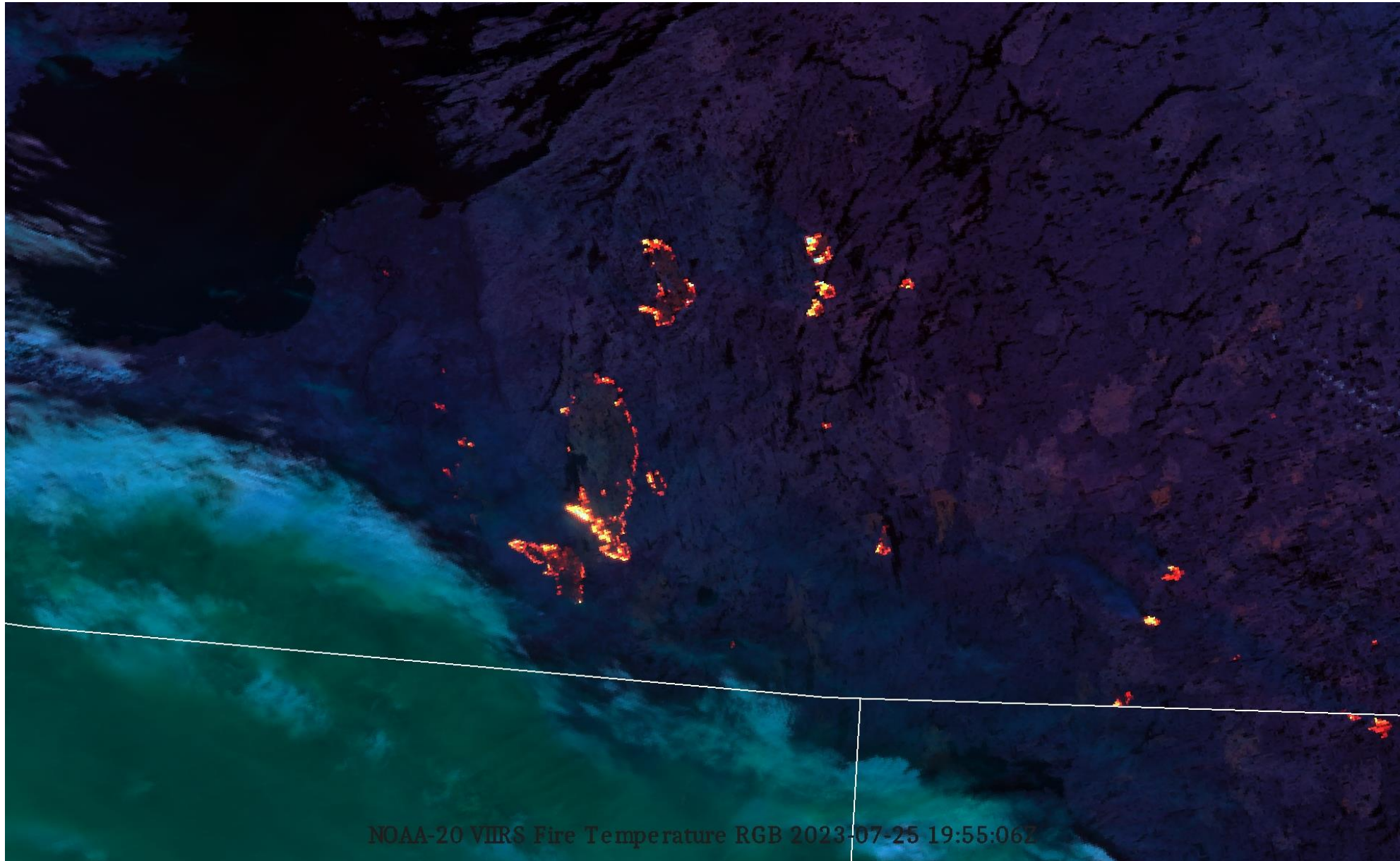
Canada Fires, Smoke, Ice, Clouds
20230729

S-NPP

True Color RGB and MWIR
(M5, M4, M3, I4)

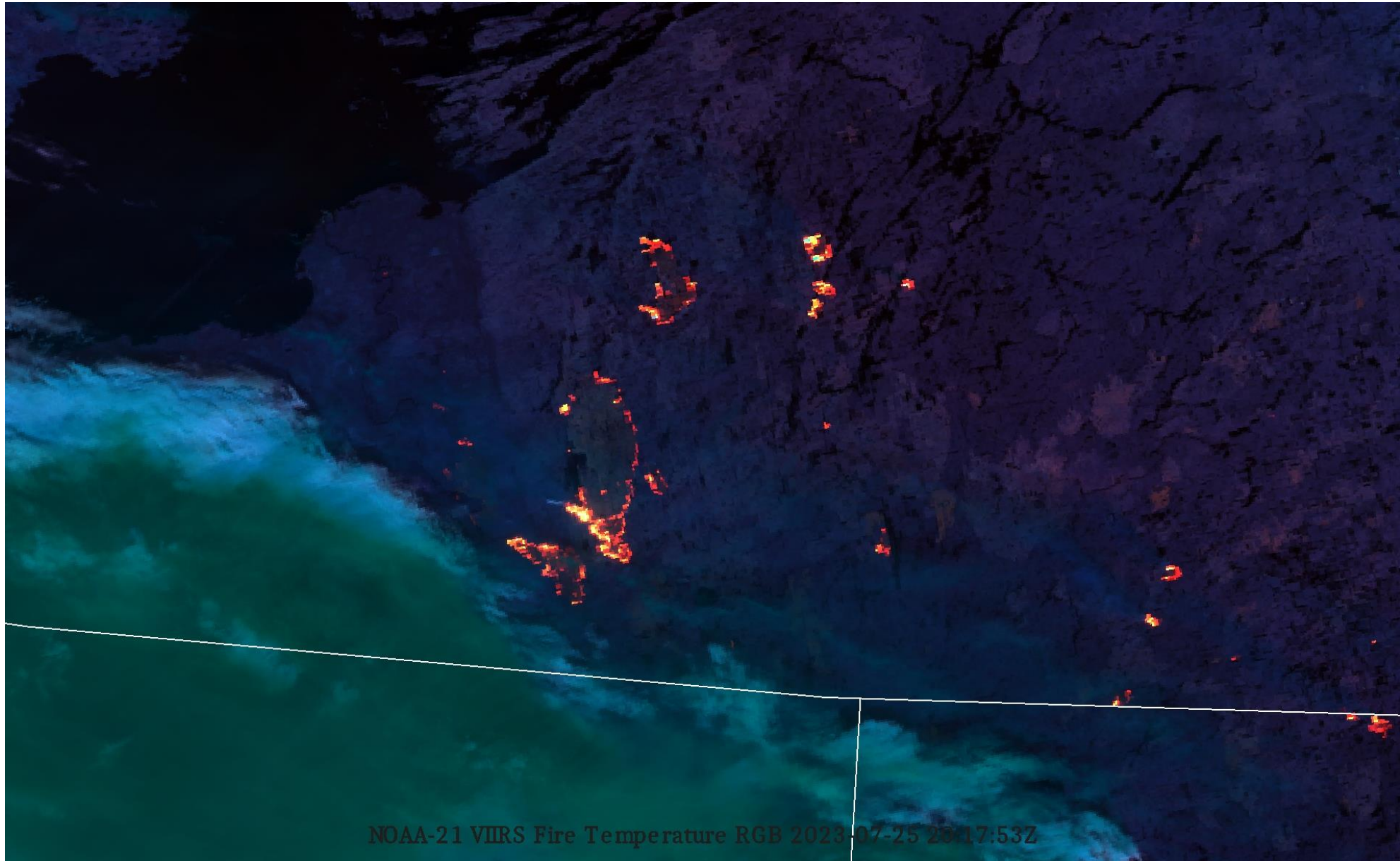


Canada Wildfires
20230725
NOAA-20
Fire Temperature RGB
(M12, M11, M10)

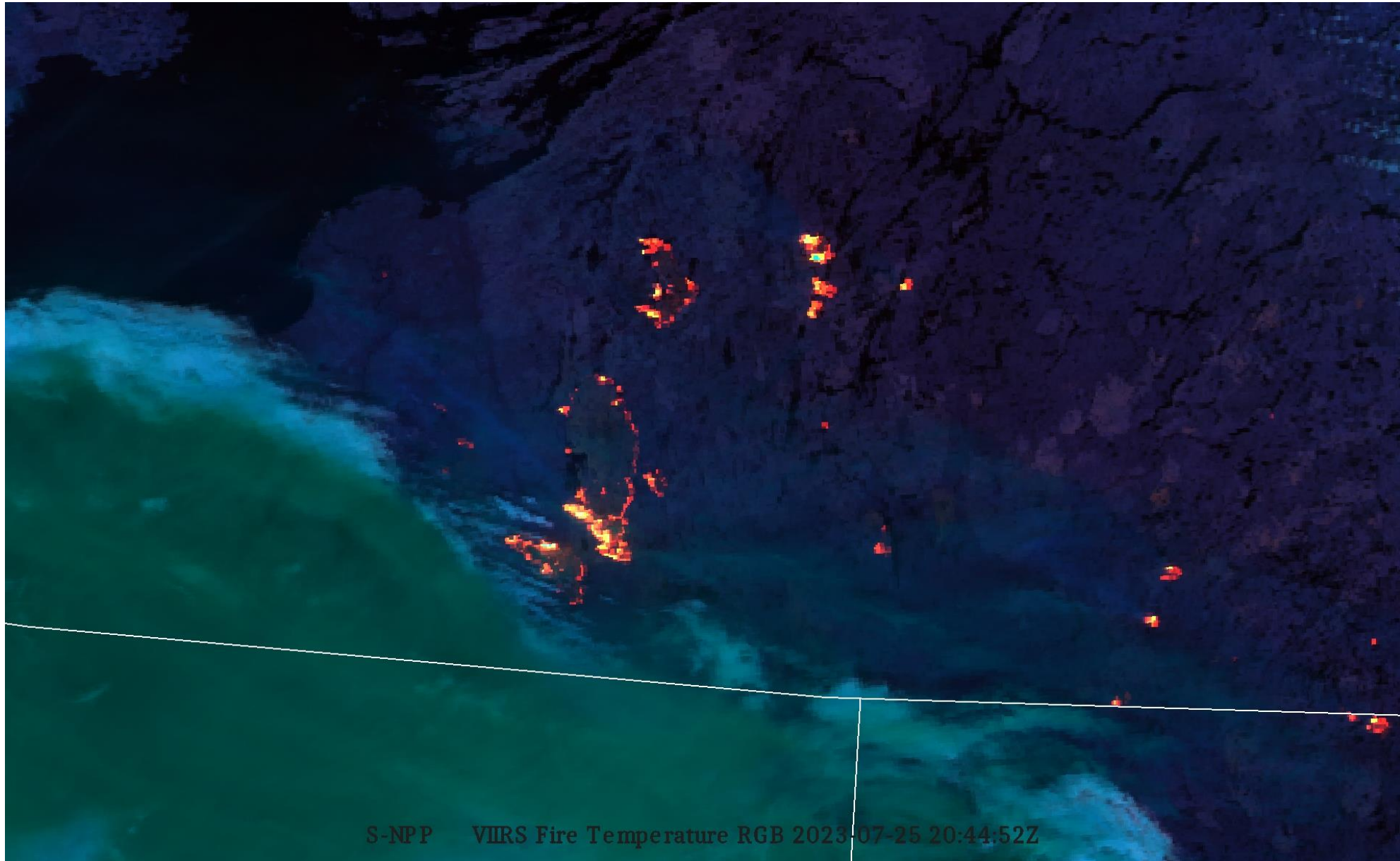


NOAA-20 VIIRS Fire Temperature RGB 2023-07-25 19:55:06Z

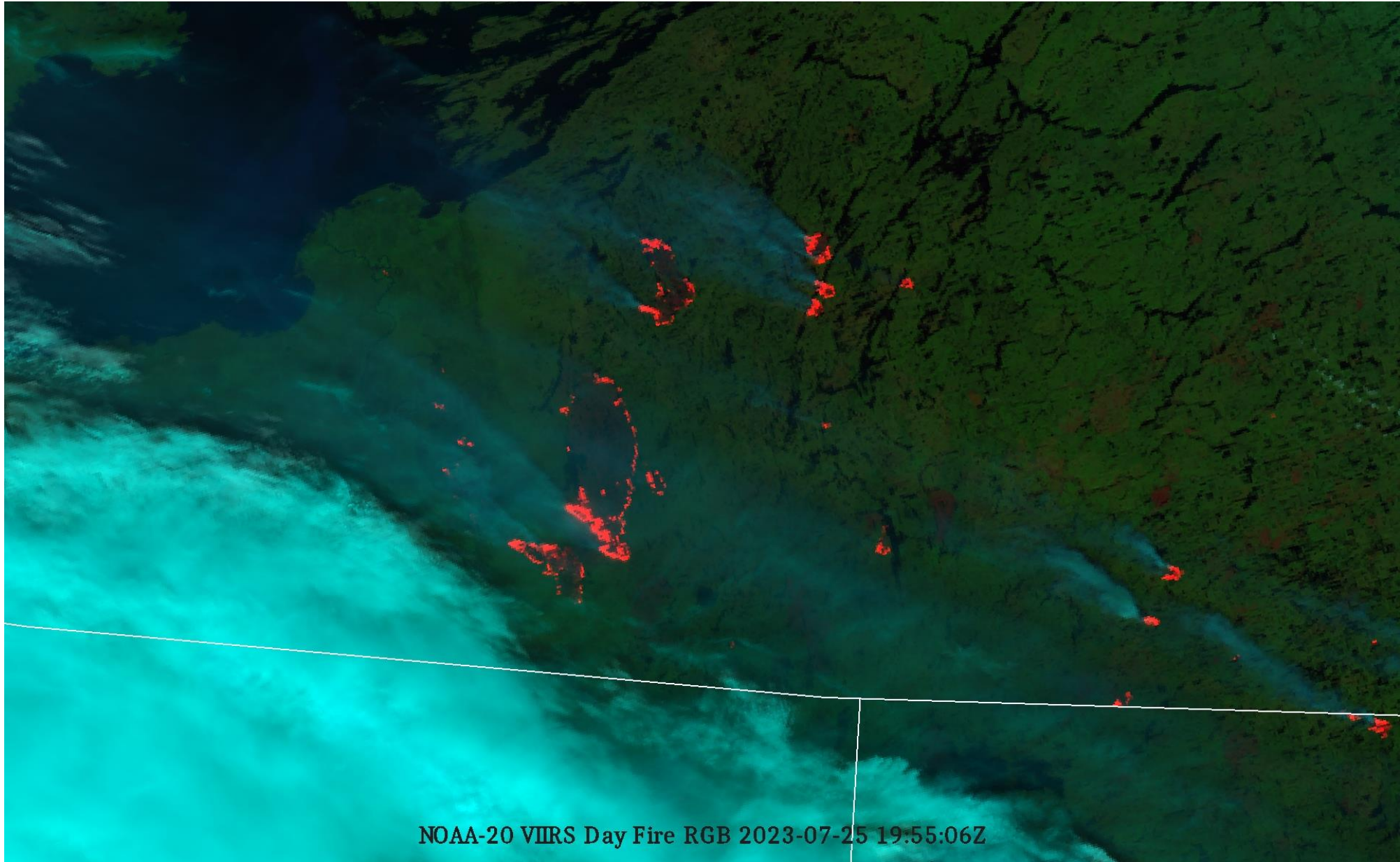
Canada Wildfires
20230725
NOAA-21
Fire Temperature RGB
(M12, M11, M10)



Canada Wildfires
20230725
S-NPP
Fire Temperature RGB
(M12, M11, M10)

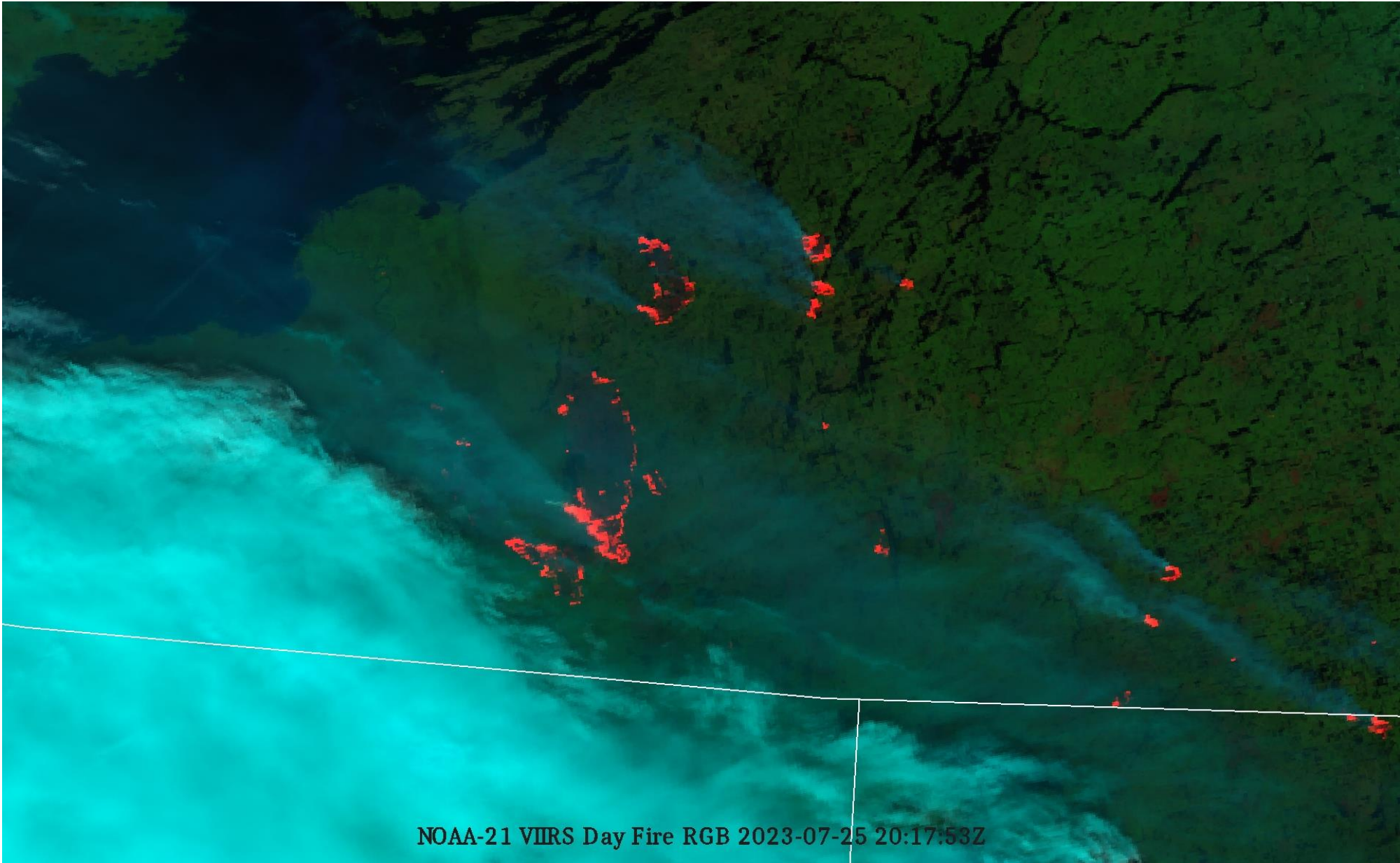


Canada Wildfires
20230725
NOAA-20
Day Fire RGB
(M12, M7, M5)



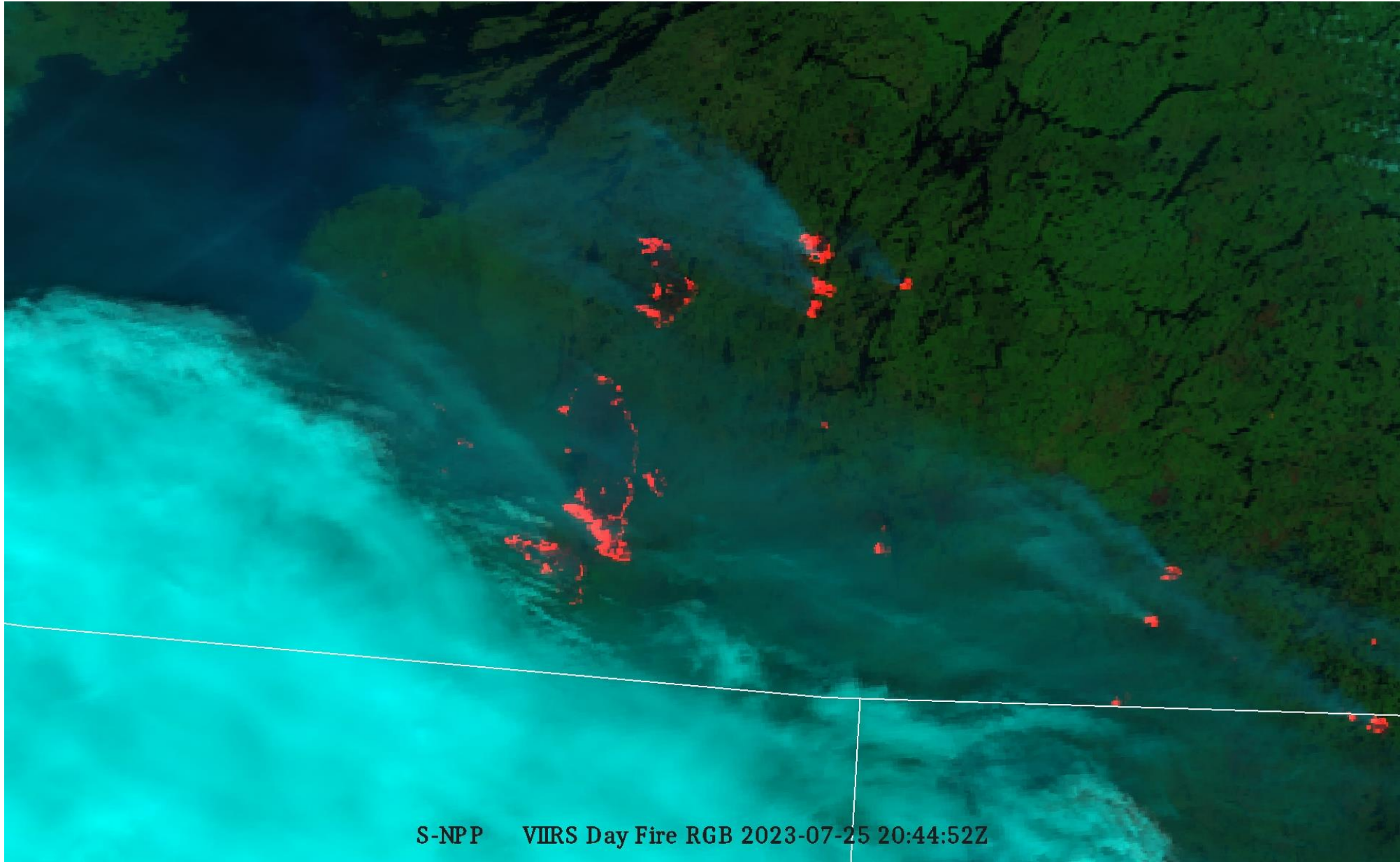
NOAA-20 VIIRS Day Fire RGB 2023-07-25 19:55:06Z

Canada Wildfires
20230725
NOAA-21
Day Fire RGB
(M12, M7, M5)



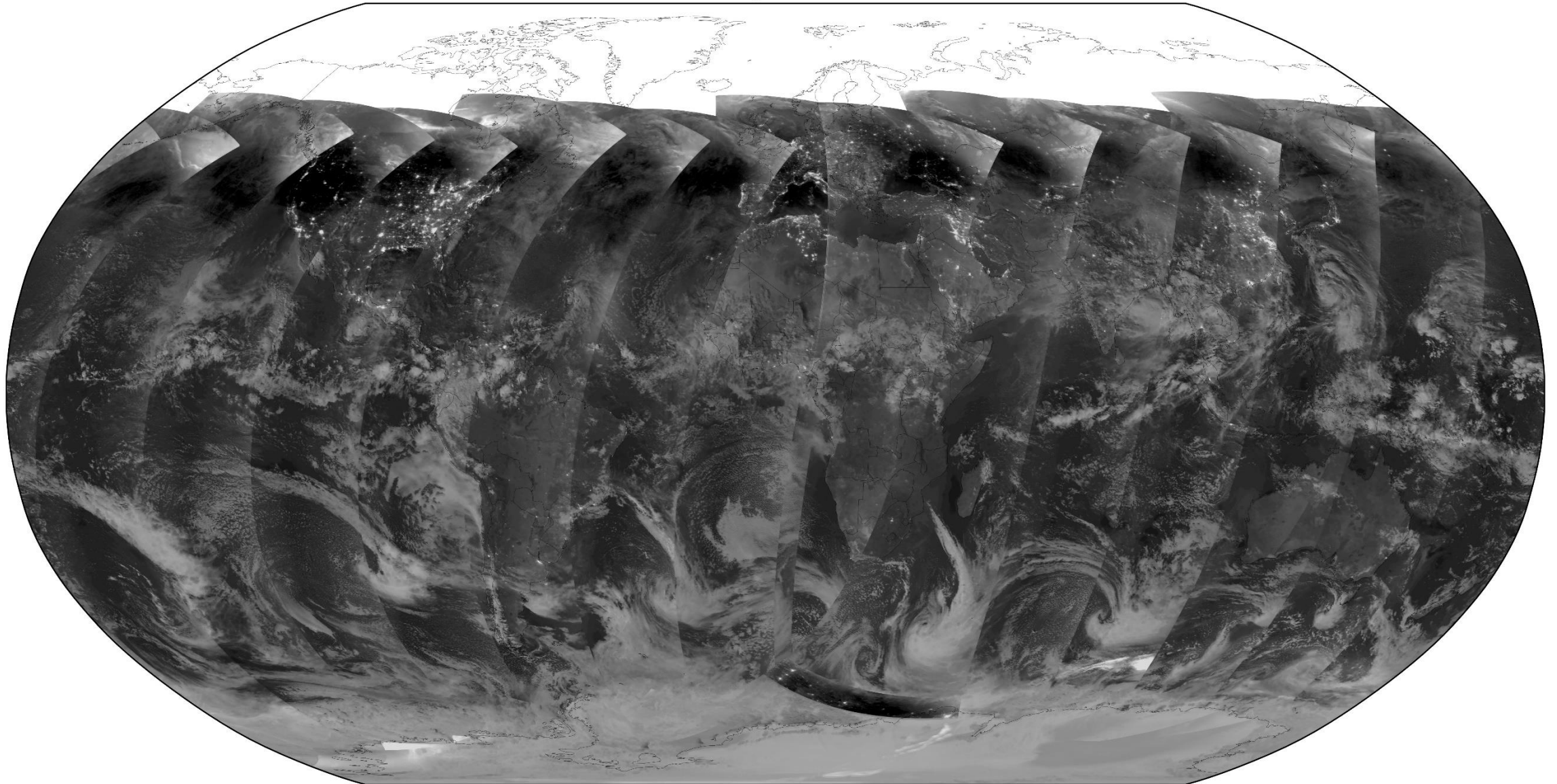
NOAA-21 VIIRS Day Fire RGB 2023-07-25 20:17:53Z

Canada Wildfires
20230725
S-NPP
Day Fire RGB
(M12, M7, M5)

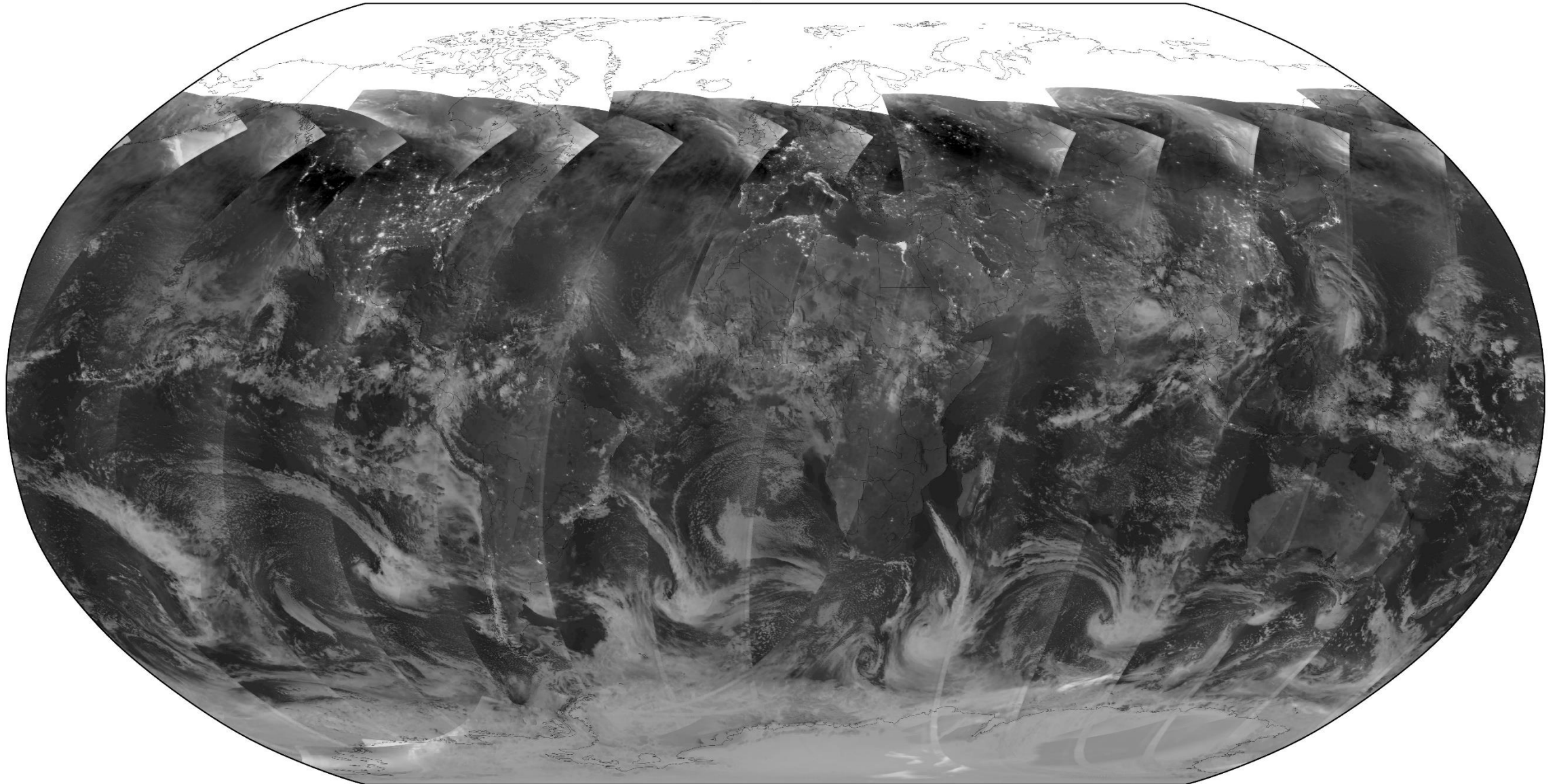


- Global Composites
- All 22 bands over a few scenes
- Multispectral Imagery
- **Near Constant Contrast**
 - Overall, compares very well with NOAA-20 and S-NPP
 - Minor striping noted, namely:
 - Sunlint and Moonglint
 - Near Edge of Scan
 - Near Terminator
 - Along-scan “Smearing” noted, but not significant (similar to in N20 and NPP)
- User Feedback

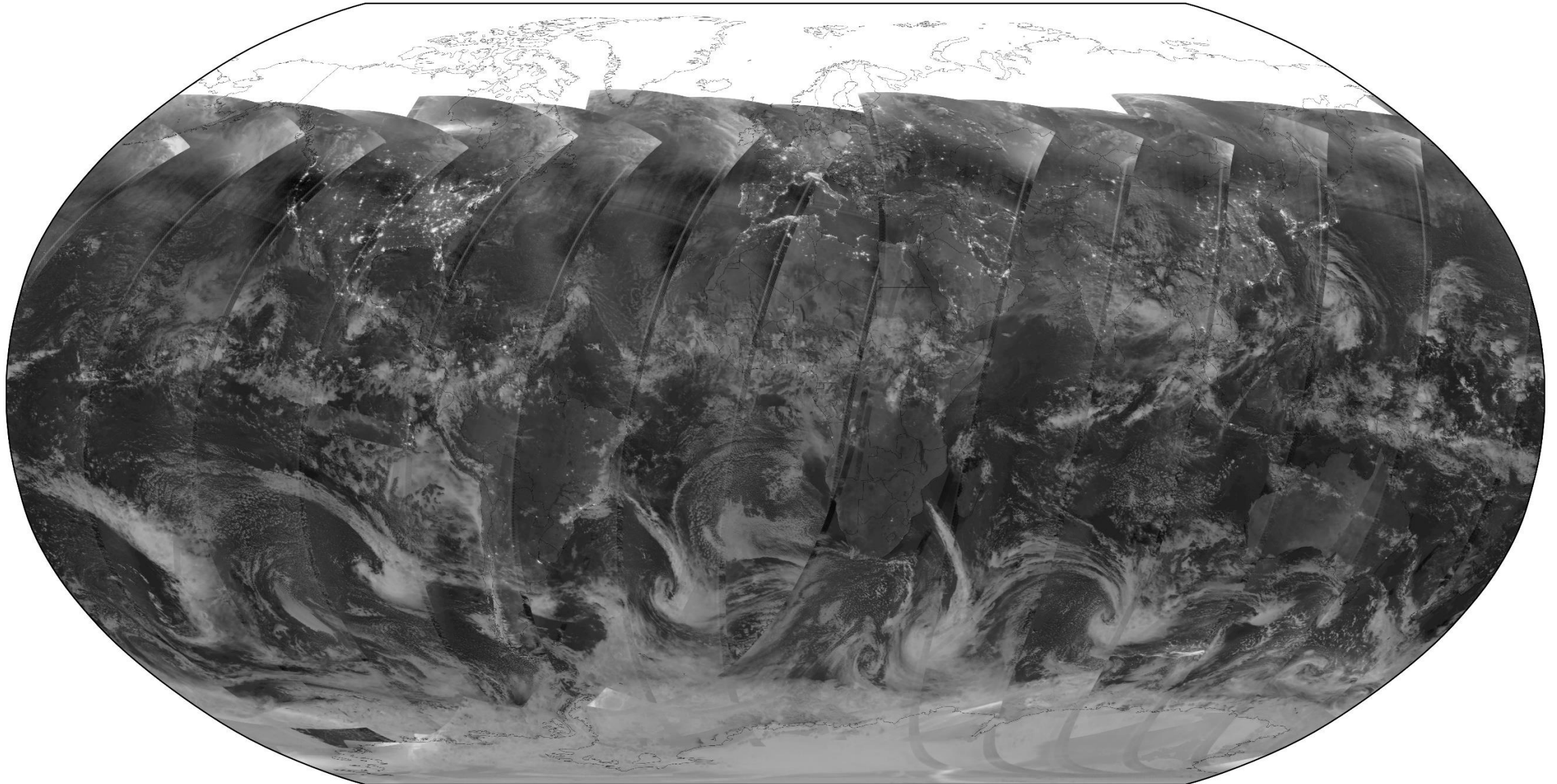
20230730 J01 VIIRS NCC



20230730 J02 VIIRS NCC

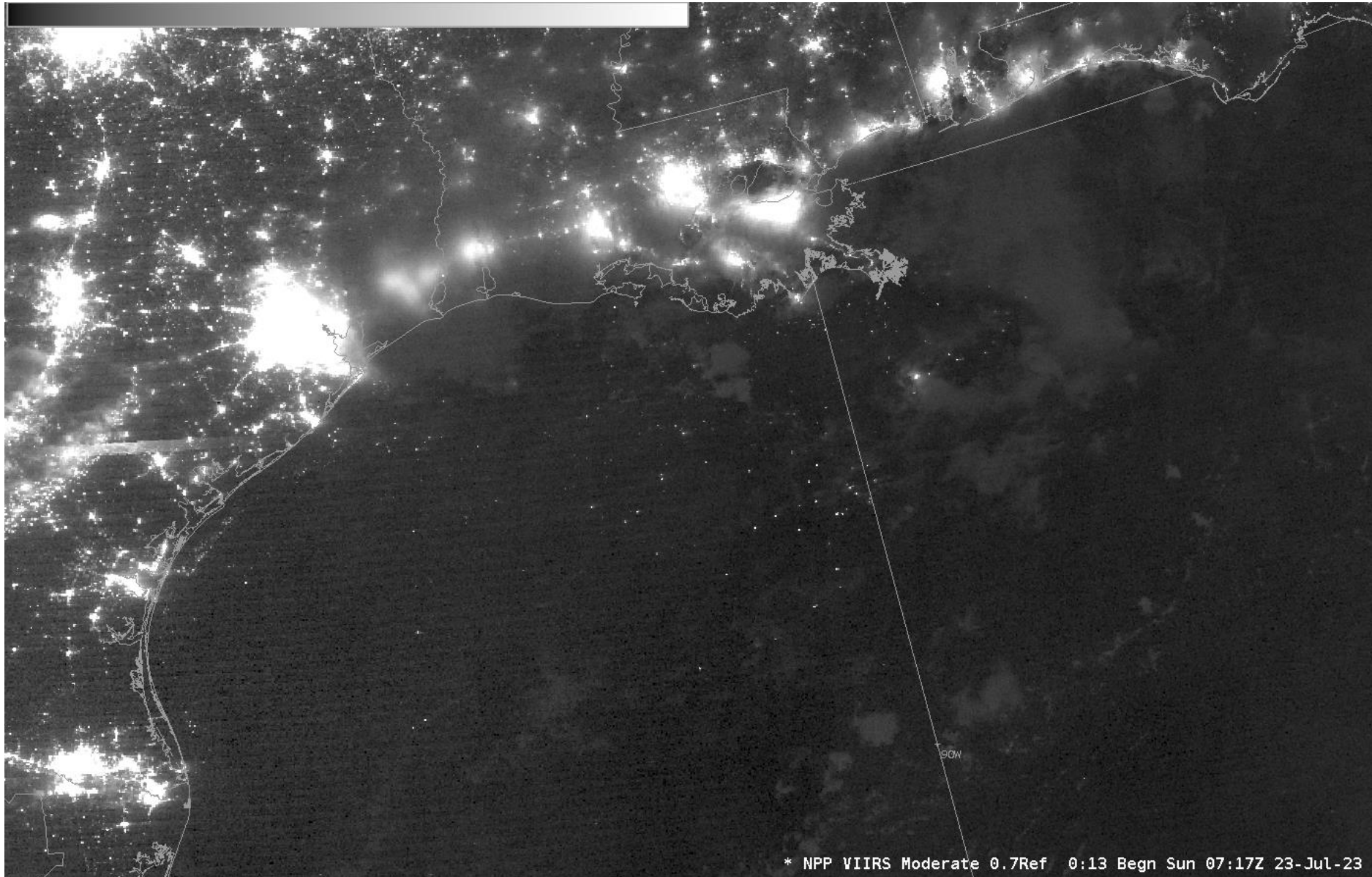


20230730 NPP VIIRS NCC

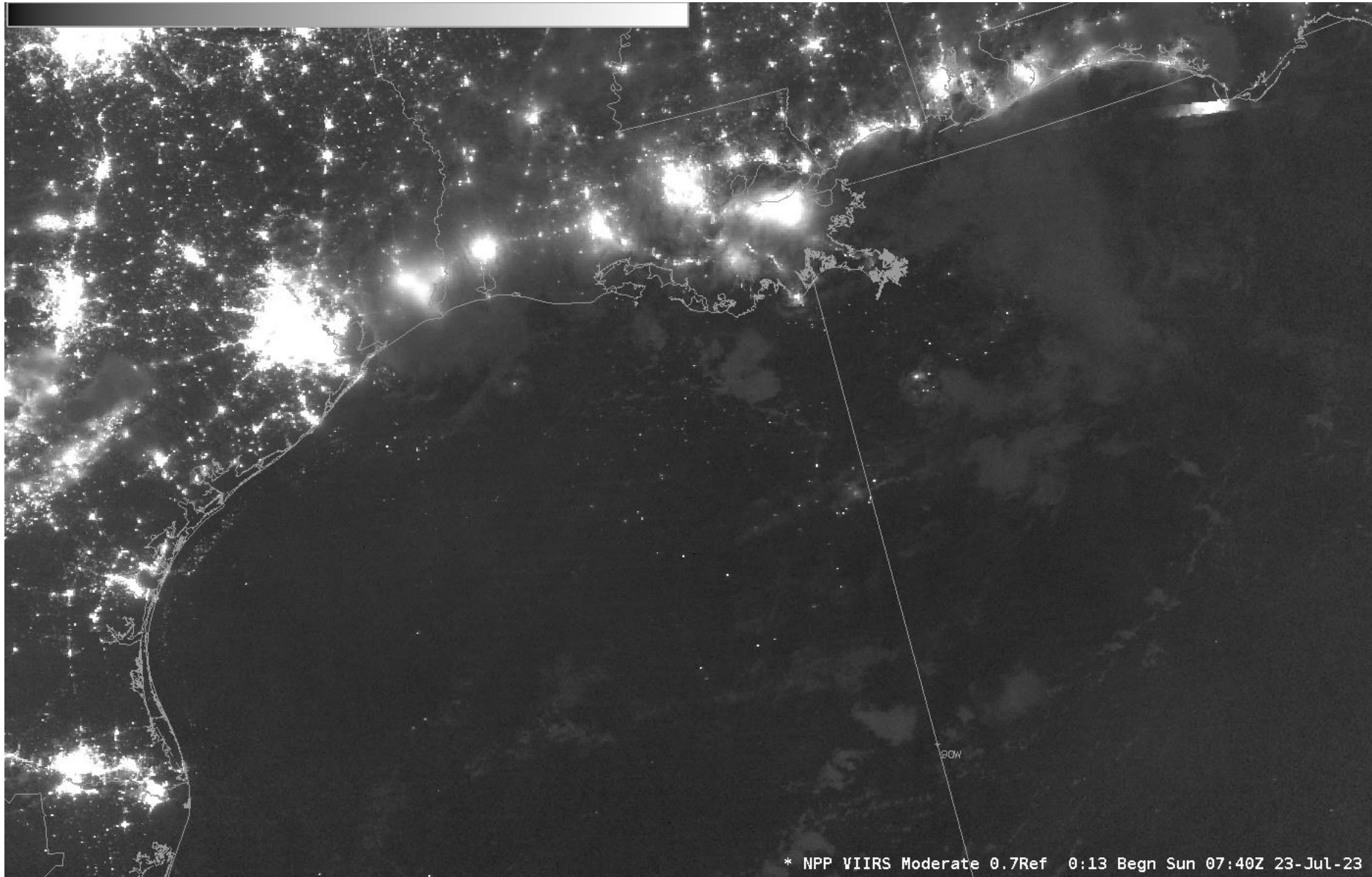


NCC Over Gulf of Mexico (Night)

Gulf of Mexico
20230723 (Night)
NOAA-20
NCC



Gulf of Mexico
20230723 (Night)
NOAA-21
NCC

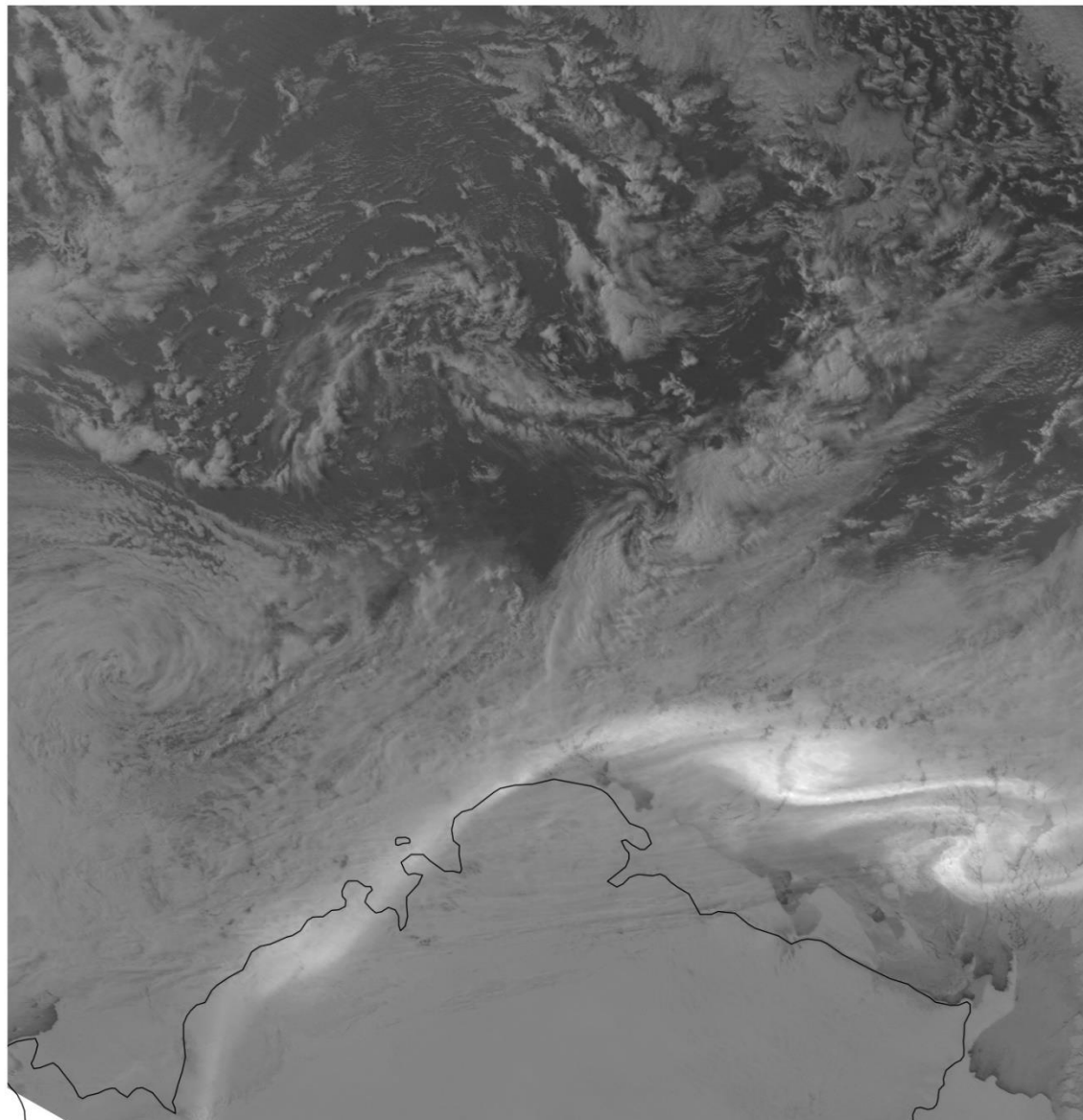


Gulf of Mexico
20230723 (Night)
S-NPP
NCC



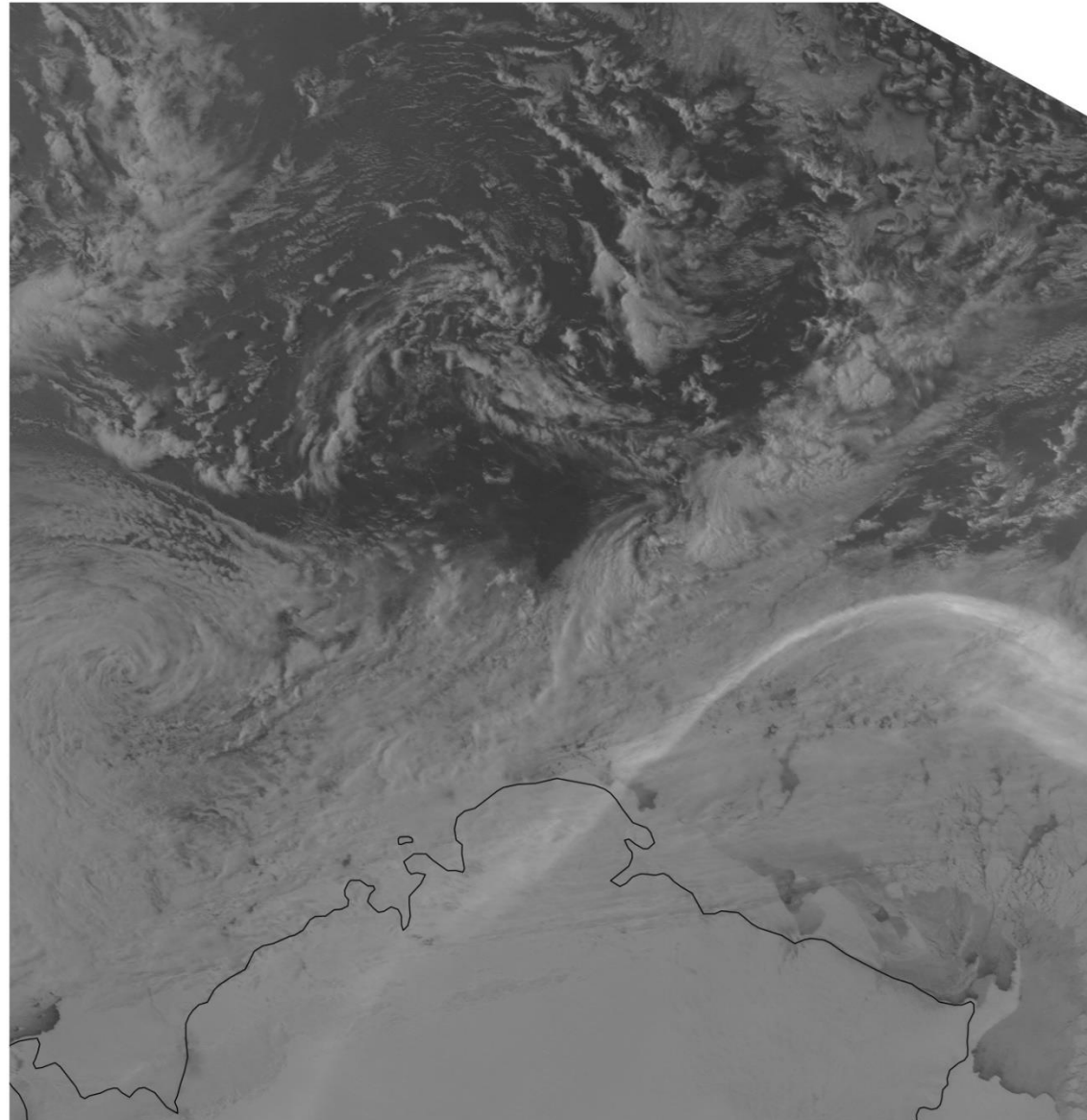
20230727 NOAA-20 VIIRS NCC

Antarctica
20230727 (Night)
NOAA-20
NCC



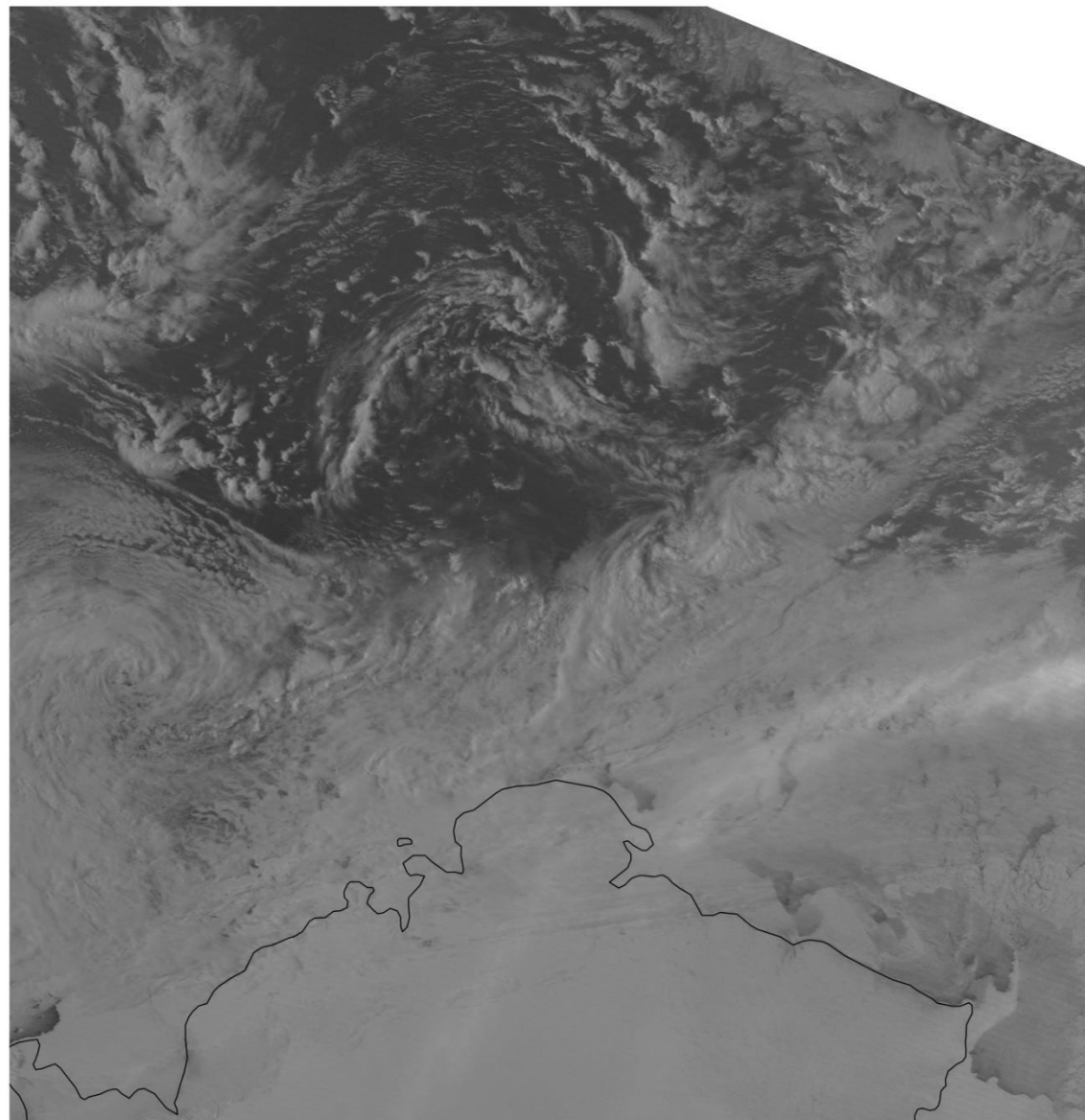
20230727 NOAA-21 VIIRS NCC

Antarctica
20230727 (Night)
NOAA-21
NCC



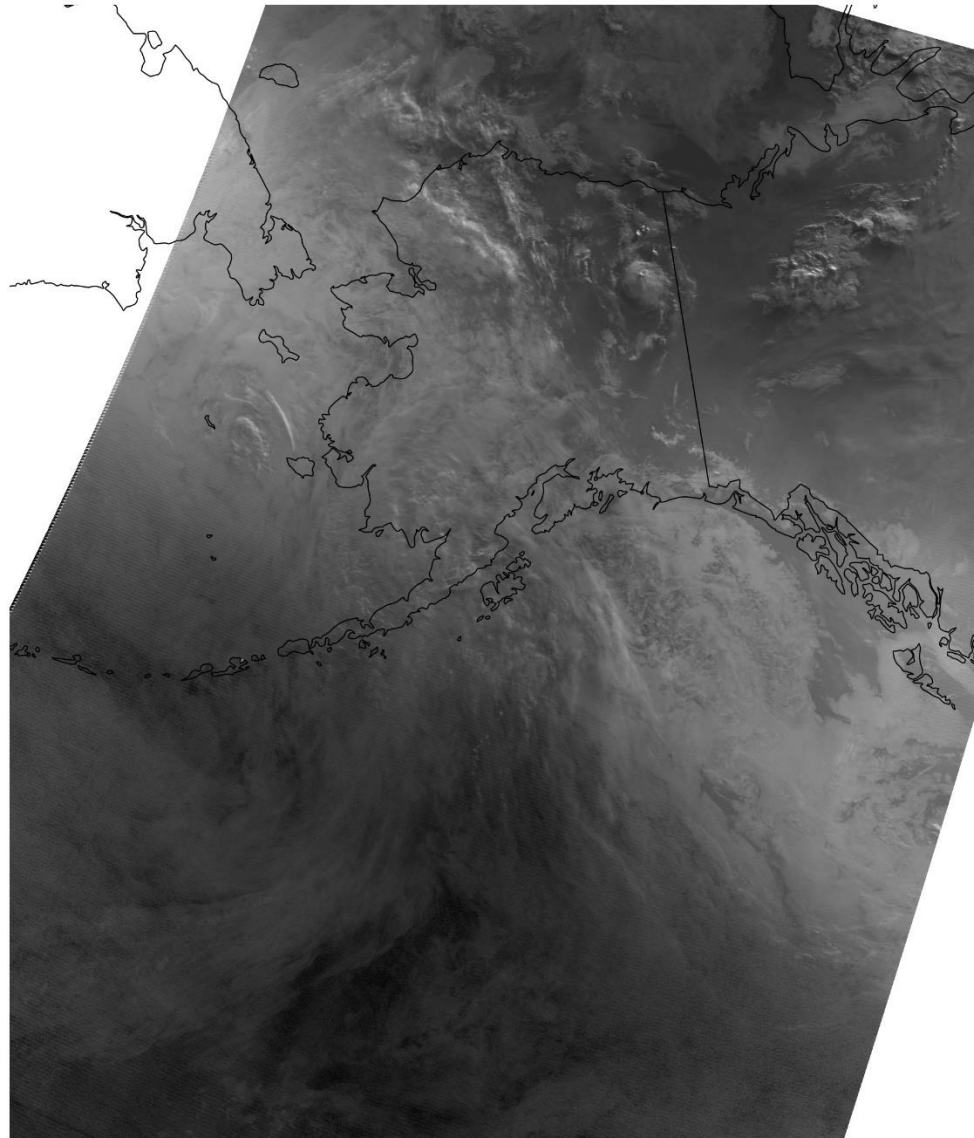
20230727 S-NPP VIIRS NCC

Antarctica
20230727 (Night)
S-NPP
NCC



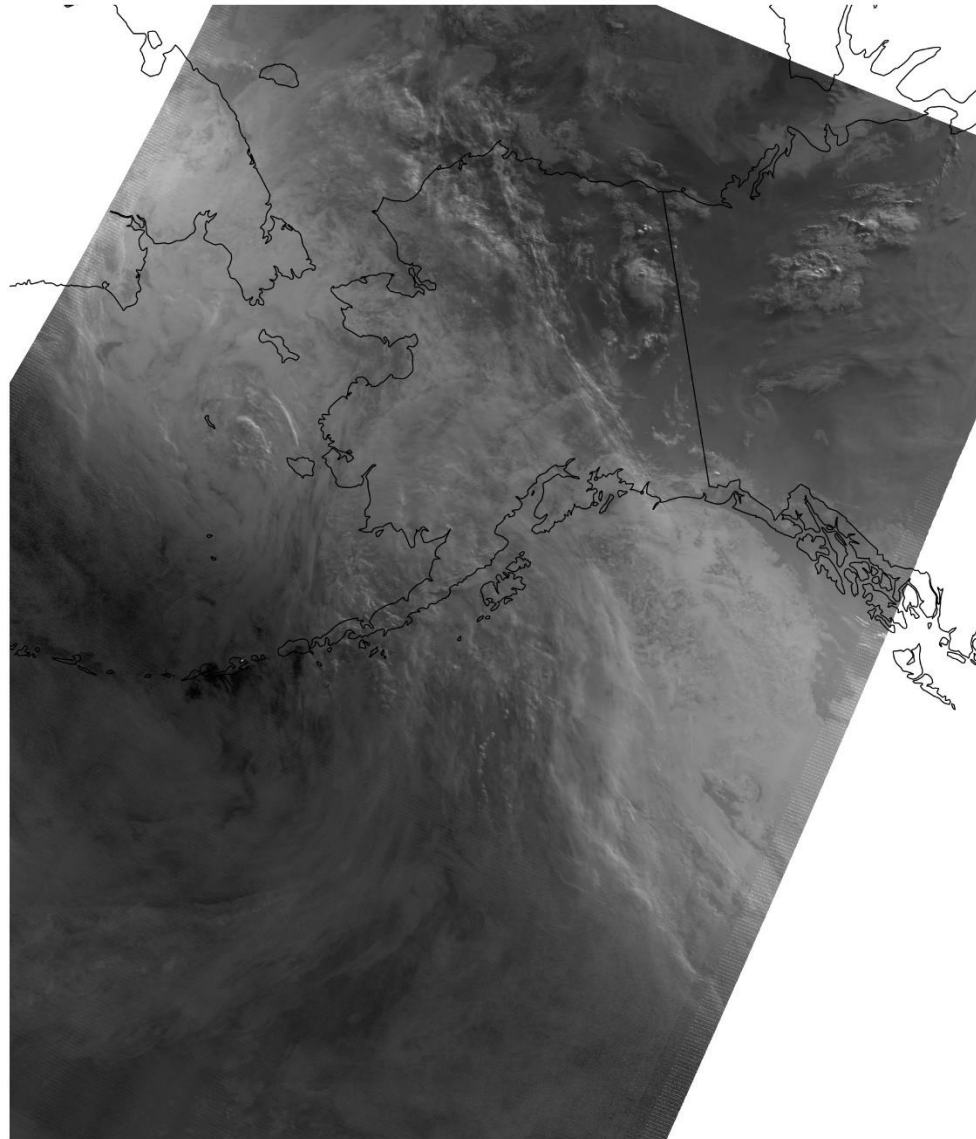
Alaska
20230728 (Day (North, Night (South))
NOAA-20
NCC

20230728 NOAA-20 VIIRS NCC



Alaska
20230728 (Day (North, Night (South))
NOAA-21
NCC

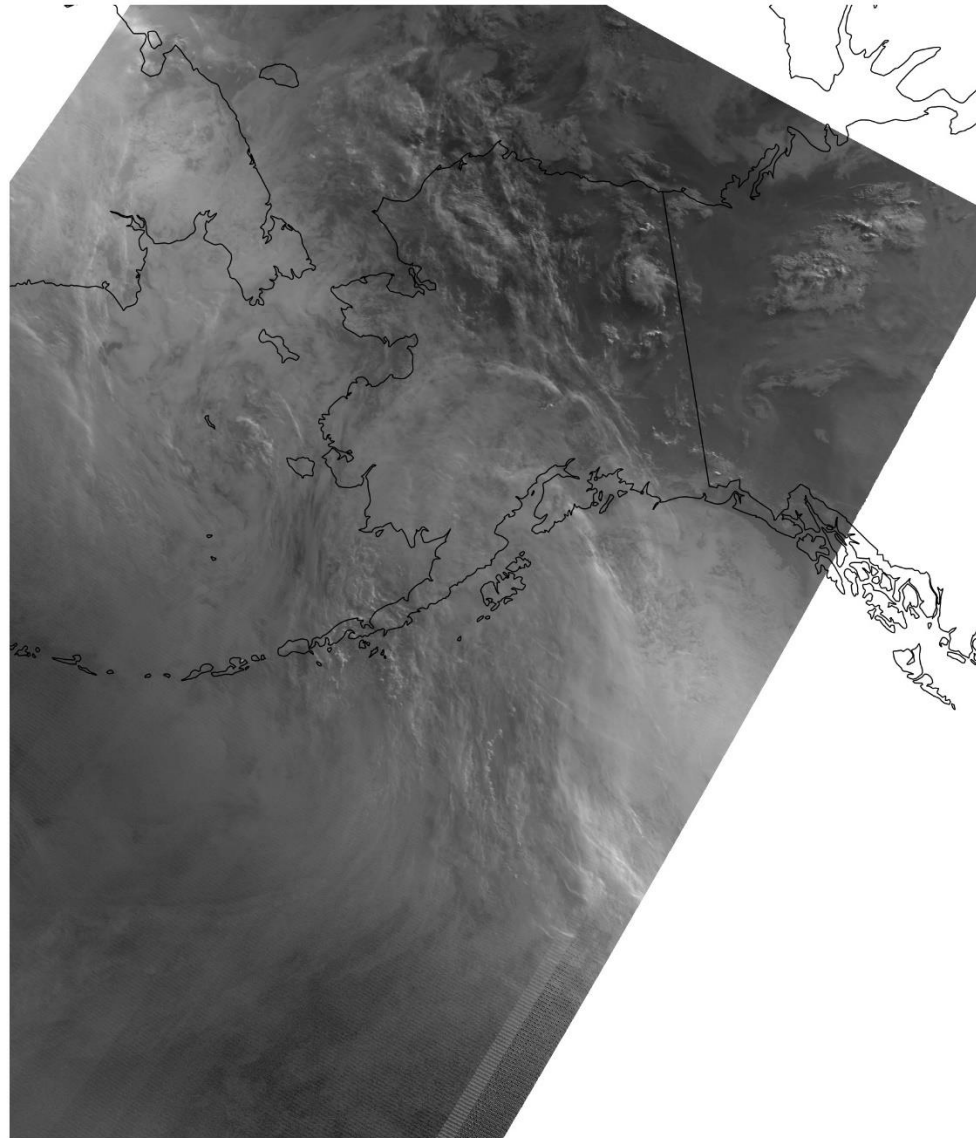
20230728 NOAA-21 VIIRS NCC



NCC Over Alaska (Day/Night)

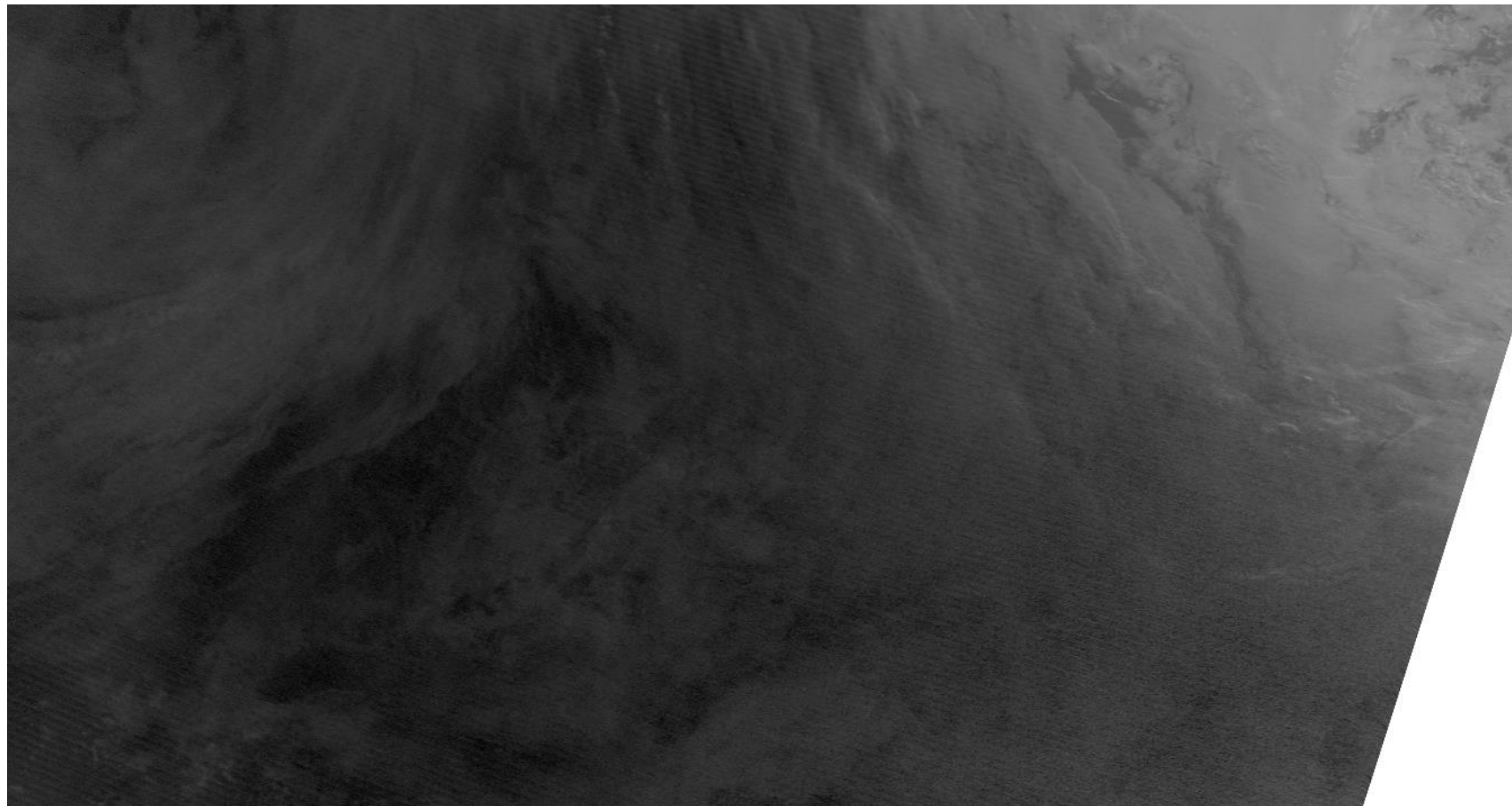
20230728 S-NPP VIIRS NCC

Alaska
20230728 (Day (North, Night (South))
S-NPP
NCC



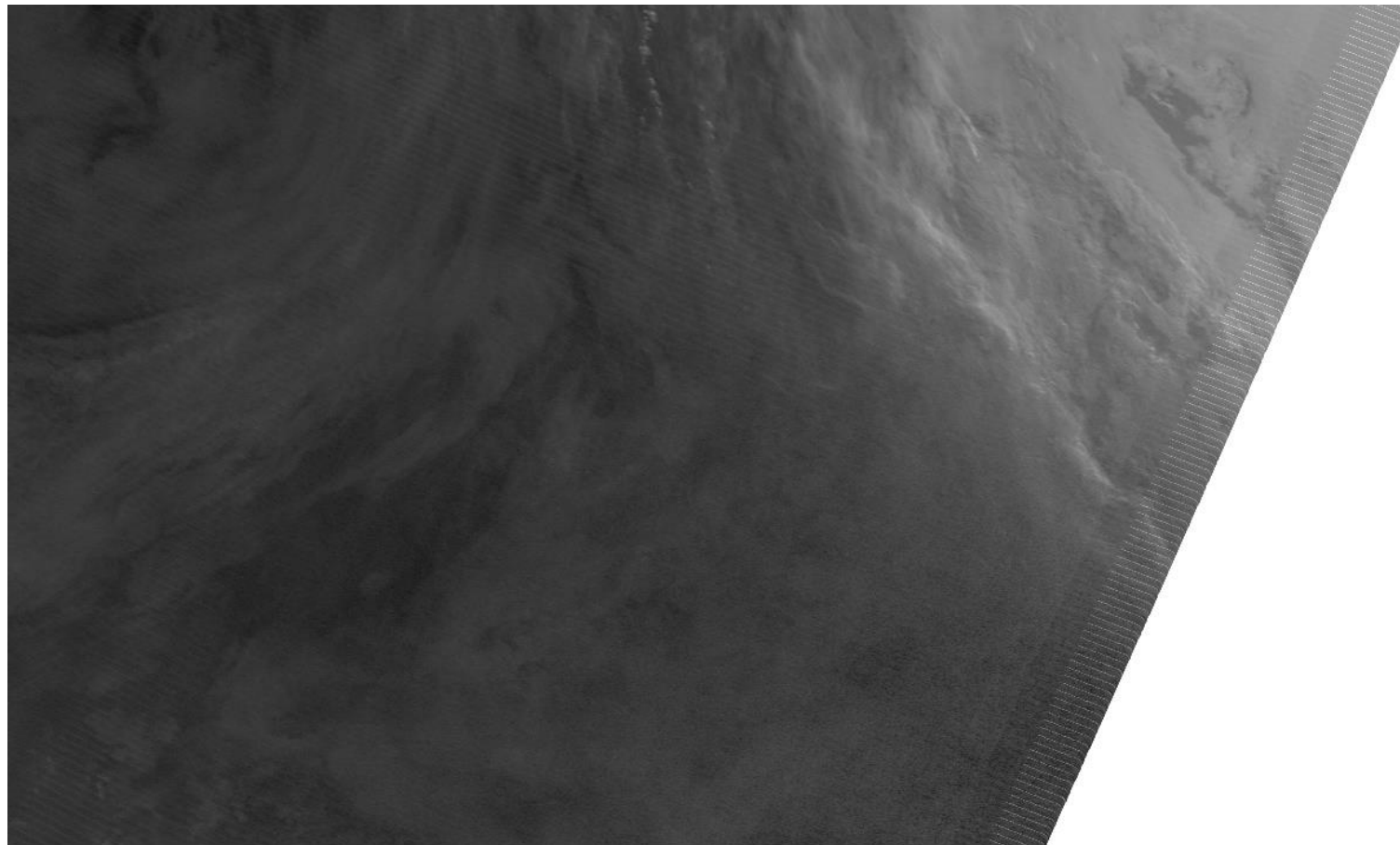
Alaska
20230728 (Day (North, Night (South)))
NOAA-20
NCC

Minor striping in NCC at night, with increased noise near edge-of-scan.



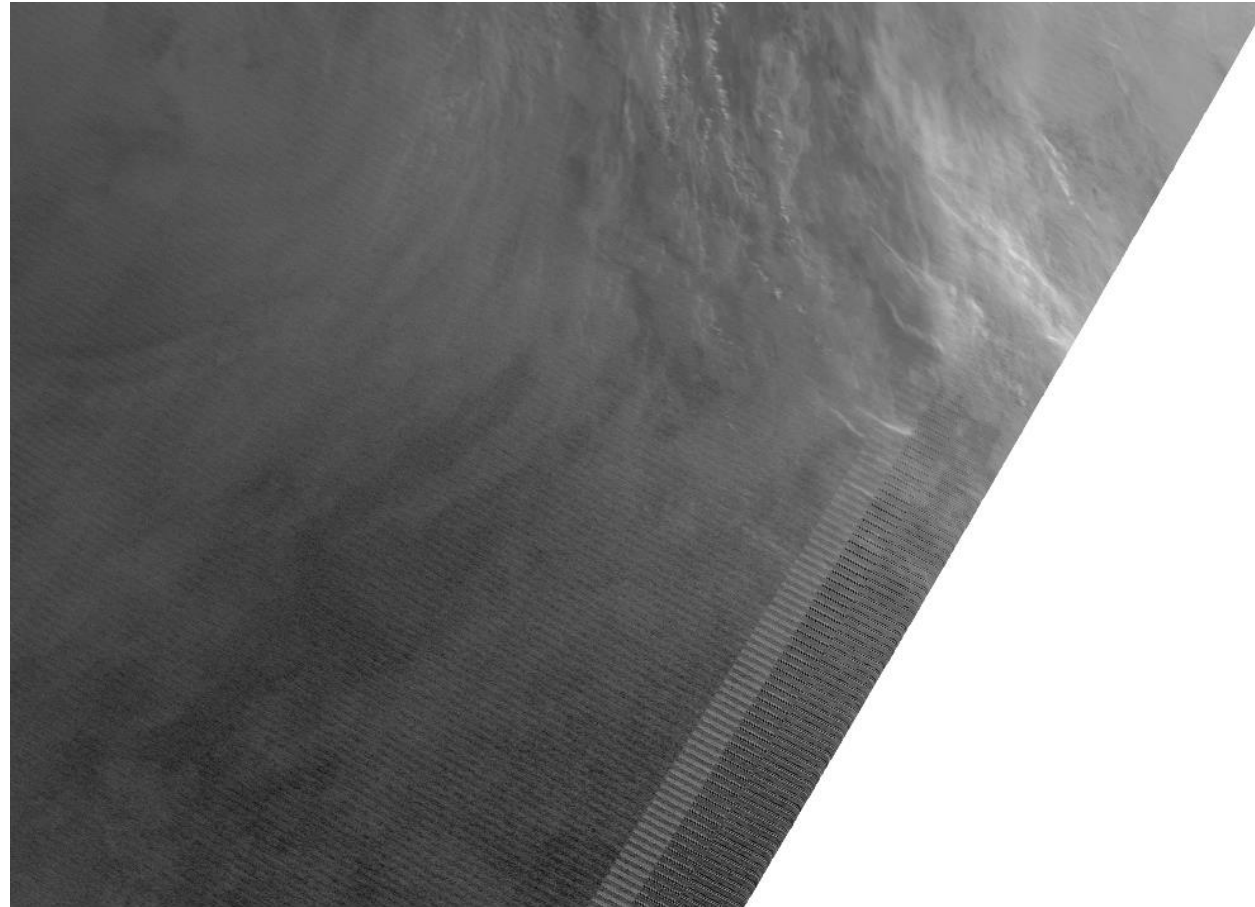
Alaska
20230728 (Day (North, Night (South)))
NOAA-21
NCC

Minor striping in NCC at night, with increased noise near edge-of-scan.



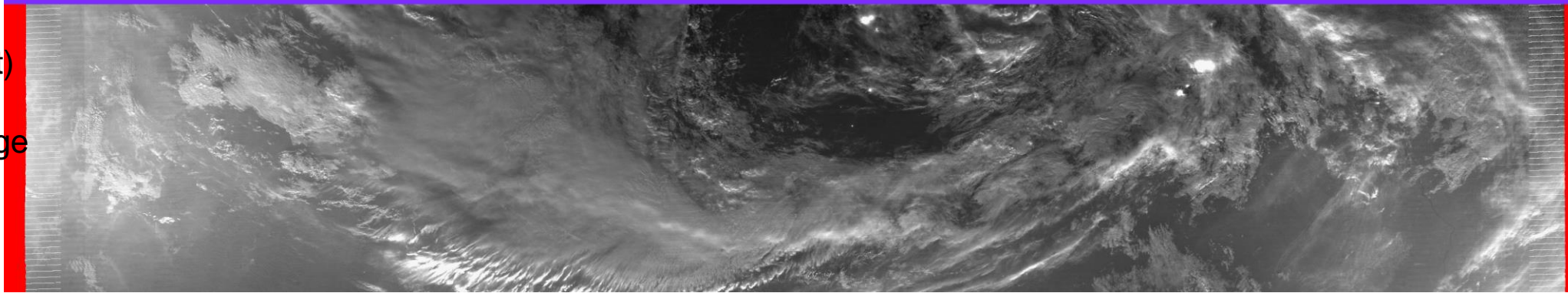
Alaska
20230728 (Day (North, Night (South)))
S-NPP
NCC

Minor striping in NCC at night, with increased noise near edge-of-scan.

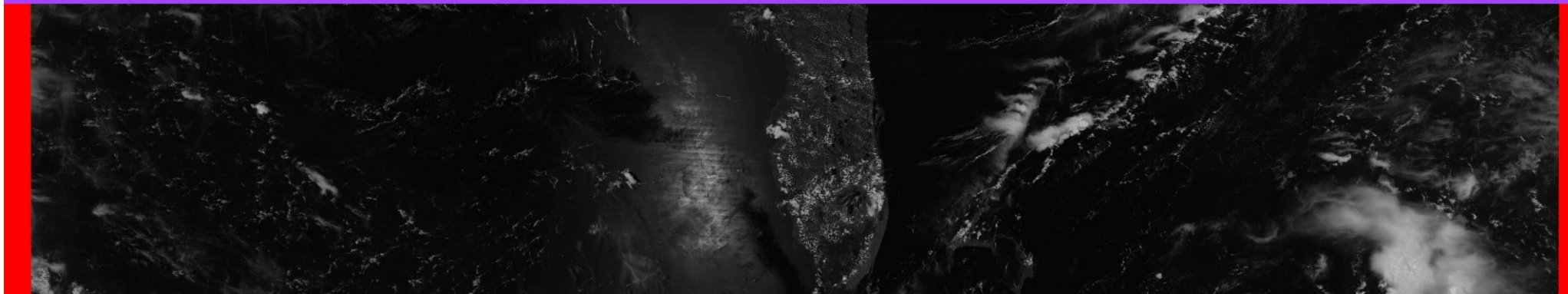


NCC Granules with Striping

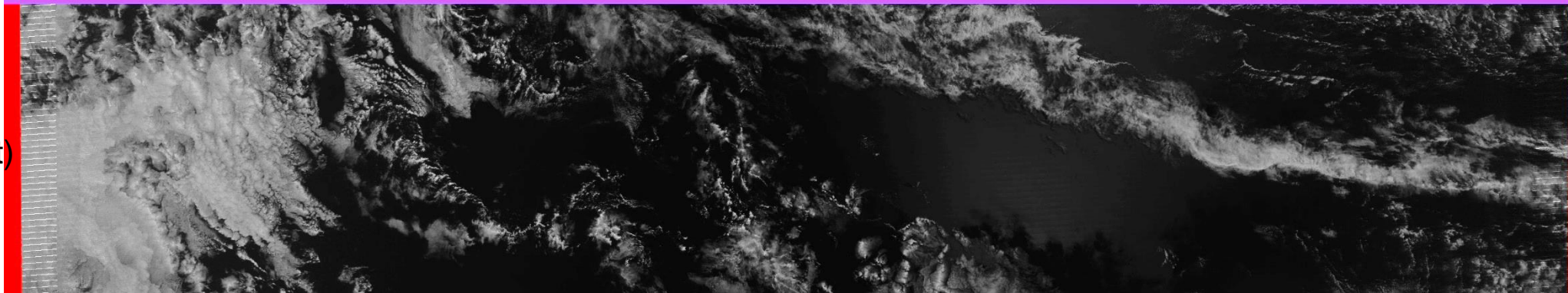
July 30, 1858 UTC (night)
Striping Near Terminator,
especially near Scan Edge



July 30, 1833 UTC (day)
Striping in Sunlight



July 30, 1924 UTC (night)
Striping in Moonglint



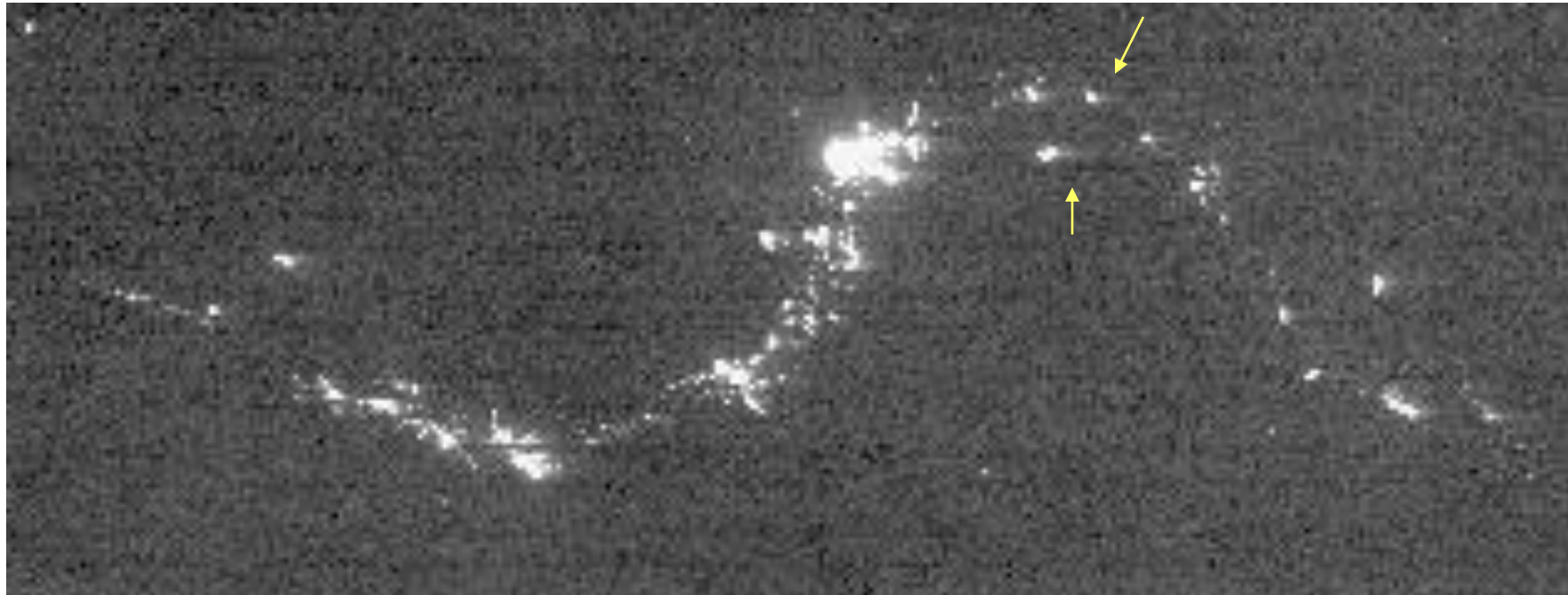
- Qualitative analysis of Smearing aka DNB trailing scan response tail (waiver)
- Methods
 - View native DNB product since remapped NCC product may cause shifts in pixel/light sources, making comparisons difficult
 - Imagery enhanced slightly to draw out low-light features
 - Focus on New Moon (low-light) periods since April
 - Compare Imagery from three satellites during consecutive night in order to view light source in similar position of swath
 - Night 1: NOAA-20, Night 2: NOAA-21, Night 3: S-NPP
 - Region must have clear skies for three consecutive nights
 - Look for along-scan smearing

Conclusion: Qualitatively, very subtle along-scan “smearing” is present in NOAA-21 DNB imagery, and appears like that in NOAA-20 and S-NPP DNB. Imagery team does not recommend mitigation.

South African Road

Along-Scan Smears

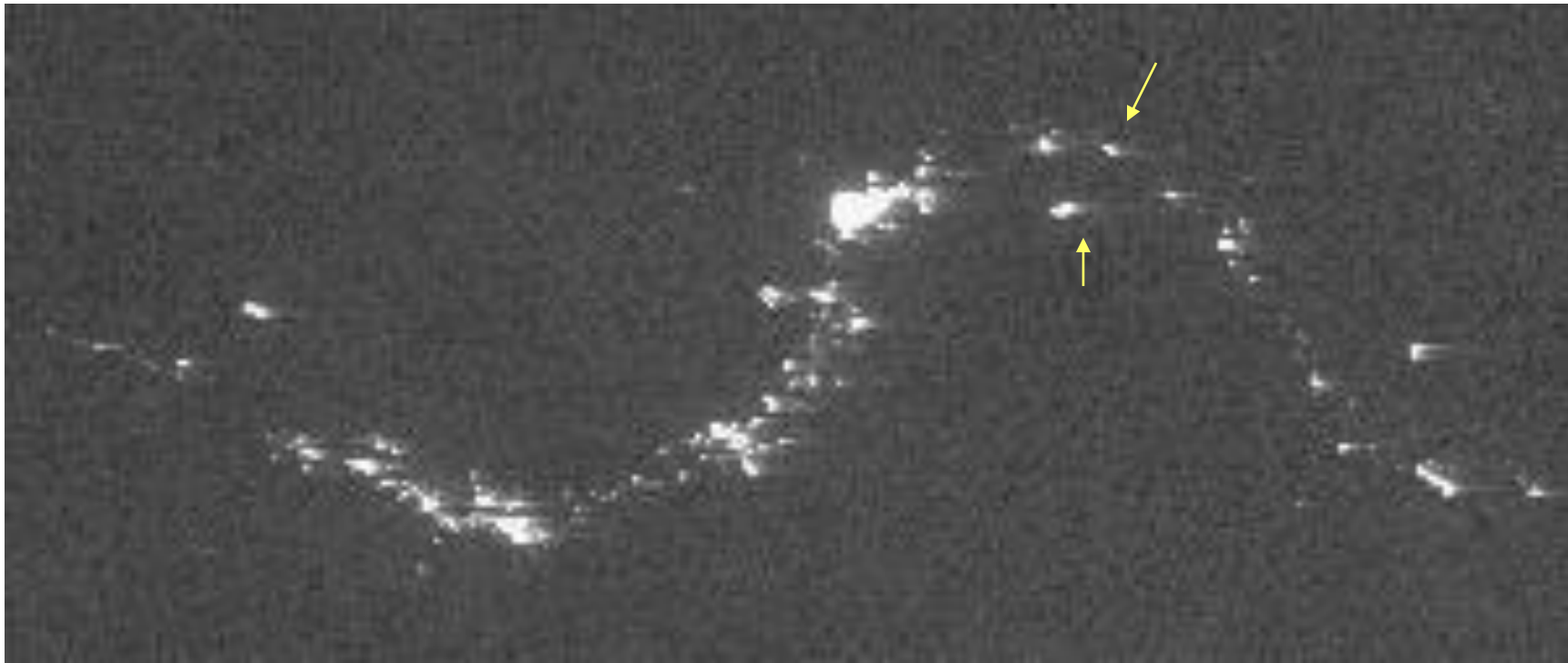
NOAA 20, 7/15/2023, 2347 UTC
Around Nadir



South African Road

Along-Scan Smears

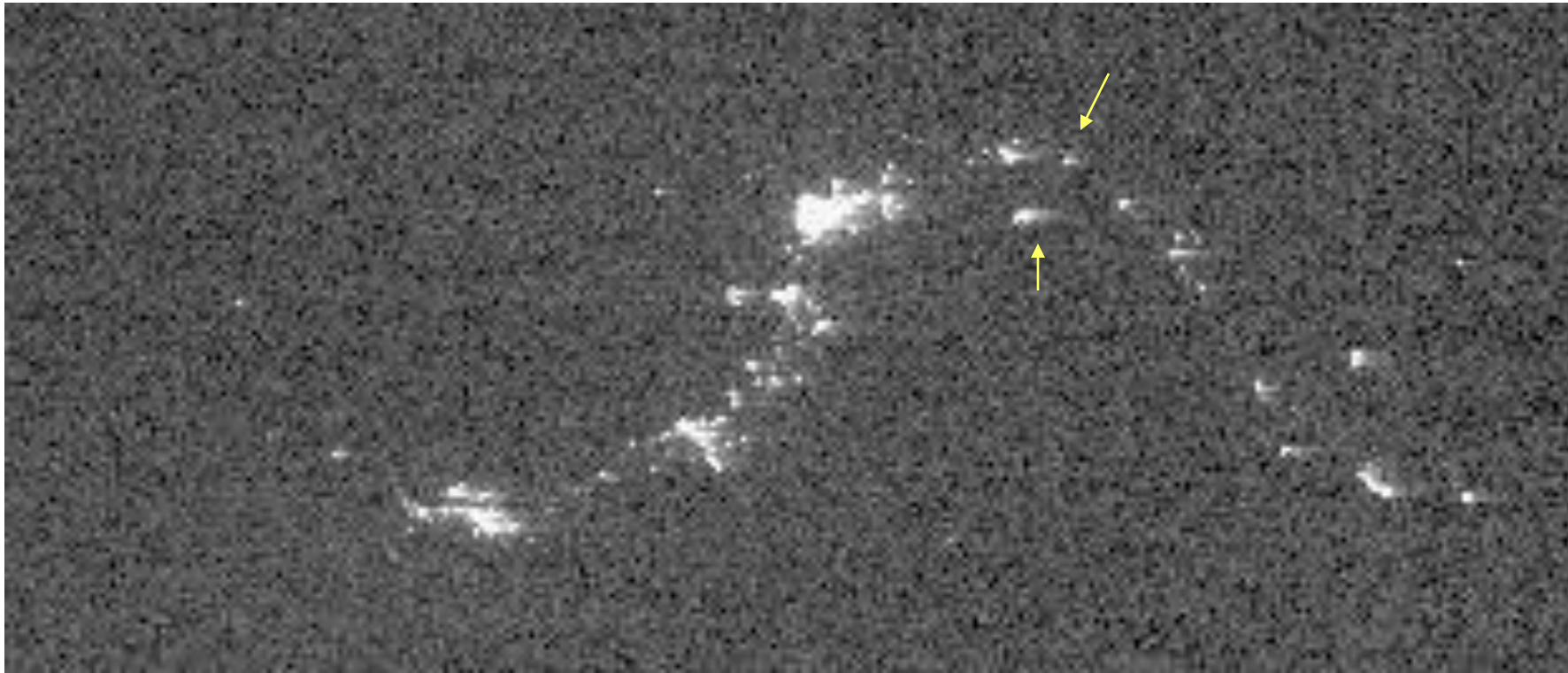
NOAA 21, 7/16/2023, 2351 UTC
Just right of Nadir



South African Road

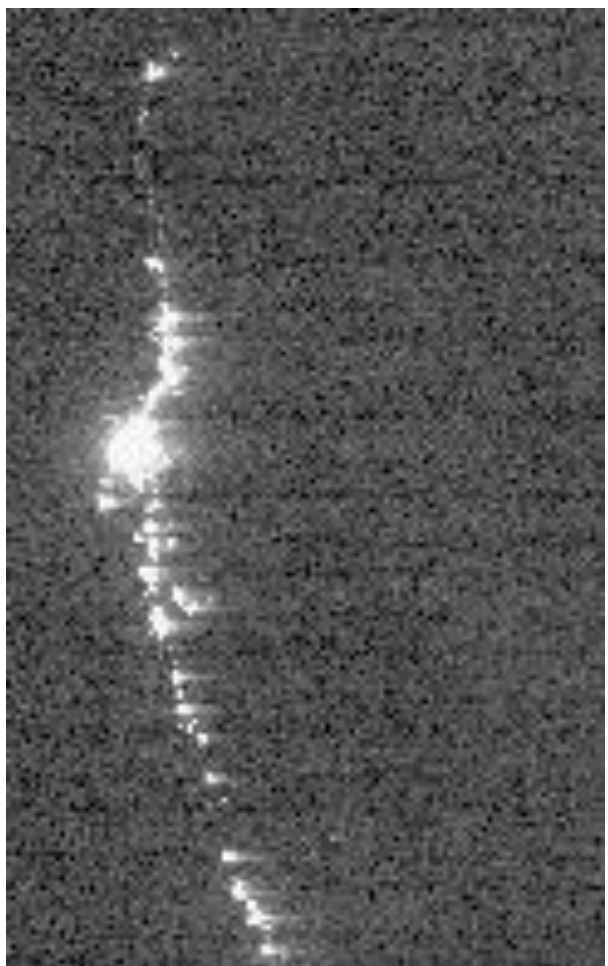
Along-Scan Smears

S-NPP, 7/17/2023, 0000 UTC
Just right of Nadir

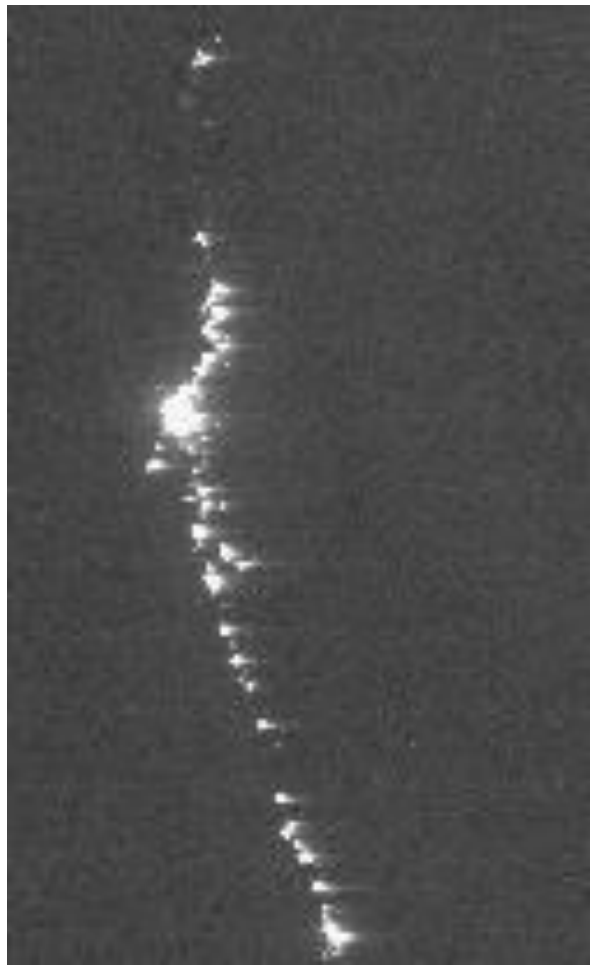


Kharga, Egypt, with Nile river east of Kharga, Egypt.

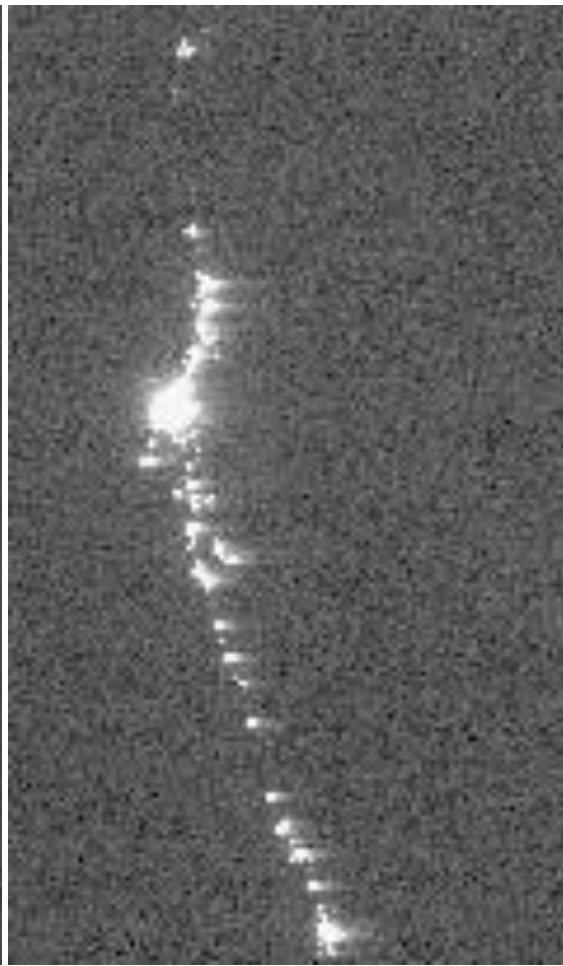
Notice along-scan (left to right) smearing in each image



NOAA 20, 7/15/2023, 2313 UTC
Just left of Nadir



NOAA 21, 7/16/2023, 2335 UTC
Around Nadir



S-NPP, 7/17/2023, 2344 UTC
Around nadir

- Global Composites
- **All 22 bands over four scenes**
 - Day Convection, Night Convection, Day Desert, Day Ice Sheet
 - Overall, compares very well with NOAA-20 and S-NPP
 - Minor striping noted in some “extreme” scenes
 - Bands M4, M8, M13
- Multispectral Imagery
 - Popular products leveraged by users
 - Overall, compares very well with NOAA-20 and S-NPP
- Near Constant Contrast
 - Overall, compares very well with NOAA-20 and S-NPP
 - Minor striping noted, namely:
 - Sunlint and Moonglint
 - Near Edge of Scan
 - Near Terminator
 - Along-scan “Smearing” noted, but not significant (similar to N20 and NPP)
- User Feedback

- Global Composites
- All 22 bands over a few scenes
- Multispectral Imagery
- Near Constant Contrast
- **User Feedback**

User Feedback (Details on Following Slides)

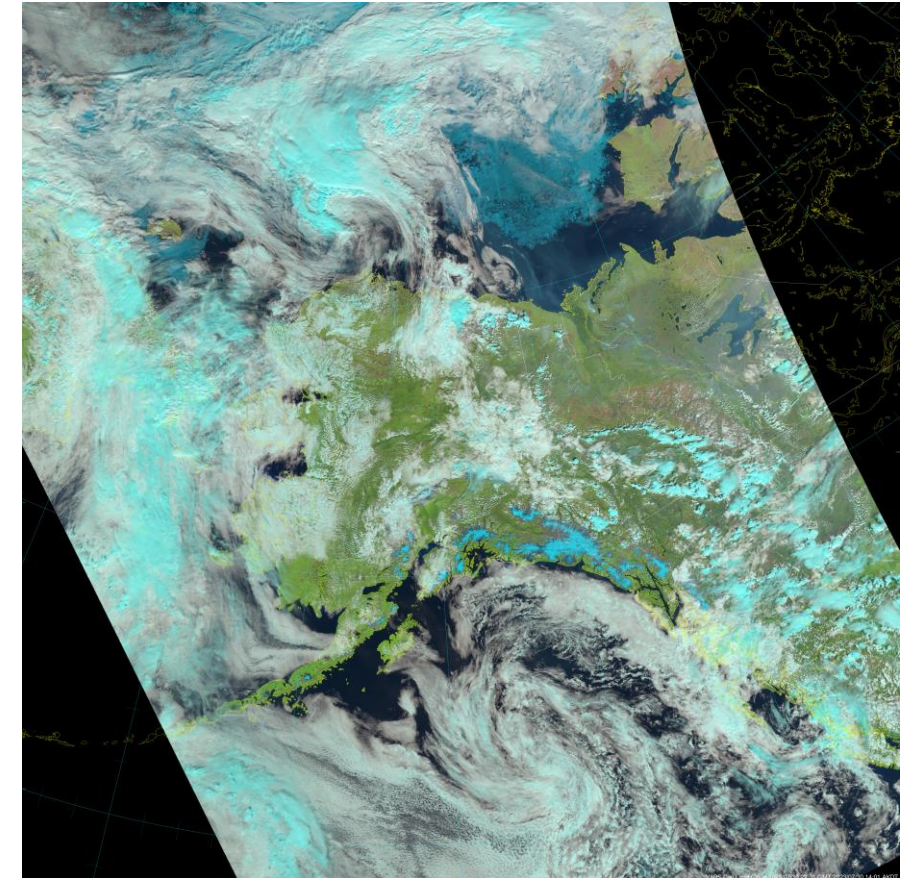
Name	Organization	Application	User Feedback - User readiness dates for ingest of data and bringing data to operations
	GINA	Many	<ul style="list-style-type: none"> - Ingesting and displaying Imagery in local AWIPS and generating Images and GeoTIFFs for display via DB - Distributing NOAA-21 imagery to the Alaska Fire Service - No concerns with Image Quality
	CIMSS/SSEC	Many	<ul style="list-style-type: none"> - Processing DB NOAA-21 VIIRS data and producing images without any problems - No concerns with Image Quality
	CIRA	Many	<ul style="list-style-type: none"> - Processing and Displaying NOAA-21 VIIRS Imagery on CIRA SLIDER and in AWIPS, via GRAVITE and CIRA and CIMSS DB - No concerns with Image Quality
	NWS	Many	<ul style="list-style-type: none"> - NCC available in NWS AWIPS via SBN - Imagery available in NWS AK AWIPS via DB (primary) - Imagery KPPs available in NWS AK AWIPS via PDA/LDM (secondary)
	Colorado School of Mines – Earth Observation Group	Night Light Detection	<ul style="list-style-type: none"> - Are making VIIRS Boat Detection and VIIRS Nightfire products from NOAA-21 VIIRS DNB - No issues noted

User Feedback - GINA

- University of Alaska Geographic Information Network of Alaska (GINA)
- Acquiring NOAA-21 VIIRS Imagery via Direct Broadcast and processed with CSPP SDR v4.0
 - Of two antennas, currently only one can receive NOAA-21 data. New antenna coming in Fall 2023
- Successfully ingesting and displaying Imagery in local AWIPS and generating Images and GeoTIFFs for display
 - NOAA-21 Imagery coming to [feeder page](#) soon. Currently being distributed on [quick-look portal](#)
 - Distributing NOAA-21 imagery to the Alaska Fire Service now and they are very pleased with the additional data.
 - NOAA-21 VIIRS SDR SCMI is being pushed to GINA's LDM for others to access (CIRA, etc)
- NWS AK HQ processes AK DB VIIRS data locally and delivers to NWS AK offices.
- Feedback:
 - No concerns with Imagery quality

File Name	Thumbnail 1	Thumbnail 2	Thumbnail 3	Thumbnail 4	Thumbnail 5	Thumbnail 6	Thumbnail 7	Thumbnail 8	Thumbnail 9
noaa18.20230731.2017									
Captured At: 2023/07/31 12:17 AKDT 2023/07/31 20:17 GMT Age: 78 minutes	Band 4, 10.8 um Received at: Gilmore	Band 5, 12.0 um Received at: Gilmore							
noaa21.20230731.2002									
Captured At: 2023/07/31 12:02 AKDT 2023/07/31 20:02 GMT Age: 93 minutes	VIIRS Snowmelt Received at: Gilmore GeoTIFF	Night time microphysics Received at: Gilmore GeoTIFF	Colorized VIIRS i05 (11.45 um) Received at: Gilmore GeoTIFF	Colorized VIIRS i04 (3.74 um) Received at: Gilmore GeoTIFF	VIIRS Fire Color Received at: Gilmore GeoTIFF	VIIRS Fire Temperature Received at: Gilmore GeoTIFF	DayLandCloud Received at: Gilmore GeoTIFF	i04 Received at: Gilmore GeoTIFF	i03 Received at: Gilmore GeoTIFF
noaa20.20230731.1941									
Captured At: 2023/07/31 11:41 AKDT 2023/07/31 19:41 GMT Age: 114 minutes	VIIRS Snowmelt Received at: Gilmore GeoTIFF	Night time microphysics Received at: Gilmore GeoTIFF	Colorized VIIRS i05 (11.45 um) Received at: Gilmore GeoTIFF	Colorized VIIRS i04 (3.74 um) Received at: Gilmore GeoTIFF	VIIRS Fire Color Received at: Gilmore GeoTIFF	VIIRS Fire Temperature Received at: Gilmore GeoTIFF	DayLandCloud Received at: Gilmore GeoTIFF	VIIRS i05 Received at: Gilmore GeoTIFF	DNB_adaptive Received at: Gilmore GeoTIFF

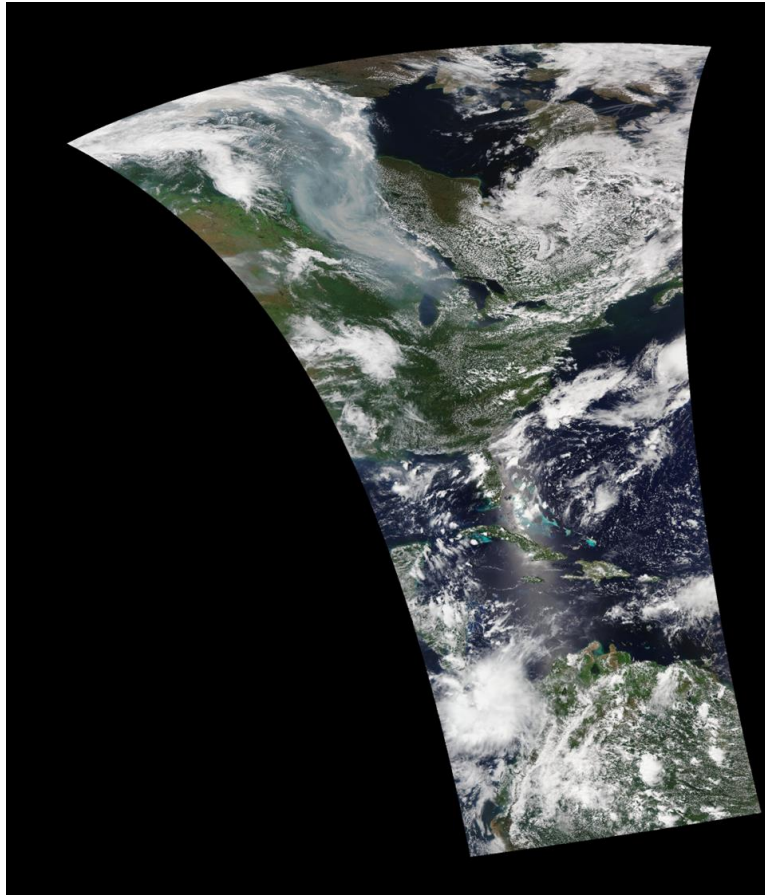
GINA Quick-Look Portal



VIIRS Day Land Cloud RGB from GINA DB

User Feedback – CIMSS/SSEC

- Acquiring NOAA-21 VIIRS Imagery via Direct Broadcast and processed with CSPP
- Have been processing direct broadcast NOAA-21 VIIRS data and producing images for quite some time without any problems.
 - Images and GeoTiffs available [online](#)
 - Data files made available for others (CIRA uses data for SLIDER, AWIPS CONUS domains)
- Feedback:
 - No concerns with Imagery quality



VIIRS True Color Imagery from CIMSS DB

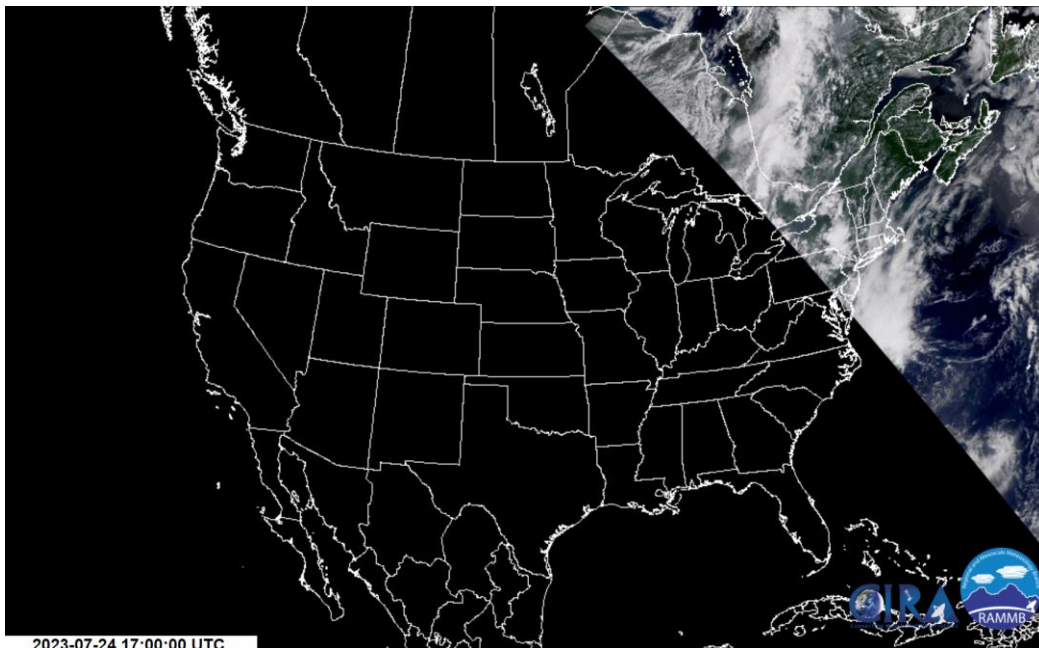


VIIRS True Color Imagery from CIMSS DB

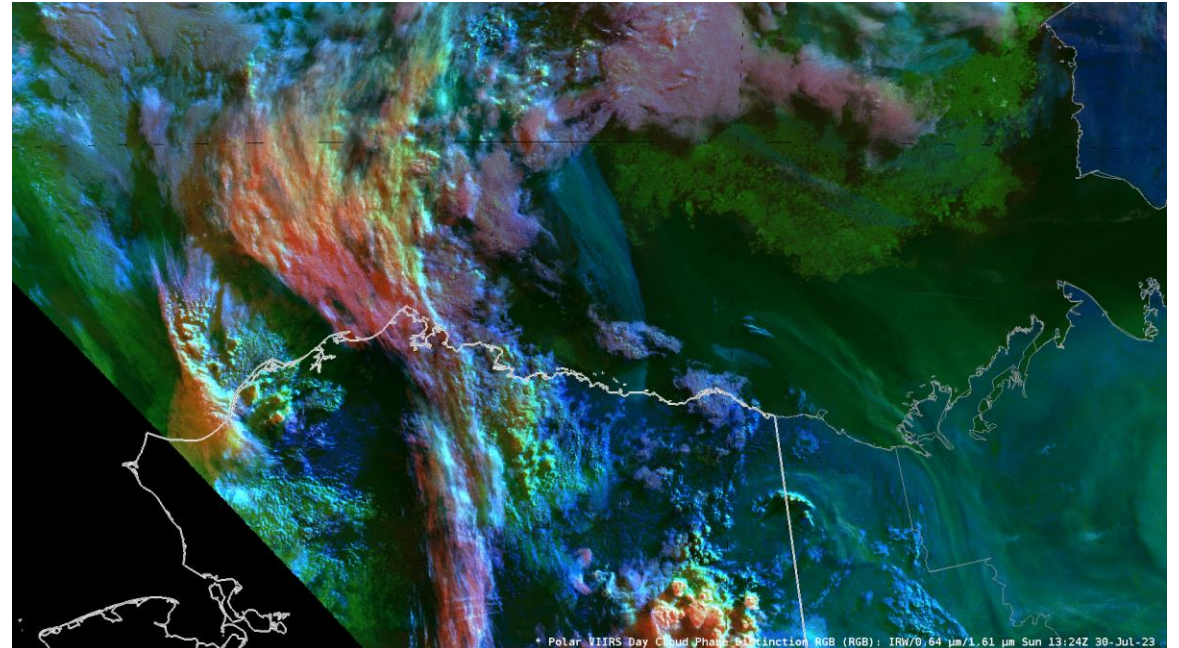
User Feedback - CIRA

- Acquiring NOAA-21 VIIRS Imagery via GRAVITE and GINA and CIMSS Direct Broadcast
 - NOAA-21 to be added to [Polar Slider Nhem](#) and Shem sectors shortly (with NOAA-20 and S-NPP)
 - EDR Imagery from GRAVITE – All M-bands, I-bands, and NCC
 - New [CONUS VIIRS Sector](#) added to Polar SLIDER
 - Direct Broadcast Imagery from CIMSS
 - Displaying Alaska VIIRS Imagery in local AWIPS (from GINA Direct Broadcast)
 - Processing and displaying CONUS VIIRS Imagery in local AWIPS (from CIMSS Direct Broadcast)
- Feedback:
 - No concerns with Imagery quality

Polar SLIDER - CONUS Sector: Uses CIMSS DB

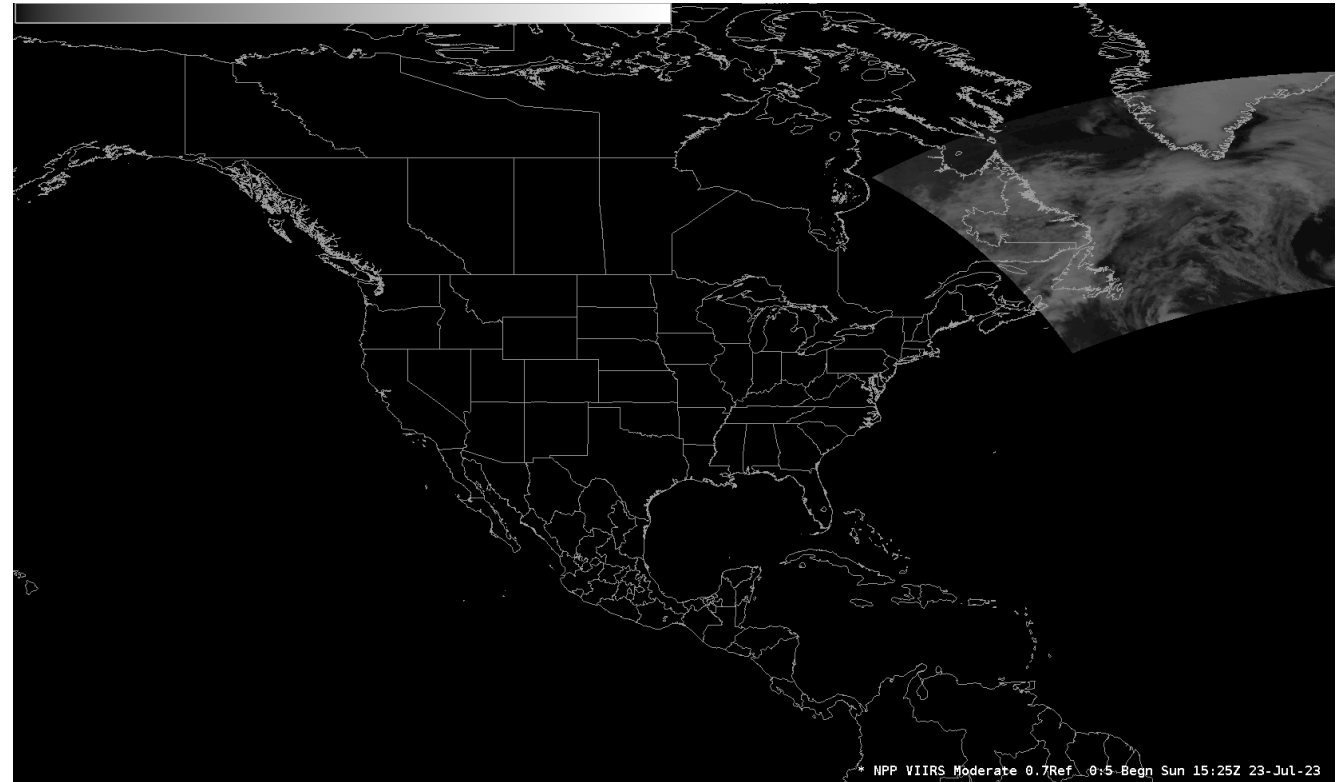


Alaska VIIRS Imagery in AWIPS: Uses GINA DB



User Feedback - NWS

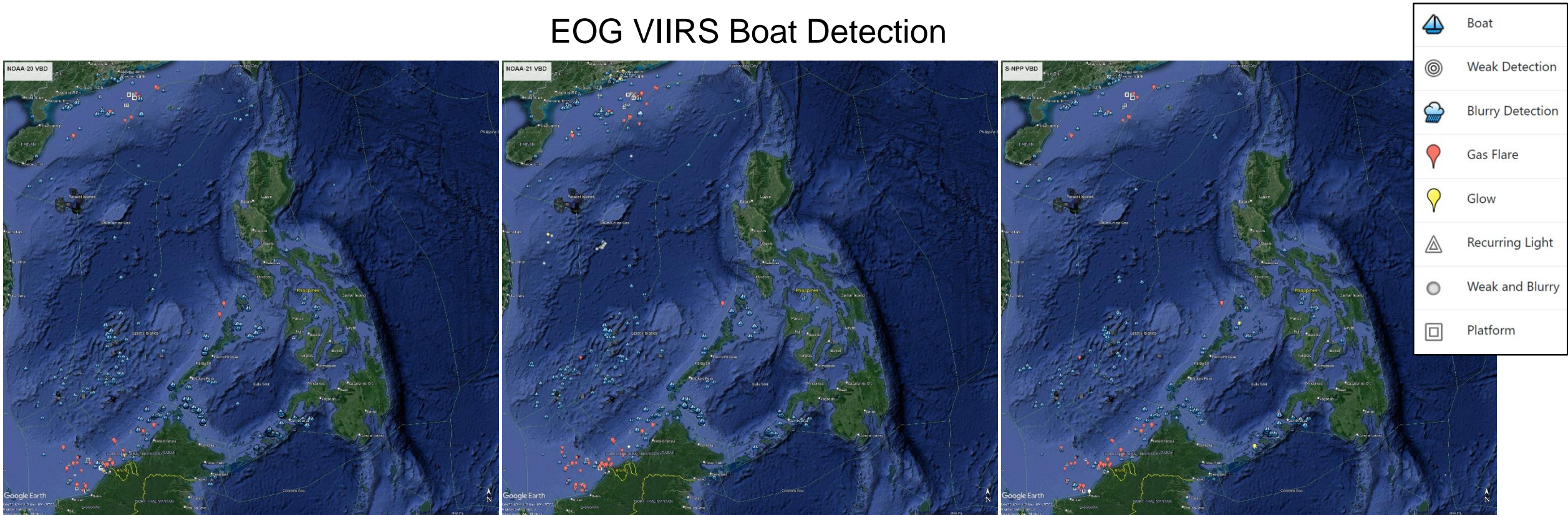
- NWS AK
 - NOAA-21 VIIRS Imagery from GINA DB processed at NWS AR HQ, delivered to local AK offices (primary)
 - NOAA-21 VIIRS Imagery (KPPs) sent to NWS AK HQ from PDA via LDM (since June 8), and forwarded to local AK offices (secondary)
- NWS (not AK)
 - NOAA-21 VIIRS NCC availability in NWS/AWIPS via SBN starting July 13
 - Alongside S-NPP and NOAA-20
 - CONUS, Pacific, and Puerto Rico sectors
- AWIPS-Specific VIIRS Imagery Issues that have (or will soon be) resolved
 - Visible white granule borders (on VIIRS imagery from all three JPSS satellites): now fixed in NCCF
 - Excessive overlap between VIIRS swaths: fix has been identified. Implemented Oct 2023
 - AWIPS occasionally geolocates a VIIRS granule a half- or quarter-orbit away from where it belongs. Implemented Oct 2023
- No new NOAA-21 VIIRS Image Quality issues have been communicated recently



User Feedback – Colorado School of Mines - EOG

- Accessing NOAA-21 VIIRS DNB data from CLASS (GRAVITE shortly) since April 1st, 2023.
- Have begun making VIIRS Boat Detection (VBD) and VIIRS Nightfire (VNF) products using NOAA 21 data
 - <https://payneinstitute.mines.edu/eog/>
- No issues with NOAA-21 VIIRS DNB data noted thus far

EOG VIIRS Boat Detection



Documentations (Check List, 1 slide)

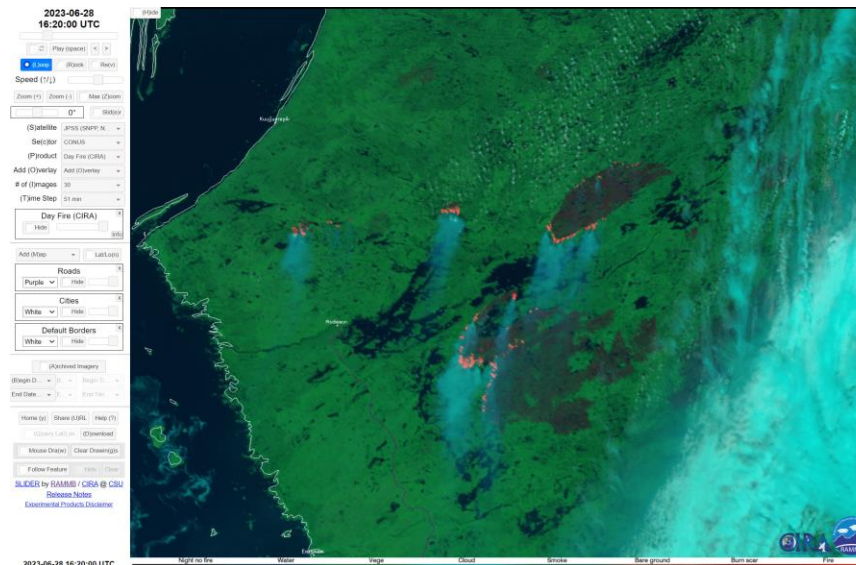
Science Maturity Check List	Yes ?
ReadMe for Data Product Users	Yes
Algorithm Theoretical Basis Document (ATBD)	Yes
Algorithm Calibration/Validation Plan	Yes
(External/Internal) Users Manual	Yes
System Maintenance Manual (for ESPC products)	
Peer Reviewed Publications (Demonstrates algorithm is independently reviewed)	Yes
Regular Validation Reports (at least annually) (Demonstrates long-term performance of the algorithm)	Monthly Meeting Reports, Annual Project Reports

Check List - Validated Maturity

Validated Maturity End State	Assessment
<p>Product performance has been demonstrated over a large and wide range of representative conditions (i.e., global, seasonal).</p>	<p>Yes, All Imagery EDR M-bands, I-bands, NCC, and Multispectral Imagery products (which leverage the Imagery EDR) have been monitored since Mid-Feb across a variety of scenes and seasons globally, and compared with Imagery from S-NPP and NOAA-20.</p>
<p>Comprehensive documentation of product performance exists that includes all known product anomalies and their recommended remediation strategies for a full range of retrieval conditions and severity level.</p>	<p>A Validated Maturity ReadMe for Data Users file summarizes NOAA-21 VIIRS Imagery EDR quality, and is available to users.</p>
<p>Product analyses are sufficient for full qualitative and quantitative determination of product fitness-for-purpose.</p>	<p>Yes, after extensive review, it has been determined that NOAA-21 VIIRS Imagery EDR have reached Validated Maturity, and can be leveraged by downstream users for further assessment.</p>
<p>Product is ready for operational use based on documented validation findings and user feedback.</p>	<p>Yes, for all Imagery EDR M-bands, I-bands, and NCC, based on qualitative analysis by the Imagery EDR Team and feedback from users.</p>
<p>Product validation, quality assurance, and algorithm stewardship continue through the lifetime of the instrument</p>	<p>Yes, as with NOAA-20 and S-NPP VIIRS, the Imagery EDR team will continue to monitor NOAA-21 VIIRS Imagery and engage users regarding performance through the lifetime of the NOAA-21 VIIRS instrument.</p>

Conclusion (1 slide)

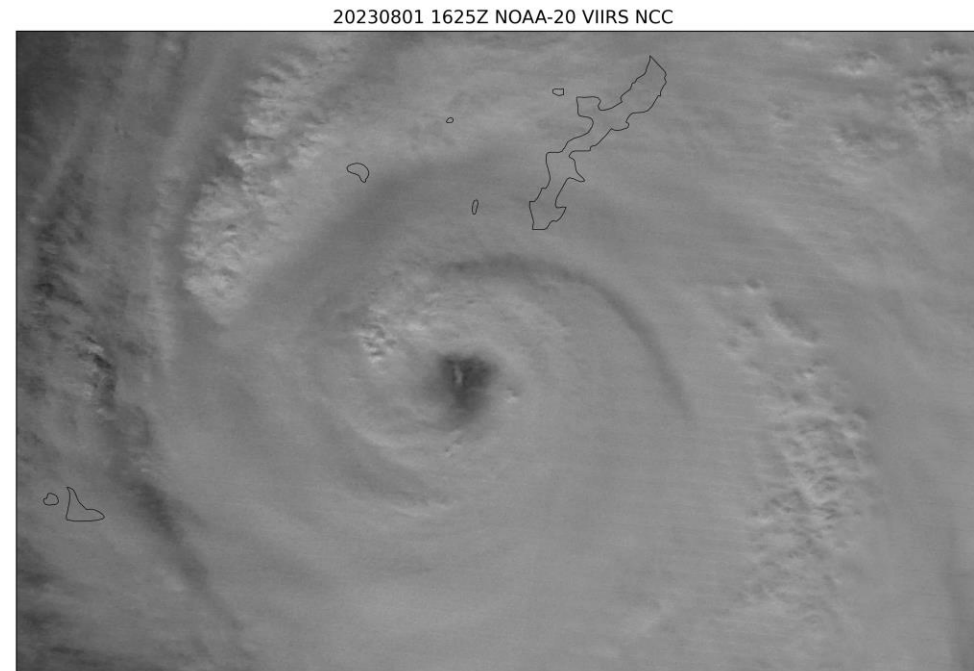
- Cal/Val results summary:
 - Team recommends **Validated Maturity** for VIIRS EDR Imagery
 - **Effective: 1342 UTC 23 June 2023**
 - Final thoughts
 - Qualitatively, Imagery looks great, and should be incorporated into operational systems.
 - Subtle striping may be observed in certain scenes, primarily in bands M4, M8, M13 and NCC.
 - No action recommended for NCC Smearing/Leakage.



20230628 Canada Wildfires
VIIRS Day Fire RGB

Path Forward (1-2 slides)

- Continued monitoring of Imagery and comparison with S-NPP and NOAA-20
 - Communicate significant observations with the VIIRS SDR team
- Engage VIIRS SDR team regarding characterization of striping in M4, M8, M13, and DNB/NCC
- Continued engagement with users regarding access to imagery, quality of imagery, and benefits of 3 VIIRS
 - Including DB Imagery processed in CSPP
- Display of NOAA-21 Imagery with S-NPP and NOAA-20 on CIRA Polar SLIDER and in AWIPS, and sharing of imagery on social media and with NESDIS comms



20230801 Typhoon Khanun
VIIRS NCC (nighttime)

Bill Line (bill.line@noaa.gov), STAR Imagery Team Lead