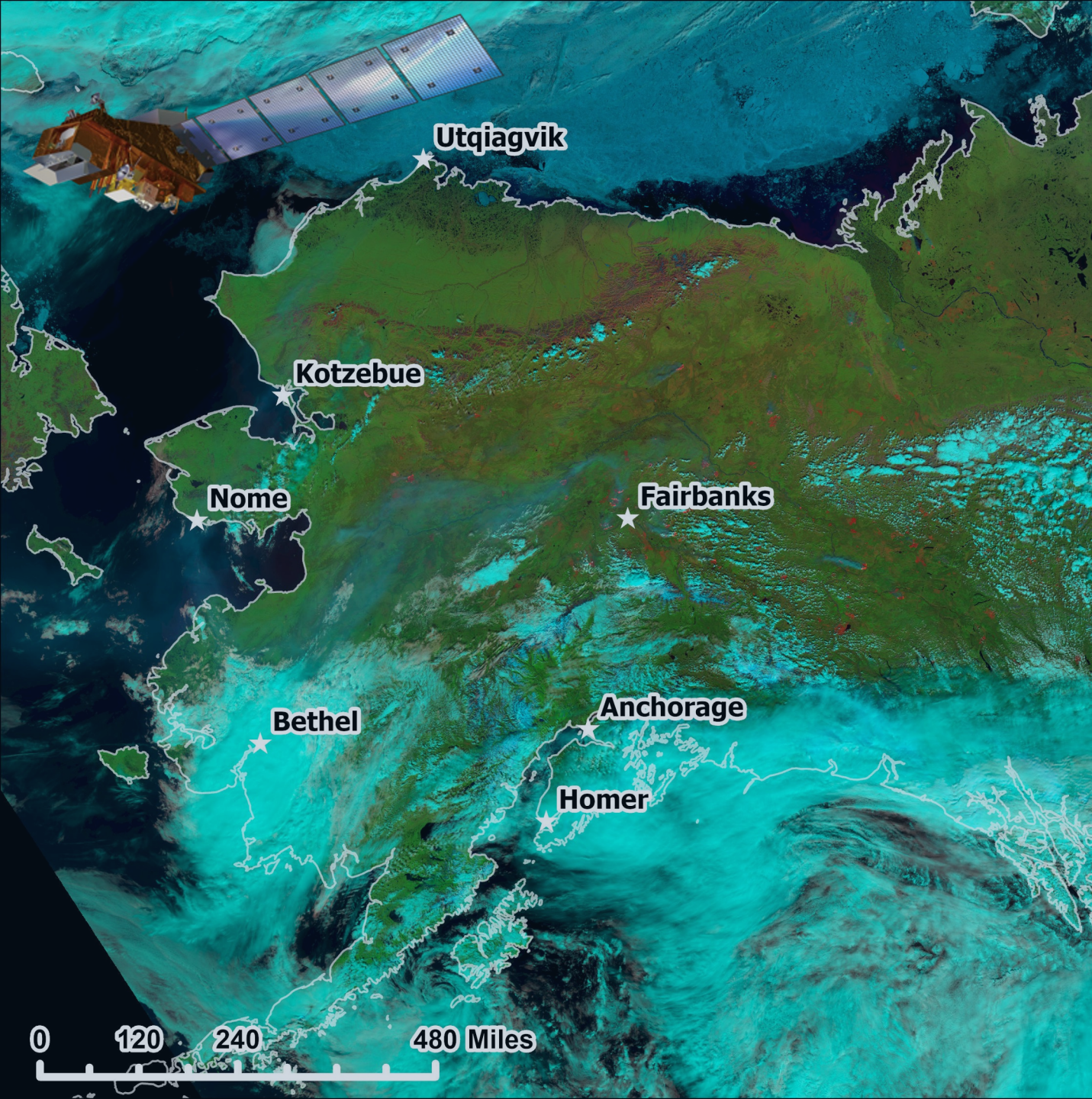




Leveraging Direct-Broadcast to Power a LEO Satellite Collective in Alaska

Jen Delamere
jsdelamere@alaska.edu

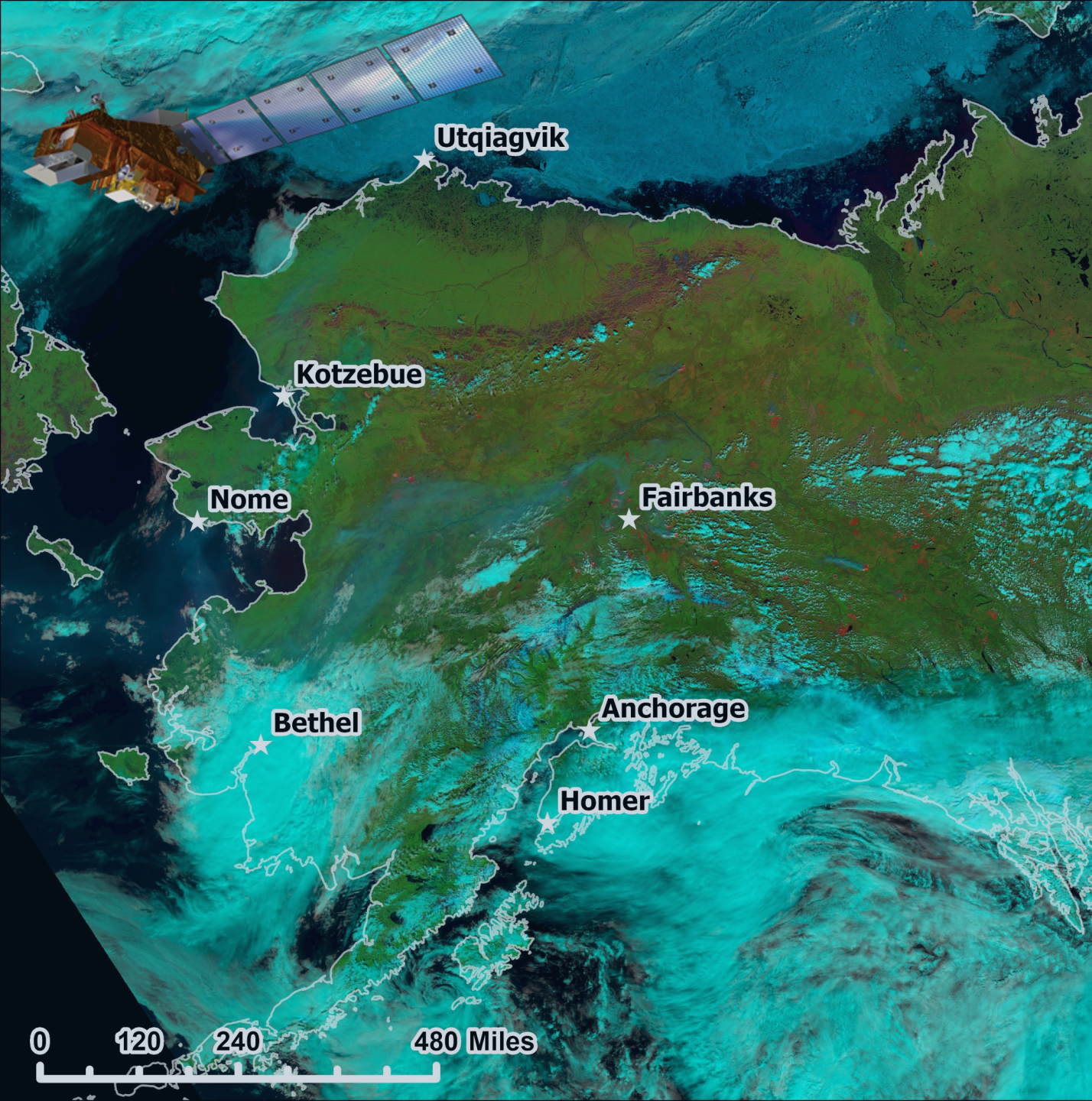
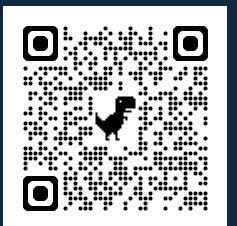
Geographic Information
Network of Alaska (GINA)

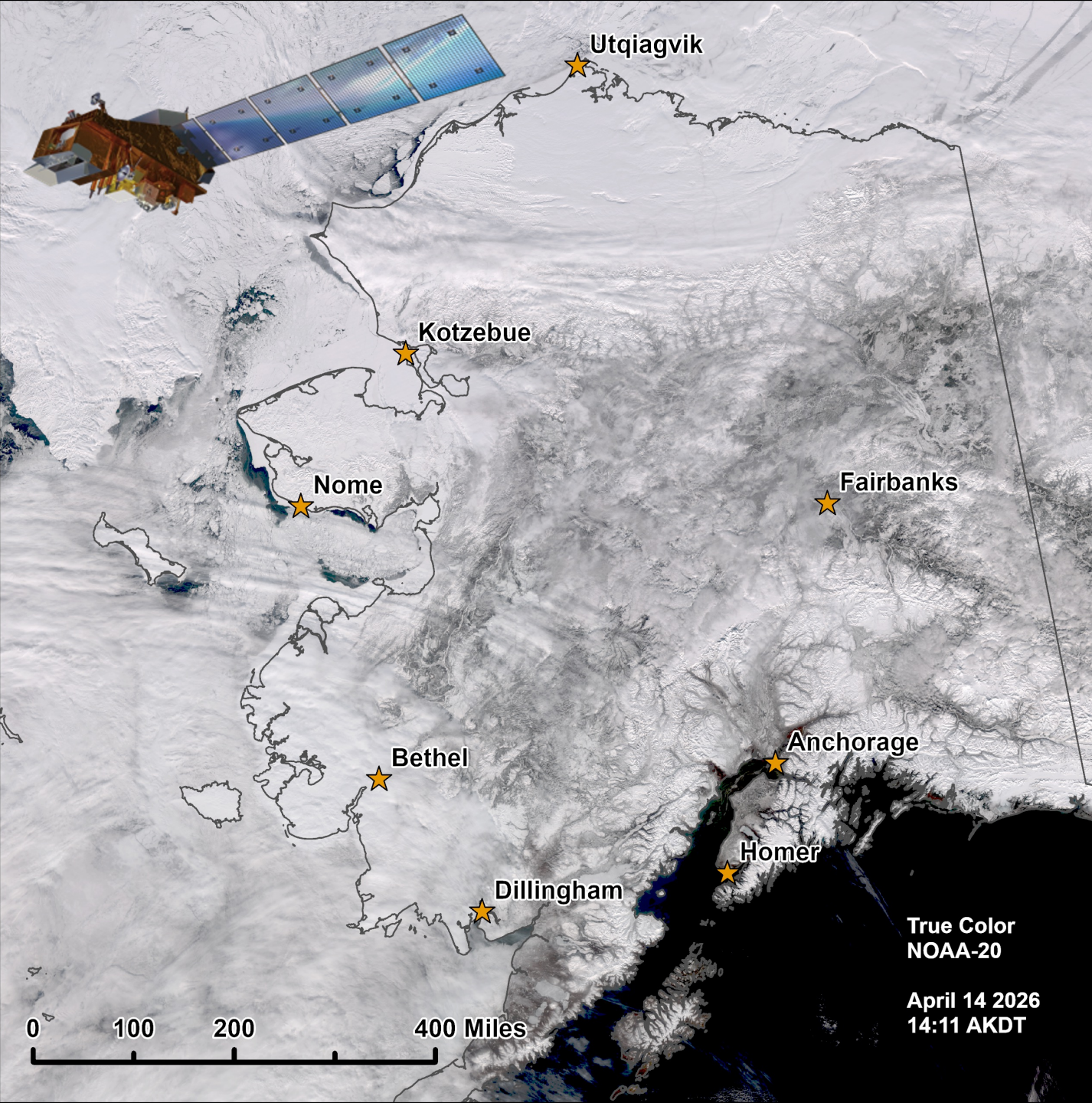


Thank you!

- CSPP & SSEC Teams: L. Gumley, K. Strabala, D. Schumacher, G. Yeoger, and many more
- UAF/GINA Team: B. Buechler, C. Buffington, J. Cable, J. Dabney, C. Dierking, A. Haas, O. Larson, H. Mair, Q. McHenry, G. Veenstra

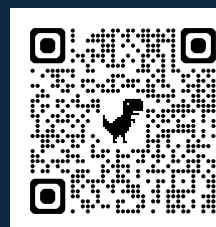
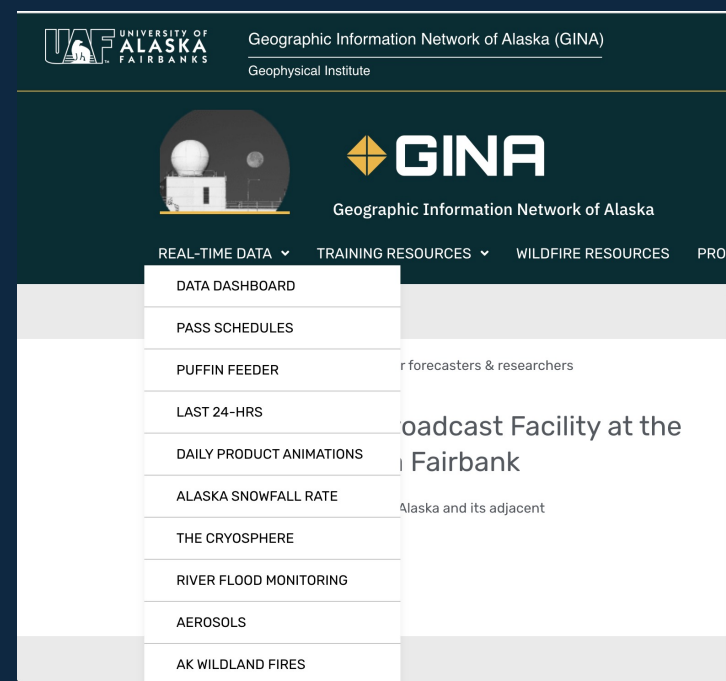
Office of Low-Earth Orbit
Observations





Presentation Summary

- See something interesting, be part of our collective.
- GINA website has lots of links (gina.alaska.edu)



Replace this slide



Open Menti to edit



Alaska

The Last Frontier



Alaska is Big & Remote

By the Numbers

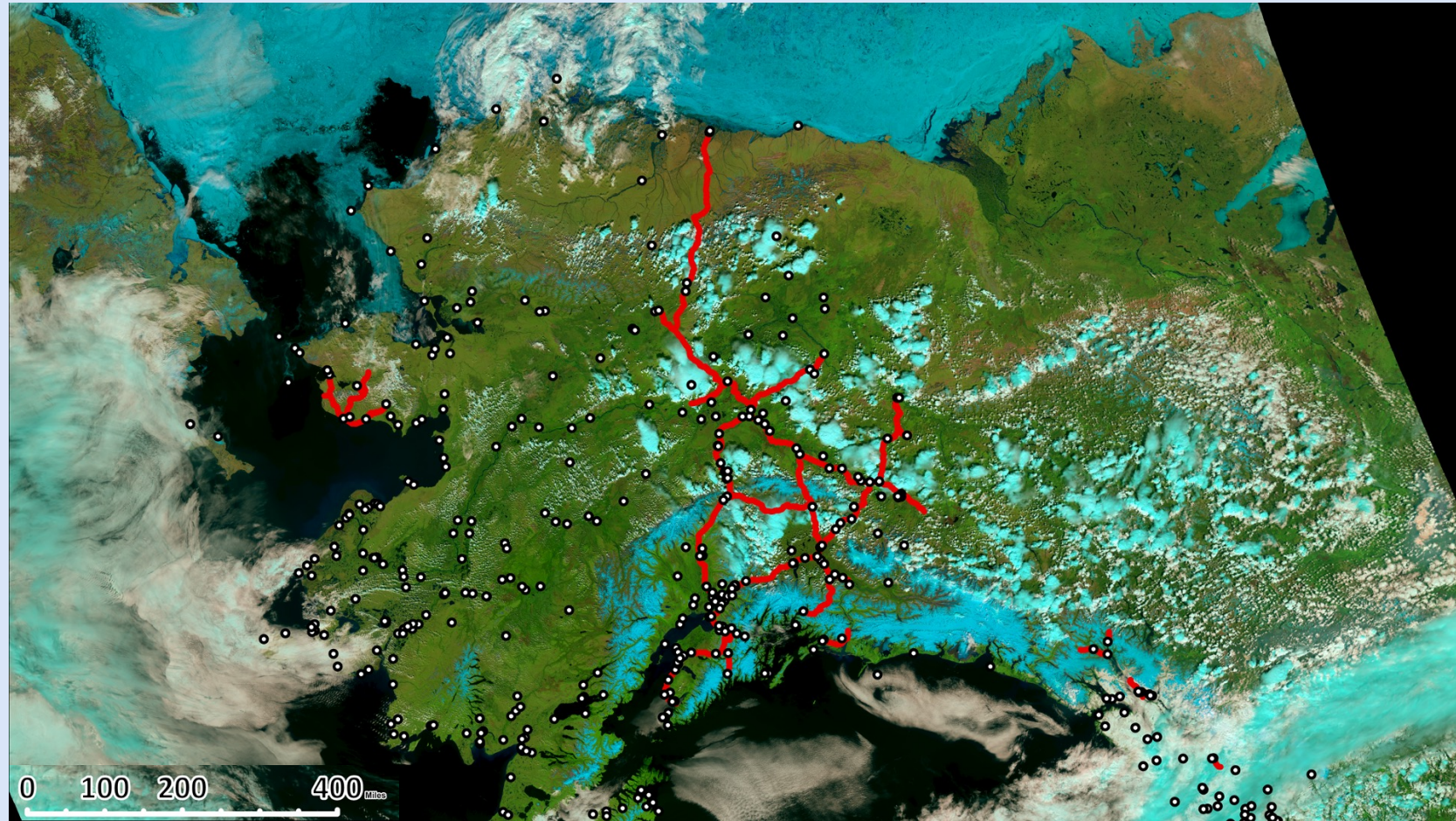
- 730,000 residents
- ~1.5M land area (km²)
- ~350 communities
- 50+ active volcanoes
- 95% underlain by permafrost
- 1 moose per 3 people



Alaska Is Not Like A lot of Other Places

Infrastructure

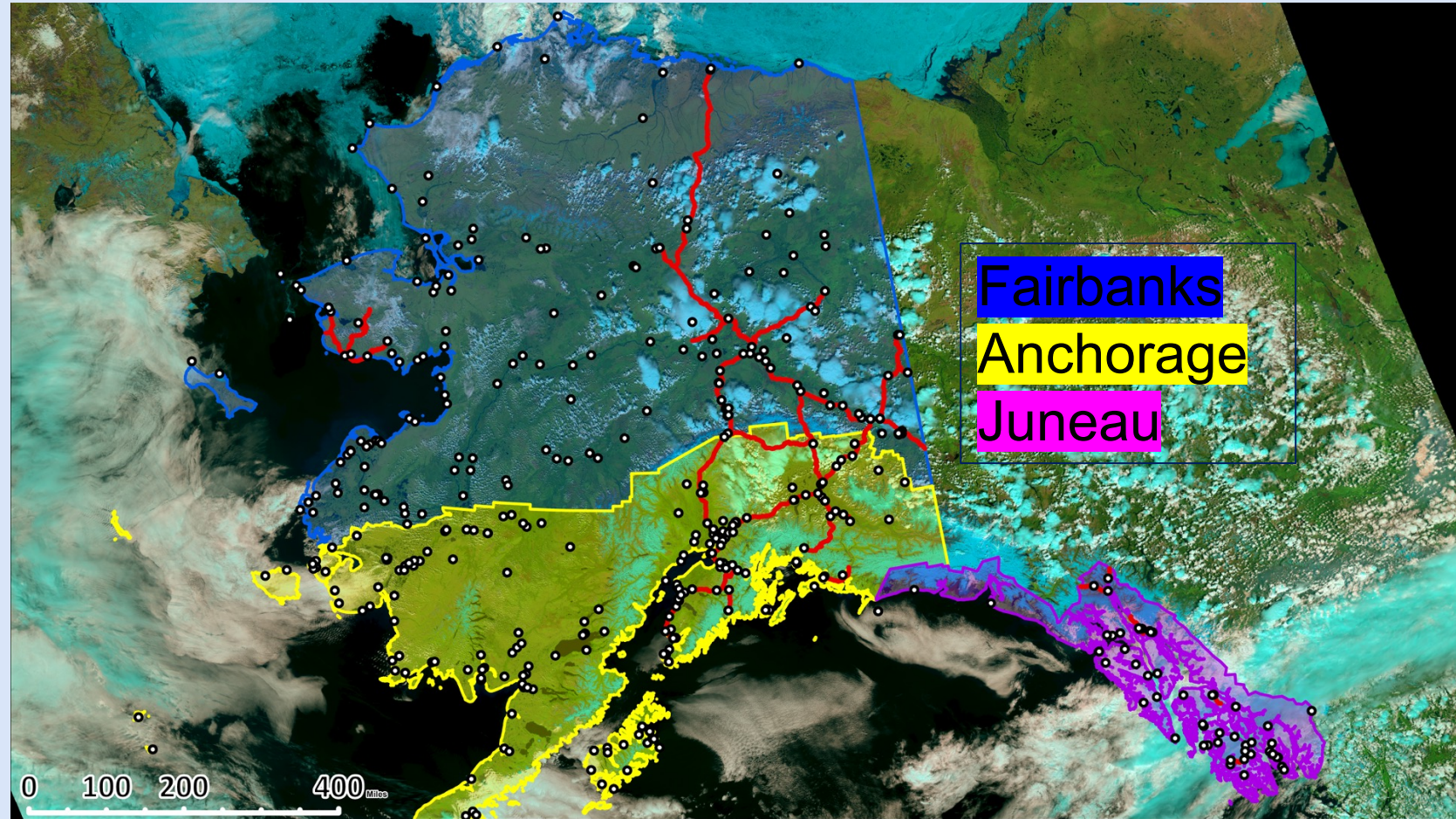
- ~82% of our communities are not on the **road system**
- ~60% of our communities **have no local fire department**



Alaska Is Not Like A lot of Other Places

Infrastructure

- ~82% of our communities are not on the **road system**
- ~60% of our communities **have no local fire department**
- Only 3 Weather Forecast Areas for U.S. National Weather Service



Delivering NOAA & Partner LEO Satellite Data From the Final Frontier to the Last Frontier

Alaska Direct-Broadcast System

Replace this slide



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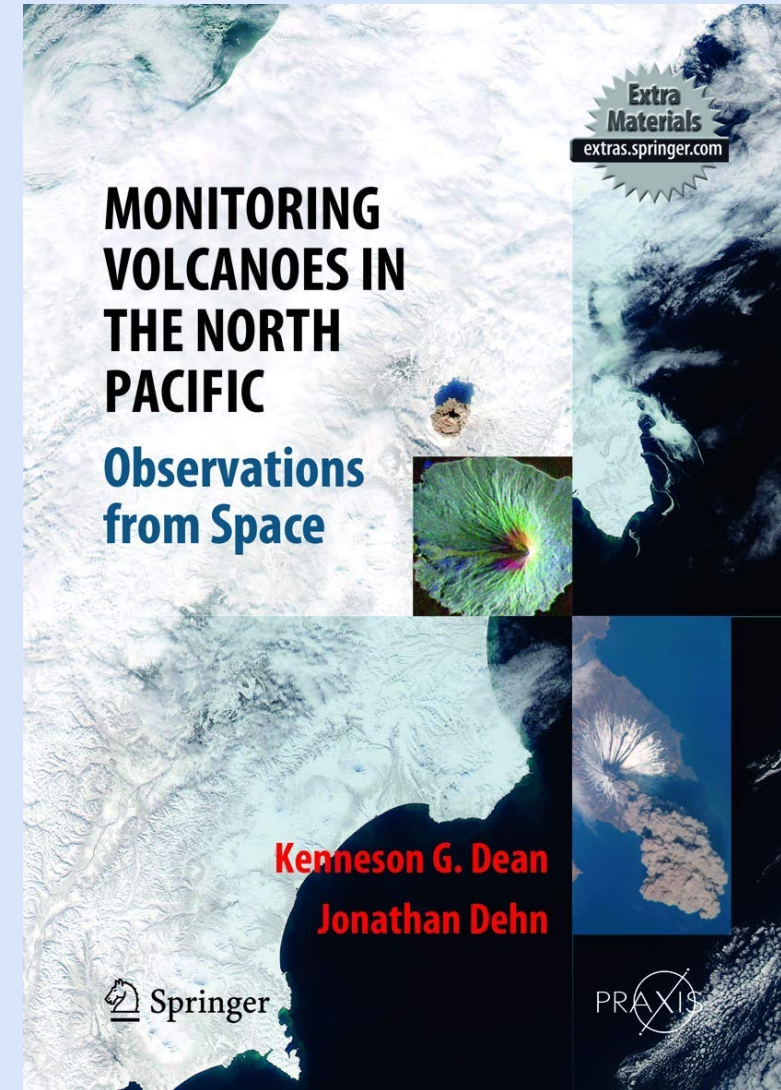
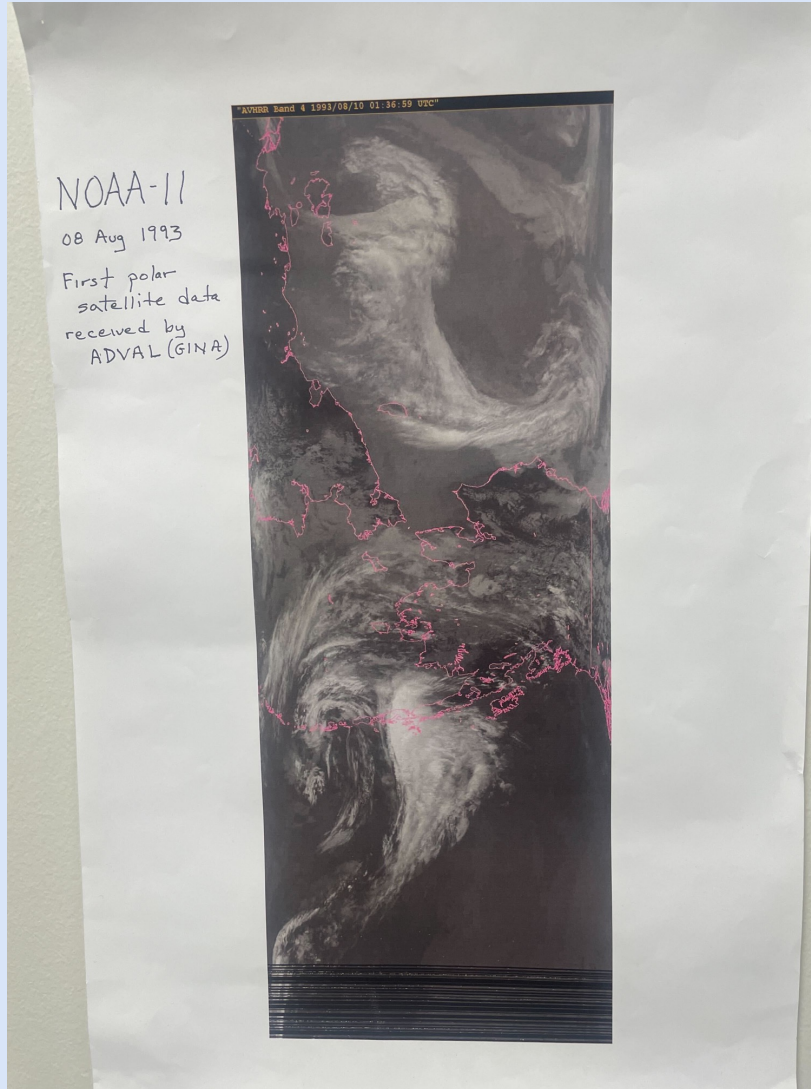


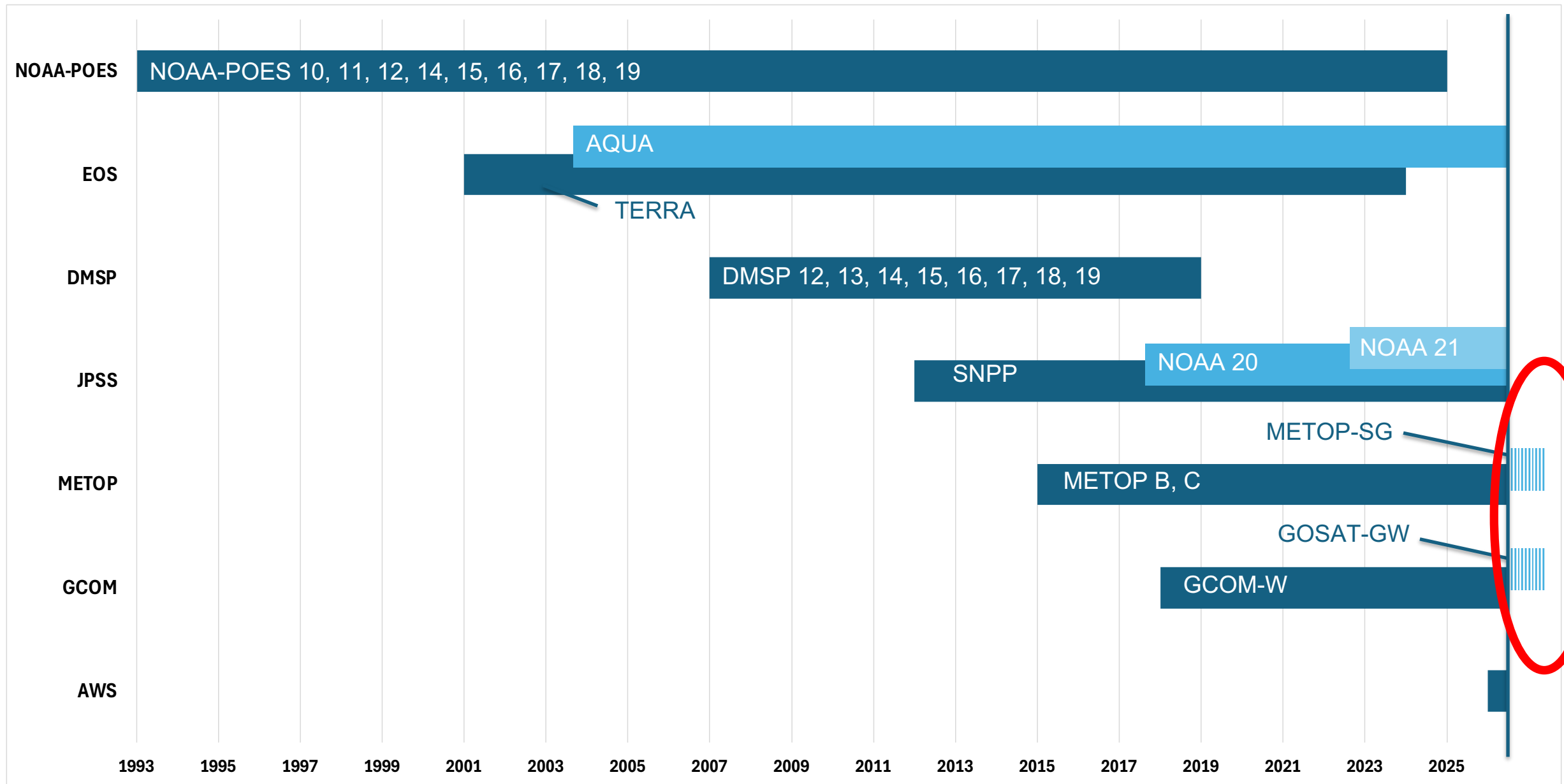
First LEO Image Received at GINA

Handwritten Note

NOAA-11
08 Aug 1993

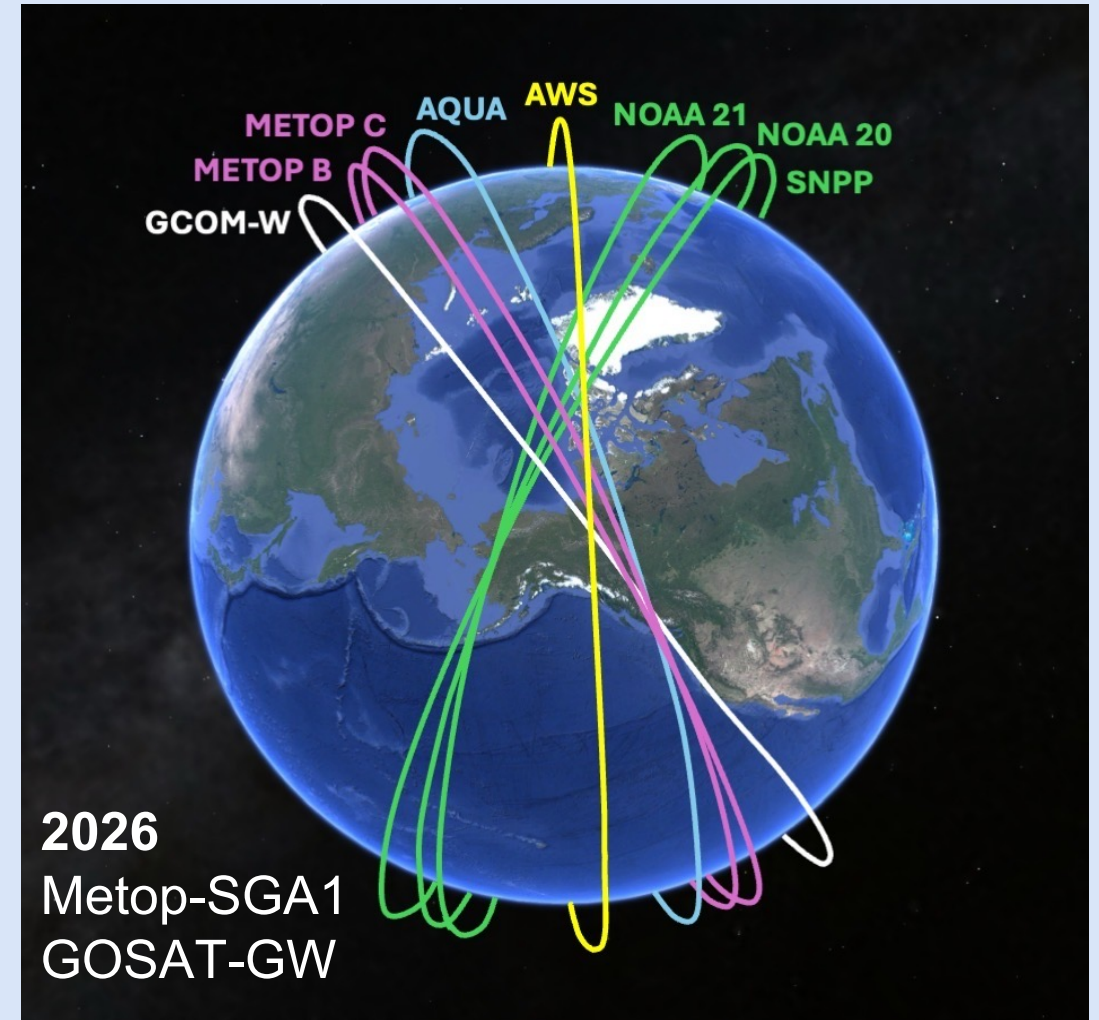
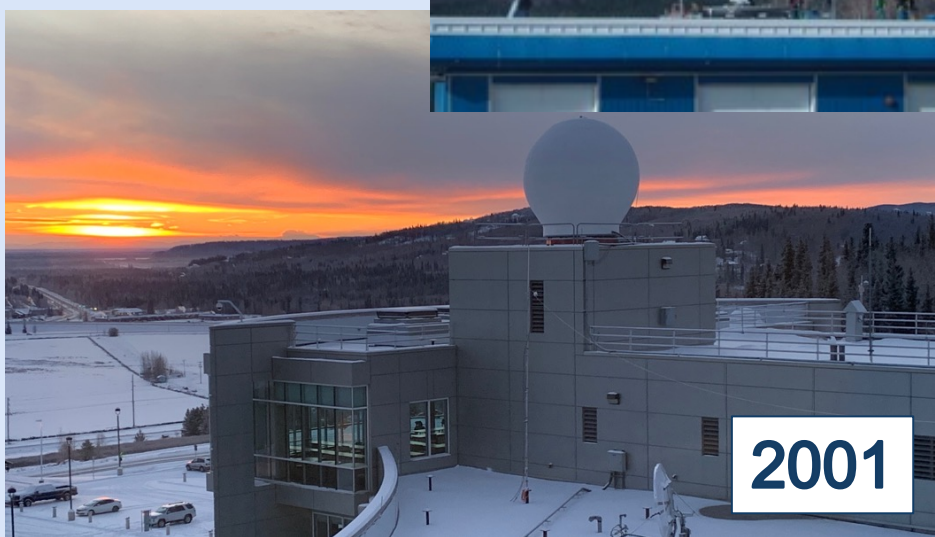
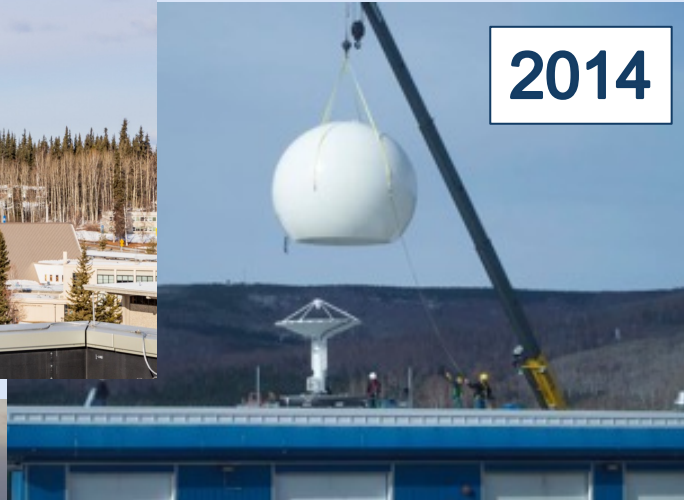
First polar satellite
data received by
ADVAL
(now GINA)





Delivering NOAA & Partner LEO Satellite Data: GINA DB Reception Over the Years

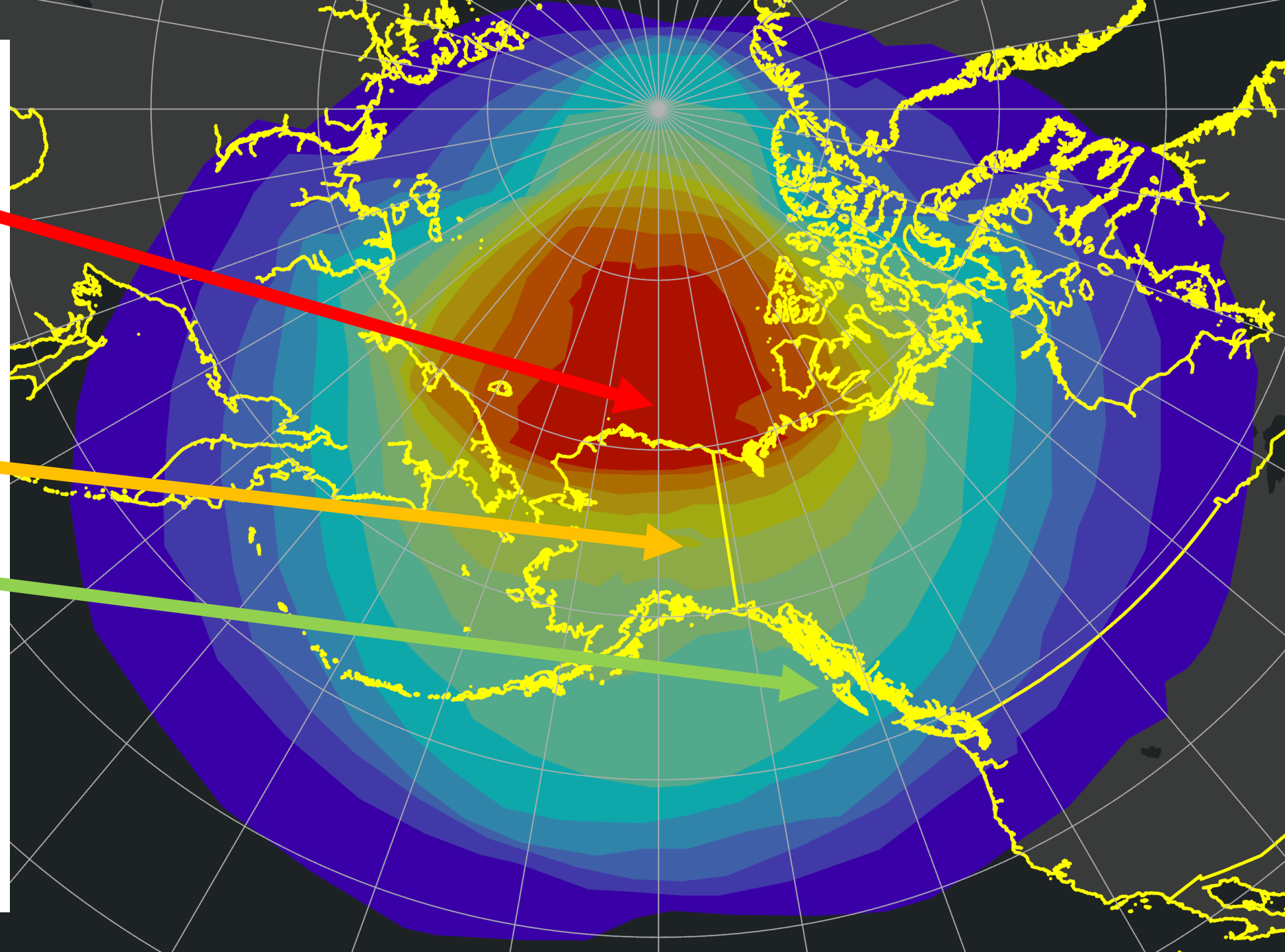
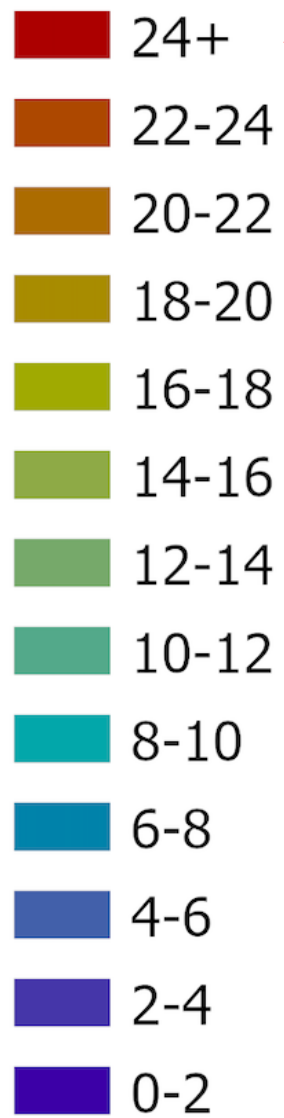
Antennas at UAF/GINA in Interior Alaska



An aerial photograph showing a modern, multi-story building with a curved section and a grid of windows. A large white spherical antenna radome is being hoisted by a crane on the roof. To the left is a lower building with a red and white striped facade. The background features a forested area and distant hills under a cloudy sky.

**GEOGRAPHIC INFORMATION NETWORK OF ALASKA
ANTENNA RADOME INSTALLATION
SEPTEMBER 8, 2024**

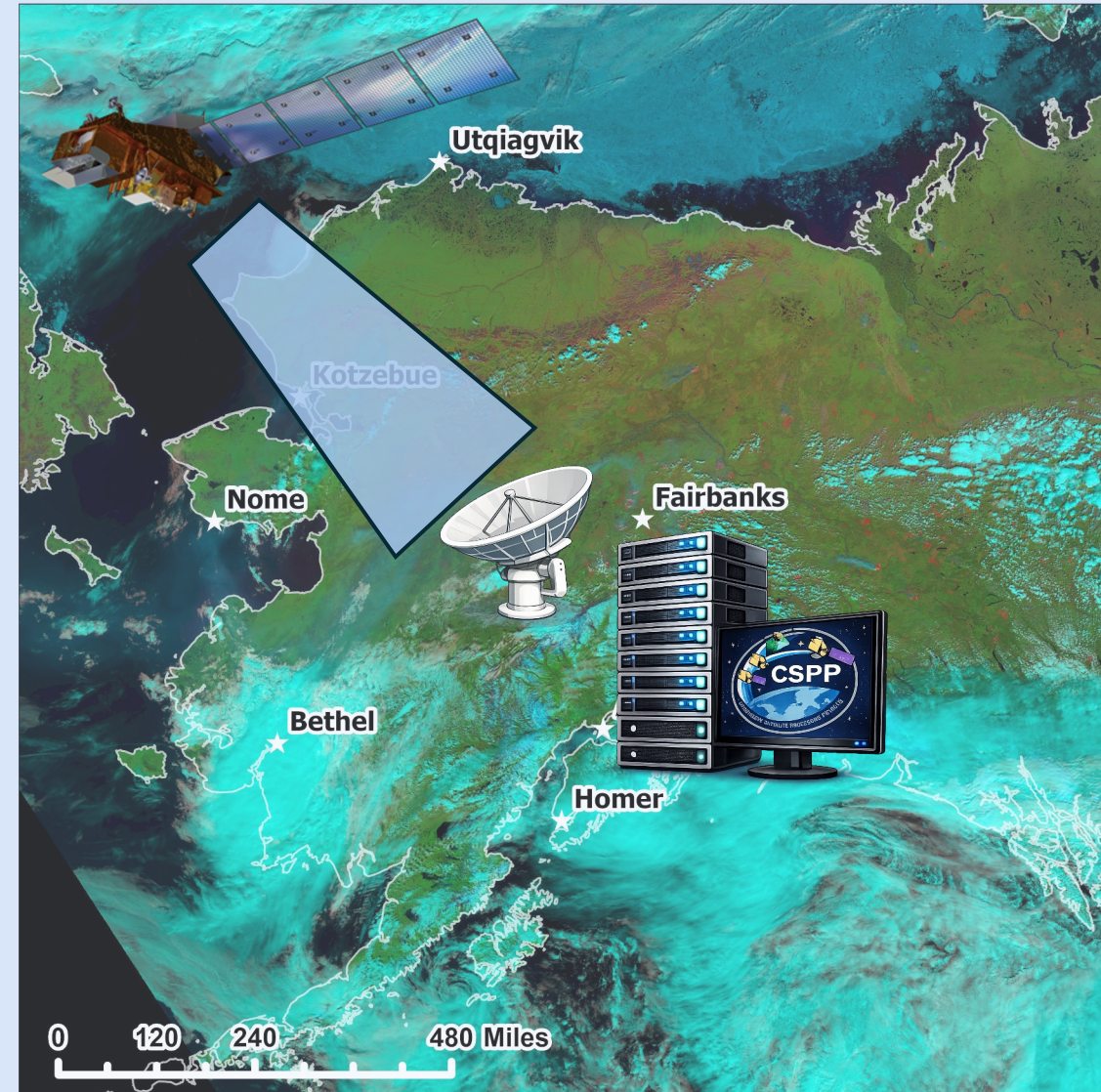
VIIRS Passes per Day



Processing the Downlinked Data at UAF

Companion Presentation:
LEO Products for NWS Pacific and Alaska Regions
Douglas Schumacher et al.
(CSPP 2026)

Passes	~80
# Files	~65,000
Daily Volume (GB)	~1.1 TB



Delivering the Data to You!

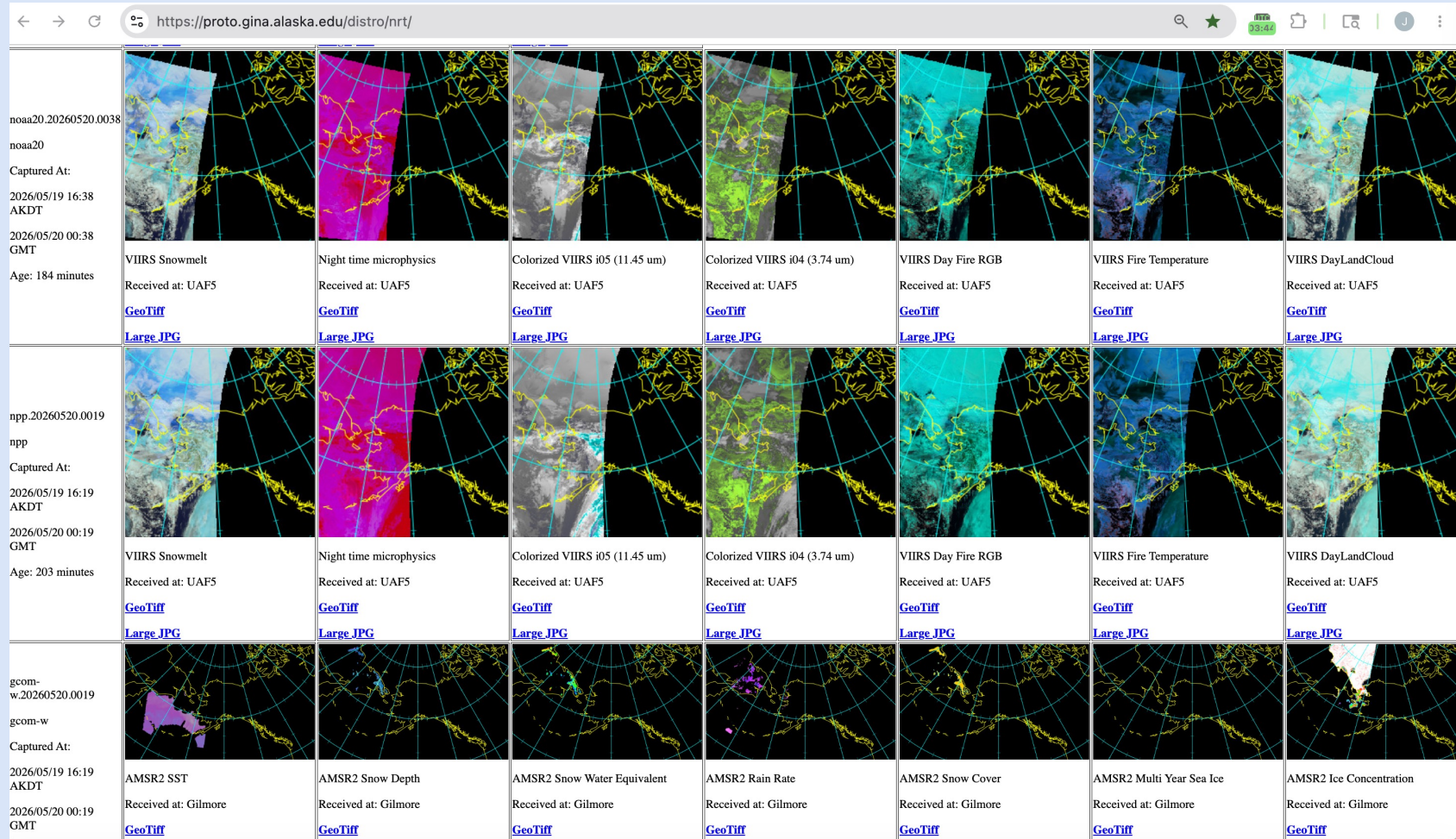
- Email satellite@gina.alaska.edu

- Visit gina.alaska.edu

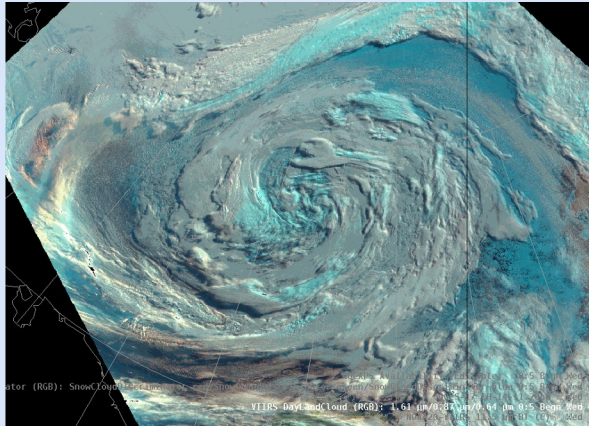
- Public API & Web Portals, including partner Sites like Real Earth

- LDM to AWIPS Users

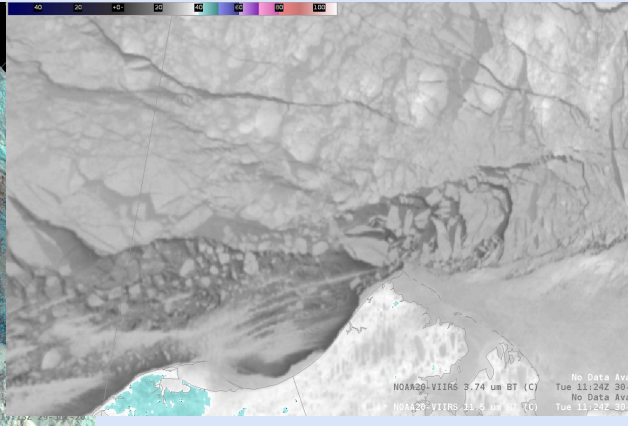
- Subset in ESRI Data Layers



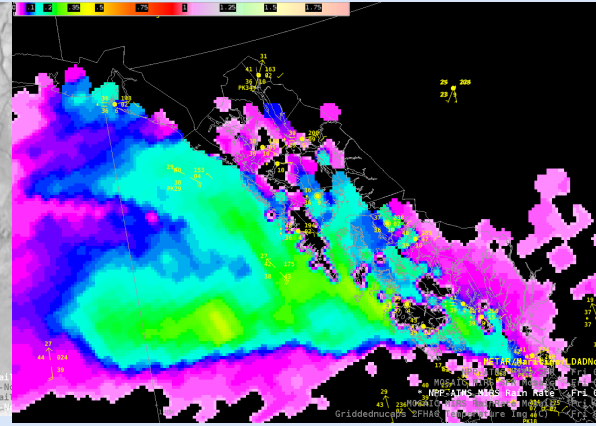
How LEO Satellites See Alaska



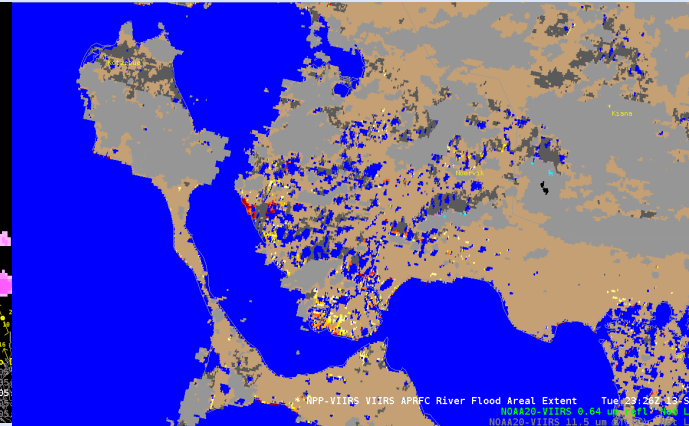
Weather



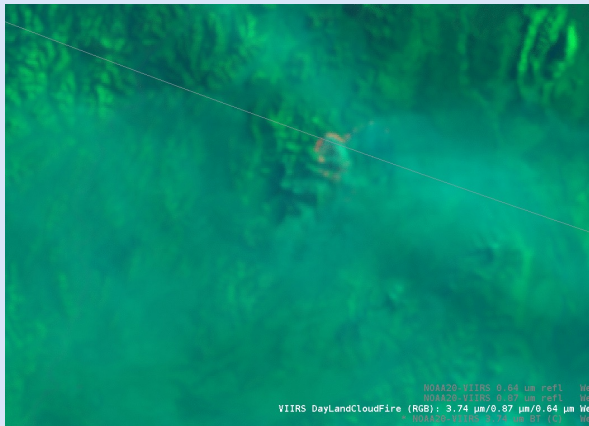
Sea Ice Motion



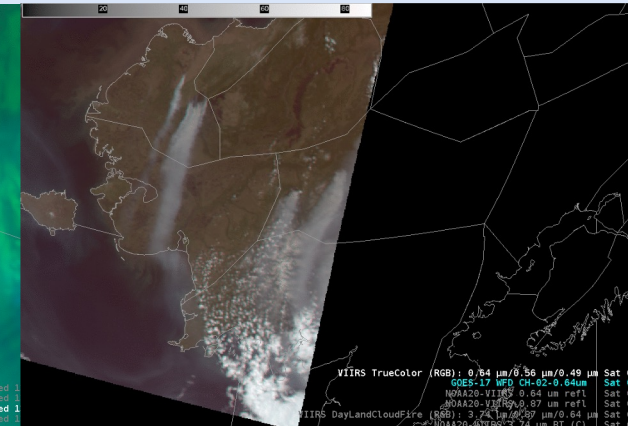
Heavy Precipitation



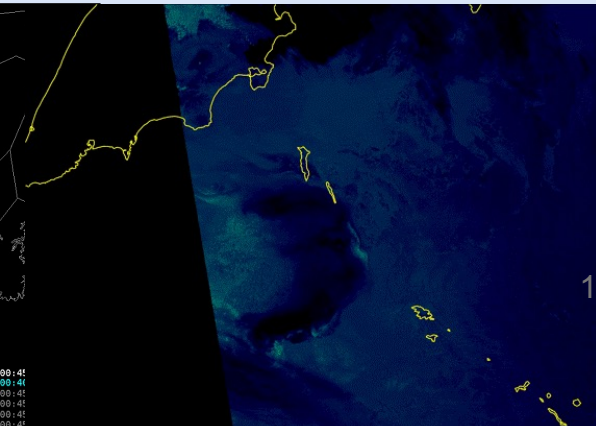
River Flooding



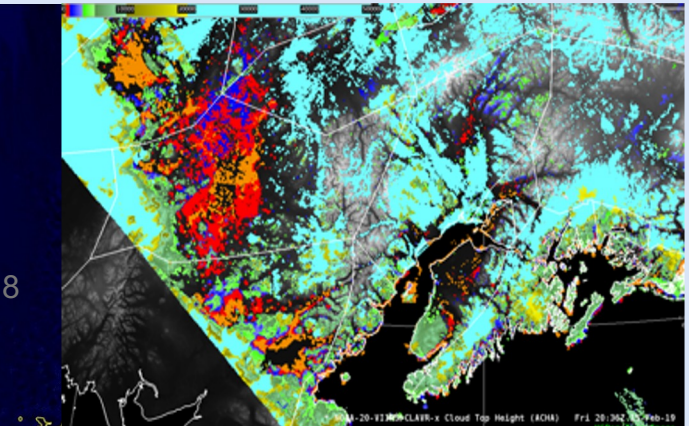
**Wildland Fire
Detections & Extent**



Smoke & Air Quality

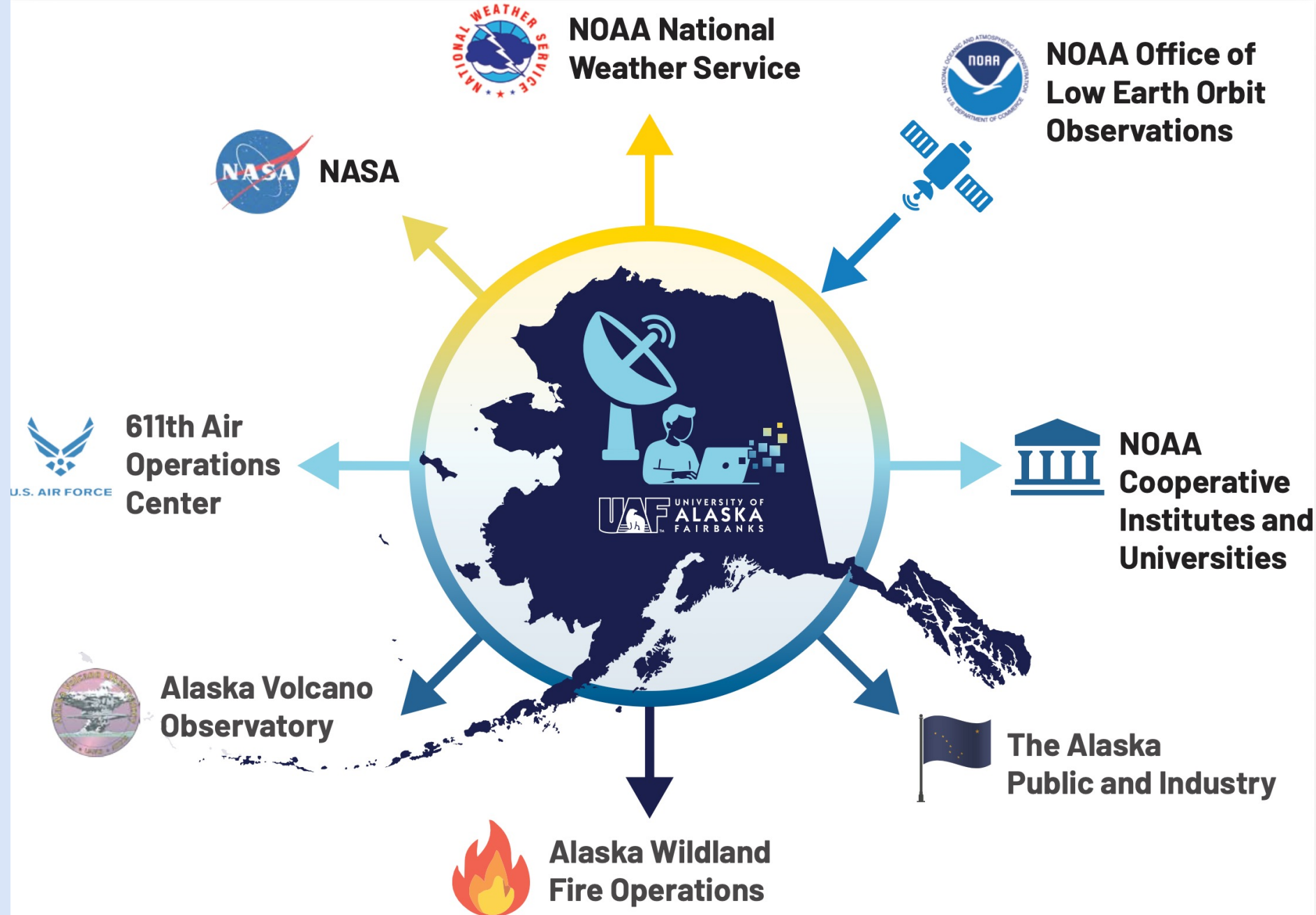


**Volcanic
Emissions**

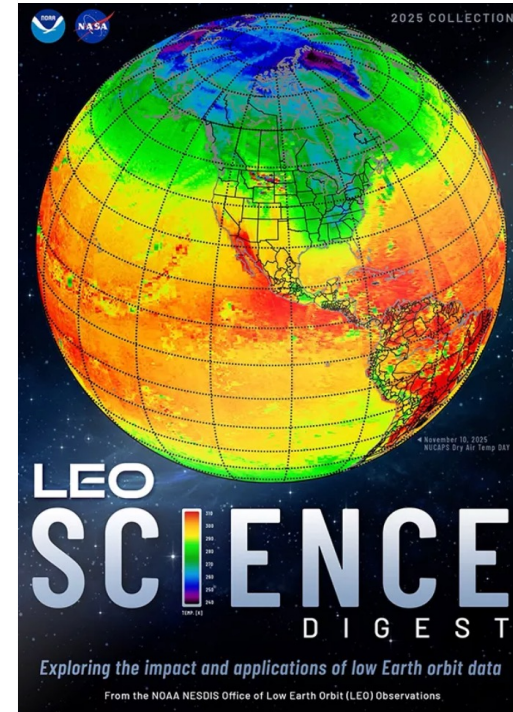
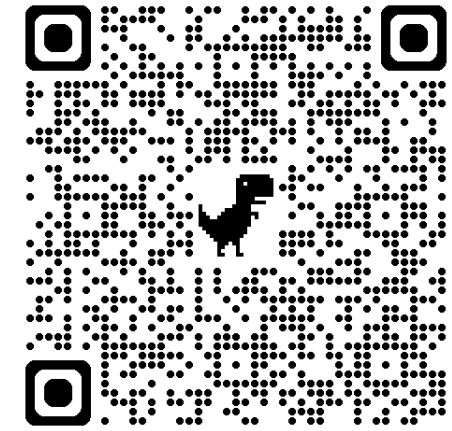


**Aviation Advisories
(Clouds)**

Leveraging Direct-Broadcast to Power a LEO Satellite Collective in Alaska



Resilience in the Last Frontier: The Role of LEO Observations in Alaska



Alaska Direct-Broadcast System

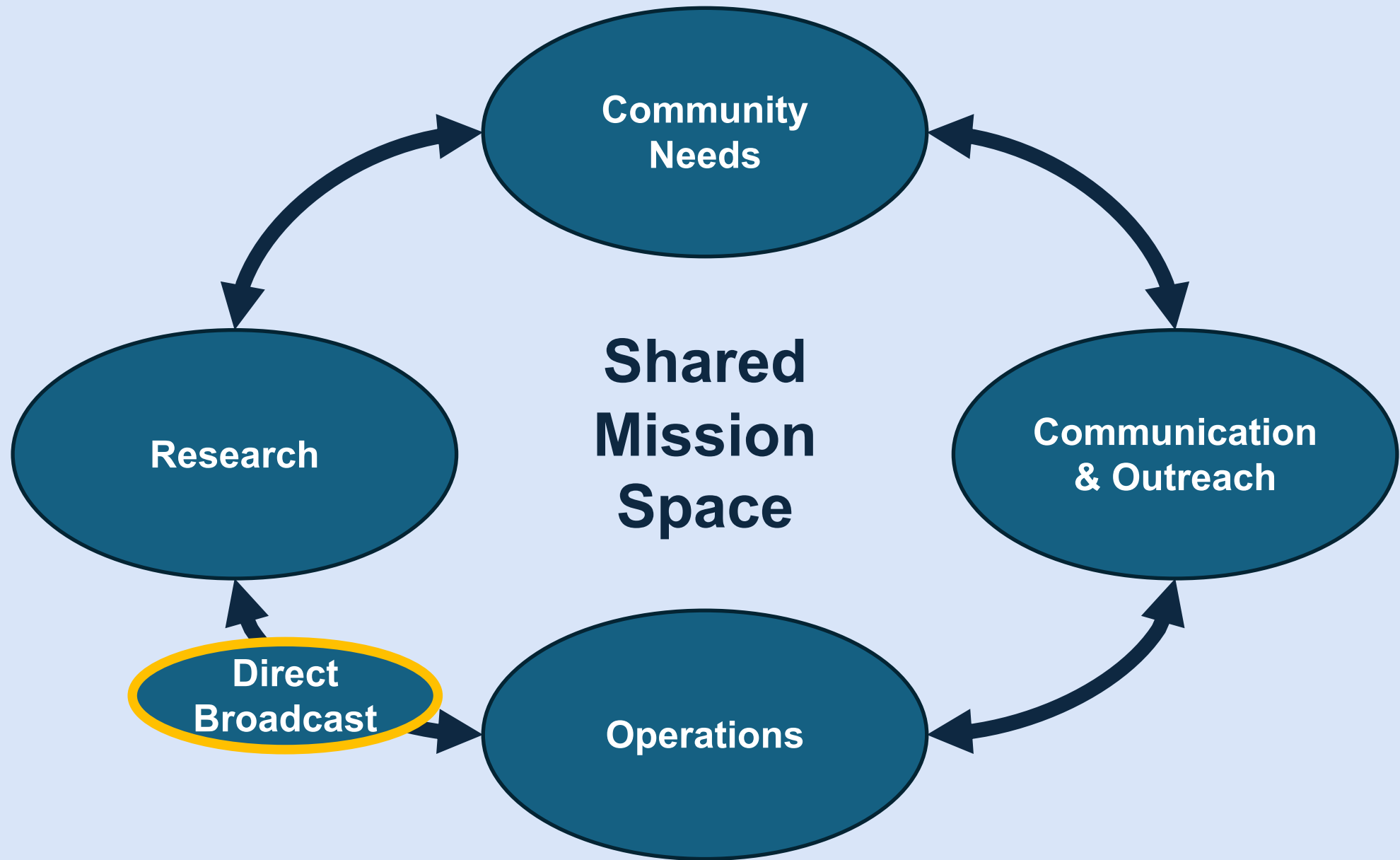
It's More Than Just A Data Stream...It's Community

**Direct
Broadcast**

Shared Mission Space



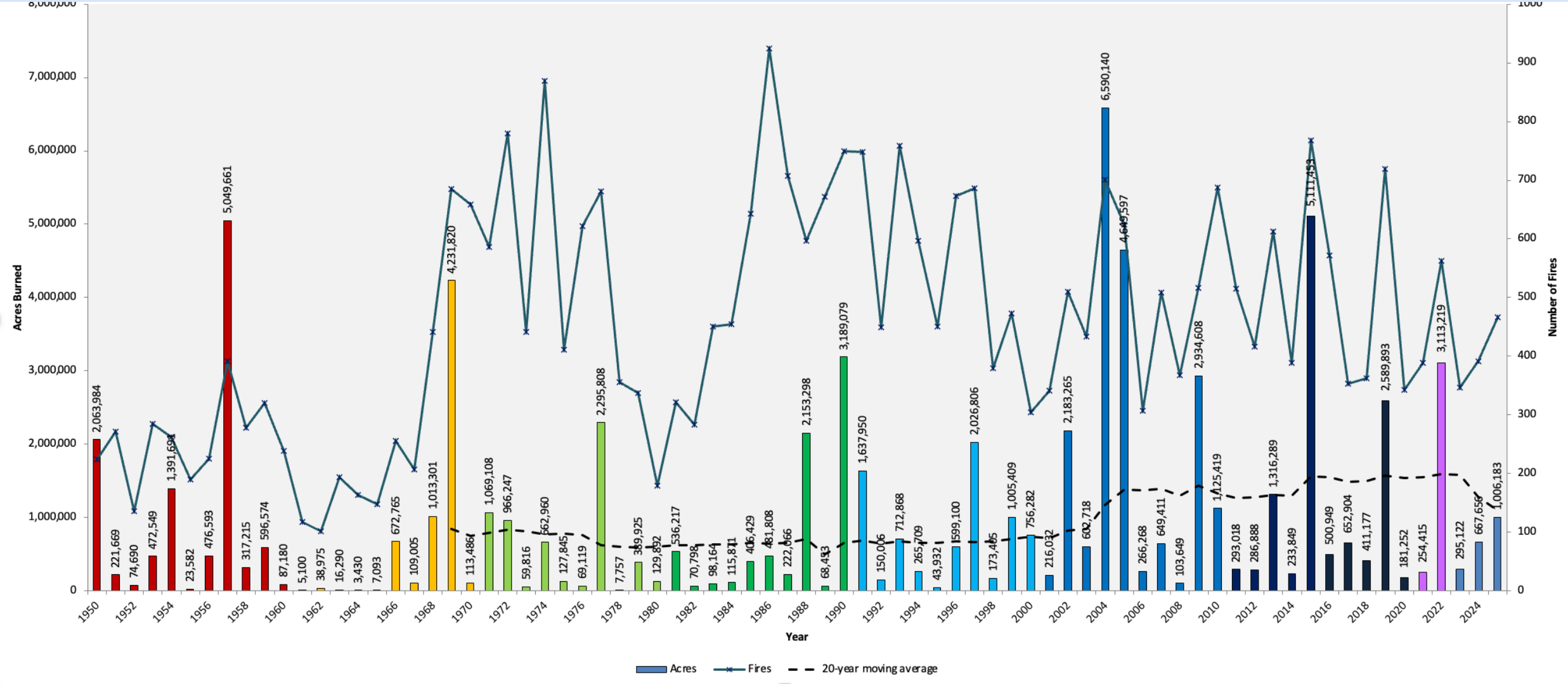
**Direct
Broadcast**

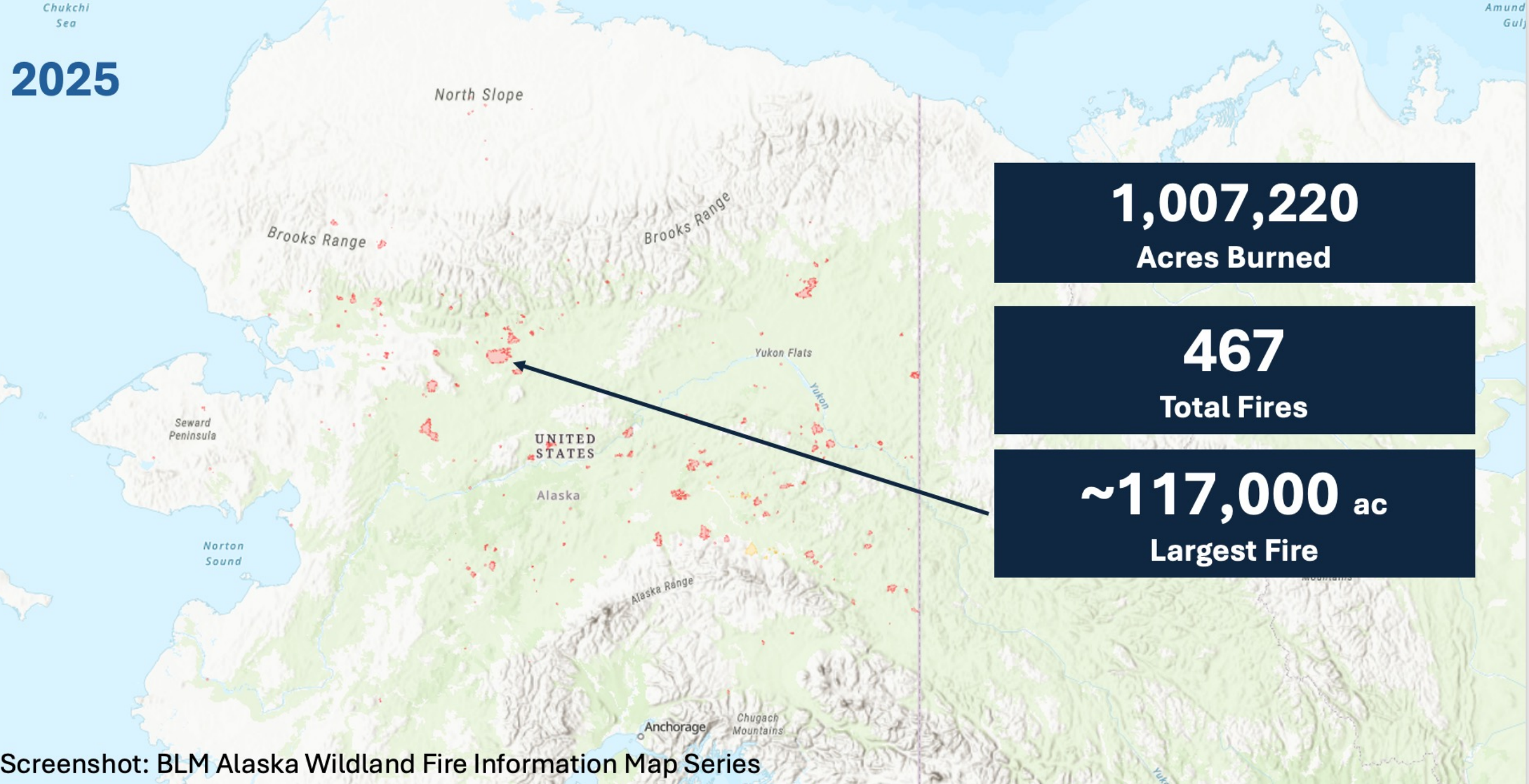


Alaska Direct-Broadcast System

Shared Mission Space: Wildfire

Alaska Wildfires By The Numbers Since 1950





Screenshot: BLM Alaska Wildland Fire Information Map Series

Shared Mission Space: Wildfire



Community Needs

The Early Days: Planes & Phone Calls

Is It on Fire?

Alaska is big,
there just
aren't enough
pilots or
roadside
drivers to
report it all

1980s Fire Detection Aircraft & Pilots (Linn Clawson)

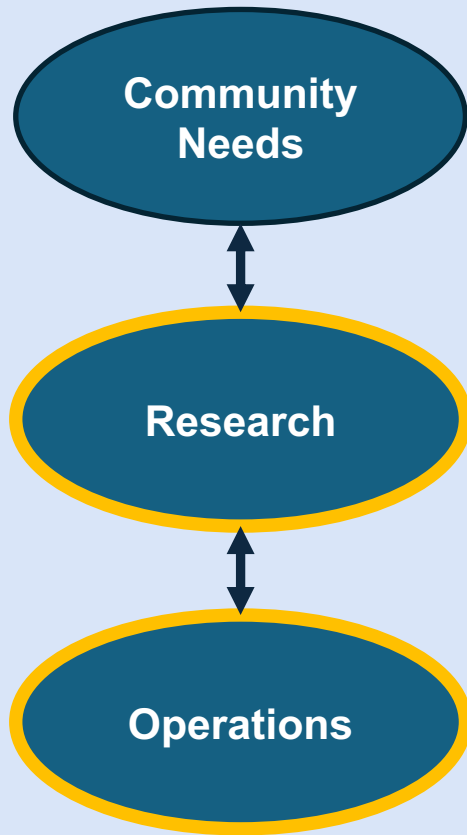


Photo by Alex Simpson, BLM AFS



Photo by Bradley Hagstrom, National Park Service

The Alaska Paradigm....2004

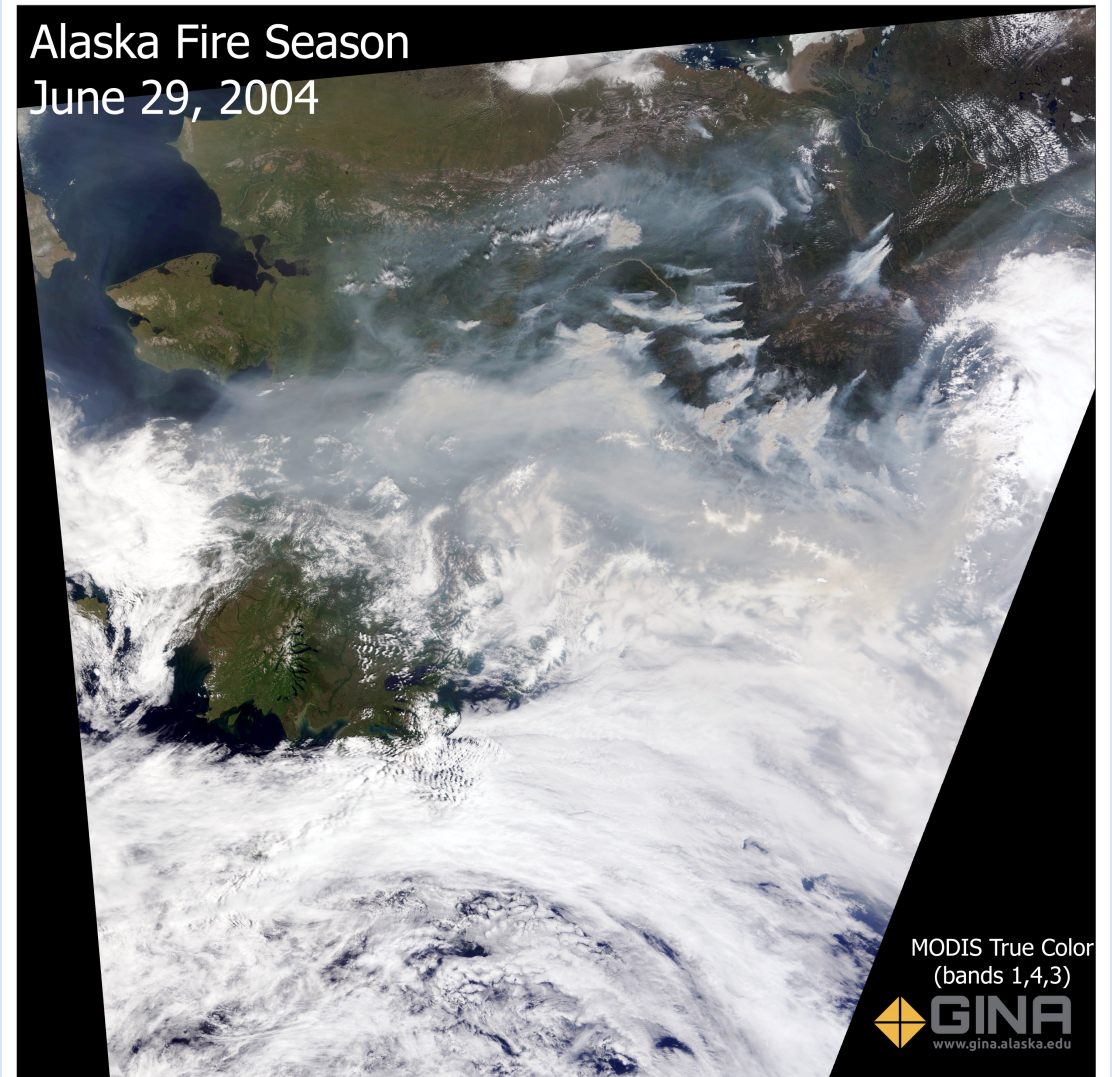


MODIS on LEO
satellites Terra & Aqua
for near real-time active
fire monitoring

Direct-broadcast
antennas were
operating at UAF/GINA

The Alaska Fire Service
worked with GINA to
map the hot spots.

Alaska Fire Season
June 29, 2004





**Can we get an
even better
spatial
resolution?
more looks?**

NOAA Low Earth Orbit (LEO) Satellites

The Office of Low Earth Orbit (LEO) Observations includes two programs: the Joint Polar Satellite System (JPSS) and the Near Earth Orbit Network (NEON).

Joint Polar Satellite System (JPSS)

The [Joint Polar Satellite System](#) (JPSS) is the nation's advanced series of polar-orbiting environmental satellites. Considered the backbone of the global observing system, JPSS satellites orbit Earth from pole to pole 14 times a day, ensuring full global coverage twice daily.



Replace this slide



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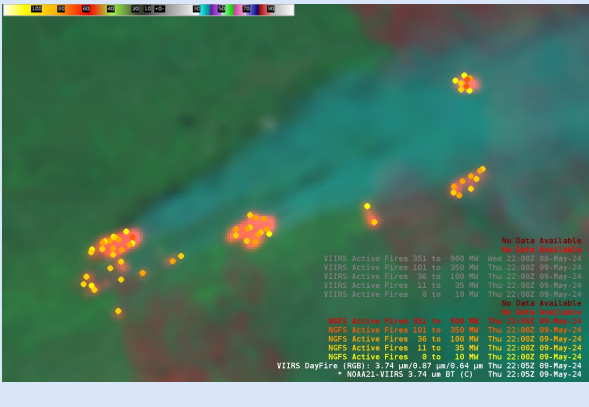
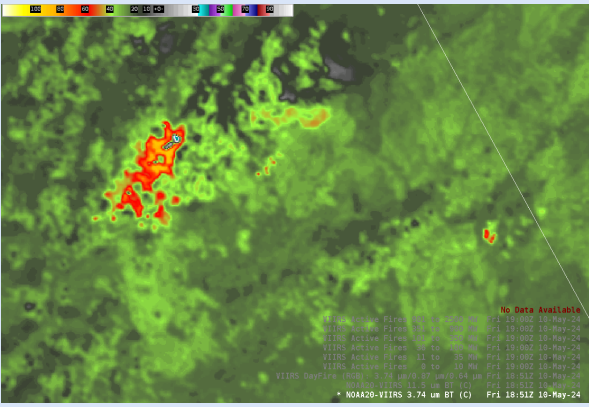
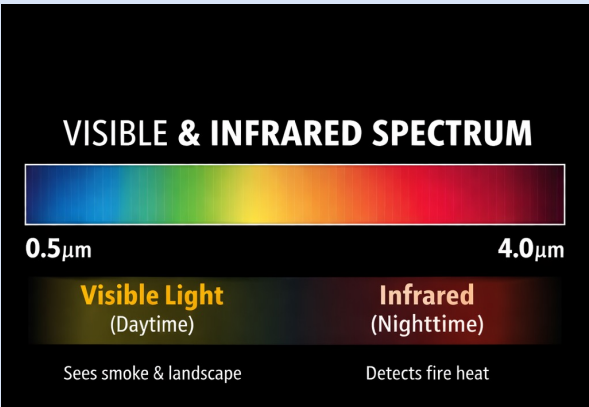
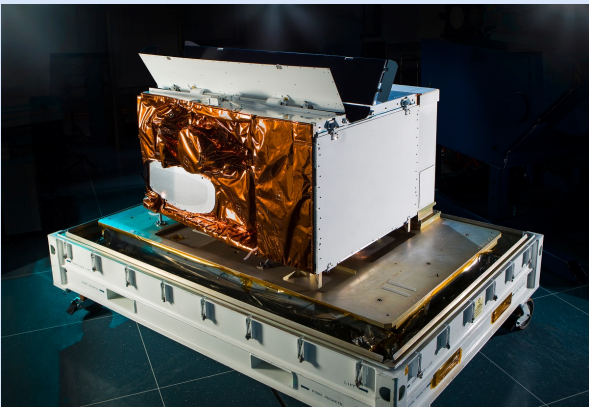
JPSS/Visible Infrared Imaging Radiometer Suite (VIIRS)

Flies on all 3
JPSS
satellites

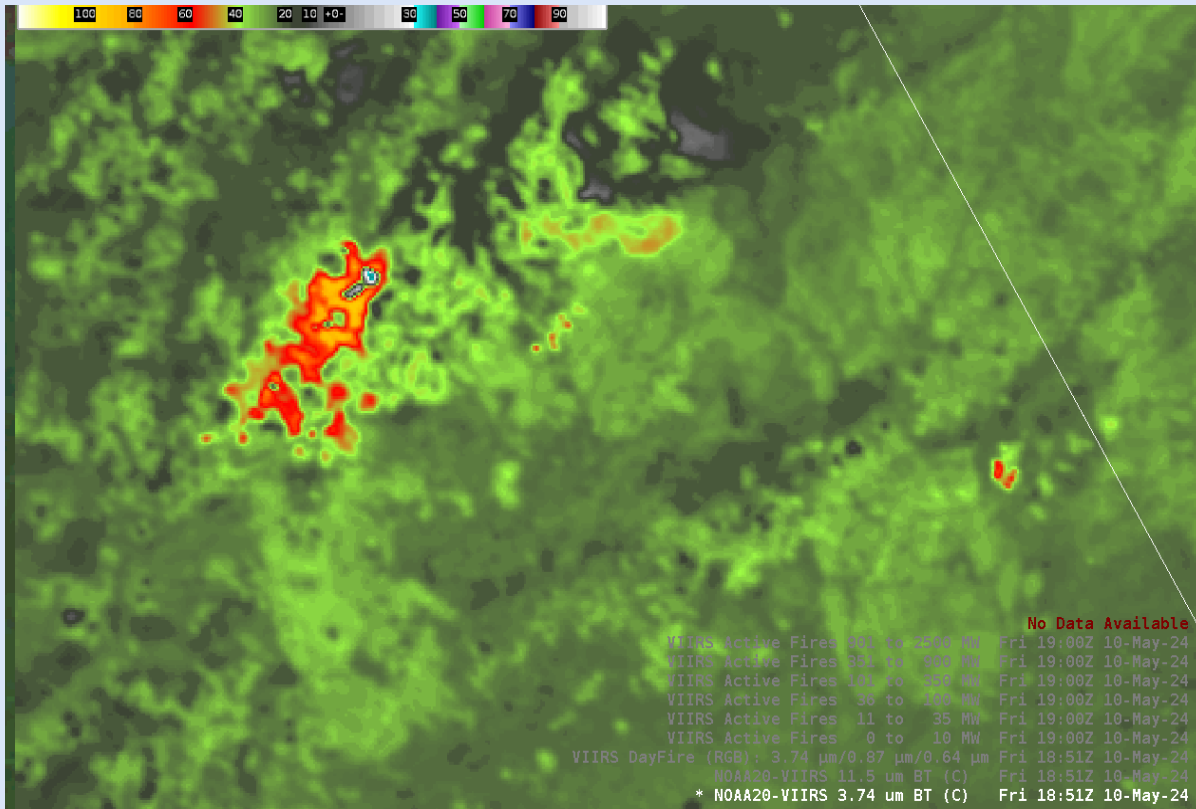
Day and night
monitoring

375-m pixel
resolution

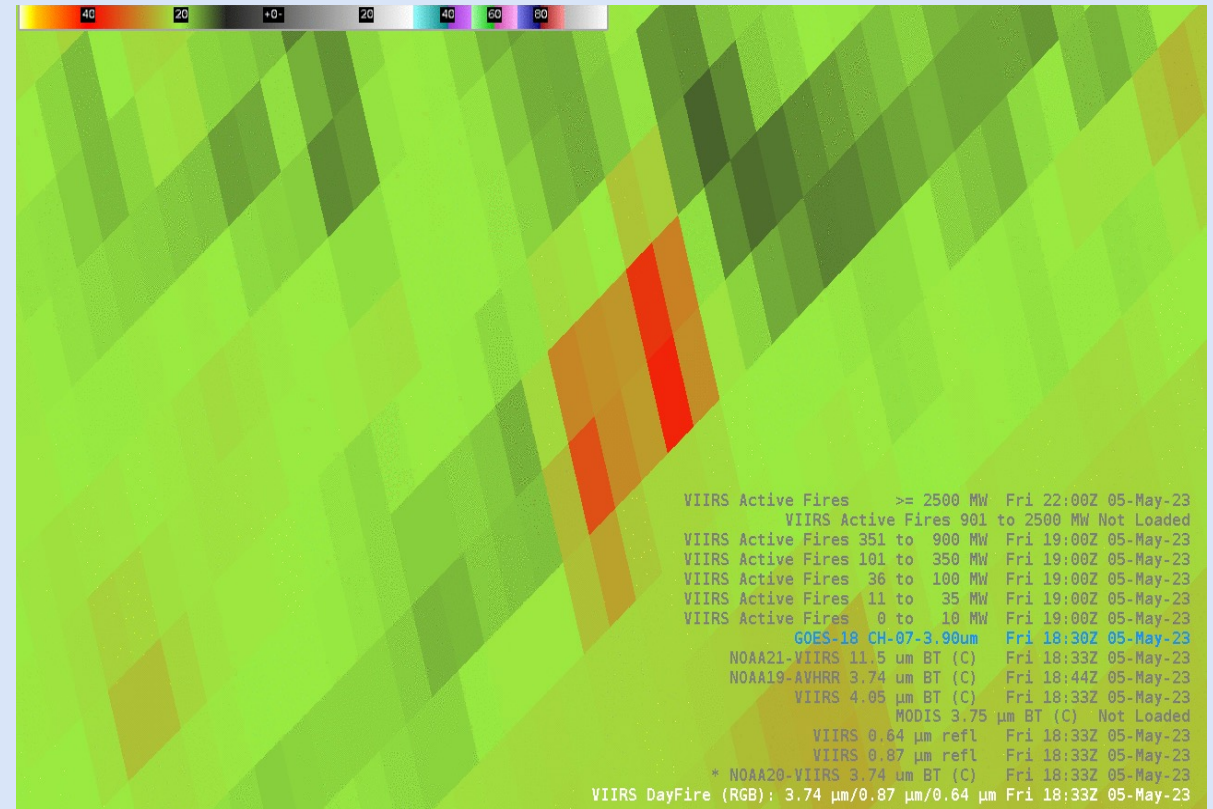
Quantify fire
characteristics



Tracking Rapidly Evolving Fire: Individual Pixels



VIIRS DayFire RGB – 10 Apr 2024
High resolution shows perimeter changes
VIIRS i04
Intensity changes within the perimeter

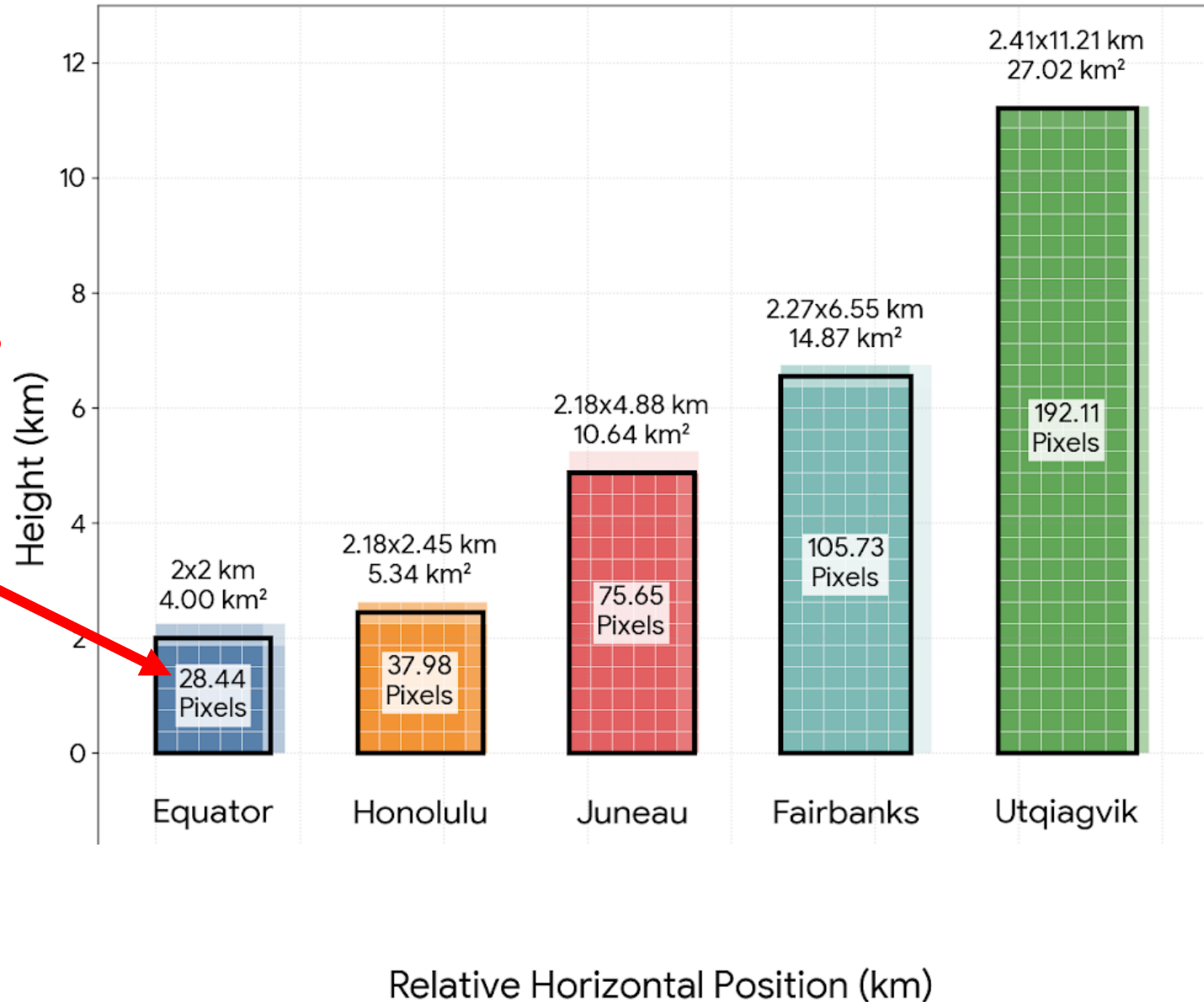


GOES ABI Ch 07 (3.9 μm) - 04 Apr 2023

- Too coarse for perimeter movement

A GOES ABI & JPSS VIIRS 375-m Pixel Comparison

VIIRS pixels
inside a
single GOES
pixel



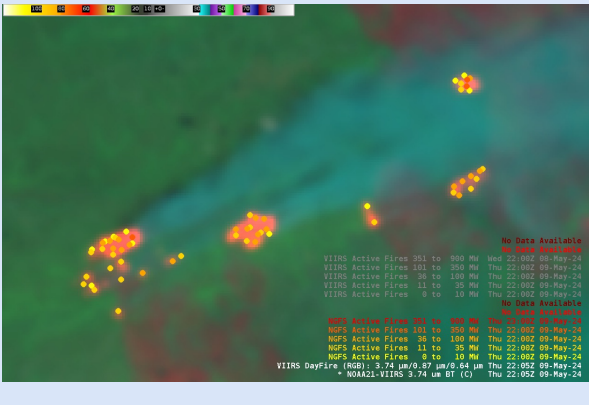
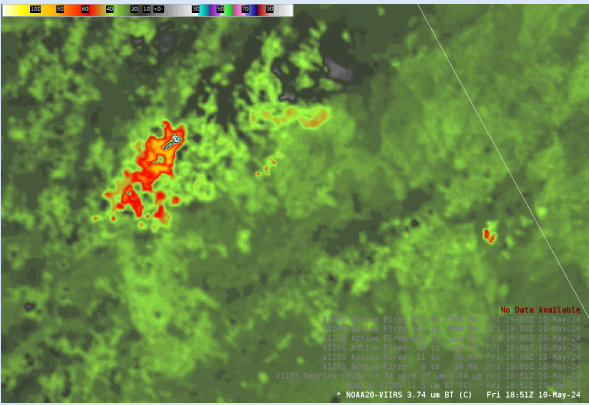
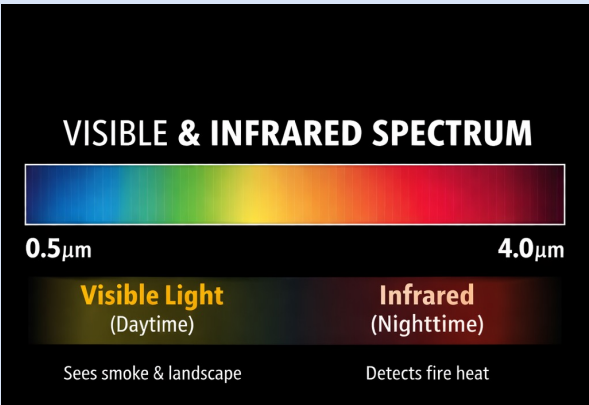
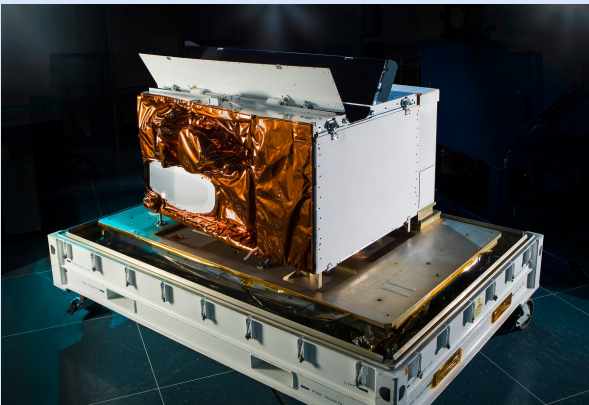
JPSS/Visible Infrared Imaging Radiometer Suite (VIIRS)

Flies on all
JPSS
satellites

Day and night
monitoring

375-m pixel
resolution

Quantify fire
characteristics



VIIRS Active Fire Detection Data Product



Lots of great
minds on the
problem!

NOAA
NOAA-CIs
Universities

The New VIIRS 375m active fire detection data product: Algorithm description and initial assessment

Wilfrid Schroeder ^a  , Patricia Oliva ^a, Louis Giglio ^a, Ivan A. Csiszar ^b

[Show more](#) 

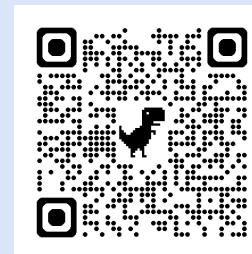
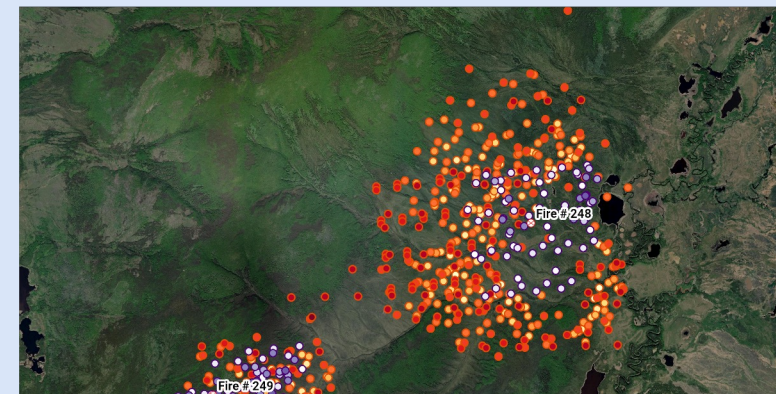
 Add to Mendeley  Share  Cite

<https://doi.org/10.1016/j.rse.2013.12.008> 

[Get rights and content](#) 

Highlights

- New active fire detection algorithm developed for the new VIIRS 375m imager data.
- Theoretical minimum detectable night fire equivalent to $\sim 5\text{m}^2$ and $\sim 1000\text{K}$ fire
- Nominal confidence fire detections showed average commission error of 1.2%.



6/15/2025

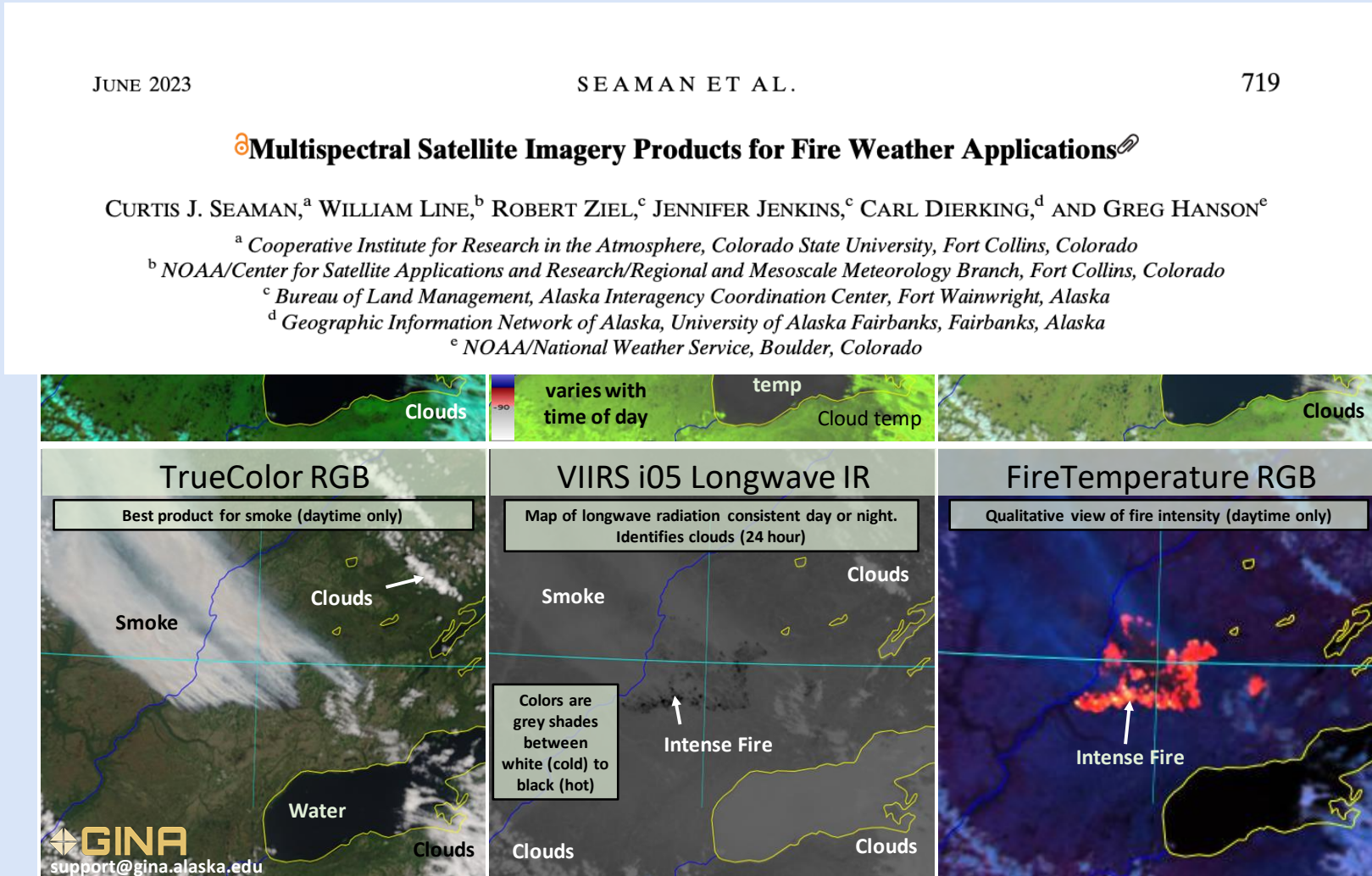


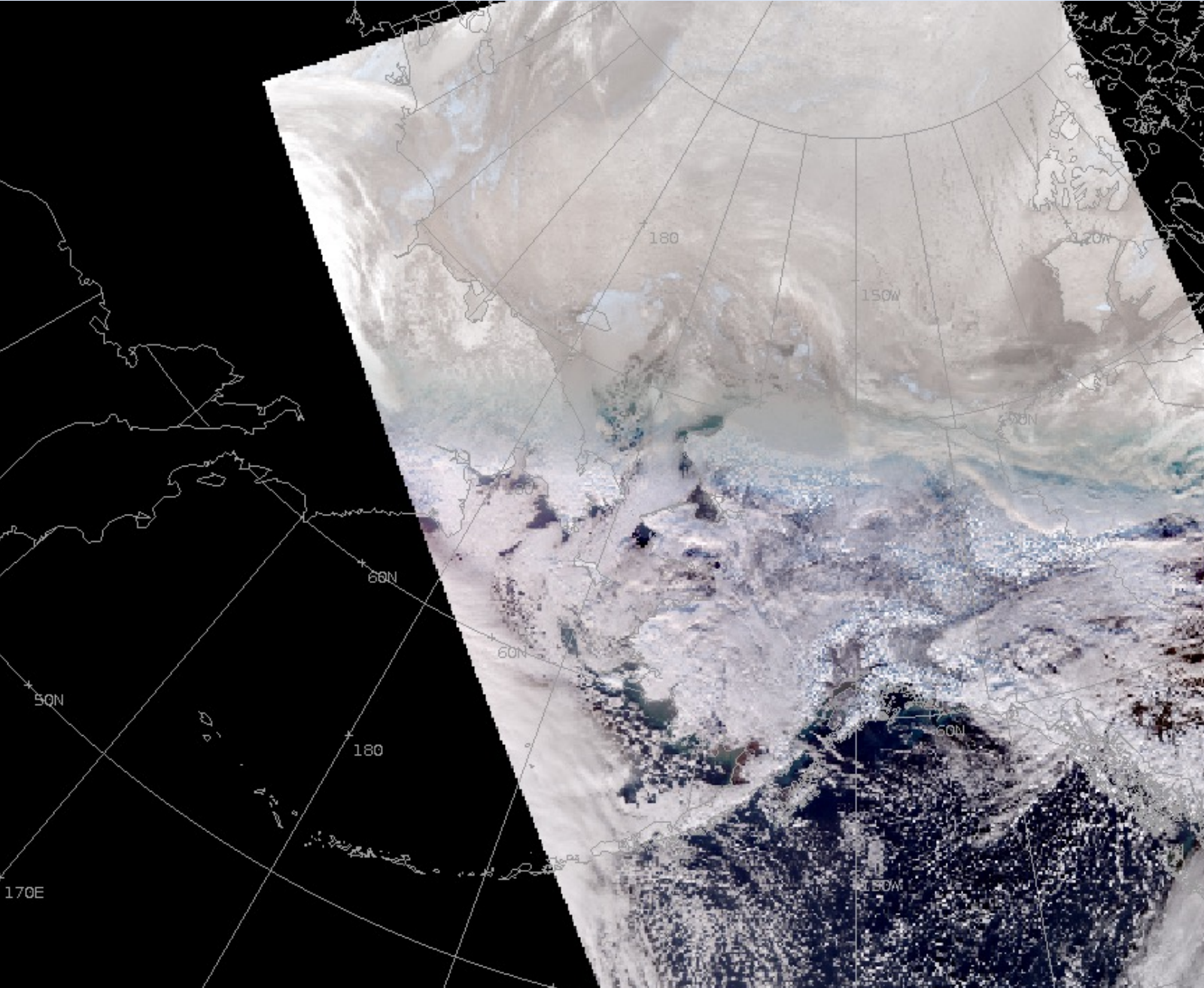
VIIRS Imagery - Wildfire Detection & Monitoring



Is it on fire?

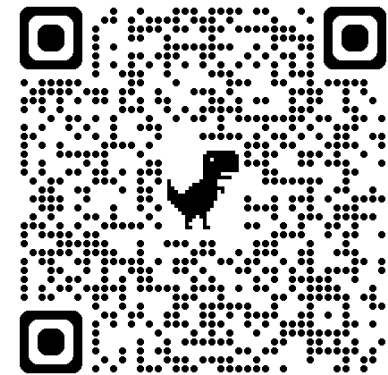
Is it a problem?





Thanks, CIRA!

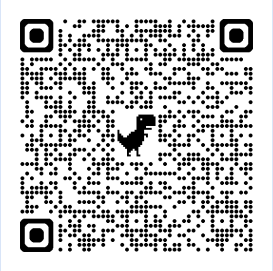
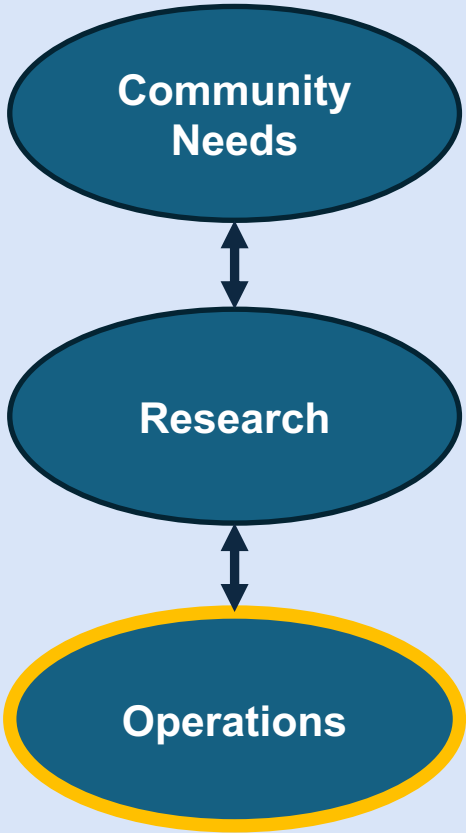
VIIRS GeoColor Quick Guide



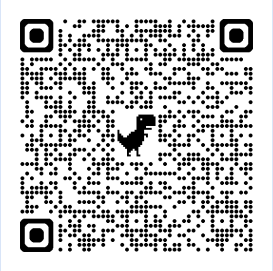
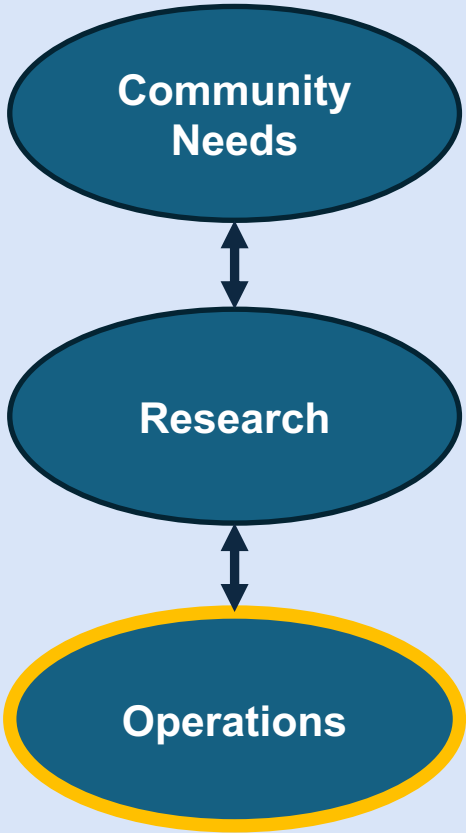
IN THE WORKS

- Day/Night Fire Temp
- CrIS-based Imagery

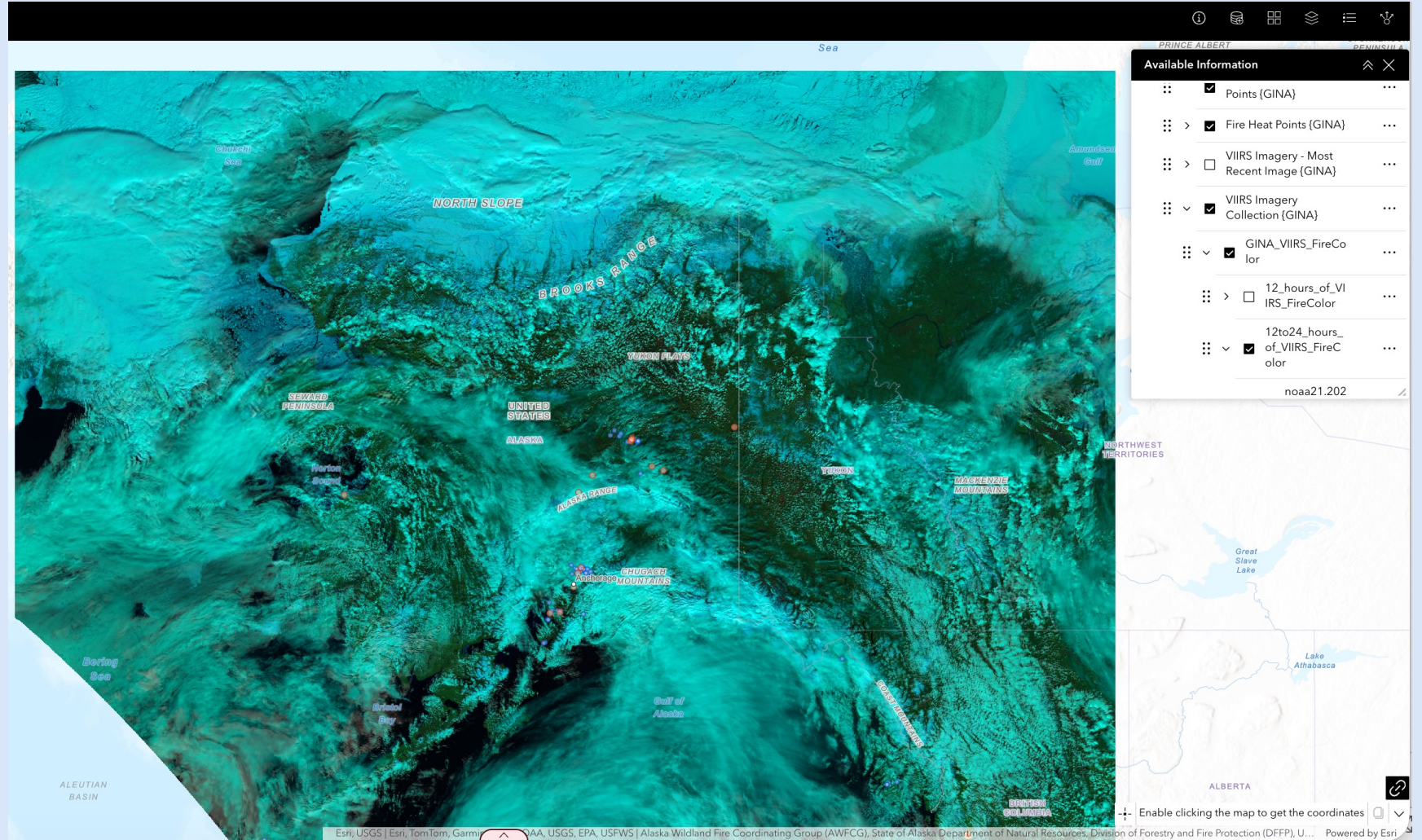
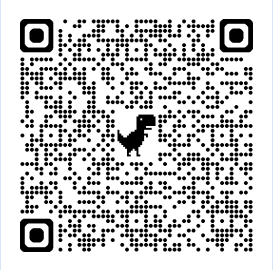
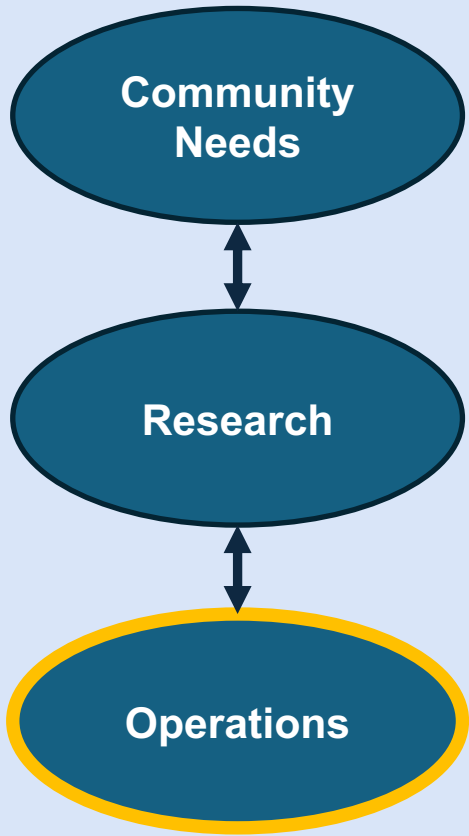
VIIRS via Direct-Broadcast to Fire Operations



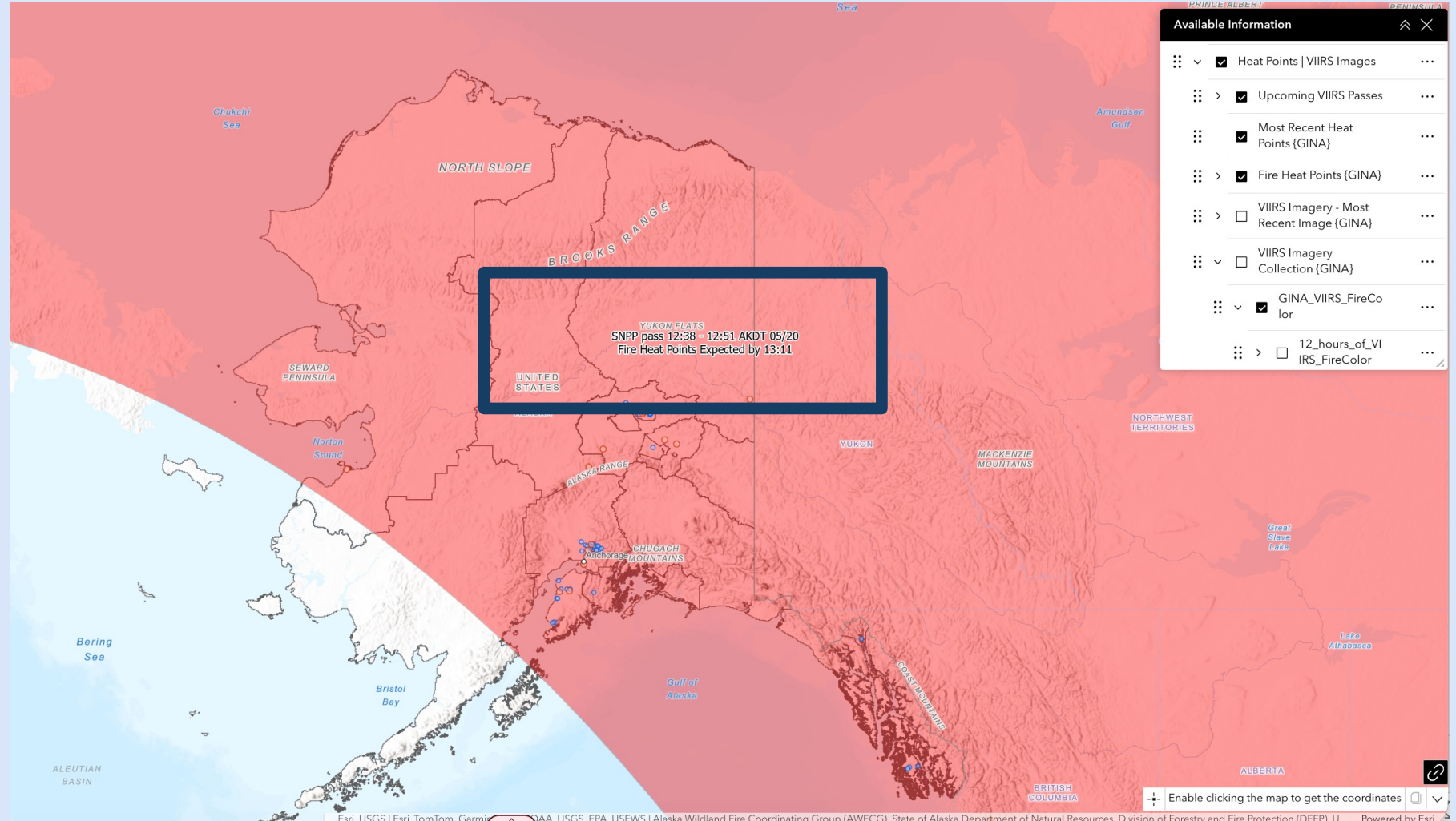
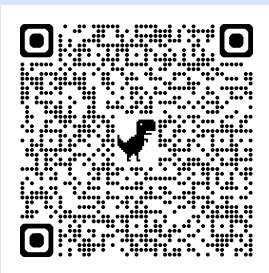
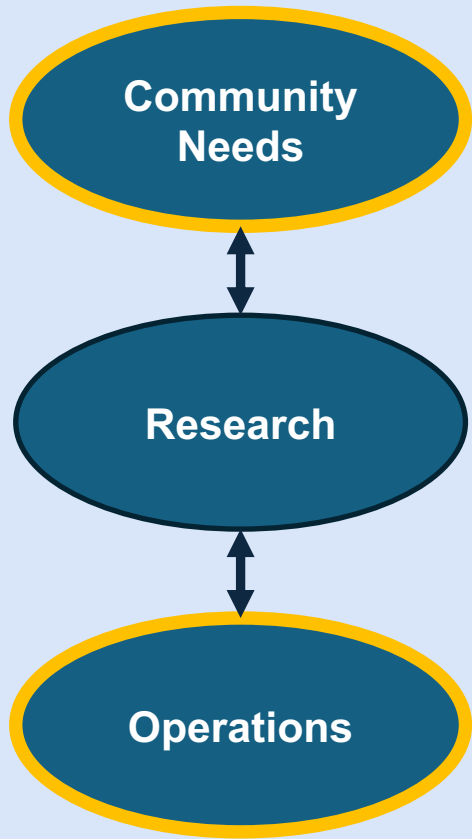
VIIRS via Direct-Broadcast to Fire Operations



VIIRS via Direct-Broadcast to Fire Operations



VIIRS via Direct-Broadcast to Fire Operations



Community Needs

Question from Assistant Fire Management Officer

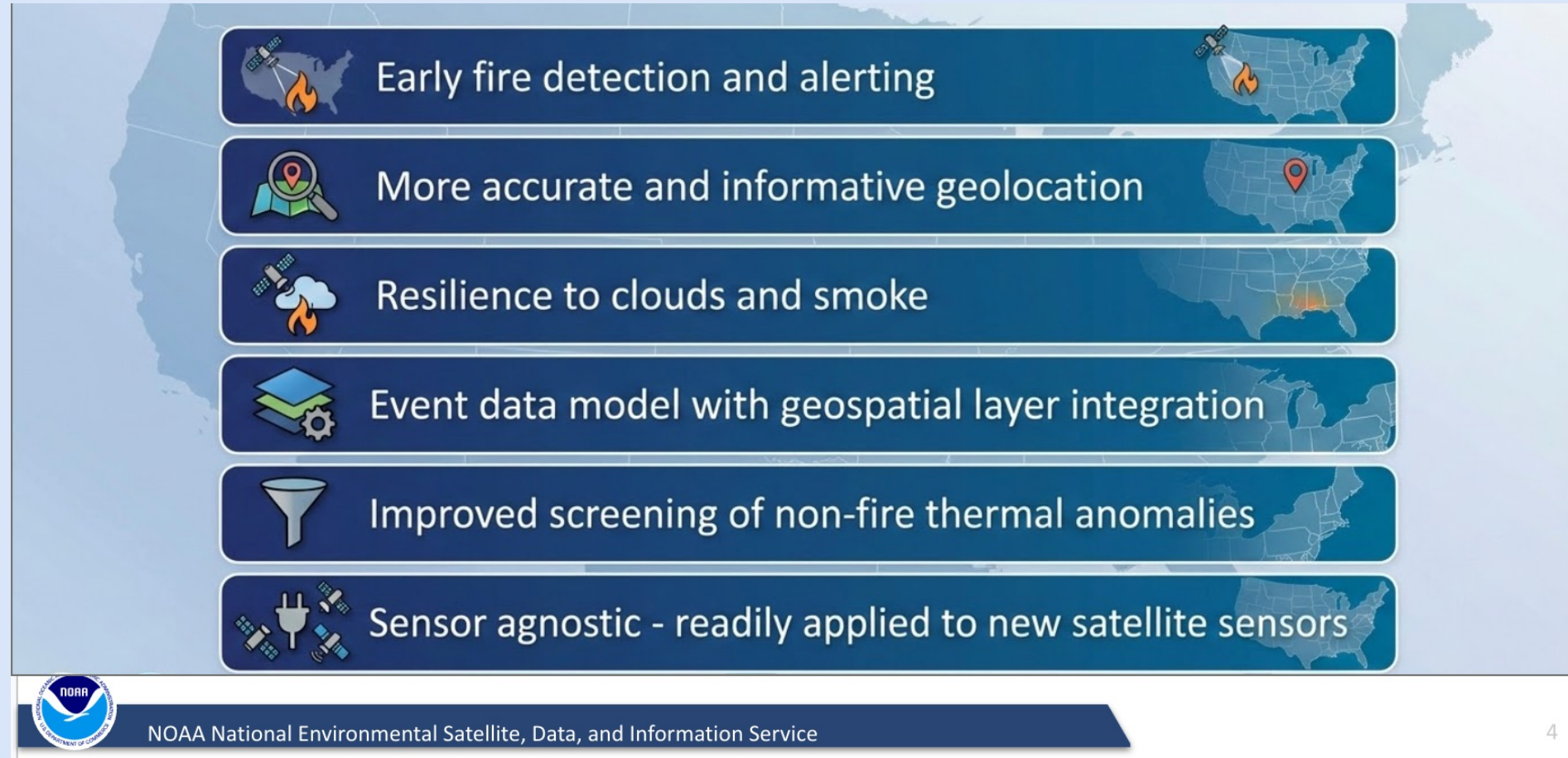
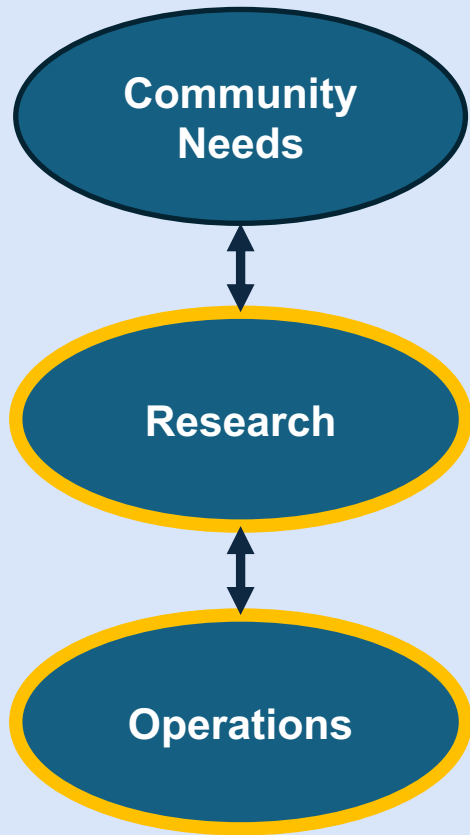
To: BLM_AK_AFS_GIS

Sat 6/1/2024 8:15

Good morning,
I'm curious if the VIIRS satellite is picking up
hotspots this year. It seems as though I might
not be functioning as well as in the past. Do you
have any information about this?
Thanks,

1. Clouds & smoke can hide fire from VIIRS so Active Fire Algorithm (VAF) has no reported detections
2. Low-intensity fires are not necessarily picked up by VAF
3. Burn period during the height of fire season is 24 hrs long. Filling in the “Evening” gap would be helpful.

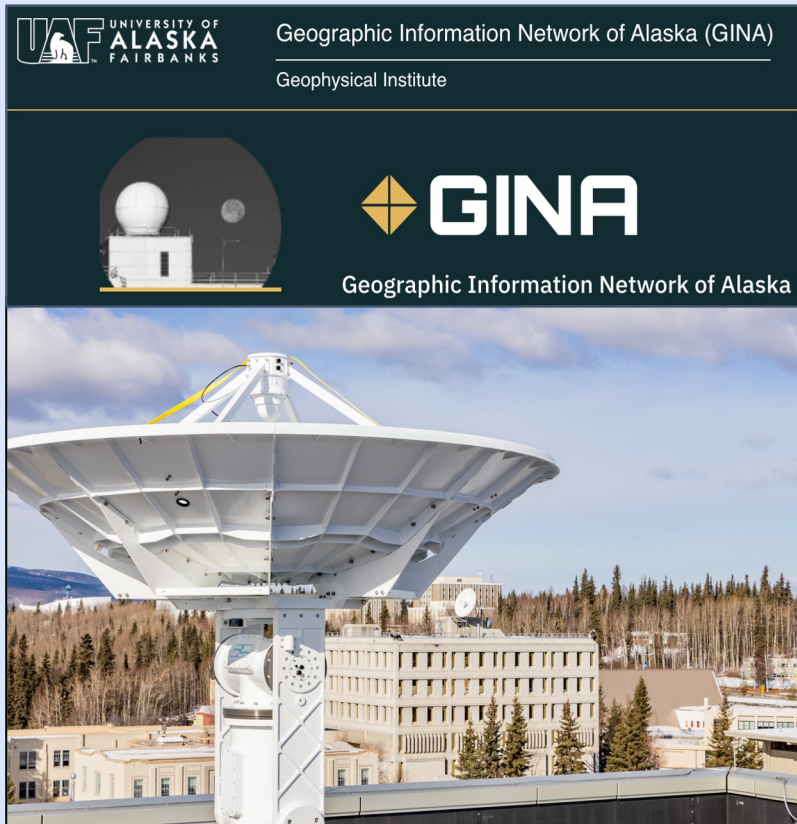
Next-Generation Fire System (NGFS)



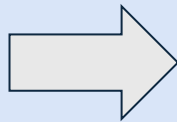
Dr. Mike Pavolonis, NOAA NESDIS Wildland Fire Program Manager &. CIMSS

The NOAA Next Generation Fire System

AI for early detection and tracking of wildfires with NOAA satellite data



Near real-time NOAA satellite data in Alaska from UAF/GINA



Actionable intelligence, including automated detection of potential new wildfires for the US Wildland Fire Service

Which atmospheric phenomenon is increasingly responsible for igniting wildfires in the high-latitude Arctic tundra?

0

Convective lightning storms in areas that rarely experienced them historically.

0

Prolonged summer droughts drying out surface tundra.

0

Increased solar radiation from thinning cloud cover.

0

Polar vortex winds carrying embers from southern forests.

Mentimeter

JD

Replace this slide

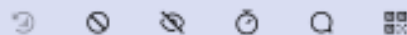


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menti.com
5951 7036

Waiting for participants



NGFS Detects Tundra Fire First

Alaska News

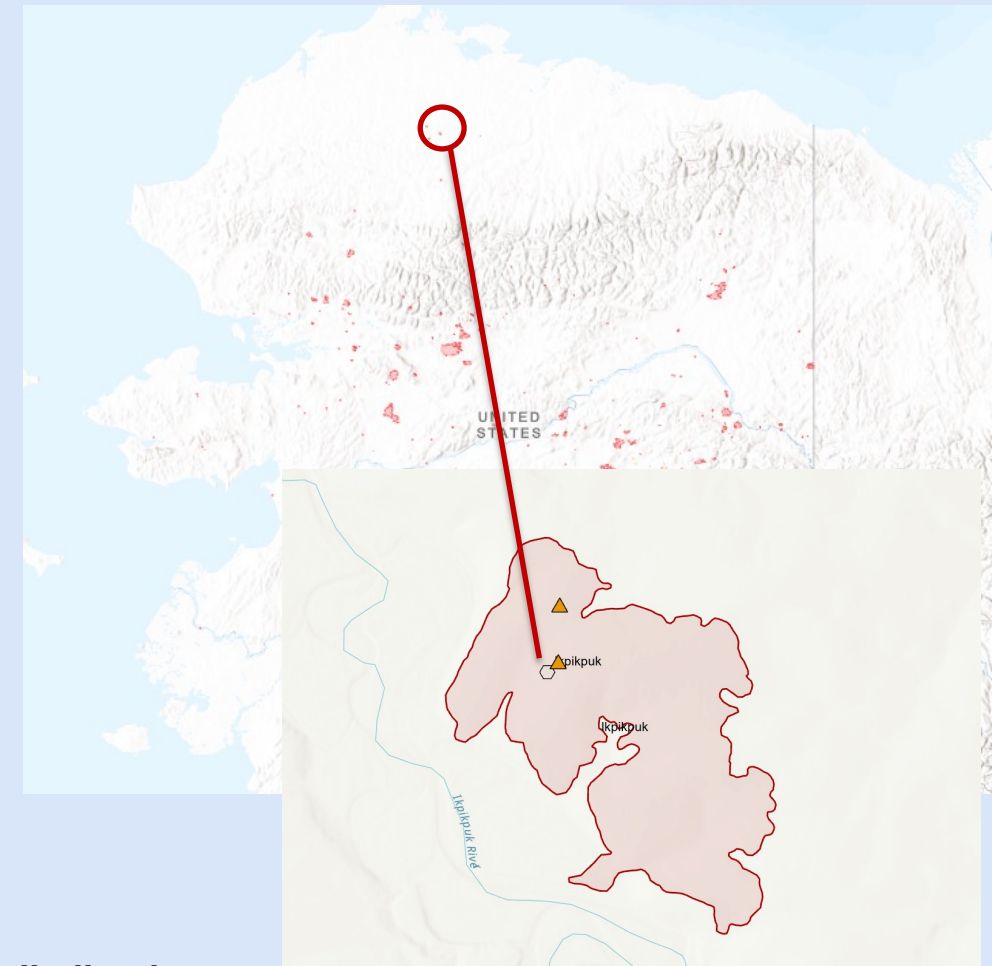
Tundra fire on Alaska's North Slope is among the biggest in recent years

By Yereth Rosen, Alaska Beacon

Published: July 8, 2025

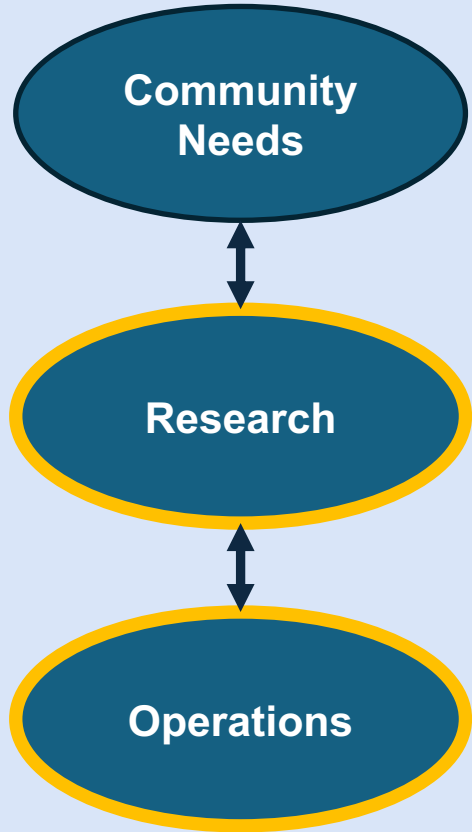


Smoke from the Ikpikuk Fire is seen on June 23 in this satellite image from Planet Labs Inc. (Image provided by Ben Jones/University of Alaska Fairbanks)



317 – Ikpikuk Discovered 06/22/2025

Fire was discovered using remote sensing. Fire is plotting in limited management area. Fire will be monitored as resources allow.



GINA ArcGIS Rest Services

- NGFS VIIRS detections, generated using GINA direct broadcast data, are available in near real-time via an ArcGIS rest service:
- Detections are available for the NOAA-20, NOAA-21, and SNPP satellites
- Detections are grouped into < 12 hr, 12-24 hr, 24-48 hr, and > 48 hr categories
- Data can be displayed in two ways:
 - Traditional points denoting the centers of the satellite pixels
 - Polygons showing the outlines of the satellite pixels



NOAA National Environ

“Evolution of Algorithm & Attributes”
- Jenn Jenkins, Alaska Fire Service

What's Coming for Alaska NGFS 2026?

More meetings with
wildfire operations
in Alaska federal,
state)

AWIPS in the Cloud
for IMETS

Expanded VIIRS
Fire Product
Training for IMETS

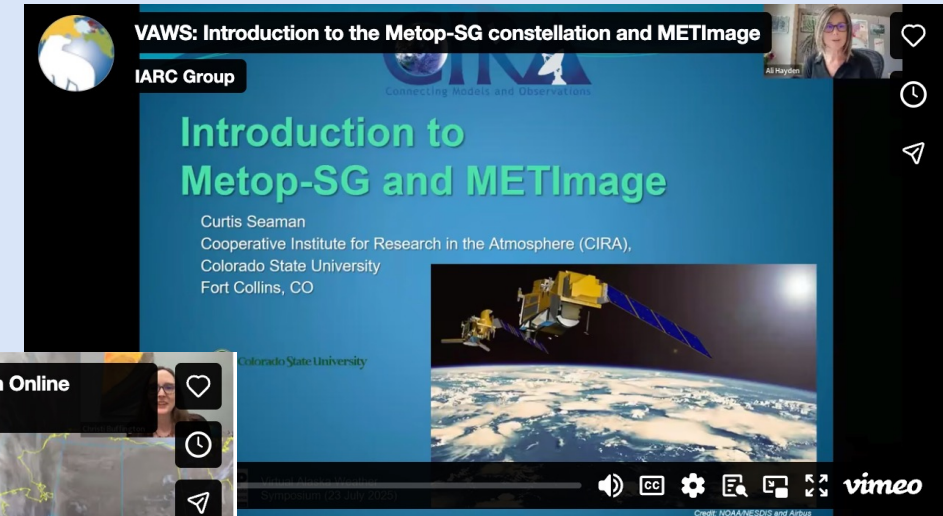
Experimental
NGFS Alert
Dashboard for
VIIRS



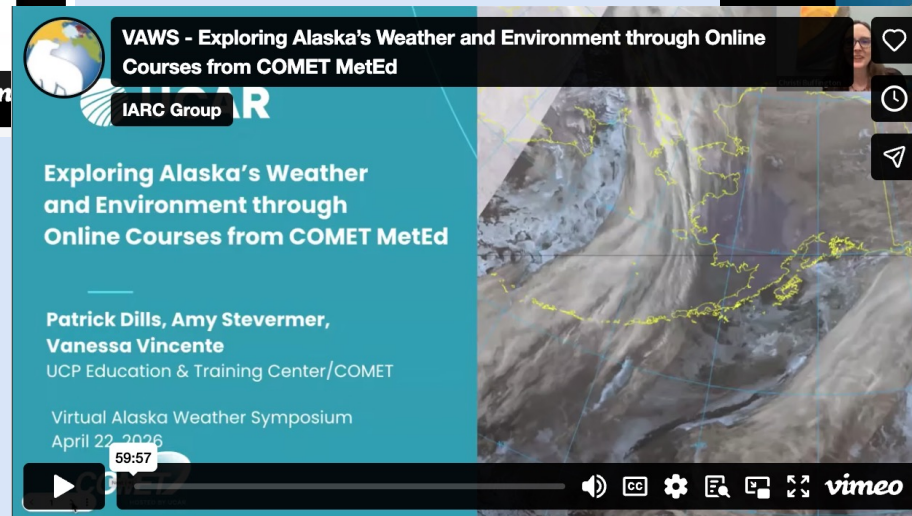
The screenshot shows the NGFS Alerts Dashboard (Experimental) interface. At the top, there is a header bar with the CIMSS logo and the title "NGFS Alerts Dashboard (Experimental)". Below the header, there is a filter bar with the following options: "Countries: United States", "Locations: All selected", "Authority: All selected", "Rankings: All selected", and "Time Threshold: 3 hours". There are also buttons for "Edit Settings", "Edit Columns", and a red alert icon. The main content area is a table with the following columns: "Location", "NWS WFO", "Most Recent Alert", and a "Hide" button. The table contains two rows of data: one for Atoka County, OK, and one for Winkler County, TX.

Location	NWS WFO	Most Recent Alert	
Atoka County, OK	Norman, OK	20 minutes ago	Hide
Winkler County, TX	Midland/Odessa, TX	24 minutes ago	Hide

Virtual Alaska Weather Symposia (VAWS): High-Latitude Weather & Climate Insights



Monthly, Wednesdays @
19:00 UTC
(11:00 AKDT)



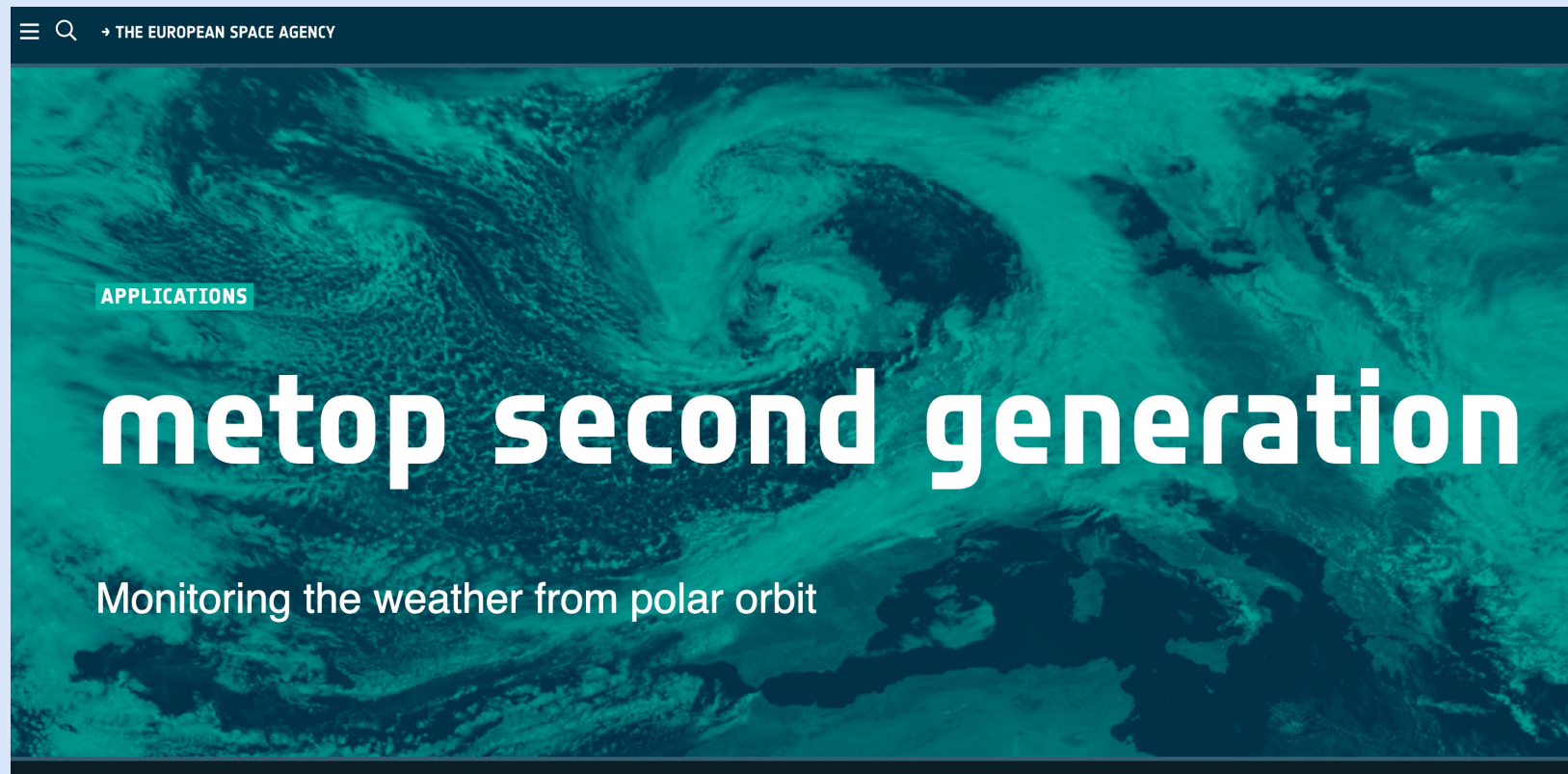
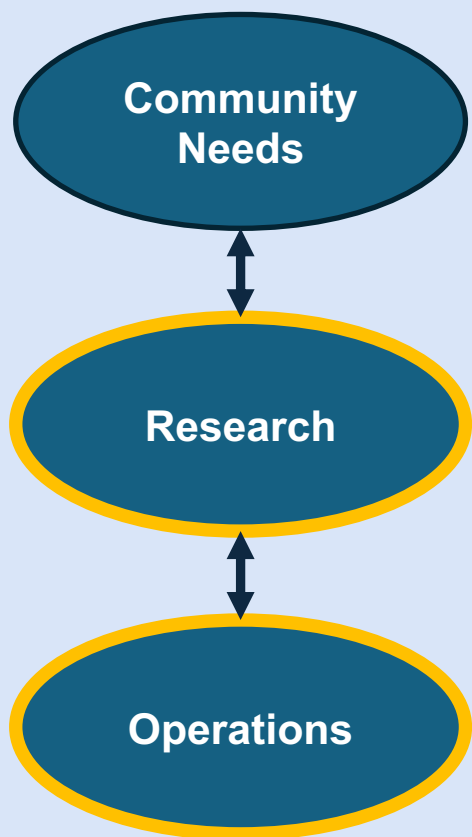
Question from Assistant Fire Management Officer

To: BLM_AK_AFS_GIS

Sat 6/1/2024 8:15

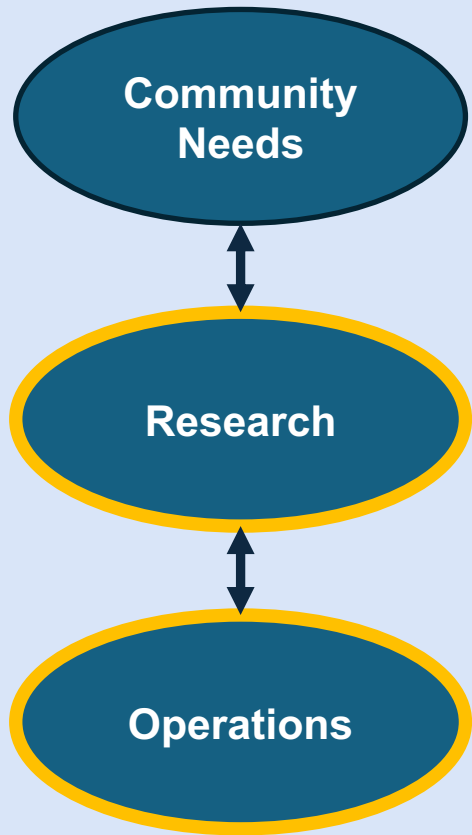
Good morning,
I'm curious if the VIIRS satellite is picking up
hotspots this year. It seems as though I might
not be functioning as well as in the past. Do you
have any information about this?
Thanks,

1. Clouds & smoke can hide fire from VIIRS so Active Fire Algorithm (VAF) has no reported detections
2. Low-intensity fires are not necessarily picked up by VAF
3. Burn period during the height of fire season is 24 hrs long. Filling in the “Evening” gap would be helpful.



	Metop SGA1 - METImage	JPSS - VIIRS
Scan Type	Cross-Track Scanning Radiometer	Cross-Track Scanning Radiometer
Swath Width and Orbit	~2700 km, Sun-synchronous	~3000 km, Sun-synchronous
Coverage & Number of Channels	Global, 20 Channels	Global, 22 Channels
Spatial Resolution	VII Bands @ 500-m	I-Bands @ 375-m, M-Bands & DNB @ 750-m
Equatorial Overpass Time and Temporal Resolution	0930 local time. *1 to 2 day and night overpasses across CONUS. More frequent coverage over Alaska.	1330 local time. *3 to 6 day and night overpasses across CONUS. More frequent coverage over Alaska.

*Assumes 1 METImage and 3 VIIRS instruments



METOP-SG-A1 METIMAGE

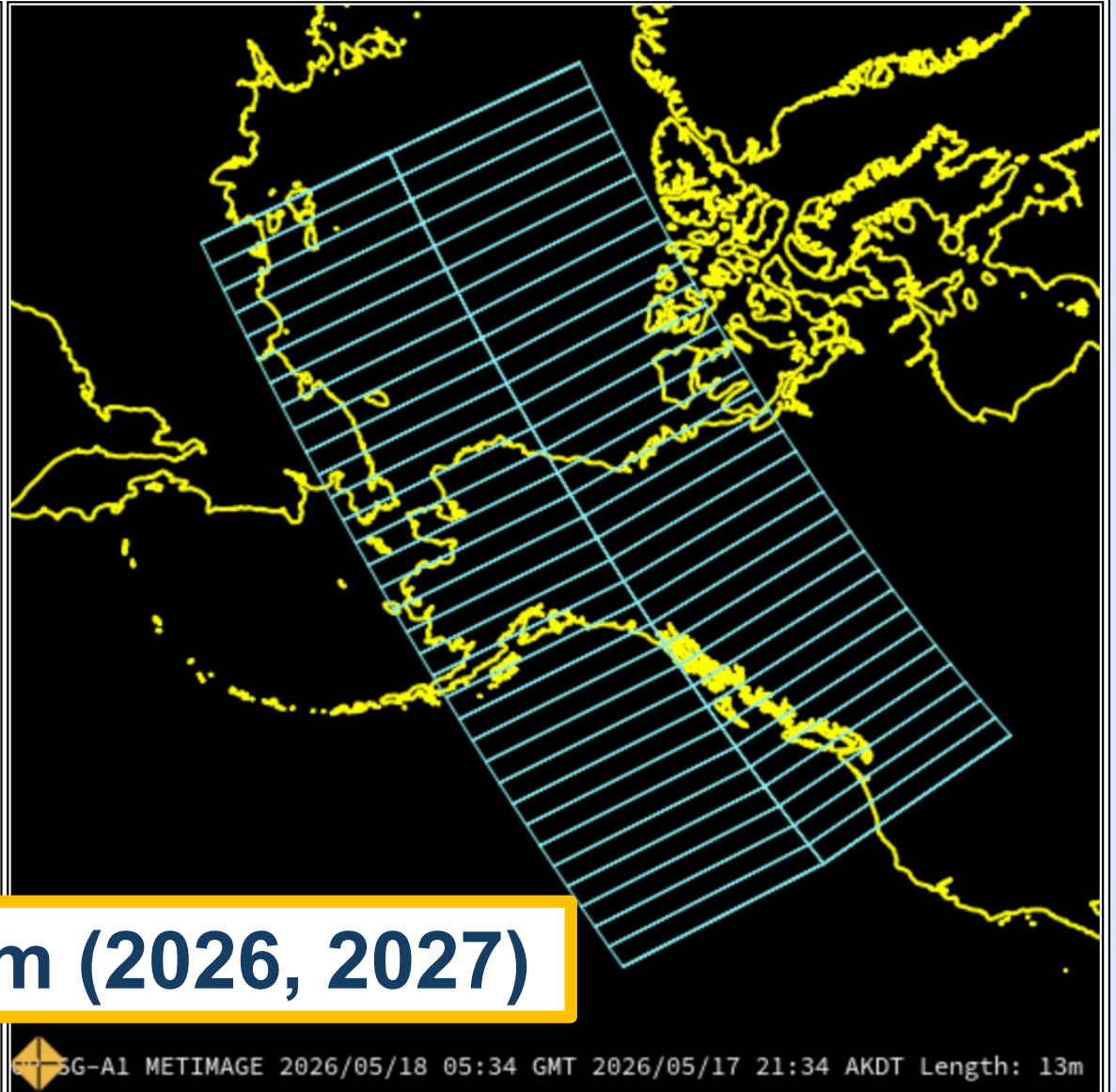
Pass Starts At:

2026/05/17 21:34 AKDT

2026/05/18 05:34 GMT

Length: 13 minutes

[GeoJson](#)



Next Generation Fire System (2026, 2027)

Community Needs

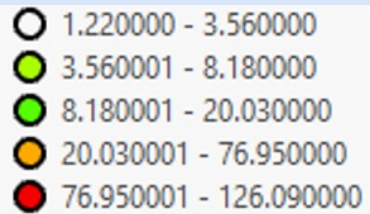
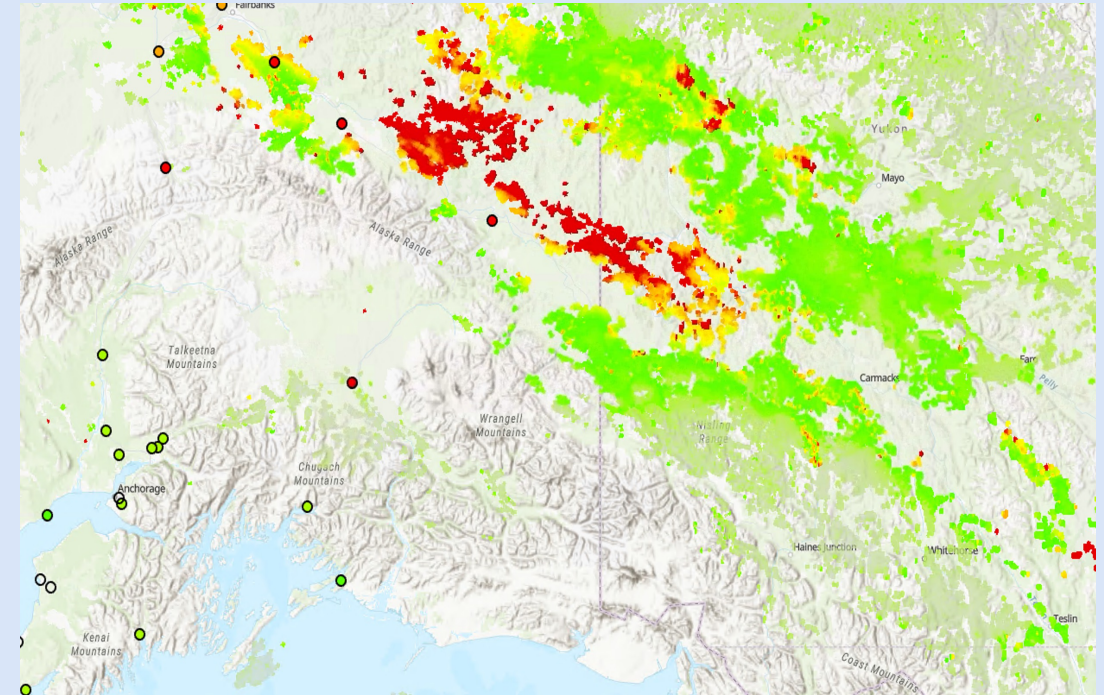
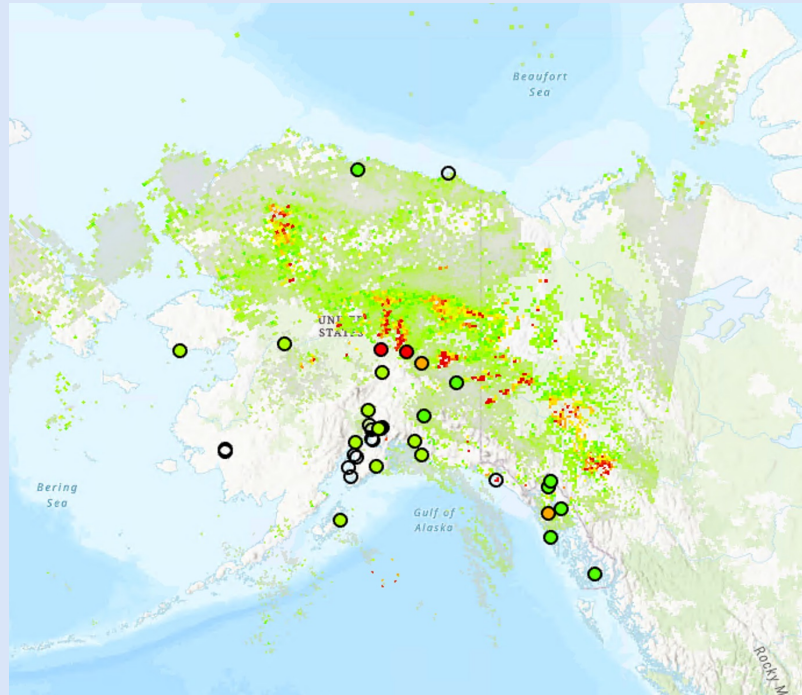
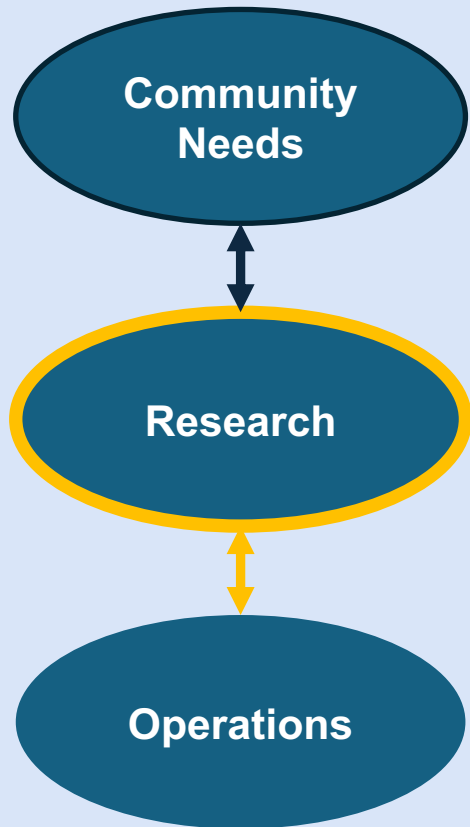
There is a lot of
fire & smoke.

Can we breath
safely outside?



Smoke of this severity level has never been documented in Nome before this month (July) (D. HOVEY, KNOM)

Estimating PM2.5 in From DB VIIRS AOD (GINA, UAF's Dr. Mao, NOAA STAR)



- Review/assess 2025 PM2.5 estimates from daily averages + VIIRS AOD from each pass; blend with OMPS smoke index
- Be prepared for 2026 fire season!

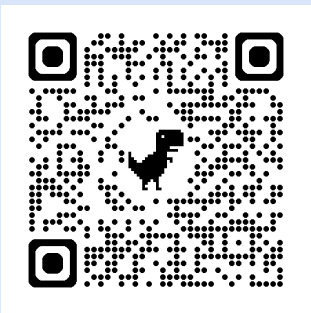
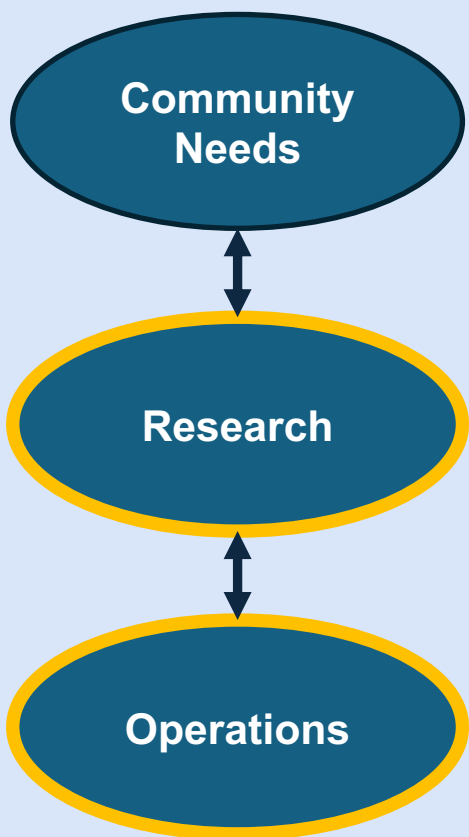
Community Needs

There is a lot of
fire & smoke.

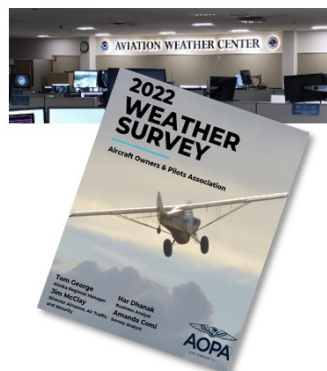
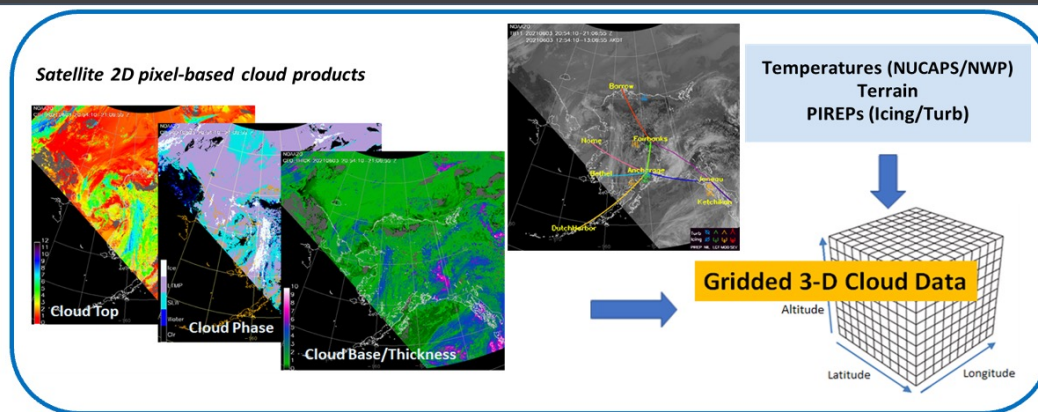
Where can we fly?



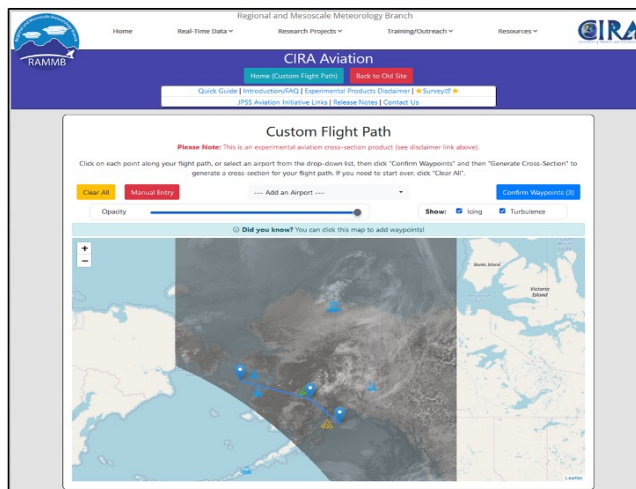
Black spruce has been burning actively in 2022 with hot and dry conditions in the Interior. Photo AK DOF



CIRA's Satellite Cloud Cross-section for Aviation



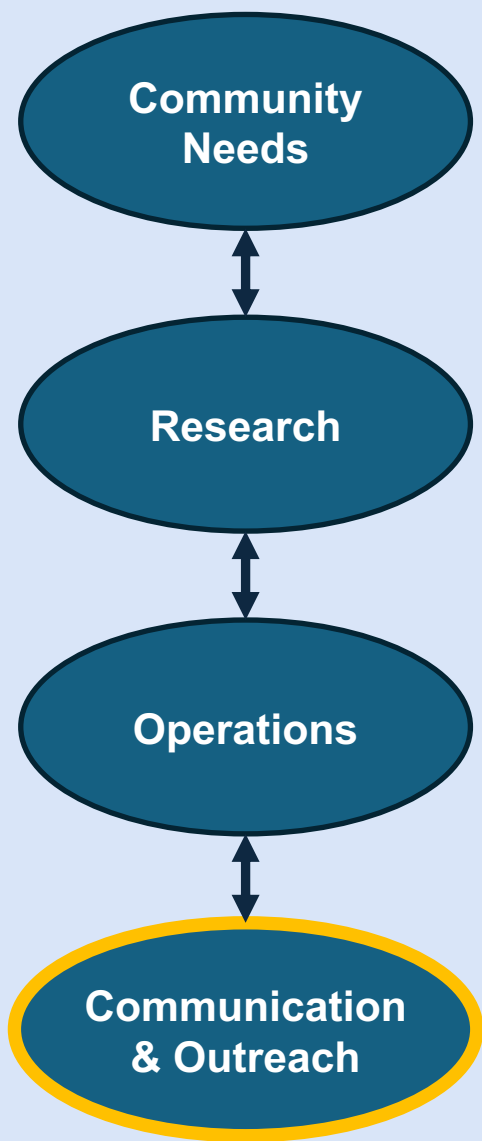
User-engaged development efforts, special thanks to Alaska aviation users →



<https://aviation.cira.colostate.edu>

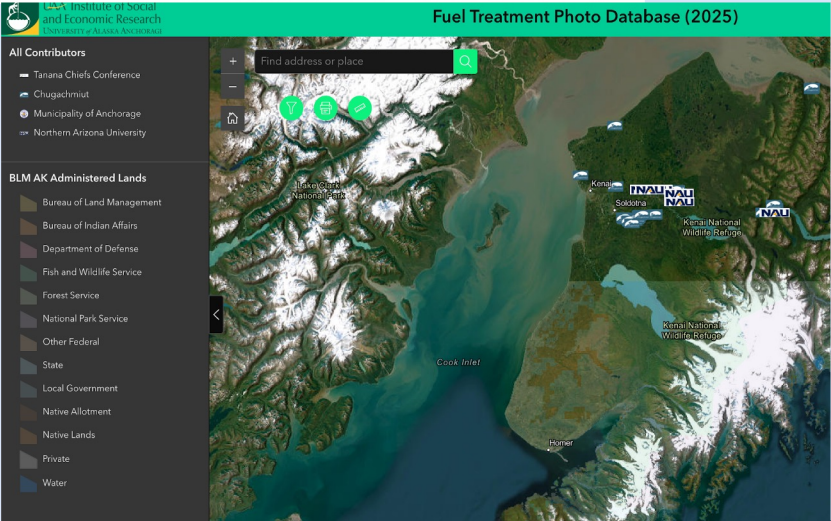
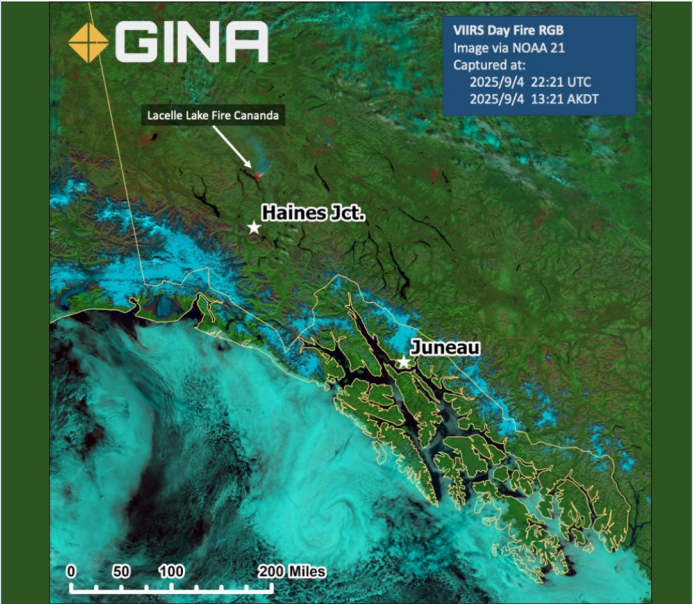
- Provide satellite-based 3D cloud information for aviation communities
- Processing multiple NOAA cloud products from CLAVR-x using real-time satellite data through *GINA's Alaska Direct Broadcast*, with additional data (HRRR-smoke, PIREPs, NUCAPS temperature)
- Experimental website for user-selectable cross-sections (*VIIRS for AK & ABI for CONUS*)
- Support aviation users: NTSB case investigations and pilots' preflight weather assessments
- Ongoing science algorithm improvements with AI / Machine Learning
- Exploring R2O pathways in collaboration with NOAA users

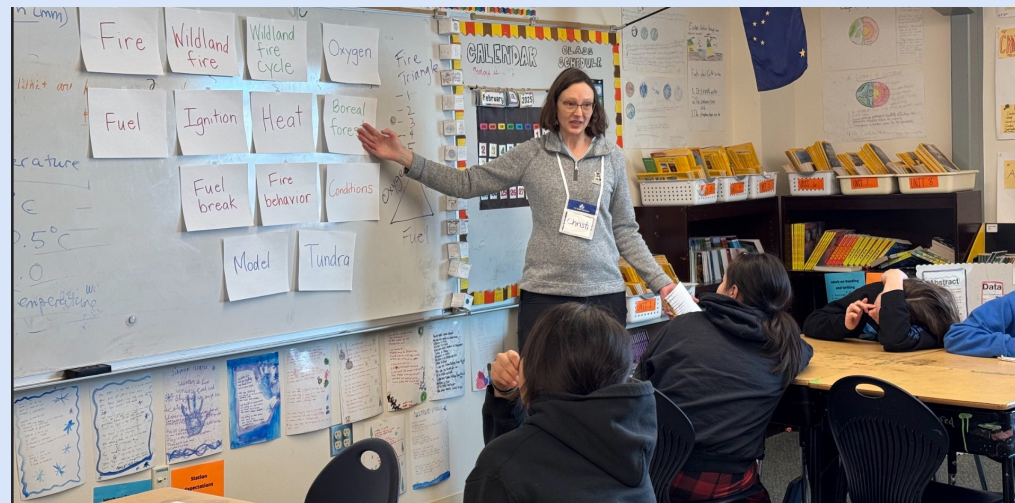
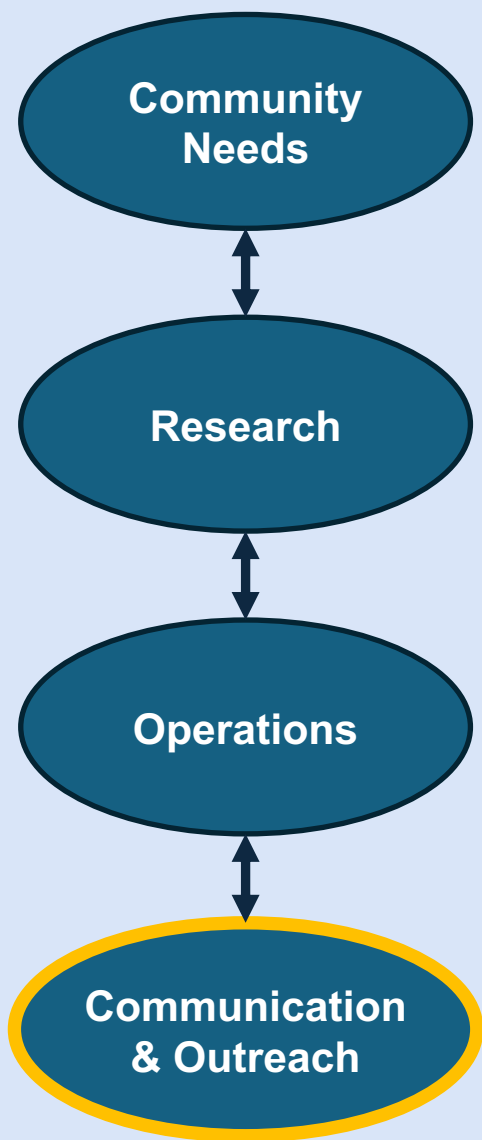
CIRA Cloud Team: Y.J. Noh, J.M. Haynes, C. White, B. Daub, L. Cheatwood 1



Clear skies last week gave us a rare, unobstructed view of Southeast Alaska's coastline and ongoing wildfires in Canada. This [#VIIRS](#) Day Fire RGB from Sept 4th highlights the active Lacelle Lake Fire close to Haines Junction in Canada's Yukon Territory.

[#akwx #2025fireseason](#)





KNOWLEDGE EXCHANGE
with the Bethel
community and University
of Alaska

PATHWAYS
for careers into fire
management, fire
response and fire science

LAND STEWARDSHIP
that matches workforce
needs with local realities

FIRE MONITORING
using tools and maps

EDUCATION
for Alaska's students

CONTACT

fireplan@gina.alaska.edu

UNIVERSITY OF ALASKA TEAM

Haley Hanson, Kuskokwim
Campus of UAF

Julie Biddle, Interior Alaska
Campus of UAF

Christi Buffington, Troth Yedda'
Campus of UAF

Jen Delamere, Troth Yedda'
Campus of UAF

Hilary Shook, Troth Yedda'
Campus of UAF



WILDFIRE WORKFORCE AND SCIENCE CONVERSATIONS

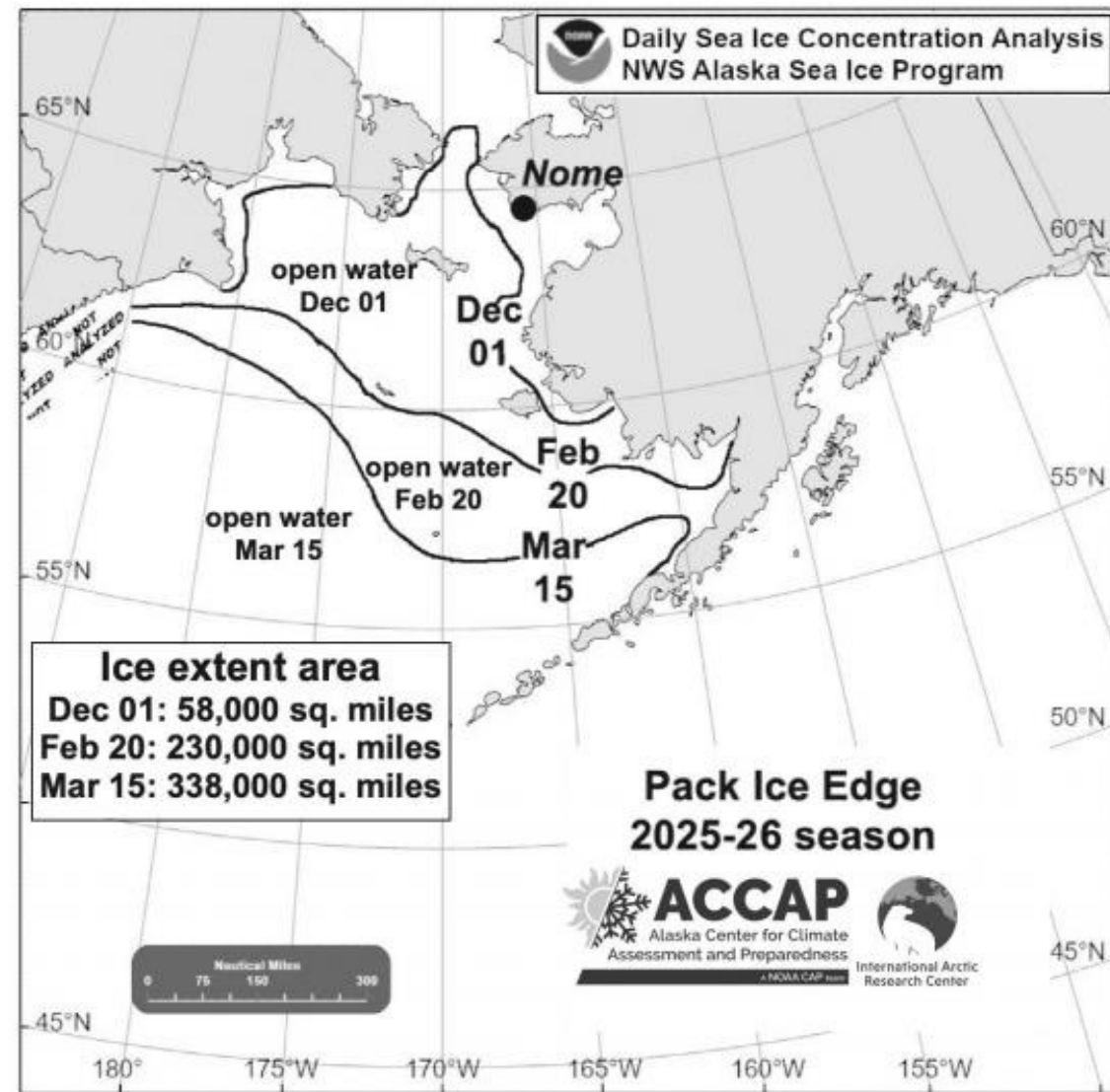
FEBRUARY 17 - 19, 2025 • BETHEL, AK



Alaska Direct-Broadcast System

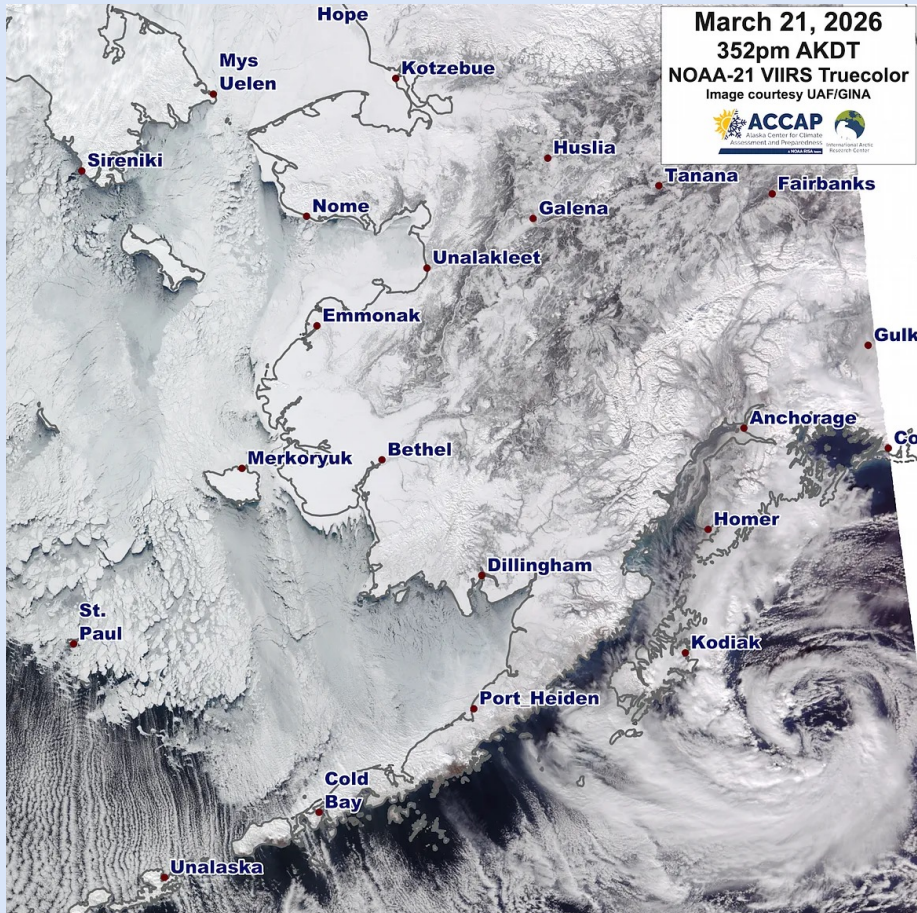
Shared Mission Space: Sea Ice

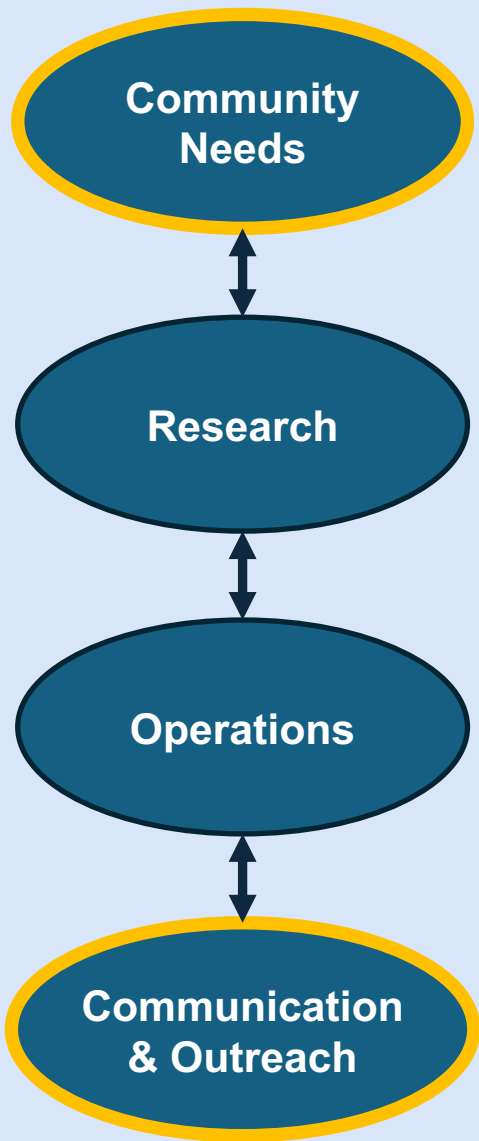




Community Needs

Sea Ice Observations & Model Data: Lots Of It, Fast, and Up Close





ALASKA SEA ICE FORECAST WORKSHOP IN NOME APRIL 16 & 17

IMPROVING ALASKA SEA ICE FORECASTS

Join us for a workshop to learn about short-term Alaska landfast sea ice forecasts, models, & share your ideas to improve forecasting.

This workshop will help improve 3-day or 72-hour sea ice forecasts that are practical with more detail, publicly accessible, & usable by stakeholders with Arctic communities for safety & planning.

Gather at the NWC Grand Hall or online via Zoom:

<https://us06web.zoom.us/j/88109000992?pwd=cjZlOvZpLU8lX1aKePXJh4k2tL7l7.1>

Hosted by the University of Michigan, Cooperative Institute for Great Lakes Research (CIGLR) with Northwest Planning, LLC.



Community Workshop with Arctic Stakeholders, Agencies, & Forecasters

4/16 1 pm - 4:30 pm
4/17 8:30 am – 1 pm

Join us in Nome at the Grand Hall at the UAF Northwest Campus or Zoom

Learn About & Help Improve 3-Day Alaska Sea Ice Forecasts with Time to Share Your Ideas

QUESTIONS?

Contact: Ukallaysaaq
Northwest Planning LLC
(907) 217-1298
info@nwplanning.net

Nome-Based & Indigenous Led Consulting Company





Replace this slide



Open Menti to edit



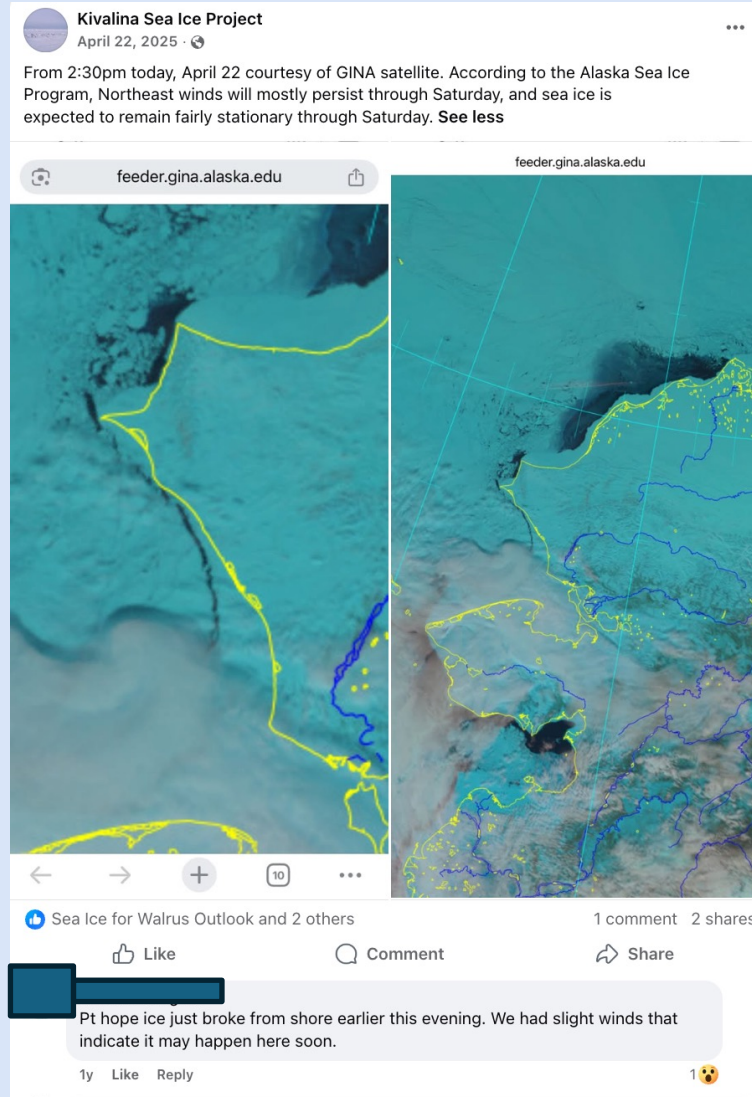
Social Media in Alaska: Satellite Data!

Community
Needs

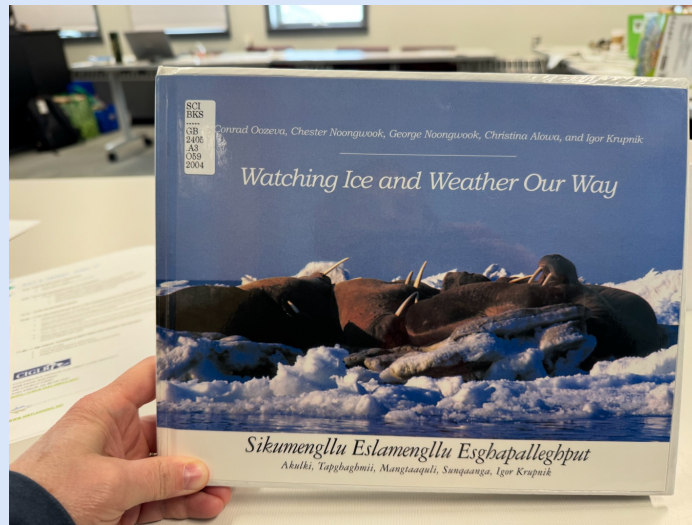
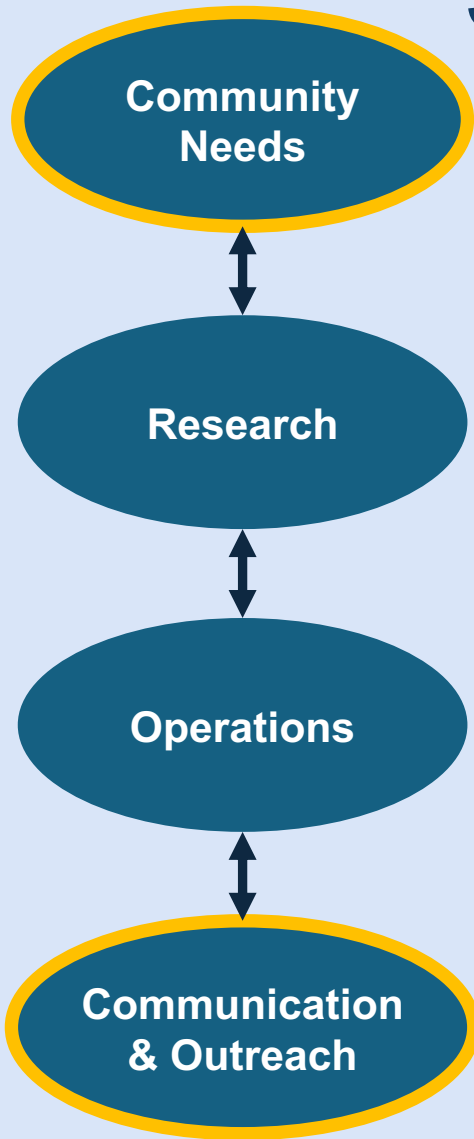
Research

Operations

Communication
& Outreach



Social Media in Alaska: Connecting Communities

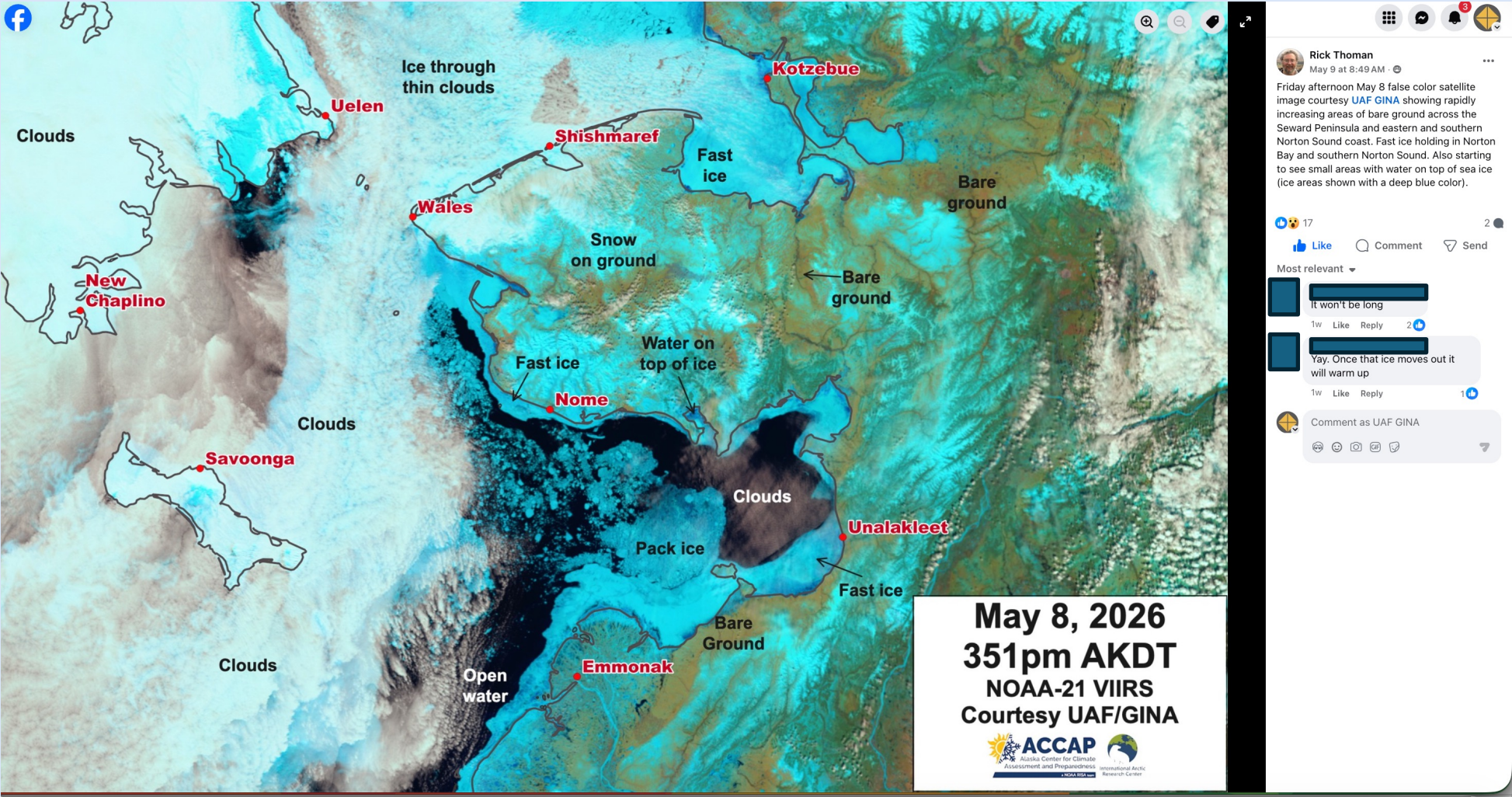
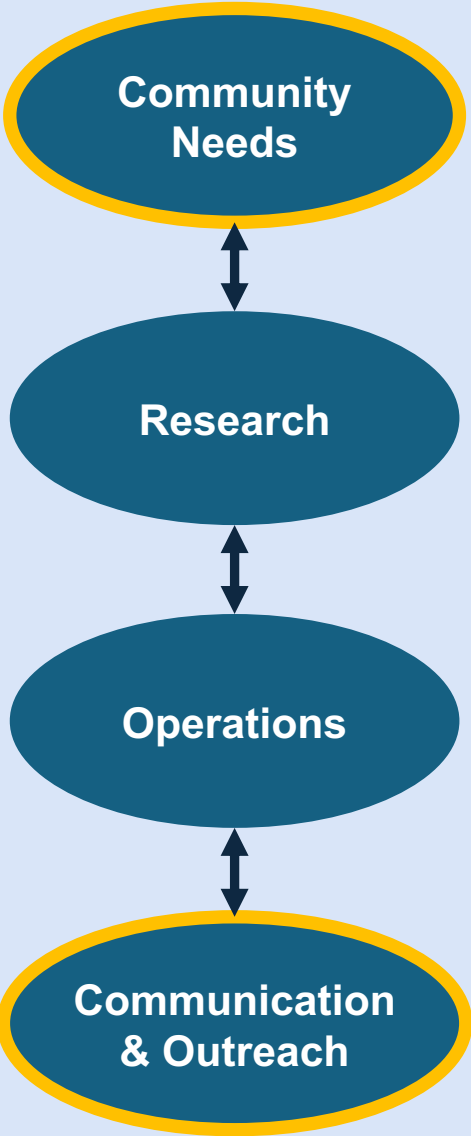


Rick Thoman
Admin All-star contributor · April 18 at 6:46 PM · 🌐

Clear skies Saturday afternoon allow for a nice view of sea ice across the northern Bering and southern Chukchi Seas in NOAA-20 VIIRS truecolor image courtesy [UAF GINA](#). Significant shorefast ice along much of the mainland Alaska coast. Areas of open water in Norton Sound east of Nome and thin new ice in what had been open water northwest of Nome. Mobile pack ice through the Bering Strait to St. Lawrence Island.

April 18, 2026
418pm AKDT
NOAA-20 VIIRS
Courtesy UAF/GINA
ACCAP
Alaska Center for Climate Assessment and Policy
Innovative Arctic Research Center

Social Media in Alaska: Annotate It!



Rick Thoman
May 9 at 8:49 AM · 🌐

Friday afternoon May 8 false color satellite image courtesy **UAF GINA** showing rapidly increasing areas of bare ground across the Seward Peninsula and eastern and southern Norton Sound coast. Fast ice holding in Norton Bay and southern Norton Sound. Also starting to see small areas with water on top of sea ice (ice areas shown with a deep blue color).

👍👍 17

👍 Like 💬 Comment 📄 Send

Most relevant ▾

👤 [Redacted]

It won't be long

1w Like Reply 2 👍

👤 [Redacted]

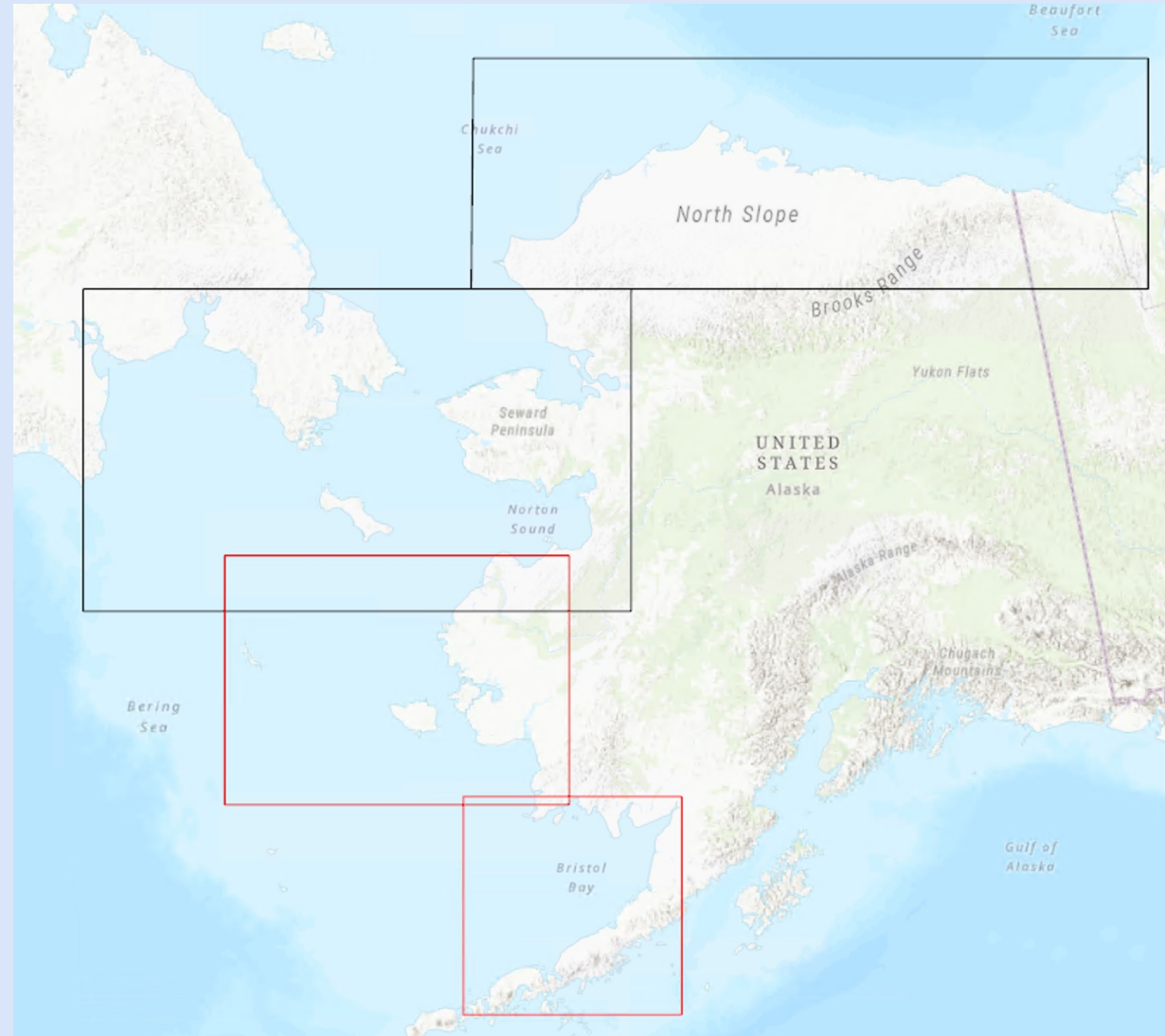
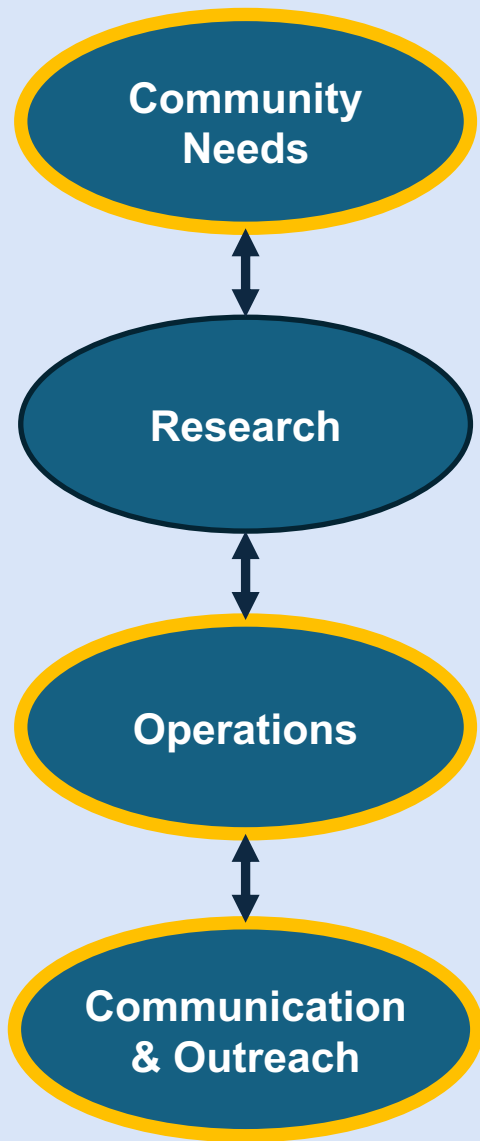
Yay. Once that ice moves out it will warm up

1w Like Reply 1 👍

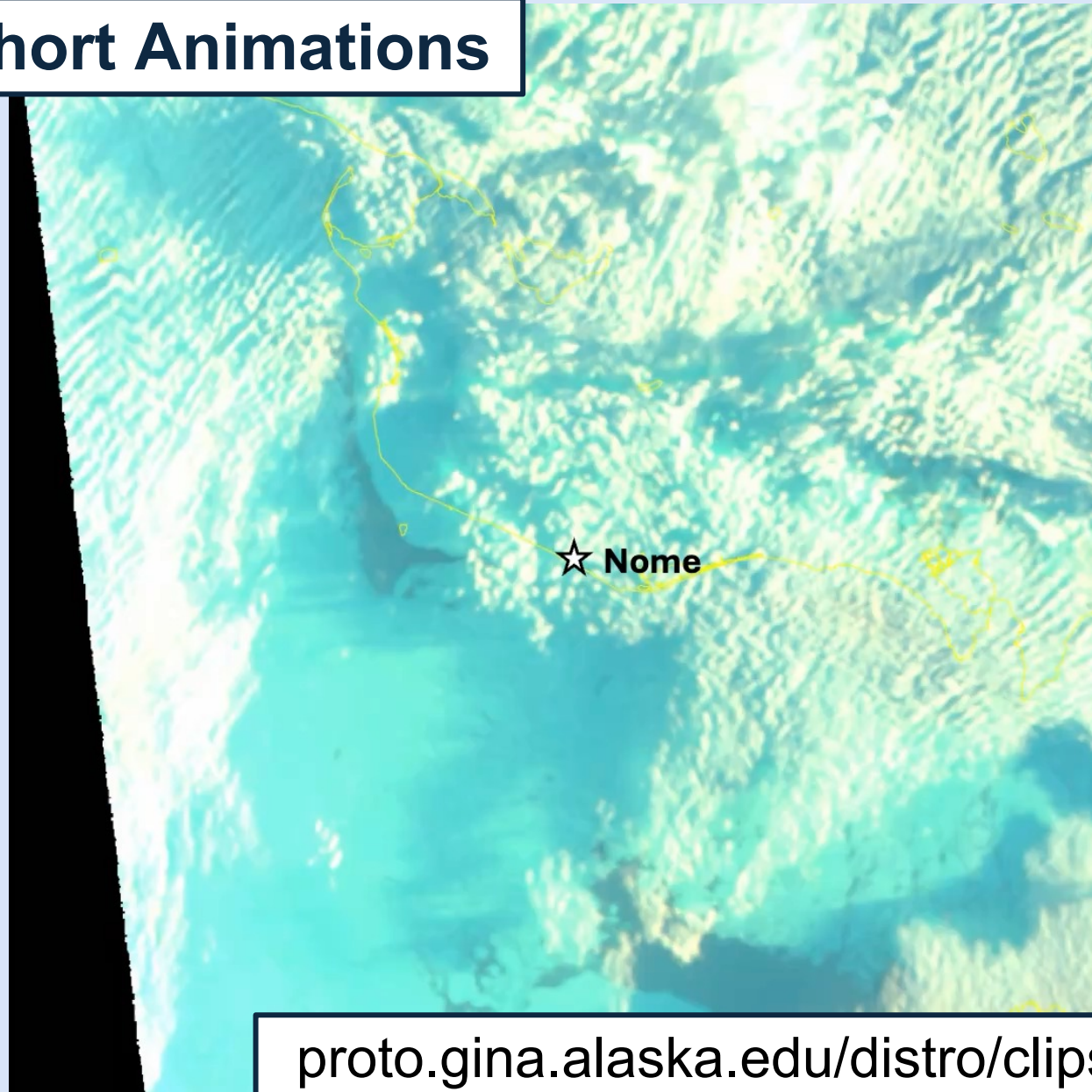
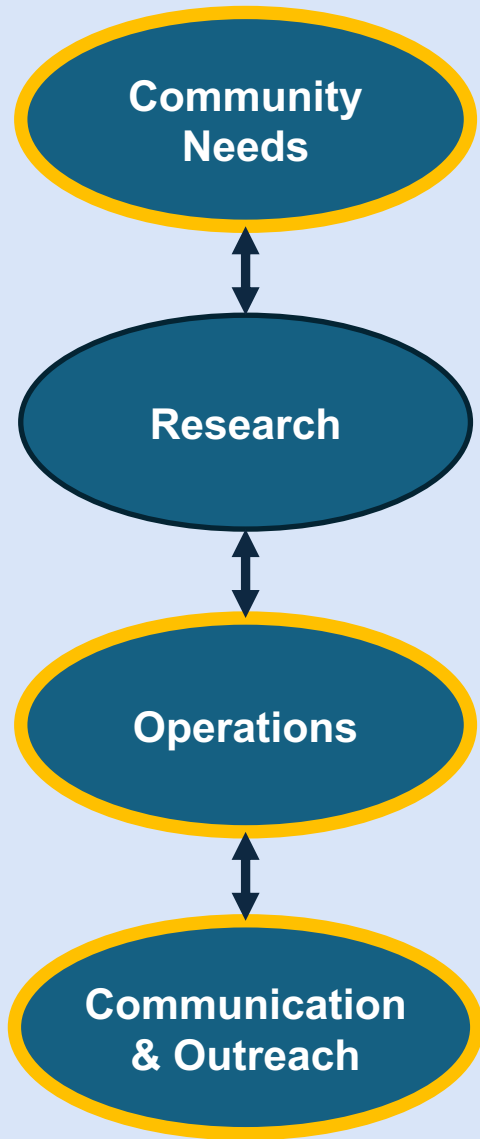
👤 Comment as UAF GINA

🗨️ 📷 📄 📌 📎

Can We Facilitate Making These Posts? Yup!



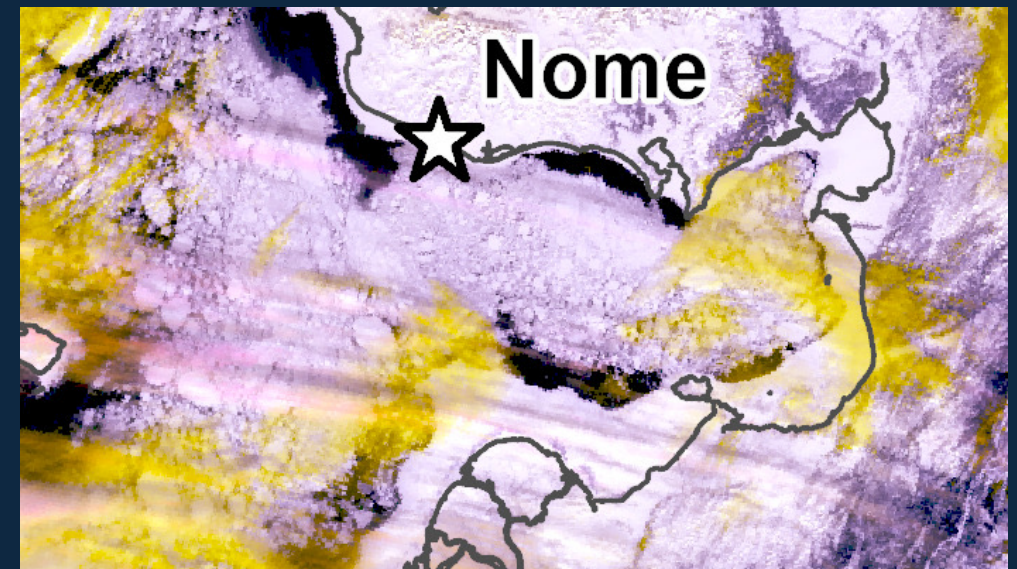
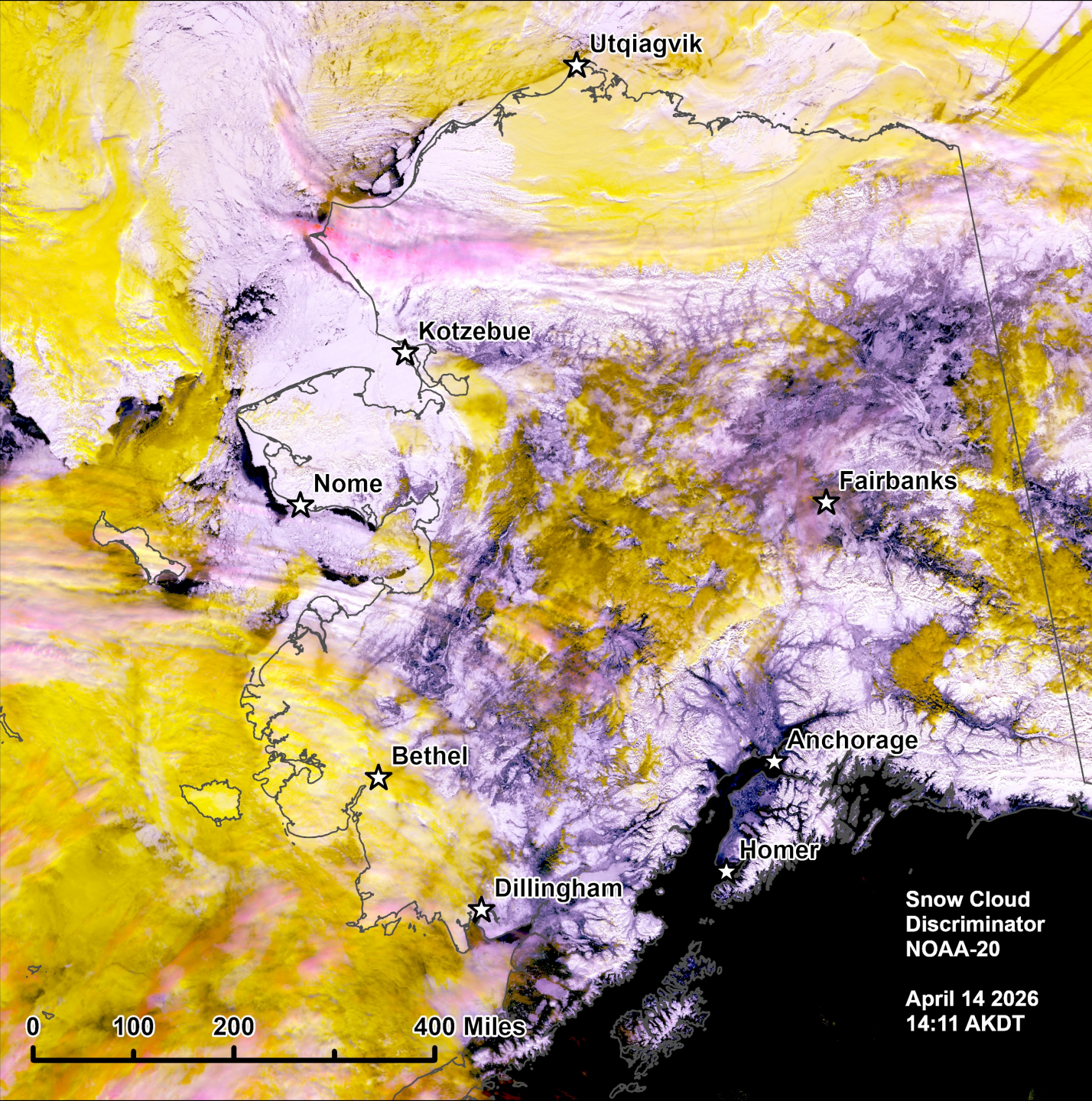
Short Animations

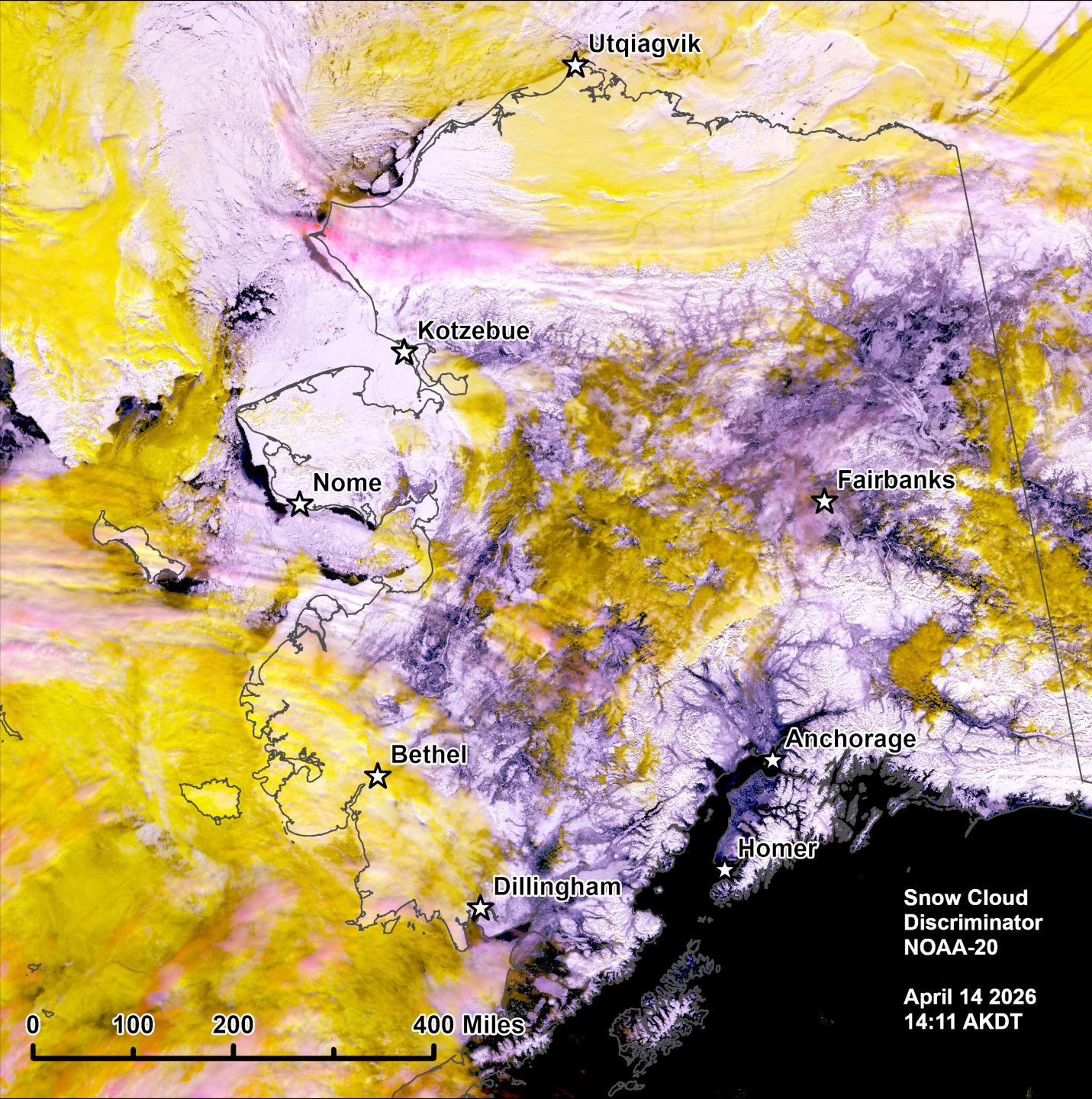


proto.gina.alaska.edu/distro/clips

VIIRS Snow/Cloud Discriminator

- Purple & White – Cold snow and sea ice
- Pink – Ice Clouds
- Yellow – Water Clouds







Sea Ice for Walrus Outlook

May 8 at 9:05 AM · 🌐

Thank you to [REDACTED] for updates this week from Shishmaref!

Wednesday, 6 May 2026

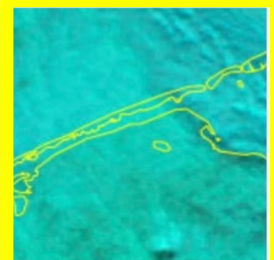
Light north winds until Friday picking up slightly. Some hunters went to the ice edge up the coast by snow machine. A few people have brought their boats around to the ocean side. I put points on my windy app map for any possible points I might need weather forecasts. So a lot of people can see possible goose hunting or marine hunting forecasts on the same map.

Thursday, 7 May 2026

Dark clouds on the horizon reflecting from open water (see video). [See less](#)

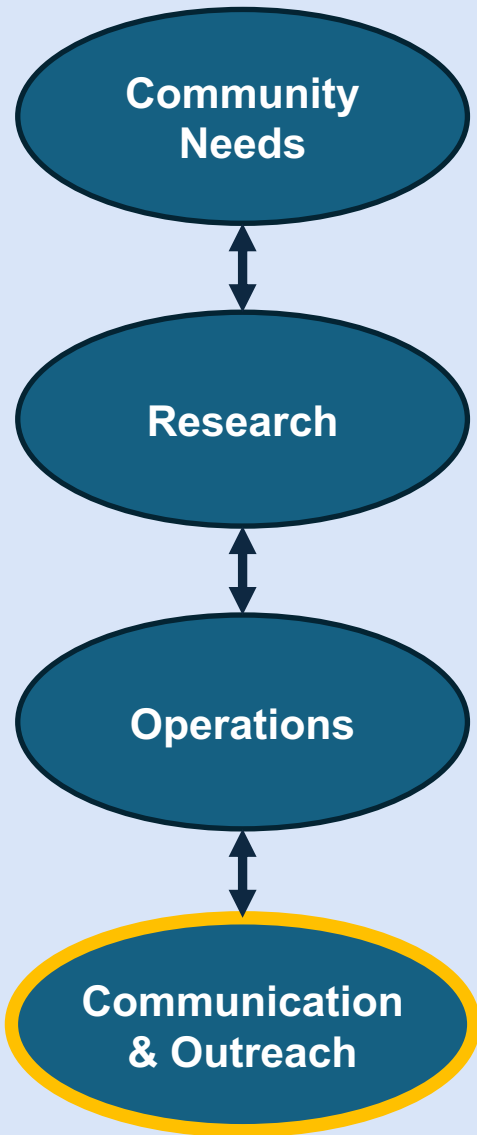


0:20 / 0:21





Quick Guides Available Thank you, NOAA CIs & NESDIS!





VIIRS Snow/Cloud Discriminator Quick Guide



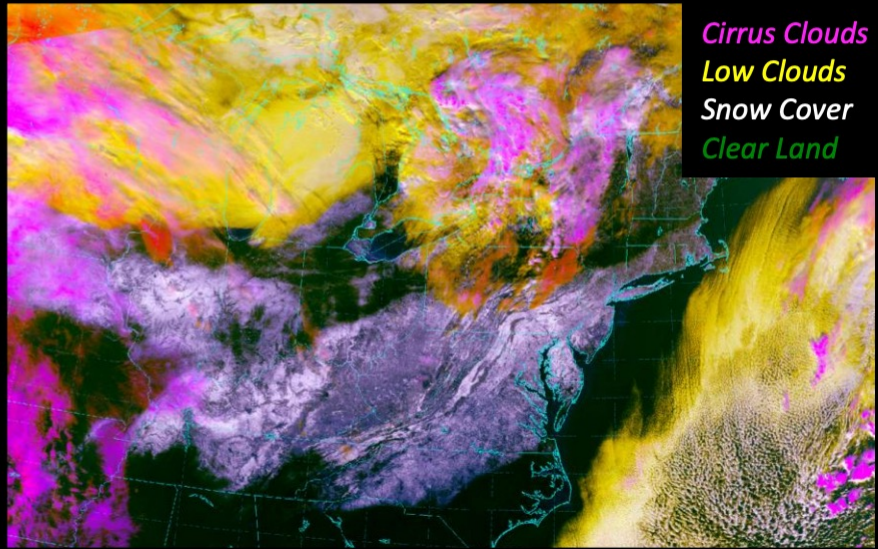
Why is the Snow/Cloud Discriminator Important?

The Snow/Cloud Discriminator combines information from 10 different bands on VIIRS (6 during the day and 4 at night) to help distinguish clouds from snow and ice. Unlike other RGBs for snow and cloud discrimination, which only work during the day, the Snow/ Cloud Discriminator utilizes the Day/Night Band (DNB) so it works around the clock. This is particularly useful during those long winter nights.

Daytime bands: 0.48, 0.67, 1.38, 1.61, 2.25, 10.7 μm .

Nighttime bands: DNB, 3.7, 8.6, 10.7 μm .

Also known as: VIIRS Snow/Cloud Layers.



Cirrus Clouds
Low Clouds
Snow Cover
Clear Land

Daytime image of the Snow/Cloud Discriminator from S-NPP VIIRS over the mid-atlantic states at 1808 UTC, 24 January, 2016



Alaska Direct-Broadcast System

Shared Mission Space: Snow



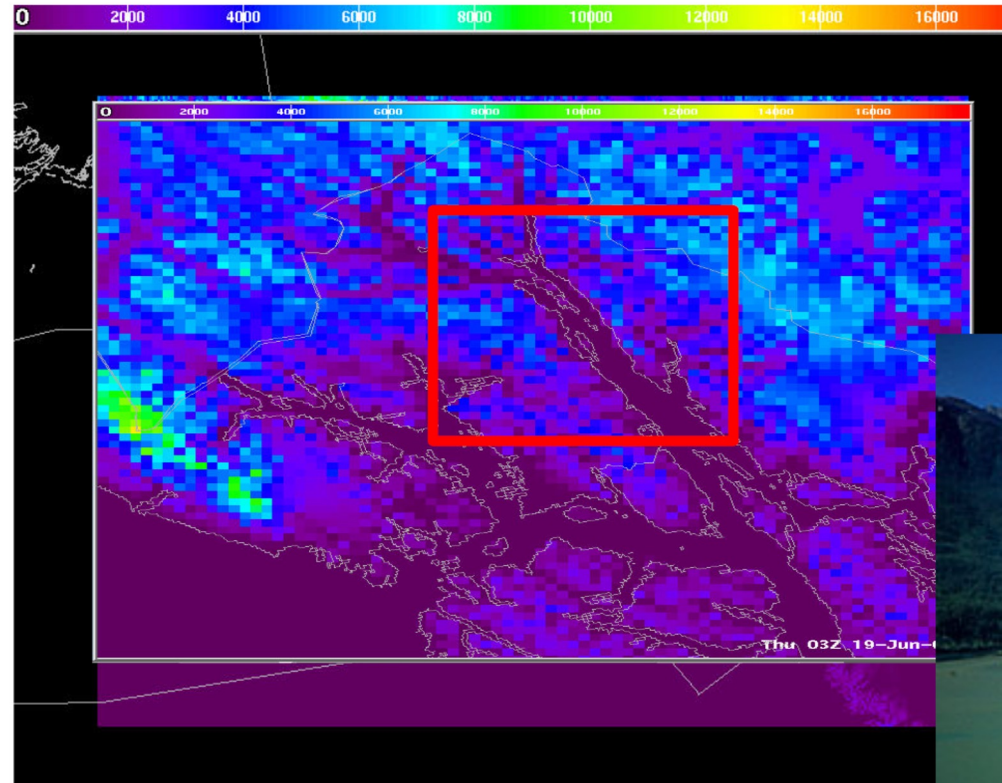
Community Needs

Where and how much is it snowing?

Situational Awareness for SE Alaska!

Radar is terrain-blocked

WFO Juneau Forecast Area Terrain



- Very steep terrain next to ocean. Area average=sea level to 3,000ft in 3 miles and in some cases sea level to 15,000ft in 8 miles



NATIONAL WEATHER SERVICE

Building a Weather-Ready Nation // 4



The poster features a background image of a satellite in orbit over Earth. At the top, a row of logos includes: NOAA/NESDIS STAR (Center for Satellite Applications & Research), CISSS (Cooperative Institute for Satellite Earth System Studies), National Weather Service, GINA (Geographic Information Network of Alaska), SPORT, and CIRA (Connecting Models and Observations). The NOAA logo is prominently displayed in the center-left. The main title, "A Machine Learning – Enhanced NOAA Snowfall Rate Product to Support Alaska Applications", is written in large blue font. Below the title, the authors are listed: Huan Meng¹, Yongzhen Fan², Jun Dong², Cezar Kongoli², Yalei You², Ralph Ferraro², Arron Jacobs³, Bryan Caffrey³, Carl Dierking⁴, Jennifer Delamere⁴, Pingping Xie⁵, Eugene Petrescu⁶, Kris White⁷, Emily Berndt⁸, and Sheldon Kusselson⁹. At the bottom left, the text reads "National Environmental Satellite, Data, and Information Service" and "NOAA Alaska NextGen Satellite Workshop 10-12 September, 2024". The email address huan.meng@noaa.gov is at the bottom right.

A Machine Learning – Enhanced NOAA Snowfall Rate Product to Support Alaska Applications

Huan Meng¹, Yongzhen Fan², Jun Dong², Cezar Kongoli², Yalei You², Ralph Ferraro², Arron Jacobs³, Bryan Caffrey³, Carl Dierking⁴, Jennifer Delamere⁴, Pingping Xie⁵, Eugene Petrescu⁶, Kris White⁷, Emily Berndt⁸, Sheldon Kusselson⁹

¹ NOAA/NESDIS/Center for Satellite Applications and Research • ² University of Maryland/ESSIC/Cooperative Institute for Satellite Earth System Studies • ³ NWS Weather Forecast Office, Juneau, AK • ⁴ Geographic Information Network of Alaska/University of Alaska Fairbanks • ⁵ NWS Climate Prediction Center • ⁶ NWS Alaska Region • ⁷ NWS Weather Forecast Office, Huntsville, AL • ⁸ NASA/MSFC/Short-term Prediction Research and Transition Center • ⁹ Colorado State University/Cooperative Institute for Research in the Atmosphere

National Environmental Satellite,
Data, and Information Service

NOAA Alaska NextGen Satellite Workshop
10-12 September, 2024

huan.meng@noaa.gov

Alaska Snowfall Rate Product (AK-SFR)

Awesome achievement using microwave data from many satellites!
Extremely cold conditions and over ocean

Community
Needs

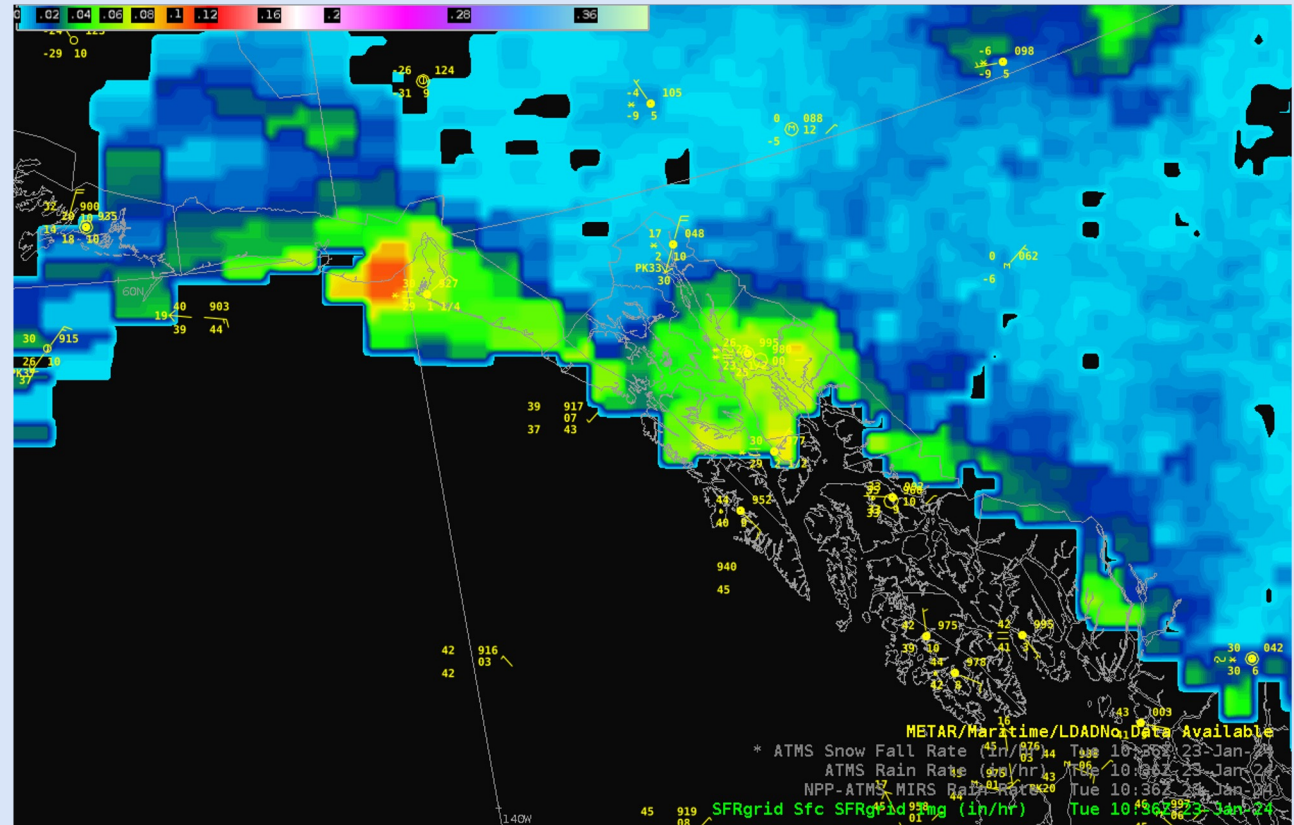
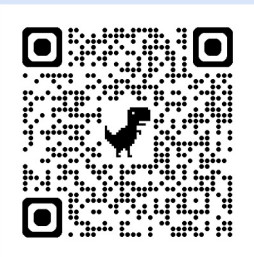
Research

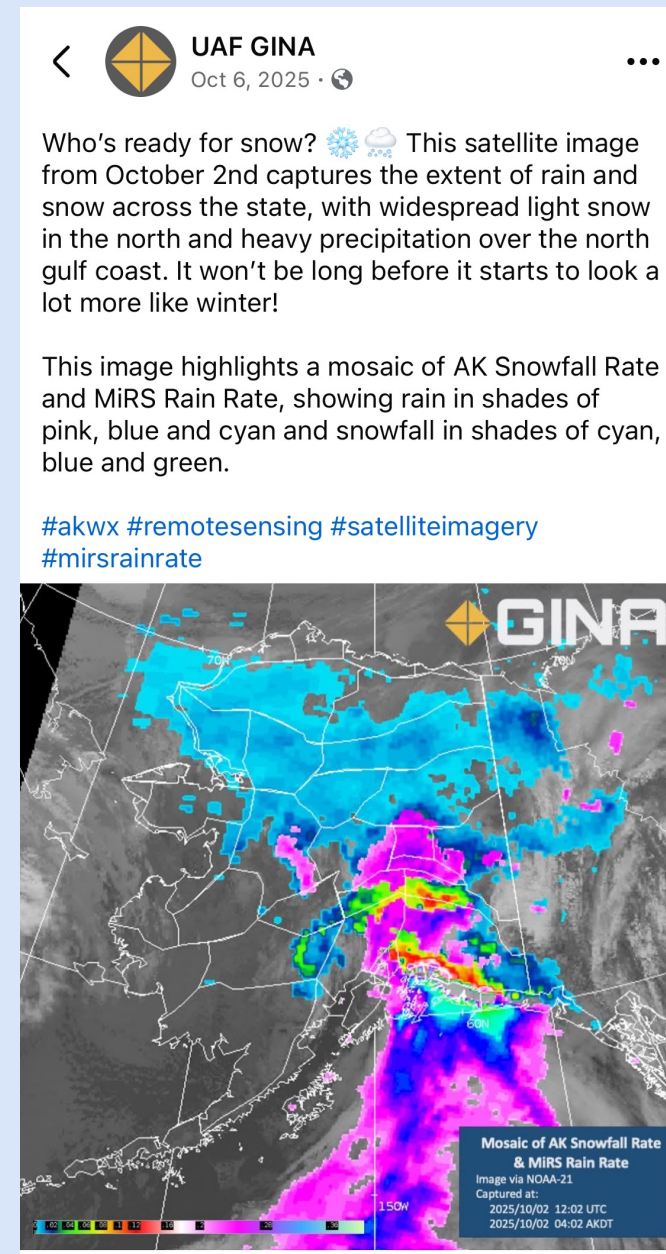
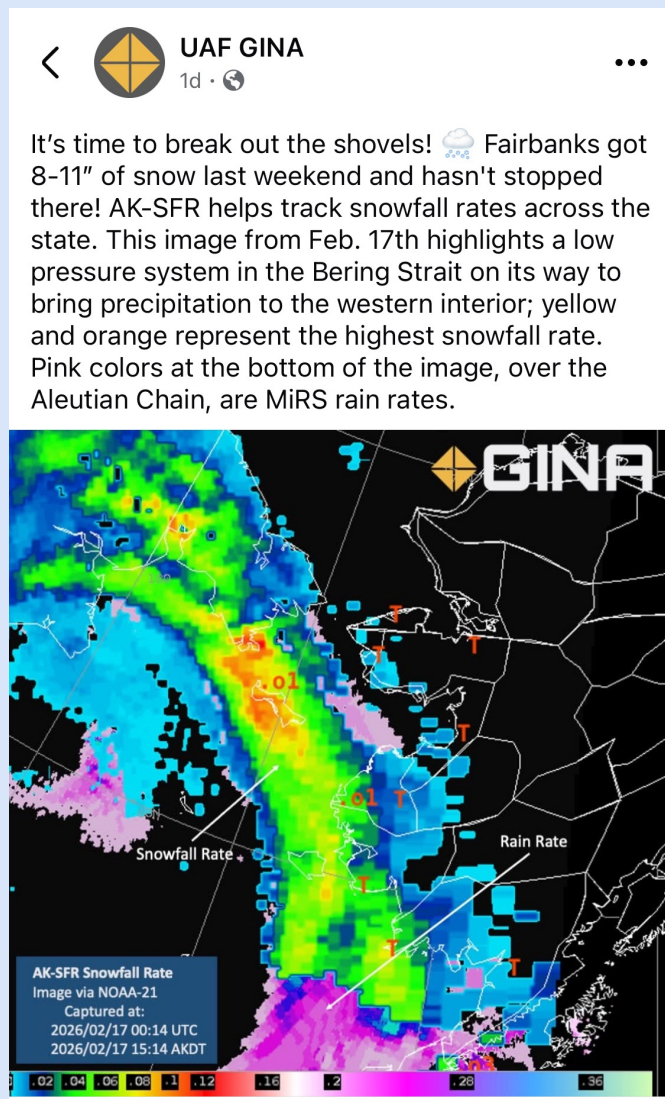
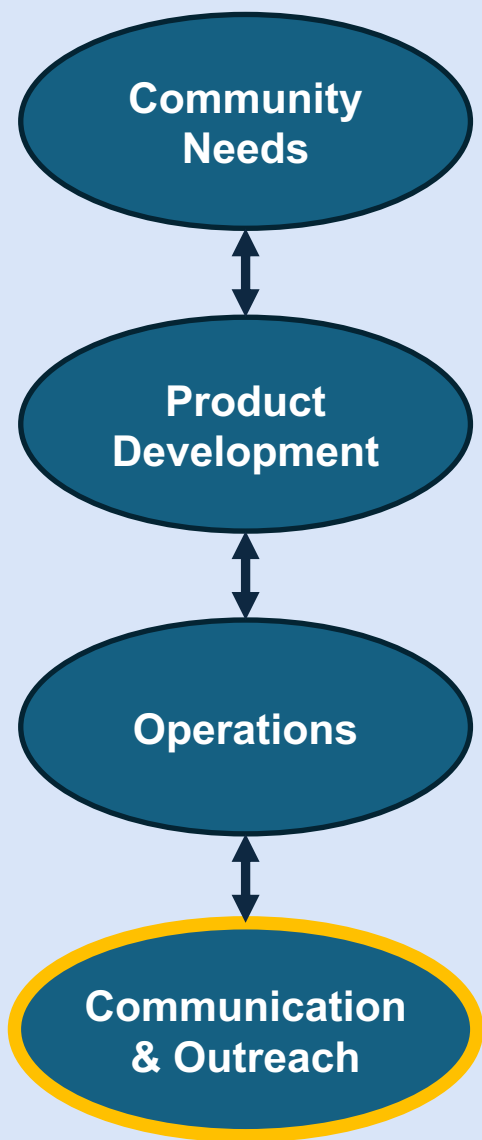
Operations

Average latency at
GINA:
14 minutes

Distributed to NWS
Alaska Region in
AWIPS environment

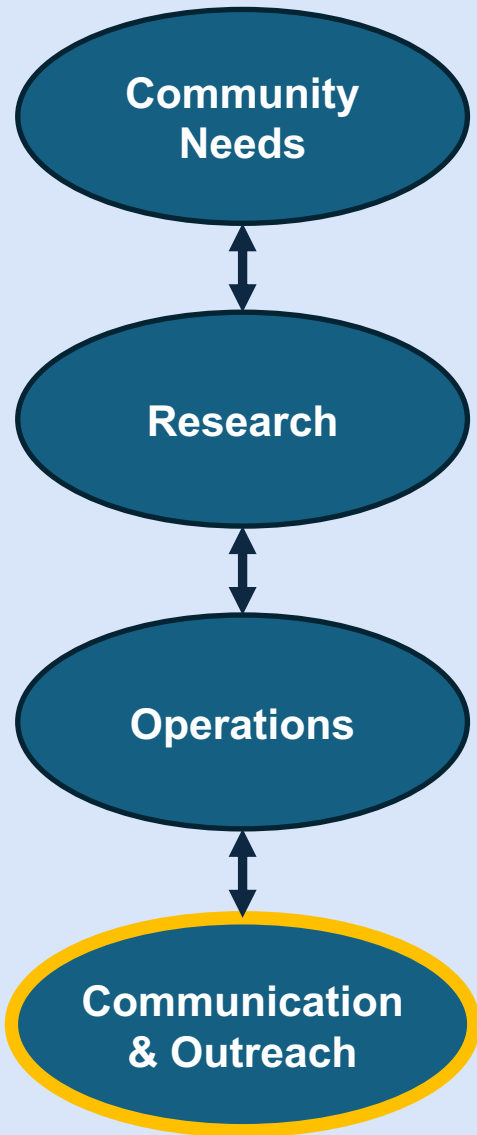
Users can access in
near real-time





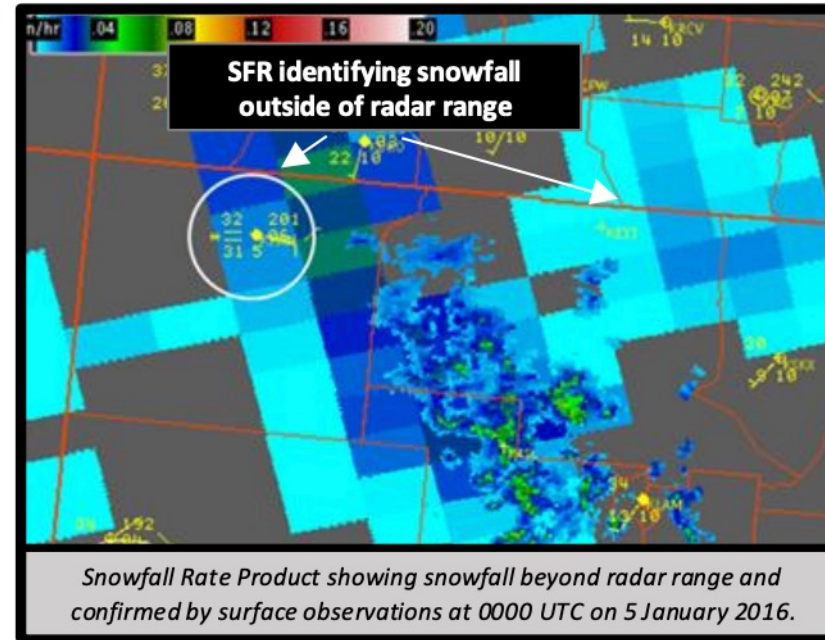
Quick Guides Available

Thank you, NOAA CIs & NESDIS!

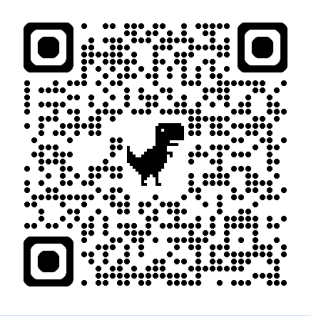
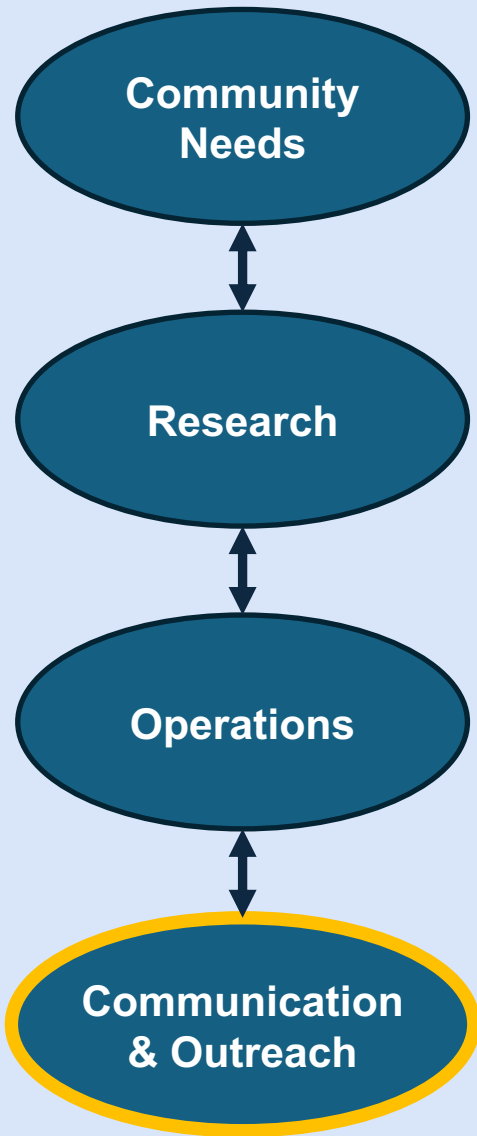


Why is the Snowfall Rate (SFR) Product Important?

The NESDIS snowfall rate product is a liquid equivalent, instantaneous snowfall rate derived from multiple passive microwave instruments on nine satellites. Since the passive microwave signal can penetrate clouds, the observations provide a signature of the snow within the clouds. The SFR quantifies snowstorms, including their extent and the locations of the most intense snowfall; features not readily apparent from traditional visible or IR imagery. The SFR is most valuable in filling observational gaps in radar poor regions such as mountains and remote locations.



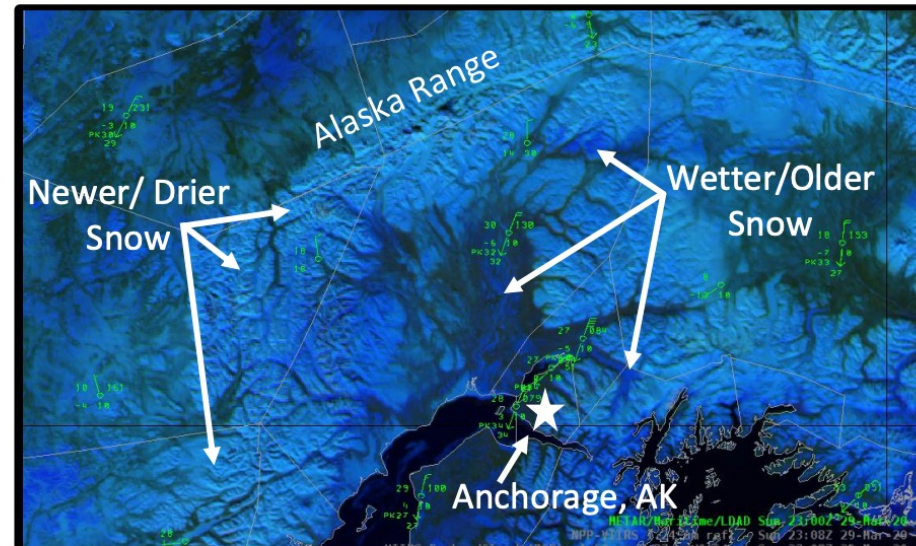
Quick Guides Available Thank you, NOAA CIs & NESDIS!



Why is the VIIRS Snowmelt RGB Important?

The 750-m SNPP and NOAA-20 VIIRS Snowmelt RGB is used to monitor snow on the ground and differentiate the microphysical characteristics of clouds (liquid versus ice). Specifically, this RGB utilizes the VIIRS 1.24- μm band that is highly sensitive to snow properties, including grain size and relative wetness. This RGB is useful for identifying areas of freezing rain and sleet accumulation, as well as for hydrological applications, such as snowmelt-enhanced flood events.

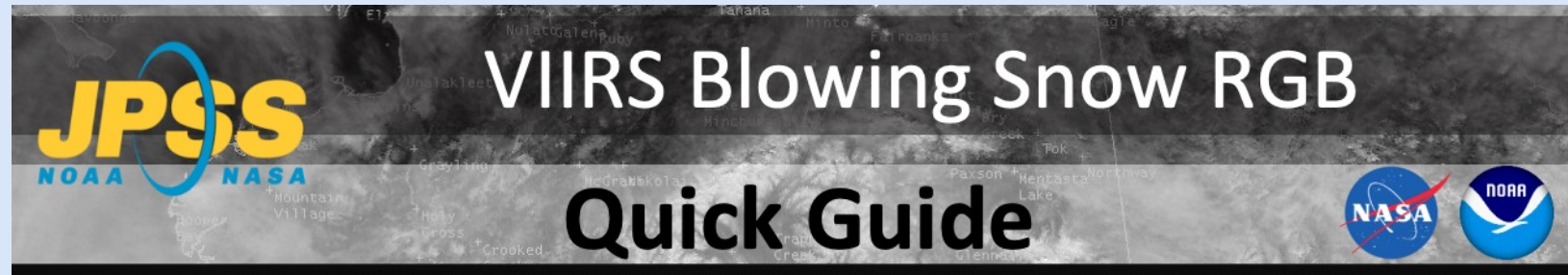
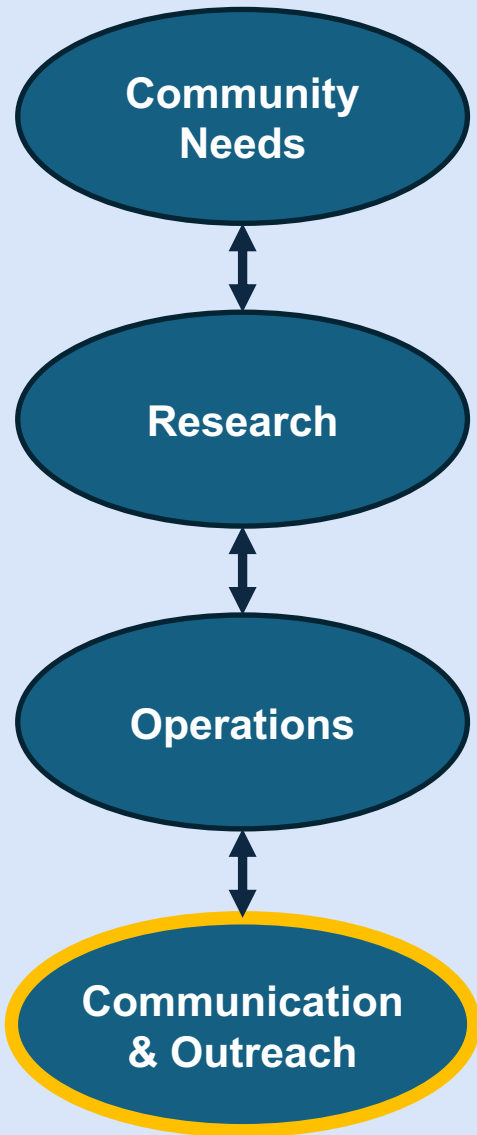
VIIRS Snowmelt RGB Recipe



SNPP VIIRS Snowmelt RGB at 2308Z, 29 March 2020; satellite overpass of southern Alaska. The cyan mountainous regions indicate newer or drier snow, whereas the dark blues in the valleys indicate wetter or older snow.

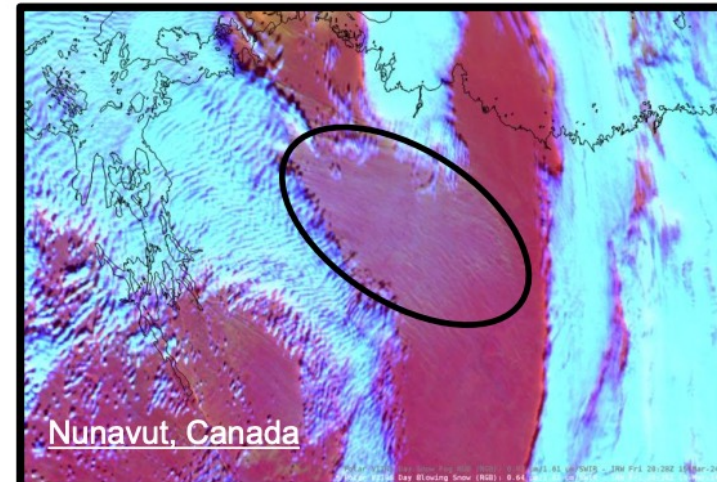
Quick Guides Available

Thank you, NOAA CIs & NESDIS!



Why is the VIIRS Blowing Snow RGB Important?

The VIIRS Blowing Snow RGB incorporates the visible, near-infrared, and fog difference imagery to indicate regions of blowing snow. The RGB highlights already accumulated snow that is picked up and blown by strong winds. Regions of blowing snow will often develop into plumes resembling Horizontal Convective Rolls (HCRs), within which significantly reduced visibilities pose a hazard to motorists and pilots. The RGB utilizes the VIIRS I-bands that have a 375-m spatial resolution.



The VIIRS Blowing Snow RGB observes widespread blowing snow (black ellipse) in Canada on 15 March 2024.

VIIRS Blowing Snow RGB Recipe

Alaska Direct-Broadcast System

The Next-Generation Workforce

UAF Undergraduates Work with All Kinds of Awesome Data



ABIGAIL HAAS
Student Geospatial Data Analyst



QUINN MCHENRY
Student Scientific Programmer



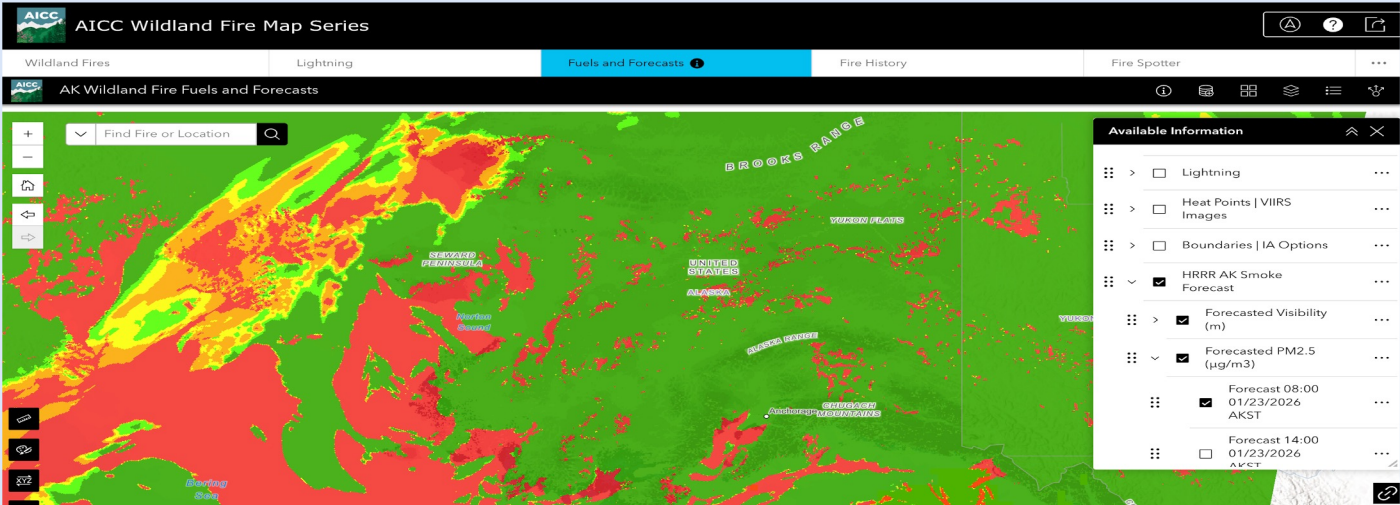
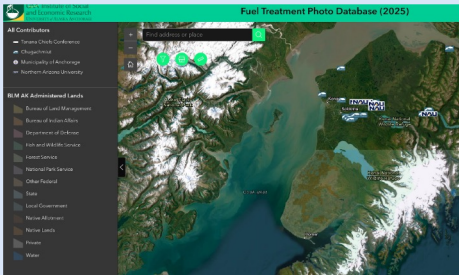
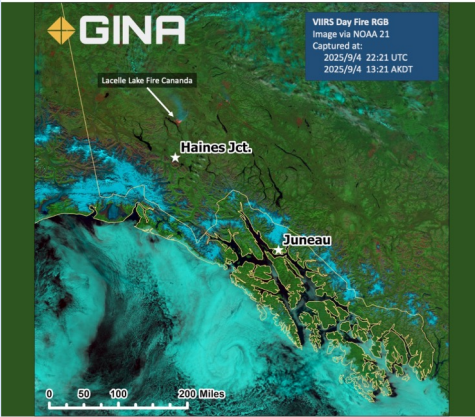
EDWARD GRAHAM
Student Geospatial Data Analyst



GRACE VEENSTRA
Communications Specialist

Clear skies last week gave us a rare, unobstructed view of Southeast Alaska's coastline and ongoing wildfires in Canada. This [VIIRS](#) Day Fire RGB from Sept 4th highlights the active Lacelle Lake Fire close to Haines Junction in Canada's Yukon Territory.

[#akwx #2025fireseason](#)



Public Outreach





ARCTIC RESEARCH

THURSDAY, MAY 14
4-7 P.M.
WEST RIDGE,
UAF TROTH YEDDHA'

Open House

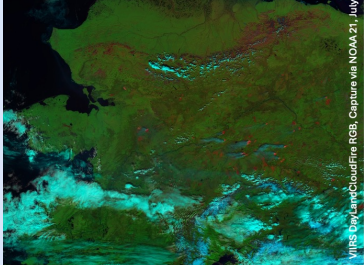






Aurora Art!





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Thanks
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Learn about wildfire in Alaska & stay informed this fire season!

Wildfire Resources



Alaska Wildfire Maps & Dashboards
Weather Information
Satellite Data Portals
Geospatial Data & Tools

<https://gina.alaska.edu/training-resources/wildfire-resources/>



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