

Warts and All: The Current State of the University of Alaska's Near Real Time Satellite Imagery

*Dayne Broderon, Jay Cable, Carl Dierking, Will Fisher, Tom Heinrichs,
and Eric Stevens*

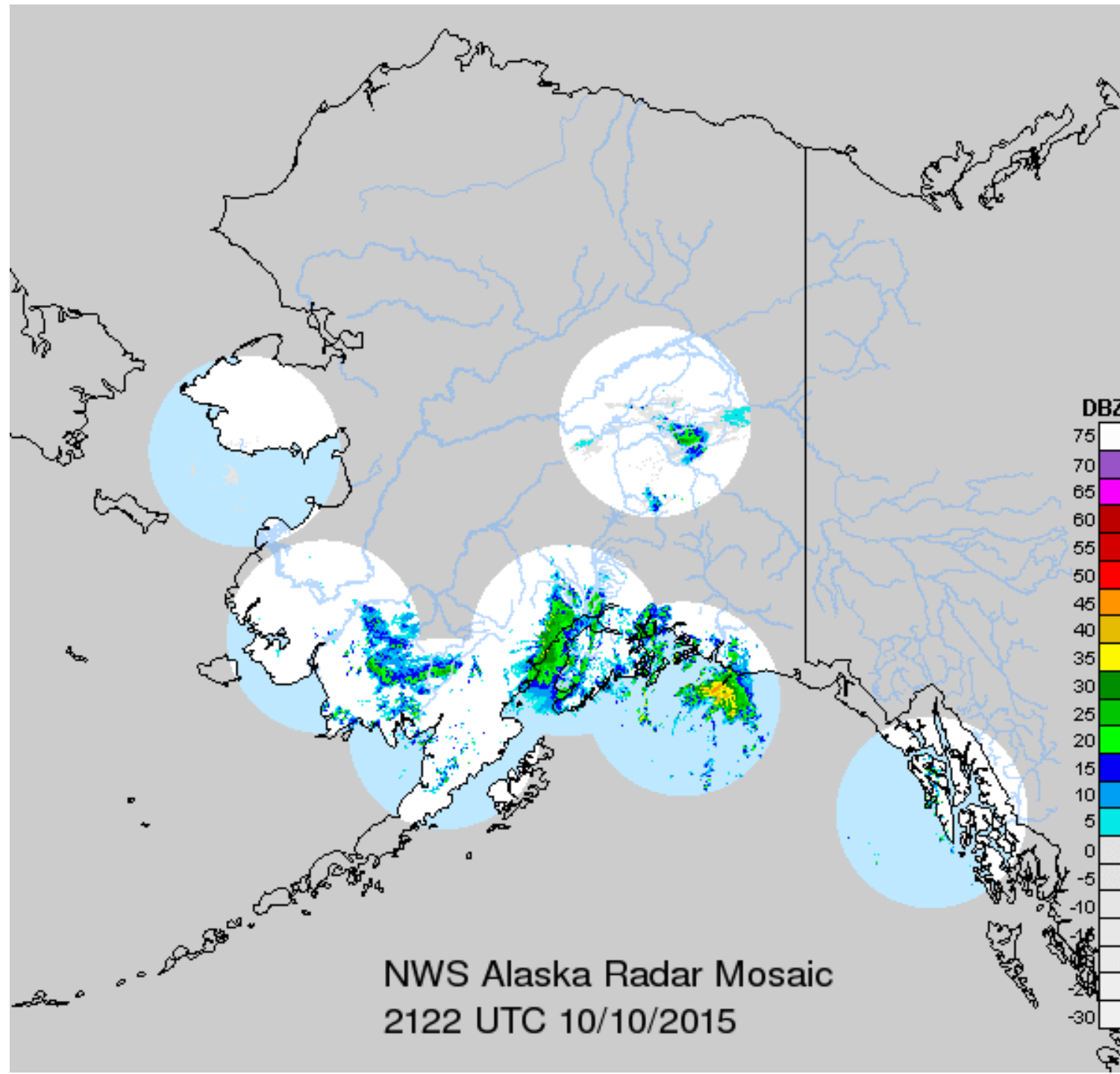
Geographic Information Network of Alaska (GINA), University of Alaska Fairbanks (UAF)





*“Prediction is very
difficult, especially about
the future.”*

Niels Bohr,
Danish Physicist



The High Latitude Proving Ground

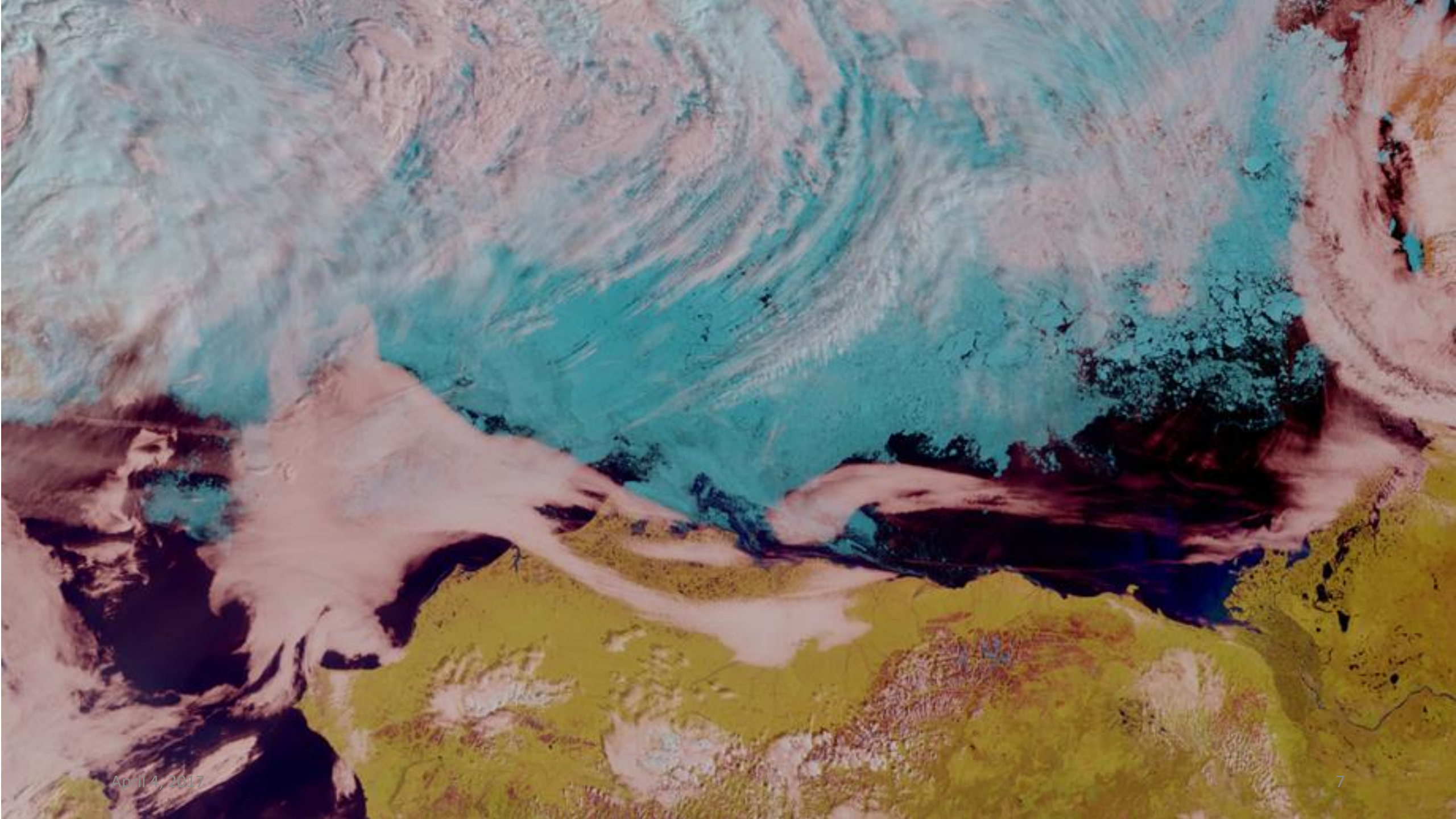
1. Receive satellite data via direct broadcast
2. Turn the data into imagery
3. Deliver imagery to users
 1. ...in formats the users want
 2. ...with minimum latency

...all the while, liaison: training, feedback, development...repeat...repeat...



April 4, 2017



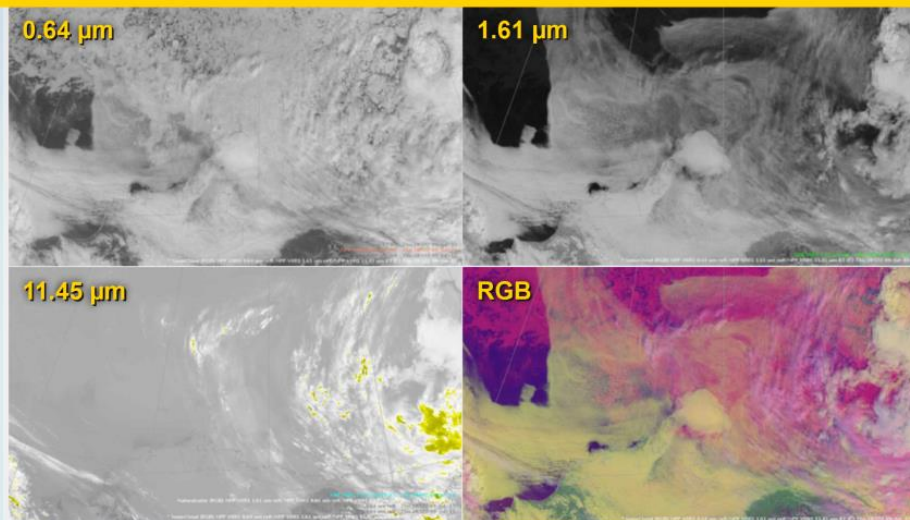




NWS sea ice forecasters provided “phenomenal weather products” that proved key to USCG decision makers, said Rear Adm. Dan Abel, commander, 17th Coast Guard District

OVERVIEW

1.61 μm channel earned the nickname "snow/ice band" because surfaces covered by snow and ice strongly absorb the 1.61 μm wavelength of incoming sunshine, while non-glaciated clouds strongly reflect the 1.61 μm wavelength. These properties of the 1.61 μm band make it a useful component of RGB images in Alaska, as the following examples demonstrate.



1.61 μm BAND AS COMPONENT OF RGBS

The four images above are from the Suomi NPP pass over the North Slope and Arctic Ocean at 1857Z July 9, 2015, with the Snow/Cloud RGB in the lower right being a combination of the other three single-channel images. The upper left image is the VIIRS 0.64 μm visible band (red component of the RGB), the upper right is the 1.61 μm snow/ice band (green in the RGB), and the lower left is the VIIRS 11.45 μm longwave infrared (IR) band (blue in the RGB).

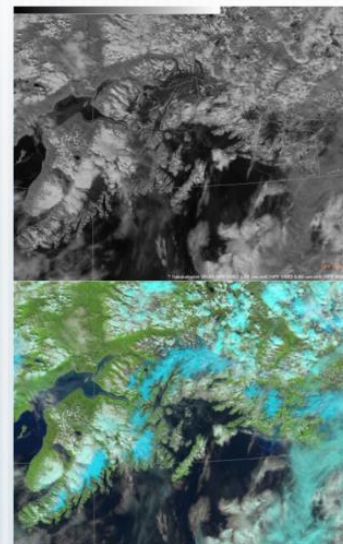
In each image, the upper left corner of the swath is free of clouds, so a mix of sea and open water may be observed. The sea ice appears reddish magenta in the RGB because the 1.61 μm channel is well absorbed by sea ice, meaning there is no green signal over sea ice. As shown in the 11.45 μm image, the sea ice and open water have similar longwave brightness temperatures, but since sea ice is much more reflective in the visible than open ocean, the sea ice appears reddish magenta, while the open ocean appears as a darker purple.

ADDITIONAL REFERENCES

Quick guides to channels on the GOES-R Advanced Baseline Imager (ABI). ABI Band 5 is centered at 1.61 μm
<http://www.goes-r.gov/education/ABI-bands-quick-info.html>
Eric Stevens: eric@gina.alaska.edu | Carl Dierking: cdierking@alaska.edu | GINA Staff: www.gina.alaska.edu/people

SURE, GLACIERS LOOK BLUE, BUT REALLY...

The imagery at left centered over Prince William Sound is from the Suomi NPP VIIRS instrument at 2156Z on July 10, 2015. The top image is the 1.61 μm snow/ice channel alone. The bottom image is the Natural Color RGB which assigns the 1.61 μm snow/ice channel to the red component, the 0.84 μm channel to the green component, and the 0.64 μm channel to the blue component.



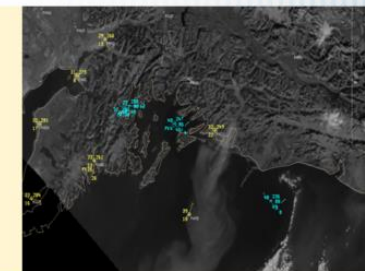
The glaciers and snow in the mountains surrounding Prince William Sound appears dark in the 1.61 μm image, due to this wavelength's strong absorption over snow and ice. Snow and ice are also not very reflective at 0.86 μm (the "veggie band"), so this RGB gets most of its signal over snow and ice from the 0.64 μm visible channel in the blue component, and hence the glaciers and snow appear blue. Liquid phase clouds are highly reflective at all three wavelengths used in this RGB, so they appear white. Glaciated cirrus clouds (in the lower right) are bluish-green because they don't reflect at 1.61 μm but do reflect at 0.64 μm and 0.86 μm .

Suomi NPP VIIRS image from 2156Z July 12, 2015.

HERE'S SILT IN YOUR EYE

1.61 μm imagery can also highlight areas of blowing glacial dust. At right, dust is blowing southward out of the Copper River Delta and over the Gulf of Alaska during an outbreak of strong northerly winds. Thus the VIIRS 1.61 μm channel can, thanks to the absence of obscuring clouds and the presence of daylight, allow forecasters to qualitatively "see the wind." This information can be useful in identifying stronger wind gusts out of bays and passes for marine forecasts.

Image courtesy Jim Nelson, WFO Anchorage



Satellite(s)	Instrument	Band Name	Wavelength	Resolution at NADIR
Suomi NPP	VIIRS	I3	1.61 μm	375 m
Terra and Aqua	MODIS	6	1.64 μm	500 m
POES and METOP	AVHRR	3a (available only during daytime)	1.61 μm	1100 m

The various satellites that carry instruments generating imagery at roughly 1.61 μm .

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<http://feeder.gina.alaska.edu>

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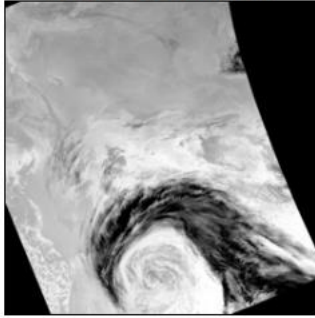
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- ☒ VIIRS 50189
- ☐ Webcam 0

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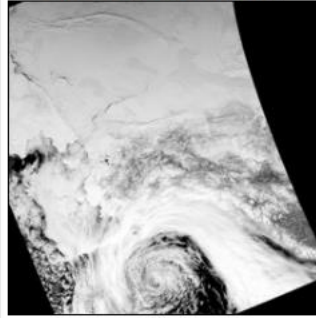
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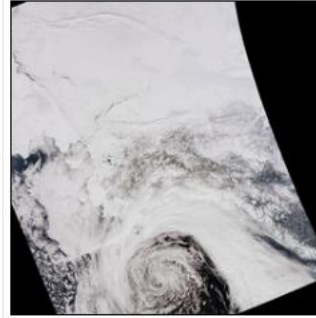
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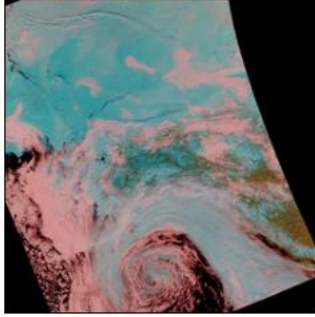
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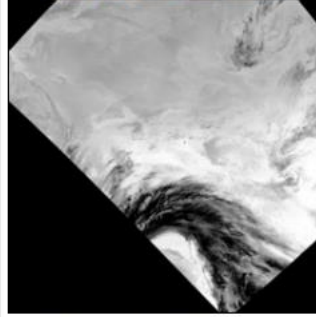
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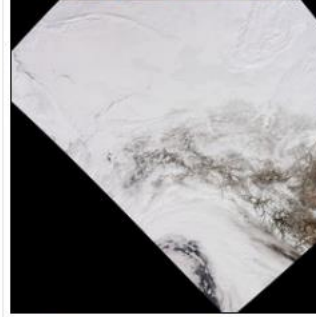
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SNPP Truecolor
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SNPP Day-Night-Band
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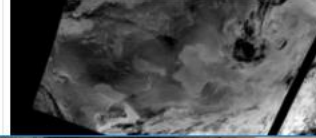
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VIIRS

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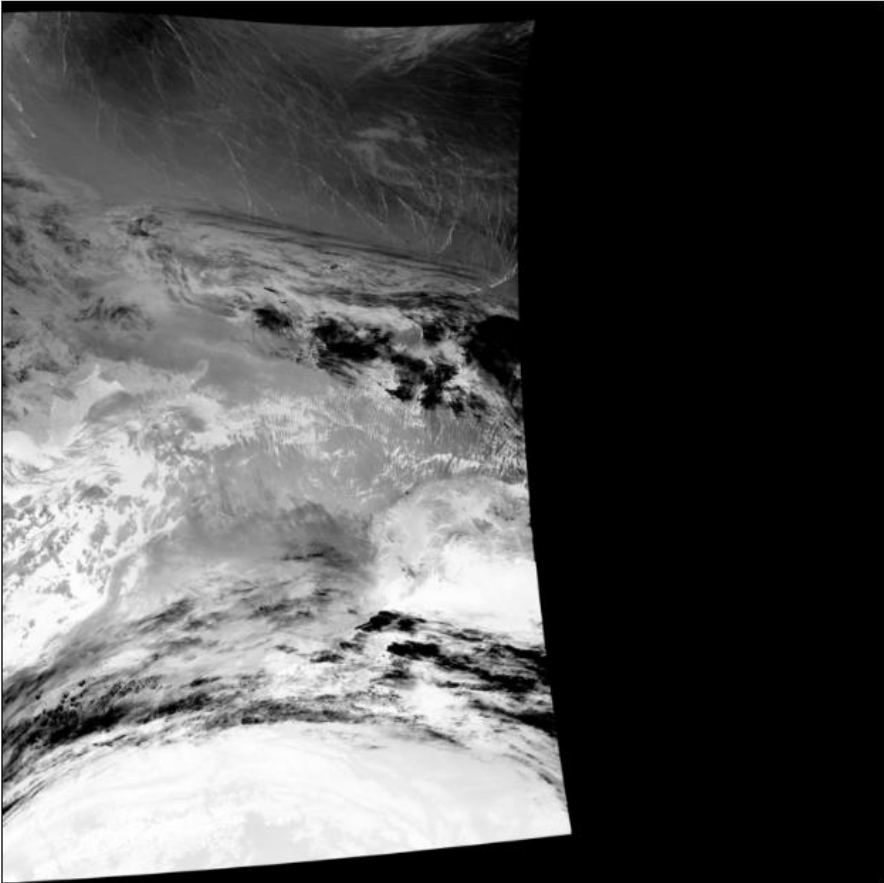
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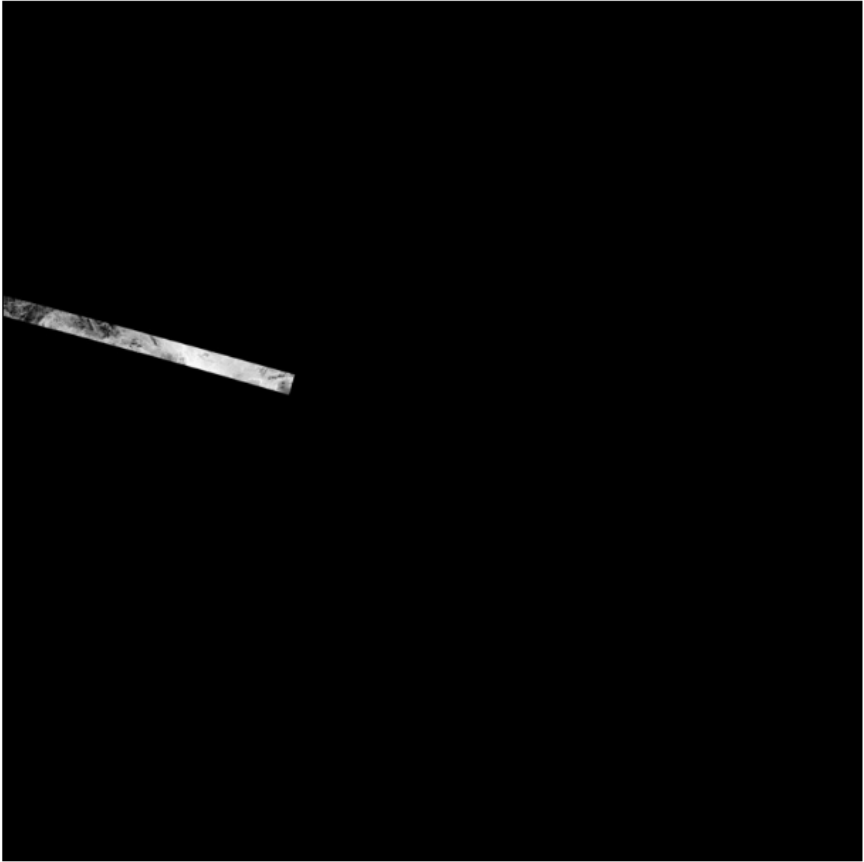
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3.7u	----
11-3.7u	----
Sounder Imagery	▶
Derived Products Imagery	▶
Derived Products Plots	▶
NPP Products	▶
----- NH/NA/US every image -----	
IR Window	03.2230
Water Vapor	03.2230
Visible	03.2230
3.9u	03.2240
13u	03.2240
11u-3.9u	03.2240
11u-13u	03.2240
WV/IR	03.2240
----- 4 Sat Composite -----	
IR Window	03.1800
Water Vapor	03.1800
Visible	03.1800
WV/IR	03.1800
----- CIRA GOES-R Proving Ground Products -----	
Simulated Model Imagery	▶
----- Alaska Region Imagery -----	
HRPT	▶
GVAR	▶
MTSAT	▶
DMSP	▶
GEOCAT	▶
GINA-VIIRS	▶
GINA-MODIS	▶
----- NASA SPoRT -----	
NASA SPoRT	▶

GINA-VIIRS		X
Day Night Band	----	
Fog 11um - 3.7um	----	
0.64um	----	
0.865um	----	
1.61um	----	
3.74um	----	
11.45um	----	
VIIRS APRFC River Flood Areal Extent	----	
VIIRS APRFC River Ice Areal Extent	----	


GINA-MODIS		X
MODIS Visible 1km - Band 1	----	
MODIS Snow-Ice 1km - Band 7	----	
MODIS Cirrus 1km - Band 26	----	
MODIS 3.7um 1km - Band 20 (C)	----	
MODIS Water Vapor 1km - Band 27 (C)	----	
MODIS IR Window - Band 31 (C)	----	
MODIS 11um - 3.7um Product 1km (C)	----	
MODIS Land Sfc Temperature 1km (F)	----	
MODIS Norm Diff Vegetation Idx 1km	----	
MODIS Land Sfc Temperature Sum 1km (F)	----	
MODIS TPW 4km (mm)	----	
MODIS Cloud Phase 4km	----	
MODIS Cloud Top Temperature 4km (C)	----	
MODIS Lifted Index 4km (C)	----	
MODIS Total Totals 4km (C)	----	
MODIS K Index 4km (C)	----	

How do we become more awesome?


- Improve Feeder: add outlines, remove “slivers,” add more products in formats users prefer, etc?
- Get the ball across the goal line: GINA imagery in FX-CAVE at AICC...but how?
- New “Fire Weather Alaska” quick guides?
- Additional thoughts?

VIIRS Imagery Application x

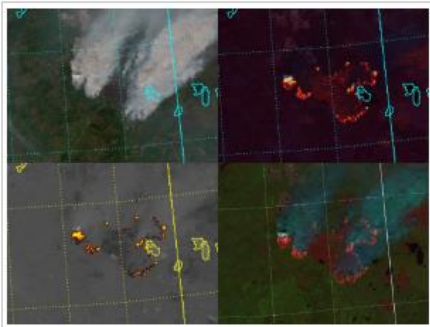
https://accap.uaf.edu/VIIRS

 **ACCAP**
Alaska Center for Climate
Assessment and Policy
A NOAA RISA TEAM

VIIRS Imagery Applications for Fire Weather Monitoring

 **Wednesday, April 12, 2017 at 11:00 AM AKDT**
Speaking:
Curtis J. Seaman CIRA, Colorado State University

The Visible Infrared Imaging Radiometer Suite (VIIRS) aboard the Suomi National Polar-orbiting Partnership (NPP) satellite has been producing high-quality imagery since its launch in October 2011. Additional VIIRS instruments will be launched on subsequent JPSS satellites (1-4). The 22 bands on VIIRS include 5 high-



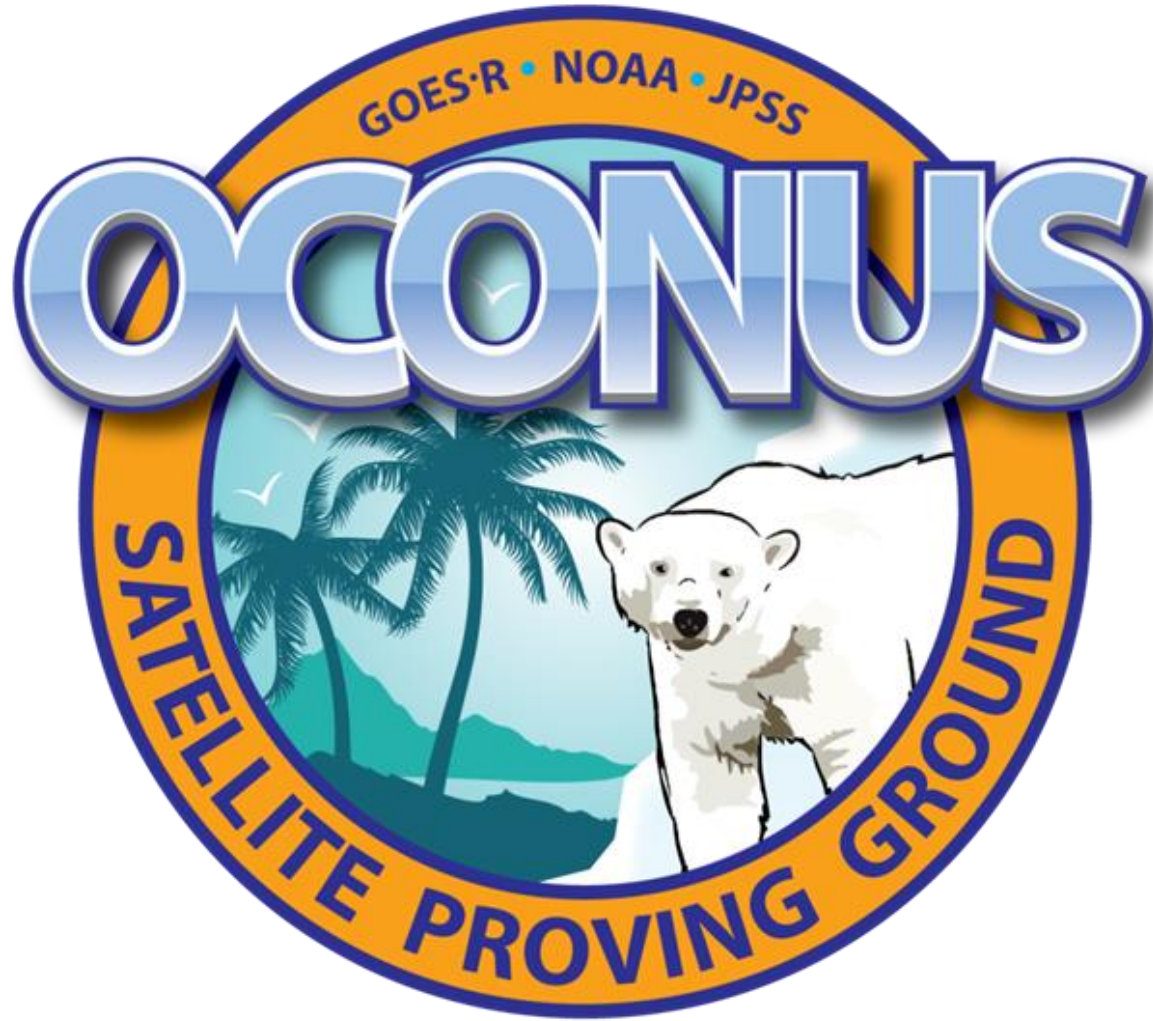
Registration

Pre-registration for webinars is strongly encouraged. The audio portion of the call is through a toll-free phone line and the slide presentation is streamed via computer. For instructions on participating through your home office or at a satellite viewing location with others in your

Be there or lose your hair!

11:00 am Alaska Time (1900 Z)
Wednesday, April 12

For more information:
accap.uaf.edu/VIIRS



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