Introducing NUCAPS at NWS Alaska Region

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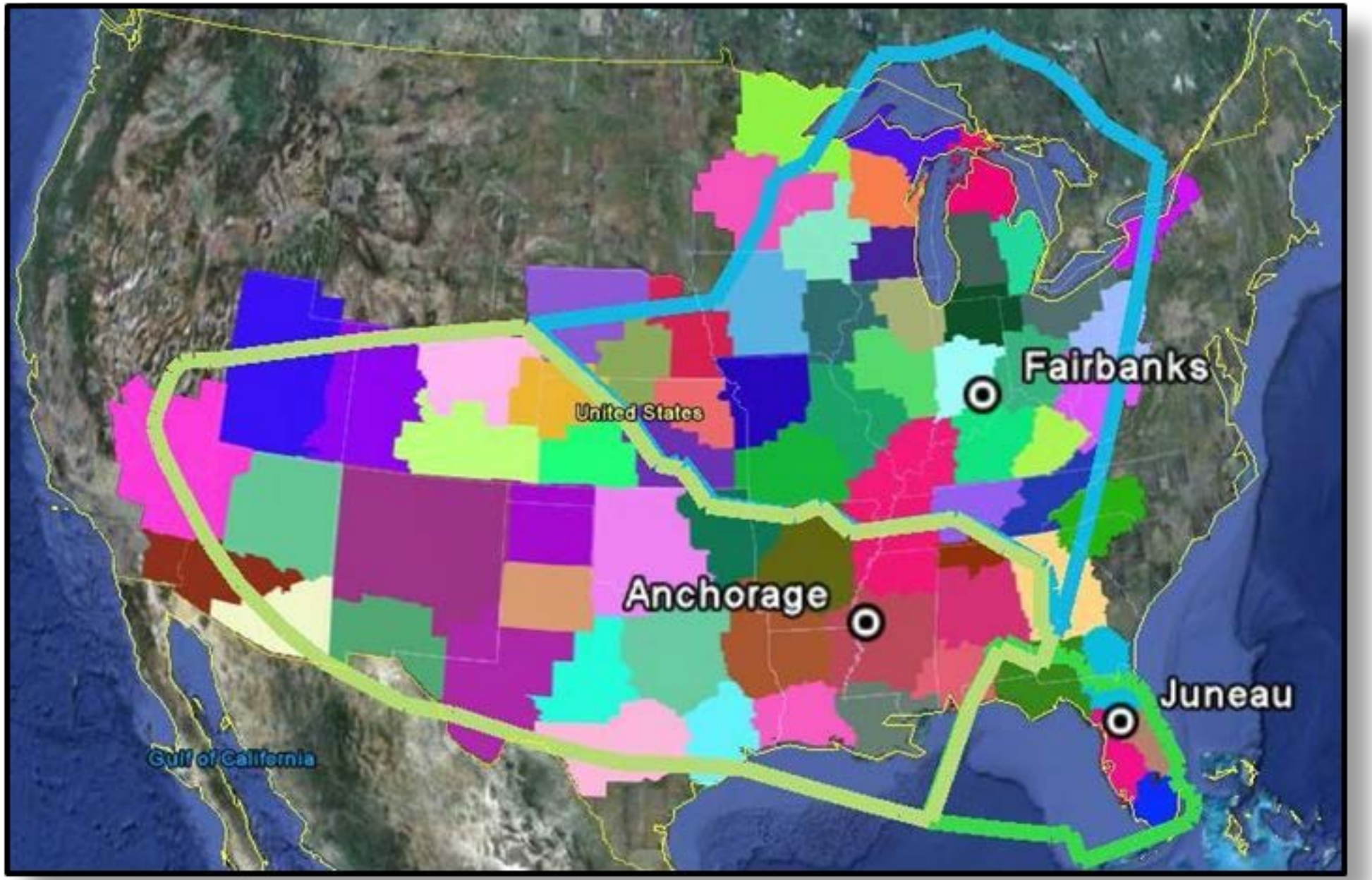
Geographic Information Network of Alaska (GINA)

Roadmap

- Challenges and advantages in Alaska
- The role of UAF/GINA
- Assessment of NUCAPS in Alaska during the 2016 wildfire season
- Plans for the future

The Alaska Challenge

- Areas of responsibility are (comparatively) huge
- The land portion of these areas of responsibility are topographically complex, yielding myriad microclimates
- Many observational networks (such as 88Ds) are very sparse…
  - *This is a big problem because the first step in forecasting is analyzing and understanding the weather now at time=0*
- The specter of climate change being concentrated in the high latitudes means that old “rules of thumb” may suffer from diminishing relevance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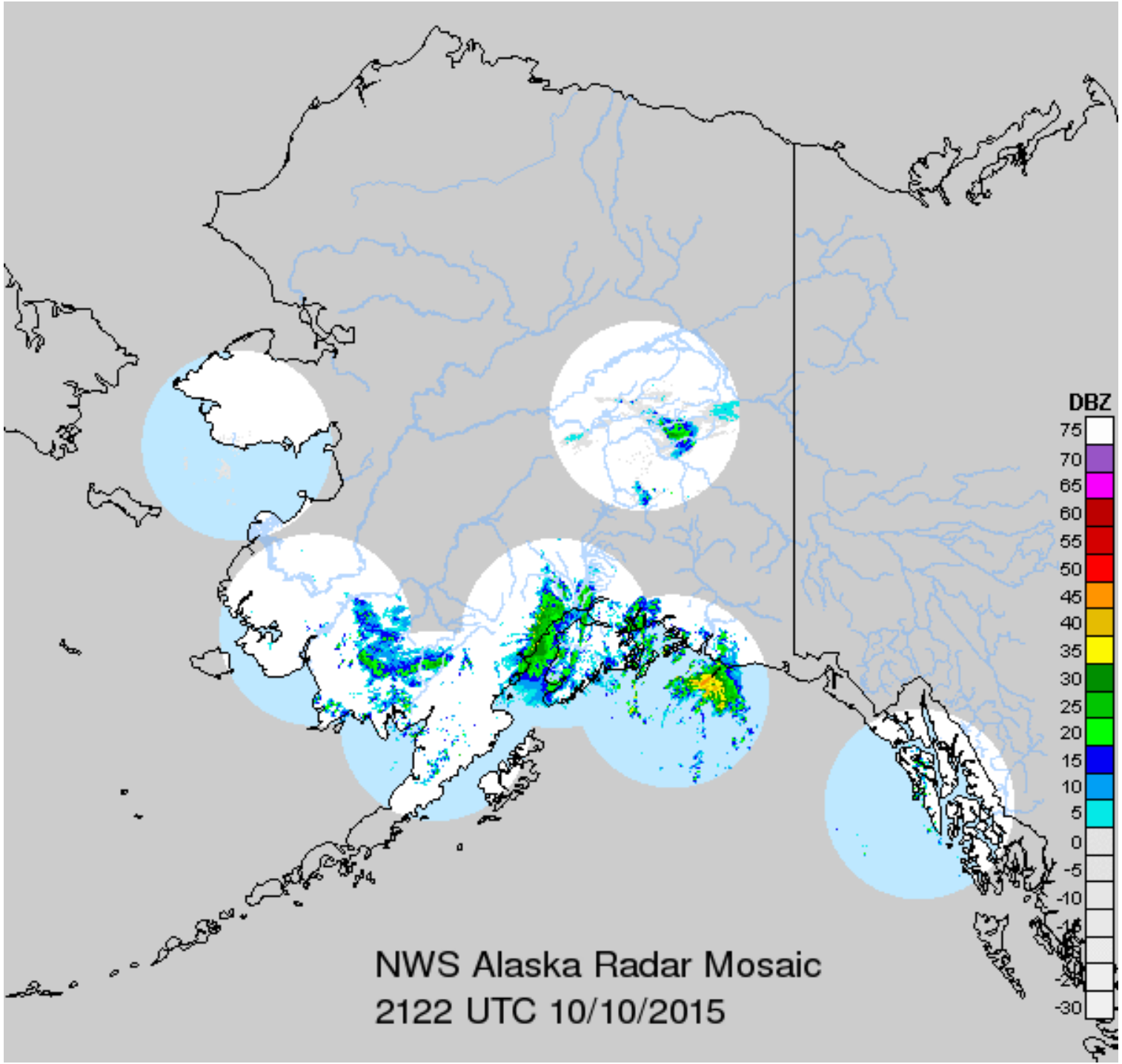
United States
Anchorage
Juneau
Gulf of California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NWS Alaska Radar Mosaic
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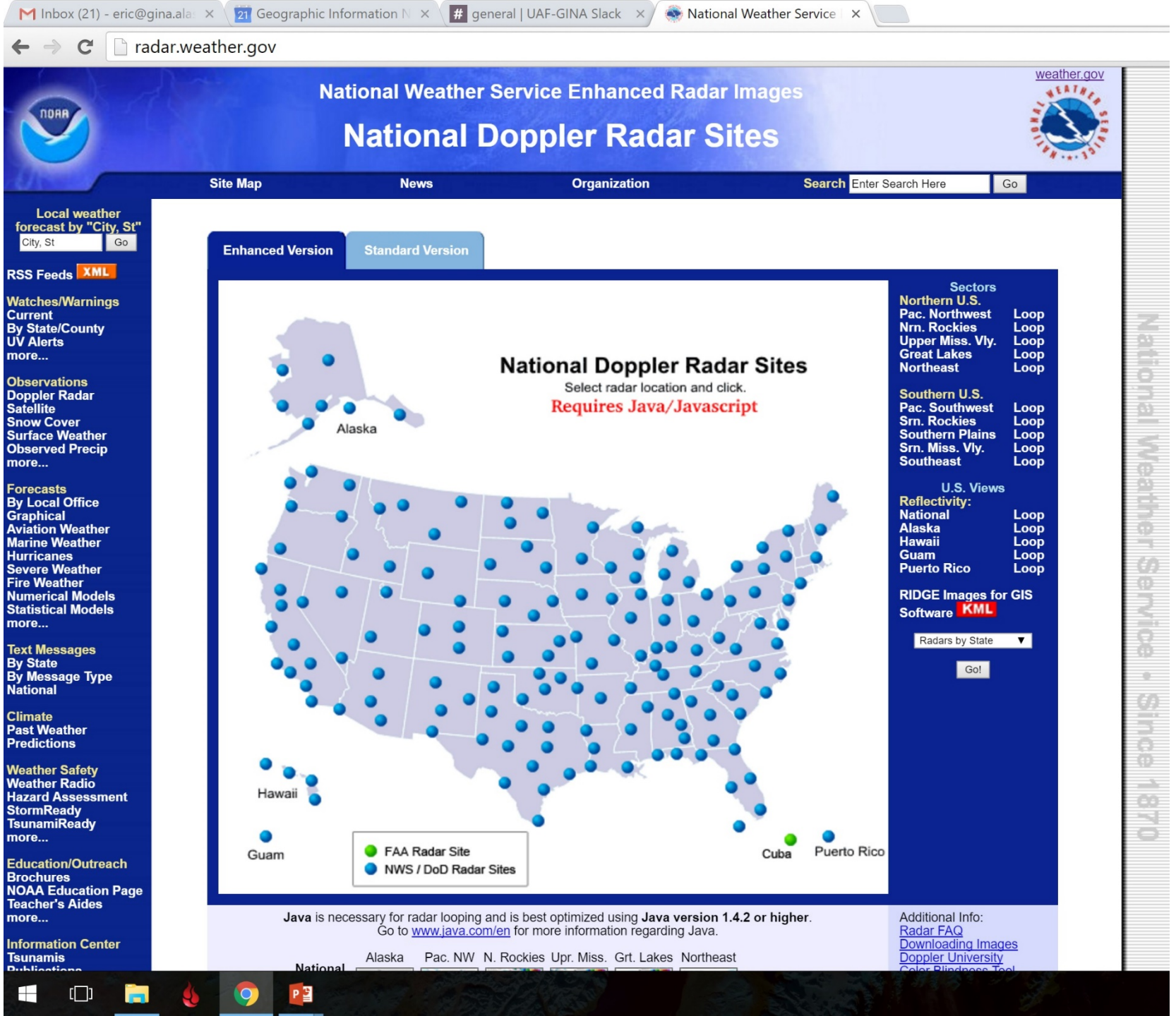
Inbox (21) - eric@gina.ala
Geographic Information
general | UAF-GINA Slack
National Weather Service
radar.weather.gov
National Weather Service Enhanced Radar Images
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Predictions
Weather Safety
Weather Radio
Hazard Assessment
StormReady
TsunamiReady
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NOAA Education Page
Teacher's Aides
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Information Center
Tsunamis
Enhanced Version
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National Doppler Radar Sites
Select radar location and click.
Requires Java/Javascript
Alaska
Hawaii
Guam
Cuba
Puerto Rico
FAA Radar Site
NWS / DoD Radar Sites
Sectors
Northern U.S.
Pac. Northwest Loop
Nrn. Rockies Loop
Upper Miss. Vly. Loop
Great Lakes Loop
Northeast Loop
Southern U.S.
Pac. Southwest Loop
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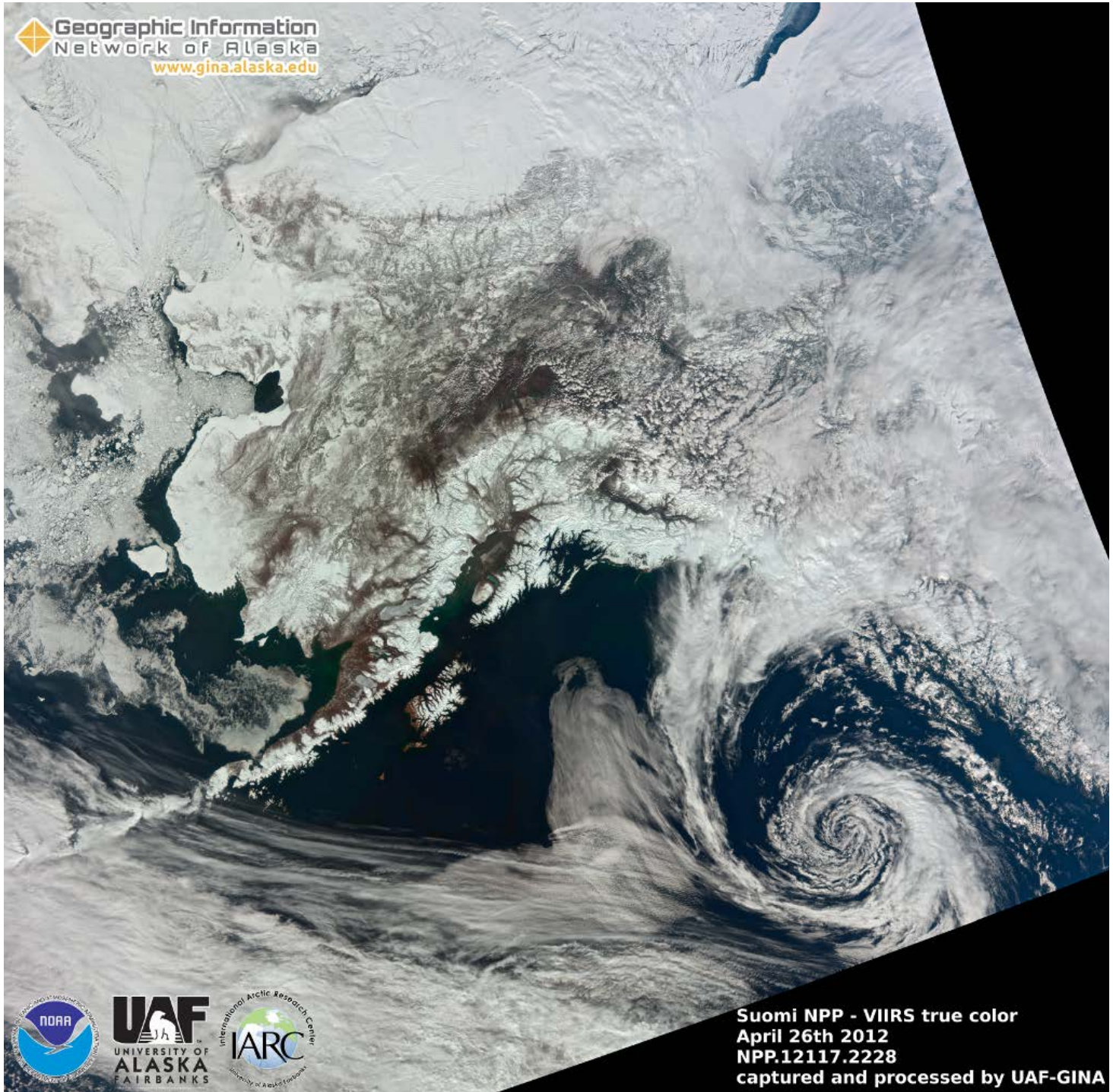
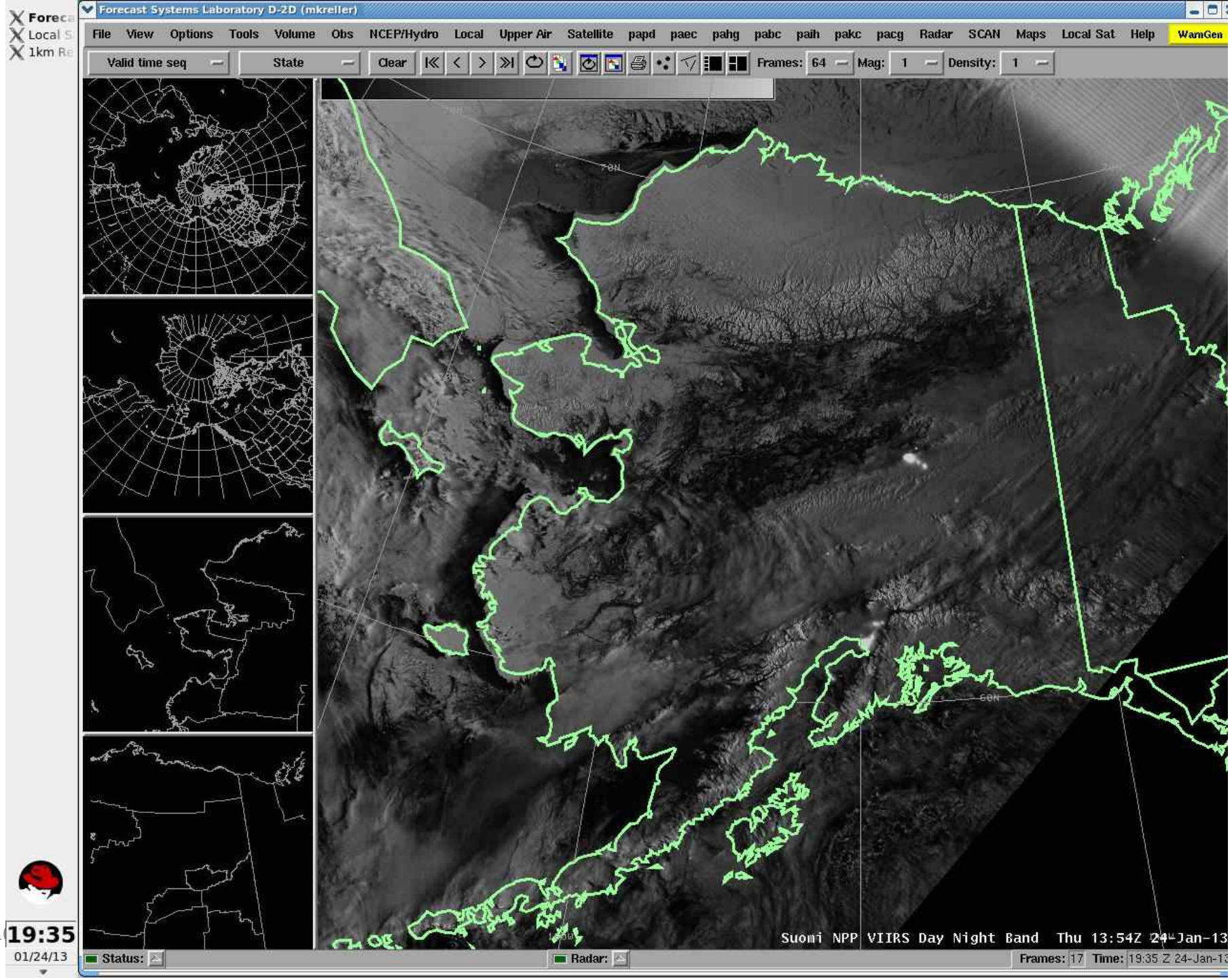
Southern Plains Loop
Srn. Miss. Vly. Loop
Southeast Loop
U.S. Views
Reflectivity:
National Loop
Alaska Loop
Hawaii Loop
Guam Loop
Puerto Rico Loop
RIDGE Images for GIS Software
KML
Radars by State
Go!
Java is necessary for radar looping and is best optimized using Java version 1.4.2 or higher.
Go to www.java.com/en for more information regarding Java.
National
Alaska
Pac. NW
N. Rockies
Upr. Miss.
Grt. Lakes
Northeast
Additional Info:
Radar FAQ
Downloading Images
Doppler University
National Weather Service • Since 1870

The Alaska Advantage

- Thanks to its high latitude, Alaska enjoys frequent coverage from polar orbiting satellites
  - Polar orbiters are quite useful for weather surveillance
- The Geographic Information Network of Alaska (GINA) at the University of Alaska Fairbanks (UAF) receives data from a number of polar orbiting satellites, including S-NPP and (in the future) JPSS-1
  - The data are then processed into AWIPS-ready imagery, as well as into non-AWIPS image formats
  - The resulting imagery is delivered to the NWS via Local Data Management (LDM)
- This “direct broadcast” approach minimizes latency


Geographic Information
Network of Alaska
www.gina.alaska.edu
NOAA
UAF
UNIVERSITY OF
ALASKA
FAIRBANKS
International Arctic Research Center
IARC
Suomi NPP - VIIRS true color
April 26th 2012
NPP.12117.2228
captured and processed by UAF-GINA


Forecast Systems Laboratory D-2D (mkreller)
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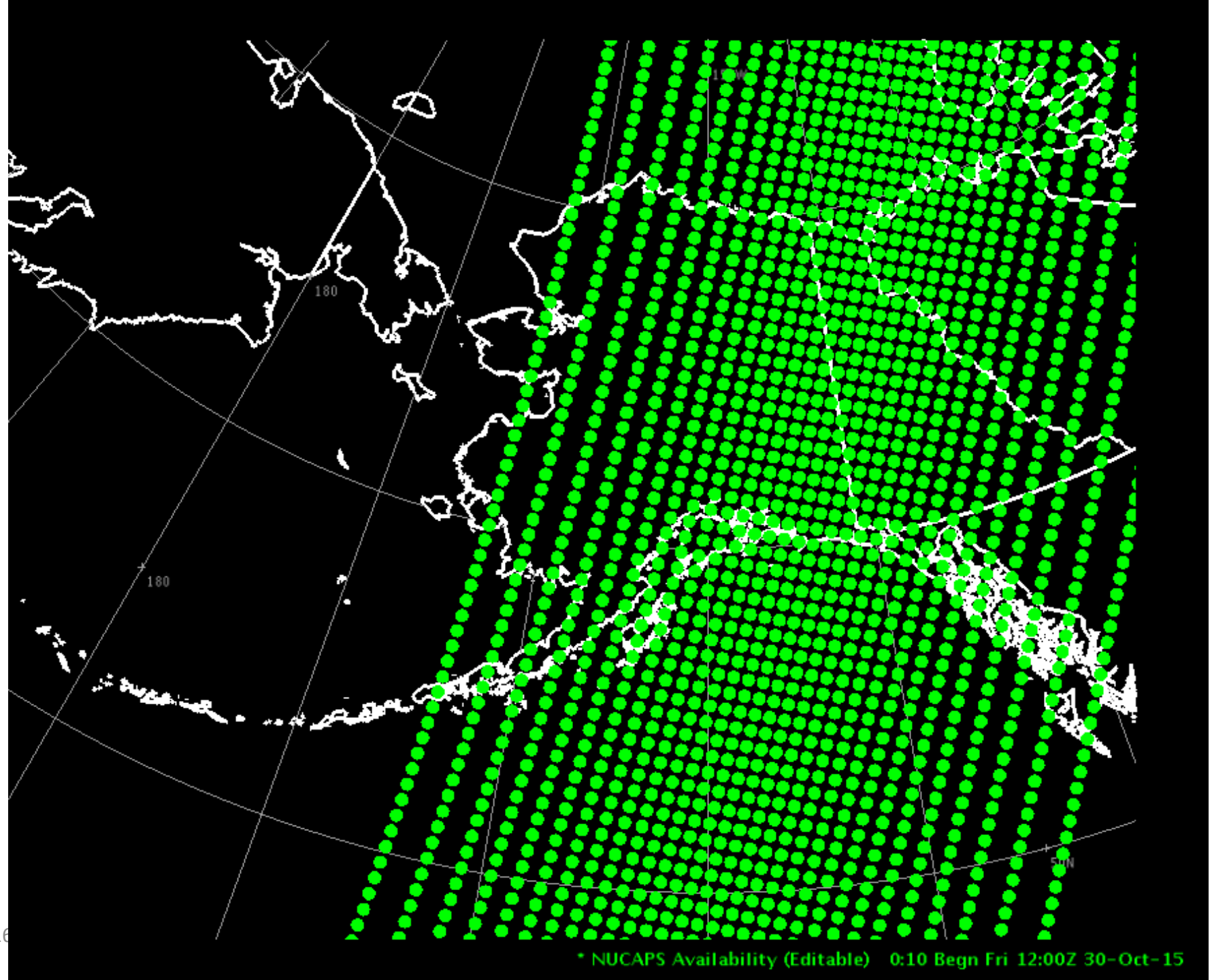
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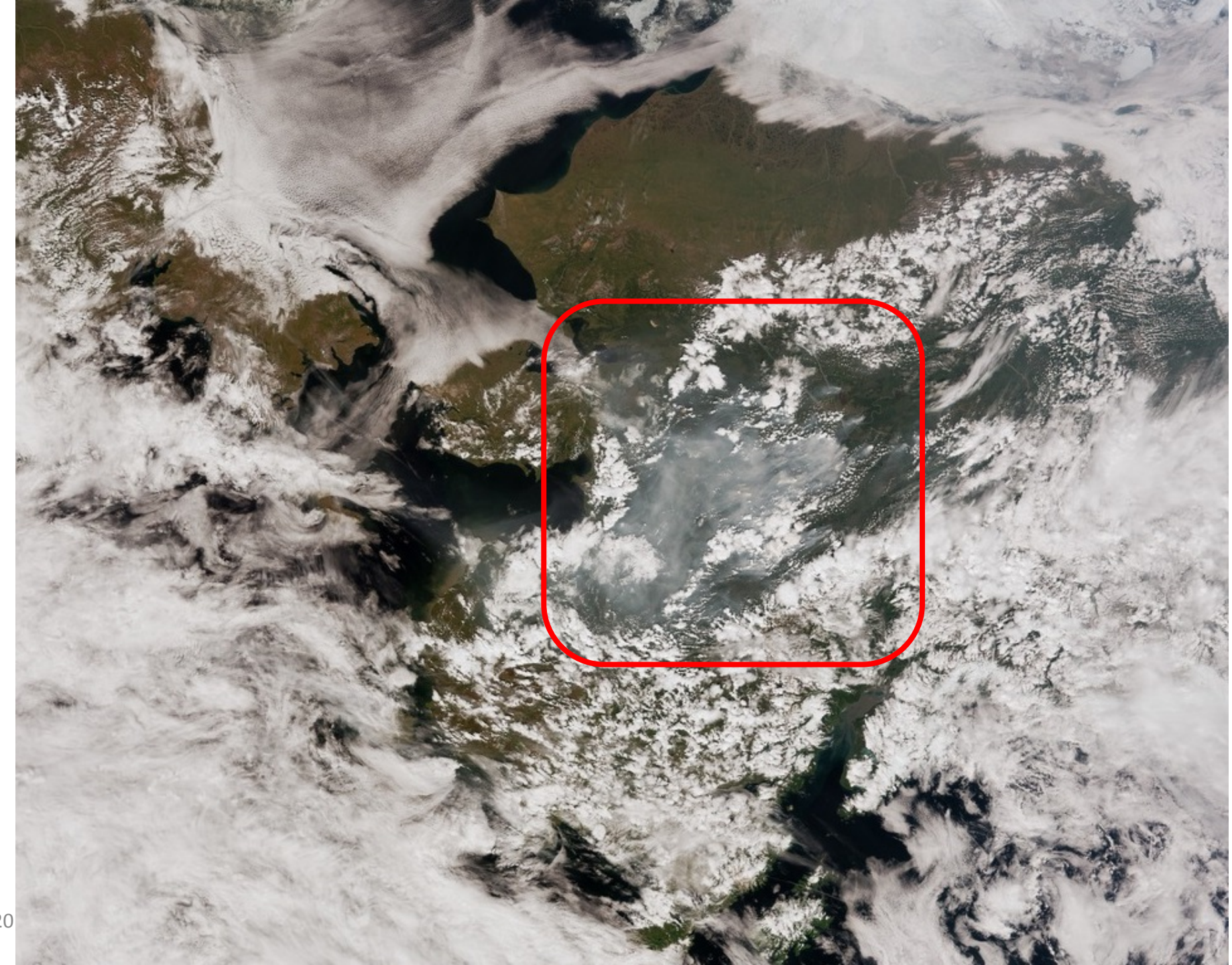


Assessment of NUCAPS in Alaska

- Goal is to assess utility of NUCAPS in the operational NWS environment during the 2016 wildfire season
  - Assessment modeled after previous collaborations between NASA/SPoRT and NWS Alaska as well as on work at the Hazardous Weather Testbed
- Outreach to NWS Alaska via…
  - Series of conference calls, with occasional guest experts such as Bill Line and Dan Nietfeld to present lessons learned with NUCAPS in the CONUS
  - Website nucapsalaska.blogspot.com
  - Web-based survey
  - In-person training
  - Contributions from student volunteer at WFO Fairbanks

NUCAPS in Alaska: 2016-

nucapsalaska.blogspot.com/

NUCAPS in Alaska

FRIDAY, JUNE 10, 2016

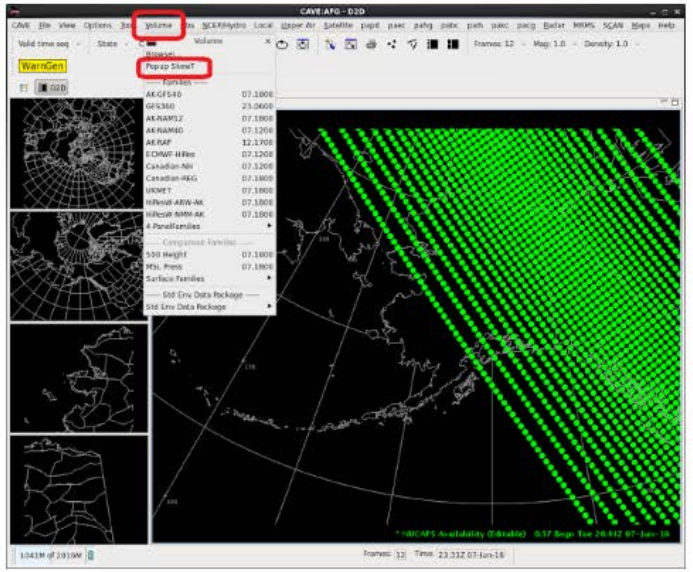
Popup Skew T to the Rescue

NUCAPS presents us with a challenge...remember, there are no "problems" in the modern professional world, just "challenges." The challenge is this: NUCAPS represents a 3-D volume of observational data, yet AWIPS D2D only displays info in two dimensions (hence the name D2D). How do you interrogate a 3-D volume on a 2-D screen?

NUCAPS offers a swath of dots along the SNPP satellite's flight path, with each dot representing a vertical profile of temperature and moisture...you click on a dot, and the display changes to the NSHARPS application to reveal the detailed (as detailed as satellite-based soundings can be) vertical info at that particular point. See the blog post from May 20th for examples of this.

But jumping back and forth between a screen with the swath of dots and the individual profiles in NSHARPS can be disorienting. A not uncommon reaction among forecasters is, "Wait a minute, which green dot did I click on to get this profile? Was it *this* dot...or maybe *this* dot...or was it *this* dot. Grrrrr...the world was a better place when all we had was the LFM model on DIFAX printouts." Luckily, the "Popup Skew T" application in AWIPS can help, at least somewhat, to mitigate the disorientation that can occur when interrogating NUCAPS points. Here is a quick knobology demo on how to use the Popup Skew T in that capacity...

The first step is to call up a swath of NUCAPS points. Next, per the image below, click "Volume" and then "Popup SkewT."

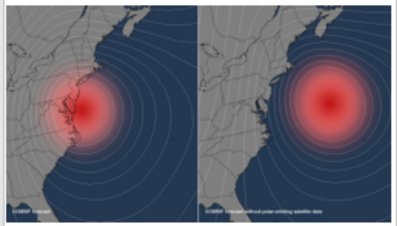


BLOG ARCHIVE

- ▼ 2016 (6)
  - ► 06/19 - 06/26 (1)
  - ► 06/12 - 06/19 (2)
  - ▼ 06/05 - 06/12 (2)
    - Popup Skew T to the Rescue
    - Which Secret AWIPS Menu Hides the NUCAPS?
  - ► 05/15 - 05/22 (1)

1 NUCAPS at NWS Alaska
What Is It, and Why Do We Care?

2 What is NUCAPS?
- NUCAPS: NOAA-Unique CrIS and ATMS Processing System
  - CrIS: Cross-track Infrared Spectroradiometer
  - ATMS: Advanced Technology Microwave Sounder
  - Now the acronym has changed to something...else...
- "GEO birds are for weather surveillance. LEO birds are for NWP models"
  - Superstorm Sandy
  - ...maybe we can use the profile data for weather surveillance as well...

3 Data Denial Study: 120 ECMWF Forecast of SLP during Superstorm Sandy


4 Our Goal
- Learn what utility NUCAPS has for operational

NUCAPS at NWS Alaska

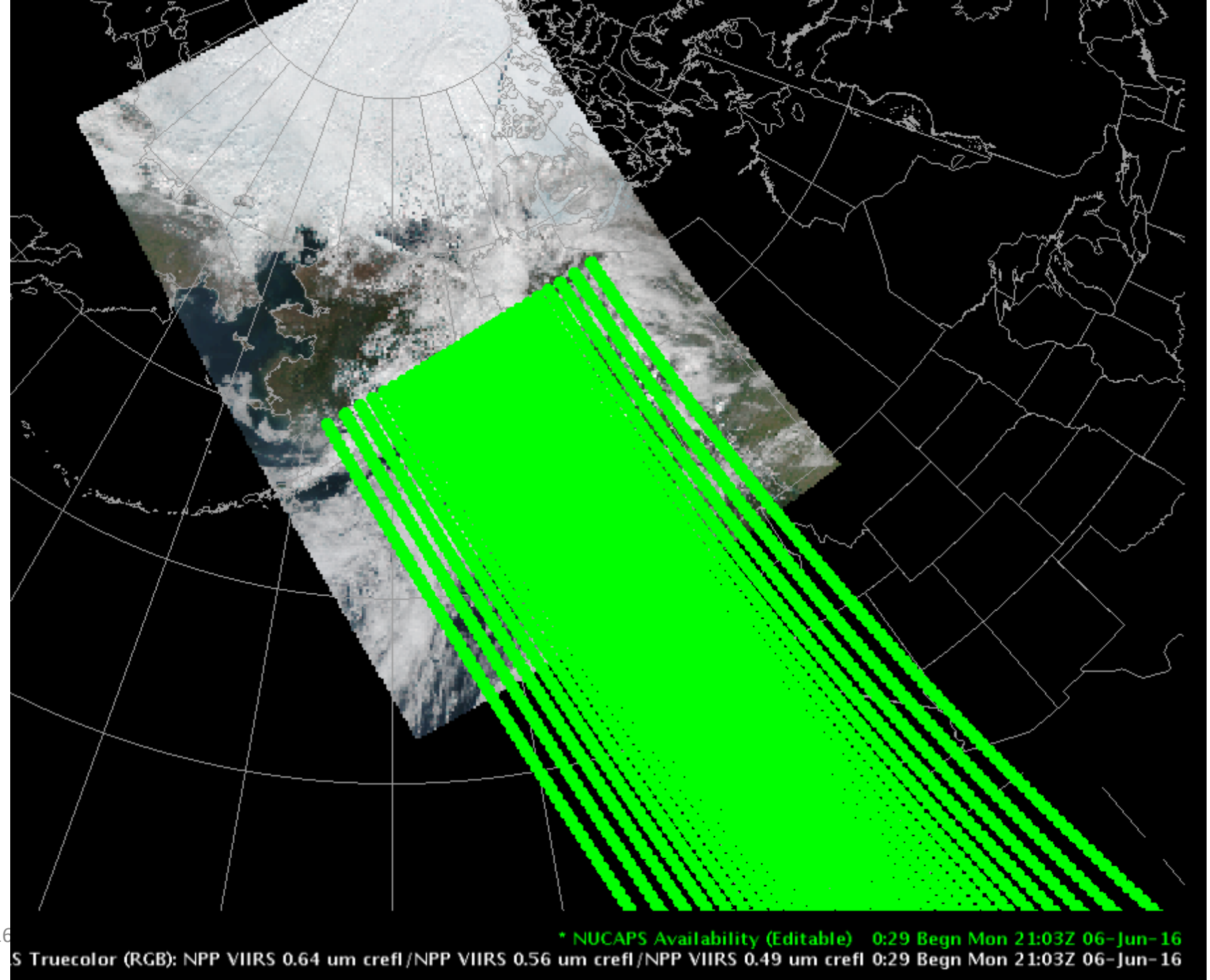
What Is It, and Why Do We Care?

Lessons Learned from 2016 Assessment

- Biggest success was simply in making forecasters aware of NUCAPS
  - capabilities of the instruments
  - Menu-ology and knob-ology of using NUCAPS in AWIPS
  - Good problem to have: forecasters have so many new tools and resources, it can be tough to keep up with it all and maintain proficiency… *how does NUCAPS break into this "crowded marketplace"?*

Lessons Learned: Remaining Challenges *and Solutions*

- Still a low level of familiarization and fluency among forecasters… *in-person training at AWIPS workstations seems to be well-received*
- Problematic latency of the SBN feed into AWIPS… *can the "direct broadcast" feed from GINA into AWIPS' LDM reduce latency?*
- Forecasters' ability to look back in time constrained by storage in AWIPS… *some degree of local configuration is possible*
- Planar views and cross sections not yet available… *on the way*
- QC flags not yet available… *on the way*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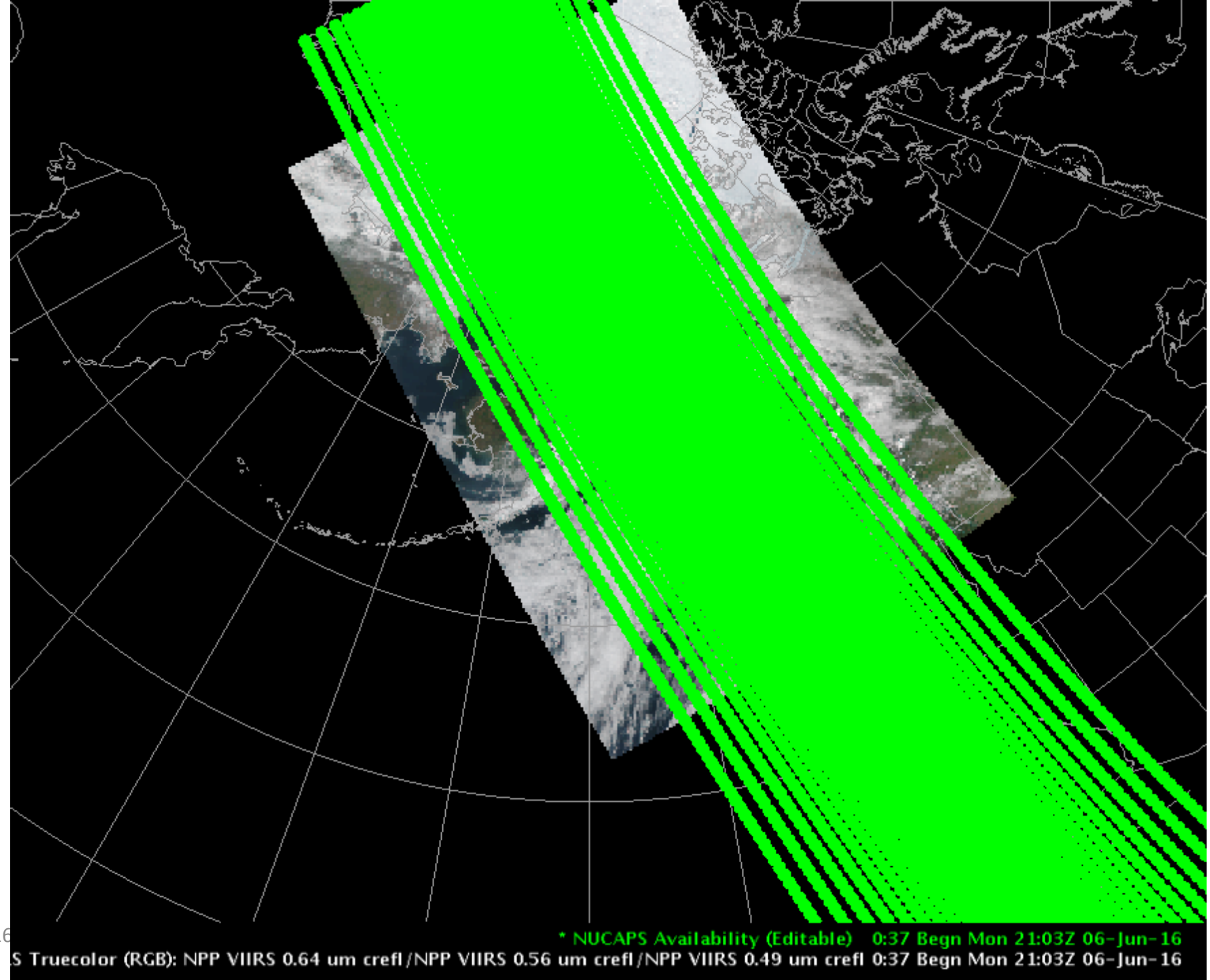
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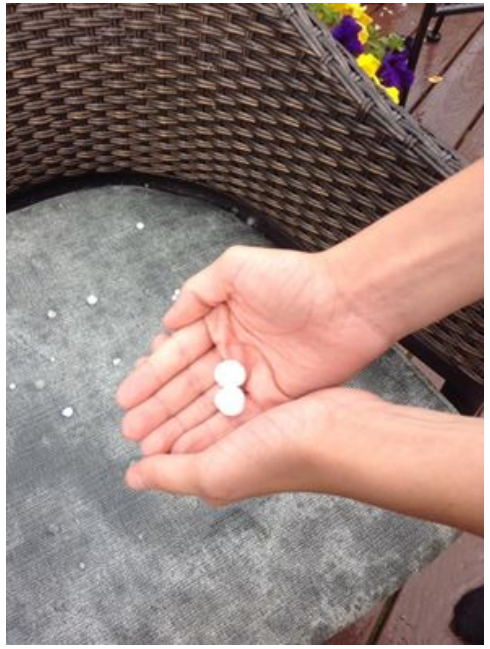
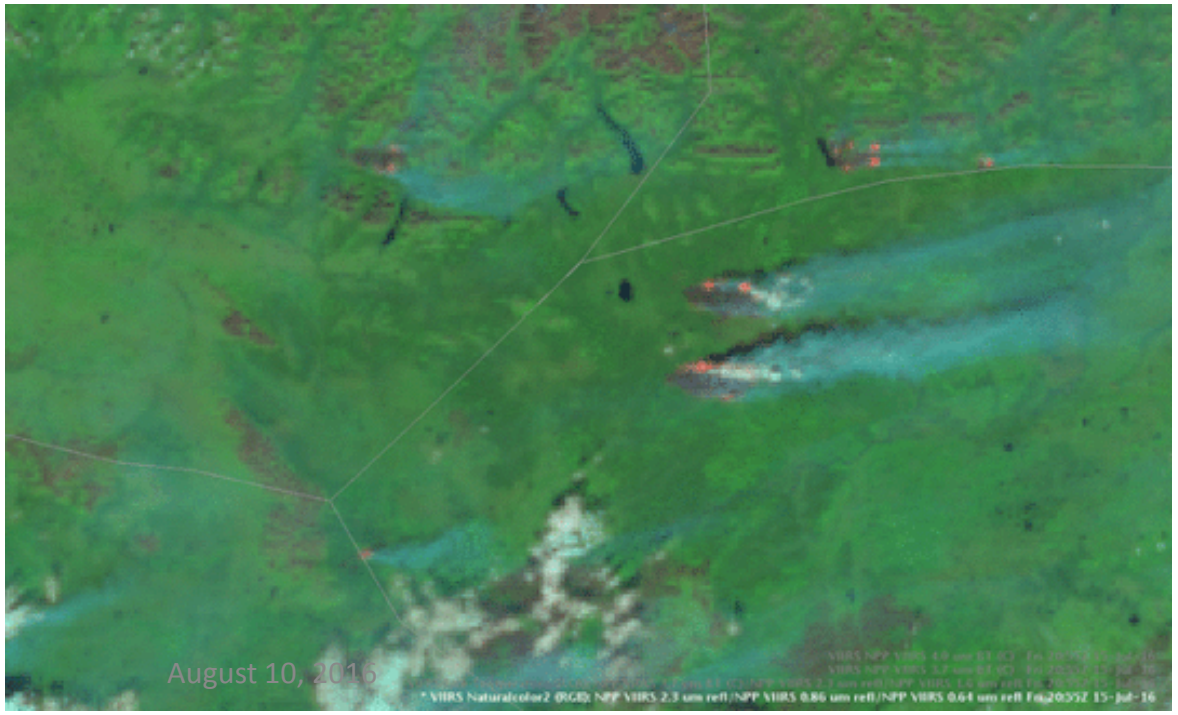
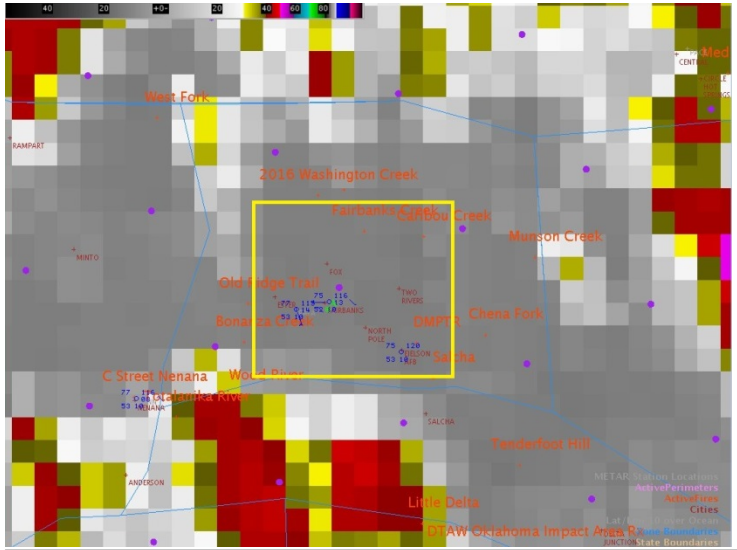


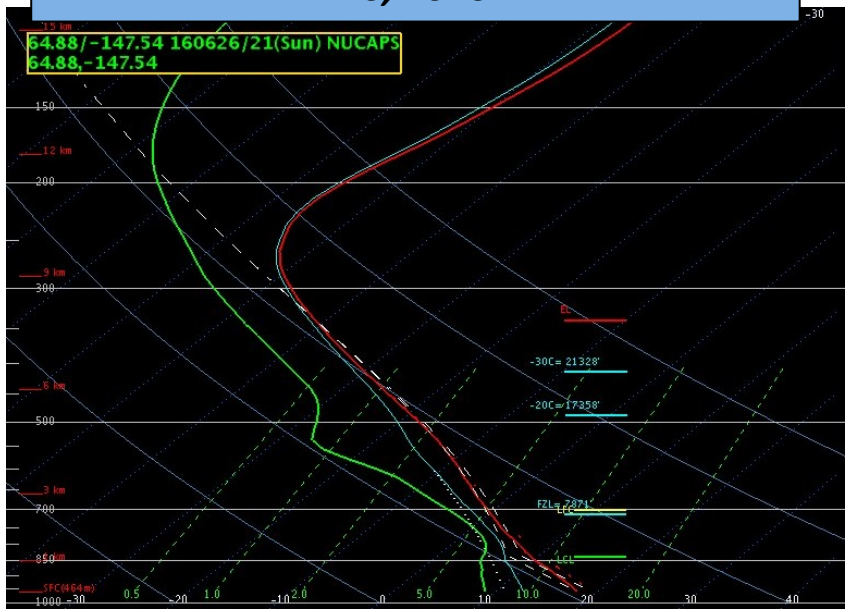


Specific Cases to Investigate

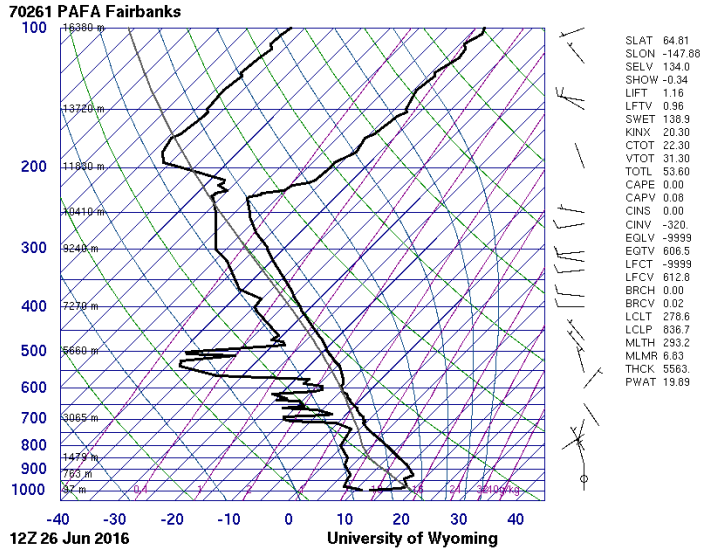
- June 26th: Convection over Interior Alaska, complete with “large” hail (above left)
- July 15th: weather conducive active if not extreme fire behavior (VIIRS RGB below left)
- WFO Fairbanks student Christina Persch has worked with Tony Reale to access archived NUCAPS profiles for specific cases



NUCAPS (64.88, -147.54) at 21Z on June 26, 2016



- NUCAPS pass at 21Z
- One sounding very close to Fairbanks was chosen for analysis



Fairbanks RAOB Sounding at 12Z on June 26, 2016

Consider The Future

- Additional training with NWS forecasters needed
  - Basic familiarization and fluency
  - Emphasize uses for NUCAPS beyond just the wildfire season
- A couple of events from summer of 2016 will be investigated
- Improvements to infrastructure: latency and storage

Thank You!

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