NASA SPoRT JPSS PG Activities in Alaska

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SHORT-TERM PREDICTION RESEARCH AND TRANSITION CENTER

NASA MARSHALL SPACE FLIGHT CENTER

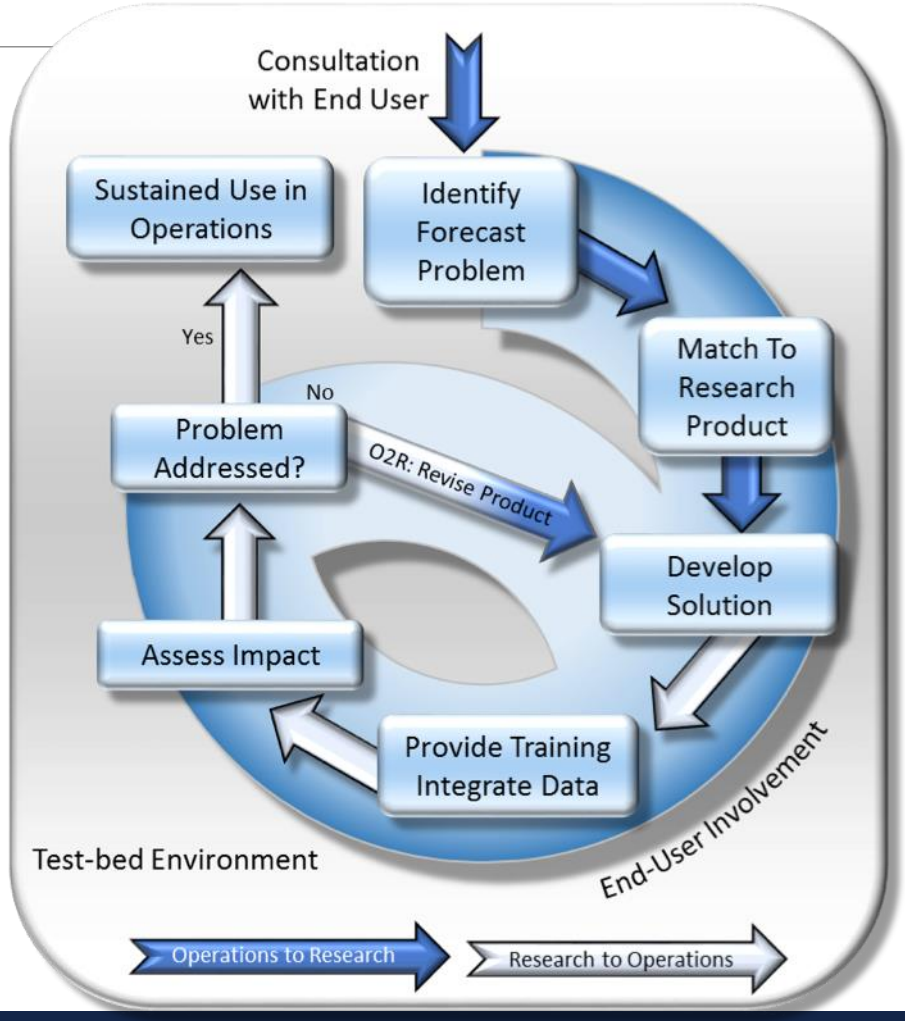
SPoRT Mission

Mission: Transition unique NASA and NOAA observations and research capabilities to the operational weather community to improve short-term weather forecasts on a regional and local scale

Bridge the "Valley of Death" through interactive partnership with end users and product or algorithm developers

Concept has been used to successfully transition more than 40 satellite datasets to operational users for nearly 15 years

Other groups in the community have adopted this paradigm



Training Approach

Targeted, applications based training

Multiple flavors of training are needed to reach all learning styles

- Site visits
- Microlessons
- User-based, interactive modules
- Quick Guides

SPoRT Applications Library

- 1-minute examples
- Short videos
- 21 total cases (and counting)

Collaborate with end users for operational/decision maker perspective

Assessment Approach

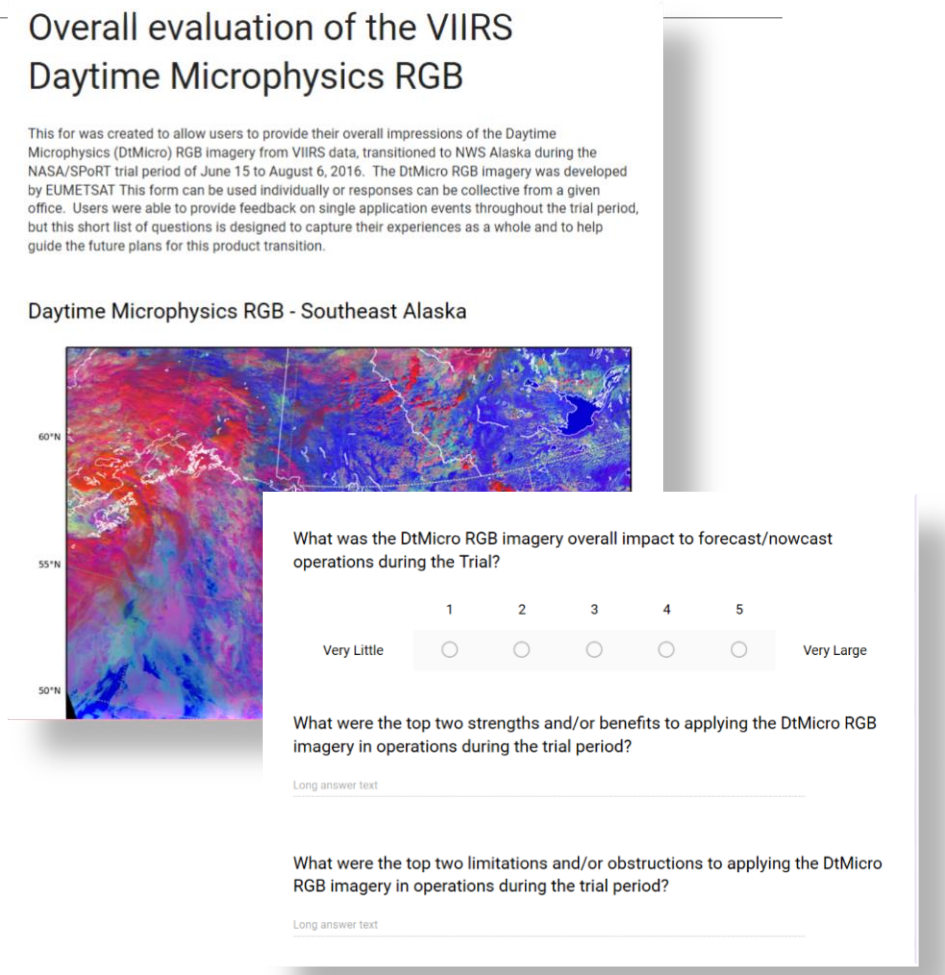
Targeted product assessments with the end user to evaluate utility of product and give feedback to developers

Methods for feedback

- Online form
- Email/phone calls
- Blog

Assessment follow-up

- Wrap-up telecon with participants
- Summarize results in a report for the developers



Overall evaluation of the VIIRS Daytime Microphysics RGB

This for was created to allow users to provide their overall impressions of the Daytime Microphysics (DtMicro) RGB imagery from VIIRS data, transitioned to NWS Alaska during the NASA/SPoRT trial period of June 15 to August 6, 2016. The DtMicro RGB imagery was developed by EUMETSAT This form can be used individually or responses can be collective from a given office. Users were able to provide feedback on single application events throughout the trial period, but this short list of questions is designed to capture their experiences as a whole and to help guide the future plans for this product transition.

Daytime Microphysics RGB - Southeast Alaska

60°N
55°N
50°N

What was the DtMicro RGB imagery overall impact to forecast/nowcast operations during the Trial?

	1	2	3	4	5	
Very Little	○	○	○	○	○	Very Large

What were the top two strengths and/or benefits to applying the DtMicro RGB imagery in operations during the trial period?

Long answer text

What were the top two limitations and/or obstructions to applying the DtMicro RGB imagery in operations during the trial period?

Long answer text

Alaska Region Activities

Microphysics RGB imagery for low cloud and fog aviation hazards

NESDIS Snowfall Rate

Passive Microwave Rain Rates including GPM IMERG

CrIS/ATMS NUCAPS

Forecast Challenge: Low Cloud & Fog

The Need:
Greater dependence on aviation for general travel

The Problems:
Lack of surface obs. for cloud ceilings given the vast domain

Highly variable terrain in AK where low clouds and fog can occur on a small-scale

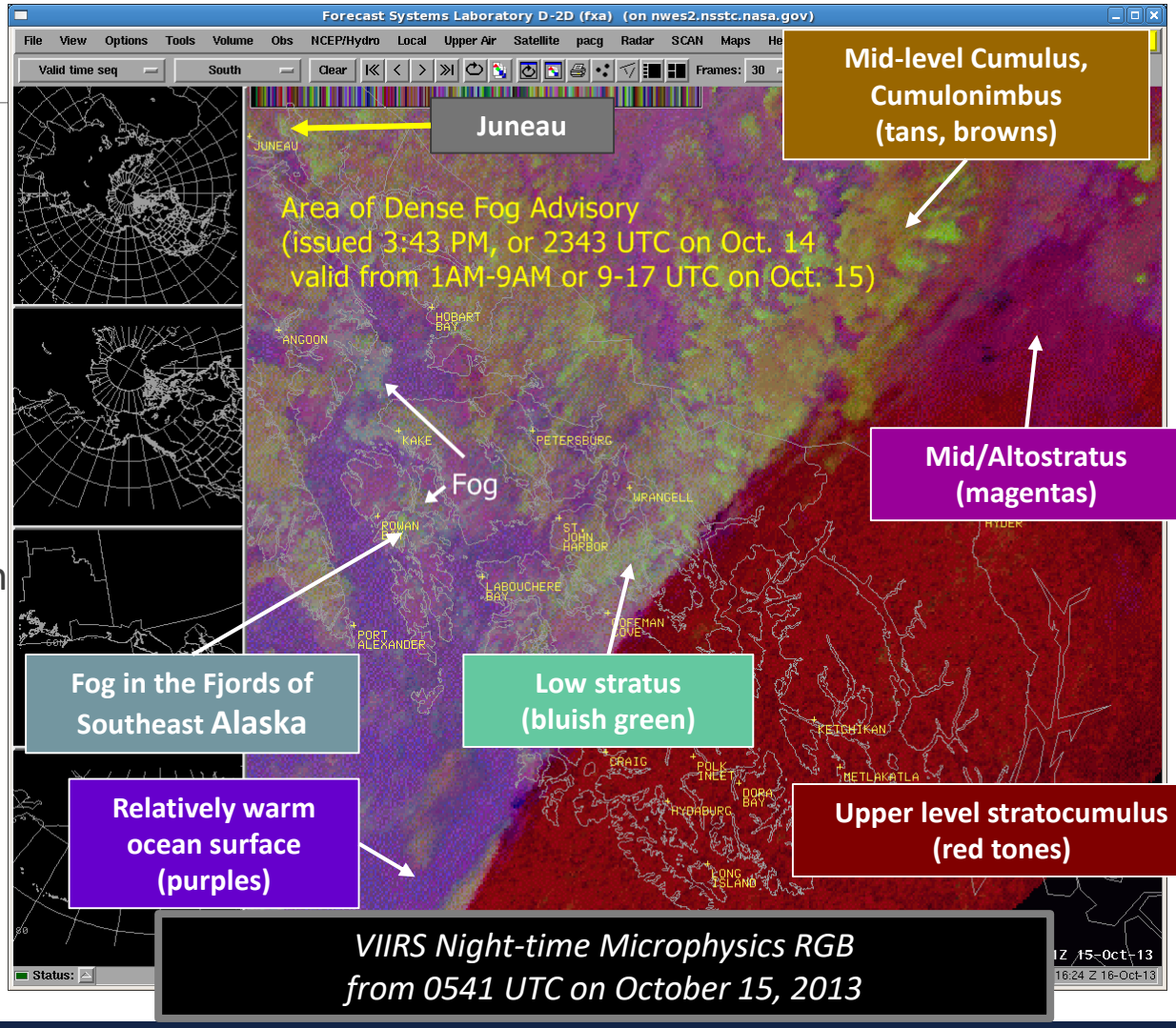
GEO resolution degrades in arctic due to view angle

Unique high latitude conditions, clouds difficult to distinguish from cold surface

The Solution:

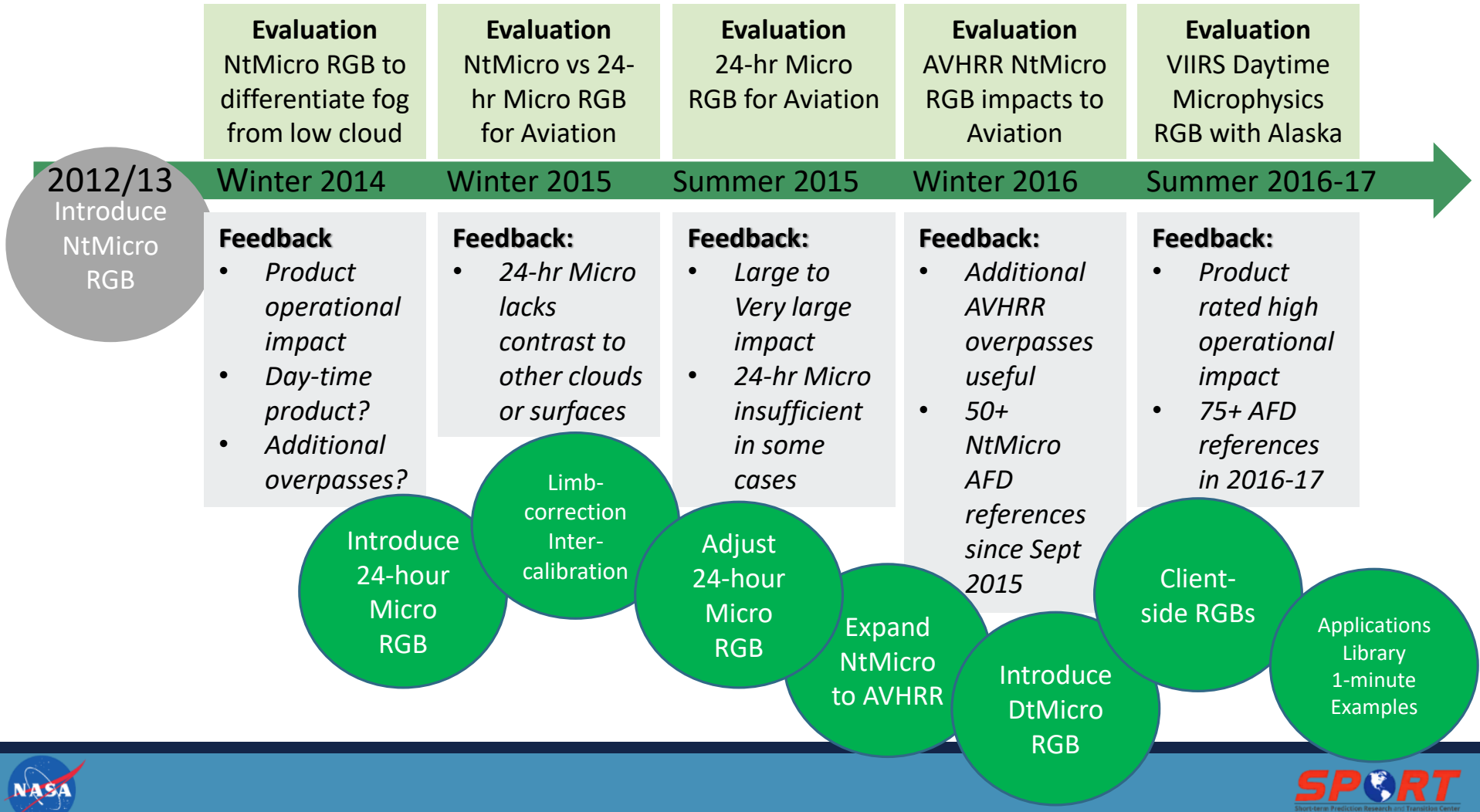
LEO provided channels for NtMicro RGB and improved resolution over GEO

RGB allows forecasters to analyze cloud types efficiently



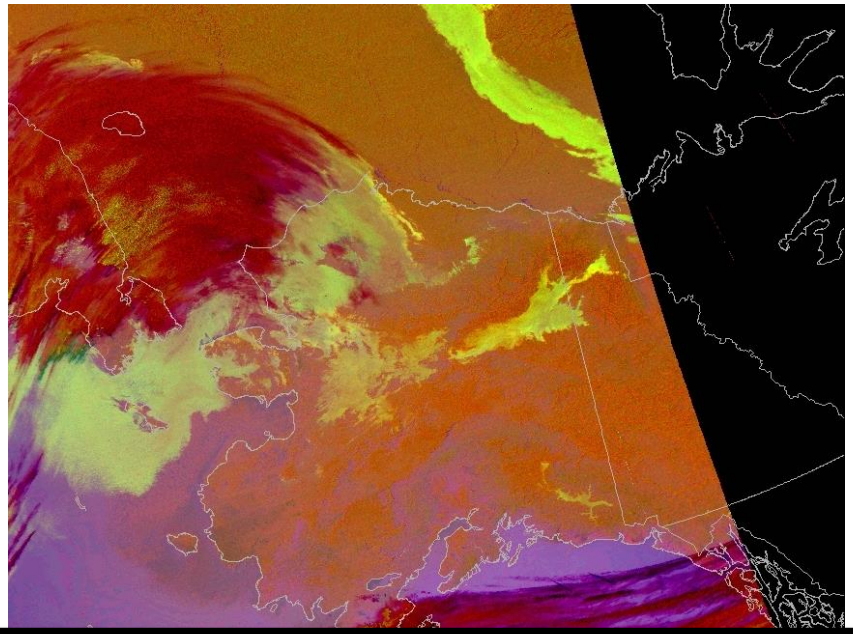
Successful implementation of SPoRT "Research to Operations/Operations to Research" Paradigm
Targeted product assessments and forecaster feedback have led to additional product development and improvements

RGB Activities in Alaska

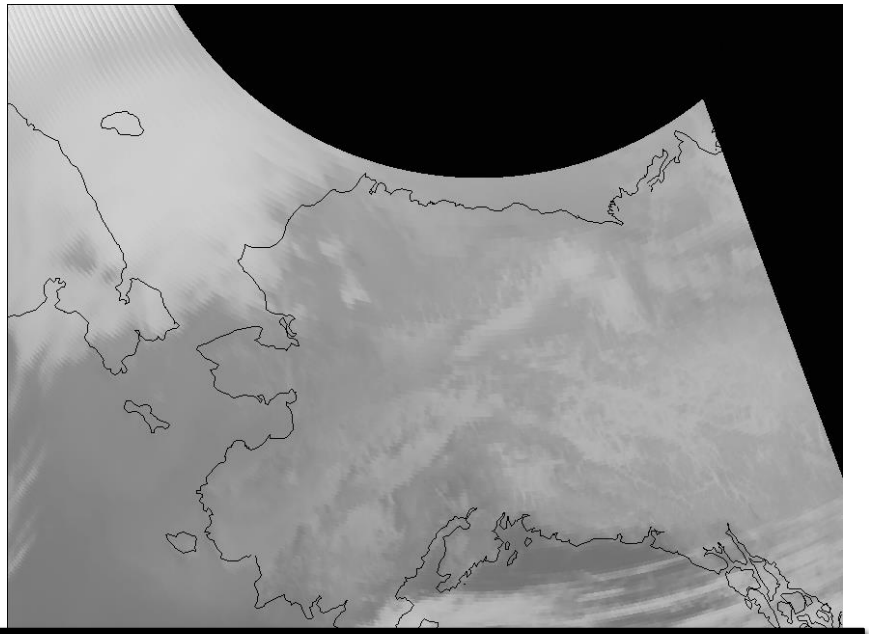


2013-2014 Assessment Feedback

NTMICRO RGB
AT 0755 UTC FROM MODIS (TERRA)



11 MICRON LONGWAVE IR
AT 0745 UTC FROM GOES



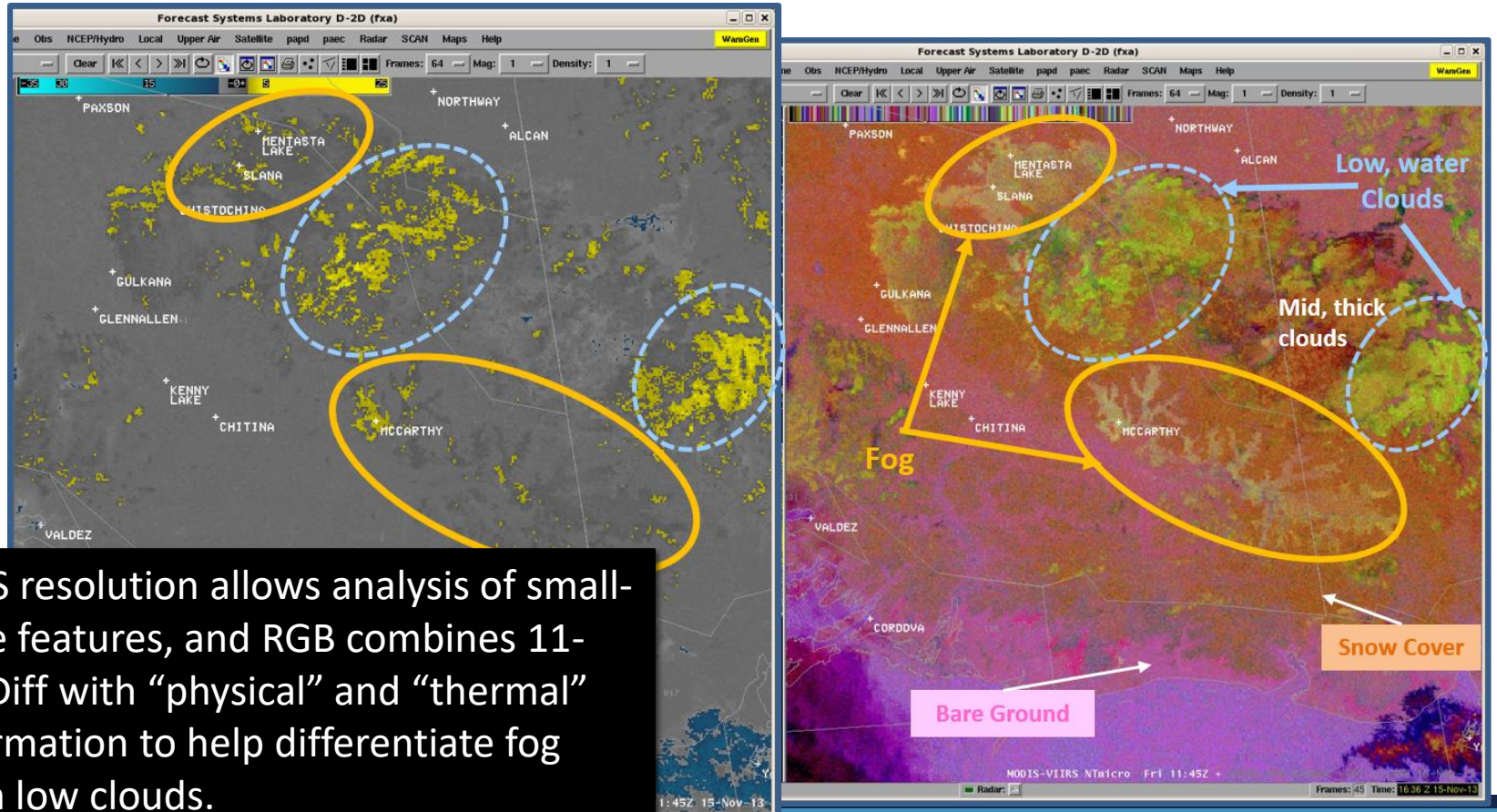
Fairbanks WFO Forecaster: “This has been an excellent product to use with black stratus that developed over the west coast and arctic. It was particularly helpful for the TAFs in those areas as the model guidance gave no indication of clouds moving into the area...but by using this product I could project the stratus slowly moving east into other areas.”

2013-2014 Assessment Feedback

VIIRS "Diff" vs RGB at 1145 UTC Nov 2013

11-3.9 MICRON DIFFERENCE

NTMICRO



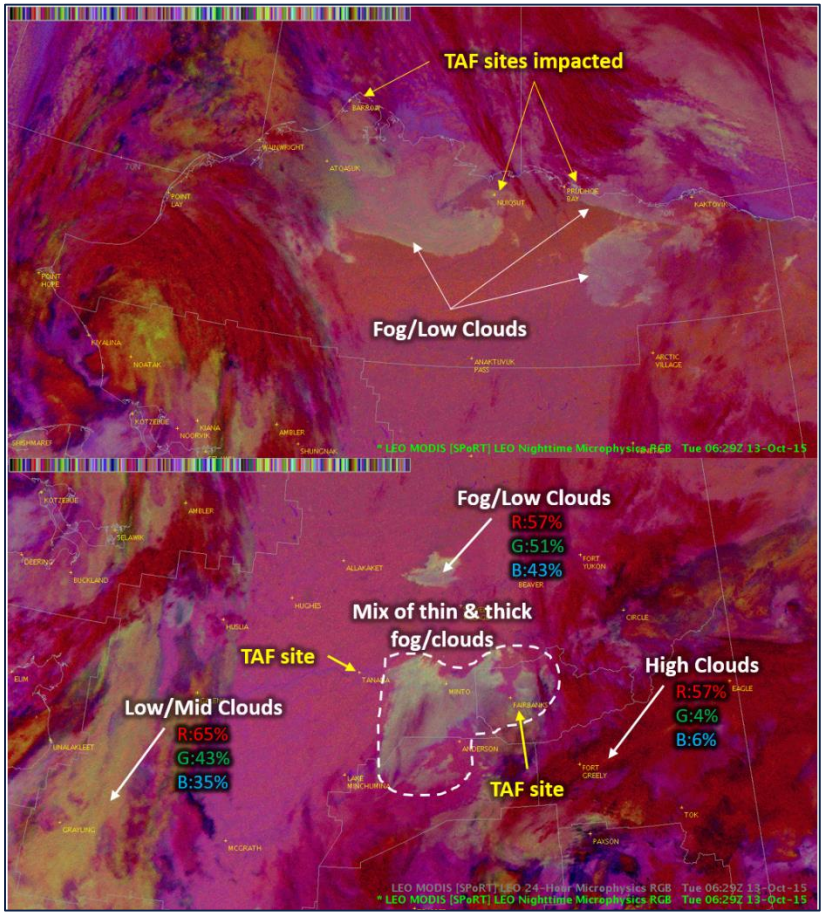
VIIRS resolution allows analysis of small-scale features, and RGB combines 11-3.9 Diff with "physical" and "thermal" information to help differentiate fog from low clouds.

(11-3.9 color curve used at the time)

Forecast Challenge: Low Cloud & Fog:
Regular Impacts to TAF sites in Arctic

Fairbanks WFO:

"Fog and stratus over the areas will impact several aviation sites as well as the public forecast areas. TAF ceiling forecasts at Barrow, Nuiqsut, Deadhorse, Tanana, and Fairbanks were influenced by the presence of stratus as analyzed through use of the NtMicro RGB. **Decided to keep the lower ceilings over these sites since several NtMicro RGB images indicated that the stratus was not moving.** This was counter to what the model guidance was indicating."



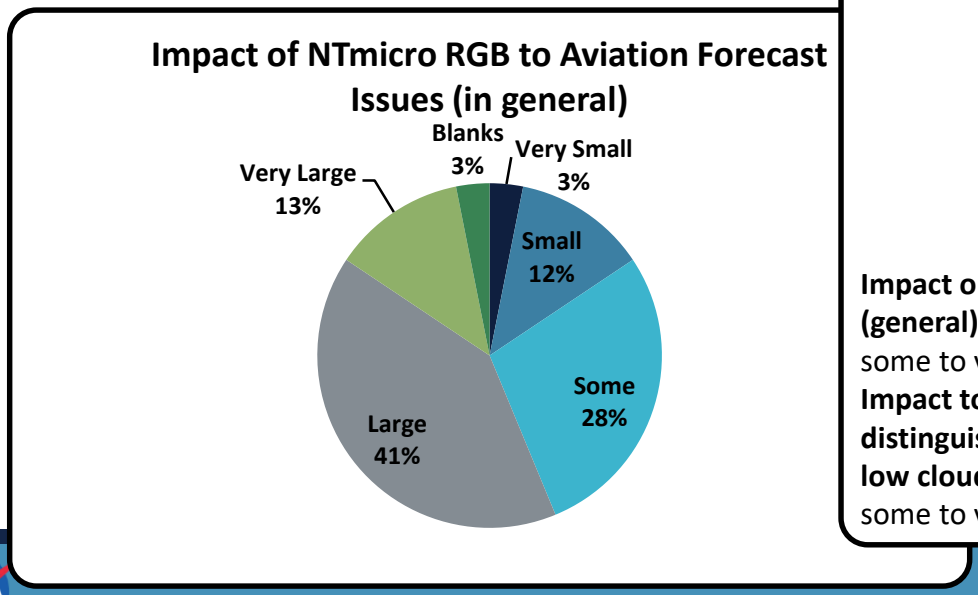
Assessment Recommendations

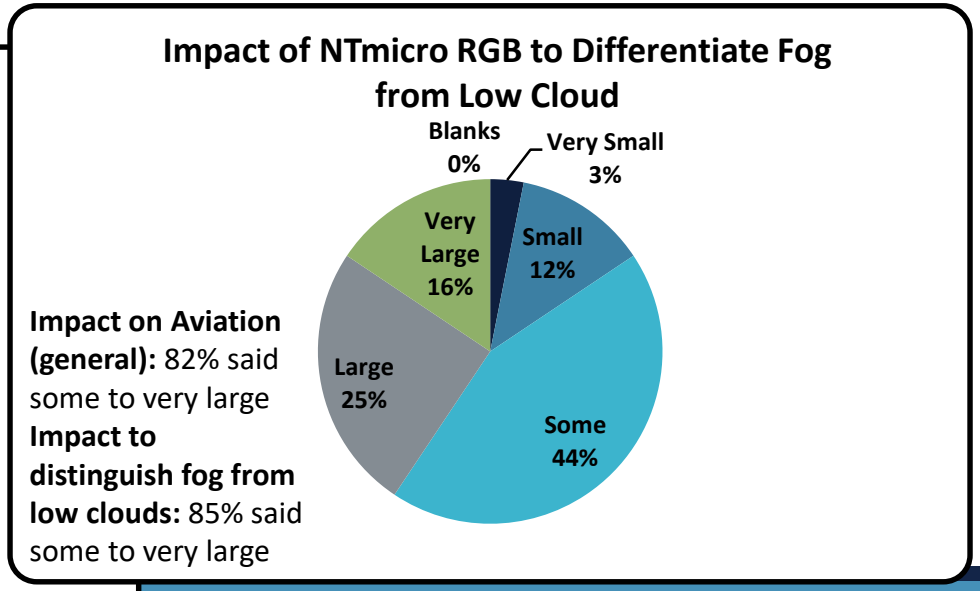
NtMicro does provide value and other satellites could be used

- NOAA 18 & 19 POES, MetOp A & B (via AVHRR instrument)

Very cold temps. and increased summer daylight limit NtMicro RGB, hence looking to testbed 24-hr Microphysics RGB (EUMETSAT developed)

Users need more training examples and experience with Nighttime Microphysics imagery





Impact on Aviation (general): 82% said some to very large
Impact to distinguish fog from low clouds: 85% said some to very large

RGB Activities in Alaska

Evaluation
NtMicro RGB to differentiate fog from low cloud

2012/13
Introduce NtMicro RGB

Winter 2014

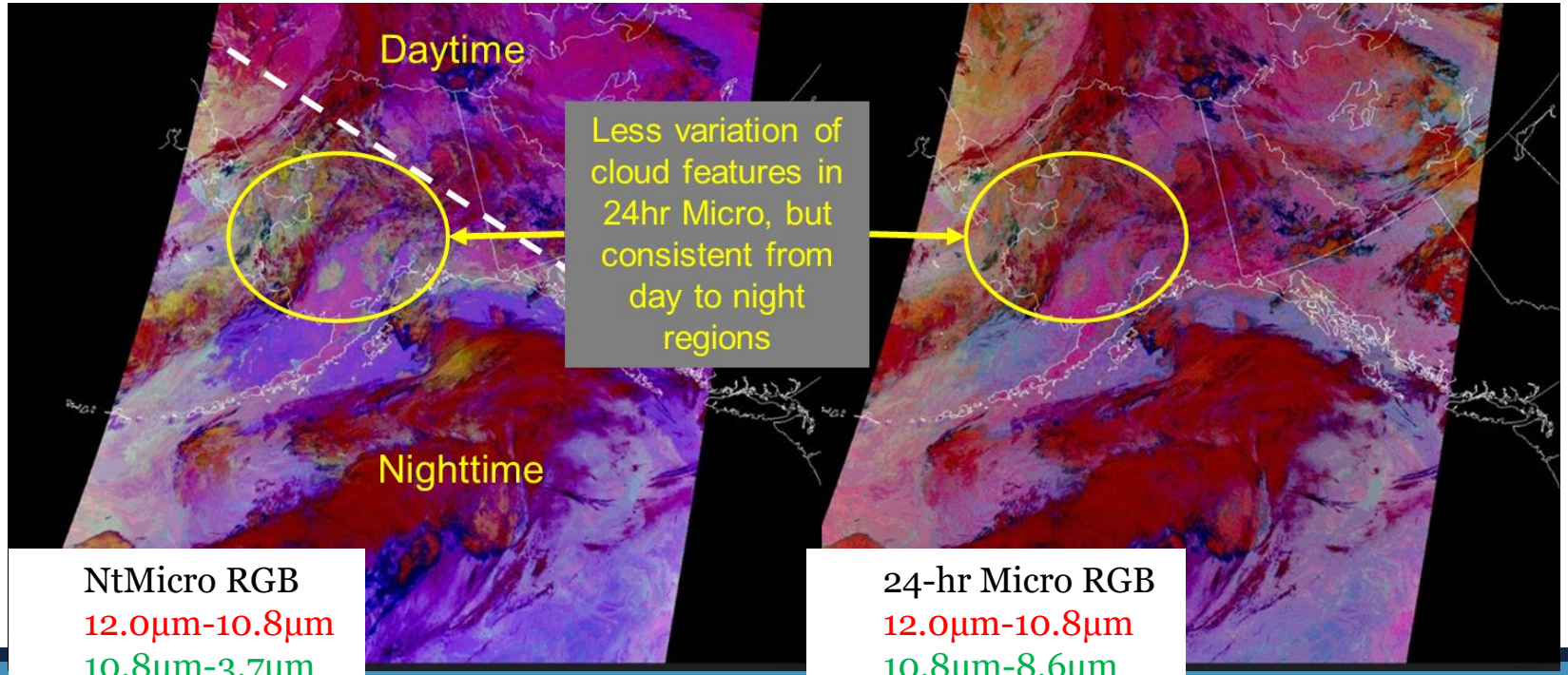
Feedback
- *Product operational impact*
- *Day-time product?*
- *Additional overpasses?*

Introduce 24-hour Micro RGB

Microphysics RGBs in Alaska

2015: RGB Improvements based on Forecaster Feedback

- Implemented 24-hour Microphysics RGB for high-latitude users
- Impact of the 24-hour Microphysics RGB Imagery for Alaska Aviation Forecasts of Low Clouds assessment during Winter and Summer 2015



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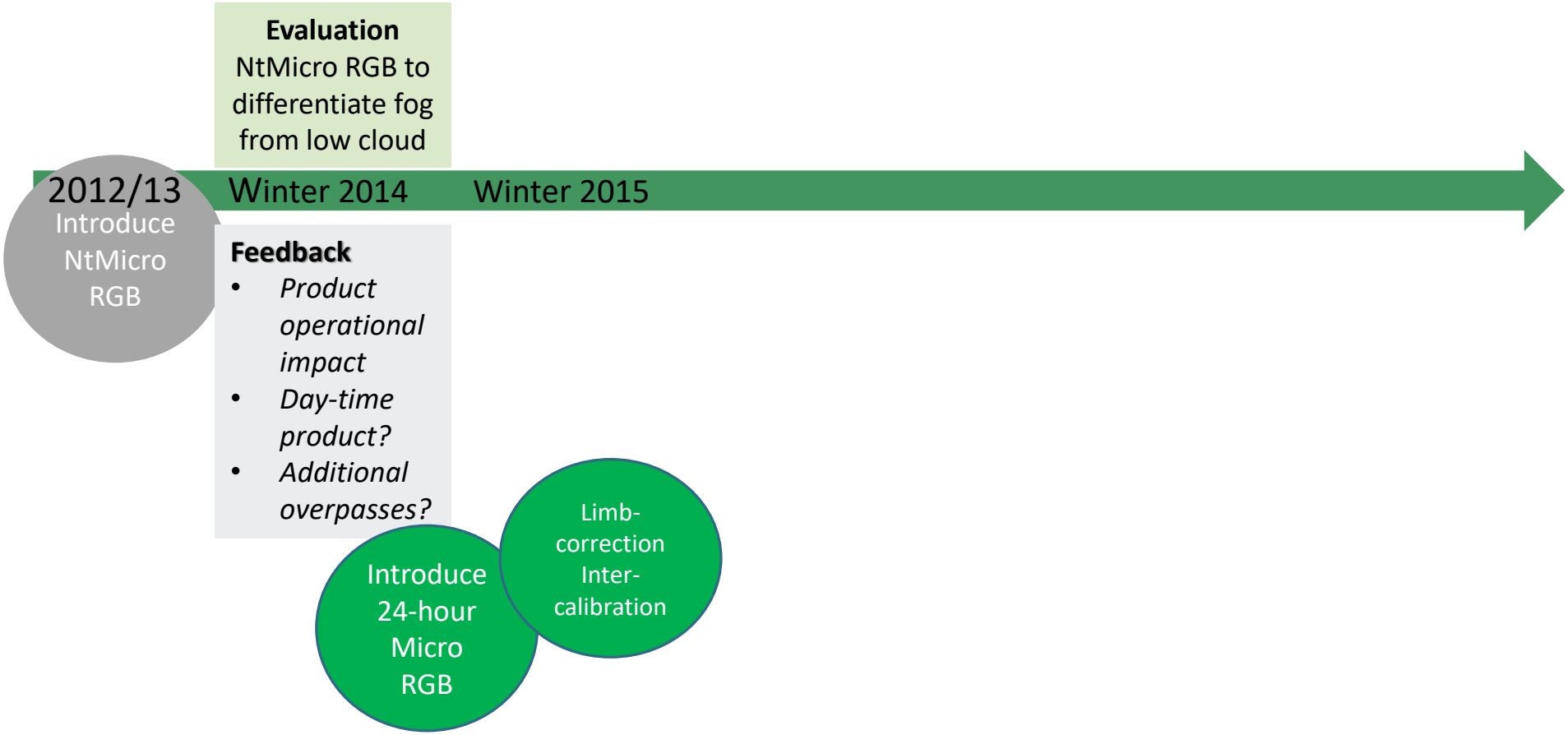
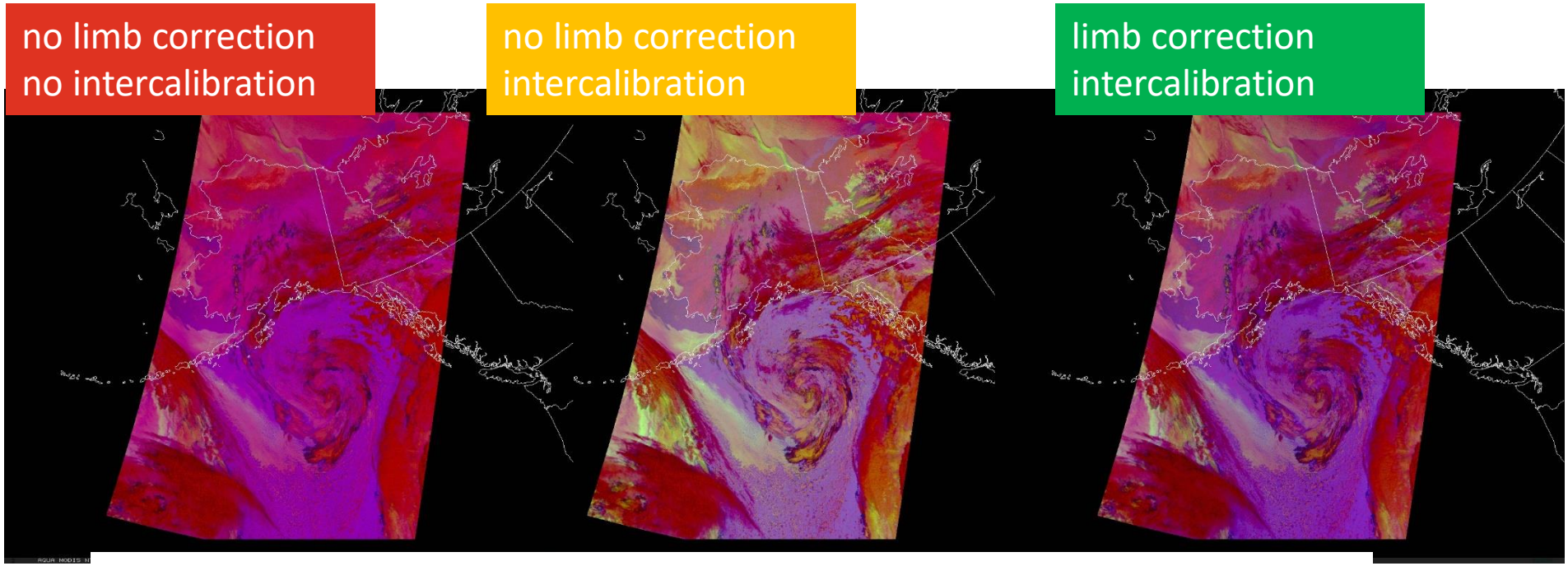
RGB Activities in Alaska



Microphysics RGBs in Alaska

2015: RGB Improvements based on Forecaster Feedback

- Limb correction applied to imagery to improve interpretation across swath and between different sensors (intercalibration)



Elmer, N., E. Berndt, G. J. Jedlovec, 2016: Limb Correction of MODIS and VIIRS Infrared Channels for the Improved Interpretation of RGB Composites, *Journal of Atmos. And Oceanic Technology,* vol. 33, no. 5, pp. 1073-1087.

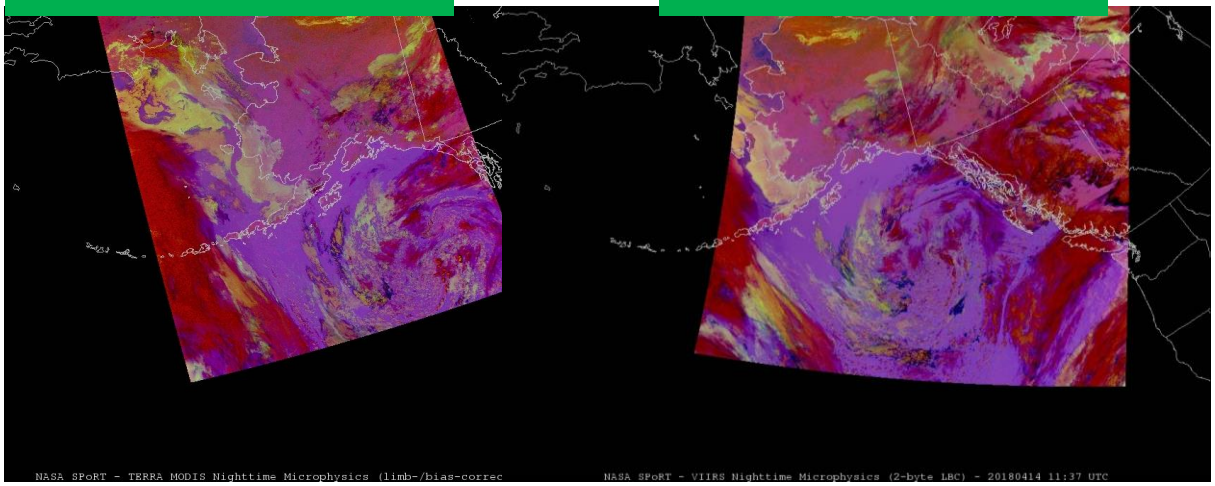
Microphysics RGBs in Alaska

2015: RGB Improvements based on Forecaster Feedback

- Limb correction applied to imagery to improve interpretation across swath and between different sensors (intercalibration)

Terra MODIS
0756 UTC 4/14/18

S-NPP VIIRS
1137 UTC 4/14/18



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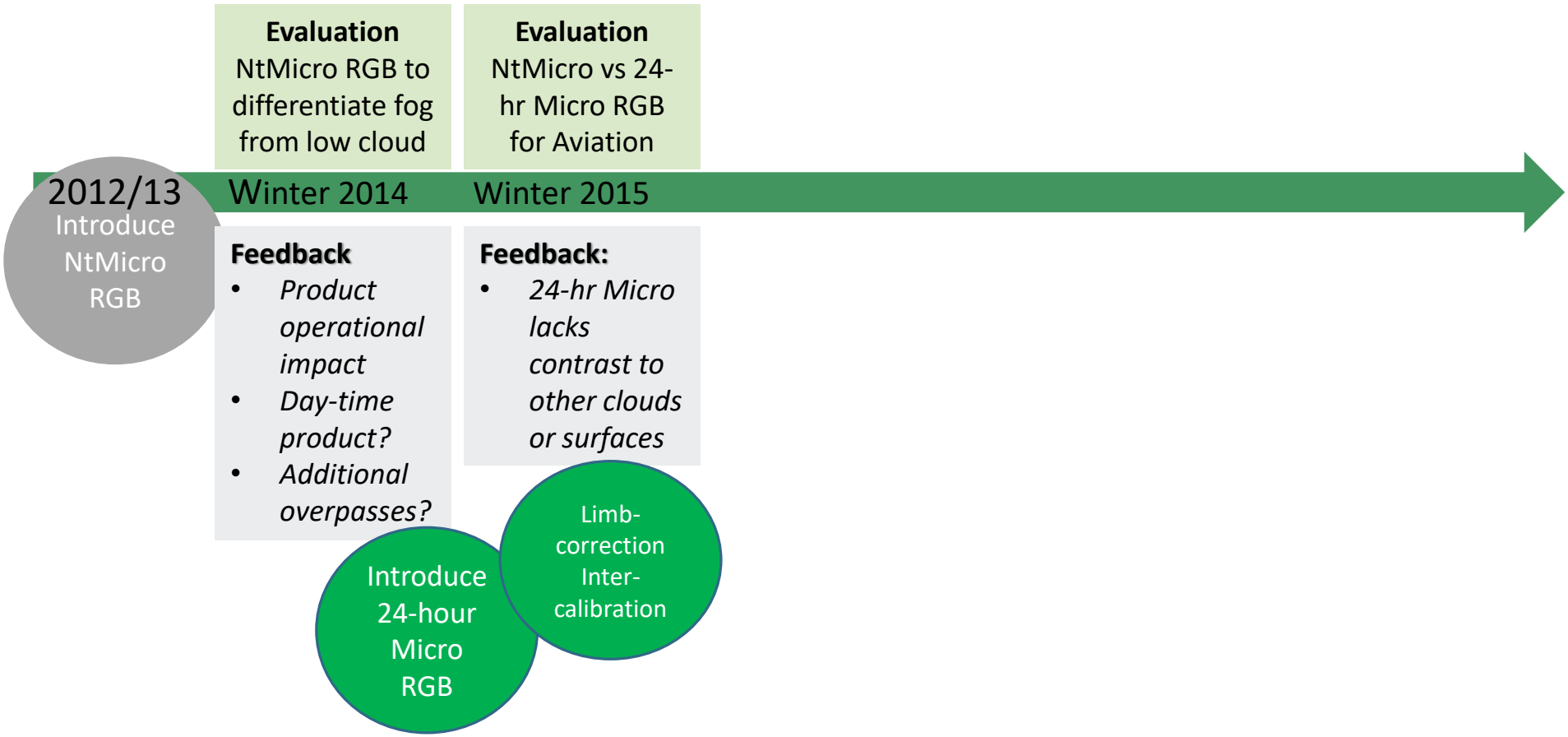
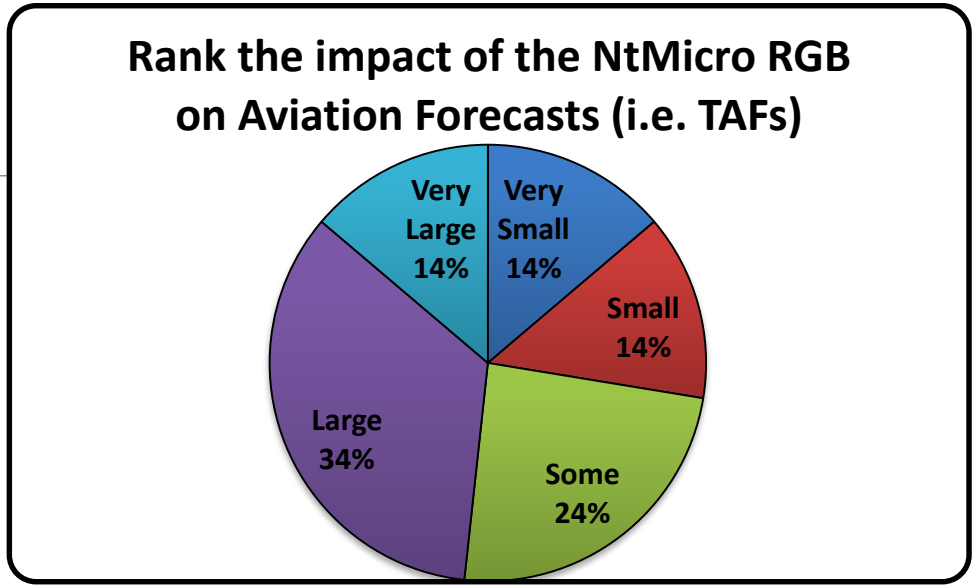
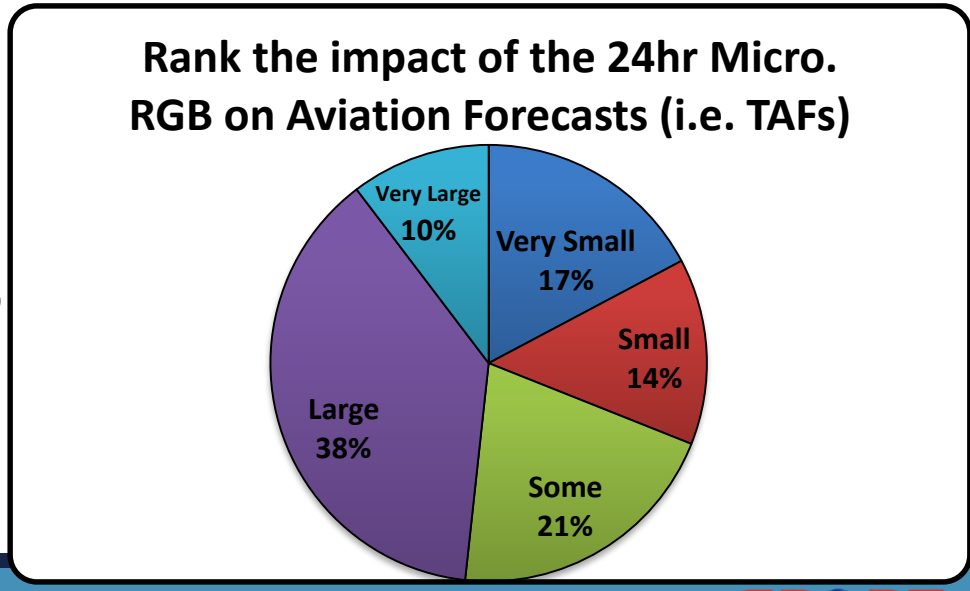
RGB Activities in Alaska



Assessment Recommendations

- **User feedback indicated similar impacts. Therefore, 24hr Micro. may have analogous value and be used in place of NtMicro (see right)**
- ~28 submitted user evaluations
- Several user comments indicated TAF adjustments were made based on imagery use.
- Fairbanks forecaster uses imagery during briefing to next shift and regularly sites it in AFD
- At times 24hr RGB lacks contrast to other clouds/sfc
  - Consider recipe adjustments





RGB Activities in Alaska

2012/13
Introduce NtMicro RGB

Winter 2014	Winter 2015	Summer 2015
Evaluation NtMicro RGB to differentiate fog from low cloud	**Evaluation** NtMicro vs 24-hr Micro RGB for Aviation	**Evaluation** 24-hr Micro RGB for Aviation
Feedback • *Product operational impact* • *Day-time product?* • *Additional overpasses?*	**Feedback:** • *24-hr Micro lacks contrast to other clouds or surfaces*	**Feedback:** • *Large to Very large impact* • *24-hr Micro insufficient in some cases*

Introduce 24-hour Micro RGB

Limb-correction Inter-calibration

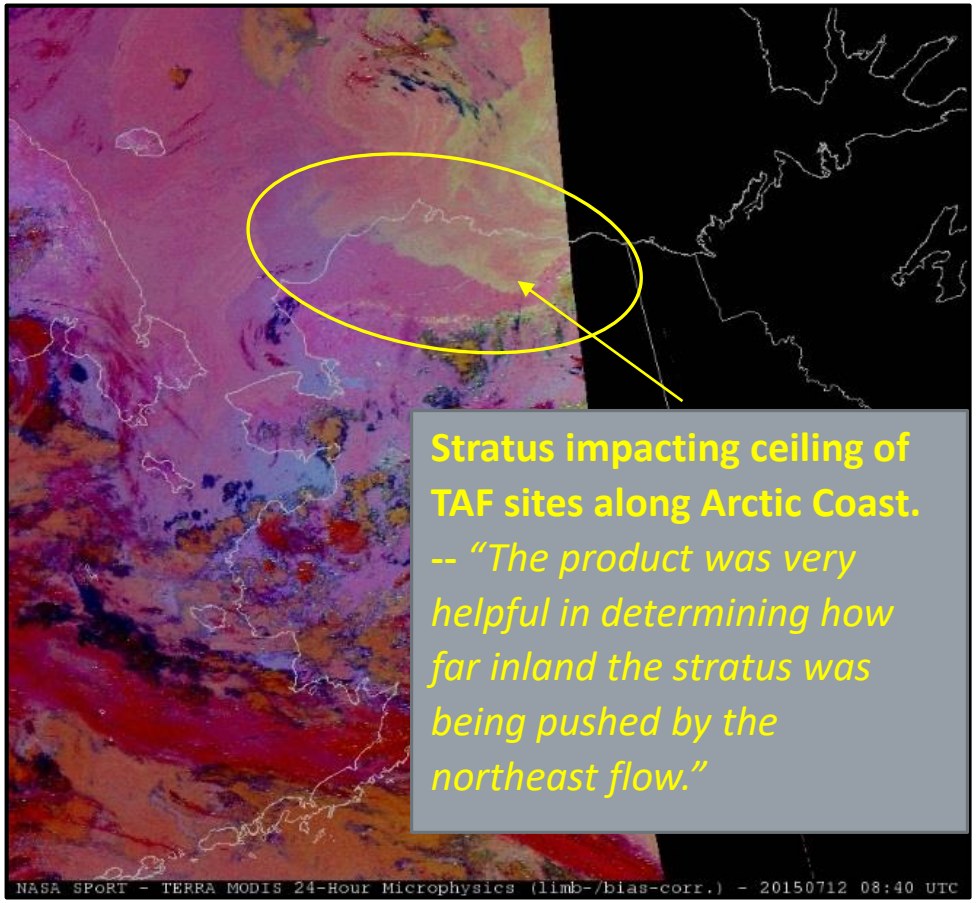
Adjust 24-hour Micro RGB

User Feedback at end of 24-hr Micro. RGB Assessment: Summer 2015

From Fairbanks WFO:

When asked for additional comments about the product and overall assessment activity …….

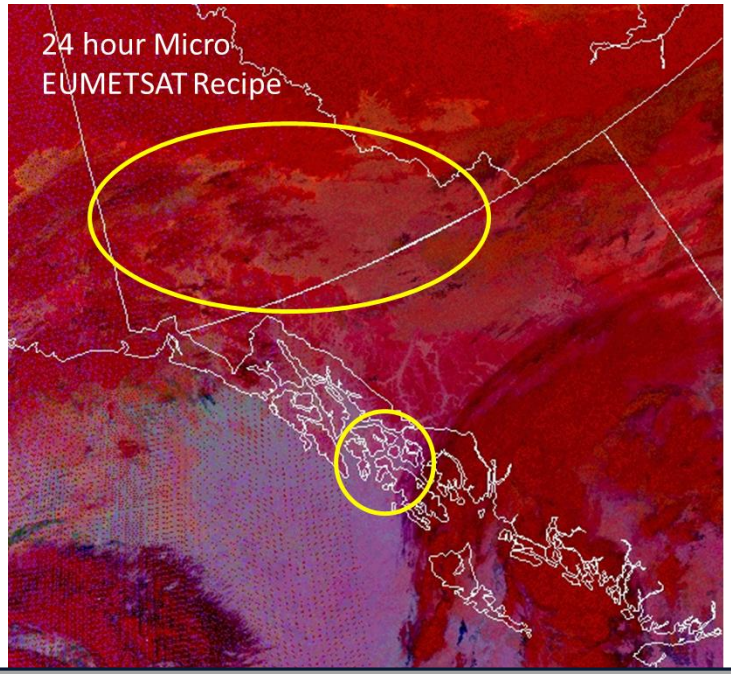
"**Very happy with the products**. They are of great utility for our office, especially over the Arctic and Bering sea. They are very helpful when working on aviation forecasts in those areas. **The injection of the new products I believe, has helped improve our TAFs and public forecast products over the last several months.** The ability to pick out the low stratus and fog has been greatly enhanced."

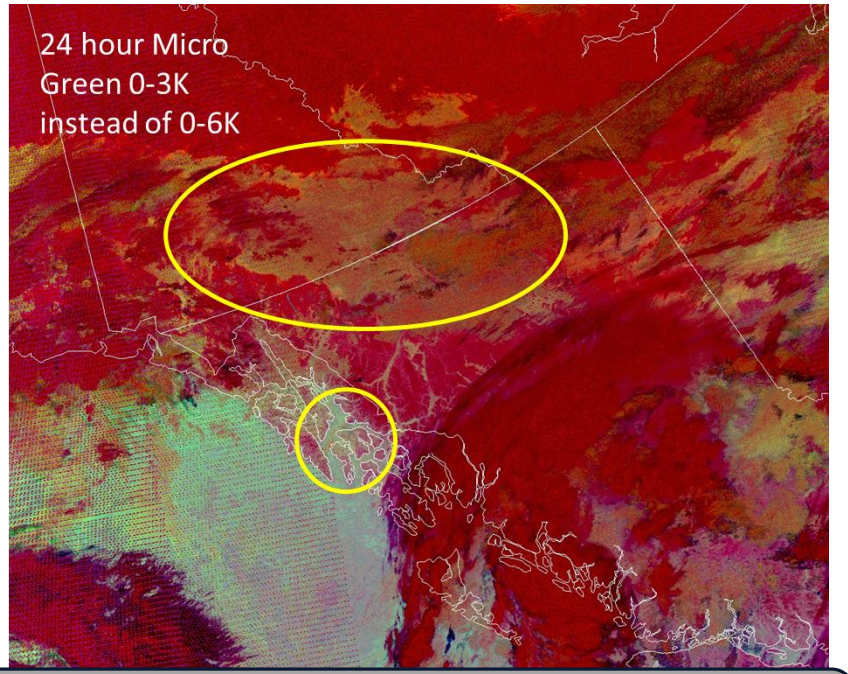


Microphysics RGBs in Alaska

2015: RGB Improvements based on Forecaster Feedback

- Adjustment of 24-hour Microphysics RGB for high-latitudes





Forecaster feedback led to product adjustments: "I had better luck picking out the cloud features in the 24-hour microphysics now than I did this past winter, however the colors displayed still make it somewhat difficult to pick out where the cloud edge is compared to using regular visible satellite images or VIIRS 1.61 band."

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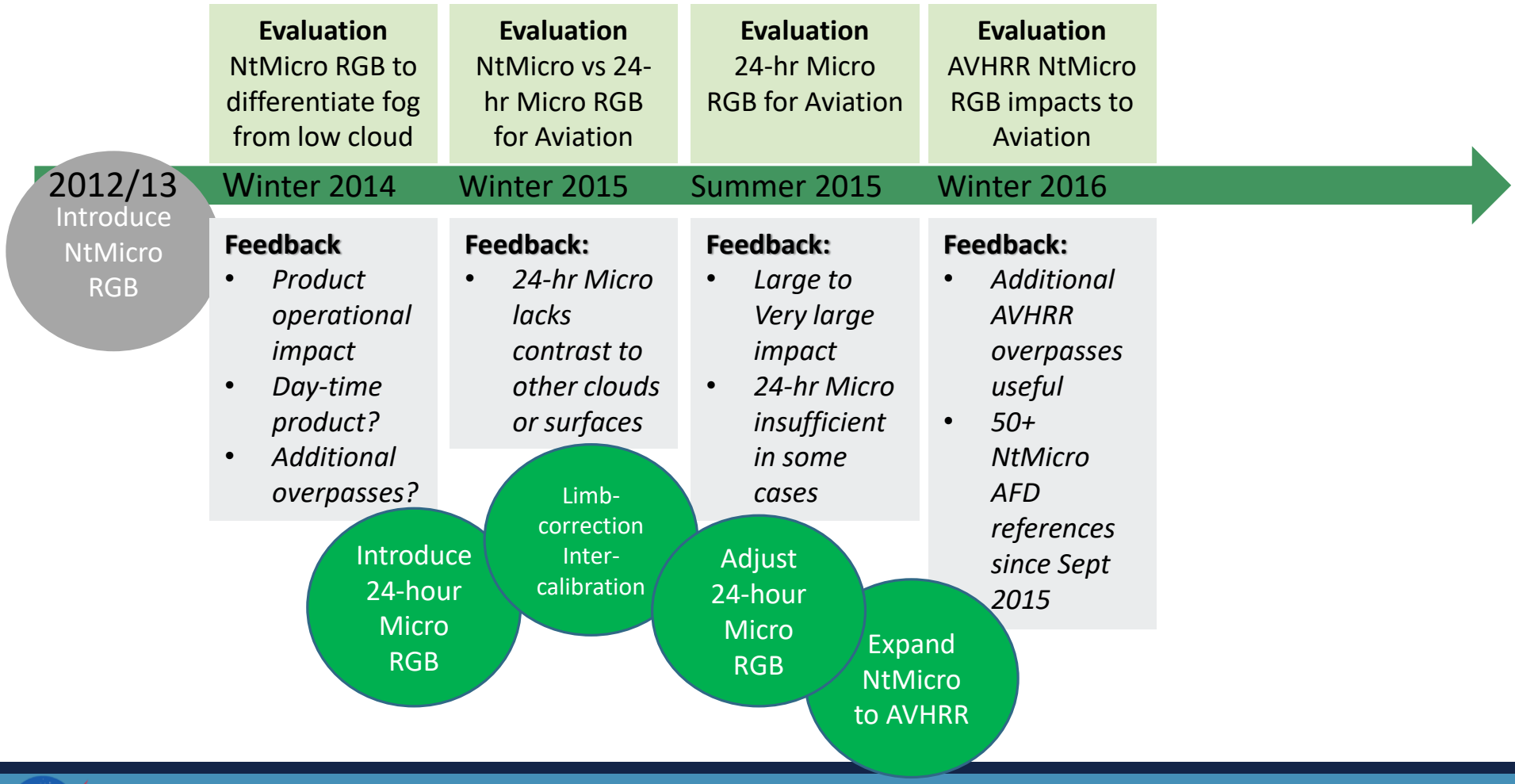
RGB Activities in Alaska



Microphysics RGBs in Alaska

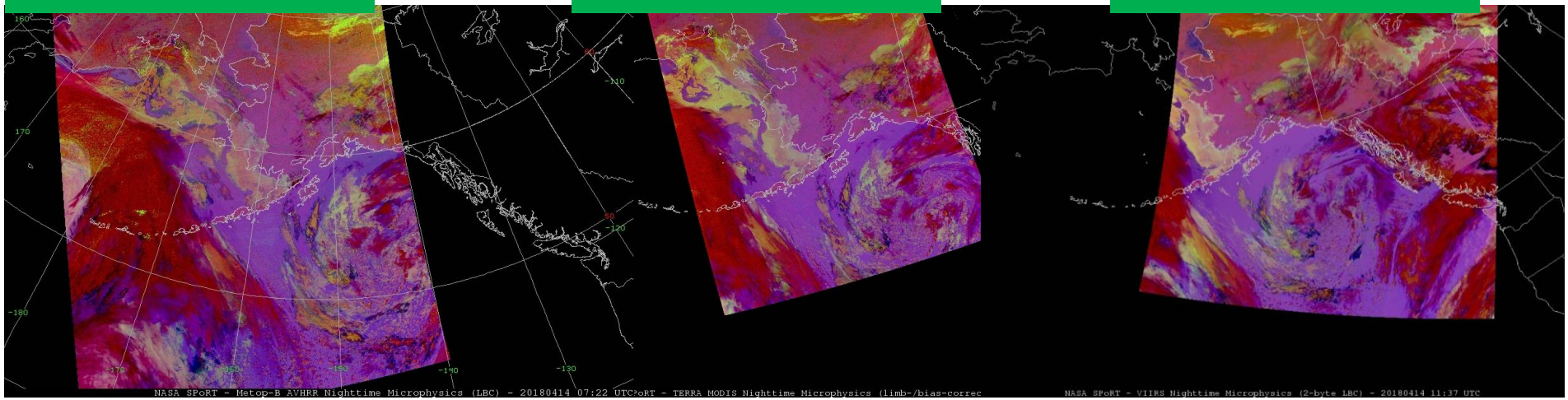
2015:

- AVHRR incorporated in NtMicro RGB product suite of LEO sensors
- Intercalibration and Limb correction applied to imagery to improve interpretation across swath and between different sensors

Metop-B AVHRR
0722 UTC 4/14/18

Terra MODIS
0756 UTC 4/14/18

S-NPP VIIRS
1137 UTC 4/14/18



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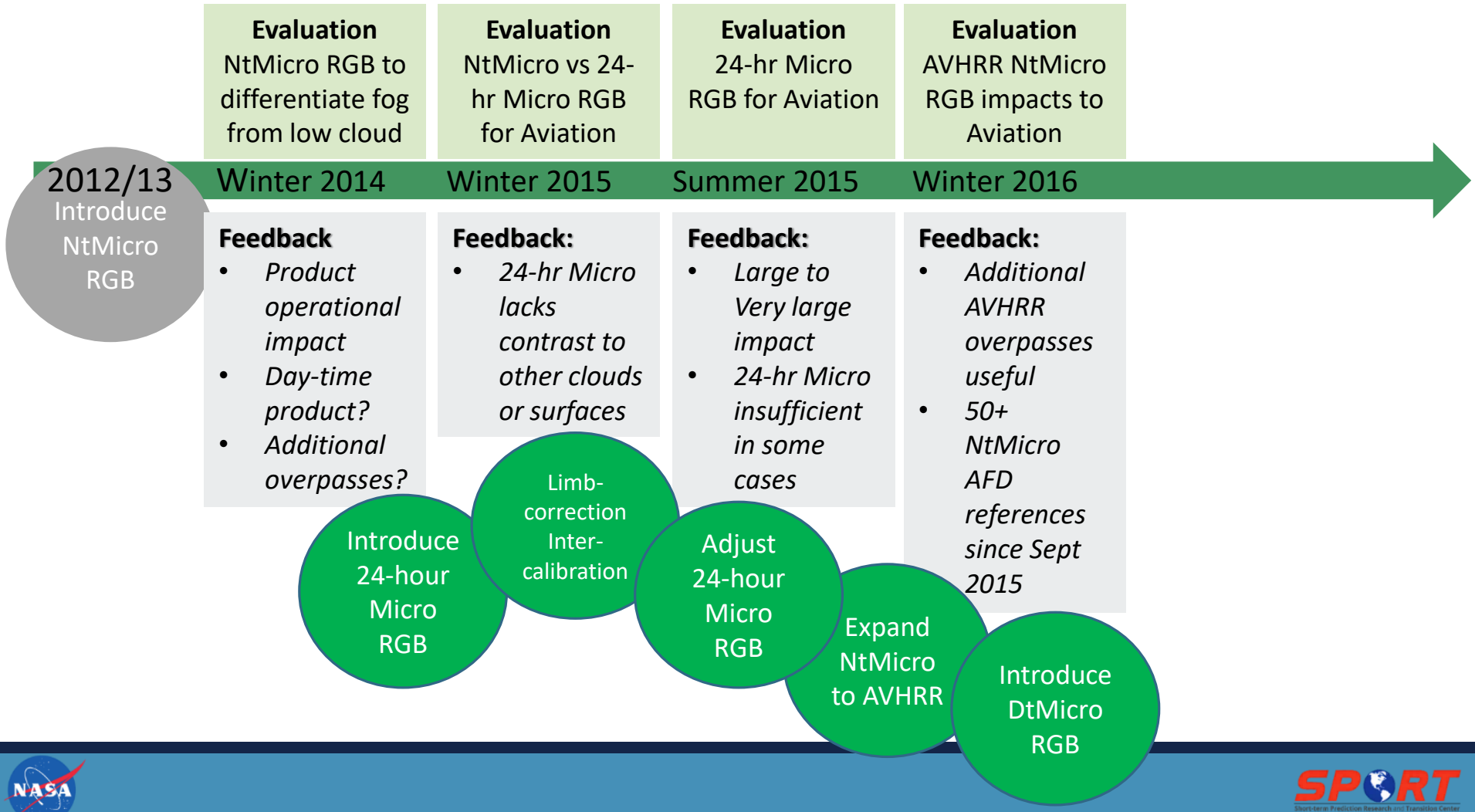
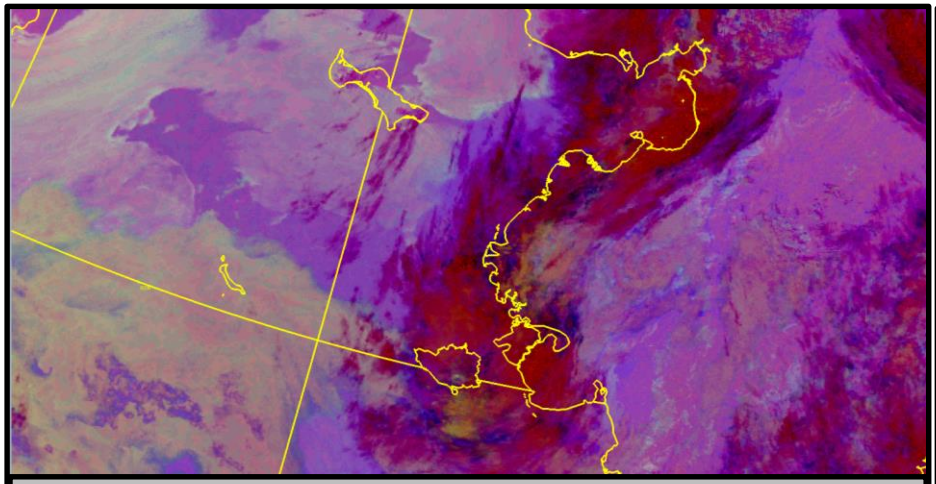


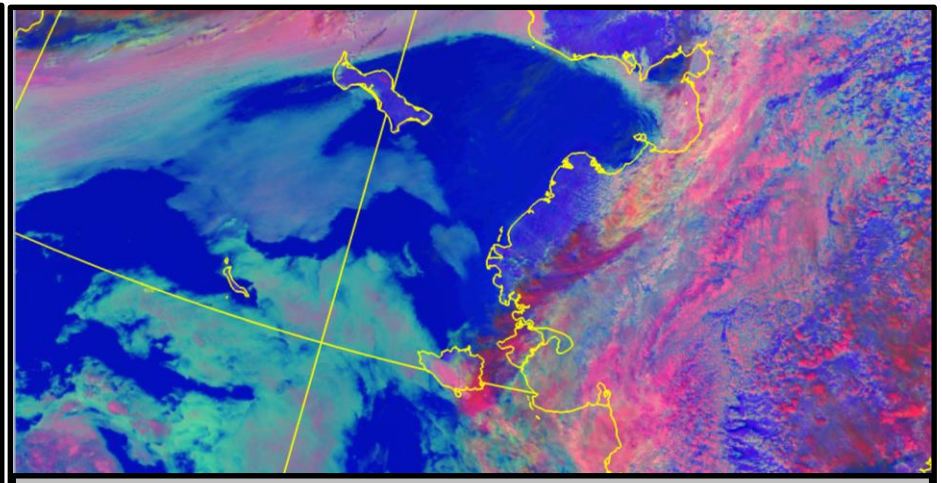
Microphysics RGBs in Alaska

2016: New RGB and client-side capabilities demonstrated

- AVHRR NtMicro RGB impacts to Aviation in Alaska assessment
- EUMETSAT Daytime Microphysics RGB (leverages 3.9 reflectance) for the ability to track low clouds and fog from night to day
- Daytime Microphysics RGB evaluated in Alaska summer 2016



SPoRT LEO 12 Jun 2016 1259 UTC
Nighttime Microphysics RGB



SPoRT LEO 12 Jun 2016 2255 UTC
Daytime Microphysics RGB

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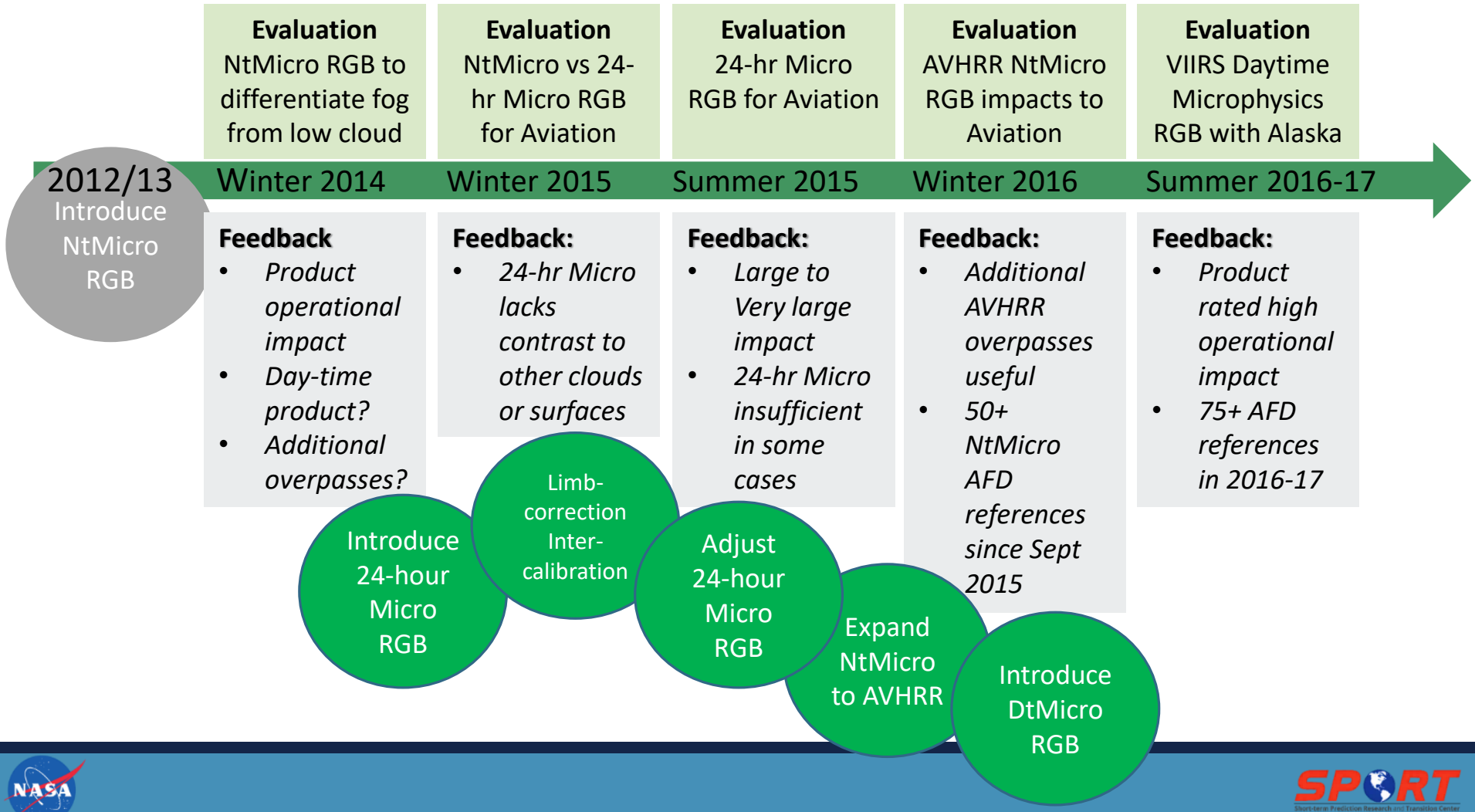
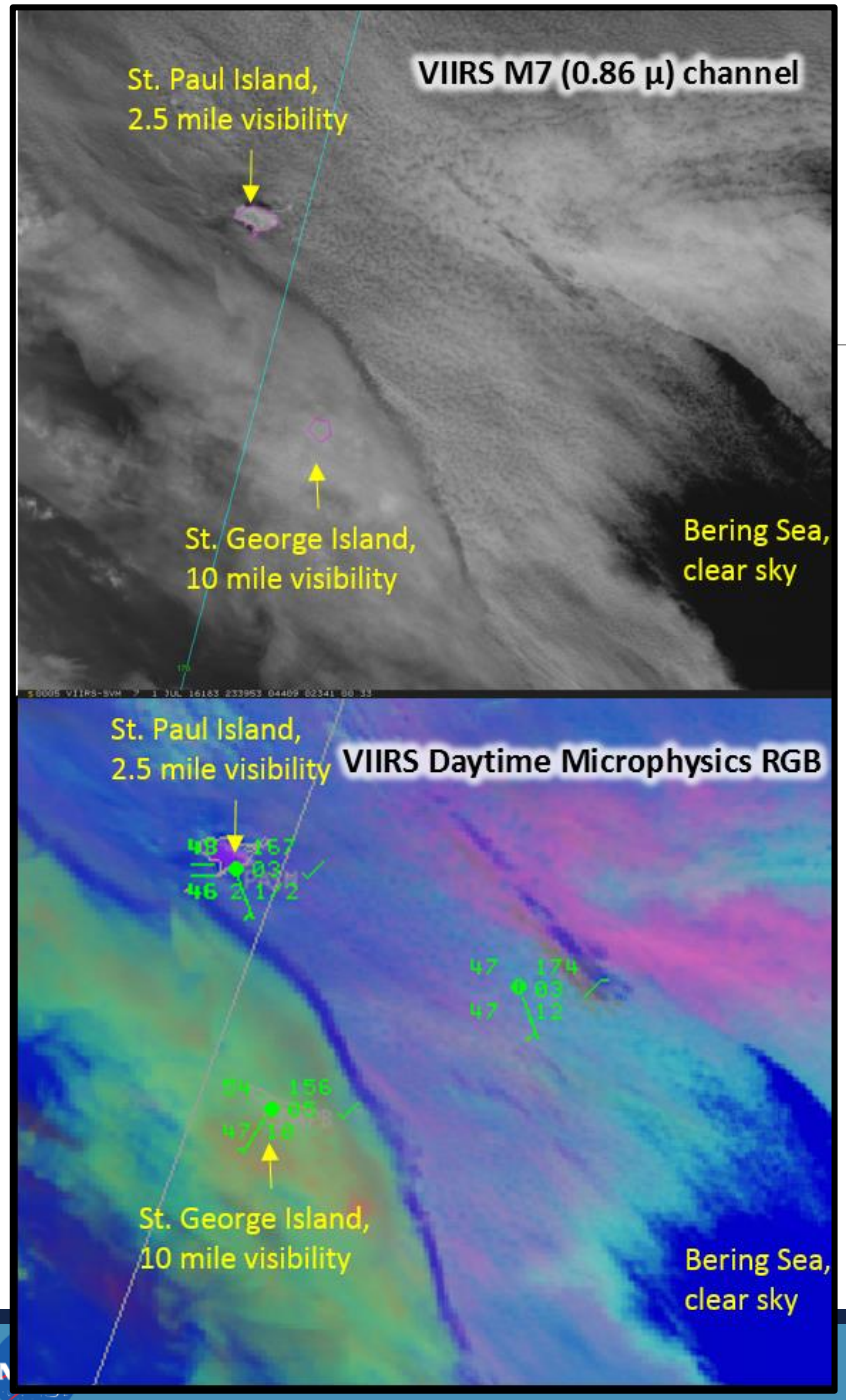




Daytime Microphysics RGB: Alaska 2016

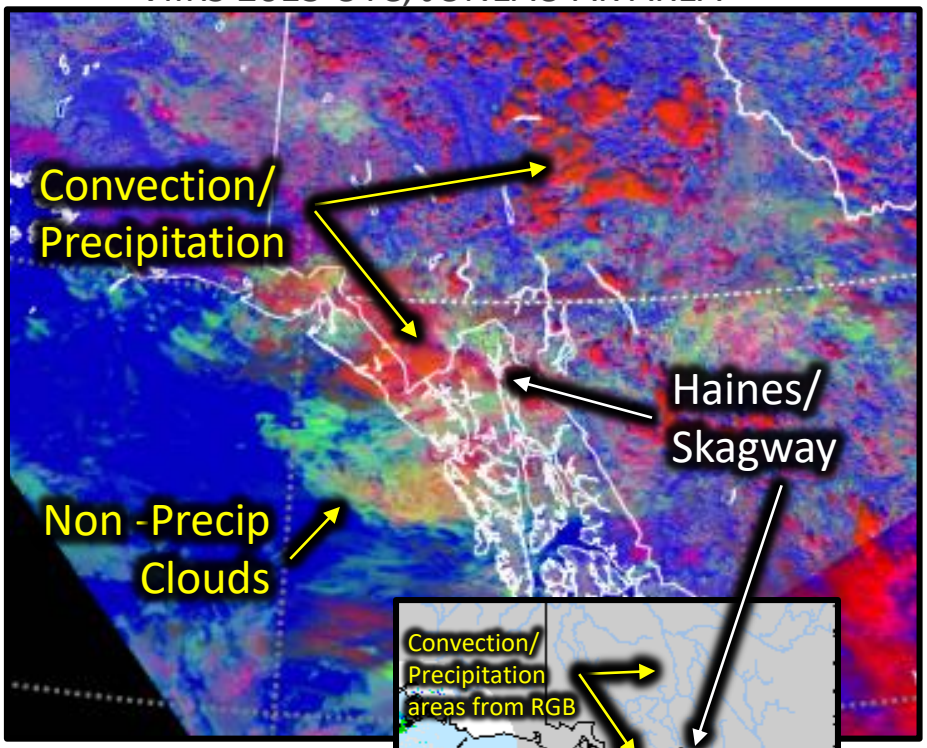
7/1/2016 Assessment feedback from Anchorage, AK forecaster:

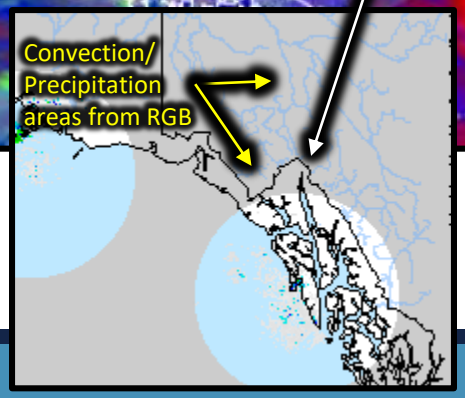
*"The **product gave great confidence** in combination with model data and surface observations to continue to forecast reduced visibility over the Pribilof Islands, both in the public forecast and PASN (St. Paul) TAF."*

The Daytime Microphysics RGB (left) shows bright greenish clouds with some tan coloring representing thick stratus at mid-levels while the blues/pinks represent low-level stratus of varying thickness. This **efficient depiction of cloud features in the preparation and updating of TAF forecasts** was a frequent comment made by users during the assessment.

Daytime Microphysics RGB:
Alaska 12 July 2016 – Convective precipitation

VIIRS 2013 UTC, JUNEAU AK AREA





Not at same time as RGB. Just used to as example of coverage

Juneau AK forecaster feedback on use of DtMicro RGB to analyze convection in area with poor radar coverage …..

"The image at 2013Z July 12 showed convection producing precipitation over the Haines/Skagway areas. The DtMicro showed clouds that should produce rainfall based on pixel color, and there were land base stations in the area that did report rainfall around the same time of the images. Good confidence on identifying cloud types that produce rainfall! Liking the product and it is becoming easier to use every time I look at it."

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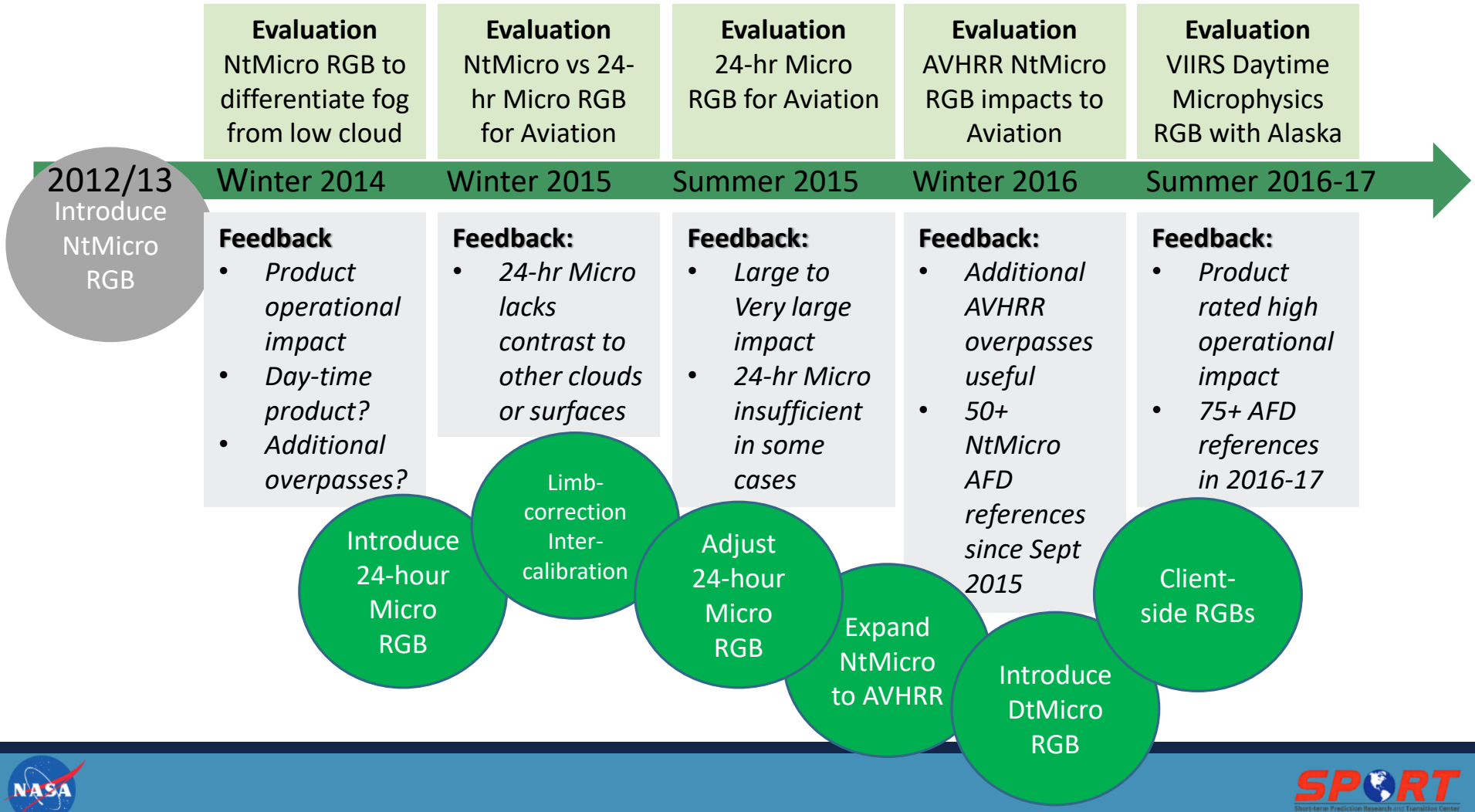
RGB Activities in Alaska

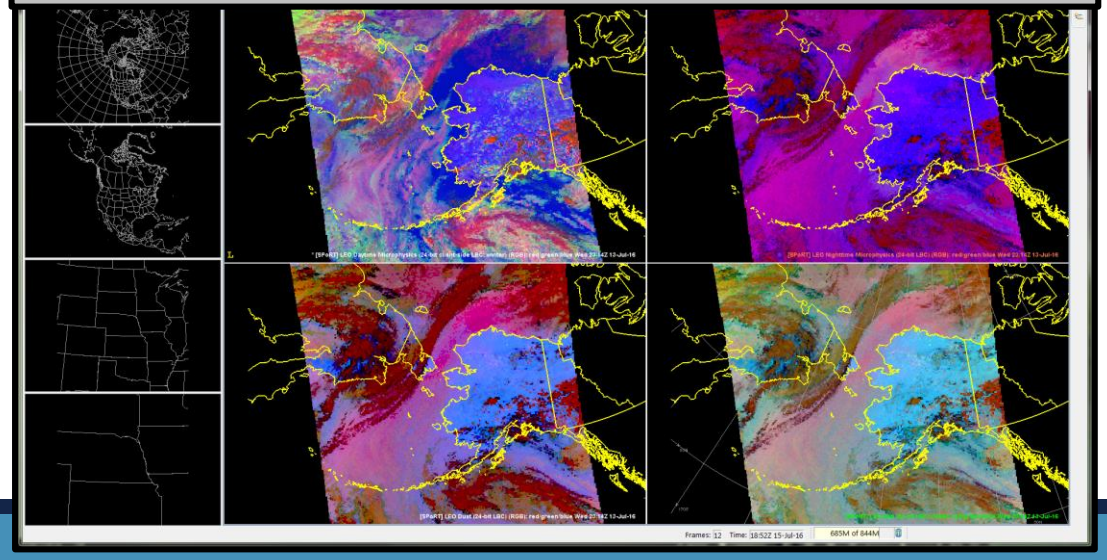


Client-side RGBs

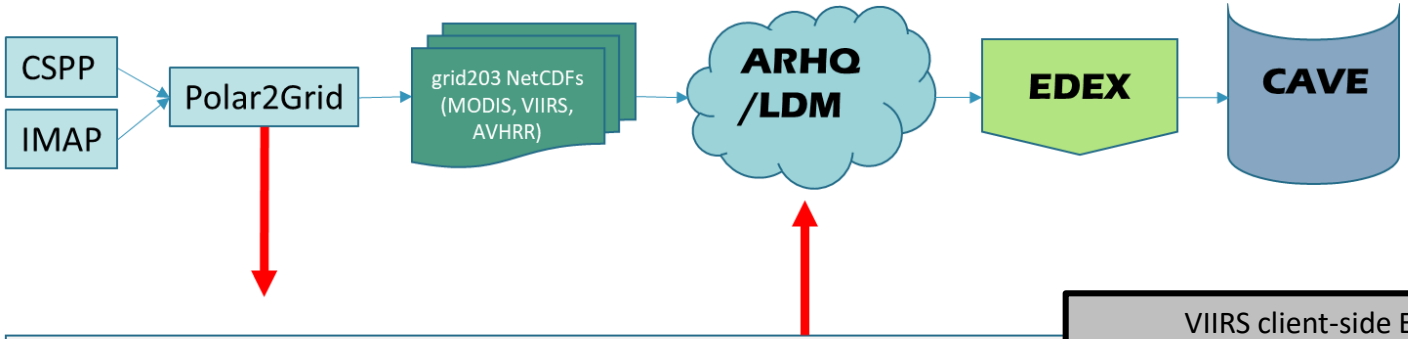
Worked with GINA & Alaska Region to demonstrate client-side RGBs with existing data stream for MODIS, VIIRS, and AVHRR

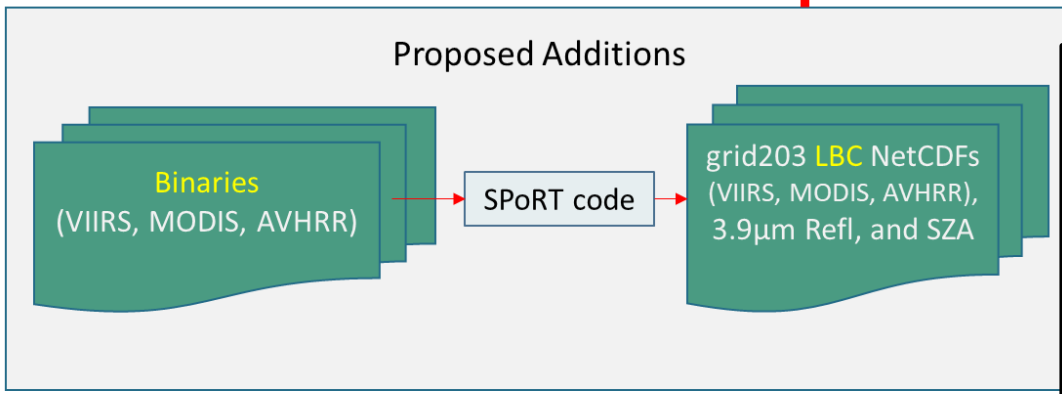
- Developed end-to-end VIIRS processing using CSPP data, polar2grid, and python
- Moving toward use of community, open source tools
- Use of existing data steams and processing at the data source reduces latency and third-party processing

VIIRS client-side EUMETSAT RGBs in Alaska
(top left) DtMicro, (top right) NtMicro, (bottom left) Dust, (bottom right) Ash



Experimental Data Processing of for High Quality RGBs





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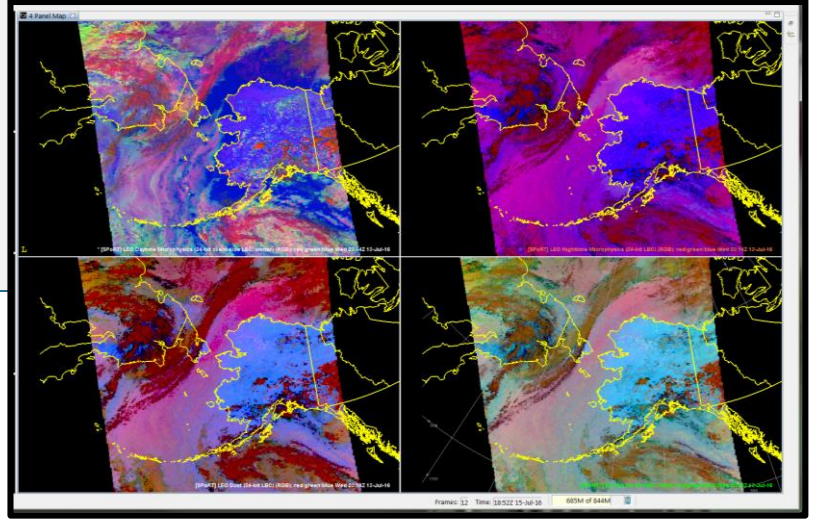


Steps forward in client-side RGB processing…

Inclusion of NOAA-20 VIIRS RGBs

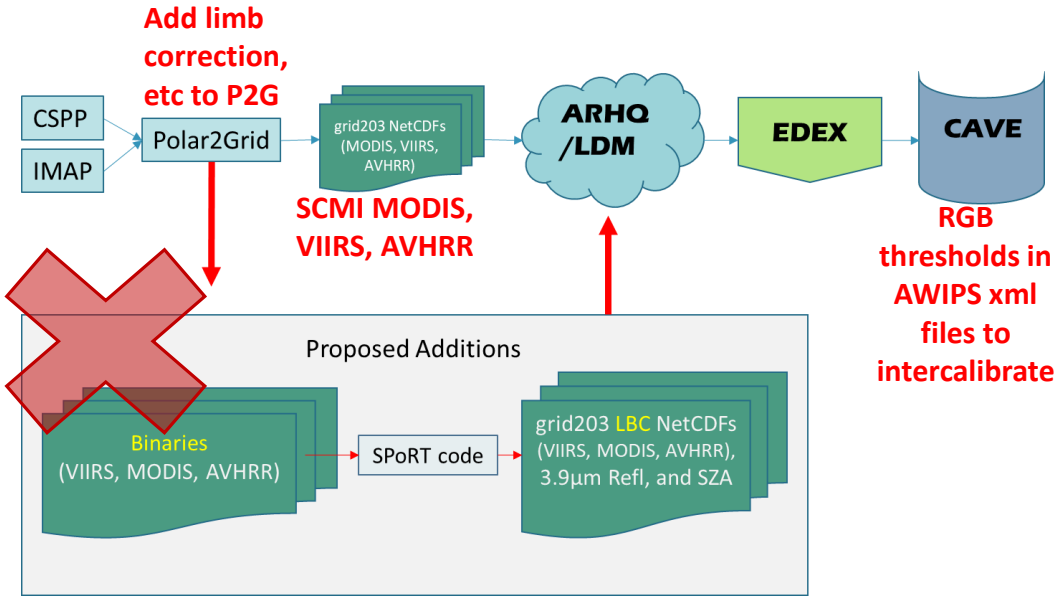
Anticipating format change to SCMI data

Limb-correction and 3.9 reflectance within Polar2Grid

RGB intercalibration can be done by adjusting the RGB thresholds rather than applying an offset to the data

Requires duplicate data streams of some single bands to provide high quality RGBs in AWIPS

Is GLSL preferred over Derived Parameters (pros and cons with both methods)



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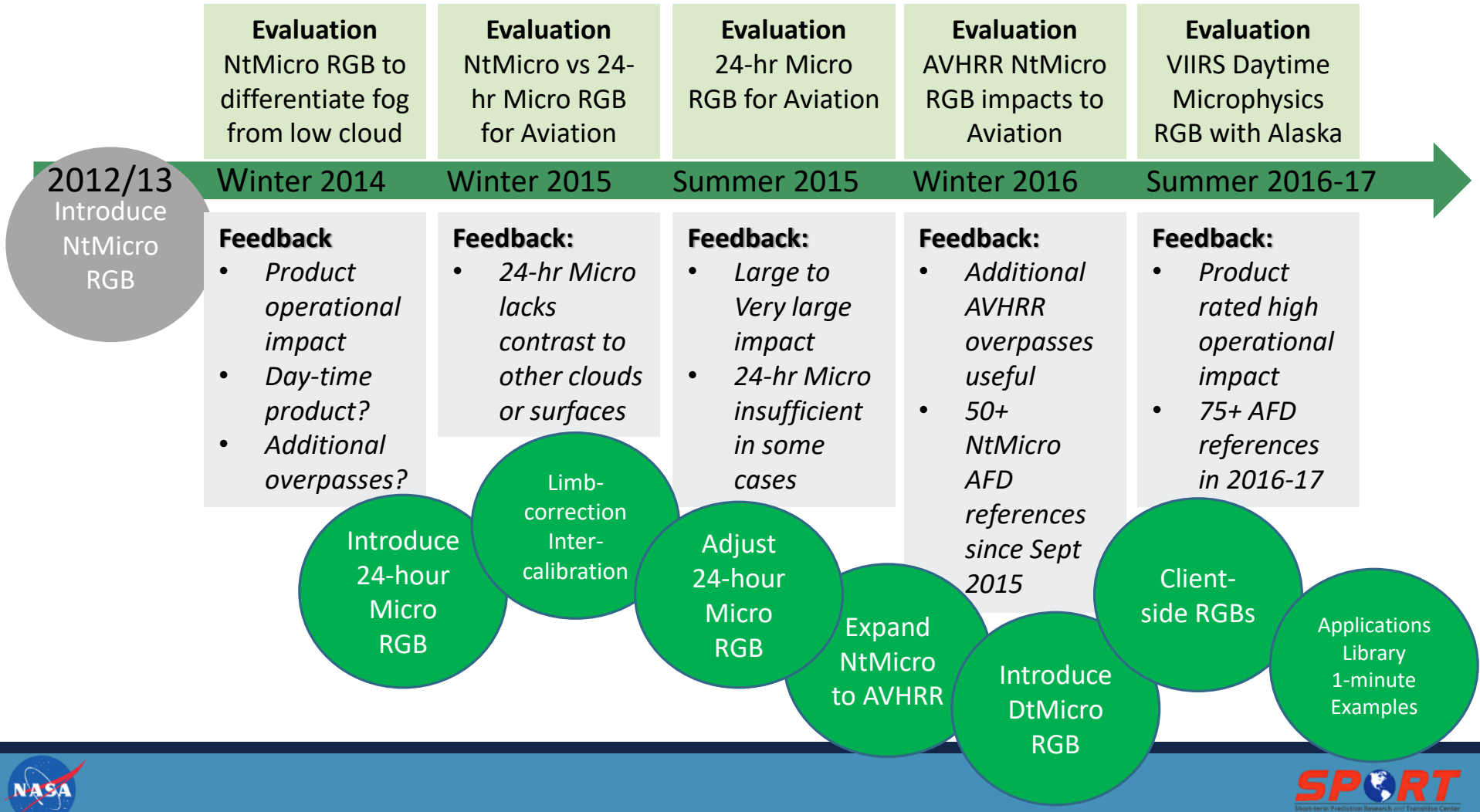


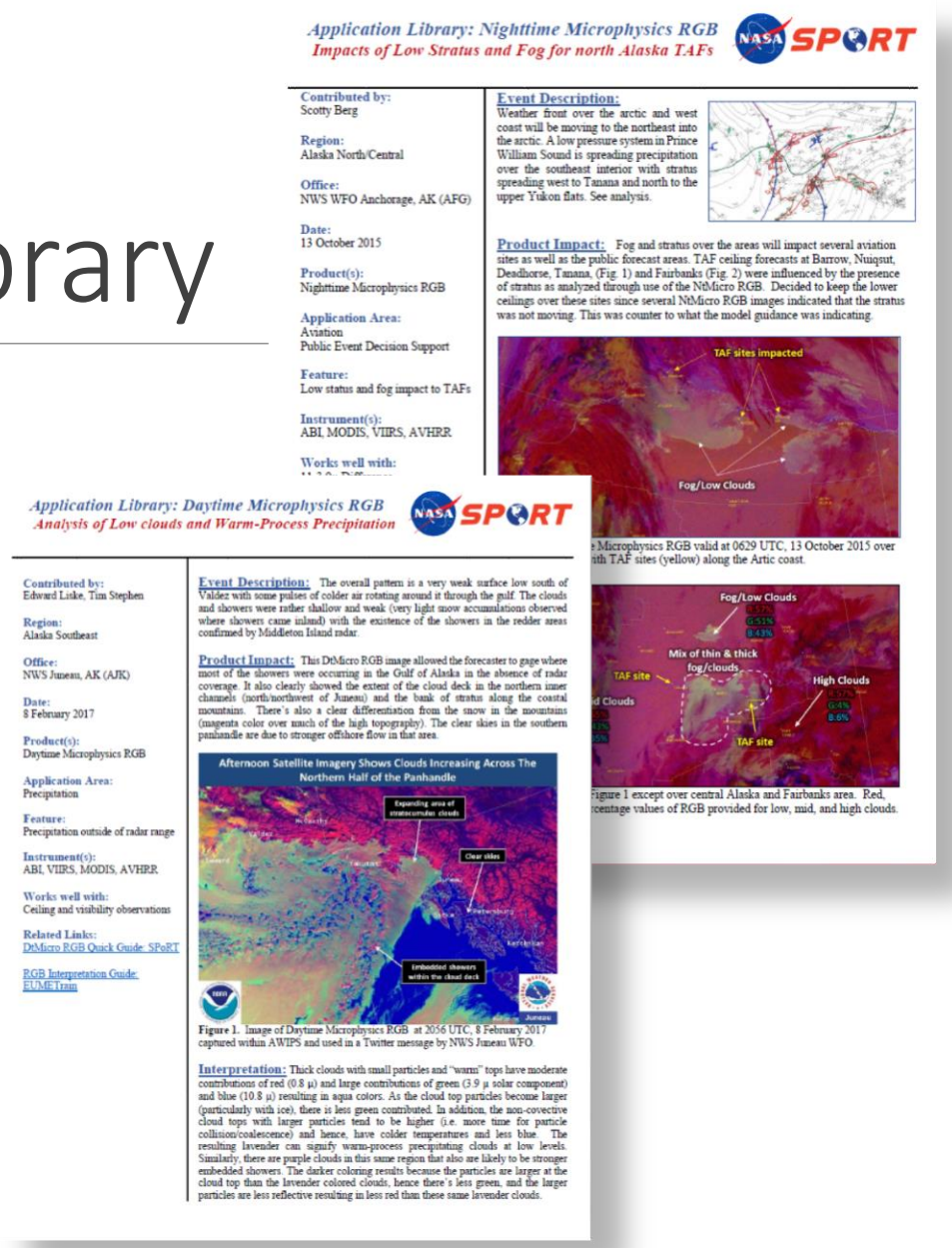
Applications Library

Short examples developed in collaboration with forecasters

Emphasis on peer to peer training

Emphasis on regionally relevant, operational examples

Viewable online or within AIR Tool (AWIPS)



Application Library: Nighttime Microphysics RGB
Impacts of Low Stratus and Fog for north Alaska TAFs

Contributed by: Scotty Berg
Region: Alaska North/Central
Office: NWS WFO Anchorage, AK (AFG)
Date: 13 October 2015
Product(s): Nighttime Microphysics RGB
Application Area: Aviation, Public Event Decision Support
Feature: Low status and fog impact to TAFs
Instrument(s): ABI, MODIS, VIIRS, AVHRR
Works well with:

Event Description: Weather front over the arctic and west coast will be moving to the northeast into the arctic. A low pressure system in Prince William Sound is spreading precipitation over the southeast interior with stratus spreading west to Tanana and north to the upper Yukon flats. See analysis.

Product Impact: Fog and stratus over the areas will impact several aviation sites as well as the public forecast areas. TAF ceiling forecasts at Barrow, Nuiqsut, Deadhorse, Tanana, (Fig. 1) and Fairbanks (Fig. 2) were influenced by the presence of stratus as analyzed through use of the NtMicro RGB. Decided to keep the lower ceilings over these sites since several NtMicro RGB images indicated that the stratus was not moving. This was counter to what the model guidance was indicating.

TAF sites impacted
Fog/Low Clouds

Microphysics RGB valid at 0629 UTC, 13 October 2015 over ith TAF sites (yellow) along the Artic coast.

Fog/Low Clouds
Mix of thin & thick fog/clouds
TAF site
High Clouds
TAF site

igure 1 except over central Alaska and Fairbanks area. Red, centage values of RGB provided for low, mid, and high clouds.

Application Library: Daytime Microphysics RGB
Analysis of Low clouds and Warm-Process Precipitation

Contributed by: Edward Liske, Tim Stephen
Region: Alaska Southeast
Office: NWS Juneau, AK (AJK)
Date: 8 February 2017
Product(s): Daytime Microphysics RGB
Application Area: Precipitation
Feature: Precipitation outside of radar range
Instrument(s): ABI, VIIRS, MODIS, AVHRR
Works well with: Ceiling and visibility observations
Related Links: DtMicro RGB Quick Guide: SPoRT
RGB Interpretation Guide: EUMETrain

Event Description: The overall pattern is a very weak surface low south of Valdez with some pulses of colder air rotating around it through the gulf. The clouds and showers were rather shallow and weak (very light snow accumulations observed where showers came inland) with the existence of the showers in the redder areas confirmed by Middleton Island radar.

Product Impact: This DtMicro RGB image allowed the forecaster to gage where most of the showers were occurring in the Gulf of Alaska in the absence of radar coverage. It also clearly showed the extent of the cloud deck in the northern inner channels (north/northwest of Juneau) and the bank of stratus along the coastal mountains. There's also a clear differentiation from the snow in the mountains (magenta color over much of the high topography). The clear skies in the southern panhandle are due to stronger offshore flow in that area.

Afternoon Satellite Imagery Shows Clouds Increasing Across The Northern Half of the Panhandle
Expanding area of stratocumulus clouds
Clear skies
Embedded showers within the cloud deck

Figure 1. Image of Daytime Microphysics RGB at 2056 UTC, 8 February 2017 captured within AWIPS and used in a Twitter message by NWS Juneau WFO.

Interpretation: Thick clouds with small particles and "warm" tops have moderate contributions of red (0.8 μ) and large contributions of green (3.9 μ solar component) and blue (10.8 μ) resulting in aqua colors. As the cloud top particles become larger (particularly with ice), there is less green contributed. In addition, the non-convective cloud tops with larger particles tend to be higher (i.e. more time for particle collision/coalescence) and hence, have colder temperatures and less blue. The resulting lavender can signify warm-process precipitating clouds at low levels. Similarly, there are purple clouds in this same region that also are likely to be stronger embedded showers. The darker coloring results because the particles are larger at the cloud top than the lavender colored clouds, hence there's less green, and the larger particles are less reflective resulting in less red than these same lavender clouds.

https://nasasporttraining.wordpress.com/applications-library-2

Summary RGB Activities

The Night-time Microphysics RGB was first introduced to Alaska Region WFOs in 2012/13 for low cloud/fog aviation hazards

Targeted product assessments and forecaster feedback have led to additional product development and improvements

- 24-hour Microphysics (winter/summer versions)
- Day-time Microphysics
- Intercalibration and limb-correction to utilize the full polar-orbiting swath
- Migration from pre-generated to client-side RGBs

Some Alaska forecasters now use Microphysics RGBs derived from polar-orbiters in daily operations

Last R2O/O2R steps include incorporating NOAA-20 VIIRS in RGB suite and fully transitioning client-side RGB processing to GINA and Alaska Region

AGU EOS Article "Transforming Satellite into Weather Forecasts"

S. Berg (AFC) from January 2015: "I use these images extensively during my briefings, ... My use of these products has rubbed off on the other forecasters in the office and most do use them, and brief them at shift changes. I also make a habit of asking about them at each briefing if they have not mentioned them. You may have also noticed that I have been adding a satellite section to my forecast discussion lately.

These are great products, keep them coming..."

NESDIS Snowfall Rate

Product

- Existing products: ATMS (S-NPP), AMSU/HMS (NOAA-18,19, MetOp-A,-B) snowfall rate (SFR)
- New products: SSMIS (DMSP: F16, F17, F18) and GMI (NASA GPM)
- SFR and MRMS (radar precip) merged snowfall rate, mSFR

Goal: Determine operational utility in the forecaster environment as it relates to:

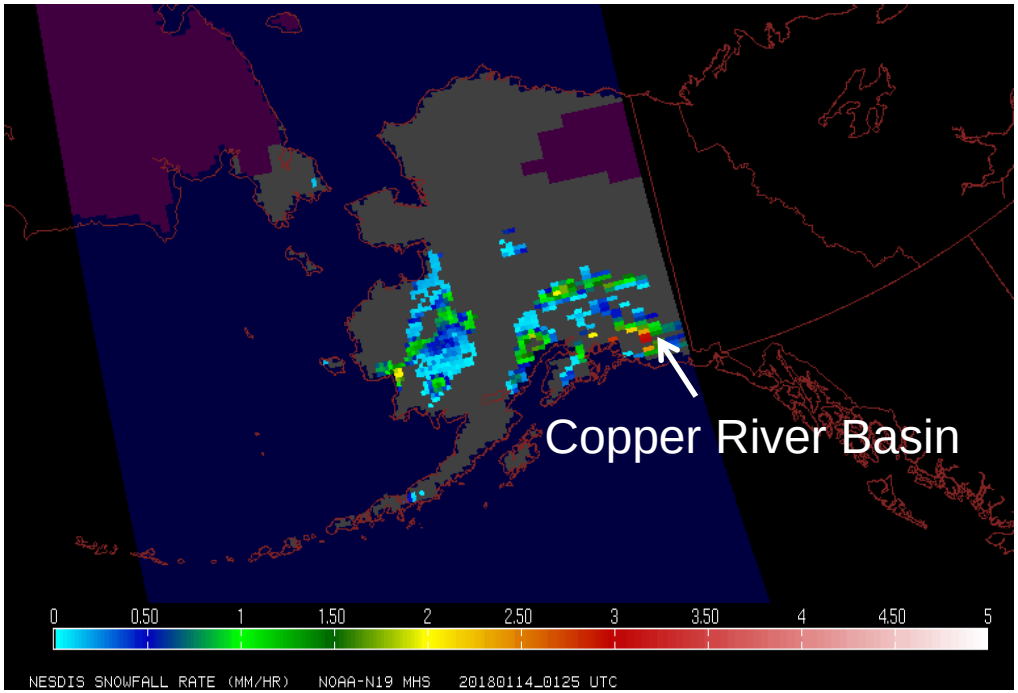
- Temporal resolution of data/imagery
- Accuracy of snowfall detection and rates, especially after adding new measurements from SSMIS and GMI
- Filling radar gaps
- Tracking snowfall rate maxima
- Determine areas where cloud seeding may be occurring ahead of falling precipitation

Active Participating Offices:

- NWS Albuquerque, NM
- NWS Juneau, AK
- Anchorage, AK

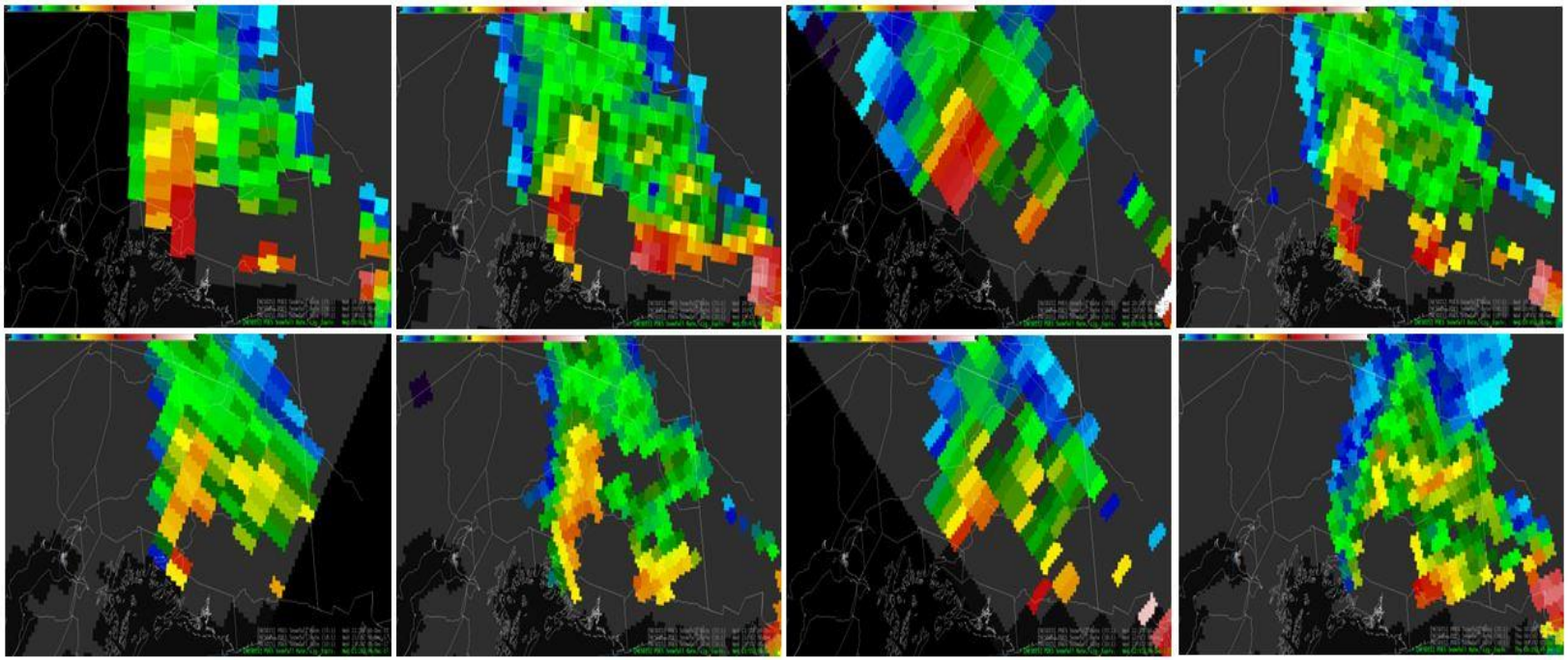
Filling Radar Gaps and Verifying Model Performance

Anchorage, AK WFO: *This product has been especially useful in the Copper River Basin, an area where we have no radar imagery and very few surface observations (ASOS/Mesonet/Snotel). Not only does it give us an idea of where it is precipitating, but helps verify model performance in a location where they really struggle with qpf and where there can be wildly different model forecasts for precipitation. In this case, I was able to use the SFR product to help figure out which guidance was verifying the best and lean toward that solution for the new forecast.*



Accuracy of Snowfall Detection and Rates

Anchorage, AK WFO: *The SFR product did a great job of accurately depicting where the heaviest snow was falling in northeast Prince William Sound (Valdez/Thompson Pass) and across the Copper River Basin. Thompson Pass observed 15" of snow in a 90 minute period and 40" of snow in 12 hours. These products helped define the area over which the heaviest snow was falling. It was underdone on the snow rates, but did show a large area of 0.15"/hr liquid equiv.*



Summary NESDIS Snowfall Rate

SPoRT and NESDIS have collaborated over the last 4 years to introduce the snowfall rate product to NWS forecasters and assess the utility in the operational environment

User feedback has let to product improvements

- A merged product and latency improvements
- Improved snowfall rate detection efficiency to capture more events
- Improved retrieval under colder surface temperatures
- Availability of liquid to snow ratio displays in AWIPS
- Inclusion of additional polar-orbiting data

Successful story of R2O and O2R with a period of intensive interaction between product developers and end-users

Passive Microwave Rain Rate

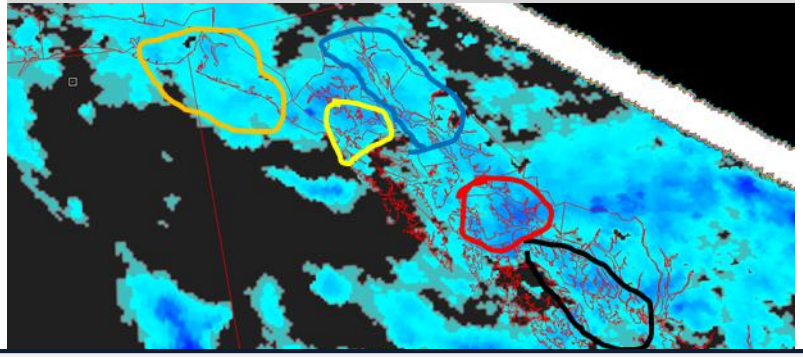
Operational Uses:

- Radar- or data-void regions
- Supplementing radar/IR/QPE/QPF
- Estimating rain rates for areal flooding potential

Recent Assessment (July-Aug 2017):

- Alaska WFOs & RFC (also IMERG [L3])
  - Latency/too few overpasses for some events (quickly evolving situations)
  - "High" or "Some" impact in the majority of cases
  - In most events, GPM swath rain rates (V05) are similar to other available rain rate data.
  - This result leads to increased forecaster confidence in the product over time.

GPM Swath Rain Rate 13 August 2017



Forecaster feedback (21Aug):
GPM did a very good job with this atmospheric river event. It showed where the heavy rain was and it matched well with surface-based obs along with radar and other satellite imagery like MIRS and other TPW sat products. It also showed where the lull in the precip was in conjunction with the warm sector/dry slot and the next wave of heavy precip moving northward. This was modeled well by NWP and it showed with the GPM rain rate products.

Passive Microwave - IMERG

Products:

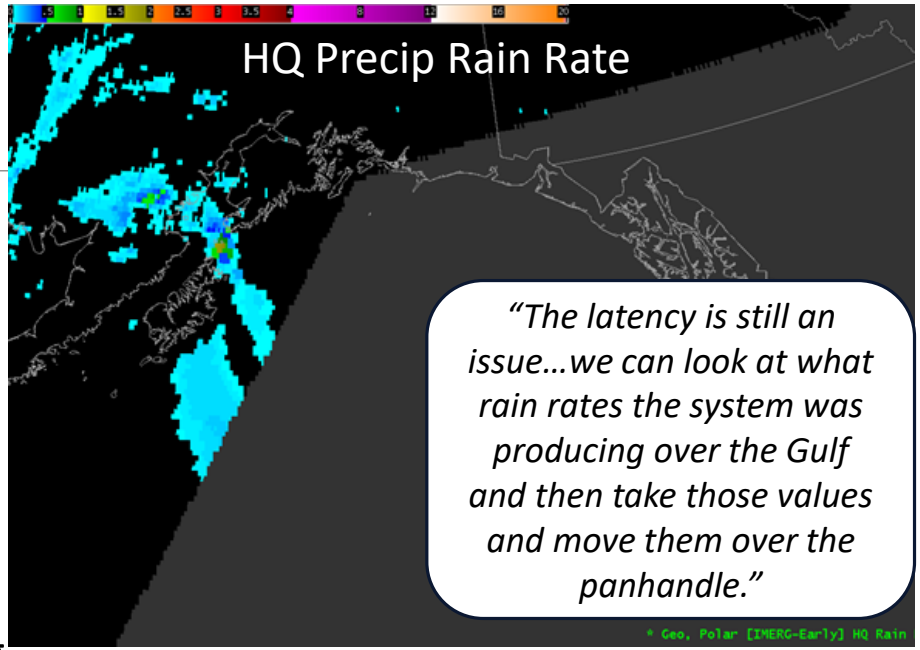
- Half-hourly Rain rate
  - Calibrated precipitation (heritage)
  - HQ precipitation (new)
    - » Beyond 60˚N
    - » No IR used
- 1-, 3-, 6-, 12-, & 24-hr accumulations
- *Early, Late* runs (<4:40h, <14:00h)

Operational Uses:

- *Early* product for nowcasting flooding
- *Late* product for post-event analysis
- *Final* product also available at GPM
- Potential use in hydrological modeling

Assessments:

- Alaska-Pacific River Forecast Center & WFOs



Feedback:

- IMERG (V04b) appears to underestimate rainrates when compared to radar estimates, model estimates, and gauge data.
- Forecasters "self-calibrate" by making educated assumptions if IMERG is the only dataset available

CrIS/ATMS NUCAPS

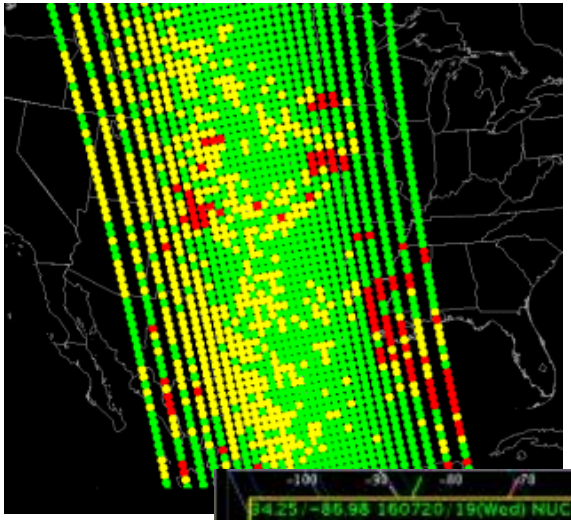
NUCAPS is the NOAA Operational Retrieval algorithm for SNPP CrIS/ATMS and Metop IASI/AMSU T and q profiles

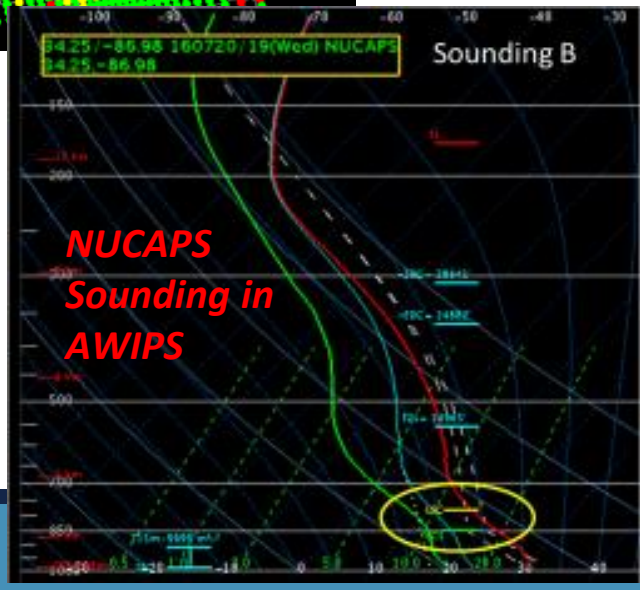
Capabilities for displaying individual Skew-T plots are available in the latest versions of AWIPS II with quality control flags

Skew-Ts are valuable for some forecast challenges, and ***visualizing the data in plan view or cross section may be more useful for others***

NUCAPS allows forecasters to observe the 3D extent of the atmosphere

Helpful where conventional observations are sparse





https://accap.uaf.edu/March2018_VAWS

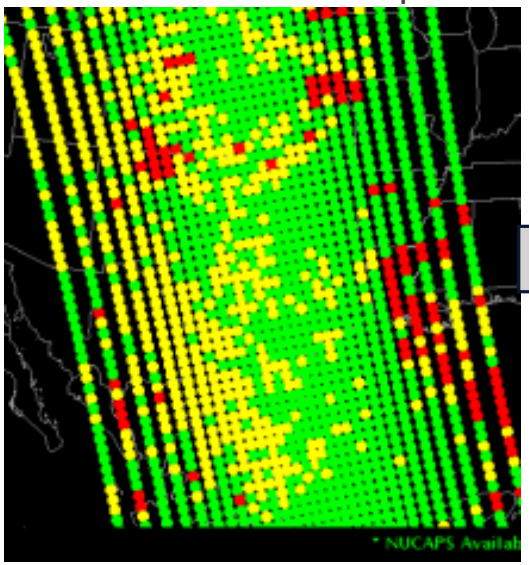
Images by Kris White
(NWS HUN/SPoRT)

Gridded NUCAPS

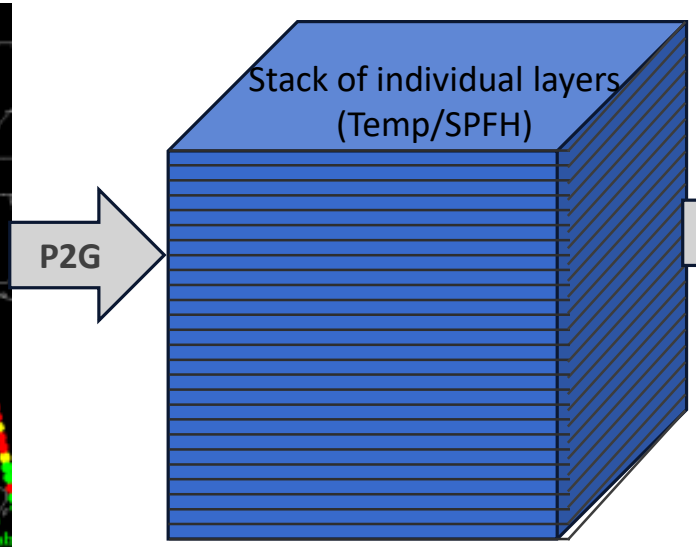
CIMSS has modified its polar2grid software package to include readers for NUCAPS

SPoRT obtains Direct Broadcast data, runs polar2grid, and converts output to gridded binary (GRIB2) format for ingest into AWIPS II

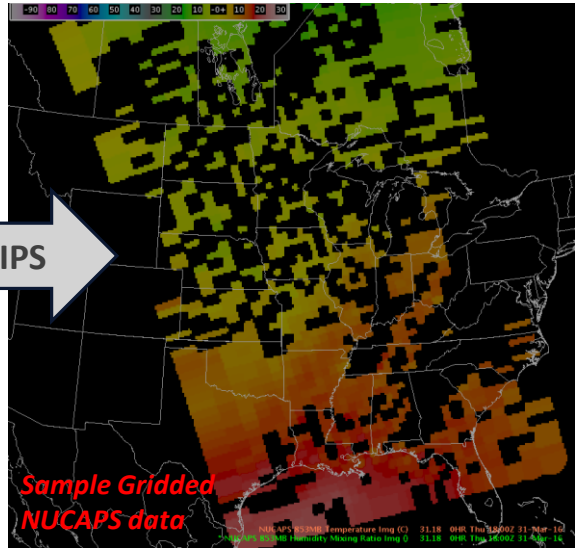
GRIB2 files are pushed to NWS partners in real-time



NUCAPS Soundings:
Need to click on each 'point' to review the vertical information



A subset of 58 layers are output using Polar2Grid from the 100 layers output by NUCAPS. File contains Temperature, Specific humidity, Surface pressure and temperature, Topography



Ingested into AWIPS on a uniform model grid, so AWIPS will interrogate the information in the same way it handles model data.

Forecast Challenge: Cold Air Aloft

Gridded NUCAPS was initially developed to address Cold Air Aloft

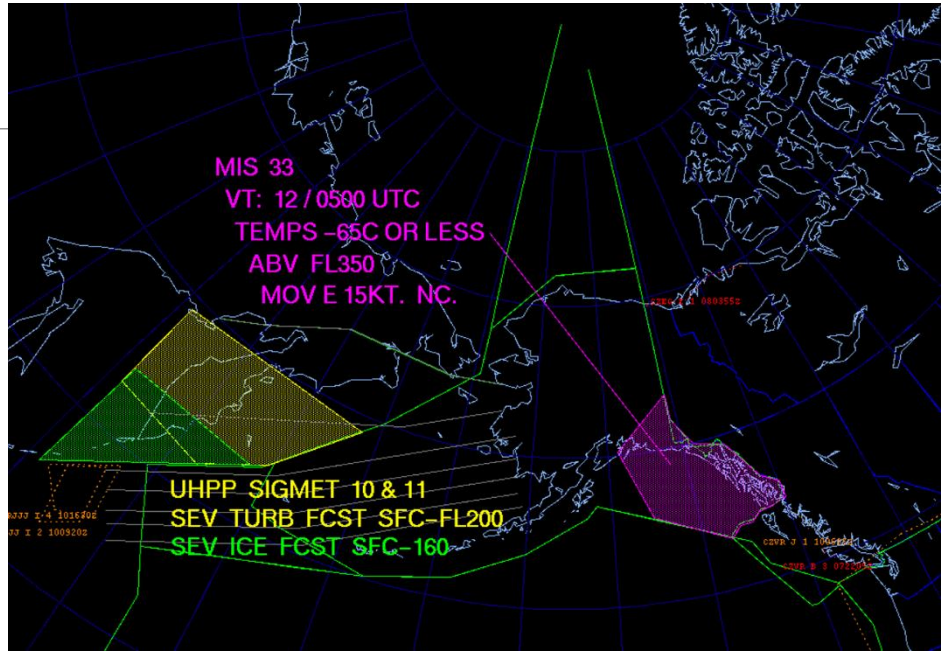
Cold Air Aloft (≤ -65°C) events can freeze airliner fuel and regularly occur at flight levels in the arctic

Center Weather Service Units (CWSU) provide Meteorological Impact Statements (MIS) to Air Traffic Controllers to direct flights around the 3D air features

In data sparse Alaska, forecasters have relied on analysis and model fields and limited radiosonde observations to guess the 3D extent of the Cold Air Aloft

Use of satellite observations provides an opportunity for forecasters to observe the 3D extent of the Cold Air Aloft in real-time

Alaska CWSU domain (green line) and warning guide for 11 January 2017. Purple hatched area is an advisory for Cold Air Aloft



Example text product disseminated by Alaska CWSU for Cold Air Aloft; valid 14 November 2015

```
FAAK20 KZAN 121458
ZAN MIS 01 VALID 121500-130300
...FOR ATC PLANNING PURPOSES ONLY...
COLD AIR ALOFT
FROM 185NE SCC-65NE ORT-55SW ENN-110NW BRW-185NE SCC
TEMPS -65C OR LESS FM FL350-400. AREA MOVG NE 40 KTS.
CMW NOV 14
```

Lat/Lon Extent of Cold Air from soundings, aircraft reports, model

Vertical Extent of Cold Air from soundings/aircraft reports/model

Motion determined from model data

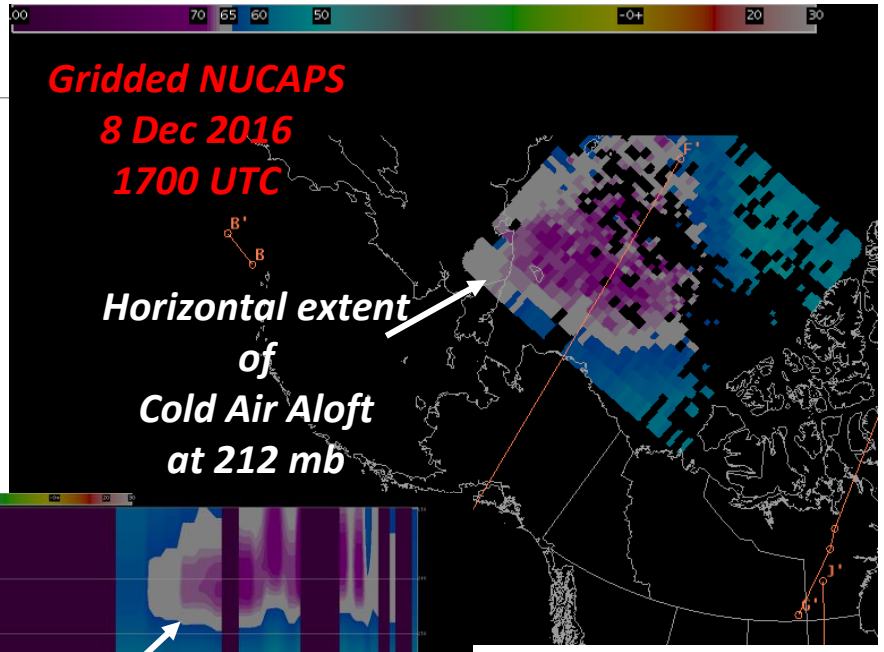
Cold Air Aloft

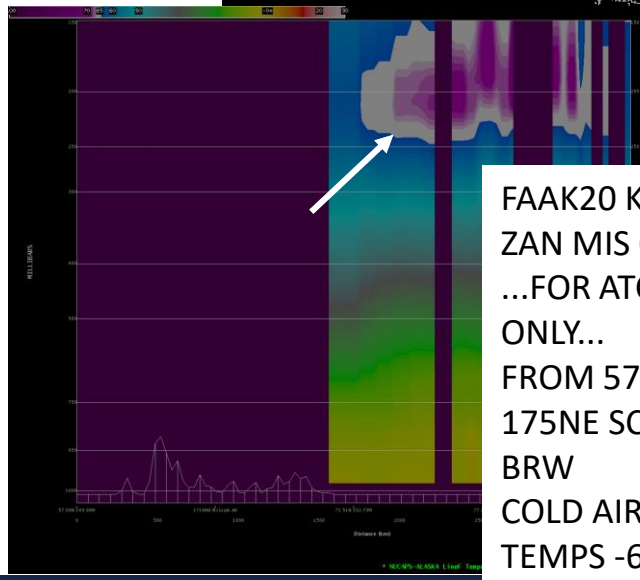
Forecasters at the Anchorage CWSU evaluated the Gridded NUCAPS during the 2016-2017 Winter

Goal was to provide data to improve Cold Air Aloft analysis and increase confidence when issuing operational MIS statements use by the FAA and airlines.

Preparation for the demonstration included:

- In person visit to the CWSU to cover training material
- A specific color curve to outline the coldest air
- A procedure to allow forecasters to quickly toggle through the vertical layers
- Short videos to demonstrate installation and use of the data





FAAK20 KZAN 082312
ZAN MIS 01 VALID 082312-090600
...FOR ATC PLANNING PURPOSES ONLY...
FROM 575NNW BRW-510NNE BRW-175NE SCC-BRW-200W BRW-572N BRW
COLD AIR ALOFT
TEMPS -65C OR LESS FM FL310-FL340. MOV E 15 KT. INTSF.
GMW DEC 16

Summary CrIS/ATMS NUCAPS

Gridded NUCAPS was developed to allow for 3-D interrogation of the atmosphere and specifically to diagnose areas of Cold Air Aloft

Forecasters have provided feedback that Gridded NUCAPS has a positive impact on identifying Cold Air Aloft events and increases confidence when issuing Meteorological Impact Statements

Gridded NUCAPS was evaluated at HWT to explore its use for diagnosing the pre-convective environment

Forecasters found utility in spatial patterns and gradients, while specific values were not as valuable, especially at lower levels of the atmosphere.

Collaborating with AWIPS developers to baseline Gridded NUCAPS and improve visualization in AWIPS

Improvements in latency of both Soundings and Gridded products are under development

Check out the Aerospace America Feature Article "Danger In the Air"

Plan to explore other applications such as turbulence, icing, and fire weather and use of microwave-only soundings

Summary

SPoRT has collaboratively worked with Alaska WFOs to introduce RGB imagery to prepare for NOAA-20 VIIRS and improve forecasting aviation related hazards

Last R2O/O2R steps include incorporating NOAA-20 VIIRS in RGB suite and fully transitioning client-side RGB processing to GINA and Alaska Region

Alaska Region WFOs have been part of the successful R2O/O2R story to assess the use of the NESDIS Snowfall Rate product in operations

SPoRT introduced passive microwave rain rate and IMERG to Alaska WFOs for use in radar-void areas and assessing flooding potential

SPoRT has been part of the multi-organization collaborative effort to introduce Gridded NUCAPS to the Anchorage CWSU to assess Cold Air Aloft events