Blogging as a Training Tool for new Forecast Tools and Products

A. Scott Bachmeier

Scott S. Lindstrom

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THANKS TO: BILL BELLON, MIKE PAVOLONIS, CHAD GRAVELLE, VISIT AND SHYMET PROGRAMS

Blogs at UW CIMSS

- http://cimss.ssec.wisc.edu/goes/blog
- http://pyrocu.ssec.wisc.edu
- http://fusedfog.ssec.wisc.edu
- Natural vehicles to showcase the abilities and potential shortcomings of new forecast techniques that are developed

Sensing the surface on GOES-13 water vapor imagery « CIMSS

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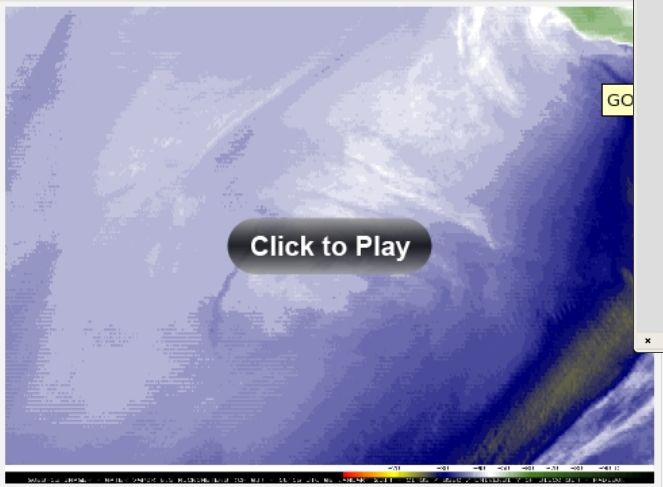
Sensing the surface on GOES-13 water vapor imagery

January 7th, 2014



GOES-13 6.5 µm water vapor channel images (click to play animation)

Most users of water vapor satellite imagery interpret the patterns they see as variations in moisture within the middle to upper troposphere — and for the most part, this is often a good first-order assumption. However, one must keep in mind that the water vapor channel is essentially an *InfraRed* channel, which is sensing the average temperature of a *layer* of moisture — and the *altitude* and *depth* of the layer of moisture being detected can change significantly, based upon such factors as the temperature and/or moisture profile of the atmospheric column, and the viewing angle of the satellite.

During an unusually cold arctic outbreak over the north-central US during the **06 January** – **07 January 2014** period, the outline of various portions of the Great Lakes (in particular, Lake Superior, Lake Michigan, and Lake Erie) could actually be seen on GOES-13 6.5 µm water vapor channel imagery ***(above; click image to play animation)***. So, how is it possible to see *surface* features on water vapor channel satellite imagery?

In helping to understand the vertical location and vertical extent of features seen on water vapor imagery, plots of the water vapor "**weighting function**" (or "contribution function") can be generated by taking into account the temperature and moisture profile of that location, along with the satellite viewing angle (or "zenith angle"). For this example, plots of GOES-13 Imager 6.5 µm water vapor weighting functions for Green Bay, Wisconsin ***(below)*** showed how the altitude

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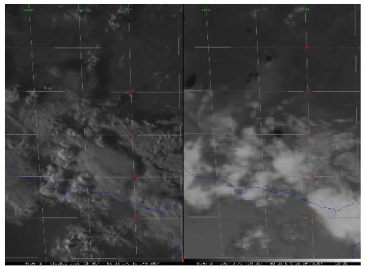
Large bushfires in southeastern Australia

By Scott Bachmeier | Published January 16, 2014



MTSAT-2 0.68 µm visible channel (left) and 3.75 µm shortwave IR (right) images [click to play animation]

An extended period of hot, dry weather led to the development of multiple large bushfires across parts of southeastern Australia, some of which began to produce pyrocumulonimbus (pyroCb) clouds during the 15-16 January 2014 period. Mod... channel data ***(above; click...*** development of a well-def... After the visible images on ... on the right panels showe... grow during the night.

MTSAT-2 10.8 µm longwa... ***MP4 animation)*** indicated ... pyroCb cloud became as ...

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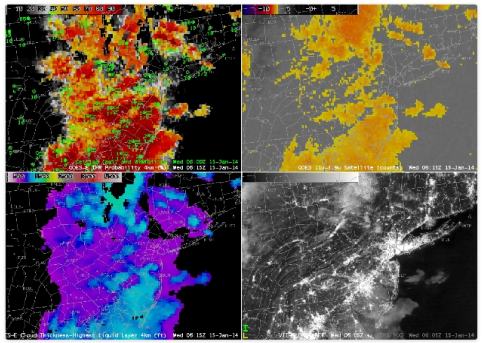
Dense fog on the East Coast



GOES-East IFR Probabilities and surface plots of visibilities/ceilings at 0615 UTC 15 January (Upper Left), GOES-East Brightness Temperature Difference (10.7 µm – 3.9 µm), 0615 UTC 15 January (Upper Right), GOES-R Cloud Thickness, 0615 UTC 15 January (Lower Left), and Suomi/NPP Day/Night Band and Brightness Temperature Difference toggle (11.35 µm – 3.74 µm), 0605 UTC 15 January (Lower Right)(click image to enlarge)

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January 7th, 2014

GOES-13 6.5 µm water vapor channel images (click to play animation)

The main blog

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Large bushfires in southeastern Australia

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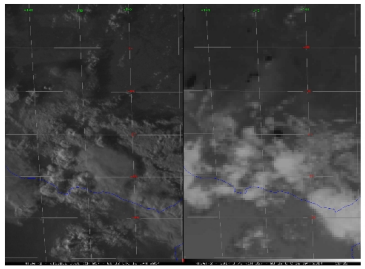

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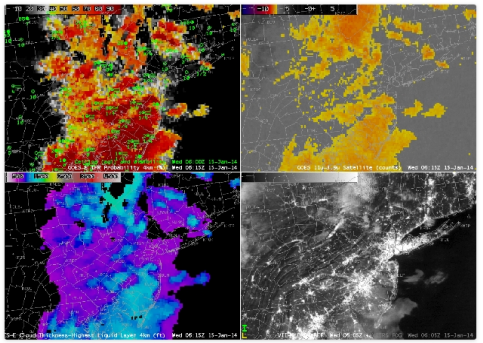

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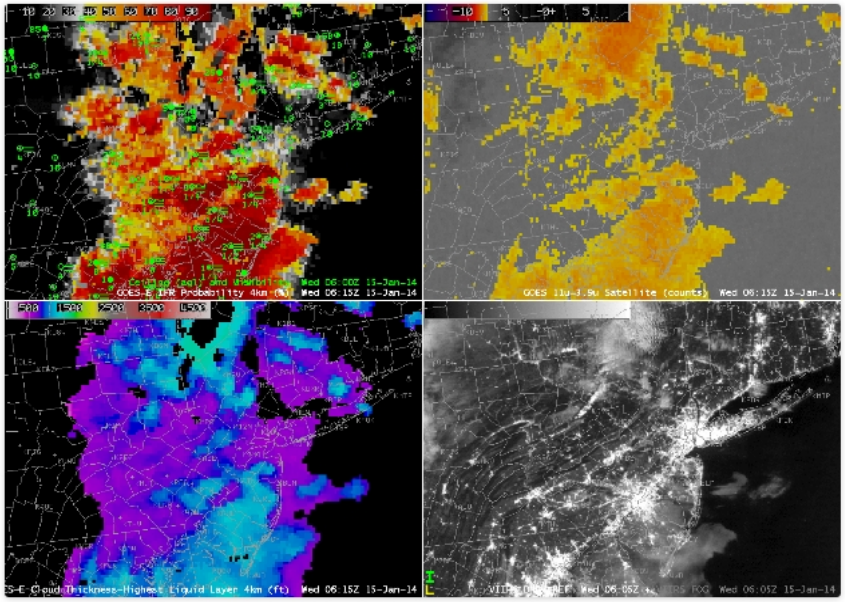
Dense fog on the East Coast



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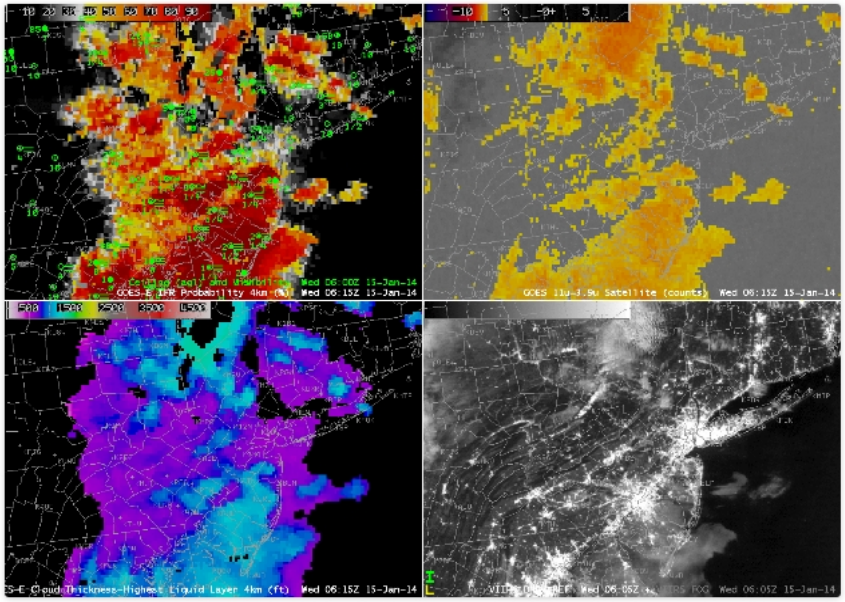

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The Facts

- http://fusedfog.ssec.wisc.edu
- Started as fusedfog.blogspot.com
- First post: July 11, 2012
- Changed to fusedfog.ssec.wisc.edu: July 25 2013
- 200+ posts
- About 1-3 new posts weekly
- Searchable by category

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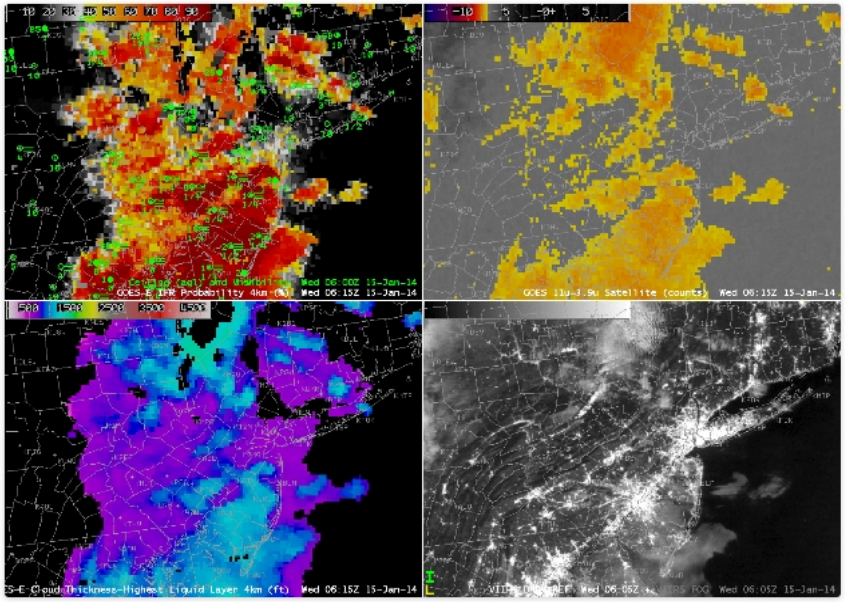

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- Error Explanations
- AFD
- Cloud Thickness
- Day/Night Band
- Day/Night Boundary
- Dissipation Time
- Emissivity
- Multiple Cloud Layers
- Snow
- Stray Light
- Terrain
- MODIS
- Suomi/NPP
- AVHRR
- Geographic regions

Blog is used to highlight cases

- Identify an interesting event
- Create imagery using AWIPS/AWIPS-2
- Create Blog posting
- Email SOOs at WFOs in the same region as the event

IFR Conditions in the Southeast | GOES-R Fog Product Examples - Mozilla Firefox

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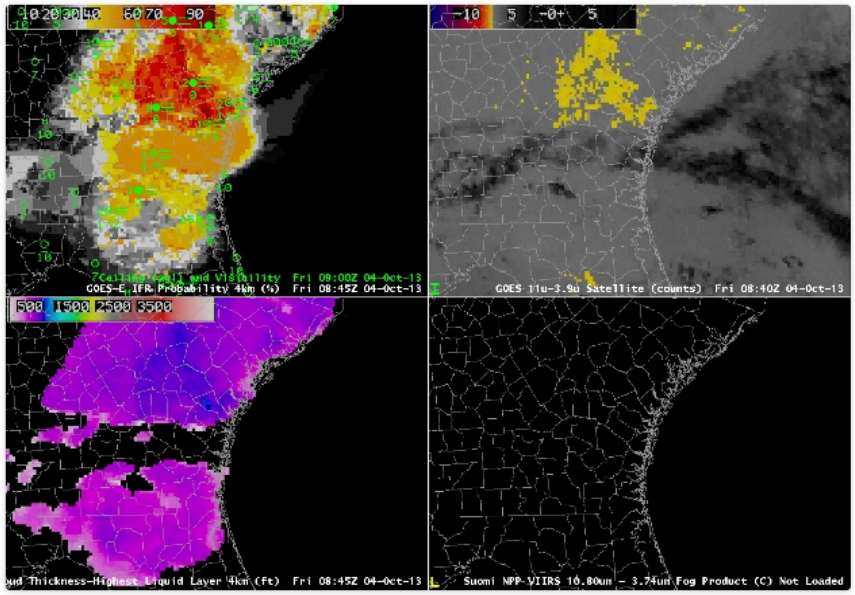

GOES-13-based GOES-R IFR Probabilities (Upper Left), GOES-13 Brightness Temperature Difference Product (10.7 µm – 3.9 µm) (Upper Right), GOES-13-based GOES-R Cloud Thickness (Lower Left), Suomi/NPP Brightness Temperature Difference (Lower Right), all times as indicated (click image to enlarge)

High Pressure of the southeast US allowed for clear skies and light winds overnight, and radiation fog developed over coastal portions of eastern Georgia. Because high clouds were present, the traditional method for detecting fog and low stratus, the brightness temperature difference between 10.7 µm and 3.9 µm on GOES could not capture the entire areal extent of the cloud. Fog is initially reported in eastern Georgia where IFR Probabilities are increasing underneath an

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AWIPS perusal the morning of 4 October 2013 revealed fog/low stratus development in southeast, occasionally under cirrus clouds that make traditional fog detection techniques ineffective

4-panel shows IFR Probabilities, GOES-R Cloud thickness, GOES-East Brightness Temperature Difference, and Suomi/NPP Brightness Temperature Difference.

Showed how Cloud Thickness can be used to forecast dissipation time

IFR Conditions in

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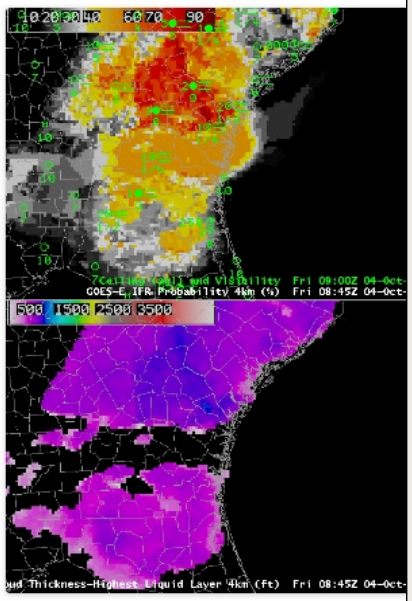

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initially reported in eastern Georgia where IFR

Fog and Low Stratus over Georgia today - scott.lindstrom@noaa.gov - National Oceanic and Atmospheric Administration Mail -

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Fog and Low Stratus over Georgia today

Inbox x

Scott Lindstrom <scottl@ssec.wisc.edu> 10/4/13

to Michael, Corey, Chad, Brian, Tony, ben.nelson, carl.jones, peter.wolf, Fra

I put together a blog post on the fog/low stratus over the SE coast this morning on the fused fog blog:

http://fusedfog.ssec.wisc.edu/?p=603

If you have any questions or comments, please contact me or Mike Pavolonis. This was a nice case of fog under high clouds that make the traditional brightness temperature difference product sketchy.

thanks!

Frank.Alsheimer - NOAA Federal <frank.alsheimer@nc 10/4/13

to Scott, Michael, Corey, Chad, Brian, Tony, ben.nelson, carl.jones, peter.w

Scott,

This is excellent. Thanks for pointing this out. I have been looking for examples to show my staff in hopes that they use the product more often, but low clouds and fog are not climatologically favored until we get into October through April. This will start the ball rolling.

SOO replies that this is a good training tool

frank_alsheimer.vcf

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Details

Blog is used to highlight cases

- SOOs are made aware of product
- Gives SOOs something to show office staff
- Rapid turn-around so the event is fresh in everyone's mind
- Just In-Time Training (JITT)

IFR Conditions in the northern Plains | GOES-R Fog Product Examples - Mozilla Firefox

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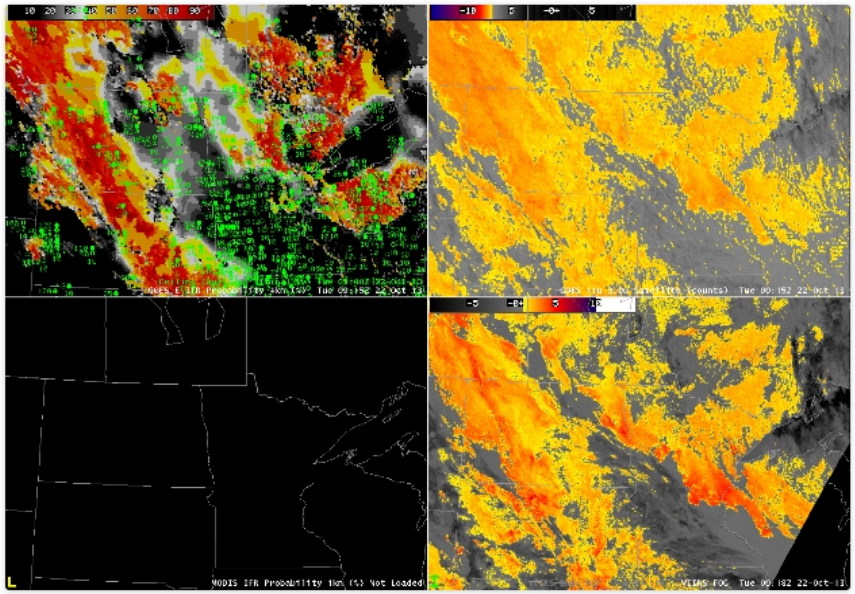

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The animation above shows GOES-R IFR Probabilities highest in a band that stretches mostly north-south from western North Dakota into central South Dakota. IFR conditions are observed under and near this band, for example at Stanley, North Dakota. The occasional MODIS-based IFR Probabilities also suggest that IFR conditions are most likely over the western Dakotas. Both GOES-based and MODIS-based IFR Probability fields de-emphasize the regions of enhanced brightness temperature difference (in both GOES and Suomi-NPP Fields) that exist over western Minnesota and the central and eastern Dakotas. In these regions, mid-level stratus is being de-

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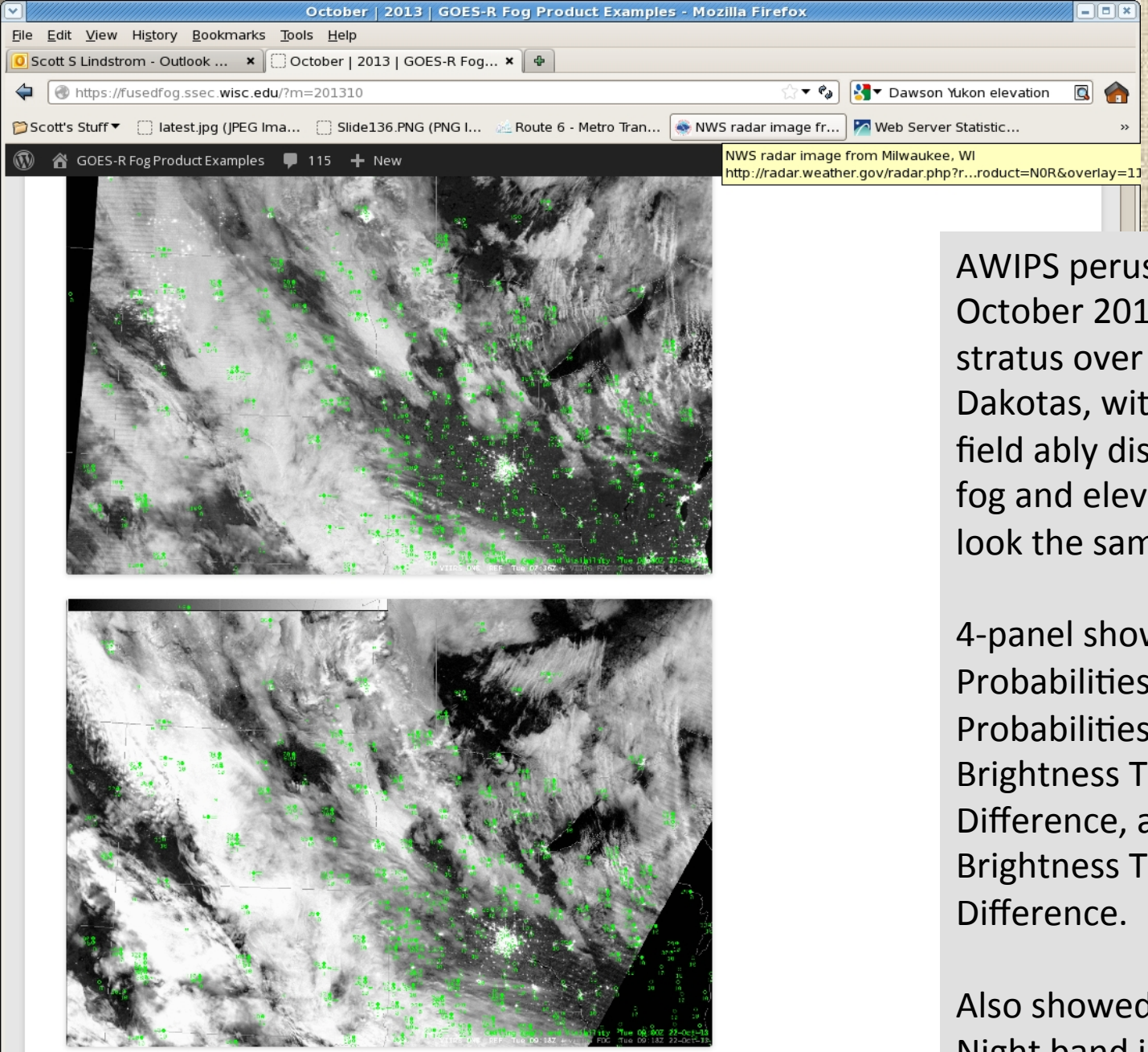
AWIPS perusal the morning of 22 October 2013 revealed fog/low stratus over Minnesota/the Dakotas, with the IFR Probability field ably distinguishing between fog and elevated stratus (which look the same from the satellite)

4-panel shows GOES-based IFR Probabilities, MODIS-based IFR Probabilities, GOES-East Brightness Temperature Difference, and Suomi/NPP Brightness Temperature Difference.

Also showed two successive Day/Night band images that viewed the same region



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IFR Conditions over North Dakota today Inbox x

Scott Lindstrom - NOAA Affiliate <scott.lindstrom@noaa. 10/22/13

to Chad, Brian, Michael, Anthony, Joshua, Bradley, scottl, Corey

I have made a blog post about the IFR conditions over western NoDak this morning, and how the IFR Probability fields were able to distinguish between that region and the elevated stratus over the Red River valley (the brightness temperature difference field flagged both fields equally).

http://fusedfog.ssec.wisc.edu/?p=661

If you have any questions, please contact me or Mike Pavolonis.

regards,

Scott

Joshua Scheck - NOAA Federal <joshua.scheck@noaa.g 10/23/13

to me

Thanks, Scott!

JOSHUA W. SCHECK, PH.D.
Science and Operations Officer
NOAA NWS Bismarck, ND
W: 701-250-4224
C: 701-934-0360

Send out email to WFOs in region, get a thank you.

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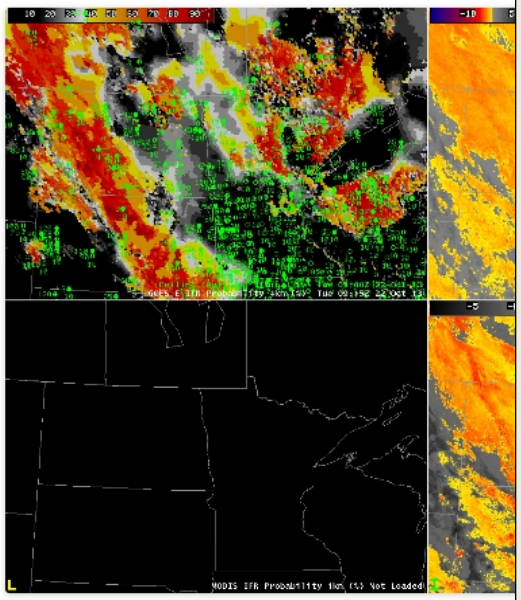

GOES-13-based GOES-R IFR Probabilities (Upper Left), GOES-13 Brig
(10.7 µm – 3.9 µm) (Upper Right), MODIS-based GOES-R IFR Probabil
Temperature Difference (11.35 µm – 3.74 µm) (Lower Right), all tim

The animation above shows GOES-R IFR Probabilities highe
north-south from western North Dakota into central South D
under and near this band, for example at Stanley, North Dak
IFR Probabilities also suggest that IFR conditions are most li
GOES-based and MODIS-based IFR Probability fields de-em
brightness temperature difference (in both GOES and Suomi
Minnesota and the central and eastern Dakotas. In these re

IFR Probability Fields - scott.lindstrom@noaa.gov - National Oceanic and Atmospheric Administration Mail - Mozilla Firefox

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Michael Pavoloni...
scottl
Steve Amburn - N...

IFR Probability Fields

Inbox x

Patrick Ayd - NOAA Federal <patrick.ayd@noaa.gov> 10/23/13

to me

Scott,
I saw your blog about the IFR probability fields over North Dakota. Can we get these and similar products into our AWIPS?

Thanks,
-Patrick Ayd
NWS Bismarck, ND

Scott Lindstrom - NOAA Affiliate Sorry for the delay -- I've been out of tow 10/28/13

Chad Gravelle - NOAA Affiliate <chad.gravelle@noaa.gc 10/28/13

to me, Patrick, Michael, Jordan, Scott

Thanks for fwding Scott.

Patrick...the following link has the LDM and AWIPS configuration directions:

http://www.ssec.wisc.edu/~jordang/awips/geocat-ec/

Please let me know if you have any difficulty in setting thi
for one of the Fog and Low Stratus training times on the
November: http://rammb.cira.colostate.edu/training/visit/c

If these dates/times do not work for you, we can coordina
training for the office.

Thanks.

Chad

==========
Chad M. Gravelle, PhD
GOES-R Satellite Liaison - NWS Operations Proving Ground
CIMSS/SSEC University of Wisconsin - Madison
NOAA/NWS Training Center
7220 N.W.101st Terr.
Kansas City, MO 64153
816-994-3068

People (5)

Chad Gravelle - NOAA Affil...
NWS

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But then I get an email asking how to get the product into AWIPS – I turn them over to Chad Gravelle for assistance

IFR Conditions in the

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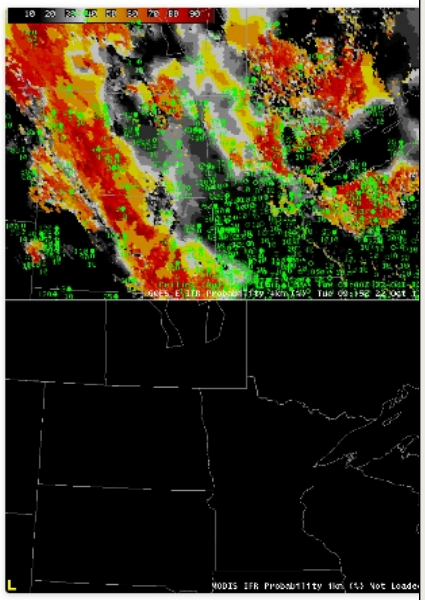

GOES-13-based GOES-R IFR Probabilities (Upper Left), (10.7 µm – 3.9 µm) (Upper Right), MODIS-based GOES-R Temperature Difference (11.35 µm – 3.74 µm) (Lower R

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north-south from western North Dakota into cen
under and near this band, for example at Stanley
IFR Probabilities also suggest that IFR conditions
GOES-based and MODIS-based IFR Probability fi
brightness temperature difference (in both GOES
Minnesota and the central and eastern Dakotas.

Blog is used to highlight cases

- SOOs are made aware of product
- Information on how to install/use the product is readily available: mentioned in emails, and online
- Facilitate their adoption of a new and useful product (shown to be useful in blog posts!)

Fog on Cape Cod | GOES-R Fog Product Examples - Mozilla Firefox

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Fog event of Cape/Islands on... | Fog on Cape Cod | GOES-R F...

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Fog detection fusing GOES, Terra/Aqua or Suomi/NPP Satellite data with Model output

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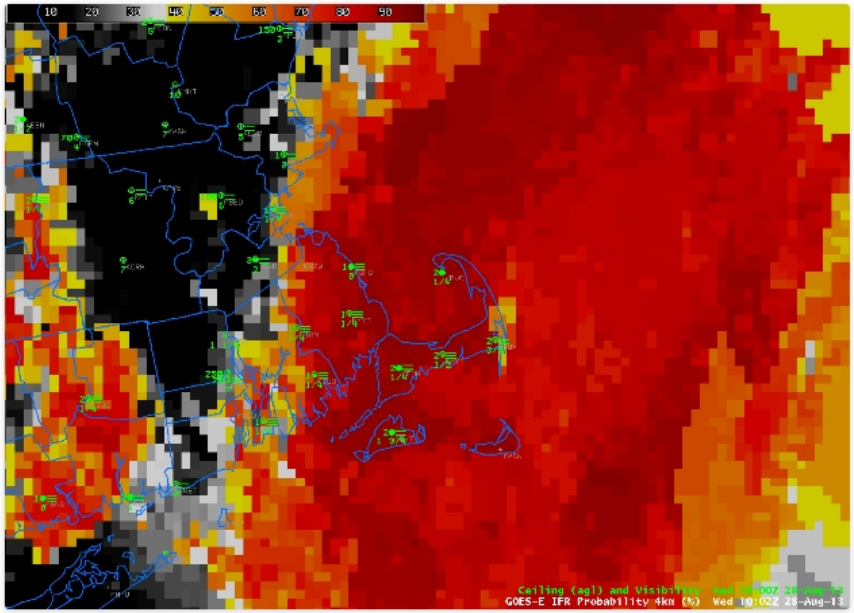

Fog developed over Cape Cod and the Islands overnight into the early morning on August 28th. The animation above (click image to animate) shows high IFR probabilities over land adjacent to the ocean. Observations show IFR or near-IFR conditions in these regions. IFR conditions decreased after sunrise. By 1410 UTC, the final image in the loop, IFR conditions persisted mostly

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over two days
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Widespread Advec
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December 2013
November 2013
October 2013
September 2013
August 2013

AWIPS perusal the morning of 28 August 2013 revealed fog/low stratus over the Cape/Islands of eastern MA. Nice sharp edge to the field, and the field matched observed IFR conditions very well.

Blog post also included the Day/ Night band over the area.

This was followed by another event and Blog Post on Sept 3rd

Ow.ly - image uploaded by @NWSBoston (NWS Boston) - Mozilla Firefox

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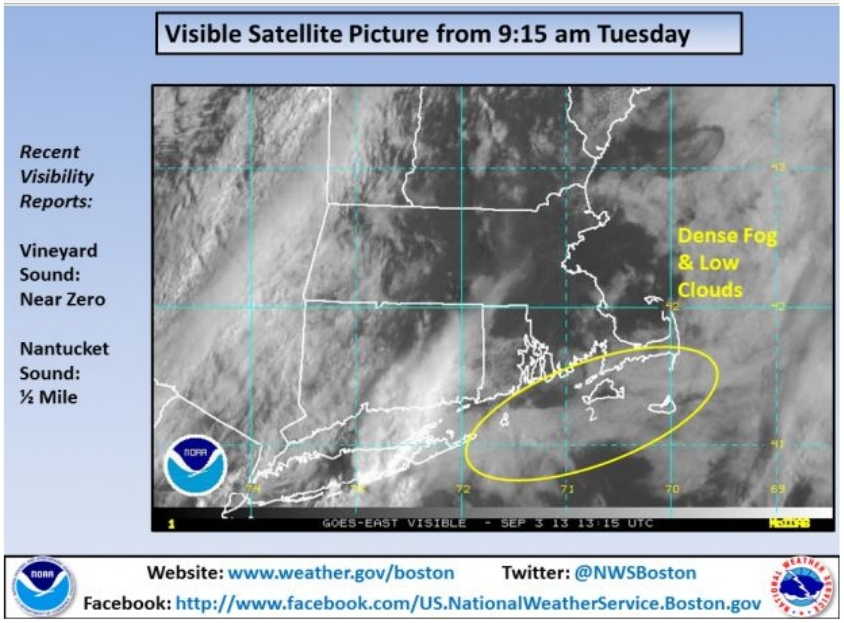

2013.09.03_AM_DenseFog.png

NWSBoston
Posted 142 days ago

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September 3rd:

Taunton Tweeted a picture of fog

Direct Link:
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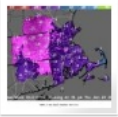

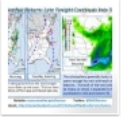

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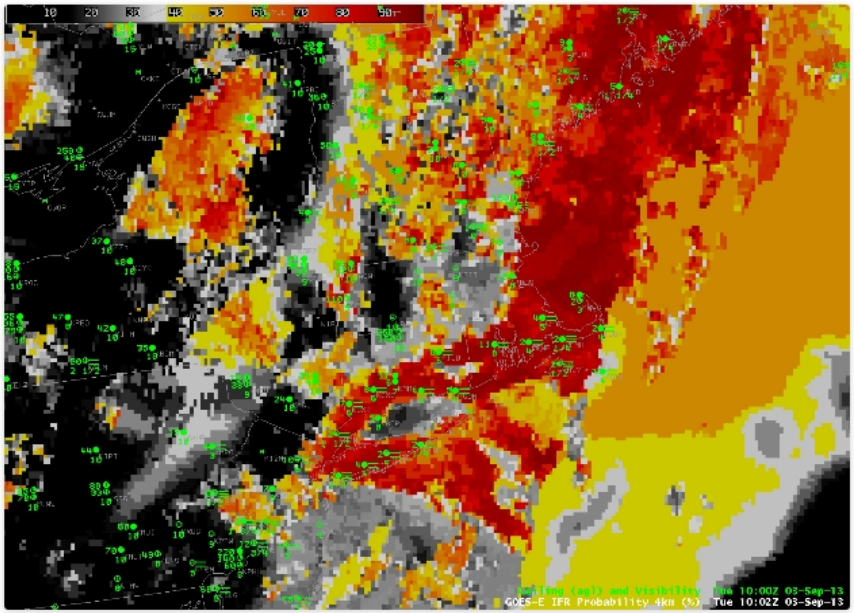
After seeing the tweet, I looked at the imagery and created a blog post

Fog over southern New England

The National Weather Service in Taunton, MA, tweeted an image of fog over coastal southern New England early on September 3rd. How well did the GOES-R IFR Probability detect this event?



GOES-R IFR Probability (click image to play animation)

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Fog event of Cape/Islands on Aug 28

Inbox x

2 more

Scott Lindstrom - NOAA Affiliate <scott.lindstrom@noaa.g 8/29/13
to Joseph, Chad, Michael, Brian

Hello --

I've been blogging about the GOES-R IFR Probability Product that Mike Pavolonis has developed, highlighting interesting or noteworthy cases, and yesterday I discussed the fog event over the Cape. The blog entry (also includes some nice Day/Night band imagery) is at:

http://fusedfog.ssec.wisc.edu/?p=439

I will send you more cases as they occur (unless you tell me not to).

regards,

Scott Lindstrom

Joe Dellicarpini <joseph.dellicarpini@noaa.gov> 8/29/13
to me

Hi Scott,

Thanks for sharing the case and keep them coming! We're going to start trying to use these products more in support of our aviation program. This is a great example!

Joe

Scott Lindstrom - NOAA Affiliate <scott.lindstrom@noaa.go 9/3/13
to Joe, Chad, Michael, Brian

Another one today .

http://fusedfog.ssec.wisc.edu/?p=474

Joe Dellicarpini <joseph.dellicarpini@noaa.gov> 9/4/13
to me

Excellent! Thanks again for sharing.

E-mail thanks for blogpost, both times

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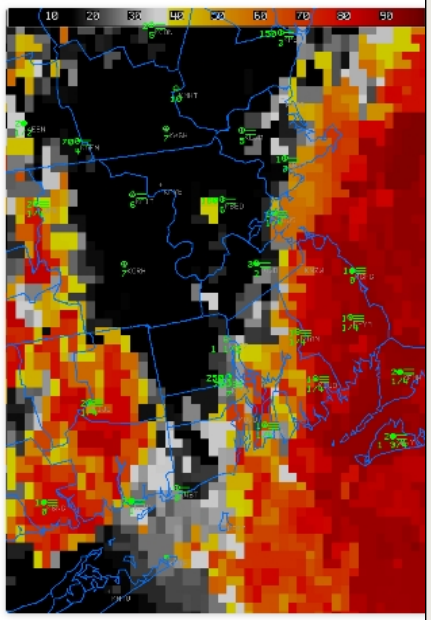

Fog developed over Cape Cod and the Islands o
The animation above (click image to animate) sh
the ocean. Observations show IFR or near-IFR c
creased after sunrise. By 1410 UTC, the final ima

Blog is used to highlight cases

- Social media brings event to blogger's attention
- Blogger expands on event, using new products to describe it
- Quick feedback to affected WFO is an effective training opportunity

Summary

- Blogs with high-quality content (presented in AWIPS/AWIPS-II format) are an effective method to convey, quickly, training materials on a variety of satellite meteorology topics.