

GOES-R/JPSS Program



CIMSS/ASPB Participation GOES-R/JPSS Proving Ground Status

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January 6, 2014





Satellite Proving Ground @ CIMSS/ASPB



- Demonstration of Satellite PG applications at National Center Testbeds / Demonstrations and NWS WFO
- AWIPS II status
- Training
- Upcoming meetings/conferences



Satellite Liaison: Bill Line

- **Product demonstrations in SPC continue (year-round). CIMSS Products currently in SPC operations as experimental:**
 - NearCast Model, Cloud Top Cooling and Overshooting Top Detection
- **Continue streamlining formats for AWIPS-2**
- **Future planning will be coordinated with Bill Line**
 - January 17 Satellite liaison/CIMSS telcon 2-3 pm
 - February 2-6: AMS... NearCast Model oral presentation
 - March 5-7 Madison, Wisconsin CIMSS satellite liaison on-site coordination meeting
 - 2014 Spring Experiment in HWT
 - Planning for 2014 Spring Experiment has begun (EFP and EWP)
 - The fused probability of severe weather product is available for inclusion in the 2014 HWT, if there is interest (product was developed by: Cintineo, Pavolonis (PI), and Sieglaff under GIMPAP)
 - EFP likely to run week of May 5 through week of June 2. EWP most likely at least first 3 weeks of that period.



2) AWC Testbed Satellite Proving Ground



Satellite Liaison: Amanda Terborg

- **Future planning will be coordinated with Amanda Terborg**
 - January 17 Satellite liaison/CIMSS telcon 2-3 pm
 - March 5-7 Madison, Wisconsin CIMSS satellite liaison on-site coordination meeting
 - AWC 2014 Testbed Experiment plan coordination





3) NWS Operations PG and WFO Interactions



Satellite Liaison: Chad Gravelle

- **Future planning will be coordinated with Chad Gravelle**
 - January 17 Satellite liaison/CIMSS telcon 2-3 pm
 - March 5-7 Madison, Wisconsin CIMSS satellite liaison on-site coordination meeting
 - ~28 NWS WFO's have access to the GOES-R fog/low cloud products developed by the AWG. These products have been cited in at least 100 NWS Area Forecast Discussions from at least 16 different WFO's
 - We are still waiting to learn if a PSDI project to transition the AWG fog/low cloud products to NESDIS operations will be funded



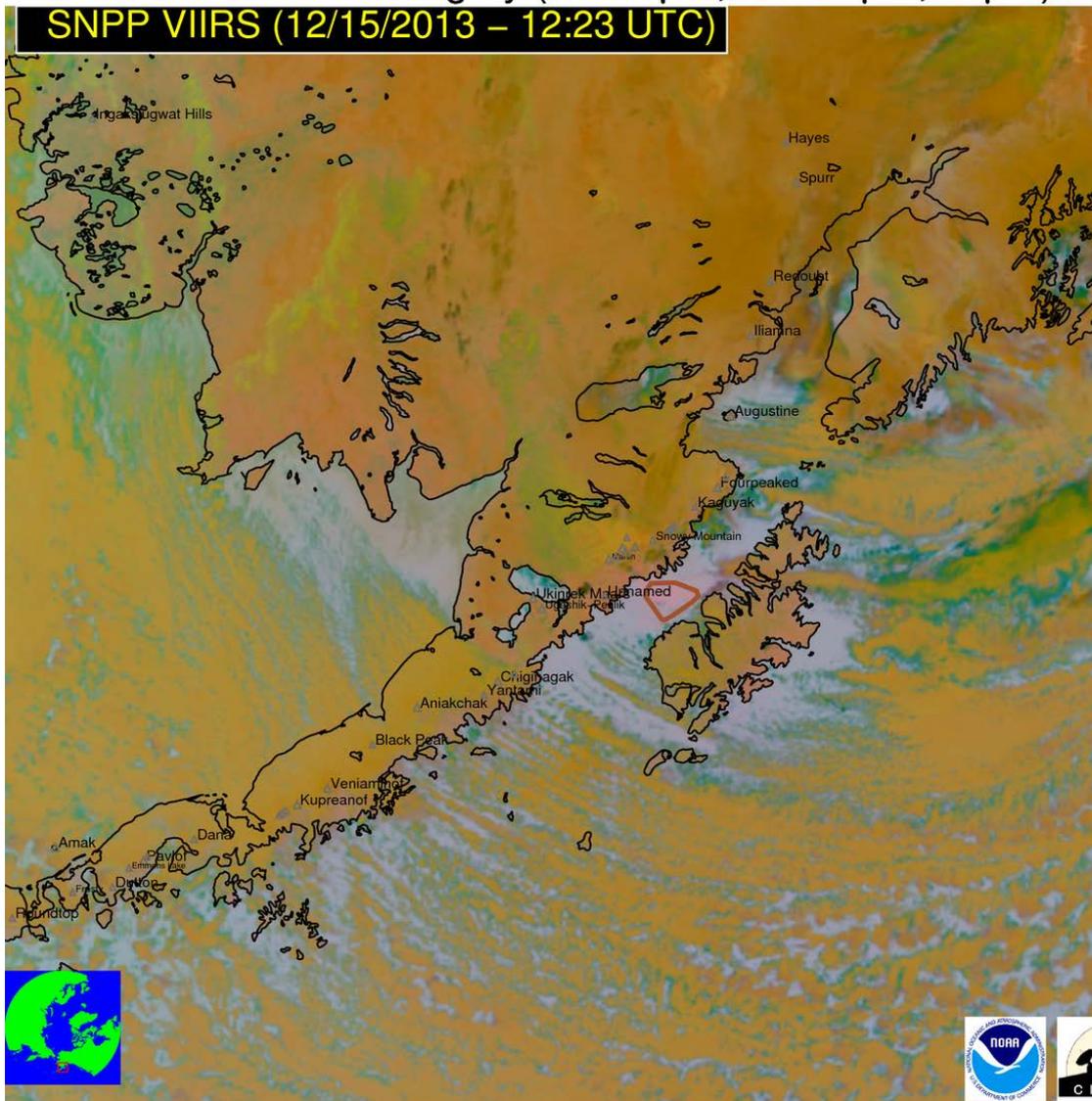
4) Alaska/AAWU/High Latitude Testbed

- The STAR/CIMSS volcanic cloud products (**from VIIRS**) were used to alert the NWS in Anchorage about a rare Katmai ash re-suspension event on December 15, 2013. A volcanic ash advisory was subsequently issued.
- An online interface that will allow individual users to configure subscriptions to receive the automated volcanic cloud alerts is nearly ready for testing (this task is rather complicated and has taken longer than expected)
- A vast amount of user training material for the volcanic cloud products is also being compiled
- The Polar2grid tool is nearly ready for testing

Automated alert generated in response to re-suspension of Katmai ash (VIIRS based alert)

False Color Imagery (12–11 μ m, 11–8.5 μ m, 11 μ m)

SNPP VIIRS (12/15/2013 – 12:23 UTC)



Alert Status	New Alert Object
Radiative Center (Lat, Lon):	57.839 °, -154.598 °
Mean Viewing Angle	11.32 °
Mean Solar Zenith Angle	137.49 °
Nearby Volcanoes (meeting alert criteria):	Unnamed (48.58 km) Trident (53.13 km) Katmai (53.56 km) Mageik (55.29 km) Snowy Mountain (55.49 km)
Cloud Object Probability	99.38022 %
Median Probability Of Object Pixels	92.68893 %
Percent Unambiguous Pixels	84.98690 %
Maximum Height [amsl]	3.00 km
90th Percentile Height [amsl]	2.70 km
Mean Tropopause Height [amsl]	8.60 km
Total Mass	0.000610 Tg
Median Effective Particle Radius	4.90 μ m
Total Area	574.75 km ²
Geographic Regions Of Nearby Volcanoes	Alaska Peninsula
Vaac Regions Of Nearby Volcanoes	Anchorage

Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb SO₂ Thermal Anomaly





5) Pacific Region/Hawaii Demonstrations

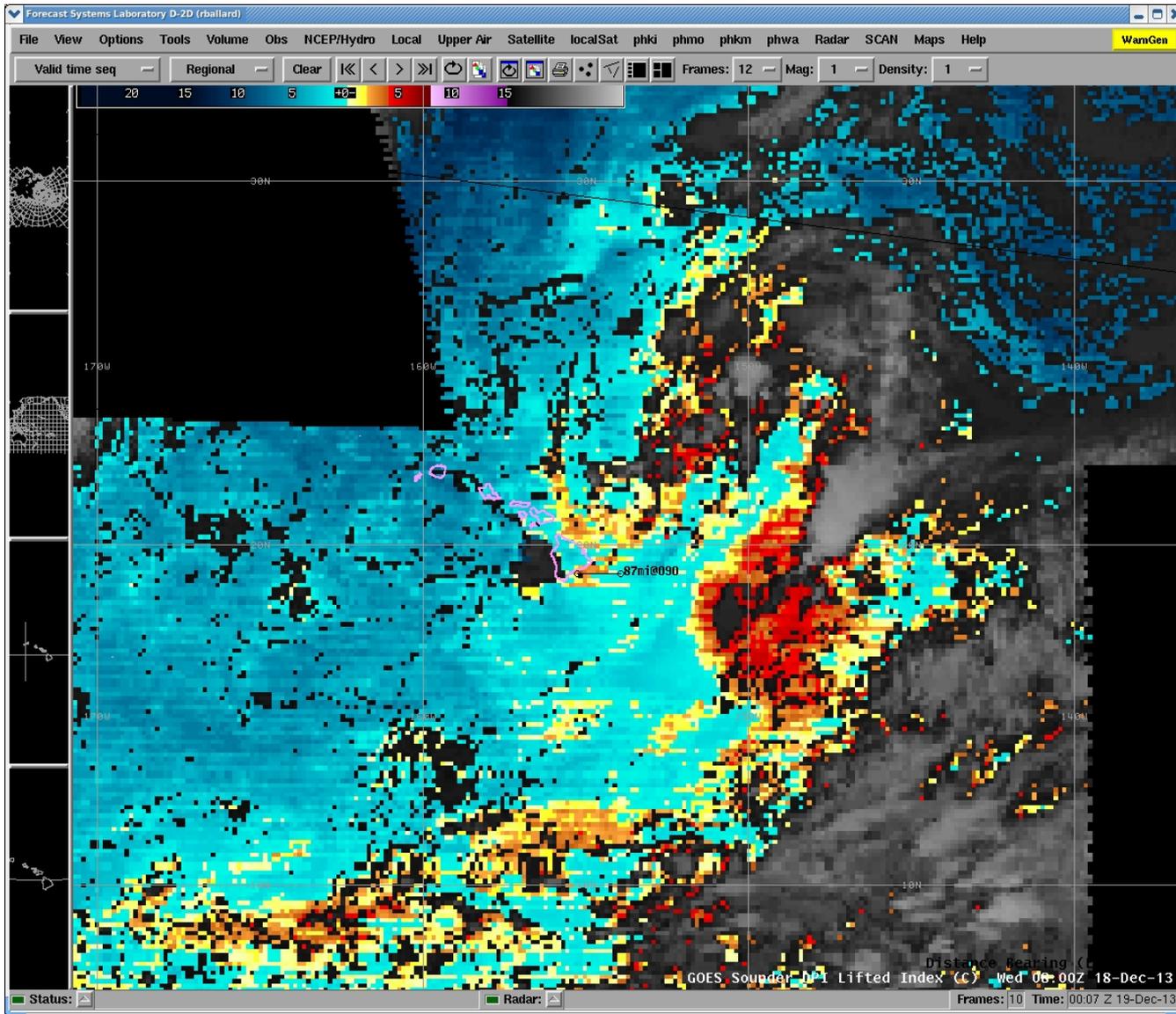


- Bill Ward will provide the complete update.
- Volcanic cloud products from GOES-15, MTSAT, and MODIS (from NASA NRT data feed) are being generated in near-realtime at CIMSS. The spatial coverage of these products includes the Pacific Region.
- Jordan Gerth visited NWS Pacific Region Headquarters and NWS WFO Honolulu from 7 through 12 December 2013.
 - The main accomplishment was configuring AWIPS I (at WFO Honolulu) and AWIPS II (at Pacific Region Headquarters) to ingest and adequately display the single field of view GOES Sounder Derived Product Imagery (skin temperature, cloud amount, cloud height, and lifted index).
 - This was an action item from the OCONUS meeting in July 2010.
 - Performed spectrum analysis at L/X-band antenna site
 - Also discussed plans for a JPSS OCONUS workshop in or around July 2014
 - Invitees and other details have yet to be decided.





5) Pacific Region/Hawaii Demonstrations



Credit:
R. Ballard





6) Satellite Proving Ground for Marine, Precipitation, and Satellite Analysis (MPSAT)



Satellite Liaison: Michael Folmer

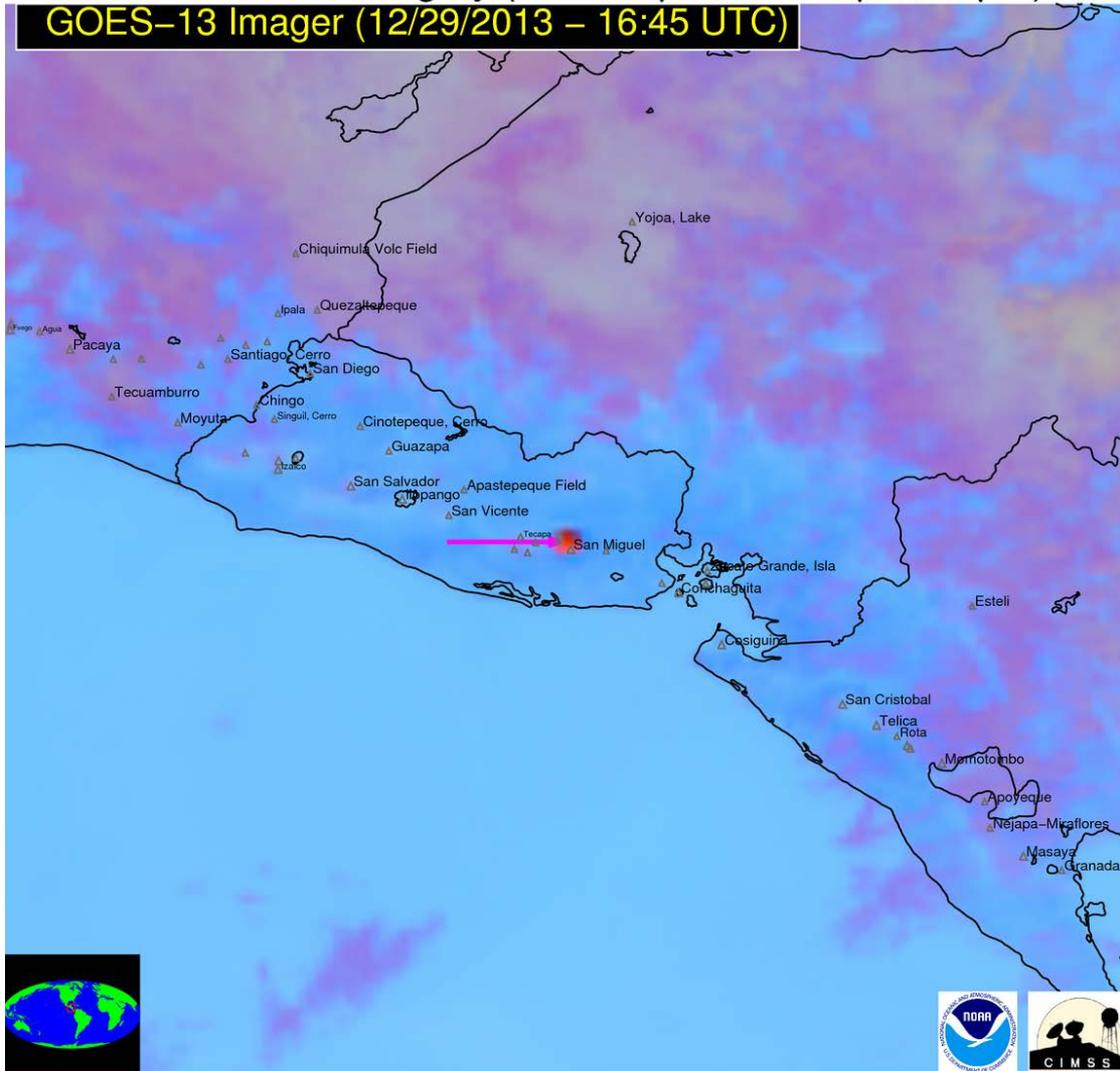
- **Other GOES-R PG decision support products requested within plan available once approved by NOAT governance process**
- **Future planning will be coordinated with Michael Folmer**
 - January 17 Satellite liaison/CIMSS telcon 2-3 pm
 - March 5-7 Madison, Wisconsin CIMSS satellite liaison on-site coordination meeting
- **Instructions for acquiring the GOES-R fog/low cloud products from the LDM have been provided.**
- **The STAR/CIMSS volcanic cloud alerts will be available upon completion of a successful test of the online alert subscription interface.**
- **GOES and MODIS have been used to automatically detect and characterize many eruptions within the Washington VAAC region of responsibility (some of which were otherwise undetected) since May 2013**
- **We now have near real-time access to MODIS and VIIRS DB data from the Mexico City X-band and we are in the process of assessing the reliability of this data feed**



Automated alert generated in response to San Miguel (El Salvador) eruption (GOES-13 based alert)

False Color Imagery (13.3–11 μ m, 11–3.9 μ m, 11 μ m)

GOES-13 Imager (12/29/2013 – 16:45 UTC)



Alert Status	New Alert Object
Radiative Center (lat, Lon):	13.440 °, -88.248 °
Mean Viewing Angle	22.18 °
Mean Solar Zenith Angle	40.61 °
Nearby Volcanoes (meeting alert criteria):	San Miguel (2.41 km) Chinameca (9.83 km) Aramuaca, Laguna (15.54 km) Tigre, El (20.27 km) Usulután (24.22 km)
Maximum Height [amsl]	12.10 km
90th Percentile Height [amsl]	11.60 km
Mean Tropopause Height [amsl]	16.90 km
Trend In Ir Brightness Temperature	-57.24 K
Vertical Growth Rate Time Interval	30 minutes
Vertical Growth Rate Anomaly	10.28 number of stddev above mean
Total Area	91.87 km ²
Geographic Regions Of Nearby Volcanoes	El Salvador
Vaac Regions Of Nearby Volcanoes	Washington

Annotation Key

(annotation colors are not related to colors in underlying image)

Ash/Dust Cloud Volcanic Cb SO₂ Thermal Anomaly





7) NHC Proving Ground



UW-CIMSS Participants: C. Velden, S. Monette

- 2013 PG ends Nov. 30; awaiting NHC product evaluation



- CIMSS actively attending AWIPS II developers' forum conference calls and remote/in-person meetings of the EPDT
- Testing of locally-produced netCDF4 files containing VIIRS imagery ongoing
- Investigating performance of regionalsat plug-in
 - Impacts legacy PG products
 - Memory issue reappeared in OB13.5
- Issue with single-digit minute GRIB2 valid times still exists
 - Impacts cloud top cooling
 - Working to submit bug fix
- Development of other small fixes/enhancements in progress
- Providing assistance to Alaska Region and Pacific Region
- Operational use of AWIPS II at local office NWS Milwaukee began in mid November

- Many PG-relevant CIMSS Satellite Blog posts:
 - <http://cimss.ssec.wisc.edu/goes/blog/>
- GOES-R Fog Product Examples (‘Fused Fog’ Blog) at new site:
 - <http://fusedfog.ssec.wisc.edu>

Fused Fog Blog: 183 total posts

- 1200 hits/day (Sept); 1360 hits/day (October)
- Emails to SOOs when case is posted in WFO

- Many PG-relevant examples posted on the [CIMSS Satellite Blog](#) and “Fused Fog” [GOES-R Fog Product Examples](#) blog:

CIMSS Satellite Blog
University of Wisconsin-Madison / Space Science and Engineering Center

Tehuano wind event in the wake of a strong eastern US winter storm
January 3rd, 2014

A strong winter storm affected much of the central and eastern US during the 02 January – 03 January 2014 period. A map of SSEC Rea/Earth 24-hour snowfall totals (above) shows how widespread the resulting snowfall was, with amounts as high as 24 inches in Massachusetts and 22 inches in New York (WPC storm summary).

As the storm system departed over the Atlantic Ocean on 03 January, an AWIPS image comparison of the 17:53 UTC (12:53 PM Eastern time) Suomi NPP VIIRS 0.64 μm visible channel data and the corresponding false-color “snow vs cloud discrimination” Red/Green/Blue (RGB) product (below) showed the unusual coverage of snow on the ground (varying shades of red on the RGB image). Some patches of supercooled water droplet clouds (varying shades of white on the RGB image) could be seen streaming off of Lake Erie and Lake Ontario; in fact, a closer look revealed mesoscale bands of “lake-effect snow” downwind of the Finger Lakes in western New York, and also downwind of Lake Champlain along the New York/Vermont border.

Suomi NPP VIIRS 0.64 μm visible channel image and False-color RGB image

Cold air moving southward in the wake of the storm crossed the western Gulf of Mexico, moved through the Chivels mountain pass in southern Mexico, and eventually emerged over the Pacific Ocean in the Gulf of Tehuantepec — this type of mountain gap wind flow is known as a Tehuano wind event or a “Tehuantepecer”. An image of Metop ASCAT surface scatterometer winds at 02:26 UTC (below) showed that a large area of northerly gale force winds (red wind bars) was present over the Gulf of Tehuantepec, with maximum remotely-sensed wind speeds of 41 knots. The tropical surface analysis (cyan) displayed the fractured cold frontal boundary that had advanced into southern Mexico; behind the cold front along the Gulf of Mexico coast at Veracruz (station identifier MMVR), the surface visibility at the time was reduced to 6 miles due to blowing sand (time series of MMVR surface reports). Surface reports at Itepec (station identifier MMIT) along the Gulf of Tehuantepec were sparse, but did show northerly winds gusting to 37 knots at 17 UTC (time series of MMIT surface reports).

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

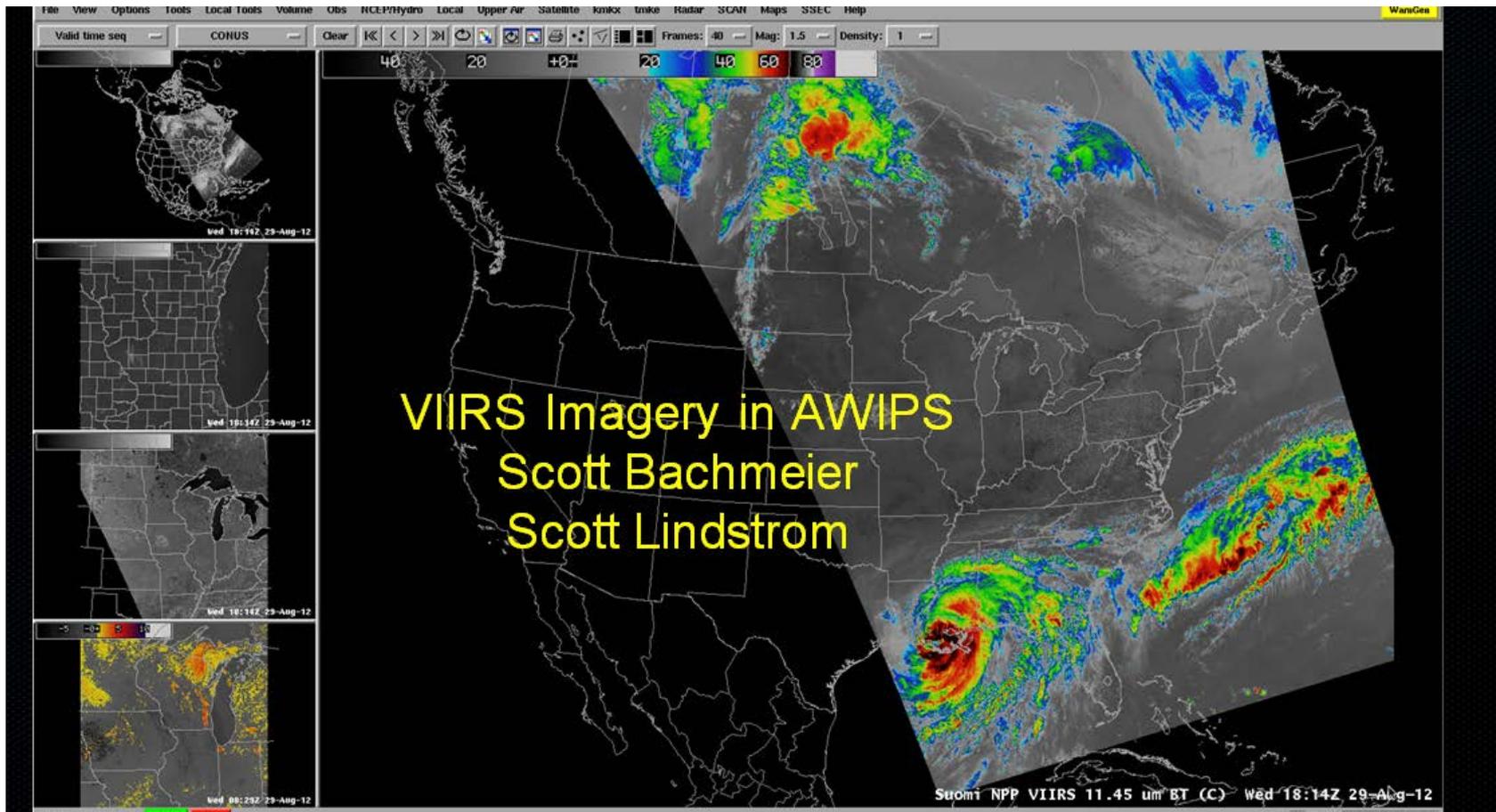
IFR Probabilities over the Pacific Northwest with a front

GOES-R IFR Probabilities from GOES-15 (upper left), GOES-15 Brightness Temperature Difference (10.7 μm – 3.8 μm) Fields (upper right), GOES-R Cloud Thickness from GOES-15 (lower left), Suomi/NPP Brightness Temperature Difference (lower right), times as indicated, 3 January 2014 (click image to animate)

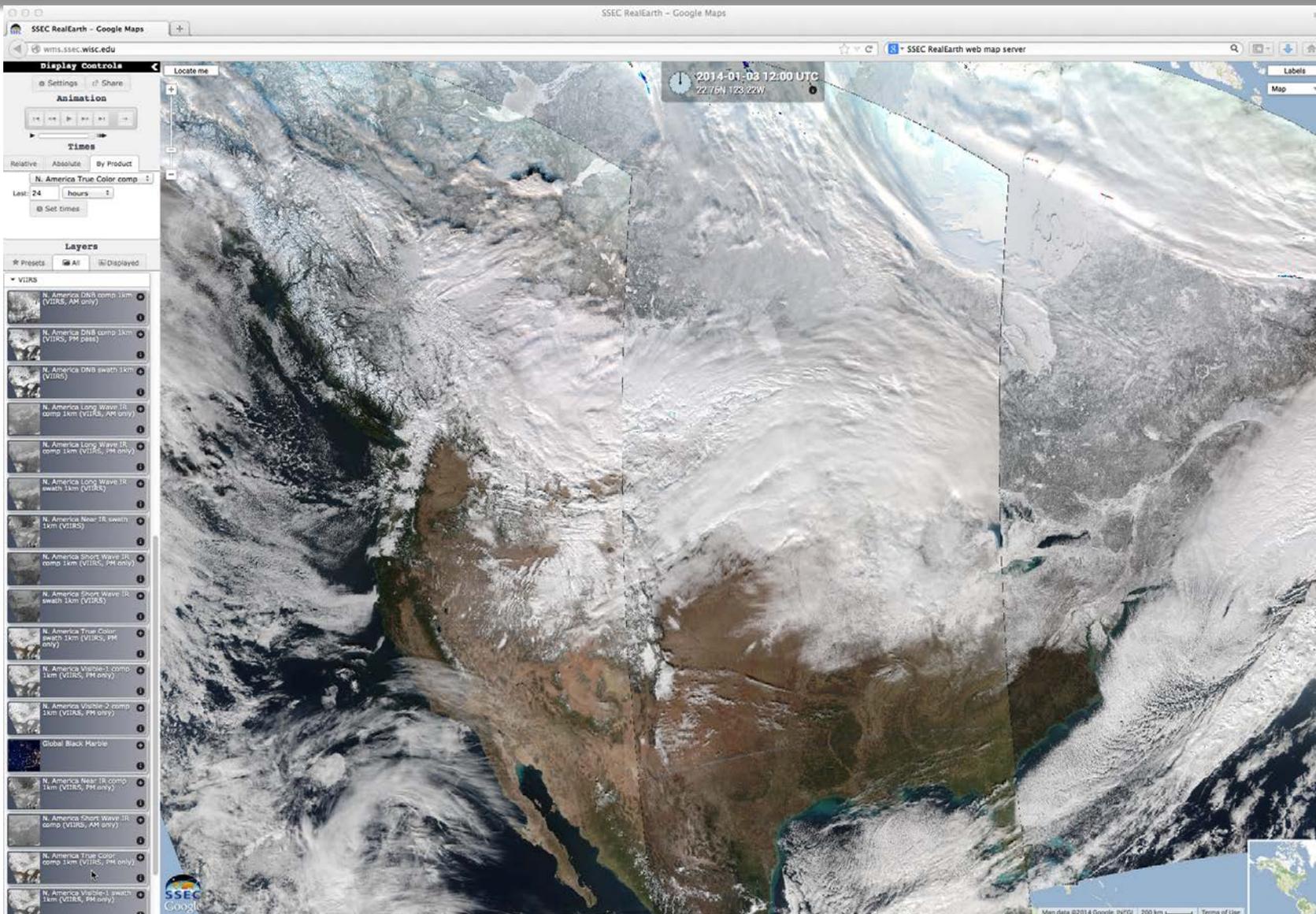
One benefit of the GOES-R IFR probabilities is its consistency from hour to hour. In the animation above, the region of higher IFR Probabilities associated with a southward-propagating front over Oregon shows good hour-to-hour consistency. In contrast, the Brightness Temperature Difference field (upper right in the figure) suffers from the presence of higher clouds (denoted in the enhancement by darker regions). As the high IFR Probabilities expand southward into southern Oregon, reported visibilities/ceilings decrease towards IFR conditions. In the animation, regions of high clouds show up in the Cloud Thickness product as regions of missing data: Cloud Thickness is of the highest water-based cloud. If the highest cloud detected by satellite is mixed-phase, or ice, Cloud Thickness is not computed. Cloud Thickness is also not computed in the 1600 UTC imagery because that time is near sunrise, and cloud thickness is not computed in twilight conditions.

Suomi/NPP provided a view of the scene as well, and the Day/Night Band showed the band of frontal clouds well. The brightness temperature difference field suggests that the cloud band was not necessarily low cloudiness, although the higher IFR Probabilities (and reduced ceilings and visibilities) testify to the presence of low clouds underneath the middle- and higher-level clouds.

“Suomi NPP VIIRS Satellite Imagery in AWIPS”
VISITview lesson delivered 7 times so far



NWS WFOs participating: AFC, AWC (x2), JAX, LSX, PHI, PDT





Other Conferences/Meetings



2014

- | | | |
|------------------------------------|-----------------|-----------------------|
| • AMS Annual Meeting | 2-6 February | Atlanta, GA |
| • “Virtual” Satellite Science Week | 11-15 March | Madison, WI |
| • International TOVS Conf | 26 Mar – 1 Apr | Jeju Island, S. Korea |
| • Warn on Forecast meeting | 1-3 April | Norman, OK |
| • European Convective WG | 7 – 11 April | Zabreb, Croatia |
| • EUMETSAT Satellite Conference | 22-26 September | Geneva, Switzerland |
| • AMS Severe Local Storms | 3-7 November | Madison, WI |





Selected Relevant Presentations@ AMS 2014



- Mon 30th Conference on Environmental Information Processing Technologies TJ4.4 C105 4:45PM Scott Lindstrom Blogging as a Training Tool for new Forecast Algorithms
- Tues Town Hall Moderator C111 12:15-1:15PM Liam Gumley Advances in Direct Broadcast Capabilities and Applications for JPSS and other Polar-orbiting Operational Environmental Satellite Systems
- Wed 10th Annual Symposium on New Generation GOES Systems J1.1 C111 4:00PM Chad Gravelle Using GOES-R Demonstration Products to Bridge the Gap Between Severe Weather Watches and Warnings for the 20 May 2013 Moore, OK Tornado Outbreak
- Wed 10th Annual Symposium on New Generation GOES Systems J1.5 C111 5:00PM Jordan Gerth Sky Cover: Shining Light on a Gloomy Problem
- Wed 4th Conference on Transition of Research to Operations 3.3 C302 2:00PM Elisabeth Weisz Encouraging the use of hyperspectral sounder products in forecasting applications
- Thurs 22nd Conference on Probability and Statistics in the Atmospheric Sciences 7.1 C205 3:30PM John Cintineo Preliminary Evaluation of a Fused
CIMSS Data for the Prediction of Severe Storms

