STAR and CI Partner Presentations

Organization of Presentations

- Slides are organized alphabetically by Last name of the primary author.

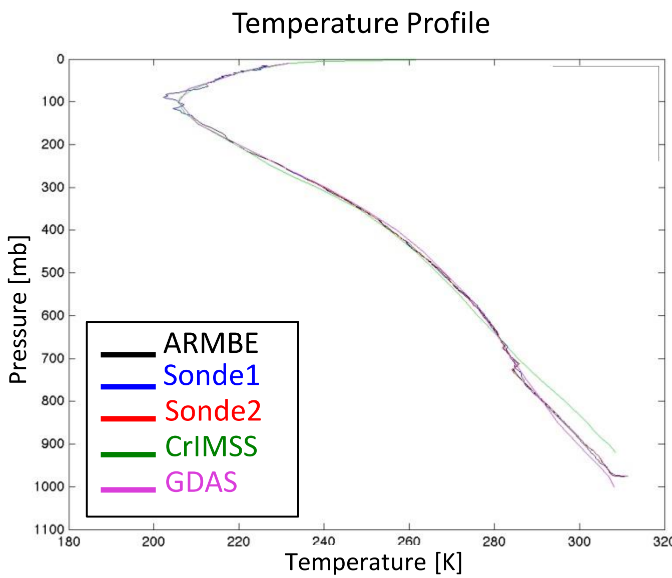
Validation of Suomi-NPP CrIMSS retrievals of temperature and water vapor using ARM site best estimates of atmospheric state

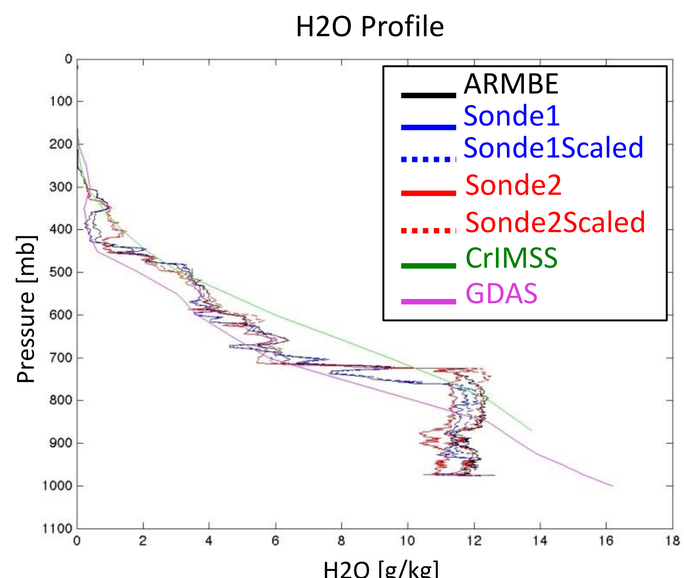
Lori A. Borg[1], and D. Tobin[1], R. Knuteson[1], H. Revercomb[1], A. Reale[2], N. R. Nalli[2], D. J. Holdridge[3], and J. H. Mather[4]

(1) SSEC Space Science and Engineering Center , (2) NOAA , (3) Argonne National Laboratory , (4) ARM

Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- At NSA, SGP, and TWP radiosondes are launched coincident with NPP overpasses and used with additional observations to create a best estimate of the atmospheric state.
- This validation data is used to assess retrievals of temperature and water vapor.
- ARM Best Estimates agree well with GDAS but differs significantly with the CrIMSS product especially near the surface.
- Launches are ongoing …



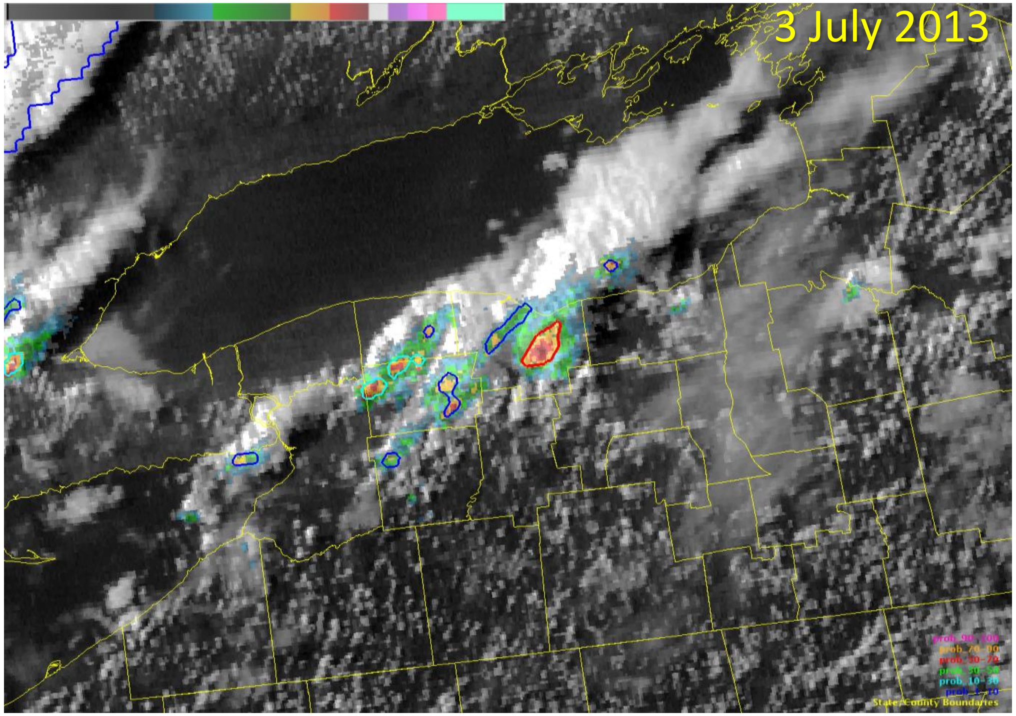


7.1 Preliminary Evaluation of a Fused Algorithm for the Prediction of Storms,

John L. Cintineo (UW-CIMSS/SSEC Madison, WI); Michael J. Pavolonis (NOAA/NESDIS/STAR Madison, WI); Justin M. Sieglaff (UW-CIMSS/SSEC Madison, WI) , and Daniel T. Lindsey (NOAA/NESDIS/STAR Fort Collins, CO)

22nd Conference on Probability and Statistics in the Atmospheric Sciences

- Successful integration of information from multiple sensors
  - Track satellite *and* radar objects at multiple scales
  - Extract satellite cloud growth rates, derived radar fields, and NWP info.
  - Compute probability of severe weather in next 60 min using naïve Bayesian model
- 2013 near real-time demonstration
  - Good skill (0.4 CSI) and reliability
  - Median lead-time of 10 min ahead of NWS warnings



Contours are identified objects, colored by probability of severe, overlaid GOES-13 visible imagery and composite reflectivity.

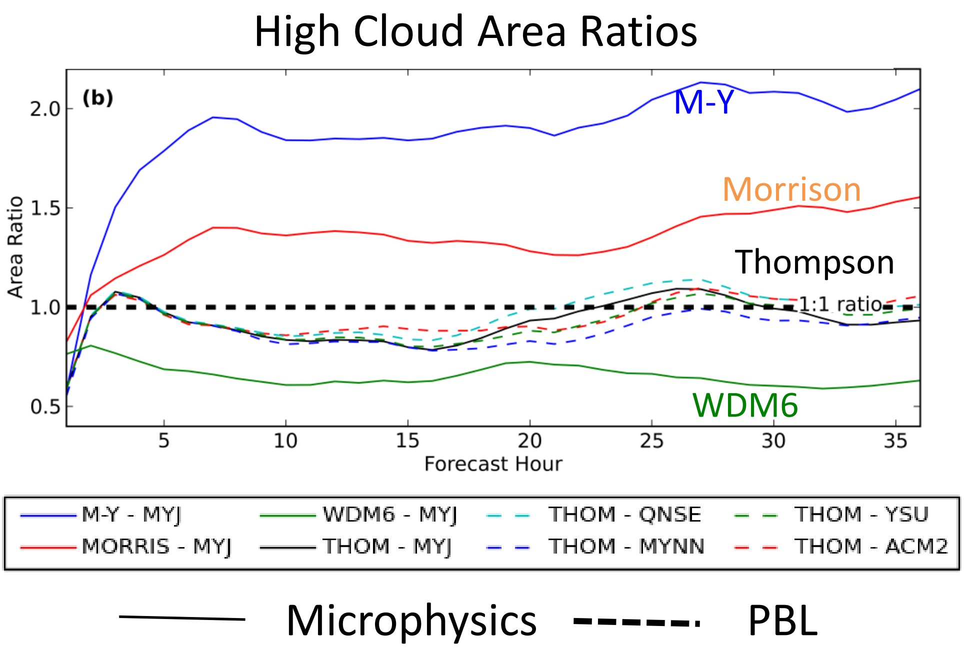
The storm with the red contour had a 50-70% prob. of severe, 20 min of lead-time to the first wind report, and 33 min of lead-time to the first severe thunderstorm warning.

14.5 Using Synthetic Satellite Observations to Evaluate the Performance of Planetary Boundary Layer and Cloud Microphysical Parameterization Schemes in Convection-Permitting Model Simulations

Rebecca Cintineo and Jason Otkin, CIMSS/University of Wisconsin-Madison
Ming Xue, and Fanyou Kong, CAPS/University of Oklahoma

26th Conf. on Weather Analysis and Forecasting / 22nd Conf. on Numerical Weather Prediction

- Compared real and synthetic GOES-13 IR brightness temperatures to evaluate accuracy of planetary boundary layer (PBL) and cloud microphysics schemes in high-resolution CAPS ensemble
- Microphysics had large impact on synthetic cloud top areas and temperatures
  - Thompson scheme generally most accurate of those tested
- Synthetic brightness temperatures less sensitive to varying PBL schemes
  - Best PBL scheme varied with different validation methods



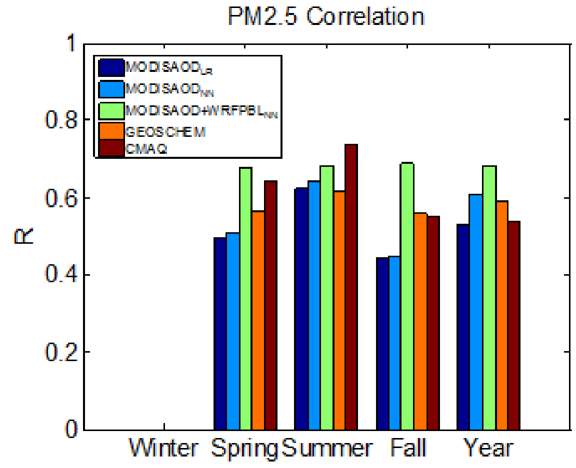
A Regional NN estimator of PM2.5 using satellite AOD and WRF meteorology measurements

Lina Cordero, *N. Malakar, D. Vidal, R. Latto, B. Gross, F. Moshary, and S. Ahmed*
City College of New York, New York, NY

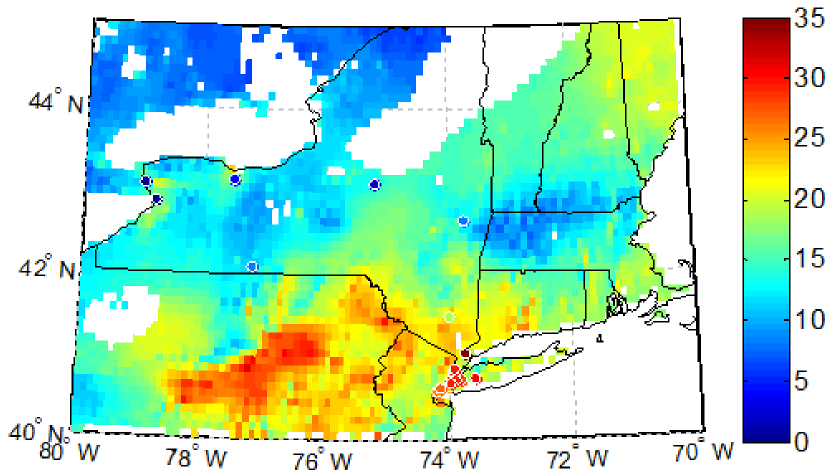
AMS Session: The Effects of Meteorology on Air Quality - Part 2

- Adding lidar derived PBL improved PM2.5 estimations for local CCNY site.
- Combining satellite AOD and WRF PBL height in a regionally trained NN performed better compared against GEOS-CHEM/CMAQ PM2.5.
- Daily PM2.5 maps based on the NN approach using high resolution AOD and PBL grids for the NY state region (applying IDW) showed reasonable agreement with station data.
- Multivariate approach using only satellite remote sensing input variables produced the highest correlation with the target in comparison to the other methods.

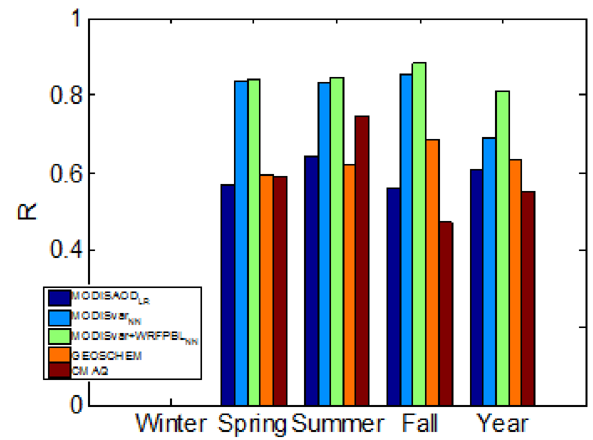
Regional neural network



NN ESTIMATED PM2.5 7-18-2006



Multivariate approach

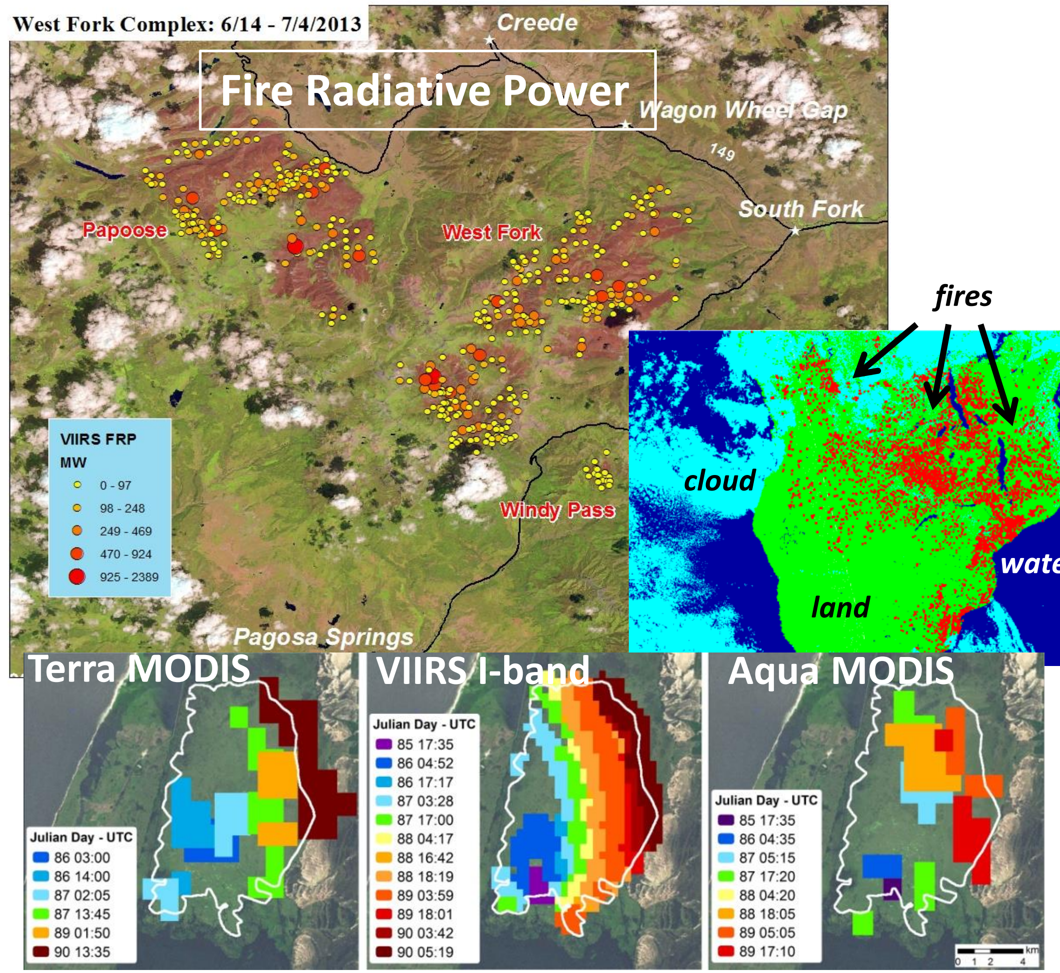


Latest results of the development and evaluation of the Suomi NPP VIIRS active fire products

I. Csiszar (STAR), W. Schroeder, L. Giglio, E. Ellicott, C.O. Justice (UMD)

10th Annual Symposium on New Generation Operational Environmental Satellite Systems

- S-NPP VIIRS IDPS product is Provisional and reaching Operational status
  - Input SDR issues addressed
  - J1 improvements ready to be implemented
- New and improved products developed:
  - Full fire mask and fire radiative power from VIIRS 750m M-band data
  - Fire detections from VIIRS 375m I-band data

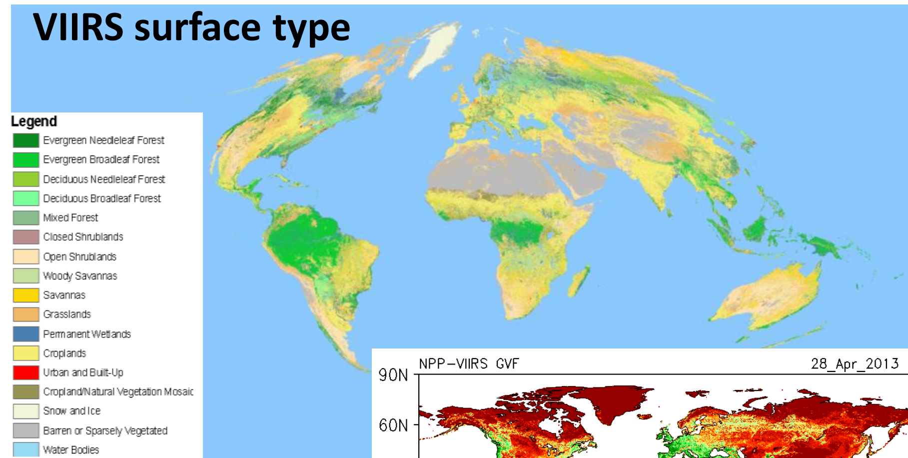


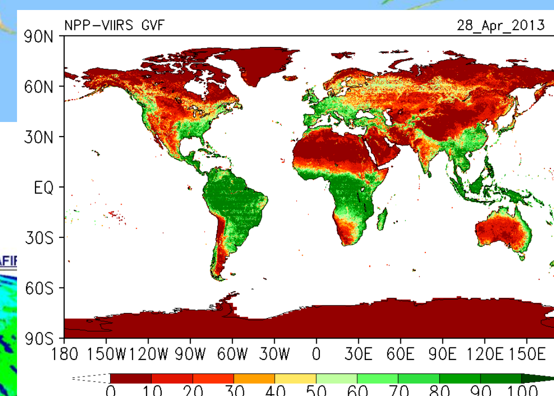
Current Status of the Terrestrial Environmental Data Products from the Suomi NPP Satellite

I. Csiszar *(STAR),* ***J. Privette*** *(NOAA/NCDC),* ***M. Román, E.Vermote*** *(NASA/GSFC),* ***C.O. Justice*** *(UMD)*

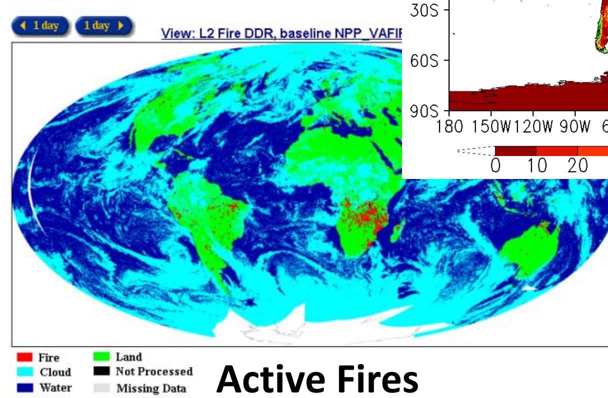
10th Annual Symposium on New Generation Operational Environmental Satellite Systems

- S-NPP VIIRS land IDPS product development and evaluation is progressing well
  - Provisional: Surface Reflectance, LST, Active Fires, Vegetation Index, Surface Type
  - Beta: Surface Albedo
- Teams are continuing the development of improved and additional products, e.g.:
  - Green Vegetation Fraction (NDE)
  - Active Fires (NASA ST and PGRR)
  - Surface Type (off-line for IDPS)





Green Vegetation Fraction



Active Fires

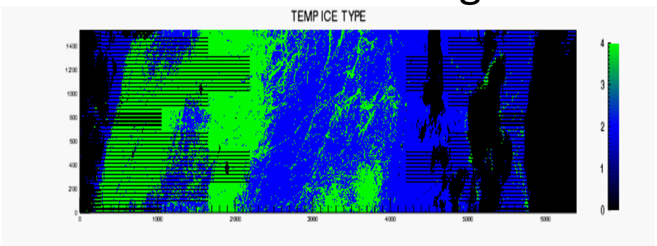
Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

Oral: Role of STAR Algorithm Integration Team (AIT) in Integrating JPSS Algorithms using Algorithm Development Library (ADL) for Product Maturity

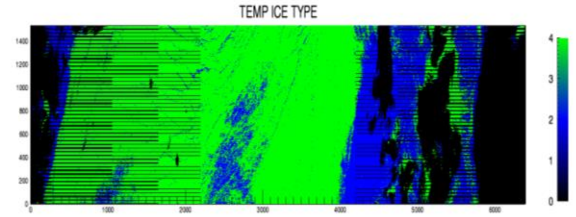
Bigyani Das, Marina Tsidulko, Youhua Tang, Weizhong Chen, Valerie Mikles, Kristina Sprietzer, Yunhui Zhao, Walter Wolf

- STAR AIT's Algorithm Integration Activities
  - Integrating Wavelength Shift and Ozone Mixing Ratio Related Changes for OMPS
  - Integrating Global Multisensor Automated Snow/Ice Map (GMASI) Tile for Cryosphere
  - Land Surface Albedo LUT Updating for VIIRS
  - Integrating New Rain Algorithm for CrIMSS EDR
  - Correcting Noise Amplification Factor Coding Error in CrIMSS EDR
  - Equation Modification for Sea Surface Temperature
- Communication, Consultation and Other Support
  - Providing ADL Training
  - Attending Team Meetings and Management Meetings
  - Submitting Change Request
  - Reviewing ATBD and OAD
  - Troubleshooting and Test Runs
  - Sensitivity Tests
  - Analyzing Test Results
  - Developing Common CM Framework

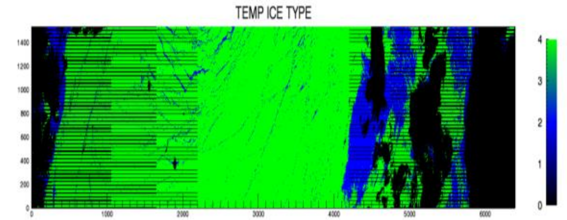
Baseline: no changes



SWR=SWR*0.7 and Albedo=const=0.8



Albedo=0.8, T(Temp)=T-2, Sh (Spec hum)= Sh-0.0002



Sensitivity Tests for Ice Age

Green – old ice, Blue – new ice

SWR: Shortwave Radiation

Impact of Near-real-time Satellite Observations on Soil Moisture Simulations of Noah LSM in NLDAS, Li Fang, UMD-ESSIC/CICS, NOAA NESDIS-STAR

28th Conference on Hydrology

- The significant variations existing in the climatological and NRT datasets presented above would inevitably impact on SM estimates for Noah land surface model.
- Validation results present positive impact on SM simulations for both surface and rootzone SM from the Noah LSM after the insertion of NRT parameters (GVF, albedo and insolation).

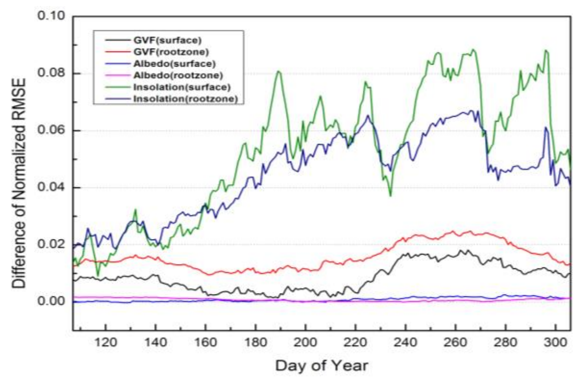


Figure 1 Difference in normalized RMSEs (RMSE(Climatology) – RMSE(NRT))

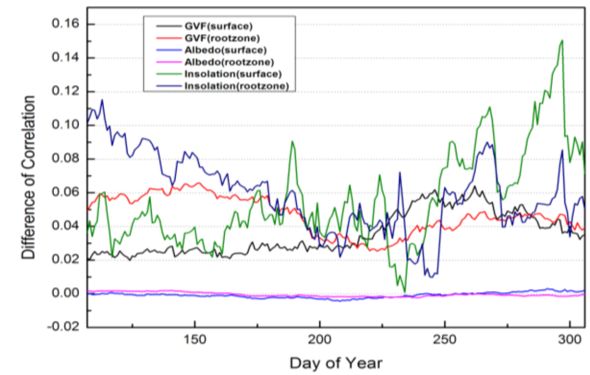


Figure 2 Difference in normalized RMSEs (Correlation(NRT) – RMSE(Climatology))

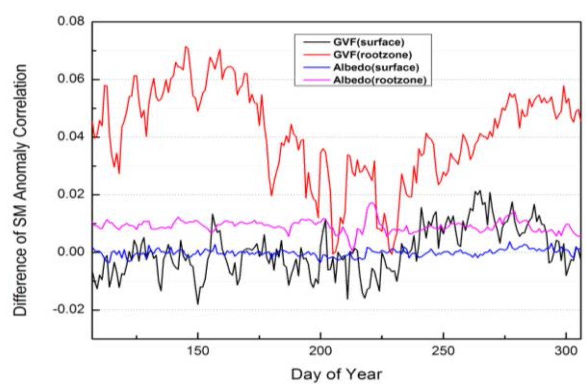


Figure 3 Difference in anomaly correlations (Correlation(NRT) – RMSE(Climatology))

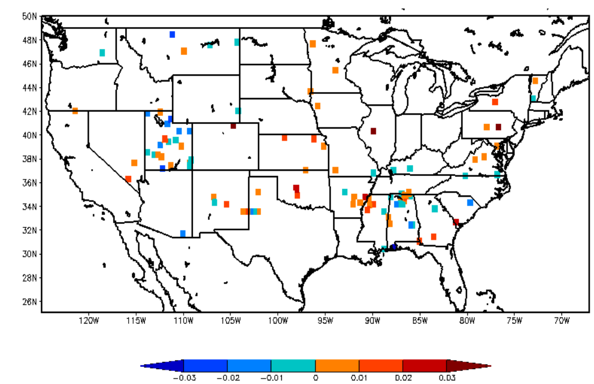


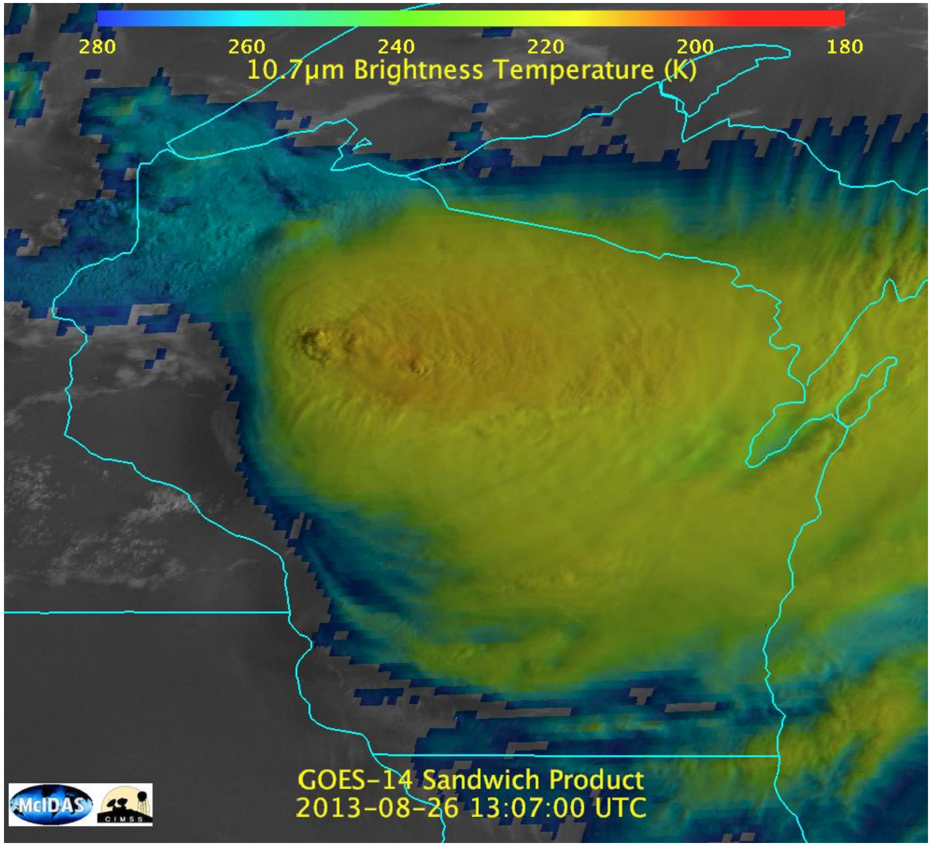
Figure 4 Spatial distribution of the difference in SM anomaly correlations for rootzone SM simulations

3B.4 Automated Visualization and Data Analysis in McIDAS-V

Joleen Feltz, E. Weisz, S. Bachmeier, T. Schmit*, M. Hiley, M. Gunshor
Cooperative Institute for Meteorological Satellite Studies (CIMSS) University of Wisconsin-Madison
*NOAA/NESDIS/STAR/ASPB

Information Systems Technologies for Generation, Communication, and Interpretation of Satellite Data

- Use of McIDAS-V Libraries for Quantitative Analysis
  - McIDAS-V libraries are being used to report image quality statistics on every GOES-East and GOES-West Image via a cron job
  - The McIDAS-V data analysis libraries are easily accessed in the jython shell, offering familiar syntax (python).
- McIDAS-V for Visualization
  - New capabilities in McIDAS-V such as transparency and layers provide new opportunities for image visualization.
  - The interactive jython shell within McIDAS-V provides consistency.

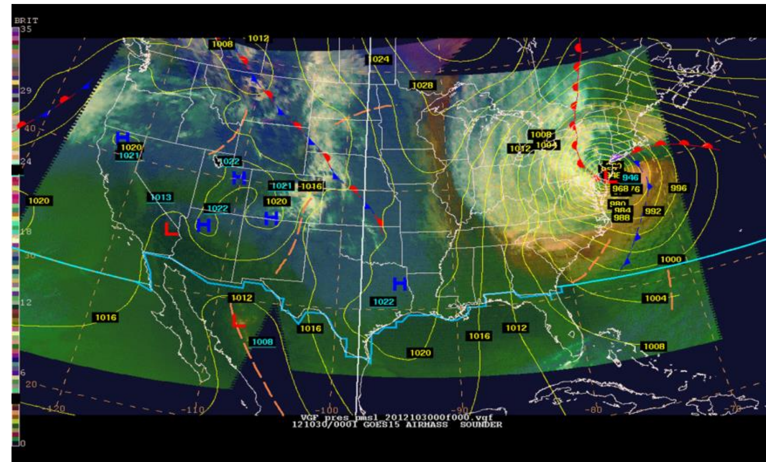


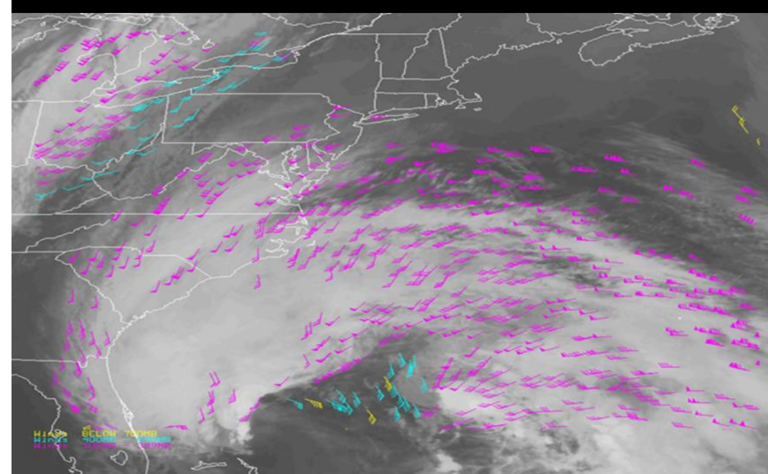
Satellite Tools to Monitor and Predict Hurricane Sandy – Current and Emerging Products

Michael Folmer[1], Mark DeMaria[2] and Ralph Ferraro[3]
[1]Univeristy of Maryland/ESSIC; [2]NOAA/NWS/NHC; [3]NOAA/NESDIS/STAR

Poster Session on Special Weather Events of 2013

- Satellite products were critical in the analysis and forecasting of Sandy
  - IR and MW imagery during hurricane phase
  - Cloud drift winds
  - QPF
- Emerging products include
  - RGB imagery
  - ATMS Warm Core Anomalies
  - GOES-R era 1 minute products
    - Cloud winds
    - Lightning from GLM





An experiment using high resolution CrIS measurements for atmospheric retrievals: carbon monoxide impact

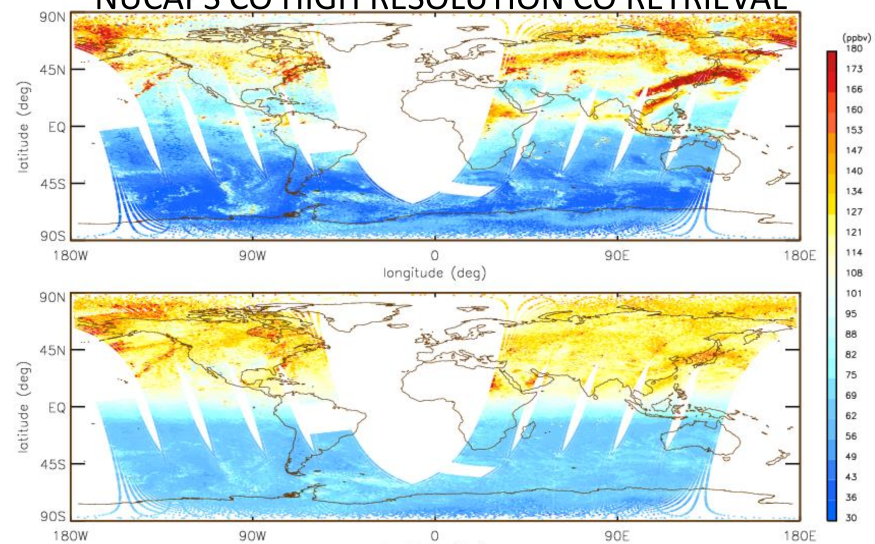
Antonia Gambacorta[(1)], C. D. Barnet[(2)], W. Wolf[(3)], T. King[(1)], E. Maddy[(2)], L. L. Strow[(4)], Y. Han[(3)], D. Tremblay[(5)], N. Nalli[(1)], X. Xiong[(1)], and M. Goldberg[(6)]

(1) IM System Groups - (2) STC, Inc. – (3) NOAA/NESDIS/STAR – (4) UMBC – (5) DTC, Inc. – (6) NOAA JPSS Office

AMS conference session: **Session:** 10thGOES-R/JPSS Posters

- The experimental high spectral resolution CO retrievals show a remarkable improvement, of almost up to one order of magnitude in the degree of freedom of the signal, with respect to the low resolution mode. Furthermore, high resolution CO retrievals show similar skill with respect to existing CO operational products from the AIRS, IASI and MOPITT instruments, both in terms of spatial variability and degrees of freedom.
- The results of this research provide evidence to support the need for high spectral resolution CrIS measurements. This is a fundamental prerequisite in guaranteeing continuity to the CO afternoon orbit monitoring as part of a multi-satellite, uniformly integrated, long term data record of atmospheric trace gases.

NUCAPS CO HIGH RESOLUTION CO RETRIEVAL



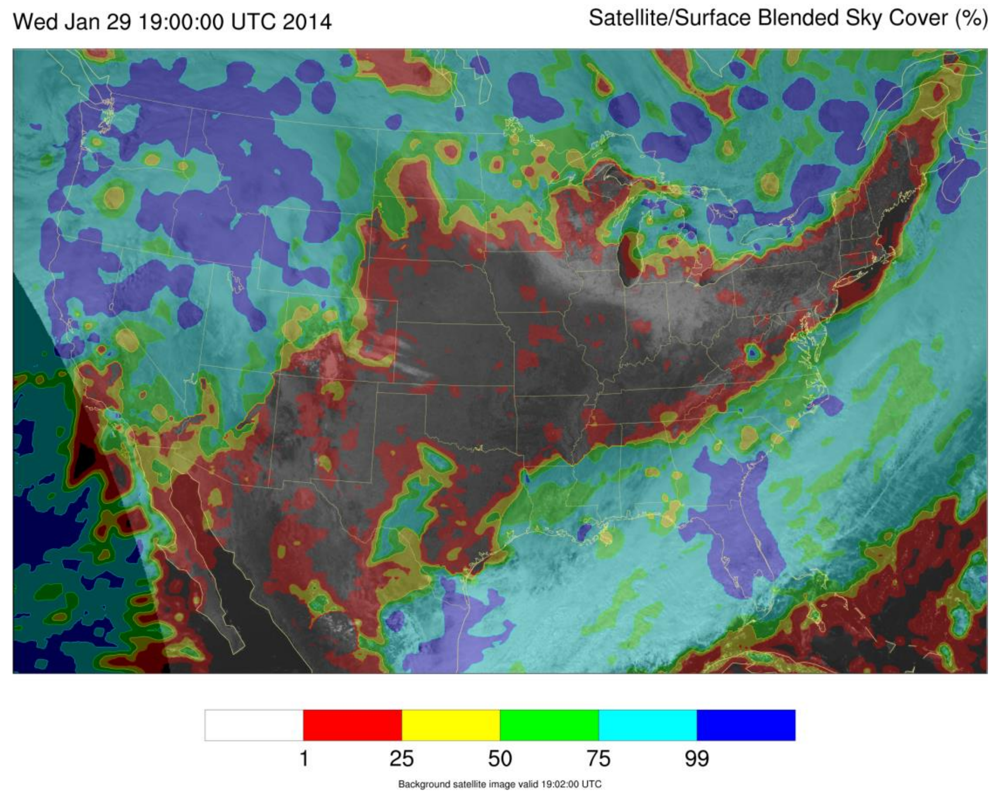
NUCAPS CO LOW RESOLUTION CO RETRIEVAL

J1.5 Sky Cover: Shining Light on a Gloomy Problem

Jordan J. Gerth, CIMSS/Univ. of Wisconsin, Madison, WI

Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- The hourly blended sky cover analysis combines in-situ surface observations and GOES effective cloud emissivity products over a one-hour window.
  - Advantages include better detection of low cloud (using surface observations) and high cloud (using satellite emissivity products)
- The analysis is a possible descendent for current cloud analyses in short-term NWP models and the satellite cloud product used to report the sky condition over NOAA Weather Radio.



The blended sky cover analysis (foreground) from 29 January 2014 captures areas of thick cloud over the Pacific Northwest , Canada, and Florida. Snow cover under clear skies in the Great Lakes region is evident in the GOES-East visible image from 19:02 UTC (background).

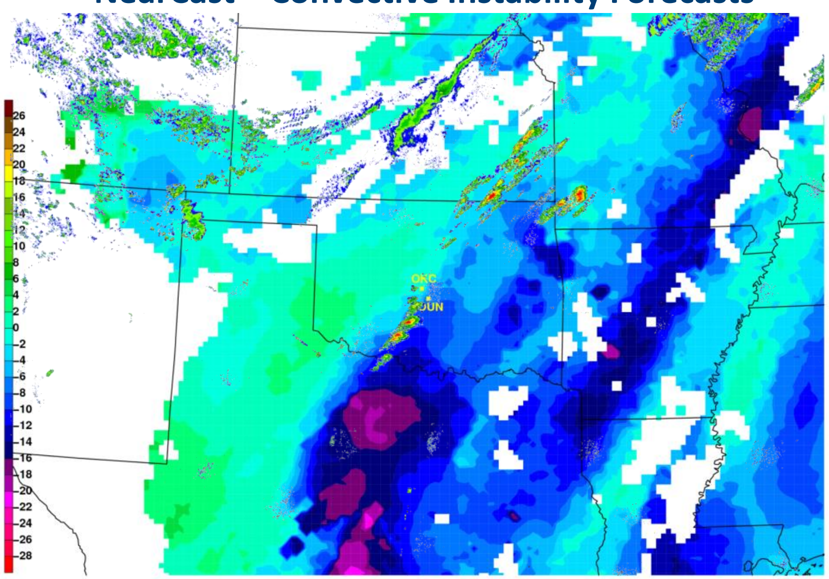
J1.1 Using GOES-R Demonstration Products to "Bridge the Gap" Between Severe Weather Watches and Warnings for the 20 May 2013 Moore, OK Tornado Outbreak

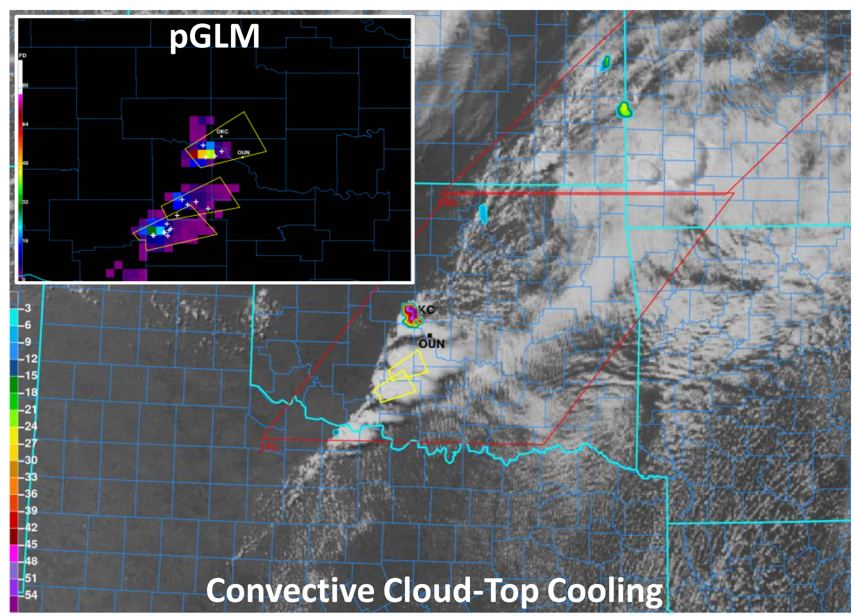
Chad M. Gravelle, CIMSS, University of Wisconsin-Madison / NWS Operations Proving Ground;
W. Line, J. Mecikalski, R. Petersen, J. Sieglaff, and G. Stano

Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- GOES-R convective monitoring demonstration products used in a data-fusion process:
  - NearCast, Convective Initiation, Convective Cloud-Top Cooling, Overshooting Top Detection, Pseudo Geostationary Lightning Mapper
- GOES-R products can be valuable in maintaining and improving situational awareness during the 0-6 h hours prior to CI and during different portions of the convective life cycle.
- Beginning the transition from "product-centric" to "multi-product" decision support towards launch.

NearCast – Convective Instability Forecasts



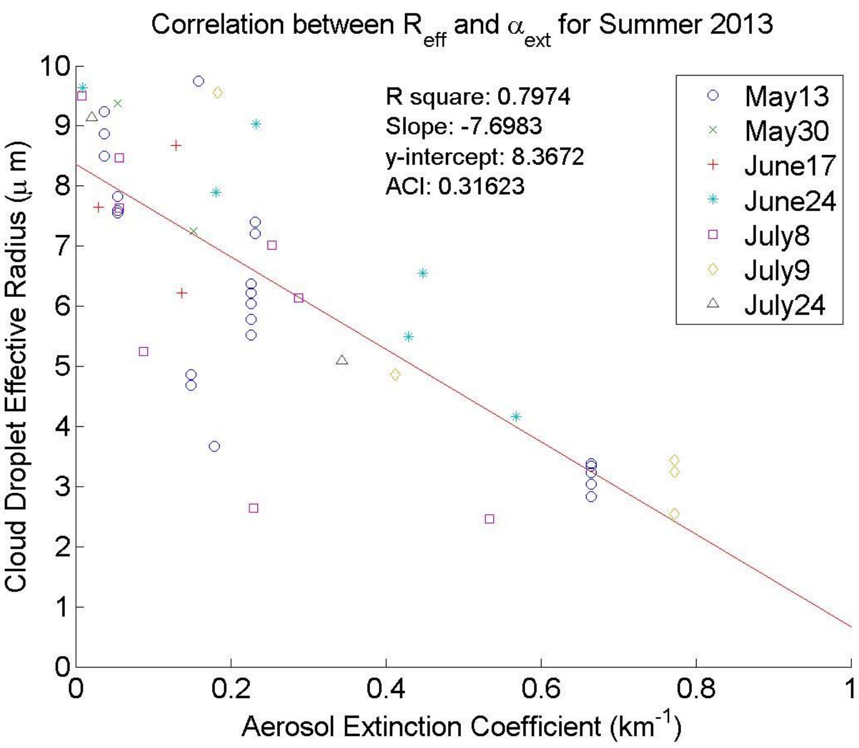


Aerosol-Cloud Interaction measurements using Ground Based Remote Sensing Systems over urban coastal area

***Zaw Han**, Y. Wu, J. Fallon, B. Gross, F. Moshary, and S. Ahmed City College of New York, New York, NY*

Sixth Symposium on Aerosol-Cloud-Climate Interactions

- Synergistic ground based system used to quantify aerosol cloud interaction
  - Clear observation of Twomey Indirect effect
  - Reasonable value for Aerosol Cloud Index
- Development of Inversion algorithm for liquid cloud phase
  - Simultaneous COD and Effective Radius
  - Preliminary extension to mixed phase clouds

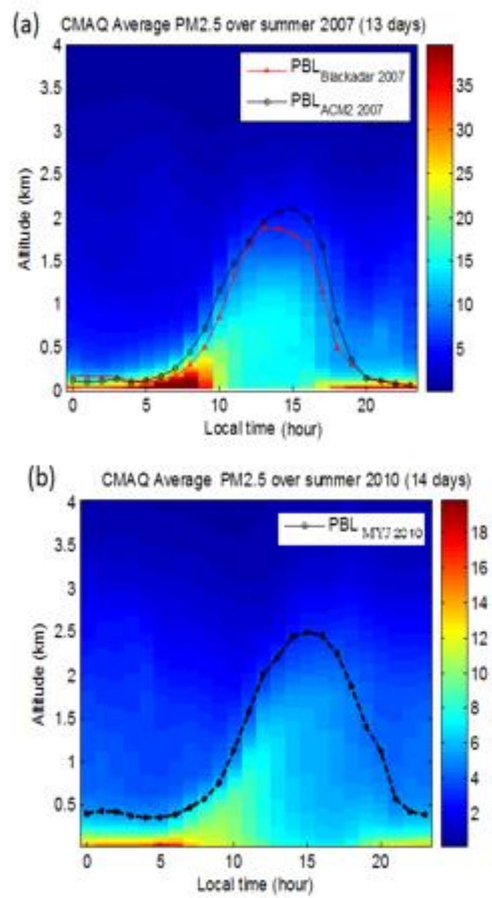


Assessment of High Resolution Urbanized Meteorological Models using ground based remote sensing and satellite imagery

***Zaw Han**, E. Gutierrez, J. E. González, B. Gross, and F. Moshary, City College of New York, New York, NY*

11th Symposium on the Urban Environment

- PM2.5 models have large biases during pre-dawn / post sunset
  - Active sensing shows that PBL height is most important factor
  - Improvement in PBL height in models are shown to remove biases some what
- Urban WRF PBL height assessment made with CCNY ground instruments
  - Improvement in PBL height for night time
  - Improved convective moisture



Suomi NPP VIIRS Near Constant Contrast (NCC) Imagery

Don Hillger[1] Curtis Seaman[2], Calvin Liang[3], Steven Miller[2], Daniel Lindsey[1], and Tom Kopp[4]

10th Annual Symposium on Future Operational Satellite Systems

- VIIRS EDR Imagery was to reach the Validation 1 maturity stage, but was so successful as a product that **Validation 3 stage was attained**!
- **Both Non-NCC and NCC Imagery** attained this level simultaneously:
  - Non-NCC imagery has been well validated and ahead of NCC Imagery for months/years
  - NCC Imagery recently made significant advances in full coverage and stray light suppression (an SDR/DNB issue)
- The EDR Imagery Team has been tasked with **recommending requirements for VIIRS Imagery for JPSS-1 and 2**, in light of the current lax requirements that were largely eliminated in the transition from NPOESS to Suomi NPP.

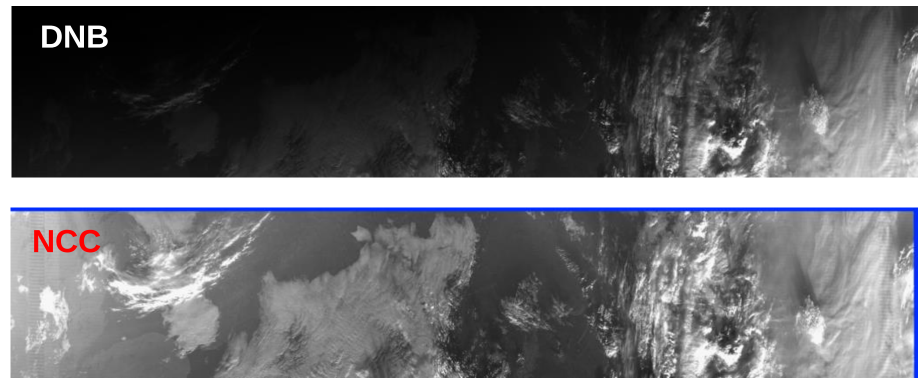


Figure: Comparison of DNB (SDR) with NCC (EDR) for a VIIRS granule that crosses the day/night terminator

Product	xDR	Units	Mapping
DNB	SDR	Radiances	Raw
NCC	EDR	Pseudo-albedos	GTM

Table: Comparison of DNB (SDR) with NCC (EDR) characteristics

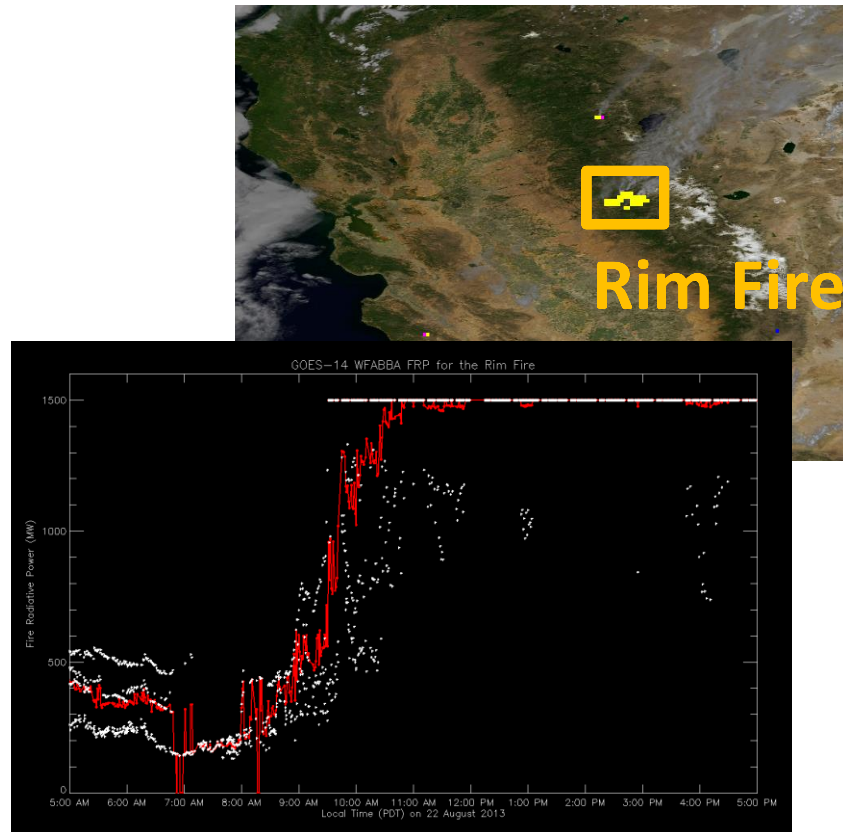
[1]NOAA/NESDIS/StAR
[2]CIRA, Colorado State University
[3]Northrop Grumman
[4]The Aerospace Corporation

793 Recent Developments With The Global Wild Fire Automated Biomass Burning Algorithm

***Jay P. Hoffman**, CIMSS/Univ. of Wisconsin, Madison, WI; and C. C. Schmidt, E. M. Prins, and J. C. Brunner*

Second Symposium on the Joint Center for Satellite Data Assimilation

- GOES-14 WFABBA coverage of Aug. 2013 Rim Fire
  - 1-minute data shows variability in fire intensity
  - New visualization tools are being developed to show recent history along with current fire detections
- Fire coverage expanded
  - Real-time products cover GOES-East/-West, METEOSAT, MTSAT, and now COMS
  - Reprocessed archive dates back to 1995



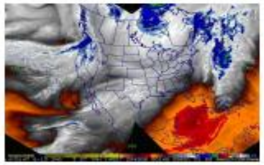
Fire Radiative Power from 1-minute GOES-14 WFABBA on Aug. 23, 2013 Rim Fire in California shows rapid fire intensification

Development and Testing of a Layer Precipitable Water Product to Aid Forecasting of Heavy Precipitation and Flooding†

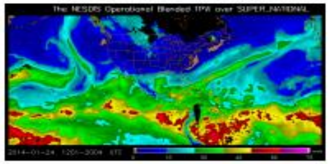
Stanley Q. Kidder,* John M. Forsythe,* Kevin K. Fuell,** Anita LeRoy,** and Gary J. Jedlovec***
*Cooperative Institute for Research in the Atmosphere (CIRA), Colorado State University, Fort Collins, CO 80523
**NASA Short-Term Prediction Research and Transition (SPoRT) Center, University of Alabama in Huntsville, Huntsville, AL 35805
***NASA Short-Term Prediction Research and Transition (SPoRT) Center, Huntsville, AL 35805

The Problem

Forecasters have long used precipitable water products to aid forecasting of heavy precipitation and flooding, especially along the west coast of continents, where atmospheric rivers make landfall. Two of the most common products are GOES water vapor imagery, which shows mid- to upper-level water vapor, and total precipitable water products from polar-orbiting microwave sensors, which allow the detection of total column water vapor through clouds. A deficiency of these products is that they contain little information about the vertical distribution of the water vapor.



GOES 6.7 µm water vapor imagery. Shows clouds and high-level moisture.



Blended TPW includes microwave observations from NOAA, DMSP, GPS, METOP, and GOES satellites, but contains no information about the vertical distribution of the water vapor.

An Opportunity

Recent instruments and techniques, such as NOAA's Microwave Integrated Retrieval System (MIRS) and NASA's Atmospheric Infrared Sounder (AIRS), allow the retrieval of water vapor profiles. We have developed a four-layer precipitable water product (surface to 850 hPa, 850 hPa to 700 hPa, 700 hPa to 500 hPa, and 500 hPa to 300 hPa), which we call Layer Precipitable Water or LPW:

$$LPW \equiv \int_{p_{top}}^{p_{bottom}} q \frac{dp}{g},$$

where p is pressure, q is mixing ratio, and g is gravity. We also calculate another product we call Layer Relative Humidity or LRH:

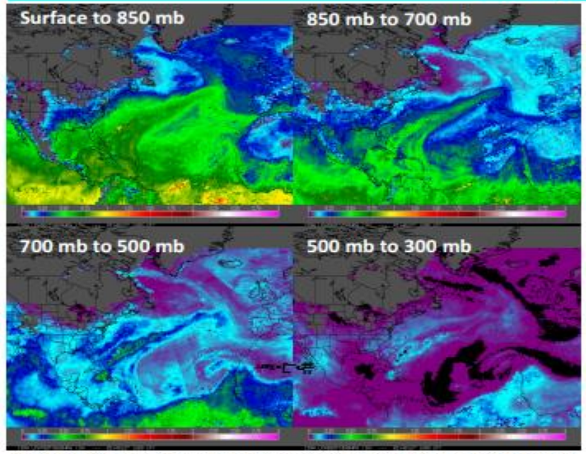
$$LPW_{sat} \equiv \int_{p_{top}}^{p_{bottom}} q_{sat}(p, T(p)) \frac{dp}{g},$$

$$LRH \equiv \frac{LPW}{LPW_{sat}},$$

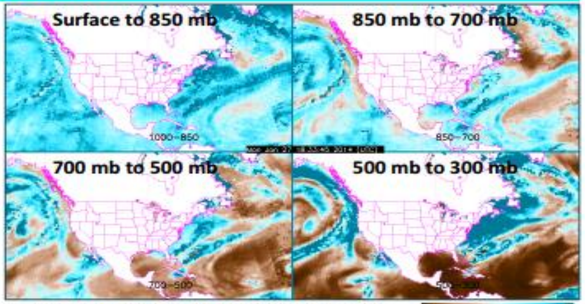
where T is the absolute temperature and the subscript sat indicates saturation values. The products are produced at 3 h intervals from MIRS and AIRS retrievals; they cover the Earth from 71°N to 71°S. They are available in real time in AWIPS format, so that forecasters can easily access the products.

Although moisture retrievals have been available for some time, layer moisture products have not previously been routinely available to forecasters.

Example Products



Layer Precipitable Water from SPoRT. Five polar satellites (NOAA-18 & 19, Metop-A, DMSP F-18 and NASA Aqua) are blended together every three hours.

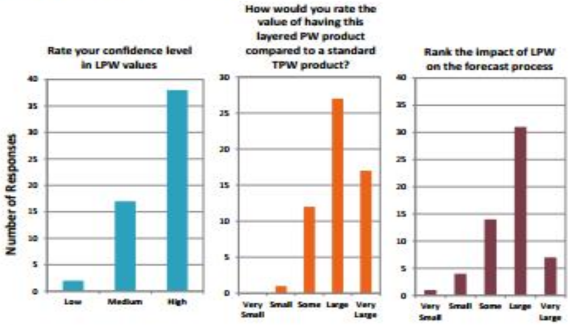


Layer Relative Humidity from CIRA. There are currently no RH retrievals over land from the MIRS system.

View Real-Time LPW Animations
http://cat.cira.colostate.edu/LPW_Animations

Product Testing

The LPW product (but not the LRH product) was converted by SPoRT into AWIPS format for testing by NWS forecasters on the U.S. West Coast, in Alaska, and in Puerto Rico in two observation periods in the spring and summer of 2013. Forecasters were asked several questions about the LPW product. A paper detailing the results is forthcoming. Briefly, preliminary overall results are presented below.



Summary and Recommendations

Forecasters generally had high confidence in the LPW product, thought it added value to the standard TPW product, and reported that it had a large impact on the forecast process. One forecaster in Puerto Rico wrote, "Overall, this product to me is of great value and should be made operational." Another forecaster who was using the product for multiple events at once was specifically pleased with the appearance of the product, saying the "visual quality is alone a help on a busy shift."

We recommend that:

1. Steps be taken toward operationalization of the LPW product.
2. Other layer moisture products, such as LRH, be similarly tested.
3. The LPW product be tested by NHC forecasters during the 2014 Atlantic hurricane season.

More Information

- This work was supported by NASA ROSES grant NNX11AL77G to CIRA/Colorado State University.
- We thank the NWS forecasters who ***volunteered*** their time to assess the LPW product.
- The first two authors wish to thank NASA's SPoRT Center for converting the LPW product into AWIPS format, getting it to forecasters, and organizing the assessment.
- http://cat.cira.colostate.edu/LPW_Poster

†26th Conference on Weather Analysis and Forecasting, 2-6 February 2014, Atlanta, GA, Poster No. 163.

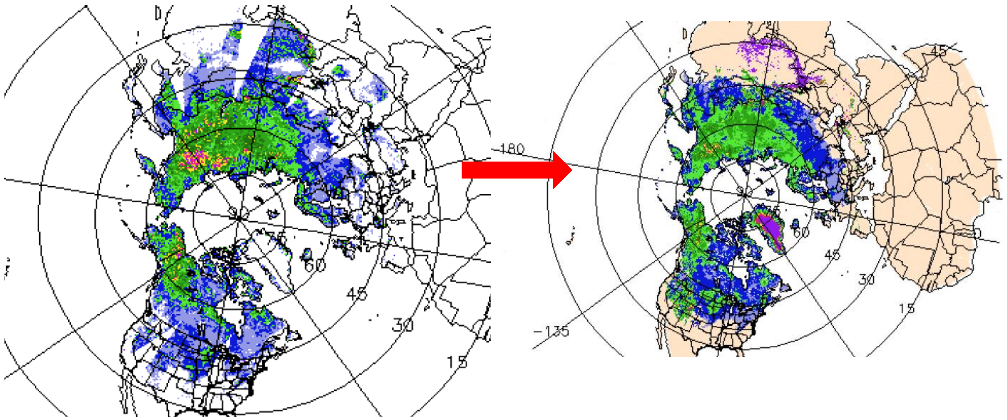
Presentation: An Interactive Blended Analysis for Snow Depth

Cezar Kongoli, Sean Helfrich and Thomas Smith

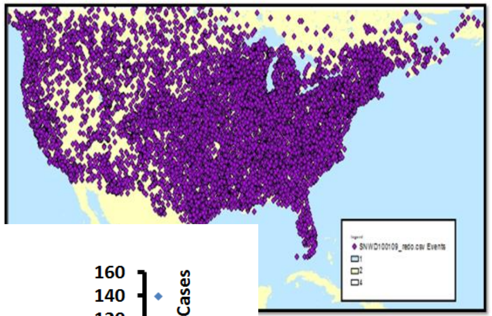
- INPUT DATA
  - SYNOP, METAR, COOP Snow Depth
  - AMSRE2 or MiRS Snow Depth
  - Interactive analyst Snow Depth
  - 4-km IMS Snow Mask
- APPROACH
  - Optimal Interpolation (OI)
- Validation
  - Global Historical Climatology Network
  - NASA AMSRE microwave proxy data
- Main Results
  - Analyzed Snow Depth within 20 cm of the GHCN-Daily measurements 86.9% of the time in January 2010, while in Feb 2010 within 20 cm 85.1% of the time

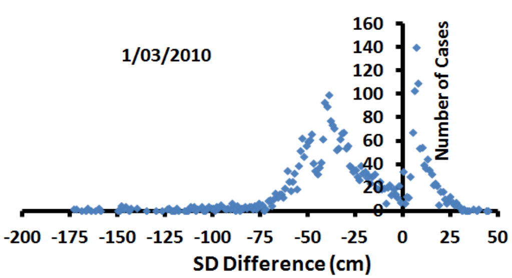
AMSRE SD

ANALYSIS SD



Validation



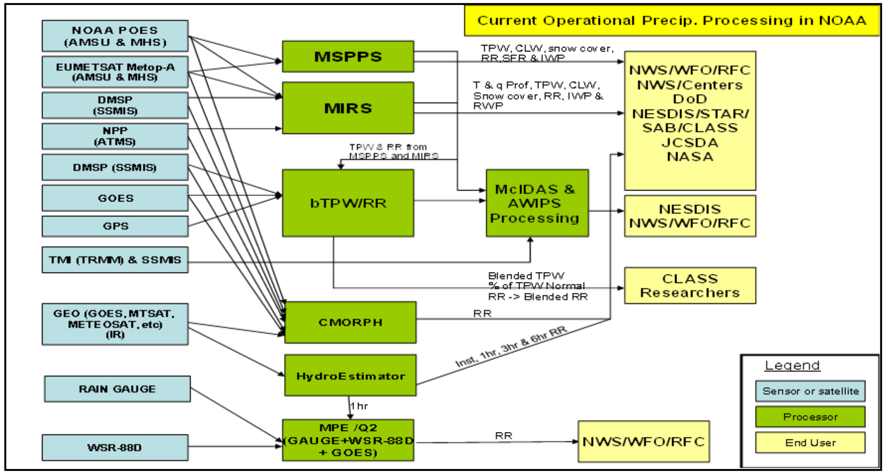


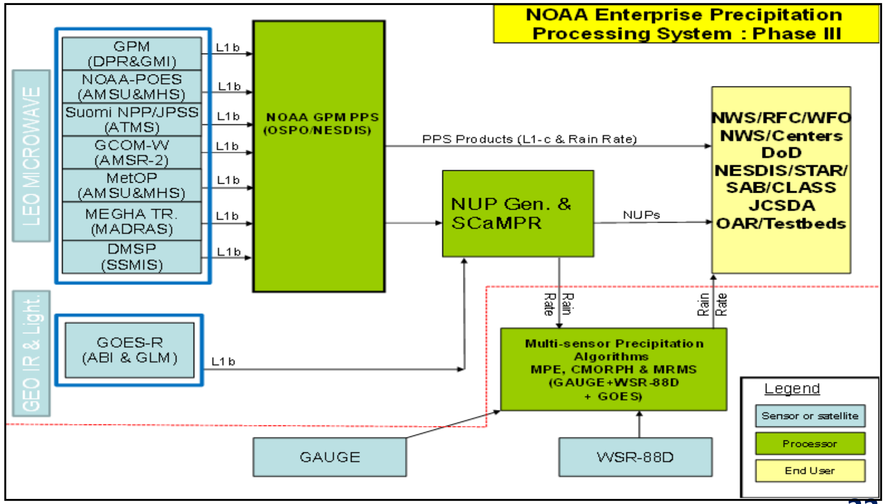
Proposed NOAA Enterprise Precipitation Processing System (EPPS)

Chandra Kondragunta[1], Ralph Ferraro[2], Mike Johnson[3] , David Hermreck[1], Tom Schott[1], John Pereira[1], Limin Zhao[4]
1. NOAA/NESDIS/OSD, 2. NOAA/NESDIS/STAR, 3. NOAA/NWS/OST, 4. NOAA/NESDIS/OSPO

Poster – Fourth Conference on Transition of Research to Operations

- NOAA continues to prepare for NASA's GPM Mission
  - Core satellite launch 27 Feb 2014
  - NOAA can leverage NASA and JAXA investments
    - GMI and DPR on core satellite
    - Extensive ground system, PPS, which contains state of the art algorithms, products and processing architecture
- Concept for the NOAA EPPS
  - Reduce current stovepipe systems that generate a variety of products for GOES and POES
  - Use the NASA PPS as a basis for unified MW product generation
    - Precipitation
    - Other NOAA Unique MW products (NUP)
  - EPPS eventually expanded to include radar and rain gauges



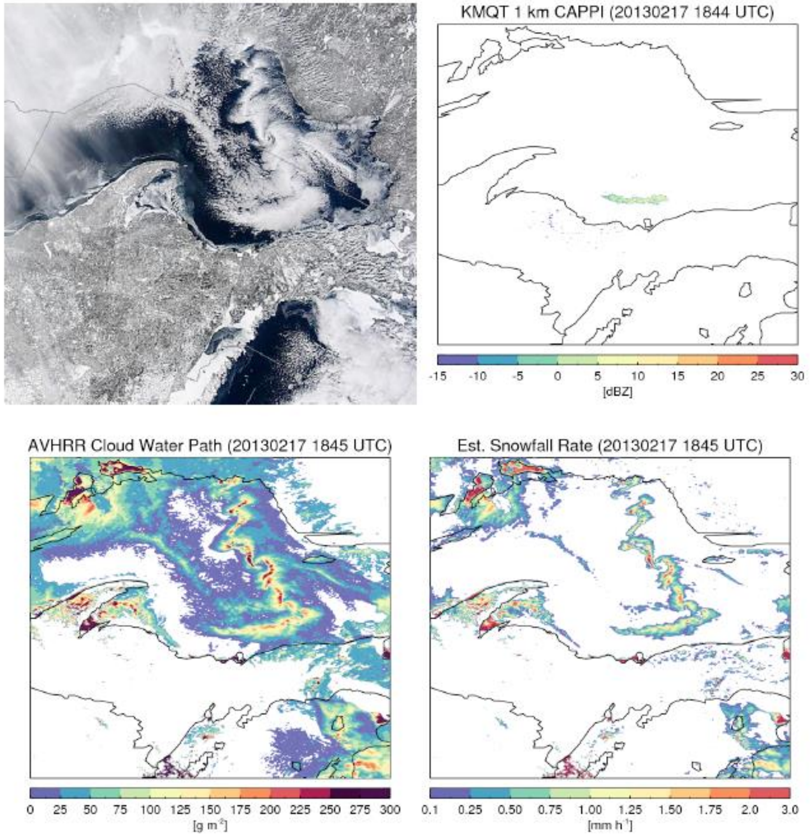


2.4 Improving Lake Effect Snow Nowcasting and Quantitative Precipitation Estimation Using Synergistic Satellite and NEXRAD Products

Mark S. Kulie, CIMSS/UW-Madison; and J.M. Feltz, A. Walther, M. Dutter, S. W. Nesbitt, R. Bennartz, and A. K. Heidinger

Fourth Conference on Transition of Research to Operations

- Year-long NEXRAD lake effect snowfall database created
- Empirical relationships developed between NOAA Algorithm Working Group (AWG) cloud water path product and NEXRAD-derived snowfall rates
- Testing performed using NOAA polar orbiter and GOES observations
- Satellite-based snowfall product augments NEXRAD observations in regions devoid of radar coverage



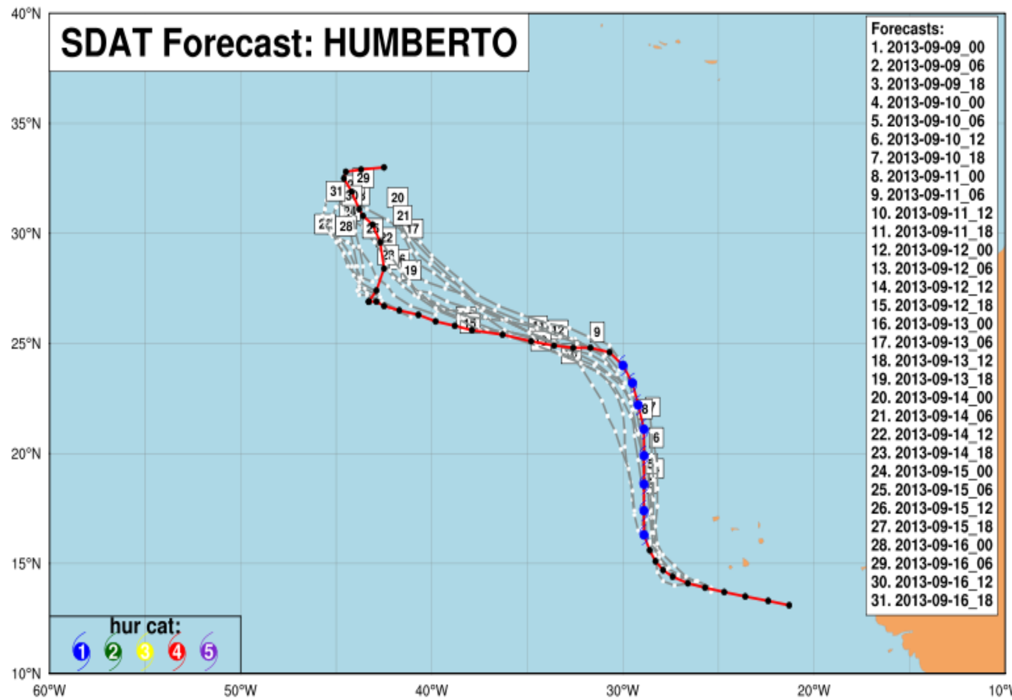
Proof-of-concept snowfall rate product (lower right) from NOAA Algorithm Working Group (AWG) cloud water path product to augment NEXRAD observations (upper right) over the Great Lakes.

J3.3 Development of a near realtime regional satellite data assimilation system for high impact weather forecast

Jinlong Li, Jun Li, Pei Wang (CIMSS/SSEC/UW-Madison), Steve Goodman (STAR/NESDIS/NOAA), Mitch Goldberg (JPSS/NOAA), Tim Schmit (STAR/NESDIS/NOAA)

The Joint Session of the 18th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, and the Fourth Conference on Transition of Research to Operations

- Satellite data assimilation for tropical cyclone (SDAT) system has been developed at CIMSS (http://cimss.ssec.wisc.edu/sdat/)
- Tools have been developed for satellite data preparation, conversion and validation.
- Different satellite data impacts have been studied. Preliminary results show reasonable and inspiring.
- The system has been run in near realtime since August 2013. The system is pretty stable and the preliminary validations are encouraging.



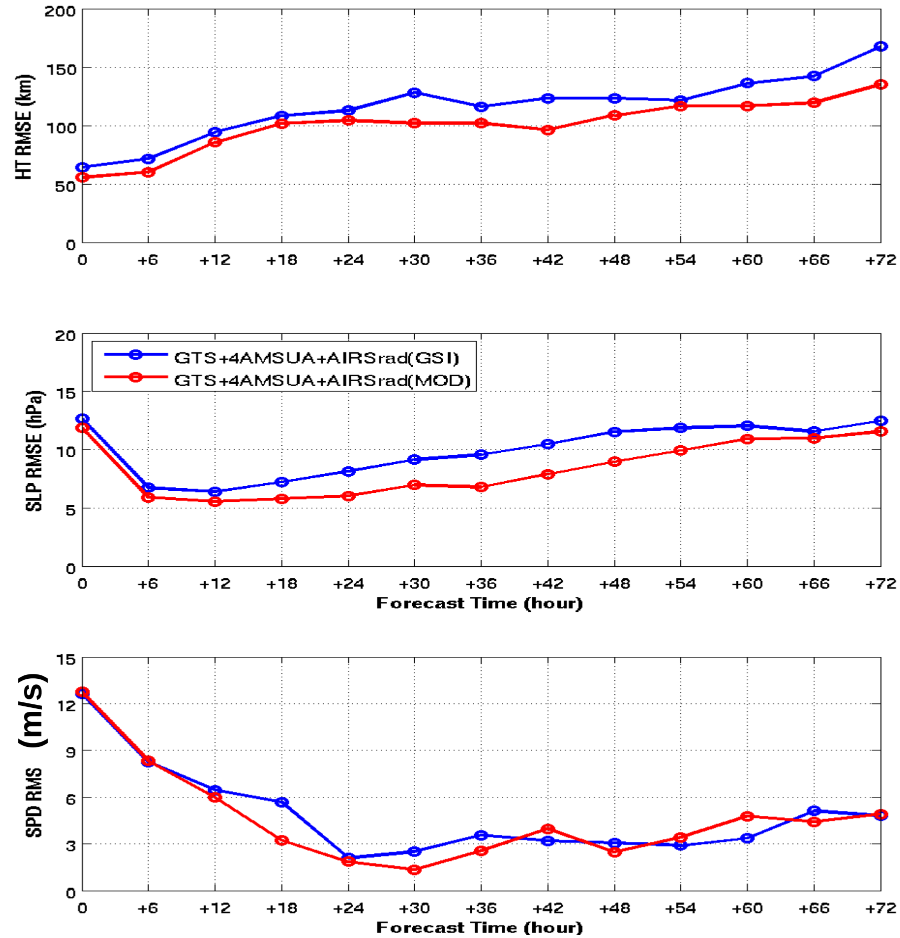
SDAT 72 hours track forecasts for hurricane Humberto from 00 UTC 9 September to 18 UTC 16 September 2013.

780 Handling clouds in assimilating high spectral resolution infrared radiances

Jun Li (CIMSS/SSEC/UW-Madison), F. Weng (STAR/NESDIS/NOAA), Pei Wang, Jinlong Li (CIMSS/SSEC/UW-Madison, Tim Schmit (STAR/NESDIS/NOAA), Wenguang Bai and Zhenglong Li (CIMSS/SSEC/UW-Madison)

Second Symposium on the Joint Center for Satellite Data Assimilation

- AIRS sub-pixel cloud detection with high spatial resolution (1 km) MODIS cloud mask
- SDAT (Satellite Data Assimilation for Tropical storm forecasts) – A near real time system based on WRF/GSI at CIMSS, is used to test the impact of AIRS cloud detection with MODIS
  - Hurricane Sandy (2012) forecast experiments
  - Conventional data from GTS, AIRS from Aqua and AMSU from four satellites are assimilated
  - GSI AIRS alone cloud detection (blue)
  - AIRS sub-pixel cloud detection with MODIS (red)
- AIRS sub-pixel cloud detection with MODIS (red) provides better impact on hurricane track (upper panel), central sea level pressure (middle panel) and maximum wind speed (lower panel) forecasts than that from AIRS alone cloud detection (blue)
- This technique on handling clouds can be applied to process IASI/AVHRR and CrIS/VIIRS for hyperspectral IR radiance assimilation in NWP



SDAT forecast RMSE of Sandy from 06z 28 to 00z 30 Oct, 2012. The model resolution is 12 km. Data are assimilated very 6 hours followed by 72-hour forecasts.

Using Simulated Imagery to Visualize Model Forecasts

Daniel T. Lindsey, Louie Grasso, Dan Bikos, Ed Szoke, Justin Arnott, Chad Gravelle, Jordan Gerth

26th Conference on Weather Analysis and Forecasting /
22nd Conference on Numerical Weather Prediction

- Simulated imagery being generated from the NSSL WRF and NAM Nest models
  - Data being sent to the NWS as part of the GOES-R Proving Ground
  - Forecaster feedback has been overwhelmingly positive
- Currently working on incorporating the cloud forecasts into the Graphical Forecast Editor
  - This is a direct result of forecaster requests
  - Should improve NWS sky cover forecasts out to 60 hours

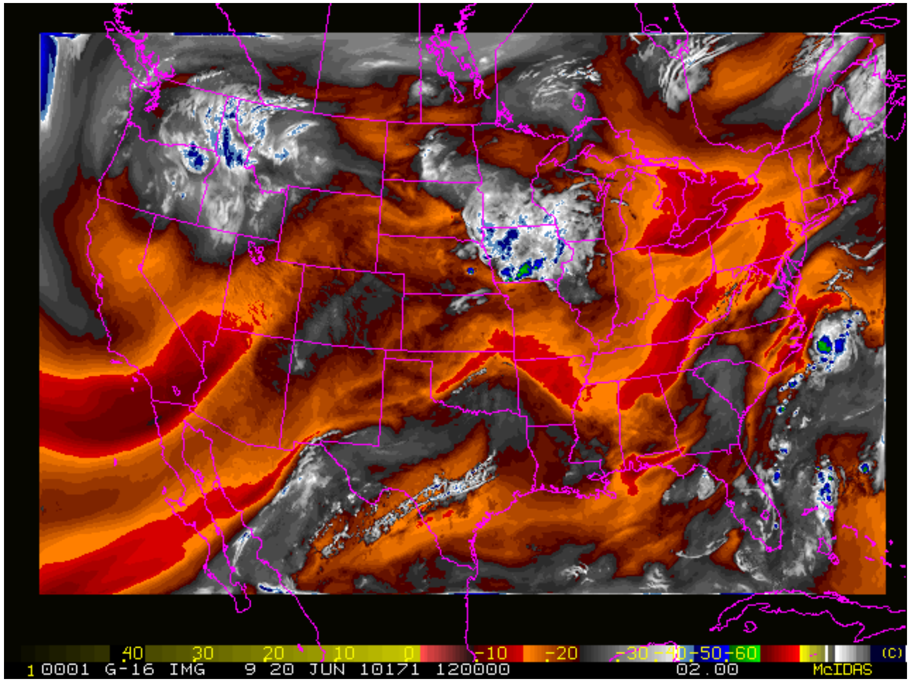


Figure: Example simulated GOES-R ABI 6.95 μm loop from 20 June 2010, based on a forecast from the NSSL WRF

A New Look at the GOES-R ABI Split Window Difference for Convective Initiation Forecasting

Daniel T. Lindsey, Louie Grasso, Jochen Kerkmann, Jack Dostalek, Ed Szoke

10th Annual Symposium on New Generation Operational Environmental Satellite Systems

- The simple split window difference (10.35-12.3 µm) from the ABI will provide useful information for forecasters about potential convective initiation
- Simulated imagery from high resolution models has been used to look carefully at this problem
- We've found that the split window difference alone may sometimes be even more helpful for locating low-level pooling of water vapor than satellite moisture retrievals
- A paper on this topic is currently in review with the Journal of Applied Meteorology and Climatology

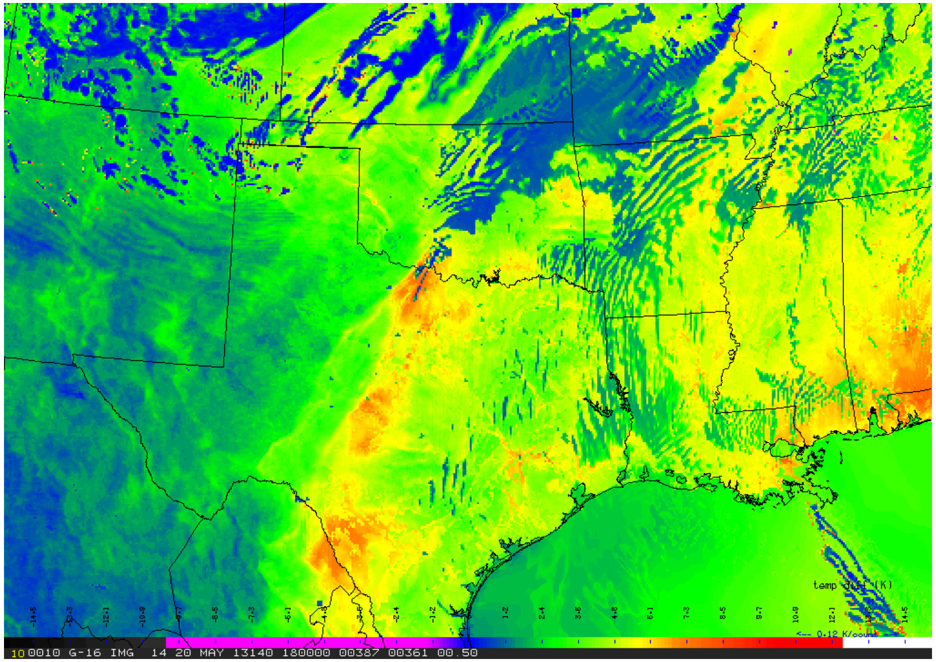


Figure: Simulated 10.35-12.3 µm split window difference, based on an 18-hour forecast from the NSSL WRF valid at 18 UTC on 20 May 2013

Evaluation of the Suomi NPP VIIRS Land Surface Temperature Product

Yuling Liu[1], Yunyue Yu[2] , Cezar Kongoli[1,2], Zhuo Wang[1], Peng Yu[1]

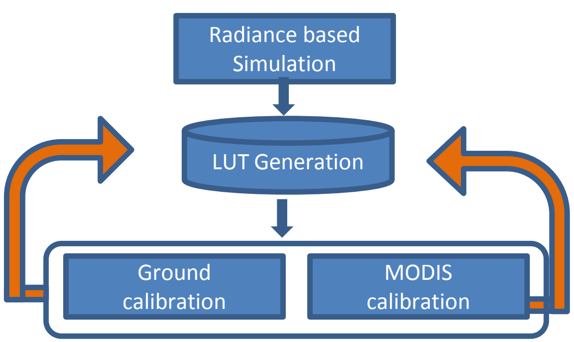
[1] CICS, University of Maryland, College Park; [2] STAR/NESDIS/NOAA

Introduction

Land Surface Temperature (LST), one of the EDR products, provides the measurement of the skin temperature over global land coverage including coastal and inland water. The LST EDR is derived from a baseline split-window regression algorithm. Coefficients of the LST algorithm are surface type dependent, referring 17 International Geosphere-Biosphere Programme (IGBP) types, with a separation for day and night.

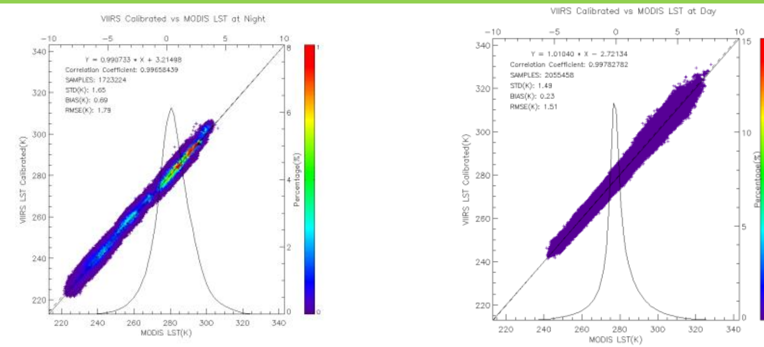
This study presents an evaluation of the LST product and addresses some issues in the algorithm development. The evaluation is mainly carried out using the conventional temperature-based approach by comparisons between the VIIRS LSTs and in-situ LSTs, and cross satellite comparison with MODIS LST. The ground evaluation result shows that VIIRS LST agrees well with the measurements from SURFRAD, with a better performance at nighttime than at daytime. However, the performance varies over surface types.

The cross satellite evaluation is mainly conducted with MODIS considering that VIIRS LST will replace MODIS LST in the future, and the comparisons are mostly over Simultaneous Nadir Overpasses (SNO) between VIIRS and Aqua. Comparison results show an overall close agreement between VIIRS and MODIS LST, but the difference in LST displays a regional stripe feature. In detail, a relatively large LST difference is found in low latitude areas such as South America and northern Australia, attributed to the significant brightness temperature difference between the two split window channels which the current VIIRS algorithm cannot handle well.



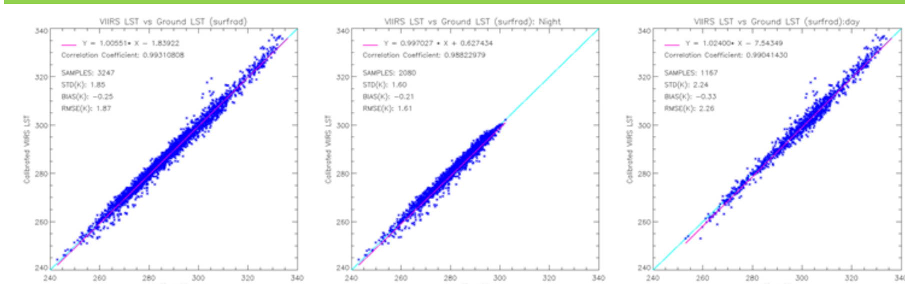
Flow chart of LST calibration

Cross satellite Evaluation

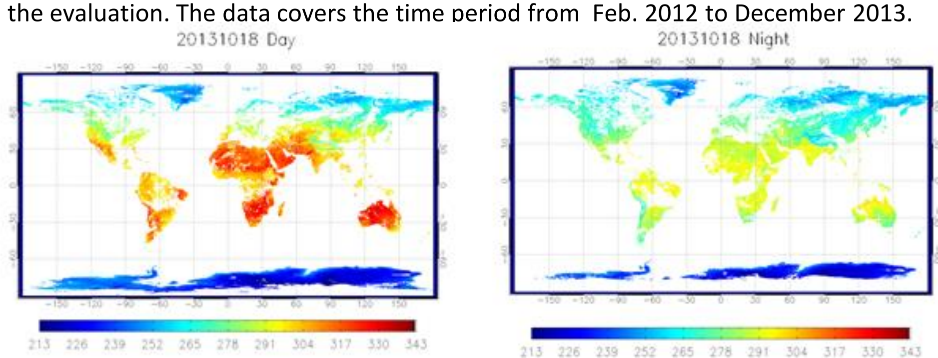


Comparison results from Simultaneous Nadir Overpass (SNO) between VIIRS and AQUA in 2012 and Oct-Dec, 2013. The matchups are quality controlled with additional cloud filter for both LST measurements.

Ground Evaluations



The ground data from The Surface Radiation Budget Network (SURFRAD) are used for the evaluation. The data covers the time period from Feb. 2012 to December 2013.



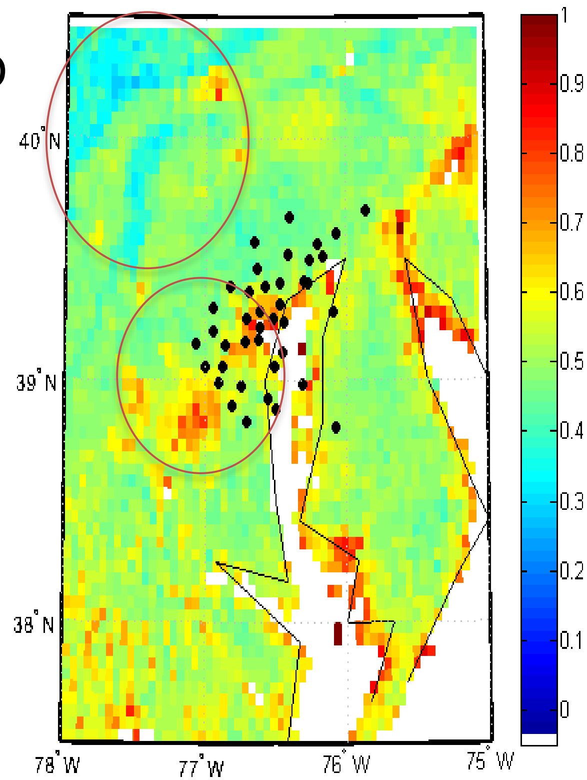
Regional estimates of ground level Aerosol using Satellite Remote Sensing and Machine-Learning

Nabin Malakar*, A. Atia, B. Gross, F. Moshary, S. Ahmed, City College of New York, New York, NY;*
and D. Lary, University of Texas at Dallas, TX

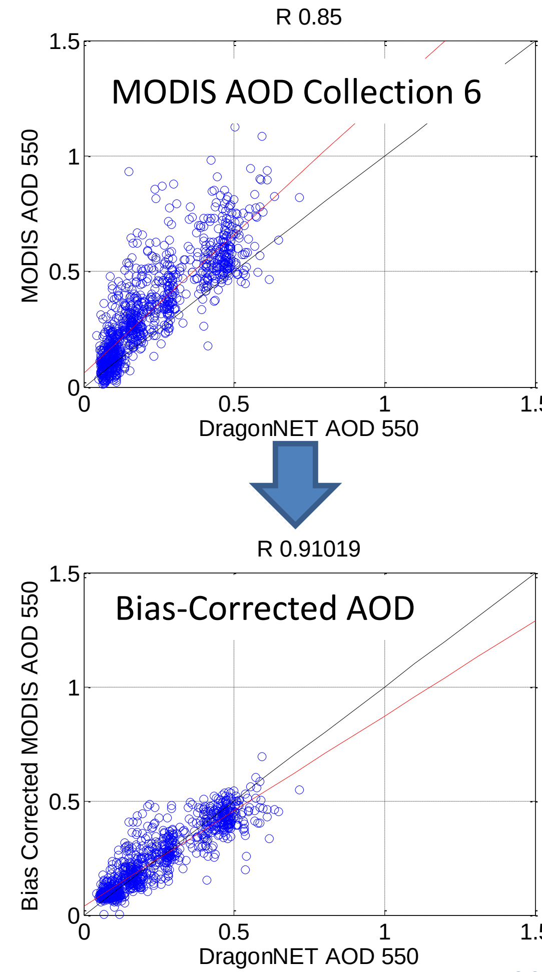
AMS Session: AI Techniques applied to environmental science

- We used the MODIS 3 km AOD products from AQUA and TERRA, and developed a machine-learning framework to compare and correct the remote sensing product with respect to the ground-based AERONET observations.
- We also constructed a neural network estimator to obtain bias-corrected AOD product.

Tuned Surface Reflection Ratio



The anomalies in the surface reflection ratio is correlated with the land usage.



TJ4.2

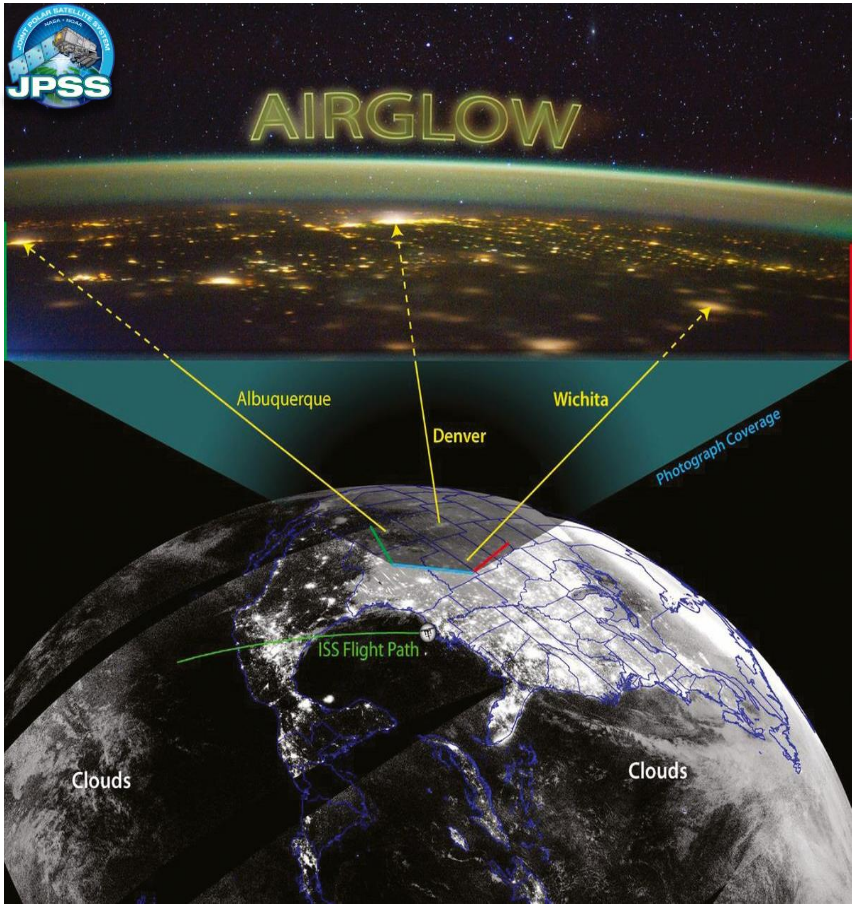
Man in the Loop:

Monday, Feb. 3rd
4:15 PM, Rm. C105

Benefits of the ISS Platform for Characterizing Low-Light Visible Observations from the Suomi NPP Day/Night Band

Steven D. Miller (CIRA), William Straka, III (CIMSS), and Donald Pettit (NASA-JSC)

- The Suomi VIIRS Day/Night Band provides a unique view of global nighttime light emissions.
- International Space Station astronaut photography offers high spatial resolution and color context to diverse scenes.
- This talk considers some ways in which the two platforms may be used in synergy:
  - Comparisons of anthropogenic lights, including bridges, ships and gas flares
  - Aurora motion via ISS movies help explain structure of DNB scanned imagery
  - ISS nightglow observations (IMAP/VISI) corroborating space/time matched DNB

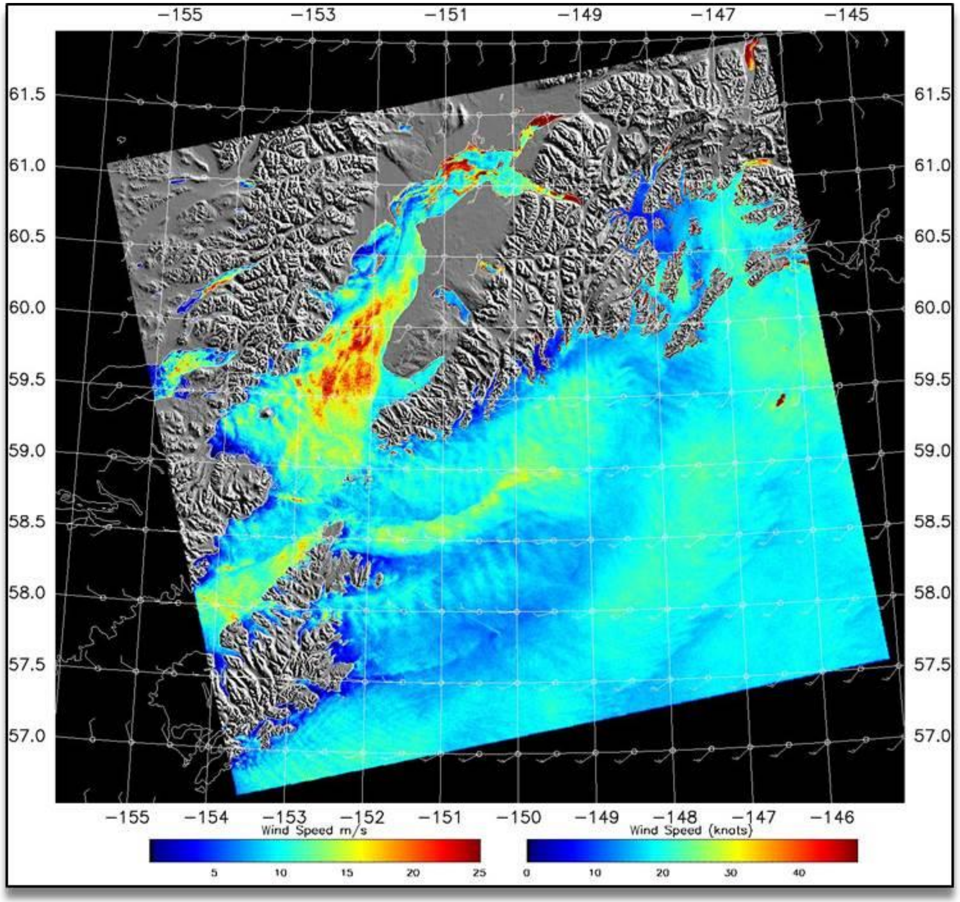


First Operational Implementation of SAR Winds at NOAA

Frank Monaldo (Johns Hopkins University APL, IPA at NOAA) and William G. Pichel (STAR NOAA)

Fourth Annual Conference on Transition of Research to Operations

- Demonstrated space borne synthetic aperture radar retrieval of marine winds.
  - 10-year routine processing of Radarsat-1 data over Alaska.
  - Validation against buoys and models.
- Operational implementation
  - Declared operation 2013-05-01.
  - Using National Ice Center access to Radarsat-2 data.
  - Gearing up for Sentinel-1A data.



Sample Pseudo-Color Wind Speed Image

Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

Using S-NPP VIIRS as a Transfer Radiometer to Inter-compare GOES-R ABI and Himawari-8 AHI,

Francis Padula[1] & Changyong Cao[2] , [1]ERT/GTT, [2]NOAA/NESDIS/STAR

- ABI and AHI both have similar spectral bands with two main differences: ABI includes a 1.38 µm channel, while this channel is replaced with a 0.51 µm channel on AHI
- GOES-R ABI & Himawari-8 AHI Spectral Comparison using Hyperspectral AVIRIS & IASI Observations:
  - **Reflective Solar Bands (RSB):** Overall good agreement (>0.5% Diff.) channels: 0.47 µm, 0.64 µm &1.61 µm
  - Largest differences in 0.865 µm & 2.25 µm channels
    - 0.865 µm - impacts vegetation, aerosol over water, winds products
    - 2.25 µm - impacts daytime land/cloud properties, participle size, snow products
  - **Thermal Emissive Bands (TEB):** All differences in Effective Temperature are within 1 K
  - Best agreement (> ~0.1 K) in channels: 7.34 µm &11.2 µm
  - Largest differences(> ~0.5 K) in channels: 6.19 µm & 8.5 µm
    - 6.19 µm - impacts high-level atmospheric water vapor, winds, rainfall
    - 8.5 µm - impacts total water for stability, cloud phase, dust, SO_2, rainfall
- S-NPP VIIRS as a Transfer Radiometer:
  - All ABI & AHI RSB channels are suitable for inter-comparisons
  - Only ABI & AHI TEB channels: 7, 11, 13, & 14 are suitable for inter-comparisons
- This effort establishes a baseline for future comparisons and supports GOES-R post-launch Cal/Val Risk Mitigation and readiness

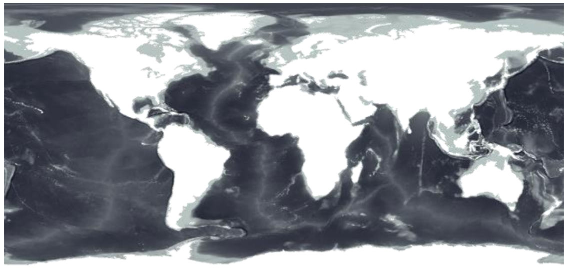
Recommendations:
GOES-R Post-Launch Cal/Val Risk Mitigation & Readiness

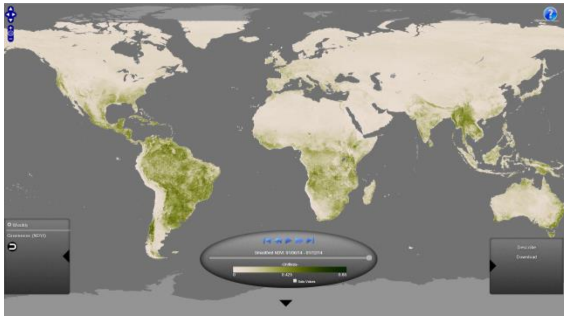
Spectral Region	Center Wavelength [µm]	ABI	AHI	VIIRS	Recommended Target
RSB	0.47	Ch 1	Ch 1	M3	**Clouds**
RSB	0.51		Ch 2	M3	Barren & Clouds
RSB	0.64	Ch 2	Ch 3	**I1**, M5	**All**
RSB	0.86	Ch 3	Ch 4	**M7, I2**	**All**
RSB	1.38	Ch 4		**M9**	**Clouds (DCC)**
RSB	1.61	Ch 5	Ch 5	**M10, I3**	**All**
RSB	2.26	Ch 6	Ch 6	**M11**	**All**
TEB	3.9	Ch 7	Ch 7	I4, M12*	Ocean
TEB	8.6	Ch 11	Ch 11	**M14**	**Clouds**
TEB	10.35	Ch 13	Ch 13	**M15**	**Ocean, DCC, Snow**
TEB	11.2	Ch 14	Ch 14	I5	**Ocean, Clouds**
TEB	12.3	Ch 15	Ch 15	I5	-

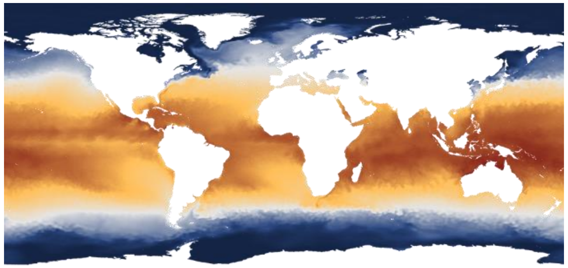
Access High Quality Data Imagery from the NOAA View Portal, Daniel P. Pisut[1], A. Powell[2], T. Loomis[1], V. Goel[1], NOAA/STAR, IM Systems Group

23^{rd} Symposium on Education/IIPS

- New Website for Accessing NOAA Data
  - 60 Datasets from Satellite, Model, In-Situ
  - 32,000 Global, High Resolution Images and Counting
- System Design
  - Uses open source geospatial tools – GeoServer, OpenLayers, OpenGIS
  - Over 170 scripts Manage Data Flow and Processing
  - Visualization Using IDL and McIDAS
  - Platform Independent: Web, Mobile, Tablet
- Educational
  - Native Compatibility with Science on a Sphere
  - Accessible Through Standard WMS Protocols
  - Images, Archives can be downloaded Through Web and FTP
  - Provides Data Exploration Tools Consistent with Next Generation Science Standards for Education





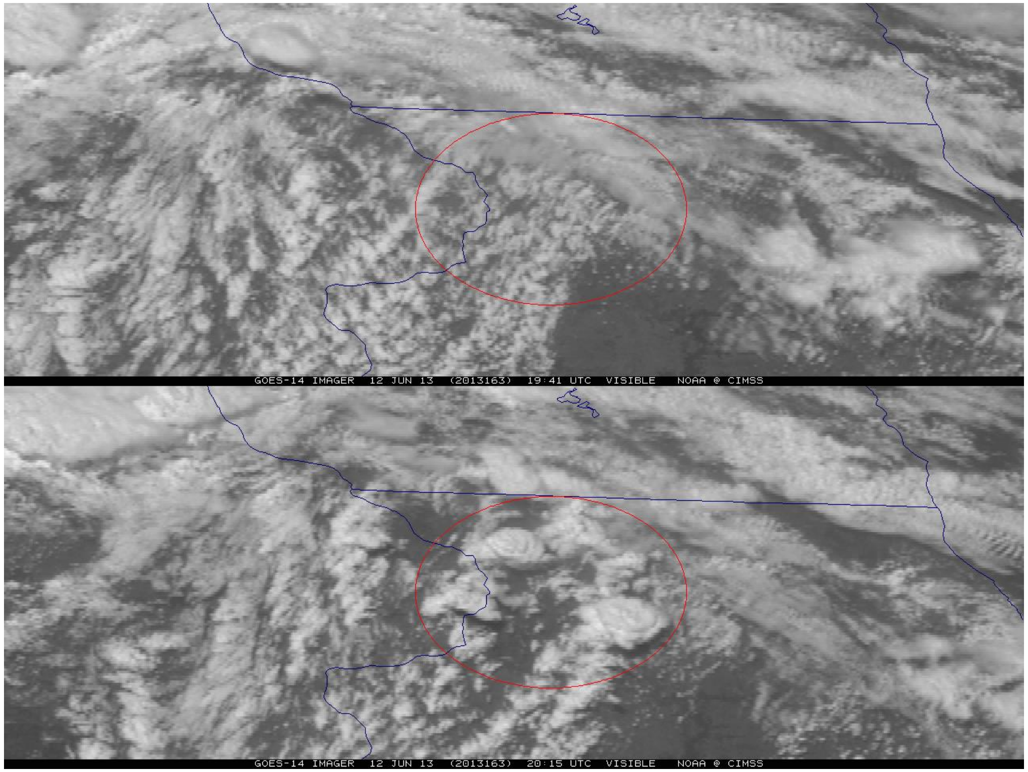


4.3 GOES-14 Super Rapid Scan Operations to Prepare for GOES-R,

Timothy J. Schmit, NOAA/NESDIS/STAR, Madison, WI; and S. J. Goodman, D. T. Lindsey, R. M. Rabin, K. Bedka, J. L. Cintineo, C. Velden, A. S. Bachmeier, S. S. Lindstrom, M. Gunshor, and C. Schmidt

Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- SRSOR (Super Rapid Scan Operations for GOES-R) from GOES-14 imager
- Data between mid-August and September 24th and late October 2012; and two days in June and 12 days in mid-August, 2013
    - *http://cimss.ssec.wisc.edu/goes/srsor/GOES-14_SRSOR.html and*
    - *http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14_SRSOR.html*
- GOES-14 provided very unique data and offered a glimpse into the possibilities that will be provided by the ABI on GOES-R in one minute mesoscale imagery
- Many phenomena were observed



GOES-14 visible image showing rapid convective development forming over approximately 30 minutes in northwest Illinois.

More opportunities for forecaster interaction for future operational satellite products – CIRA's activities in the GOES-R and JPSS Proving Grounds

Ed Szoke[1,2], Dan Bikos[1], Renate Brummer[1], Hiro Gosden[1], Steve Miller[1], Mark DeMaria[3], Dan Lindsey[3], Don Hillger[3], Curtis Seaman[1], and Deb Molenar[3]

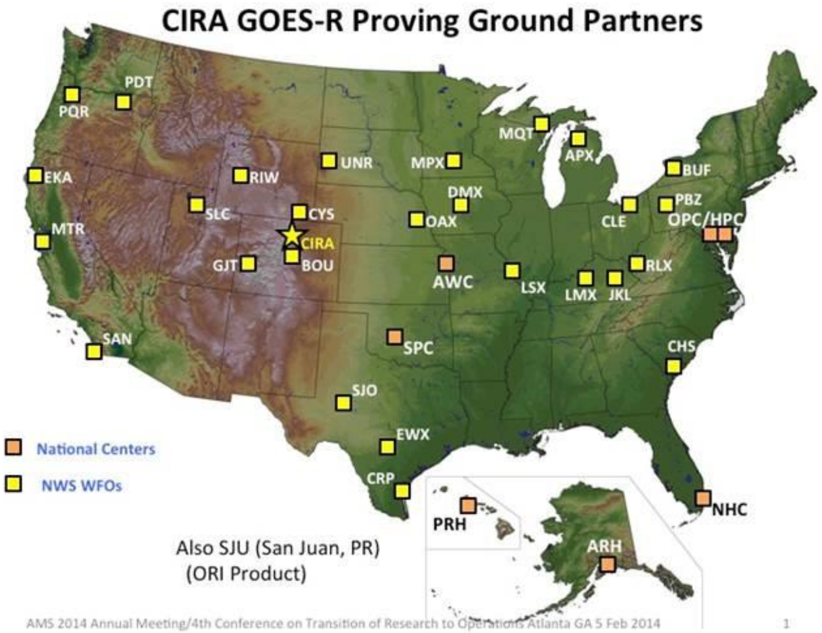
[1]Cooperative Institute for Research in the Atmosphere (CIRA)

[2]NOAA/Earth System Research Laboratory (ESRL)/Global Systems Division (GSD)

[3]NOAA/National Environmental Satellite, Data, and Information Services, Center for Satellite Applications and Research (NESDIS/STAR)

Presented at 4th Conference on Transition of Research to Operations

- Summary of CIRA Proving Ground interactions
  - Demonstrate potential products using
    - Current GOES-based products
    - MODIS and VIIRS
    - Synthetic imagery
- Achieving feedback from forecasters
  - Work most closely with WFOs Boulder and Cheyenne
  - Continue to improve our coordination with the various Satellite Liaisons



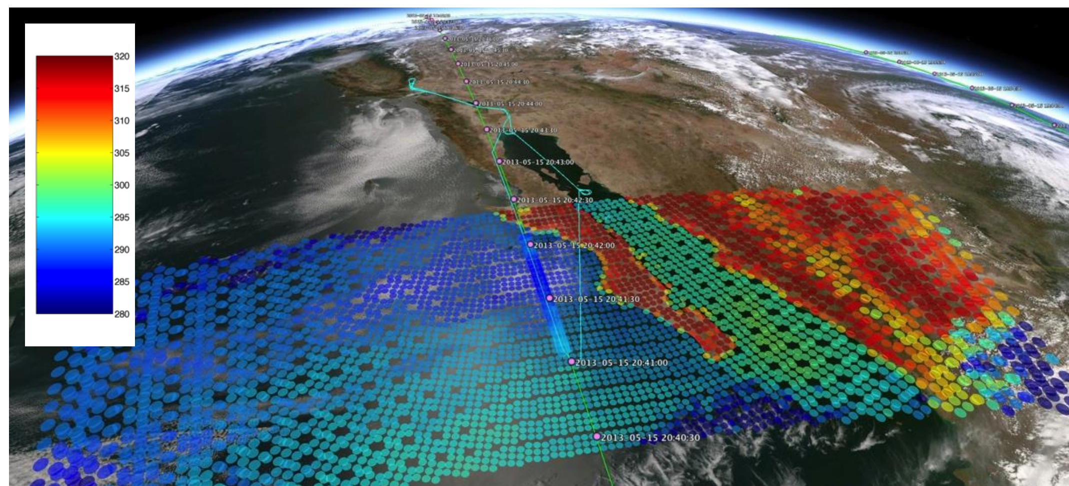
690: Suomi NPP/JPSS Cross-track Infrared Sounder (CrIS): Calibration Validation With The Aircraft Based Scanning High-resolution Interferometer Sounder (S-HIS)

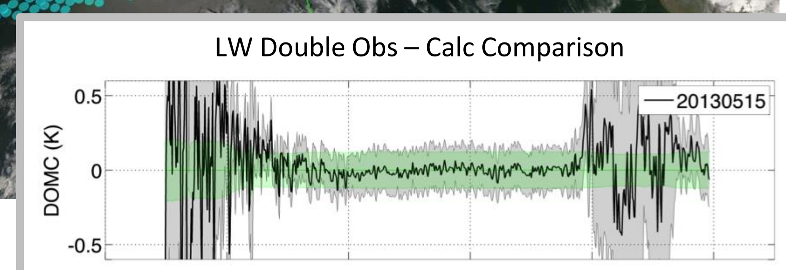
Joe K. Taylor, D. C. Tobin, H. E. Revercomb, F. A. Best, R. O. Knuteson, R. K. Garcia, D. Deslover, and L. A. Borg
Space Science and Engineering Center, University of Wisconsin-Madison

Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- 2013 Suomi-NPP Aircraft Campaign
  - 10 science flights (NASA ER-2)
  - Excellent radiance validation conditions (high scene uniformity, good spatial and temporal co-location) for several flights.
- Excellent CrIS calibration validation results with S-HIS on the ER-2
  - Day and night over ocean
  - ~0.1K agreement (well within uncertainty bounds)

May 15 Under-flight example:
S-HIS and CrIS 895 – 900 cm^{-1} BTs overlaid on VIIRS true color image





10.3 Suomi-NPP Cross-Track Infrared Sounder (CrIS) Radiometric Calibration Uncertainty,

David Tobin, CIMSS/SSEC/UW-Madison, Madison, WI; and Henry Revercomb, Robert Knuteson, Joe Taylor, Lori Borg, Dan DeSlover, Graeme Martin

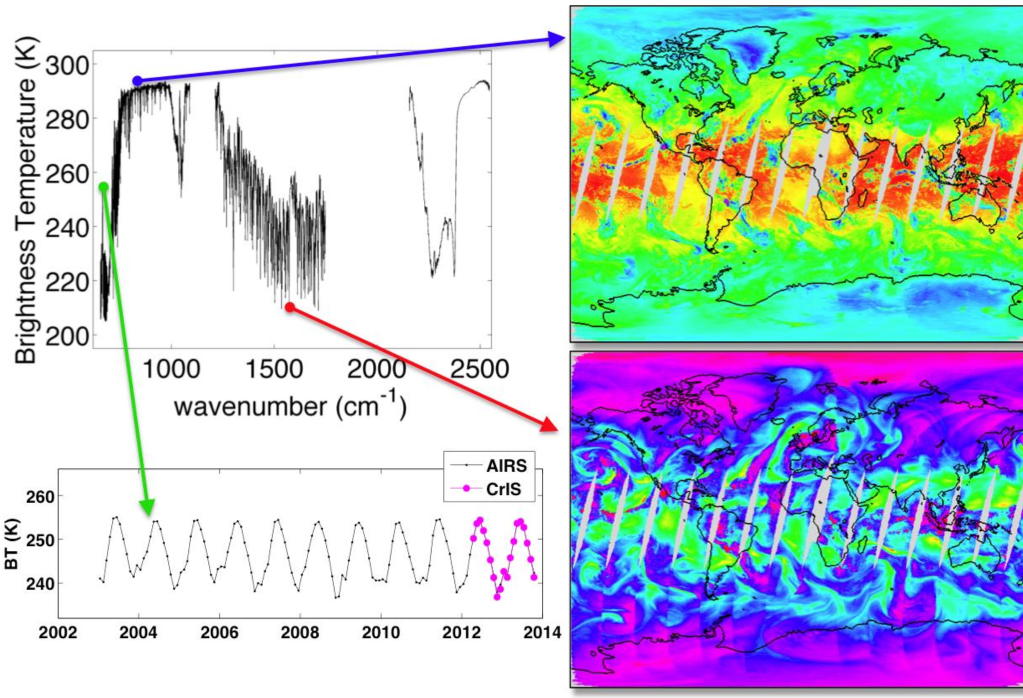
Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- Summarizes results in: *Tobin, D., et al. (2013), Suomi-NPP CrIS radiometric calibration uncertainty, J. Geophys. Res. Atmos., 118, 10,589–10,600, doi:10.1002/jgrd.50809.:*

- CrIS is providing infrared radiance spectra for weather and climate studies.

- The CrIS on-orbit Radiometric Uncertainty is less than 0.3 K 3-sigma.

- Validation results to date confirm this Radiometric Uncertainty estimate.



Daily, global high spectral resolution radiance spectra for NWP, Atmospheric State Retrieval, Regional Forecasting, Climate Process and Trend studies, and Intercalibration.

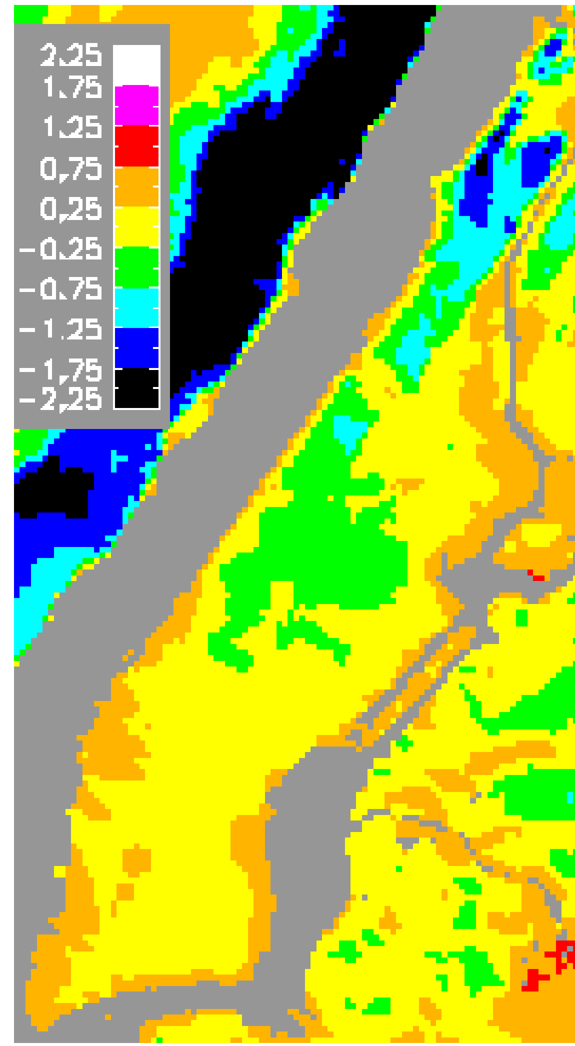
Fine scale mapping of Manhattan's urban heat island for health impacts

Brian Vant-Hull, Maryam Karimi, Rouzbeh Nazari, Reza Khanbilvardi

11th Symposium on the Urban Environment

- High resolution measurements made of temperature and humidity at street level (left)
- Results applied to statistical modeling of temperature anomalies based on surface characteristics (right)

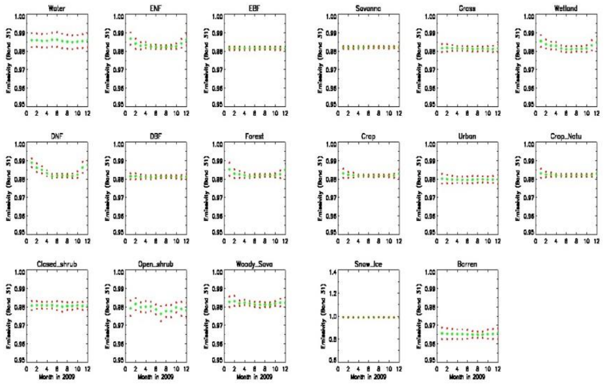
  (albedo, vegetation, building parameters, elevation, water fraction)



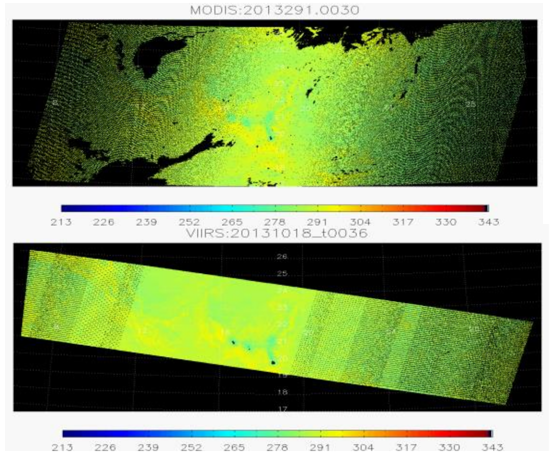
Using the Model Simulation to Improve the Land Surface Temperature Retrieval for JPSS and GOES-R Missions

Zhuo Wang[1], Yunyue Yu[2], Yuling Liu[1], Peng Yu[1]
[1] University of Maryland, College Park; [2] NOAA/NESDIS/STAR, MD

- Model Simulation
  - Generate a database of simulated brightness temperatures.
  - Build up new emissivity pairs to represent 17 IGBP types.
- Algorithm Improvement
  - Obtain new algorithm coefficients and evaluate them.
  - Test new algorithms for different satellites.



New emissivity pairs based on 10 Year averaged MODIS emissivity data



The LST was generated from new algorithm coefficients and evaluated using MODIS LST data.

Top: MYD11_L2 MODIS/Aqua LST

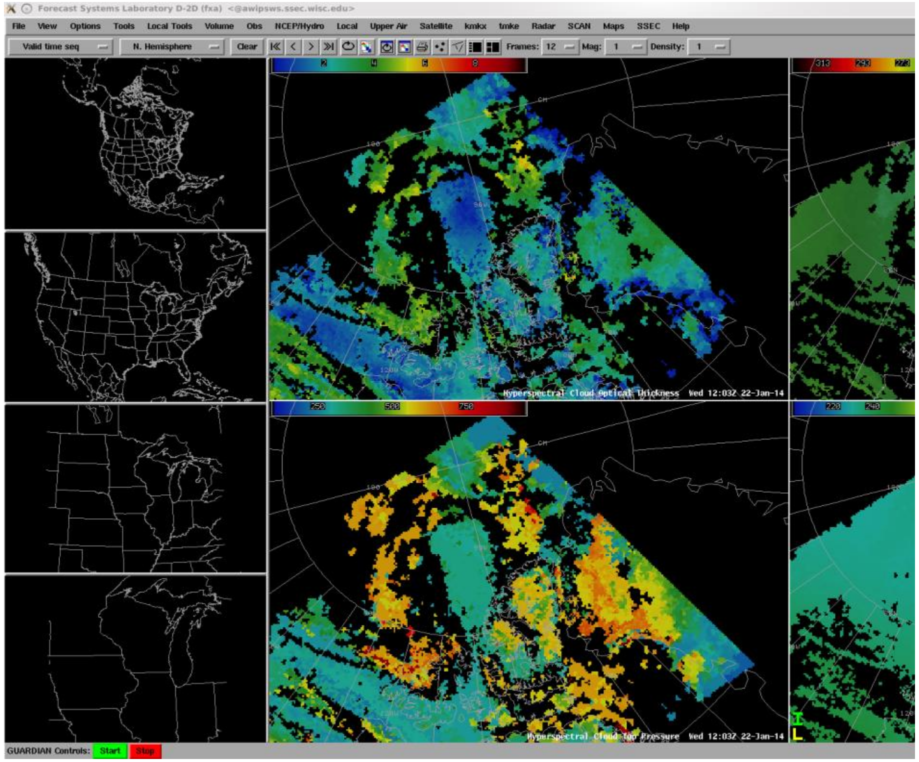
Bottom: VIIRS LST from new LUT

3.3 Encouraging the Use of Hyperspectral Sounder Products in Forecasting Applications

Elisabeth Weisz, W. L. Smith Sr., N. Smith, W. Straka, R. Garcia, and D. Hoese
CIMSS/UW-Madison

Fourth Conference on Transition of Research to Operations

- Hyperspectral radiance data allow the retrievals of high vertical resolution temperature and moisture profiles.
- Reliable sounding, cloud and surface information is available in near real-time anywhere on the globe (at least twice daily per instrument).
- AIRS, IASI and CrIS products add quantitative information to traditional data.
- Multi-instrument algorithm allows the study of time tendencies (of moisture, instability, cloud parameters) from consecutive overpasses.
- Tools (e.g. to view/analyze products in AWIPS) are being developed to initiate the use of these products in forecast operations.



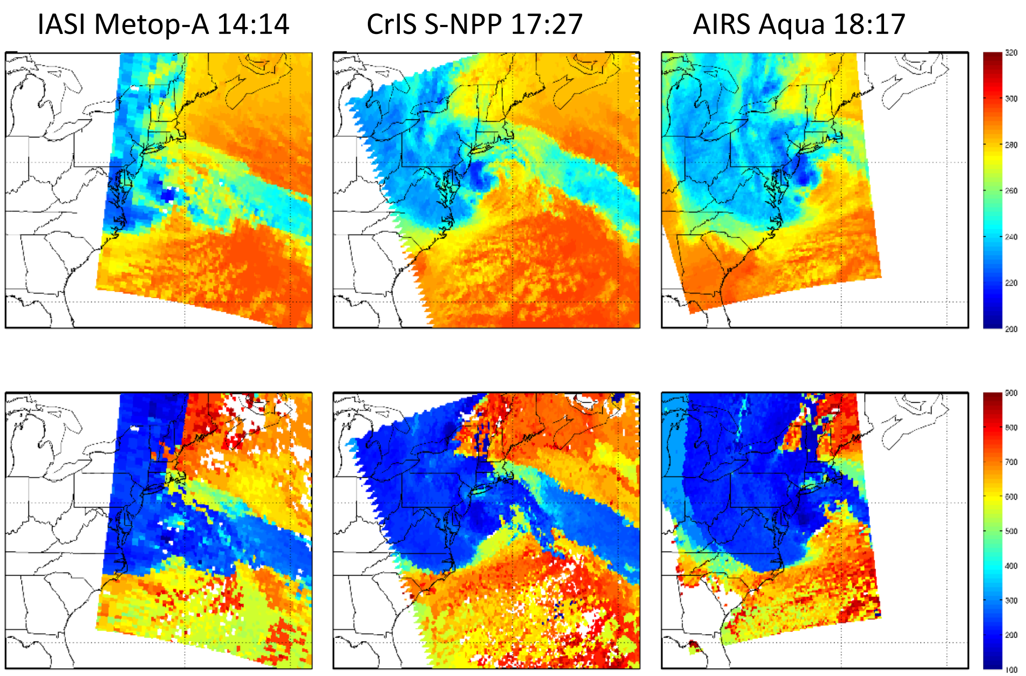
AWIPS screenshot example showing cloud optical thickness and cloud top pressure retrieved from direct broadcast AIRS measurements.

867. Using Real-Time Retrievals from Multiple Hyperspectral Sounders in the Analysis of Superstorm Sandy

Elisabeth Weisz, W. L. Smith Sr., and N. Smith
CIMSS/UW-Madison

Superstorm Sandy and the Built Environment: New Perspectives, Opportunities, and Tools

- Superstorm Sandy when it made landfall on 29 Oct 2012.
- Joint investigation of AIRS, IASI and CrIS radiances and retrieval products.
- Retrievals provide useful information on convective instability, moisture transport, and atmospheric motion.



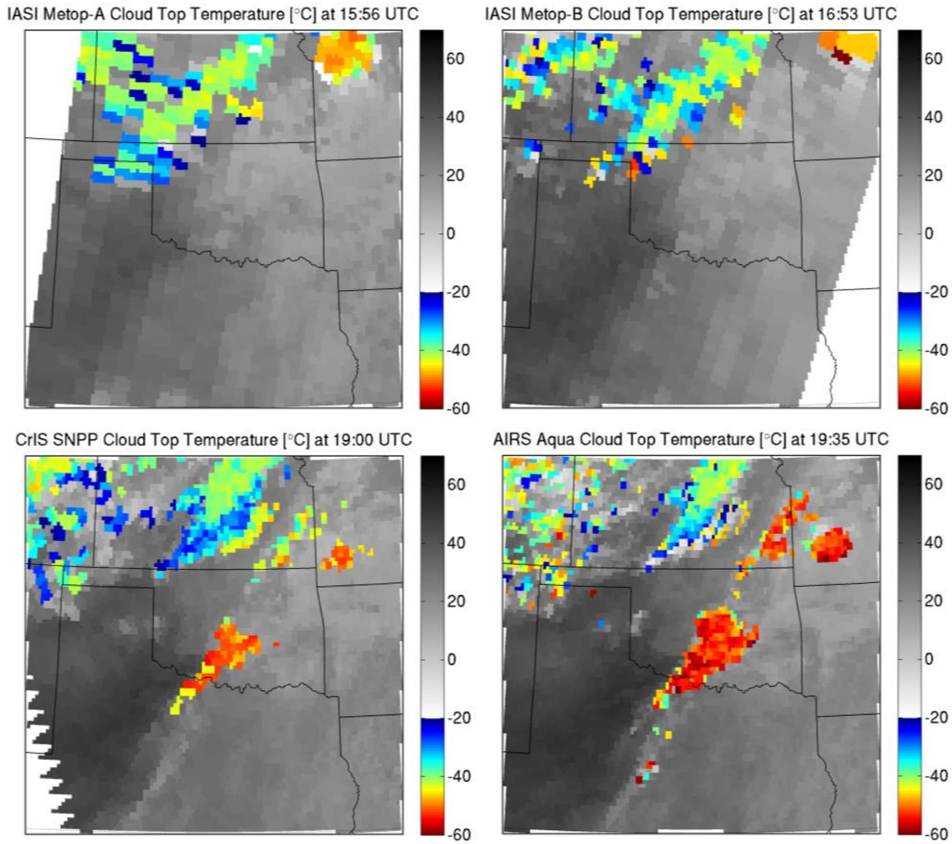
Brightness temperature at 910 cm^{-1} (top) and cloud top pressures (bottom) retrieved from IASI, CrIS and AIRS radiance measurements on 29 Oct 2012.

827. New Perspectives on Using Multi-Instrument Hyperspectral Sounder Information in the Analysis of Severe Local Storms

Elisabeth Weisz, W. L. Smith Sr., N. Smith, J. Feltz, S. Bachmeier, and J. Gerth
CIMSS/UW-Madison

Special Symposium on Severe Local Storms: The Current State of the Science and Understanding Impacts

- Atmospheric conditions before and during the devastating tornado that hit Moore, OK on May 20, 2013 are investigated.
- Sounding profile tendencies, cloud top and stability changes from IASI, CrIS and AIRS are studied.
- Hyperspectral retrievals add independent and quantitative information to traditional data sources.



Cloud top temperature retrieved from IASI on Metop-A, IASI on Metop-B, CrIS on Suomi NPP and AIRS on Aqua on 20 May 2013.

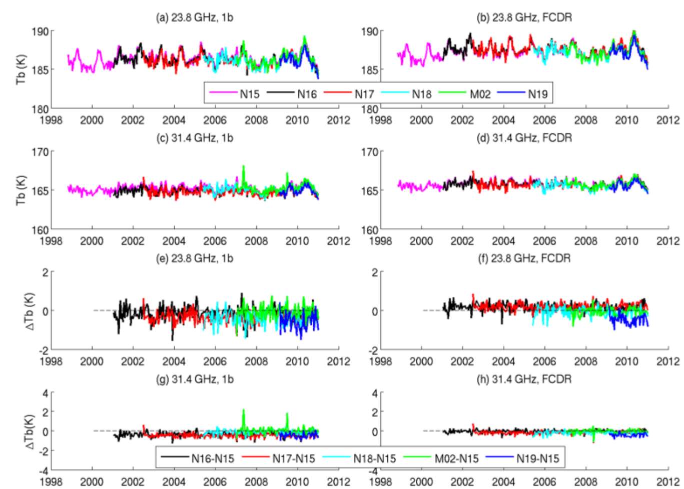
An Improved Microwave Satellite Data Set for Hydrological and Meteorological Applications

Wenze Yang[1], Huan Meng[2] and Ralph Ferraro[2]
[1]Univeirsity of Maryland/ESSIC; [2]NOAA/NESDIS/STAR

Poster - Second Symposium on the Joint Center for Satellite Data Assimilation

- AMSU time series 15-years in length
- On-going project to transform time series in Climate Data Records (CDR)
  - FCDR – radiances
  - TCDR – hydrological products
- Corrections include
  - Geolocation
  - Cross-Scan biases
  - Intersatellite calibration
- Beta data sets generated
  - Initial delivery to NCDC Feb 2014
  - Final data sets available by summer 2014

Products	Main Channels (GHz) Used in MSPPS*
Rain Rate	23.8, 31.4, 50.3, 89, 150/157, 183.3±1, ±3, ±7/190.3
Ice Water Path	23.8, 31.4, 89, 150/157
Total Precipitable Water	23.8, 31.4
Cloud Liquid Water	23.8, 31.4
Snow Cover	23.8, 31.4, 89
Snow Water Equivalent	23.8, 31.4, 89
Sea Ice	23.8, 31.4, 50.3

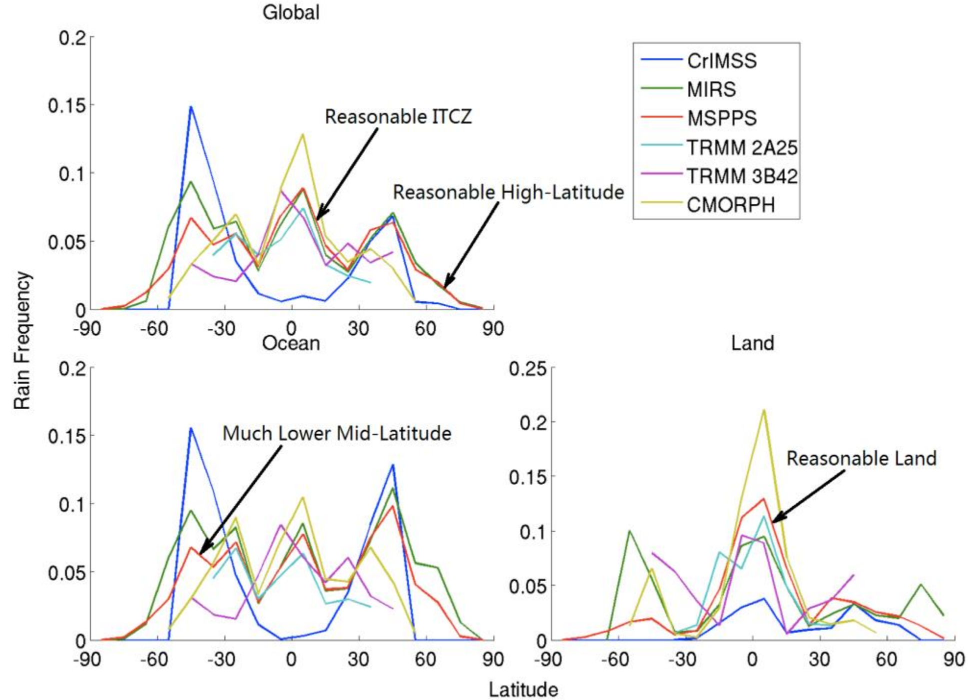


Evaluation and Improvement of the S-NPP CrIMSS Rain Flag

Wenze Yang[1], Flavio Iturbide-Sanchez[2], Ralph Ferraro[3], Murty Divakarla[2], and Anthony Reale[3]
1. UMD/ESSIC/CICS, College Park,;2. IMSG @ NOAA/NESDIS/STAR, College ; Park, MD; 3. NOAA/NESDIS/STAR, College Park, MD

Poster -Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems

- Original CrIMSS rain flag had severe deficiencies
  - Based on a very old algorithm
  - Was implemented incorrectly
  - Caused degradation of soundings
- NESDIS/MSPPS algorithm for AMSU/MHS was retrofitted for S-NPP ATMS
  - Empirically remapping of 50.3 GHz and 166 GHz to AMSU/MHS counterparts
  - Residual differences due to primary polarization changes between two sensors
- New rain flag delivered to NPP program and will be implemented in future CrIMSS upgrade



NOAA-CREST Research Presented at the AMS meeting, Atlanta February 2014

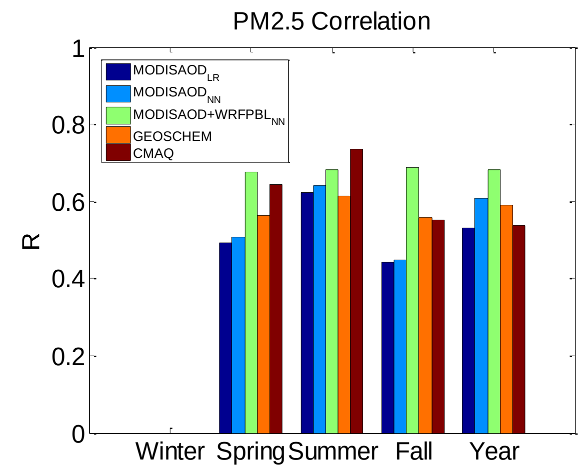
A Regional NN estimator of PM2.5 using satellite AOD and WRF meteorology measurements

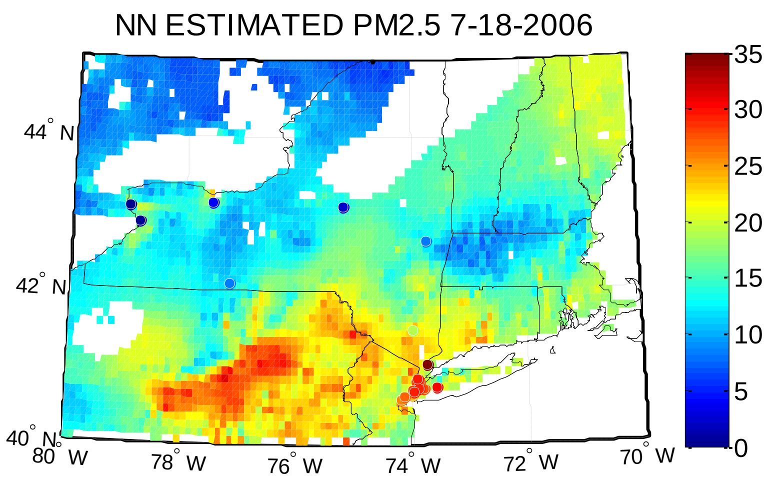
Lina Cordero, *N. Malakar, D. Vidal, R. Latto, B. Gross, F. Moshary, and S. Ahmed*
City College of New York, New York, NY

AMS Session: The Effects of Meteorology on Air Quality - Part 2

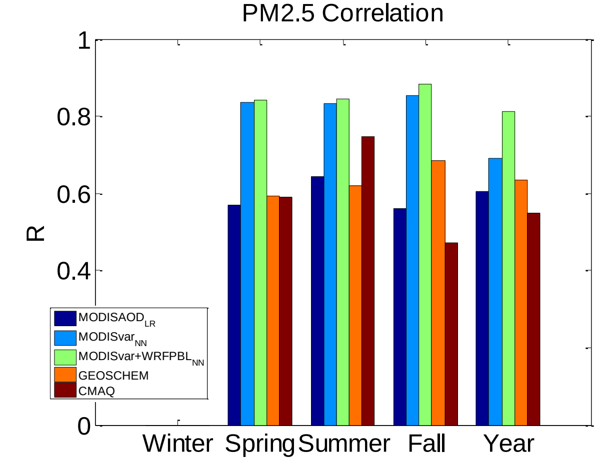
- Adding lidar derived PBL improved PM2.5 estimations for local CCNY site.
- Combining satellite AOD and WRF PBL height in a regionally trained NN performed better compared against GEOS-CHEM/CMAQ PM2.5.
- Daily PM2.5 maps based on the NN approach using high resolution AOD and PBL grids for the NY state region (applying IDW) showed reasonable agreement with station data.
- Multivariate approach using only satellite remote sensing input variables produced the highest correlation with the target in comparison to the other methods.

Regional neural network





Multivariate approach

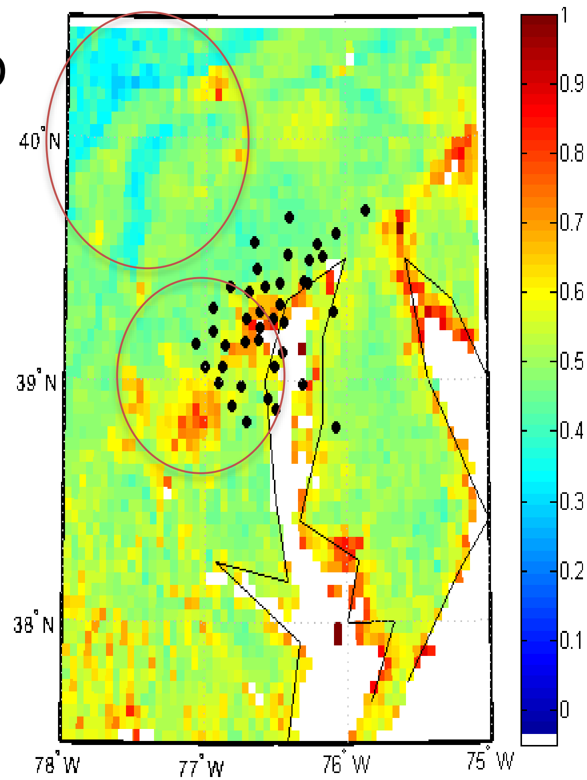


Regional estimates of ground level Aerosol using Satellite Remote Sensing and Machine-Learning

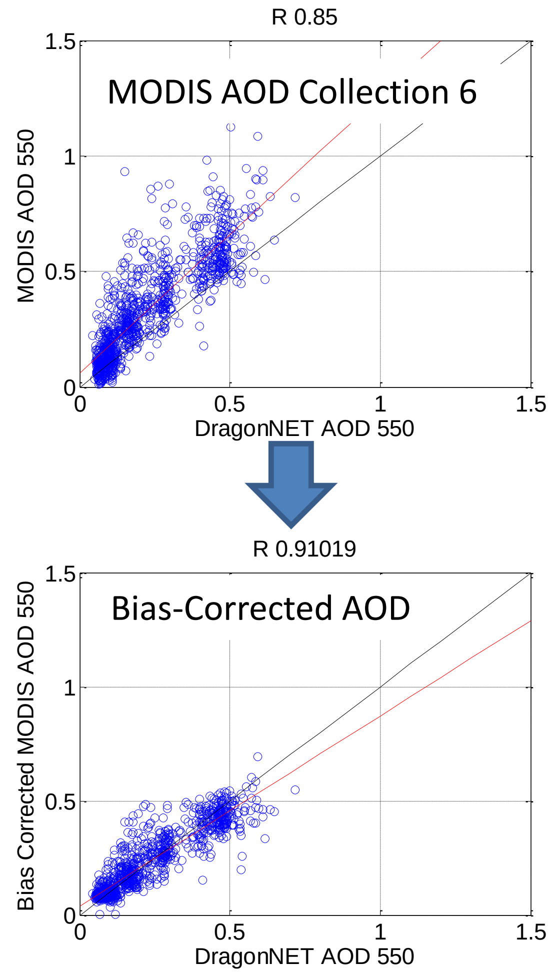
***Nabin Malakar**, A. Atia, B. Gross, F. Moshary, S. Ahmed, City College of New York, New York, NY; and D. Lary, University of Texas at Dallas, TX*

AMS Session: AI Techniques applied to environmental science

- We used the MODIS 3 km AOD products from AQUA and TERRA, and developed a machine-learning framework to compare and correct the remote sensing product with respect to the ground-based AERONET observations.
- We also constructed a neural network estimator to obtain bias-corrected AOD product.



The anomalies in the surface reflection ratio is correlated with the land usage.

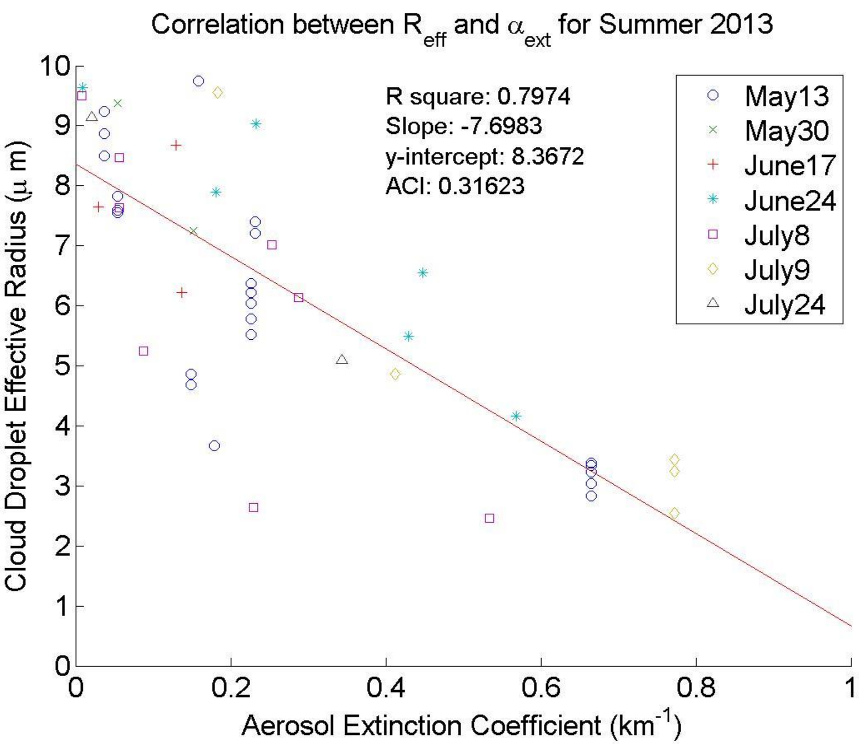


Aerosol-Cloud Interaction measurements using Ground Based Remote Sensing Systems over urban coastal area

***Zaw Han**, Y. Wu, J. Fallon, B. Gross, F. Moshary, and S. Ahmed City College of New York, New York, NY*

Sixth Symposium on Aerosol-Cloud-Climate Interactions

- Synergistic ground based system used to quantify aerosol cloud interaction
  - Clear observation of Twomey Indirect effect
  - Reasonable value for Aerosol Cloud Index
- Development of Inversion algorithm for liquid cloud phase
  - Simultaneous COD and Effective Radius
  - Preliminary extension to mixed phase clouds

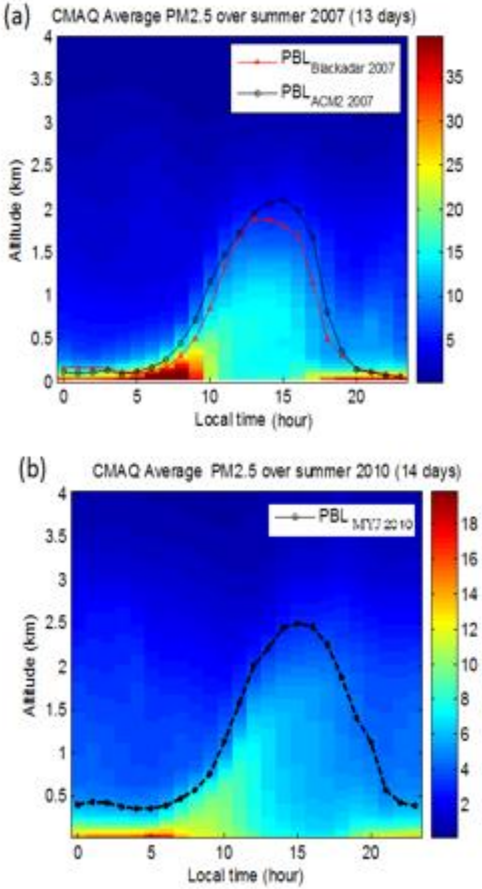


Assessment of High Resolution Urbanized Meteorological Models using ground based remote sensing and satellite imagery

***Zaw Han**, E. Gutierrez, J. E. González, B. Gross, and F. Moshary, City College of New York, New York, NY*

11th Symposium on the Urban Environment

- PM2.5 models have large biases during pre-dawn / post sunset
  - Active sensing shows that PBL height is most important factor
  - Improvement in PBL height in models are shown to remove biases some what
- Urban WRF PBL height assessment made with CCNY ground instruments
  - Improvement in PBL height for night time
  - Improved convective moisture



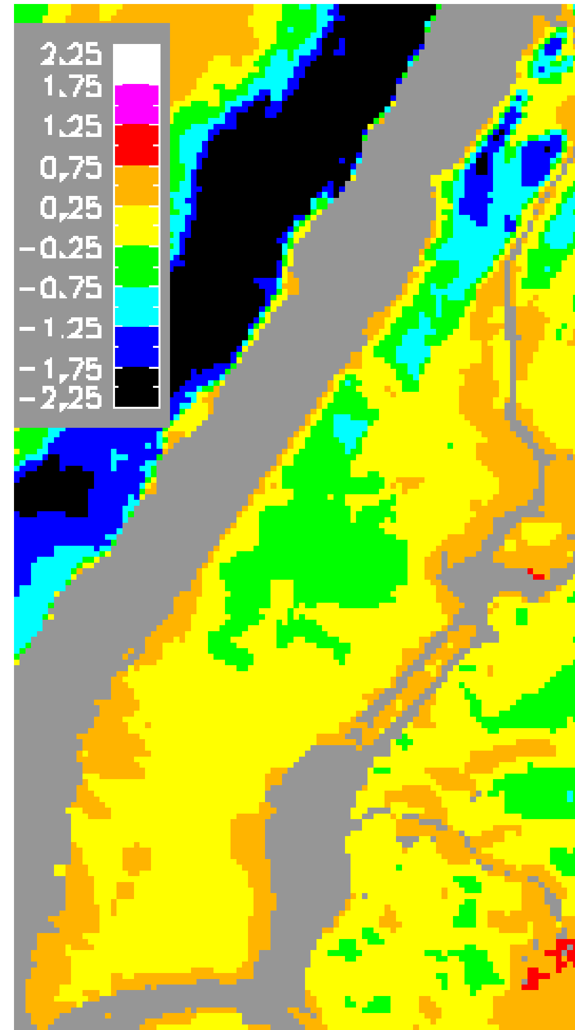
Fine scale mapping of Manhattan's urban heat island for health impacts

Brian Vant-Hull, Maryam Karimi, Rouzbeh Nazari, Reza Khanbilvardi

11th Symposium on the Urban Environment

- High resolution measurements made of temperature and humidity at street level (left)
- Results applied to statistical modeling of temperature anomalies based on surface characteristics (right)

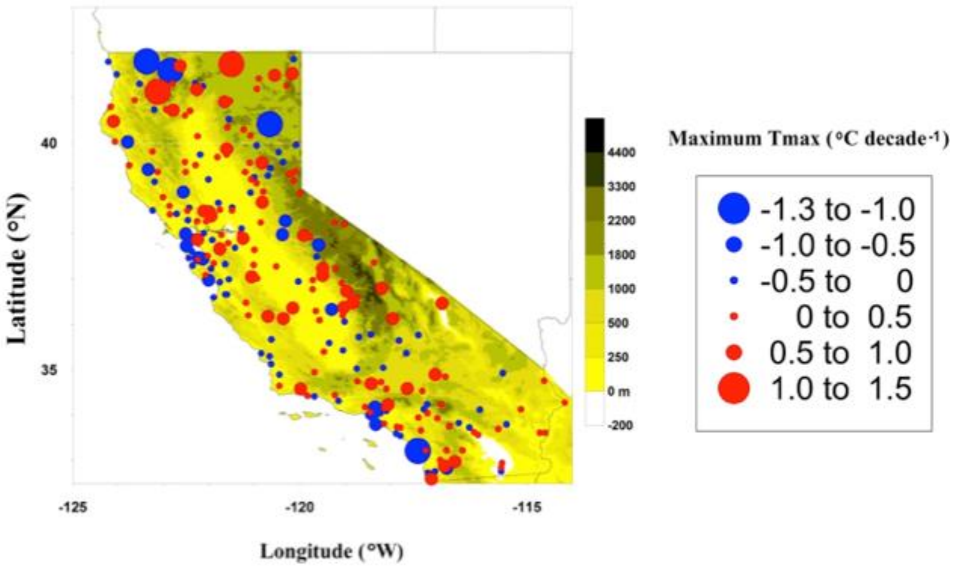
  (albedo, vegetation, building parameters, elevation, water fraction)

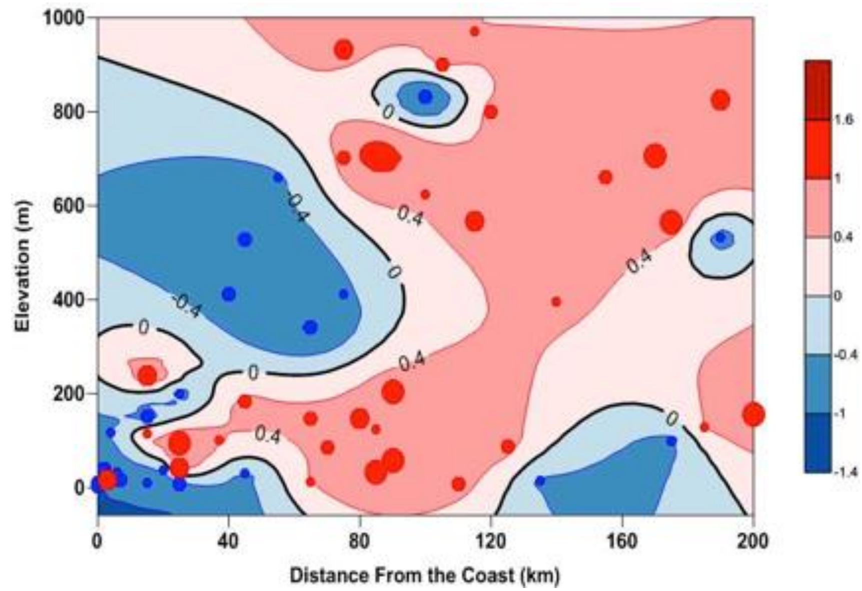


California's Summer Coastal Cooling: Global-Warming Counter-Reaction and/or Large-Scale Oceanic Forcing

Pedro Sequera, Jorge Gonzalez, Steve Ladochy and Robert Bornstein

11th Symposium on the Urban Environment





- (Left) Spatial Distribution of California's Summer Coastal Cooling from 1970-2010 (left).
- (Right) The spatial distribution of the maxT_{max} trends according to elevation and distance can be clarified by eliminating locations with statistically non-significant trends.
- Most cooling trends **(in blue)** are located in the lower-left quadrant.
- Heating sites **(in red)** take most of the upper-right quadrant.

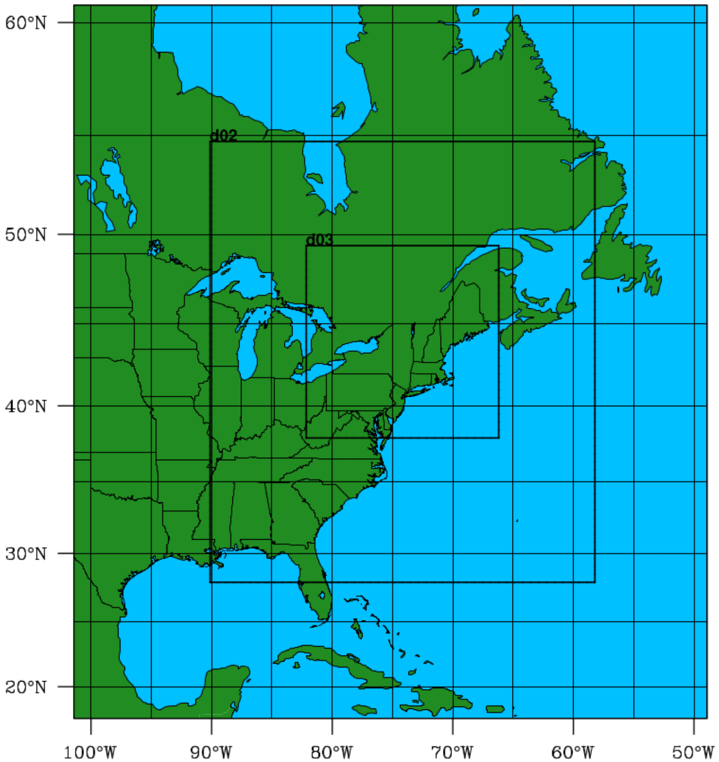
High Resolution Modeling of Summer Extremes in the Northeast United States

28th Conference on Hydrology

L. Ortiz[1], J. González[1], B. Lebassi-Habtezion[2]

[1]Mechanical Engineering Department, The City College of New York, New York, NY

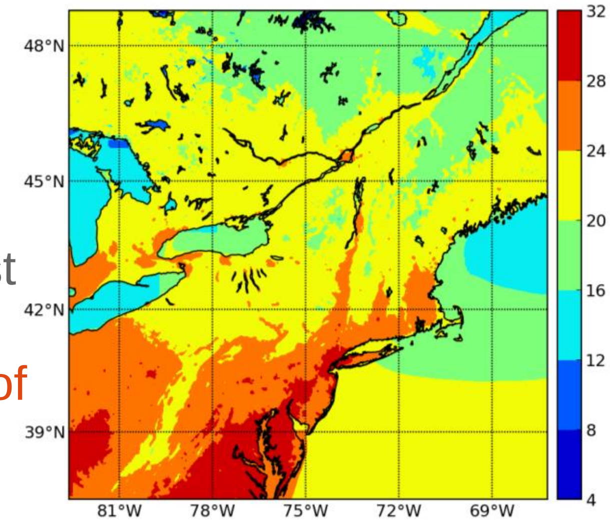
[2] Lawrence Livermore National Lab, Livermore, CA



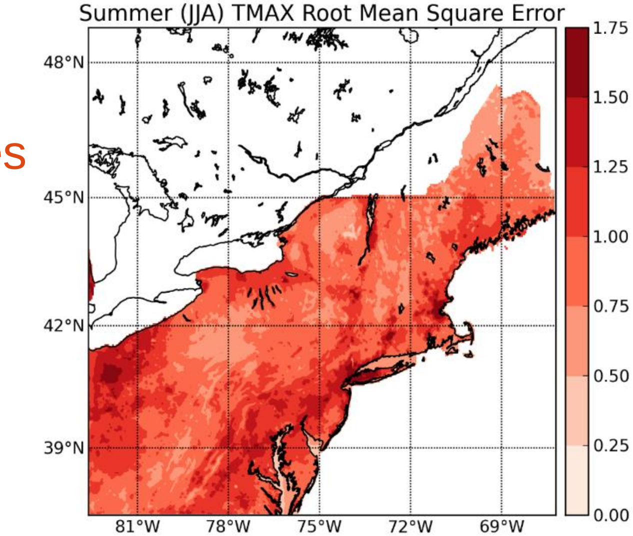
WRF course (d01,d02) and fine resolution domains.

- Validation of Weather Research and Forecast Model (WRF) for dynamic downscaling of GCM and Reanalysis data for the U.S. Northeast.
- Focus on Summer maximum temperatures as key drivers of peak electric demand.
- Statistical analysis of biases and their variation.

2000-2010 Tmax – WRF-NNRP



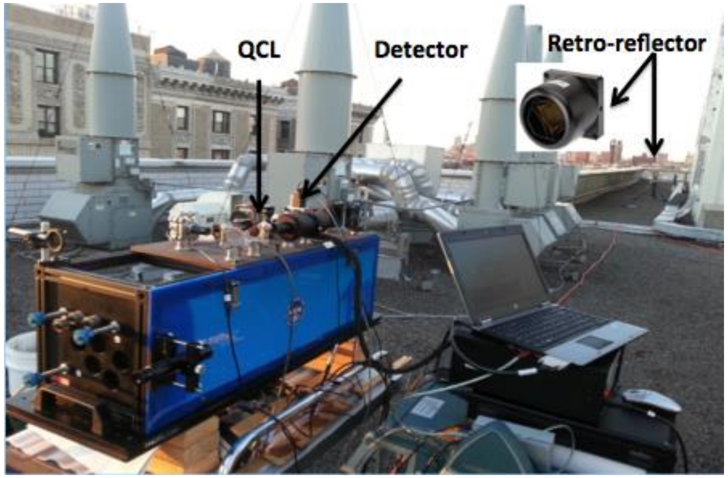
Summer (JJA) TMAX Root Mean Square Error



Long Path Quantum Cascade Laser Based Sensor for Urban Monitoring of CH_4 and N_2O

Paulo Castillo, Ihor Sydoryk, Barry Gross, Fred Moshary, *City College of New York, New York, NY;*

AMS Session: Air Pollution Instrumentation and the Role of Technology in Air Pollution Applications



- Portable, high resolution, field deployable Open-Path System
  - Quantum Cascade Laser wavelength: 7.78um
  - Spectral Window: 1299 – 1300 cm^{-1}, ambient conc. STP @500m
- Simultaneous concentration retrieval of N_2O and CH_4 demonstrated
  - Retrieval errors < 1% ambient concentration
  - Retrieval averaging < 5ms