92nd AMS Annual Meeting

STAR Preview 1-19-2012

New Orleans, LA

22-26 January 2012

Dial in number: 888-396-1320

Passcode: 9371952

Order & Timing of the Talks

- New York – CREST (9 papers) (100 – 130 pm)
- Maryland – CICS and SCSB (12 papers) (130 – 215 pm)
- Maryland – STAR - Camp Springs/Silver Spring (17 papers) (215 – 300 pm)
- BREAK and switch to Room 701
- Complete STAR (315 – 330 pm)
- Wisconsin – CIMSS and ASPB (12 papers) (330 – 415 pm)
- Colorado – CIRA and RAMMB (5 papers) (415 – 430 pm)

City College of New York/CREST

- Cordero
- Hosannah
- Nazari
- Vant-Hull
- Seo
- Aizenman
- Molina
- Rossow
- Comarazamy

AMERICAN METEOROLOGICAL SOCIETY - 92nd Annual Meeting

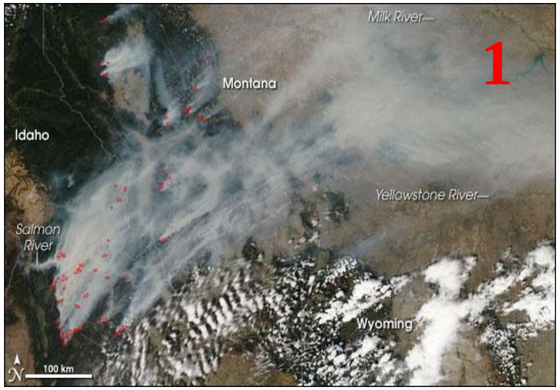
Oral – "**Smoke plume optical properties and transport observed by a multi-wavelength lidar, sunphotometer and satellite**"

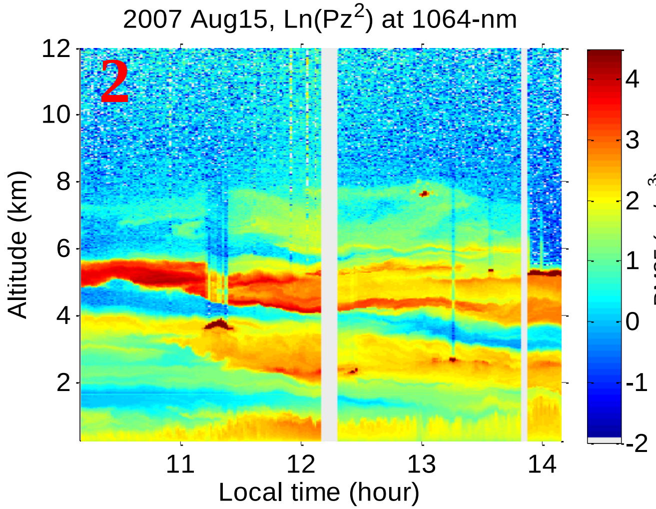
Lina Cordero[a,b], Yonghua Wu[a,b], Barry Gross[a,b], Fred Moshary[a,b],Sam Ahmed[a,b]

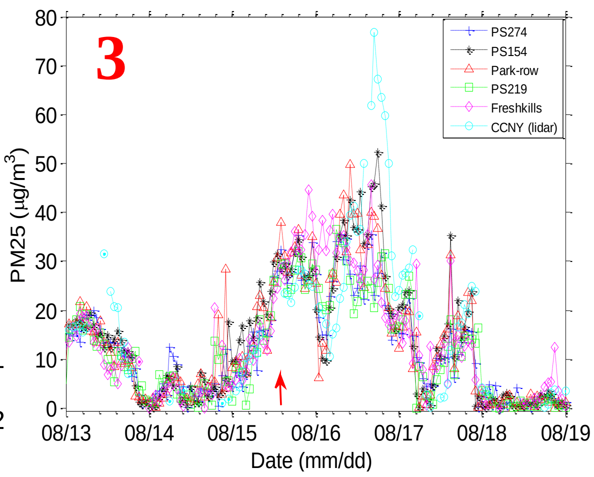
[a] NOAA-Cooperative Remote Sensing Science and Technology Center

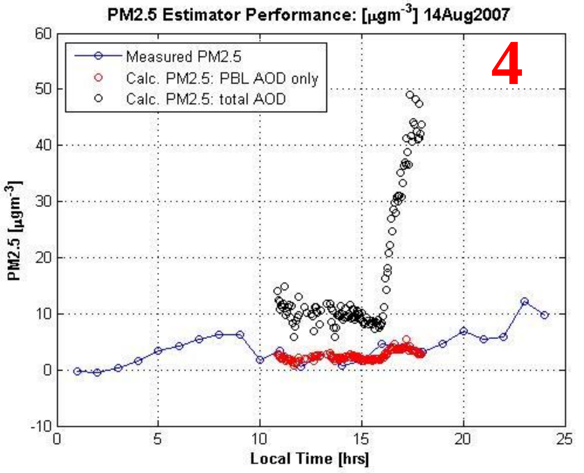
[b] Optical Remote Sensing Lab, Department of Electrical Engineering, The City College of New York

1. Smoke plumes optical properties and long-distance transport to the US east coast are observed with a lidar, sun-photometer and satellite.
2. The lidar observations indicate that the elevated smoke plumes were entrained into the turbulent PBL, and the surface $PM_{2.5}$ concentrations show the corresponding increasing trends.
3. When correctly identifying the PBL-AOD contribution from the total column AOD, the static relationship between $PM_{2.5}$ mass concentration and AOD could be satisfied to a reasonable accuracy.







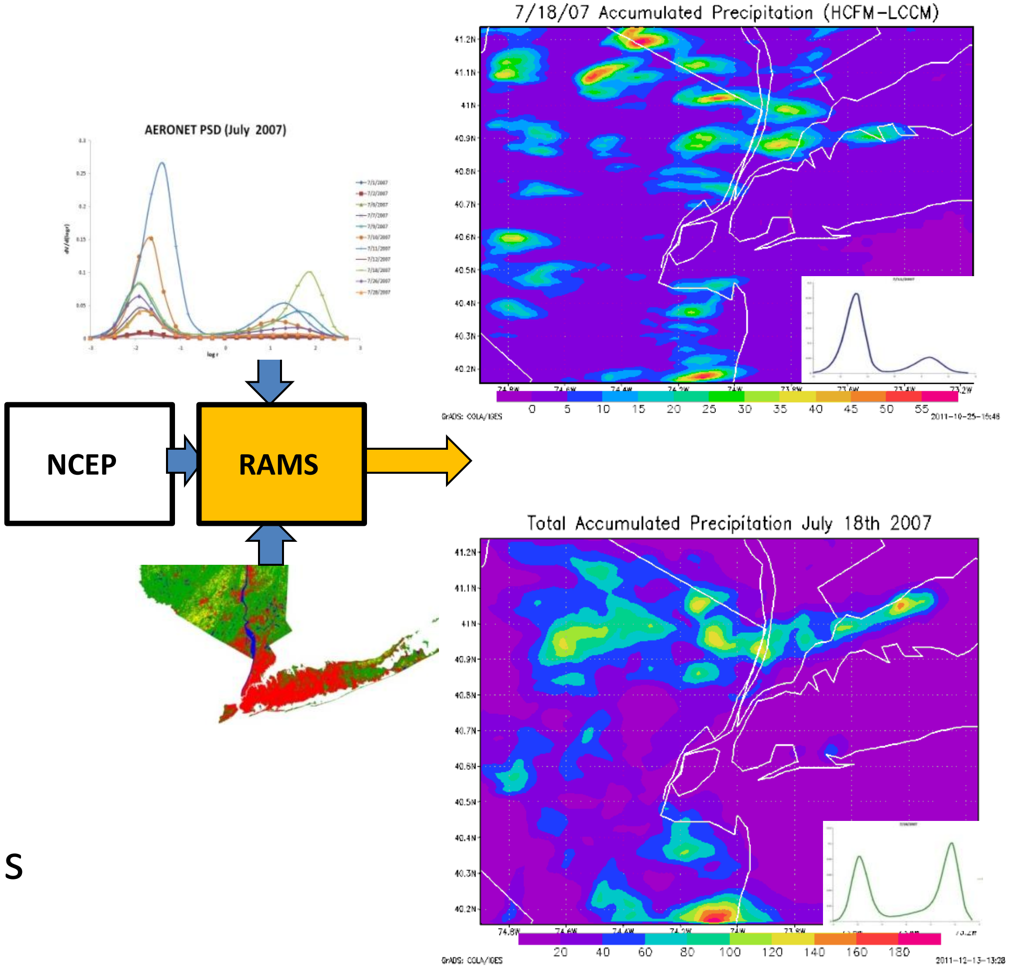


92nd Annual Meeting of the American Meteorological Society:

Quantifying the Effects of Local PSD on Localized Urban Precipitation Events Using a Cloud-Resolving Mesoscale Model

Nathan Hosannah

- Cities impact precipitation
  - LCLU, UHI, & Aerosol
  - Storm Dynamics
- Research Tools
  - AERONET, NWS, USGS
  - RAMS
    - 3 Grids, 16km,4km,1km , 30s
    - NCEP Data
- Results
  - Ingesting varied PSD affects precipitation patterns
  - LCLU impacts precipitation totals



National Oceanic and Atmospheric Administration
Cooperative Remote Sensing Science and Technology Center

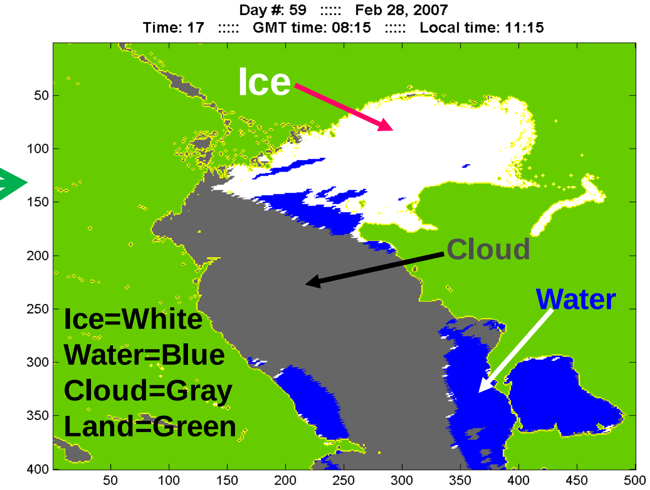
NOAA CREST

Development Of An Advanced Technique For Mapping And Monitoring Sea And Lake Ice For The Future GOES-R Advanced Baseline Imager (ABI)

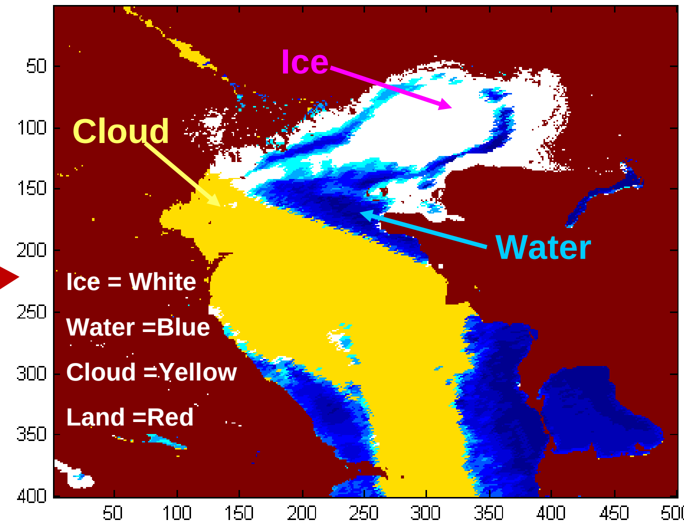
Rouzbeh Nazari, PhD
The City University Of New York, NOAA CREST

This research aims to generate the following products:

Product 1: Hourly Ice Map

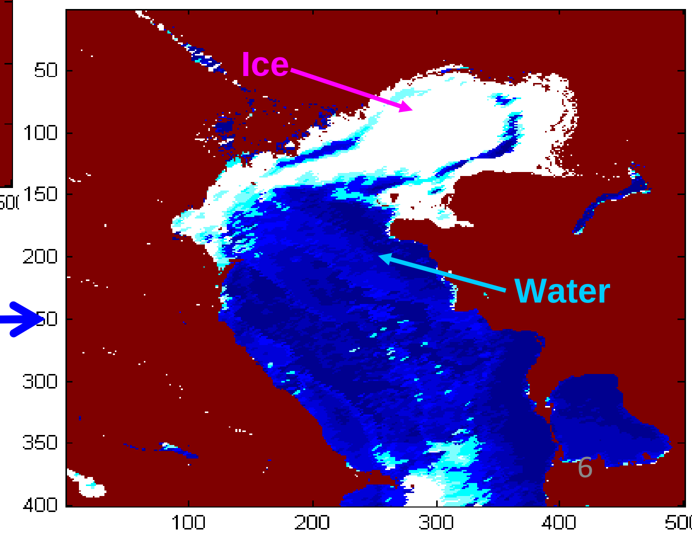


Product 2: Daily Ice Map with Cloud



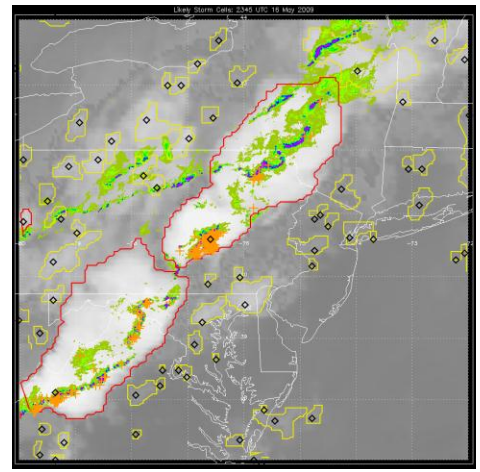
Product 3: Daily Cloud-free ice map

(multi-date image composited approach)

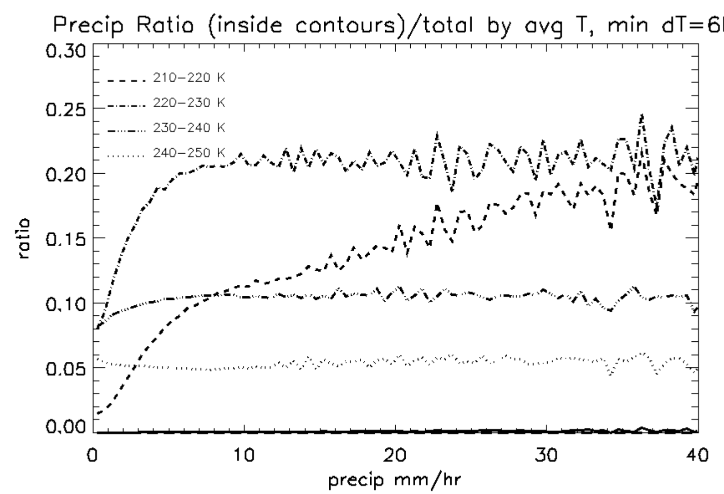


26th Conference on Hydrology:
Oral – “Convective Towers and Precipitation Frequency and Intensity”
B. Vant-Hull, F. Autones, S. Mahaneh, R. Rabin, J. Mecikalski, R. Khanbilvardi

- Convective Towers (top)
  - Selected by RDT IR algorithm
  - May be subset of larger cloud mass
- Precipitation Distributions
  - Ratios of pixels inside/total formed for each tower average cloud top temperature
  - Above 5 mm/hr, the distributions inside and outside the towers are the same until the average cloud top temperature becomes colder than 220 C



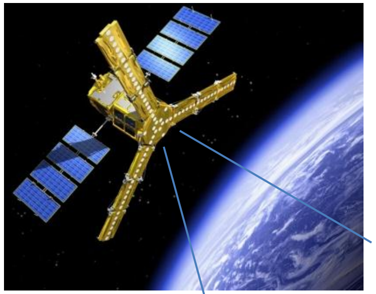
Green-blue: radar
Orange: lightning
Red/Yellow:
RDT towers
Black Diamonds:
cold points

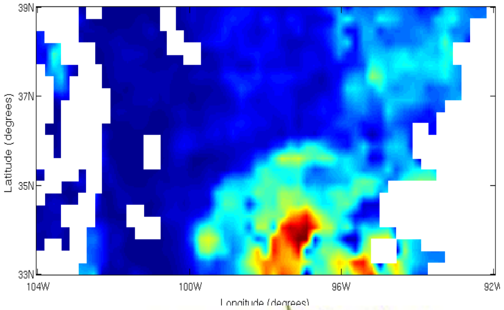


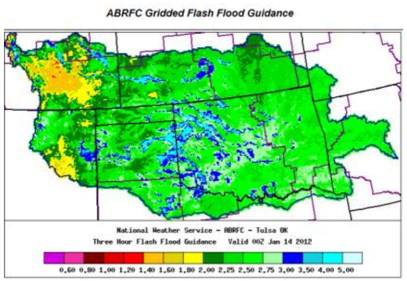
Oral– “Satellite Based Soil Moisture Data on Gridded Flash Flood Guidance for Arkansas Red River Basin”

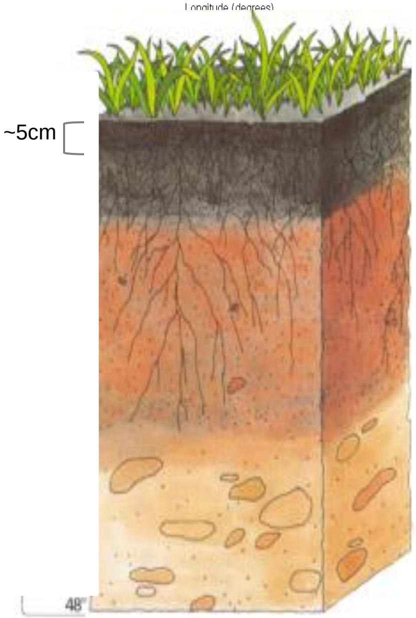
Dugwon Seo, Dr.Reza Khanbilvardi, Dr.Tarendra Lakhankar and Brian Cosgrove (NWS/OHD)

- Developed a framework for integrating the satellite based soil moisture with hydrological modeling system.
- Currently working on spatial, vertical, and temporal assimilation of soil moisture data using SMOS in to the GFFG system.
- Verified current GFFG System with reported flood events in ABRFC for 2010 and 2011.







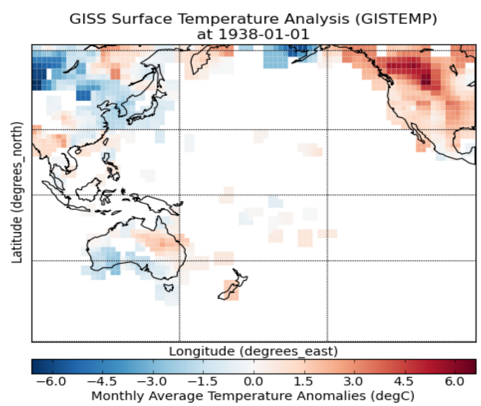


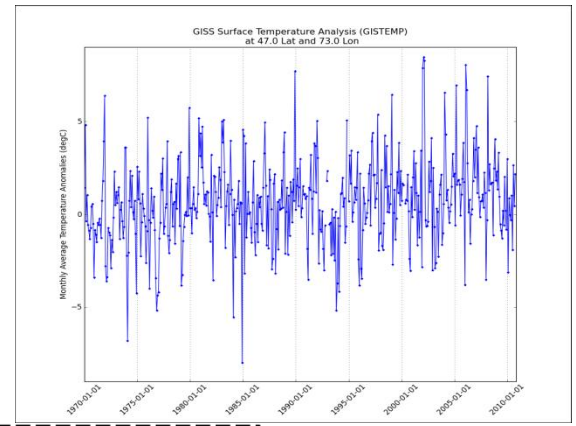
Second Symposium on Advances in Modeling and Analysis Using Python

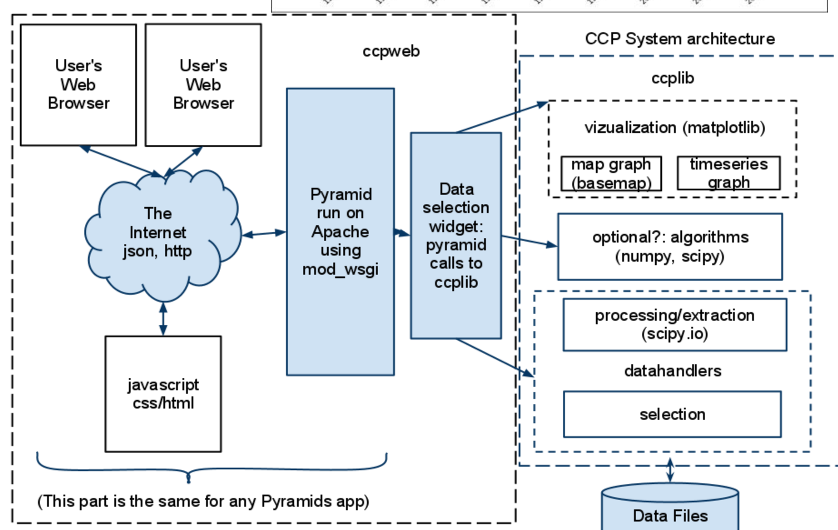
Oral - Web Based Visualization Tool for Climate Data Using Python

Hannah Aizenman, M. Grossberg, D. Jones, N. Barnes,
J. Smerdon, K. Anchukaitis, and J. E. Geay

- Embeddable and extensible
- Supports a variety of datasets
- Generates assorted visualizations
- Modular component based architecture
- https://code.google.com/p/ccp-viz-toolkit/





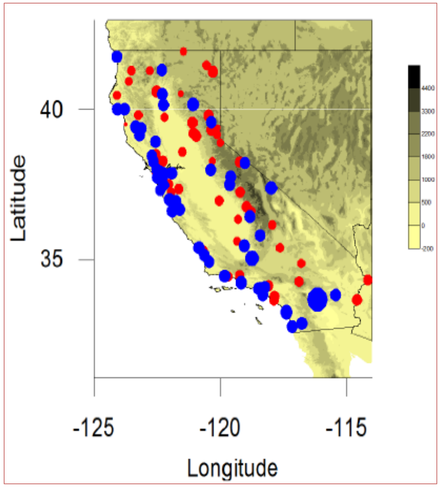


AMS 3rd Conference on Weather, Climate, and the New Energy Economy

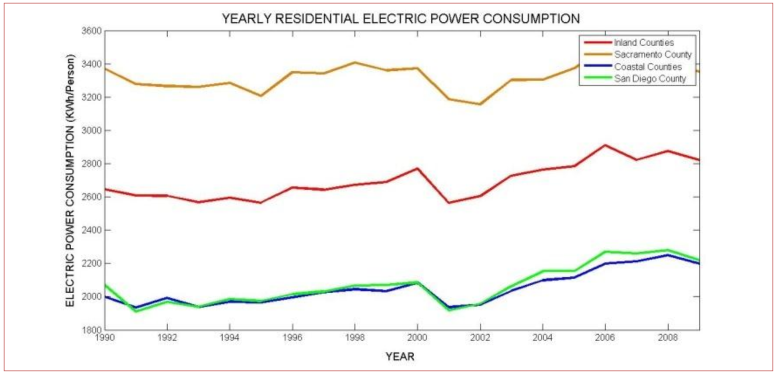
Impacts of Summertime Climate Change on Energy Demands in California

Yanelly Molina, CREST, CCNY

- California Temperature Trends
  - Summertime Coastal Cooling
  - Summertime Inland Warming
- California Electric Power Trends
  - Coastal peak hourly demand decreasing at specific sites
    - Coastal consumption smaller at county level
  - Inland peak hourly demand increasing at specific sites
    - Inland consumption larger at county level
- Future Work
  - Additional peak hourly demand studies
  - Detailed county consumption studies



Source: Sequera, P., O. Rhone, J.E. González, R. Bornstein, and B. Lebassi, 2011: Impacts of Climate Changes in the Northern Pacific Coast on Related Regional Scale Energy Demands, *2011 International Conference on Energy Sustainability.*



Source: California Energy Commission and U.S. Census Bureau

PATHFINDER OF R2O

William B. Rossow, City College of New York

http://isccp.giss.nasa.gov

KEY CHARACTERISTICS OF PROCESSING SYSTEM:

Script Controlled Chain of Procedures, Multiple Re-entry Points, Option Available for Every Outcome, Design for Re-processing, Design for Aging of Computer Properties, Expert Human Involvement Required to Monitor and Investigate Anomalies

KEY CHARACTERISTICS OF DATA PRODUCTS:

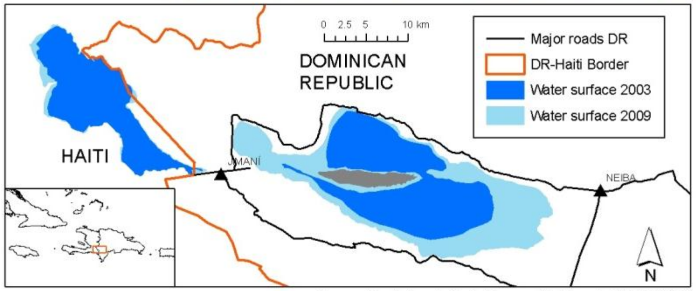
Approximately Uniform Space-Time Sampling, Hierarchical Multi-Purpose Product Design, Indicators of Branching, Version Control, Document What Was Done & Why

24th Conference on Climate Variability and Change:

"On the Hydro-Meteorological and Social Response of a Tropical Lake Basin, Lakes Enriquillo and Sumatra (La Hispaniola) to Changes in Regional Climate and Land Cover"

D.E. Comarazamy, J E. González, R. González, and D.R. Brito

- Lakes in the Enriquillo Basin have experienced significant surface area growth over ~15yrs
  - Lake Enriquillo surface area coverage has nearly doubled since 2004
  - The situation has reached critical levels affecting communities, biodiversity, international trade, and the local economy
  - Regional climate changes are believed to play a key role in this phenomenon
- A hydro-met hypothesis
  - Increased SSTs -> Increased moisture -> Increased pcp (vertical and horizontal) and runoff -> Increase in lake area
  - No significant LCLU changes were found



Prepared by Laboratorio de Percepción Remota INTEC 2011

Satellite Climate Studies Branch and CICS-MD

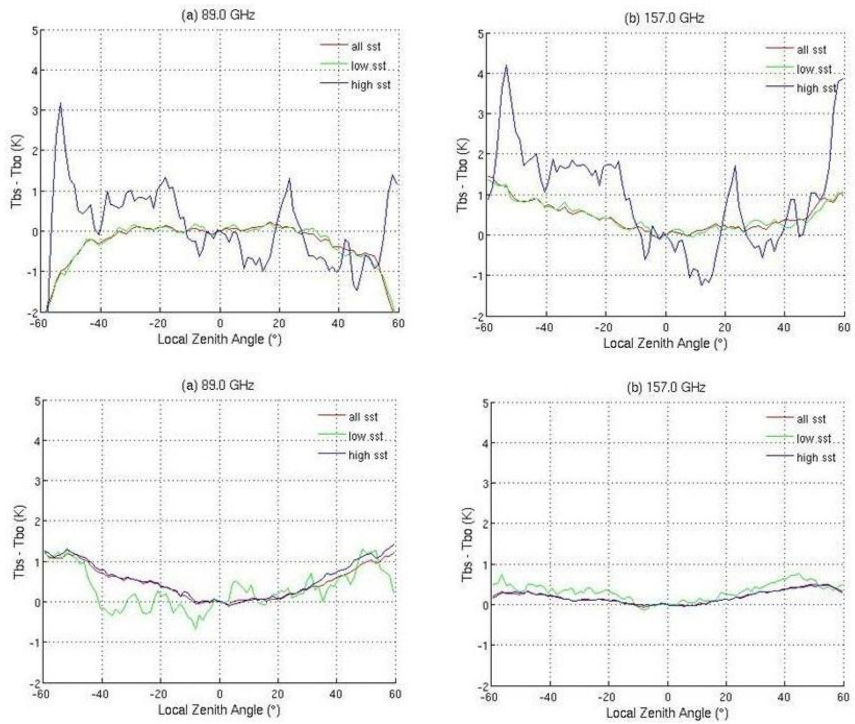
- Devaraj
- Ferraro
- Folmer (2)
- Hernandez
- Li (2)
- Moradi
- Vila
- Wang (2)
- Xu

18th Conference on Satellite Meteorology, Oceanography and Climatology:

Poster – "The Development of AMSU-B/MHS Fundamental CDR's"

Chabitha Devaraj, Huan Meng, Ralph Ferraro, Wenze Yang and Isaac Moradi

- Characterizing scan asymmetry for AMSU-B/ MHS window channels using CRTM
- Stratification of different environmental conditions
  - Low wind speed and low/high humidity stratification case over tropical/subtropical ocean under clear-sky
  - 89 GHz is sensitive to surface parameters,157 GHz is sensitive to atmospheric humidity
  - Develop different approaches to characterize these two channels



Mean bias observed in 2008 NOAA-18 MHS channels for low wind speed and low humidity stratification case are shown in top row and for low wind speed and high humidity stratification case are shown in bottom row.

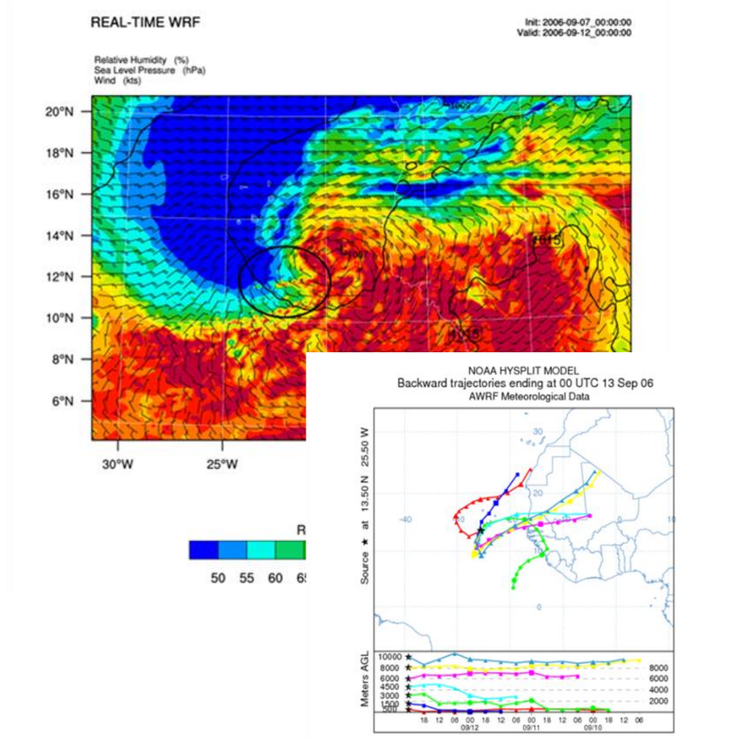
Fourth Symposium on Aerosol-Cloud-Climate Interactions

Poster – "The Impact of the Saharan Air Layer on the Development of Eastern Atlantic Tropical Cyclones"

Michael J. Folmer[1], R.W. Pasken[2], T. Eichler[2], G. Chen[3], J. Dunion[4], and J. Halverson[5]

[1]University of Maryland – ESSIC, CICS, [2]Department of Earth and Atmospheric Sciences Saint Louis University, [3]NASA Langley Research Center, [4]NOAA AOML/HRD, [5]University of Maryland – Baltimore County

- Dust impact on two African Easterly Waves (AEWs) in 2006, one non-developer and one that develops
  - WRF used with assimilated dropsondes
  - Performed analysis to decipher what has bigger impact – dust or synoptic environment.
- HySPLIT backward trajectories confirm source origin of air parcels
  - Many parcels originate in Sahara and become entrained into the developing and non-developing AEW
  - The SAL and associated dust appear to have a negative impact and acts as a catalyst to start the weakening process in an AEW.
  - Lays the foundation for studying the aerosol impacts using WRF-Chem.



Two sample figures of Wave 7 (Helene): (top) 700 hPa RH, (bottom) HySPLIT backward trajectories

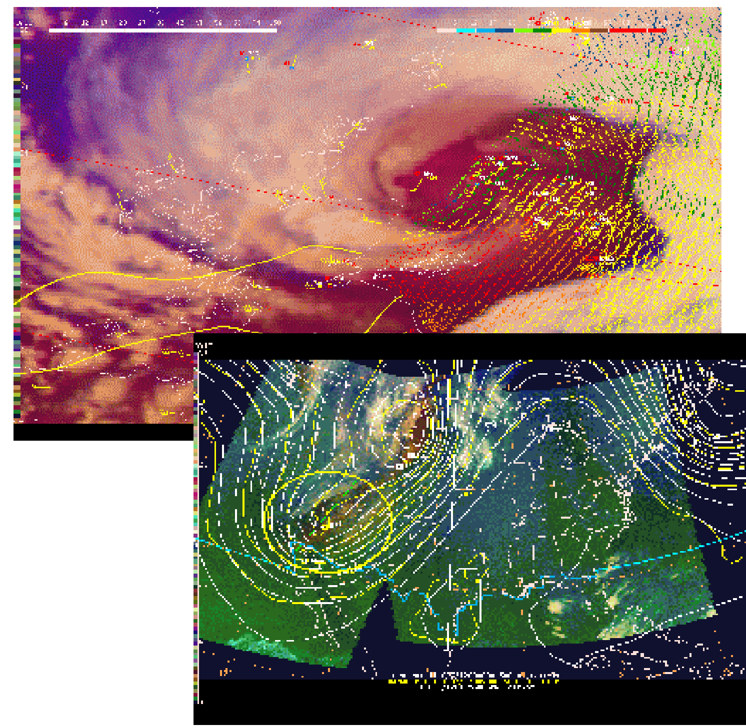
Eighth Annual Symposium on Future Operational Environmental Satellite Systems

Poster – "The 2011 HPC/OPC/SAB GOES-R Proving Ground Demonstration"

Michael J. Folmer[1], B. Reed[2], S. Goodman[3], J. M. Sienkiewicz[4], E. Danaher[5], D. R. Novak[5] and J. Kibler[6]

[1]University of Maryland – ESSIC, CICS, [2]General Dynamics Information Technology, [3]GOES-R Program Office, [4]NOAA/NWS/OPC, [5]NOAA/NWS/HPC, [6]NOAA/NESDIS/SAB

- GOES-R products are being ingested and evaluated at HPC, OPC, and SAB.
  - The first product to be evaluated is the RGB Airmass product (NASA SPoRT, CIRA).
  - Additional products in the queue include:
    - WRF-simulated ABI imagery (Bands 08-16) – CIMSS
    - Enhanced-V / Overshooting Top – CIMSS
    - Lightning Detection – Rudlosky (STAR)
    - Convective Initiation – UAH
    - Volcanic Ash – NESDIS/STAR
    - Additional products to be added later
  - Training has begun at all agencies with evaluations to begin in February after forecasters/analysts have had time to use the product in daily operations.
  - Additional coordination has begun to help with a workshop in Brazil and with NASA SPoRT for development of training modules on the RGB products.

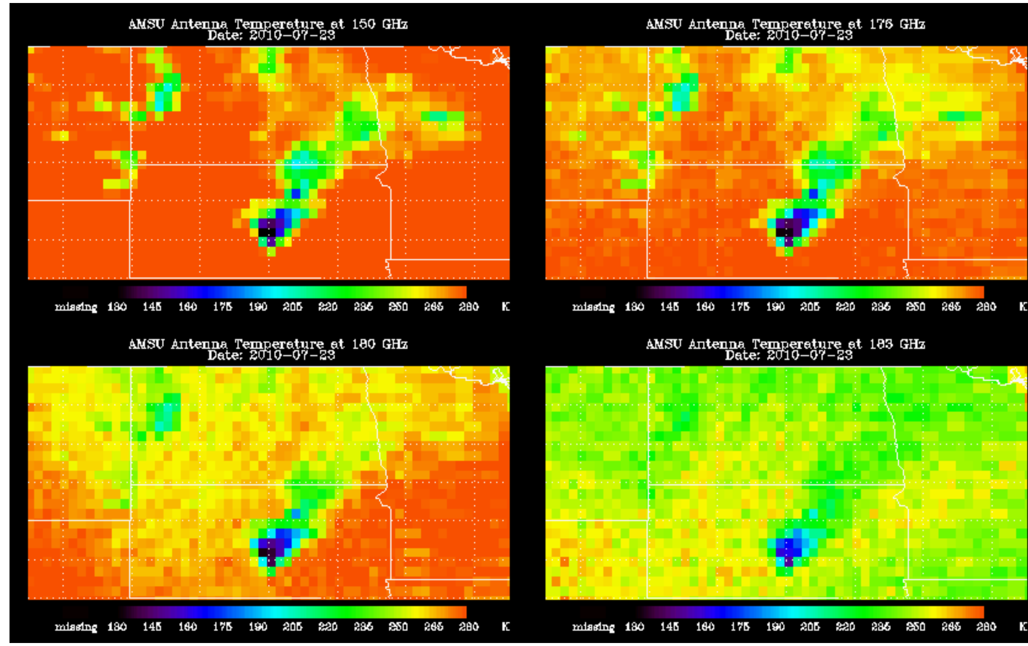


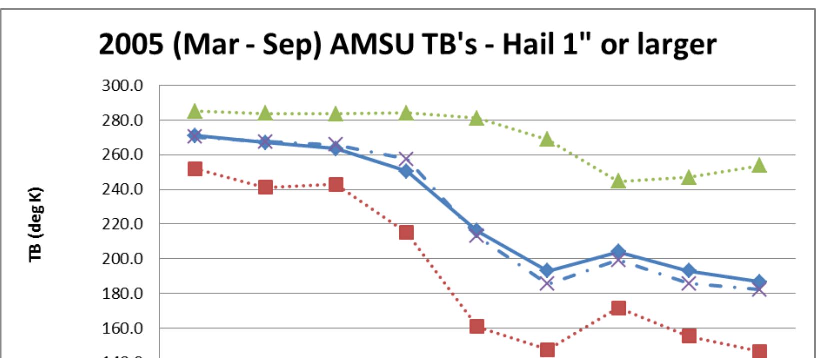
Two sample images of the RGB Airmass product: (top) "sting jet" case in Scotland, (bottom) model diagnostics example in Southwest U.S.

Severe Storm Identification with the Advanced Microwave Sounding Unit(AMSU)

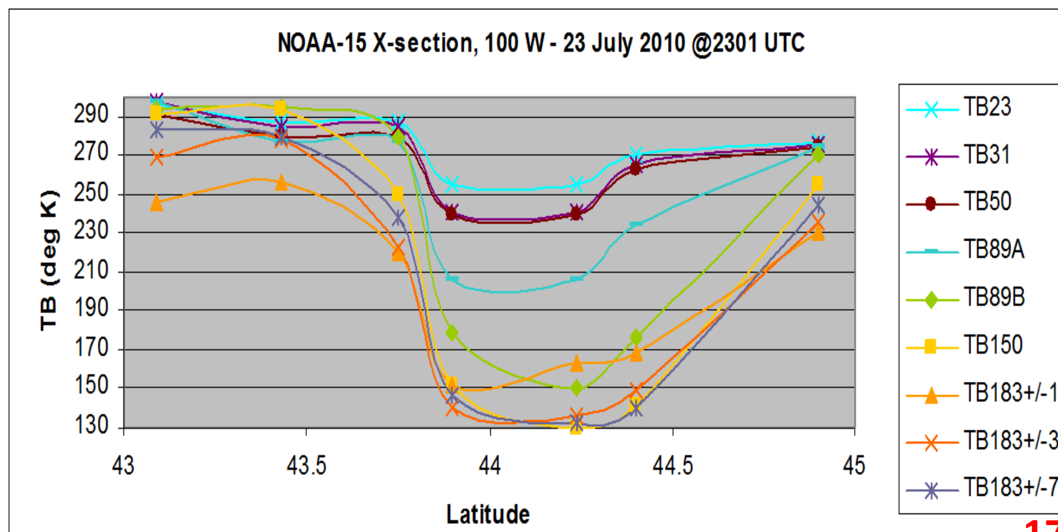
Ralph Ferraro, Chi Quinn (NOAA Summer Intern), Dan Cecil (Univ. Alabama – Huntsville)

- Previous studies
  - Spencer – SMMR, SSMI
  - Cecil – TMI, AMSR-E
- Physical Basis
  - Large ice/Mie Scattering
    - AMSU-B/MHS, H2O bands
- Encouraging results
  - 1”+ hail can be identified
  - Excellent comparisons with surface hail reports





	TB23	TB31	TB50	TB89A	TB89B	TB150	TB183	TB180	TB176
Average	271.2	267.0	263.4	250.5	216.1	192.8	204.0	193.0	186.8
Min	252.1	241.3	243.0	215.0	160.9	147.4	171.6	155.2	146.4
Max	285.2	283.8	283.6	284.1	281.2	268.8	244.6	247.0	253.8
Median	270.4	267.5	265.7	257.4	213.0	185.5	199.3	185.7	182.1
Std. Dev.	9.8	11.9	11.0	20.5	32.4	35.2	22.2	28.9	32.1

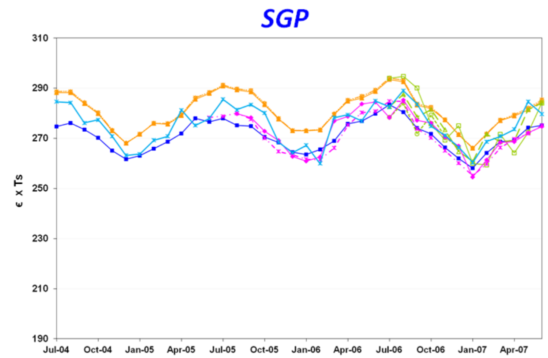


Joint Conference between the 18th Conference on Satellite Meteorology, Oceanography and Climatology/ First Joint AMS-Asia Satellite Meteorology Conference; and the 26th Conference on Hydrology

Oral – "An Evaluation of Microwave Land Surface Emissivities for Use in Precipitation Algorithms"

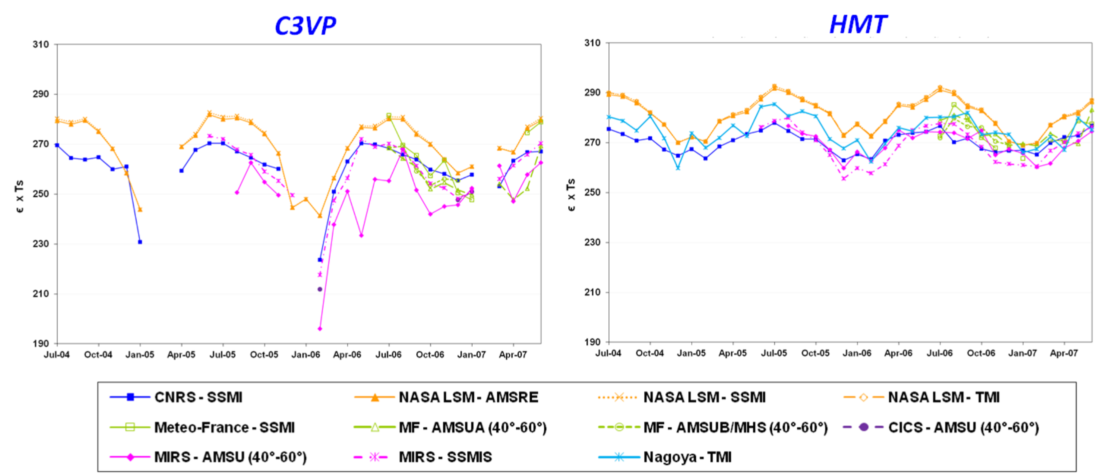
C. Hernandez, R. Ferraro, C. Peters-Lidard and members of the PMM Land Surface Working Group

- Objectives
  - Assess the current state of land surface emissivity models/retrieval
  - Inter compare models to study its differences and similarities
- Results
  - Three different sites were compared
  - Differences in the treatment of surface temperature, therefore ϵ*T_s was used
  - Differences between models during periods of rain, or snow on the ground
  - Similar seasonal variation between models



85/89/91 GHz

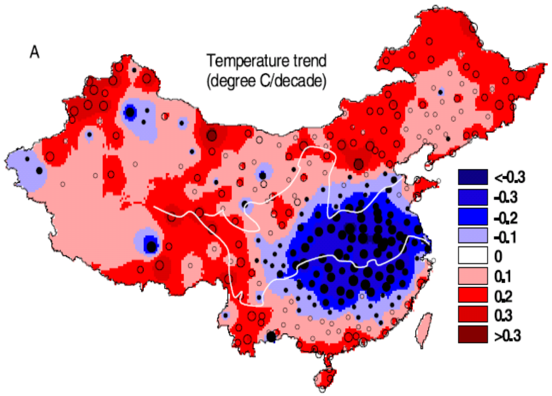
AMSRE (89 GHz), AMSU (89 GHz), SSMI (85.5 GHz), SSMIS (91 GHz), TMI (85 GHz)

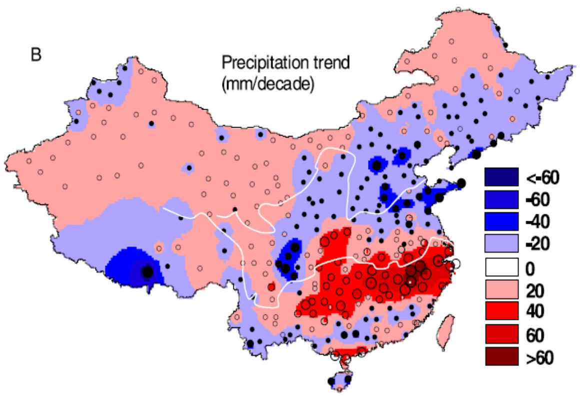


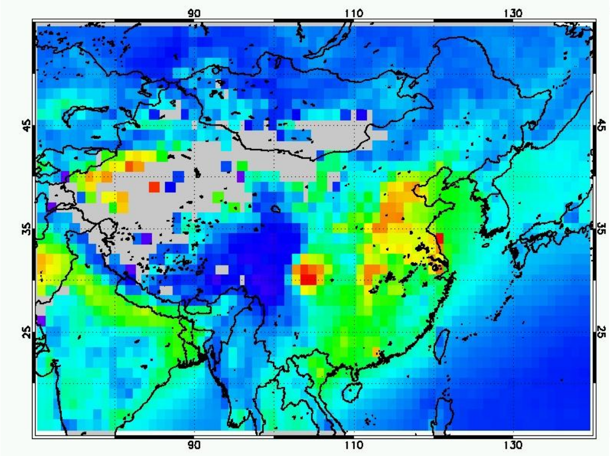
18th Conference on Satellite Meteorology, Oceanography and Climatology / First Joint AMS-Asia Satellite Meteorology Conference & 4th Sym. on Aerosol-Cloud-Climate Interaction

Z. Li invited talk– "Use of A-Train Satellite and ARM Ground Measurements to Study the Impact of Aerosols on Cloud and Precipitation"

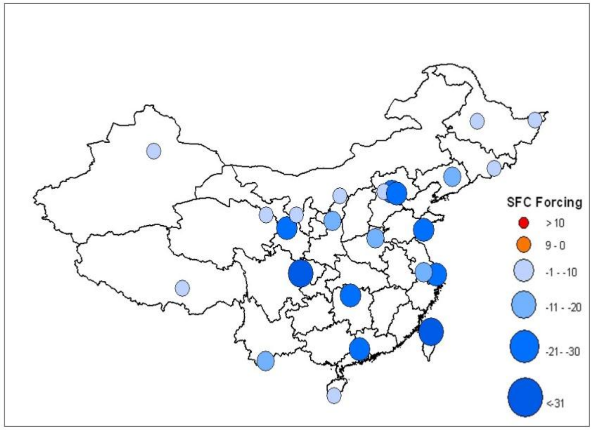
- Aerosol loading & its changes in China are large
- Aerosol raditiave effect may account for some changes in the temperature trend
- Aerosol indirect effects may account for some changes in the rainfall trends.







Aerosol optical depth

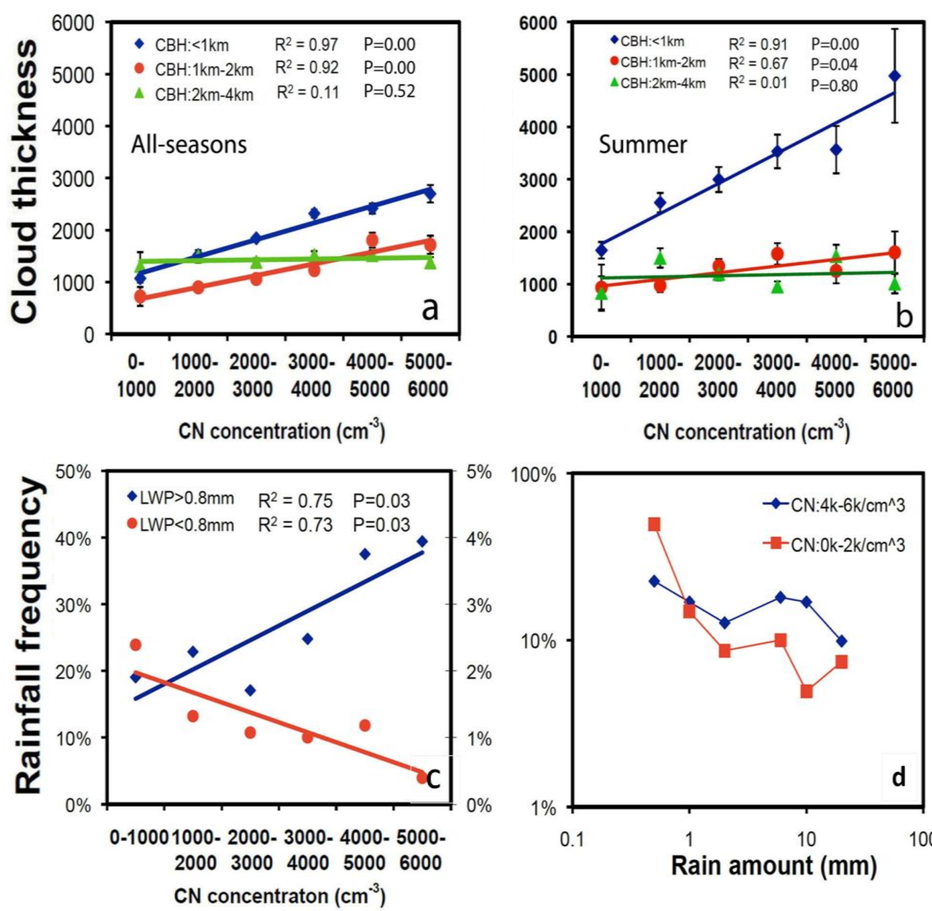


Aerosol radiative forcing

18th Conference on Satellite Meteorology, Oceanography and Climatology / First Joint AMS-Asia Satellite Meteorology Conference :

Z. Li invited talk– "Use of A-Train Satellite and ARM Ground Measurements to Study the Impact of Aerosols on Cloud and Precipitation"

- Aerosols can increase cloud top height and thickness drastically for mixed-phase clouds
- Aerosols suppress rainfall for warm clouds but enhance it for mixed-phase clouds
- The aerosol indirect effects depend on cloud geometry and cloud phase, convective strength, etc.

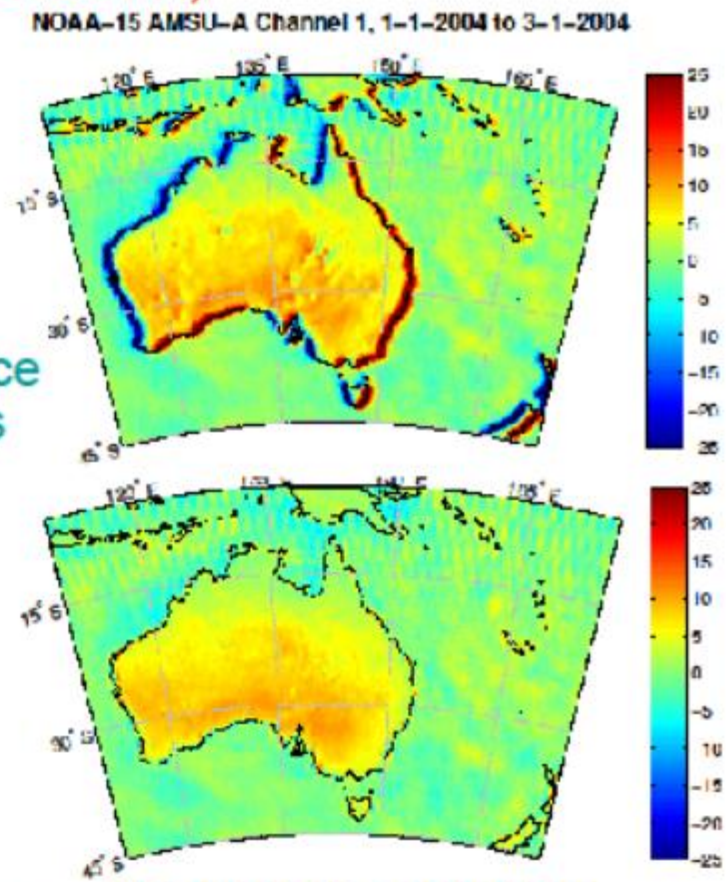


Geolocation Correction for the NOAA Passive Microwave Instruments

Isaac Moradi, Huan Meng, Ralph Ferraro

(Oral, *Room 257 01/25/12 4:00 PM)*

- Main Sources of Geolocation Errors
  - Satellite attitude and sensor mounting errors
  - Satellite clock offset
- Quantifying Geolocation Errors
  - In the case of geolocation error, difference between ascending and descending TBs (ΔTB) along the coastlines is very large
  - Index: number of pixels where ΔTB > threshold
- Results
  - 1.2 deg. roll offset for N15 Ch.1 & 2
  - ~1.2 deg. pitch offset for N18 Ch.1 & 2
  - 0.6-0.7 pitch offset for N19 AMSU-A
  - 0.4 deg. pitch and yaw offset for N19 MHS



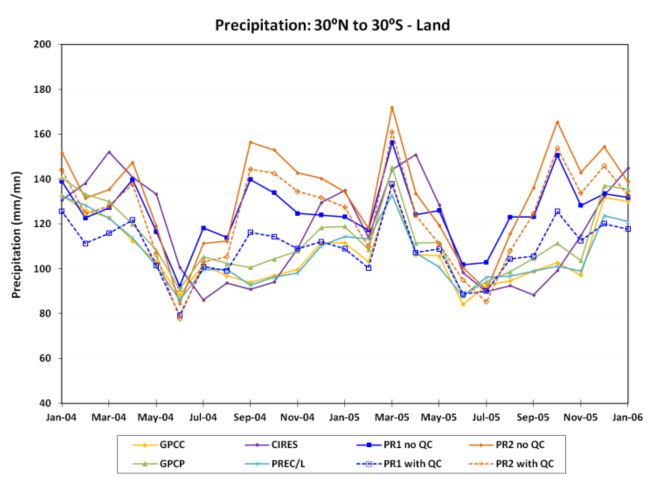
Top: before correction, bottom: after correction

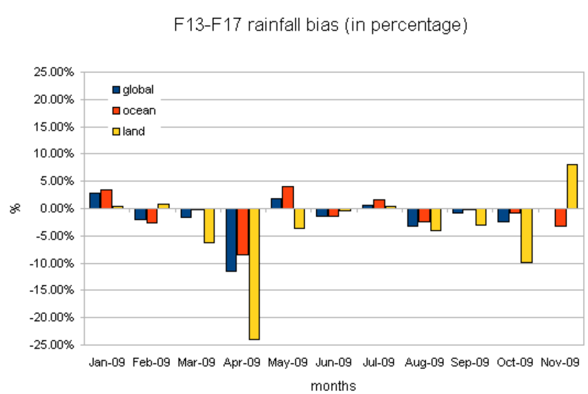
18th Conference on Satellite Meteorology, Oceanography and Climatology:

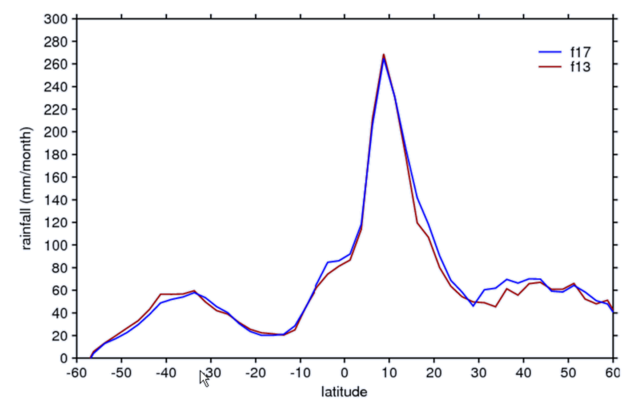
Oral – "The Performance of Hydrological Monthly Products using SSMI–SSMI/S sensors"

Daniel Vila, C. Hernandez, R. Ferraro and H. Semunegus

- Objectives
  - Apply an improved QC scheme to historical antenna temperature of SSM/I sensor since 1987 to 2008 and measure the impact on different hydrological products.
  - Develop an improved strategy to extend the SSM/I time series into the SSMIS era, starting with data in 2009.
- Results – 1st objective
  - Improvement of precipitation estimates using the QC scheme, especially over land.
- Results – 2nd objective
  - Look-up tables (LUTs) for every channel stratified for surface type (land & ocean) using an histogram matching technique were created using global 1/3 degree global daily grids for January - July 2009.
  - The monthly rainfall bias between F13 and F17 is below 10% for all cases with exception of April 2009 over land.
  - The computed global rainfall mean for both satellites during August 2009 (not used for creating LUT) is in good agreement.





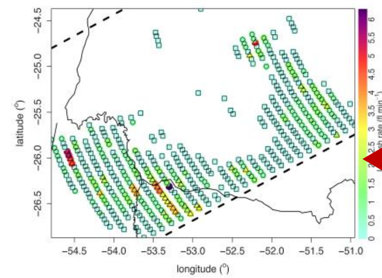


Satellite Meteorology Conference: Satellite-based algorithm developments

Oral – "Improving Precipitation Retrieval Using Total Lightning Data: A Multi-sensor, Multi-platform Synergy between GOES-R and GPM "

N-Y Wang, K. Gopalan, R. Albrecht

- Multi-sensor Synergy on Precipitation Retrieval
  - Lightning
  - Microwave
- Using Lightning to refine microwave's Convective Identification
  - Lightning flash occurrence and rate
  - Microwave TB, ice scattering signals
- Improve highly convective region

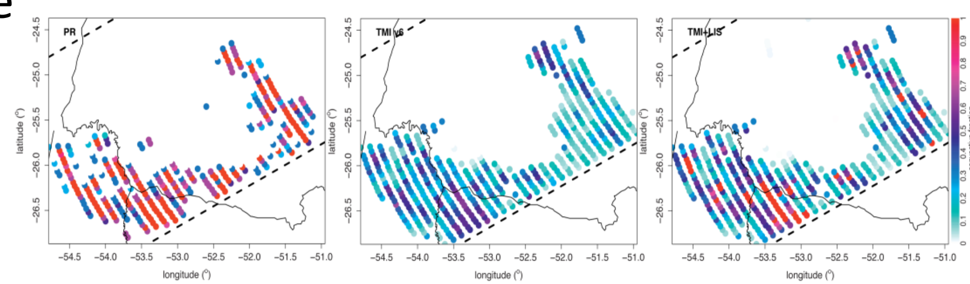


Lightning makes a difference on the microwave convection classification, particularly on strong convection

radar

microwave

microwave + lightning



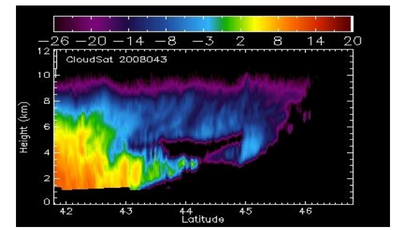
Satellite Meteorology Conference on Hydrometeorologocal Appl GPM 2:

Oral – “Developing Winter Precipitation Algorithm over C3VP”

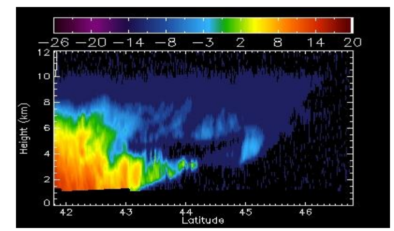
N.-Y. Wang, K Gopalan, R. Ferraro, and J. Turk

- Snowfall retrieval over land: Challenges
  - weak microwave snowfall signals against strong land surface background
  - uncertain snow scattering from various snow shapes
- Satellite overpasses
  - AMSU-B/MHS
  - CloudSat
- Can we model the satellite observations of snowfall reasonably well?

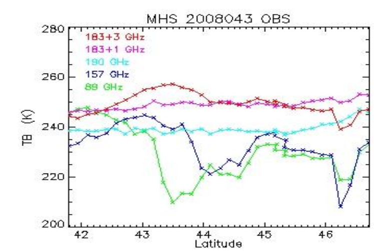
CloudSat Reflectivity observations



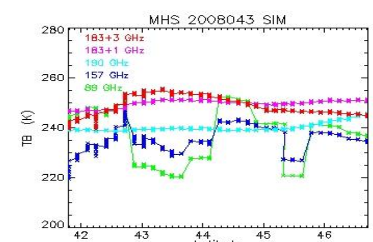
CloudSat reflectivity simulations



MHS TB Observations



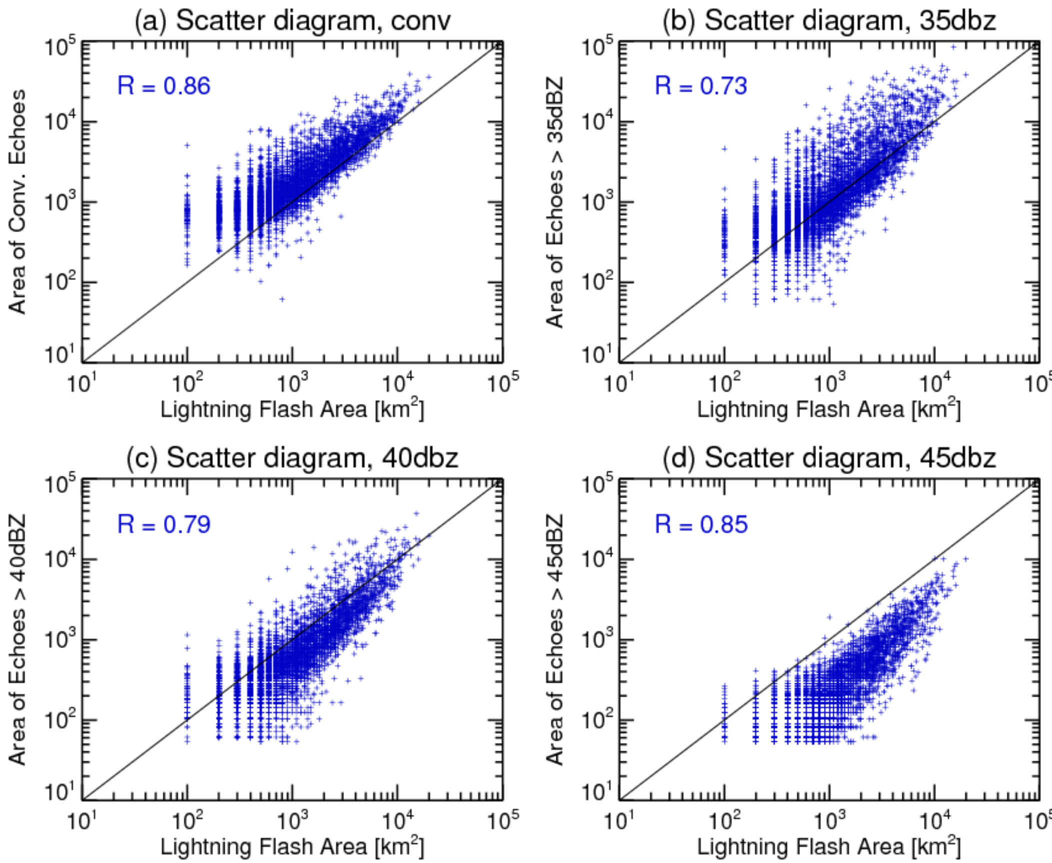
MHS TB Simulations



Oral – "**Improving Geostationary Satellite Rainfall Estimates Using Lightning Information**"

Weixin Xu, Robert F. Adler, Nai-Yu Wang

- **Objectives**
  - Remove false IR-defined intense convection;
  - Identify convective cores and their size;
  - Define correct rain-rate.
- **Results**
  - Lightning can discriminate intense and weak storms;
  - Lightning and conv. rain are well correlated on storm scale;
  - Linear pixel-scale lightning-rainrate relationships are not found;



NESDIS STAR

- Bayler
- Cao
- Divakarla
- Flynn (2)
- Kuligowski (2)
- Liu
- Nali (3)
- Pisut
- Pryor
- Reale (2)
- Wu (2)

Joint Session (Oral): 2nd Conference on Transition of Research to Operations
18th Conference on Satellite Meteorology, Oceanography and Climatology
1st Joint AMS-Asia Satellite Meteorology Conference

The Application of Satellite SSS Observations to Operational Passive Microwave Radiometry

- Surface Brightness Temperature (Tb_0)

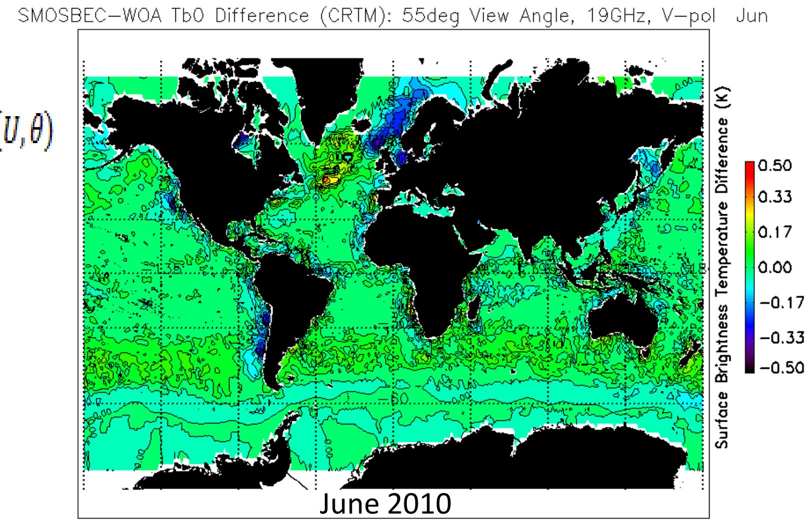
$$\epsilon_{sfc}(\upsilon,\theta,p,SST,SSS,U,\phi) = \epsilon_{flat}(\upsilon,\theta,p,SST,SSS) + \epsilon_{rough}(\epsilon_{flat},U,\phi) + \varepsilon_{foam}(U,\theta)$$

$$\mathbf{Tb_0 = SST * \varepsilon_{sfc}}$$

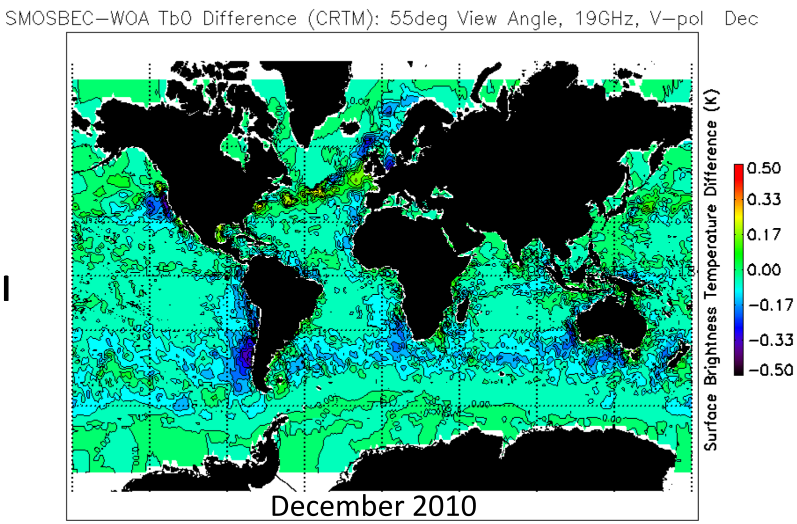
Assumed: Flat sea, no wind, 55° viewing angle, vertical polarization

- Tb_0 difference due near-real-time SSS vs climatology at operationally-representative frequencies
  - Data
    - NOAA/NODC World Ocean Atlas 2009 SSS
    - SMOS Barcelona Expert Centre Level-3 SSS
  - Frequencies
    - 6, 11, 19, 23, 37 GHz

- **IMPACT: Passive Microwave Retrievals**
  - ***SSS affects surface emissivity term***
  - **Near-real-time SSS improves accuracy vs climatological SSS values**
    - **SSS climatologies notably sparse in space and time**
  - **Will reduce biases and uncertainty due to non-representative climatological values**



June 2010



December 2010

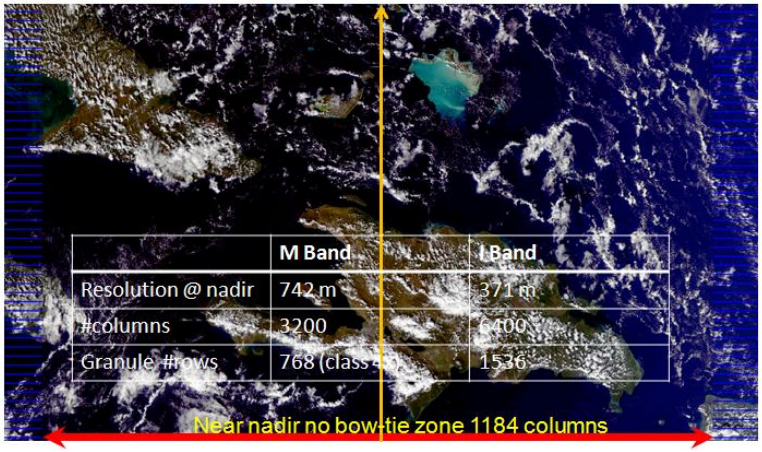
Data provided by ESA and SMOS-BEC

18th Conference on Satellite Meteorology, Oceanography and Climatology/
First Joint AMS-Asia Satellite Meteorology Conference Conference

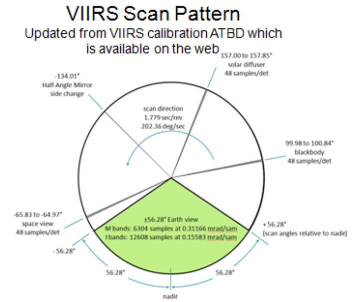
Oral – "NPP VIIRS SDR Postlaunch Calibration/Validation"

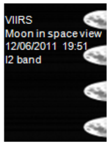
C. Cao, Q. Liu, S. Blonski, et al.

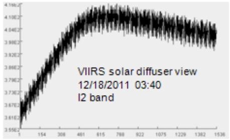
- Intensive Cal/Val started when VIIRS Nadir Door Opened on 11/21/2011.
  - 57 cal/val tasks by five organizations
  - VIIRS producing excellent images
  - Channel gain degradation in some channels is under investigation
- VIIRS comprehensive calibration approach
  - Onboard calibration similar to MODIS
  - SNO and SNOx method essential
    - Polar vs. Tropical SNOs
    - Both radiometric and geolocation verification
- SWIR and LWIR channels will be available soon.
  - The VIIRS SDR team is working hard to ensure the SDR quality.
  - More information available at STAR VIIRS website: http://www.star.nesdis.noaa.gov/jpss/VIIRS/



VIIRS	MODIS	AVHRR
Rotating telescope w/ half angle mirror	Paddle Mirror (large RVS effect)	45 deg mirror (image pixel rotation at high scan angles)
V-Grooved Blackbody	V-Grooved Blackbody	Honeycomb Blackbody
Space view	Space view	Space view
Solar diffuser + screen (VISNIR+DNB)	Solar diffuser +screen+door (VISNIR)	Vicarious (desert)
Solar diffuser stability monitor	Solar diffuser stability monitor	-
Lunar cal	Lunar cal	-
None	SRCA	None







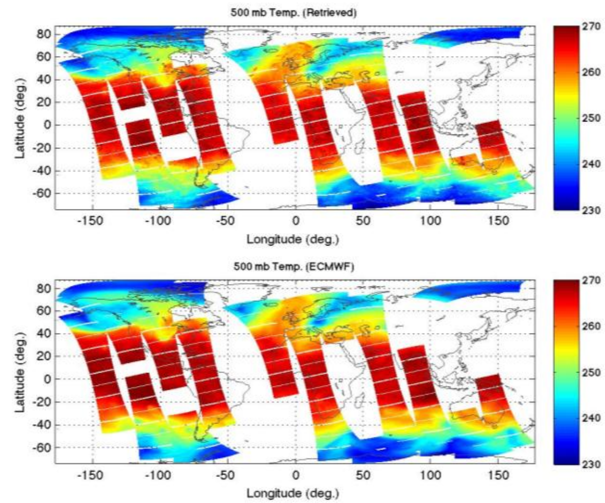
Eighth Annual Symposium on Future Operational Environmental Satellite Systems

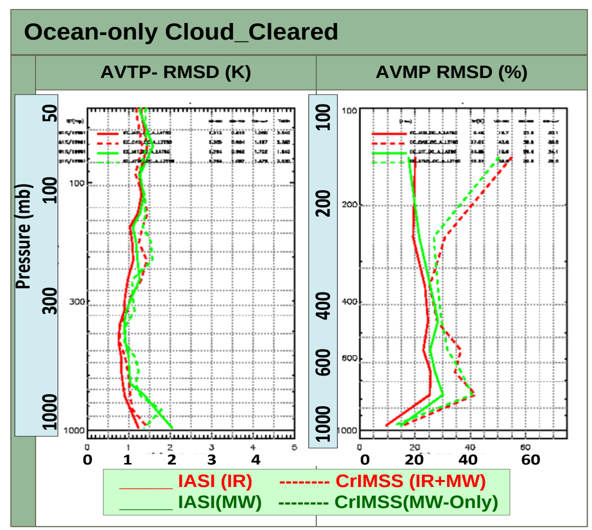
Oral - “Pre-Launch to Post-Launch Transition and Evaluation of CrIMSS EDR Algorithm and Products”

Murty Divakarla, C.D. Barnet, M. Goldberg D. Gu, X. Liu, Tom King,
W. Blackwell, X. Xiong, E. Maddy , N.R. Nalli, A. Gambacorta, G. Guo, X.L. Ma, S. Kizer, H.Xie, and K. Zhang

Evaluate CrIMSS EDR Algorithm for Launch Ready Performance

- EDR Product Generation Using Proxy CrIS/ATMS - SDRs (derived from IASI/AMSU-A/MHS) - > Assessment with Matched Collocations of RAOBs/ECMWF and IASI EDRs.
- Functional Testing of Operational Data Flow GRAVITE/IDPS JPSS-Rehearsal-II (P-72 Data Sets) - Consistency in CrIMSS EDR Code Implementations (Science code, IDPS-OPS, Off-line)
- **The CrIMSS algorithm shows Reasonable Ability for a Post-Launch Performance.**





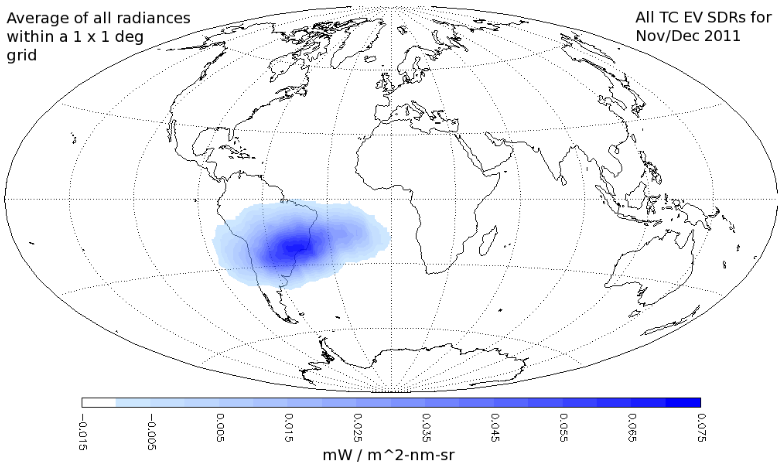
Evaluation of CrIMSS EDRs with ECMWF and IASI Retrievals

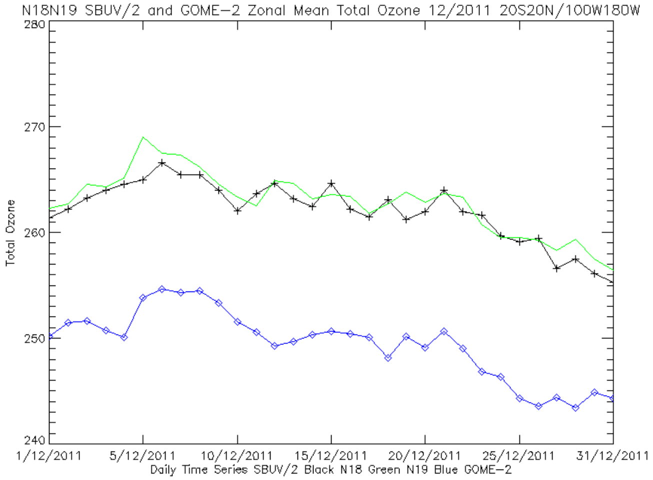
8th Annual Symposium on Future Operational Environmental Satellite Systems

Poster: "NPP Product Validation for the Ozone Mapping and Profiler Suite (OMPS)"

L. Flynn, I. Petropavlovskikh, D. Swales, J. Niu, E. Beach, W. Yu, C. Seftor, C. Long

- Internal Calibration as expected
  - Dark, Nonlinearity, Noise, Hot Pixels
  - SAA effects present
- Starting Solar Diffuser Measurements
- Validation sets/analysis ready
  - Other Satellites
  - Ground-based Dobson and Brewer stations





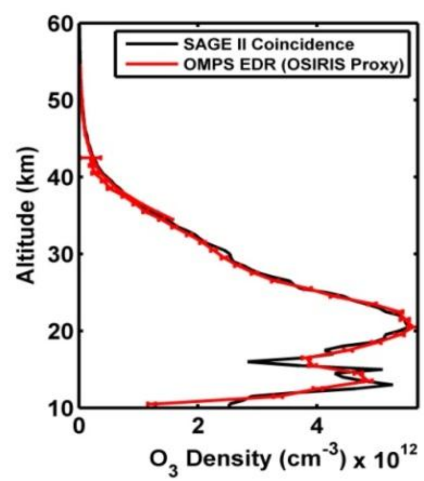
18th conference on satellite meteorology, oceanography and climatology:

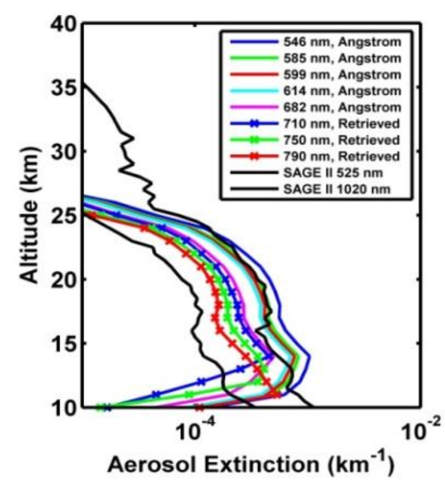
Oral: "Operational Ozone Sensors and Beyond"

L. Flynn, D. Loyola, F. Huang, W. Wang, D. Rault, T. Beck, C. Long, S. Kondragunta

- R2O is working
  - New AC Products
  - NPP Science Team
- Climate Data Records
  - Stable systems
  - DOAS and Multiple Diffusers
- OMPS Limb Profiler
  - Good global coverage
  - Expected performance compared to Occultation

Institutes Satellites	Instruments Spectra	Launch Dates	Products
NOAA POES	SBUV/2 250-400 nm	N-18 2005 N-19 2009	Total &Profile Ozone
NOAA NPP & JPSS	OMPS 250-310 nm 300-380 nm 290-1000 nm	NPP 2011 J1 2016 J2 2021	Total &Profile Ozone, SO2, Aerosol Index
EuMetSat Metop	GOME-2 240-790 nm	M-A 2006 M-B 2012 M-C 2017	Total &Profile Ozone, NO2, BrO, SO2, Aerosol Index
CMA FY-3	TOU & SBUS 308-360 nm 250-400 nm	FY-3A 2009 FY-3B 2011	Total &Profile Ozone, Aerosol Index



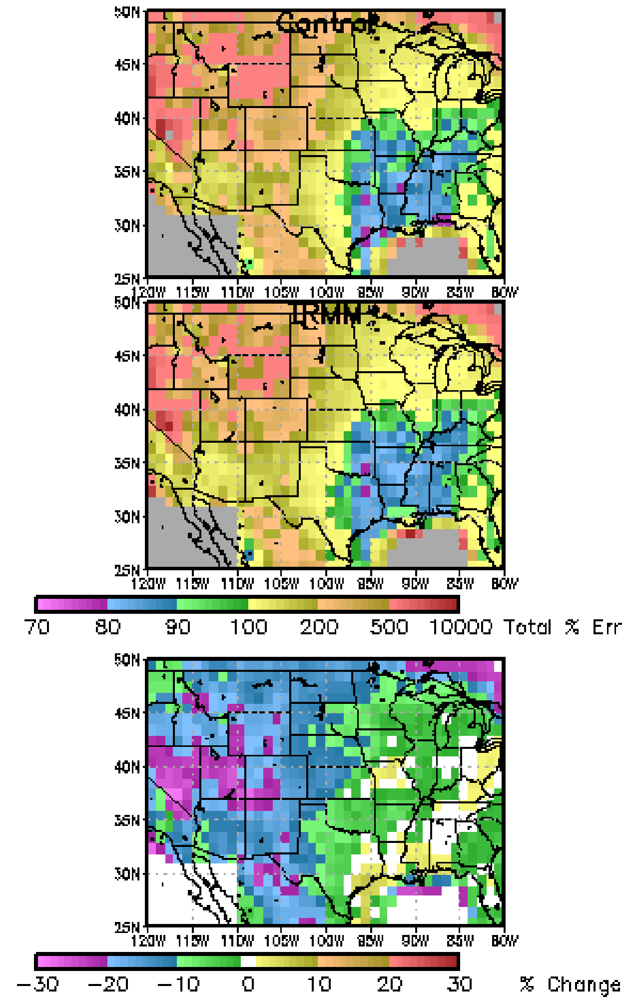


18th Conference on Satellite Meteorology and Oceanography:

Oral– “Application of TRMM Data to Multisatellite Rainfall Estimation and Hydrologic Forecasting”

R. J. Kuligowski, Y. Li, Y. Zhang, H. Lee, D. Kitzmiller, and D.-J. Seo

- TRMM data are not ideal for operational hydrologic forecasting due to data latency and sampling
- Solution: incorporate into a multisensor satellite rainfall algorithm (SCaMPR); evaluate results against gauges and in a hydrologic model
- Results:
  - Adding TRMM improves SCaMPR performance, particularly over the western US; also improves flood forecast peak & timing
  - However, SCaMPR outperforms gauge-only analysis only for areas with sparse gauge coverage (1 gauge / 7,000km^2)

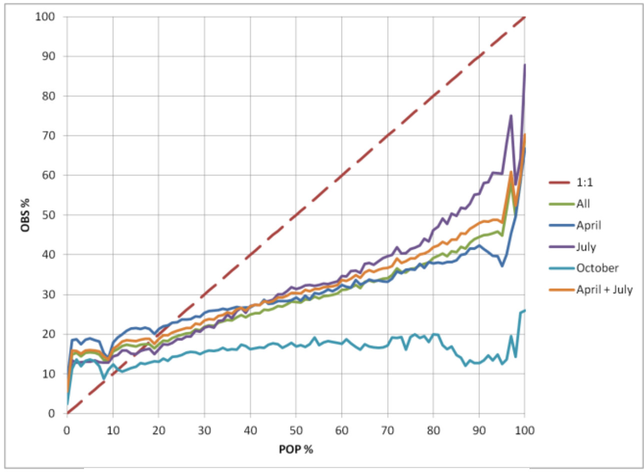


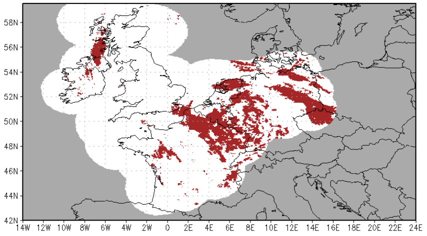
26th Conference on Hydrology:

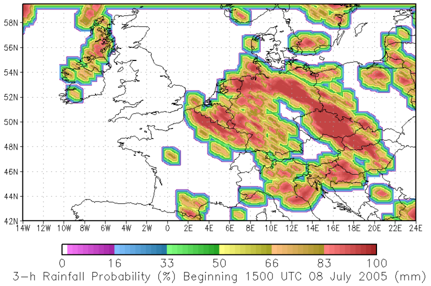
Oral– “The GOES-R Probability of Rainfall Algorithm”

R. Barnhill and R. J. Kuligowski

- Statistical algorithm for predicting probability of ≥ 1 mm of rainfall during the next 3 h at the full GOES space / time resolution
- Inputs derived from forecasts of rainfall rate at 15-min intervals from the GOES-R Rainfall Potential algorithm
- Developed on SEVIRI data (proxy for GOES-R ABI)
- Validation against Nimrod radar over Western Europe shows skill but some bias.





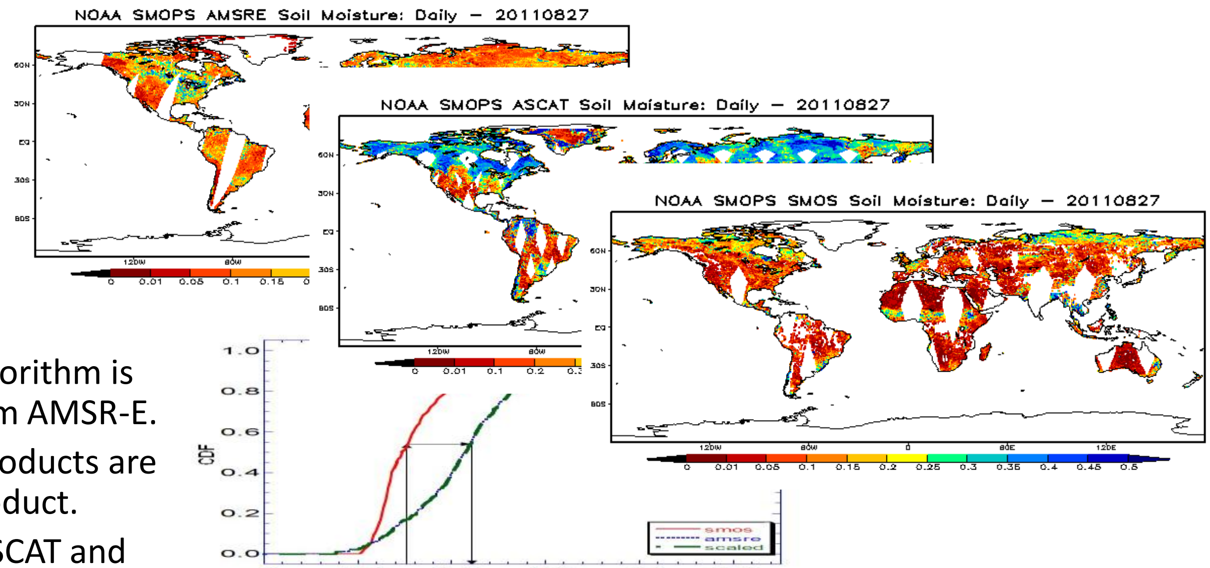


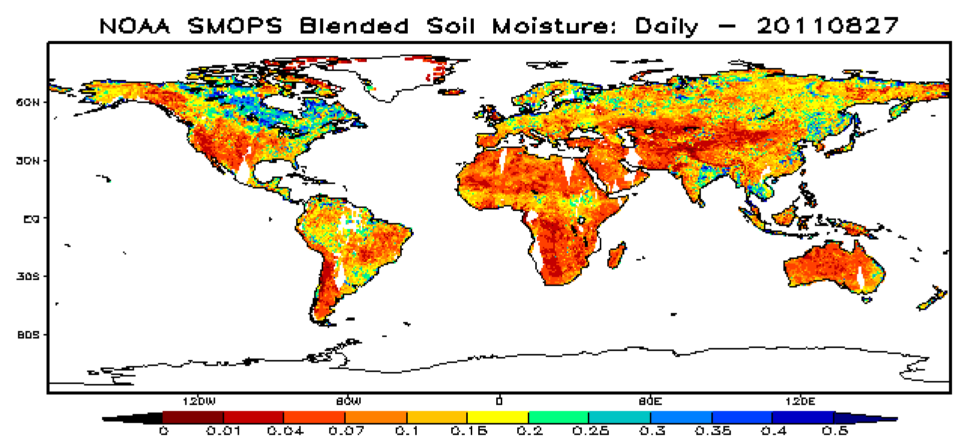
92nd AMS Annual Meeting - 26th Conference on Hydrology:

Poster – "NOAA Soil Moisture Operational Product System (SMOPS) and Its Soil Moisture Retrieval From AMSR-E"

Jicheng Liu, I.M. Systems Group at NOAA/NESDIS, Camp Springs, MD; and X. Zhan, L. Zhao, K. A. Jensen, and X. Wang

- Why SMOPS?
  - Quality needs to be improved.
  - Better spatial coverage.
  - Higher temporal resolution.
  - Operational production.
- How?
  - Single Channel Retrieval (SCR) algorithm is used to retrieve soil moisture from AMSR-E.
  - SMOS and ASCAT soil moisture products are used to generate the blended product.
  - CDFs are used to match SMOS, ASCAT and AMSR-E products before blending.
- Results
  - Improved retrieval quality.
  - Improved spatial coverage: Complete daily global coverage.
  - Improved temporal resolution: 6-hour product will be produced.
  - SMOPS soil moisture product will be operationally produced at NOAA.





16th Symposium on Meteorological Observation and Instrumentation:

Oral – “On the Angular Effect of Residual Clouds/ Aerosols in Clear-Sky IR Window Radiance Observations”

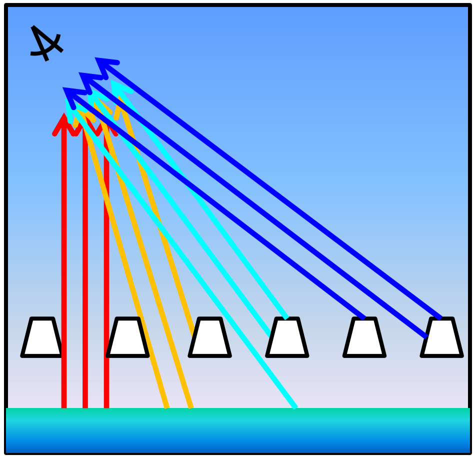
Nicholas R. Nalli, and C. D. Barnet, A. Gambacorta, E. Maddy, W. L. Smith

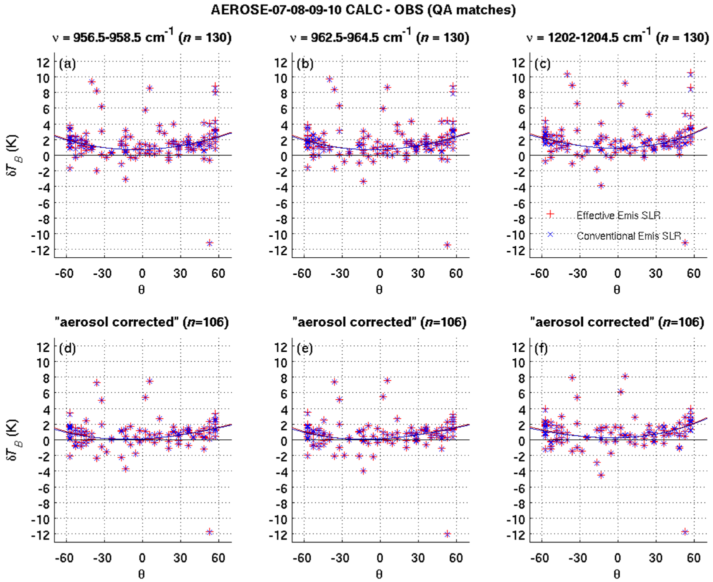
- Accurate satellite observations and calculations of top-of-atmosphere IR spectral radiances are required for the accurate retrieval of geophysical state parameters such as atmospheric vertical temperature and water vapor profiles

- Ideally, it is desired that systematic differences between OBS and CALC under well-characterized conditions be minimal over the scanning range zenith angles

- A fundamental problem with clear-sky analyses of CALC – OBS is the assumption of “clear-sky” OBS, when in reality we only have access to cloud-masked or cloud-cleared OBS, themselves being the products of algorithms, both of which are subject to errors and not designed to mask aerosols

- This presentation summarizes work (*Nalli et al.* 2012, in prep for *JGR*) investigating the impact of the “clear-sky” OBS commonly used in such analyses, which include “cloud-masked” data, as is typical from imagers, as well as “cloud-cleared radiances,” as is typical from hyper/ultraspectral sounders
  – Analyses of hyperspectral microwindow observations against forward calculations suggests that contamination by residual clouds and/or aerosols within clear-sky observations can have a measurable concave-up impact on the angular agreement of OBS with CALC





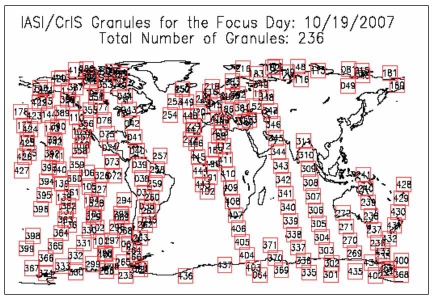
8th Annual Symposium on Future Operational Environmental Satellite Systems:

Oral – “Joint Polar Satellite System (JPSS) Cross-Track Infrared Microwave Sounding Suite (CrIMSS) Environmental Data Record Validation Status”

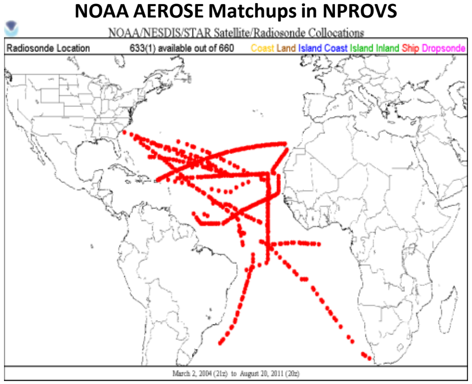
Nicholas R. Nalli, C. D. Barnet, M. Divakarla, L. Zhou,
X. Xiong, G. Guo T. Reale, *et al.*

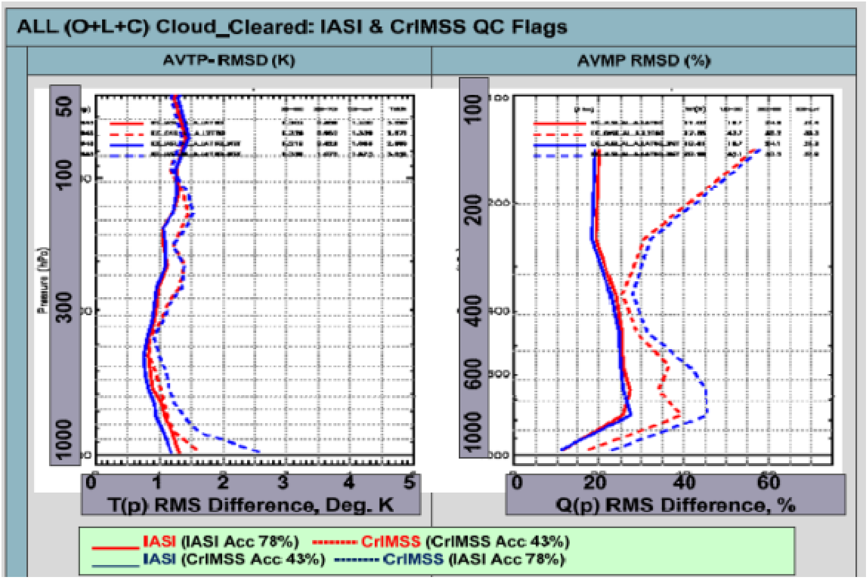
- The Joint Polar Satellite System (JPSS) mission is to provide environmental data records (EDRs) to NOAA’s users. To ensure the data products comply with the requirements of the sponsoring agencies, a calibration/validation (cal/val) plan was devised in advance of the launch of the preparatory NPP satellite launched on 28 October 2011.
- The cal/val plan establishes science and user community leadership and participation, and demonstrated, cost-effective approaches under four distinct phases: (1) Pre-Launch, (2) Early-Orbit Checkout (EOC), (3) Intensive Cal/Val (ICV) and (4) Long-Term Monitoring (LTM).
- This presentation provides a review of validation activities for the NPP Cross-track Infrared Microwave Sounding Suite (CrIMSS). CrIMSS measures upwelling IR and MW radiances to provide three EDRs, namely the atmospheric vertical temperature, moisture and pressure profiles (AVTP, AVMP and AVPP, respectively), with the lower tropospheric AVTP and AVMP being JPSS Key Performance Parameters (KPPs).
- Focus is given to the NPP CrIMSS EDR validation activities that took place during the Pre-Launch Phase, as well as a preview of current and planned efforts for the EOC–ICV Phases.

Focus Day Proxy Data



NOAA AEROSE Matchups in NPROVS

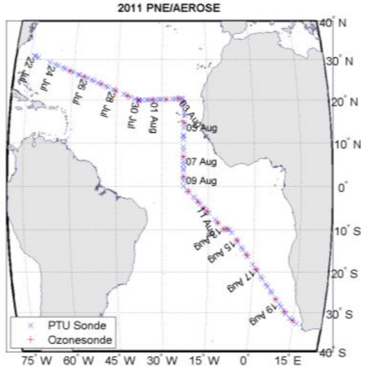


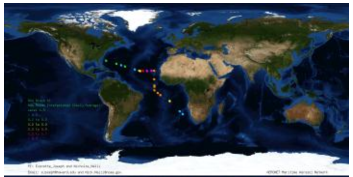


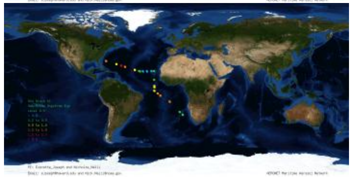
Poster – “NOAA Aerosols and Ocean Science Expeditions (AEROSE) for Cal/Val of CrIMSS EDRs”

Nicholas R. Nalli, C. D. Barnet, E. Joseph, V. R. Morris, D. Wolfe, M. Divakarla,
T. King, H. Xie, A. Gambacorta, P. Minnett, T. Reale, *et al.*

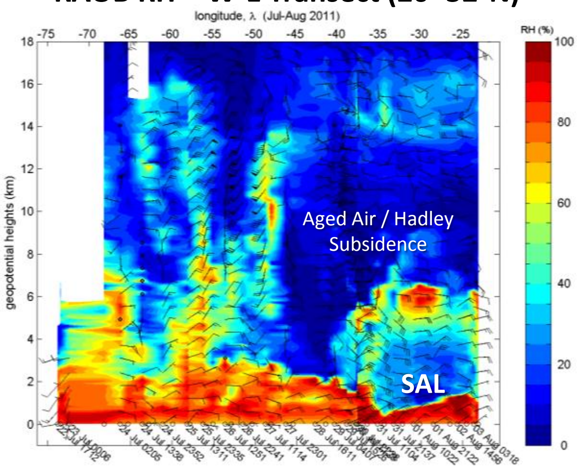
- This presentation provides an overview of dedicated soundings acquired from ozonesondes and radiosondes launched over the tropical Atlantic Ocean during the ongoing NOAA Aerosols and Ocean Science Expedition (AEROSE) campaigns conducted in partnership with the PIRATA Northeast Extension (PNE) project onboard the NOAA Ship *Ronald H. Brown*.
- The AEROSE data complement is one of the most extensive collections of *in situ* measurements over the tropical Atlantic Ocean, conducted during boreal spring and summer over multiple years (2004, 2006-2011, and potentially beyond).
- Ship based sonde launches have been timed to coincide with Aqua AIRS and MetOp IASI satellite overpass times, thereby providing dedicated radiosonde observations (RAOBs) as correlative data for developments of proxy datasets to be used for pre-launch NPP/JPSS CrIMSS environmental data record (EDR).
- Among other things, the AEROSE data are unique in their range of marine meteorological phenomena germane to the satellite missions in question, including dust and smoke outflows from Africa, the Saharan air layer (SAL) and tropical water vapor distribution, and tropospheric ozone dynamics.
- In the current work, data from the most recent 2011 AEROSE campaign are highlighted.



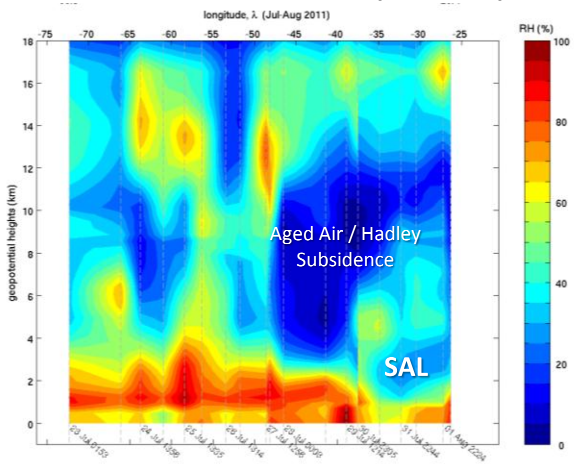




RAOB RH – W-E Transect (20–32°N)



IASI RH – W-E Transect (20–32°N)



NOAA Exhibit Booth

The Big Picture

Dan Pisut

- VisLab and NOAA Communications are conducting interviews with NOAA scientists at the NOAA AMS exhibit booth

- Tell the story about your science/research in under 2 minutes.

- Videos are green screened and edited on site, distributed on NOAA web and social media sites.

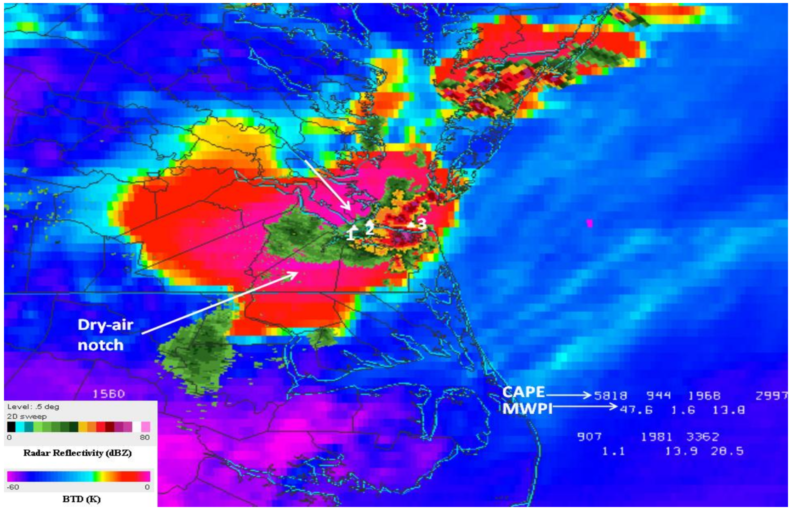
- Several STAR/CI staff are already involved: Felix Kogan, Ivan Csiszar, Tim Schmit, Bob Kuligowski, Steve Ackerman

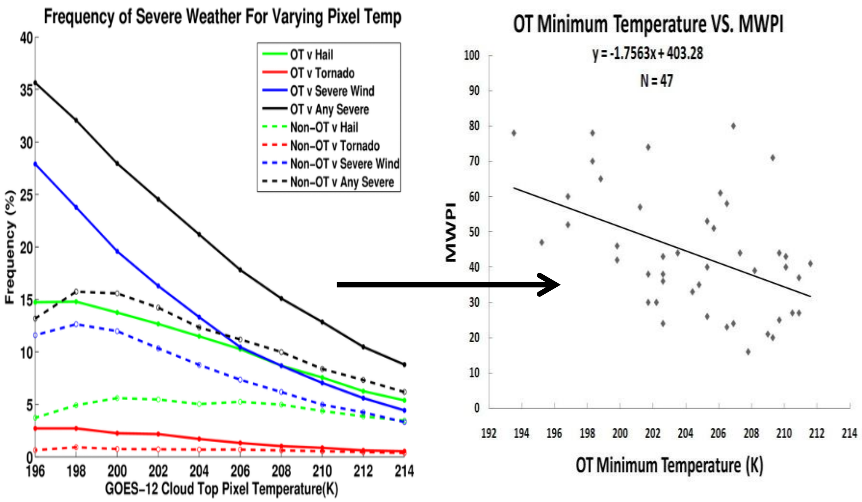
- Volunteers still needed. Filming is going on each day during exhibit hours. Will take approximately 30 minutes of your time to complete.

For more information:

18th Conference on Satellite Meteorology:
Poster – "Microburst nowcasting applications of GOES"
Kenneth L. Pryor

- Composite microburst image development
  - GOES sounder Microburst Windspeed Potential Index (MWPI), GOES imager brightness temperature difference (BTD), and radar imagery can be combined with McIDAS-V.
  - Demonstrated effectiveness for a severe downburst storm over S.E. Virginia in May 2011.
- Overshooting top intercomparison study
  - Close correspondence between the location of overshooting tops, proximate MWPI values, and the location of observed downburst winds.



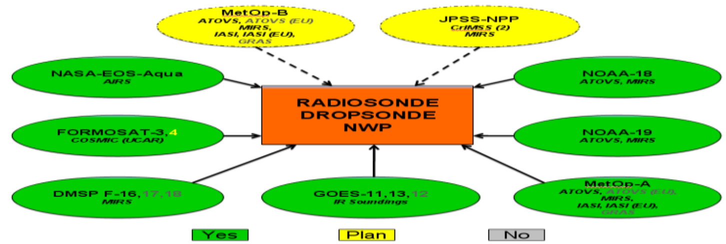


18th Conference on SatMet … Poster (Monday PM; 169):

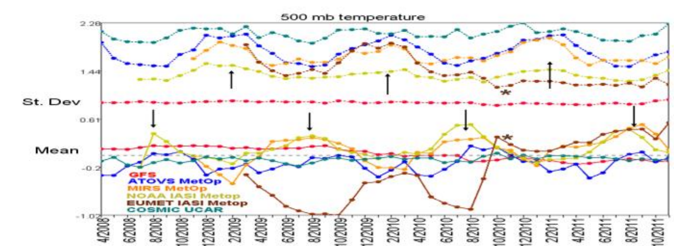
Satellite and Upper Air Weather Product Inter-comparisons Using the NOAA Products Validation System (NPROVS)

Reale (STAR)
Sun, Pettey, Tilley (IMSG)

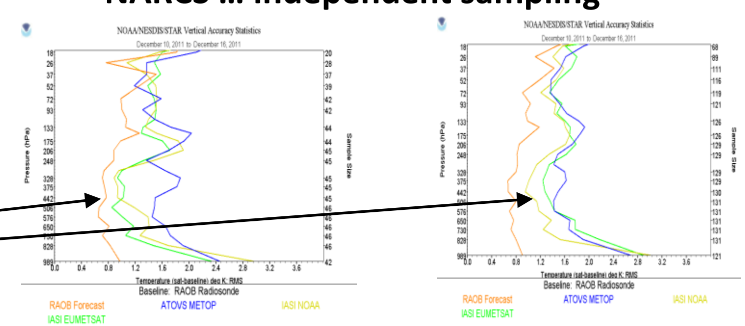
- NPROVS
  - Runs every day
  - Centralized Inter-comparison
- Long Term Monitor (NARCS)
  - Independent Samples
  - Seasonal, System Change Impacts
    - IASI, MIRS
    - IASI EU
- Shorter Term Monitoring (PDISP)
  - Common Samples
  - Yield



NPROVS schematic



NARCS … independent sampling



PDISP … common sampling

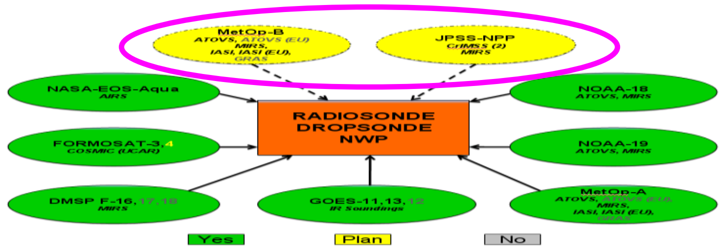
Demo at NOAA Exhibit !

8th Symposium on Future Sat. Systems … Post / Oral: (Wed/Thurs PM)

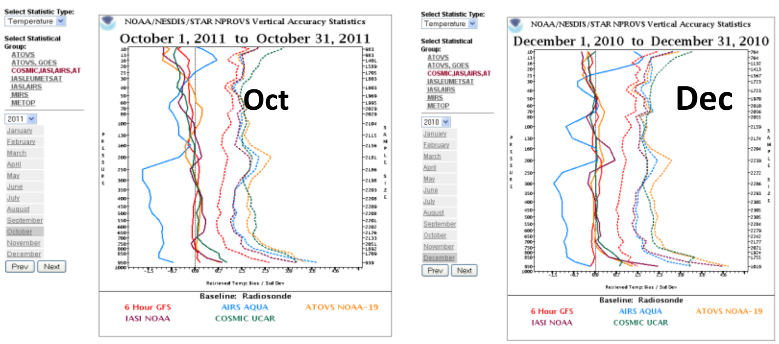
Satellite Product Inter-comparisons Using (NPROVS) and Plans for NPP Sounding Cal/val Support

Reale (STAR)
Sun, Pettey, Tilley, Divakarla (IMSG)

- **Expansion for NPP**
  - IDPS, NUCAPS, MiRS …
  - First guess, ATMS only …
- **Issues**
  - 42 levels (IPDS) vs 100 levels (NUCAPS)
  - averaging strategy over 1km layers
  - Quality Control … *new rules* !
  - Meeting spec (clear vs cloudy, T vs H20 …)
- **GCOS Reference Upper Air Network (GRUAN)**
  - Uncertainty; product, mismatch… (Sun 509)
  - Site Atmospheric State Best Estimate (SASBE) *at NPP overpass* … Dave Tobin (CIMSS), John Dykema (Harvard)
  - ICM-4, Marc, Japan



NPROVS schematic



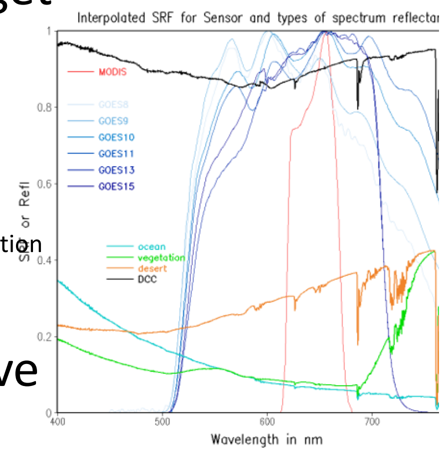
Initially 15 stations, envisaged to be a network of 30-40 sites across the globe

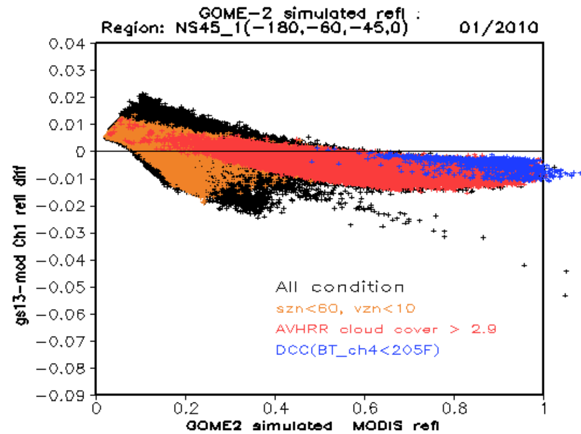
Demo at NOAA Exhibit !

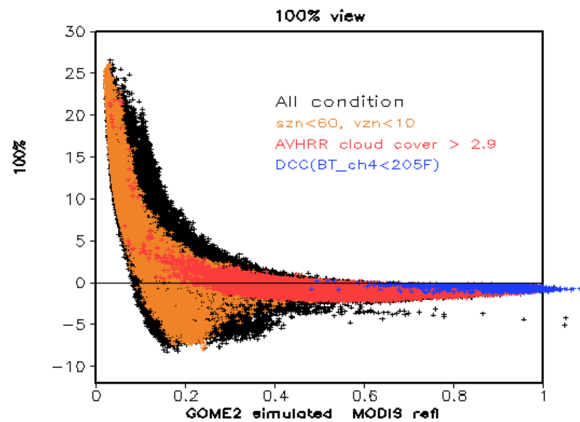
Target Characterization for Vicarious Calibration of Visible Channels of NOAA Satellite Instruments (Oral)

Xiangqian Wu, H. Qian and F. Yu

- Calibration accuracy of the vicarious calibration relies on the accurate target characterization
  - Spatial: homogeneous
  - Temporal: long-term stable
  - Spectral: stable
    - Important for sensor inter-calibration and absolute calibration





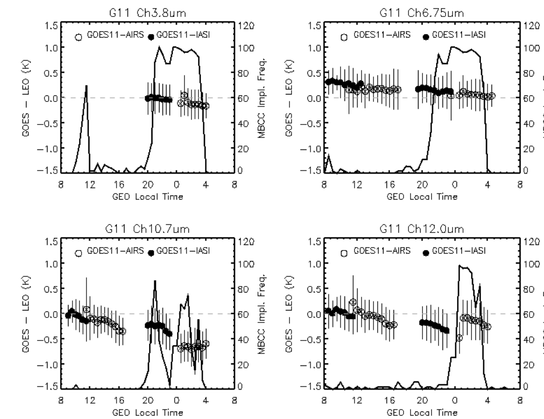


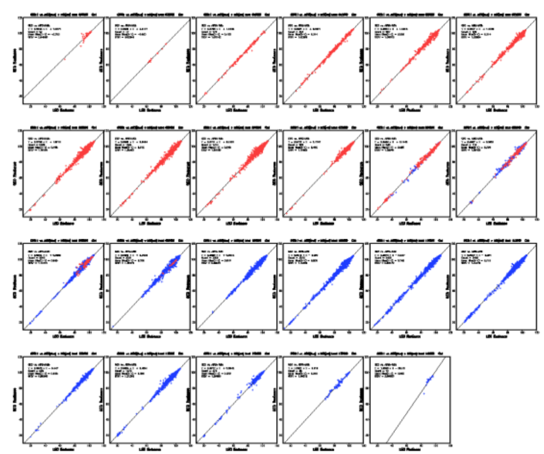
- Spectral calibration of deep convective cloud (DCC) with GOME-2
  - DCC available at the tropical regions over the world
  - Relatively stable spectral reflectance
  - Slight scene dependent reflectance difference
  - Using Aqua MODIS Band 1 as reference, calibration uncertainty caused by the SRF difference of GOES12 Imager Ch1 is less than 1%.

(Oral) Time-dependent GSICS Calibration Correction for the three-axis stabilized GEO satellite IR channels

Fangfang Yu, Xiangqian Wu and Haifeng Qian

- All the current 3-axis stabilized GEO IR channels experience midnight calibration anomaly
  - Mainly caused by the blackbody (BB) reflectance of excessive background flux to the detectors in the BB calibration event
  - Last 6-8 hours, centered around the satellite midnight
- A remedial algorithm, midnight blackbody calibration correction (MBCC) is applied, yet with calibration residual
  - Residual dependent on the implementation duration and frequency
  - Change with time (season and long-term) and channels
- Empirical correction to IASI standard with the GSICS GEO-LEO collocation data
  - linear regression at half-hour bins with monthly data





Advanced Satellite Products Branch and CIMSS

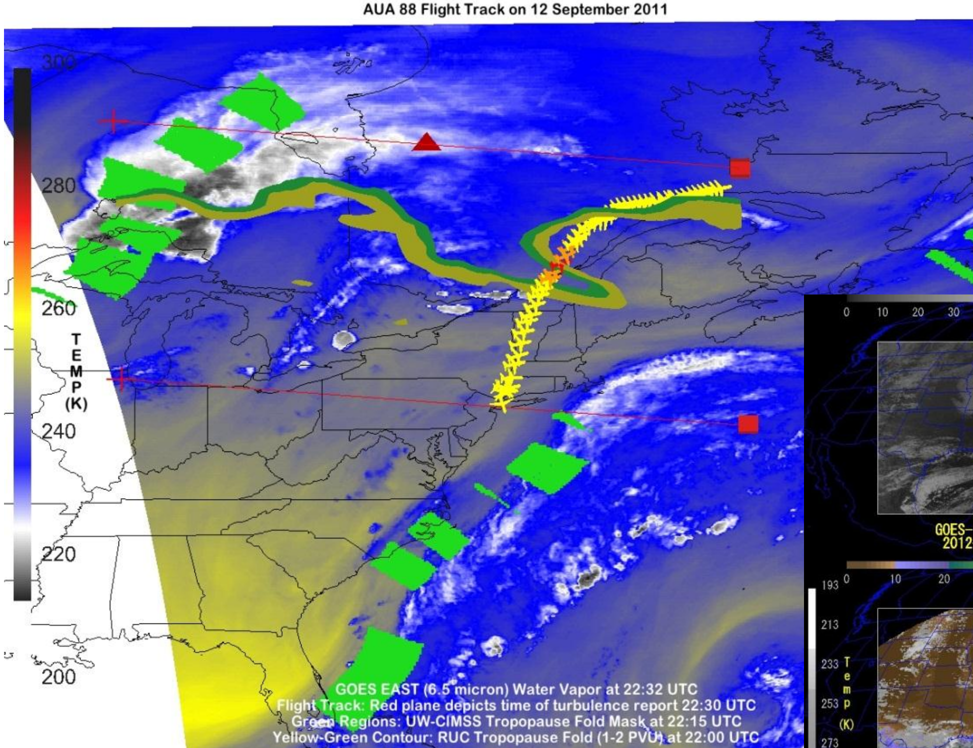
- J. Feltz
- Huang (2)
- Lee
- J. Li (2)
- Z. Li
- Pavolonis (2)
- Schmit
- Zhang
- Zheng

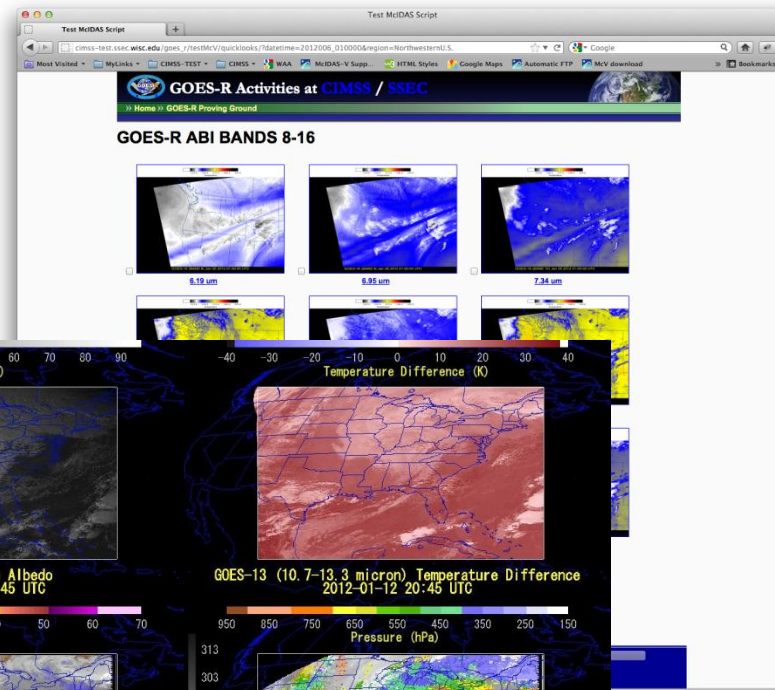
GOES-R Proving Ground Aviation Weather Products Displayed in McIDAS-V

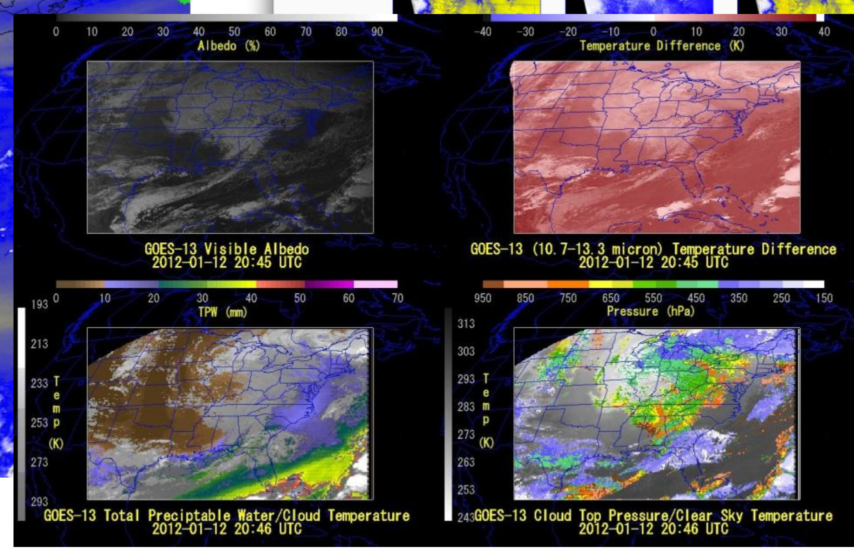
Joleen Feltz, Tim Schmit*, Kaba Bah,
Tom Rink, Tom Achtor

Cooperative Institute for Meteorological Satellite Studies (CIMSS) University of Wisconsin-Madison
*NOAA/NESDIS/Satellite Applications and Research
Advanced Satellite Products Branch (ASPB)

AUA 88 Flight Track on 12 September 2011



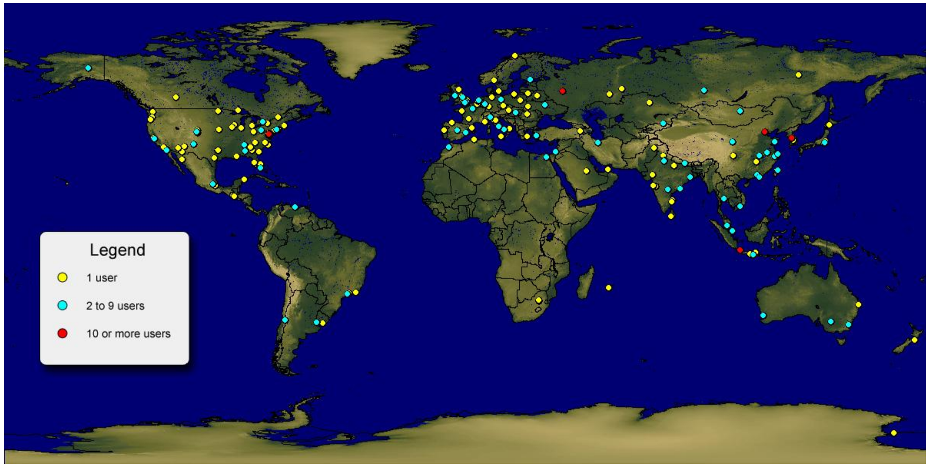




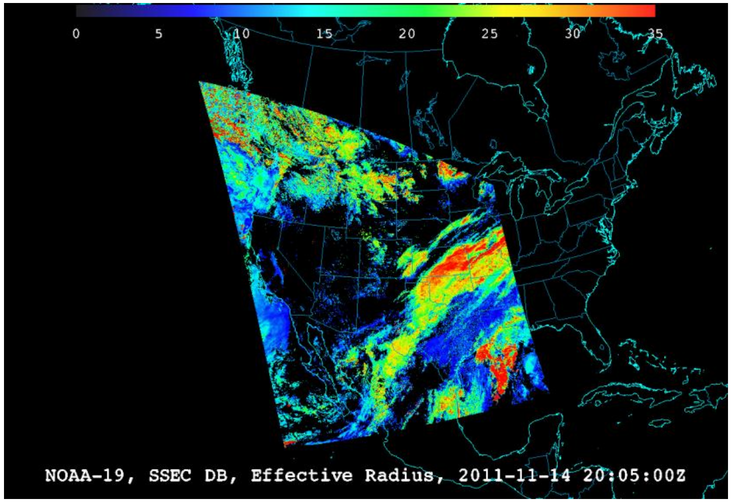
Eighth Annual Symposium on Future Operational Environmental Satellite Systems:

Oral – **Community Satellite Processing Package (CSPP)**

- Proposal accepted by JPSS project in fall 2011.
- VIIRS, CrIS & ATMS RDR to SDR S/W released to Beta testers on 21 December, 2011
- VIIRS, CrIS, & ATMS SDR and EDR algorithms to the Direct Broadcast community in Jan 2012 (NPP DB starts on Jan 11).
- Will also release CLAVR-X from Andy Heidinger for AVHRR Level-2 products (future version will support MODIS and VIIRS).
- Will also release IASI retrieval algorithm from Bill Smith and Elisabeth Weisz.



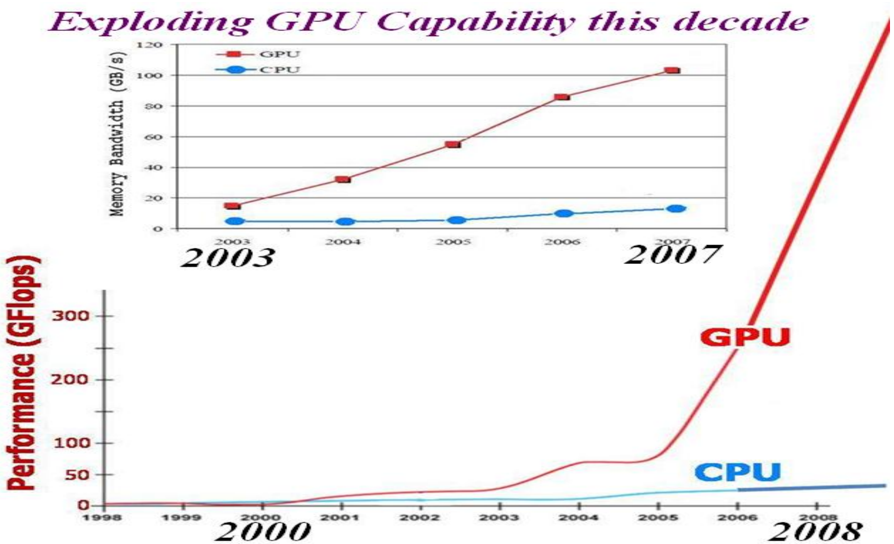
Potential CSPP Users (>1000 IMAPP users in 65 countries)



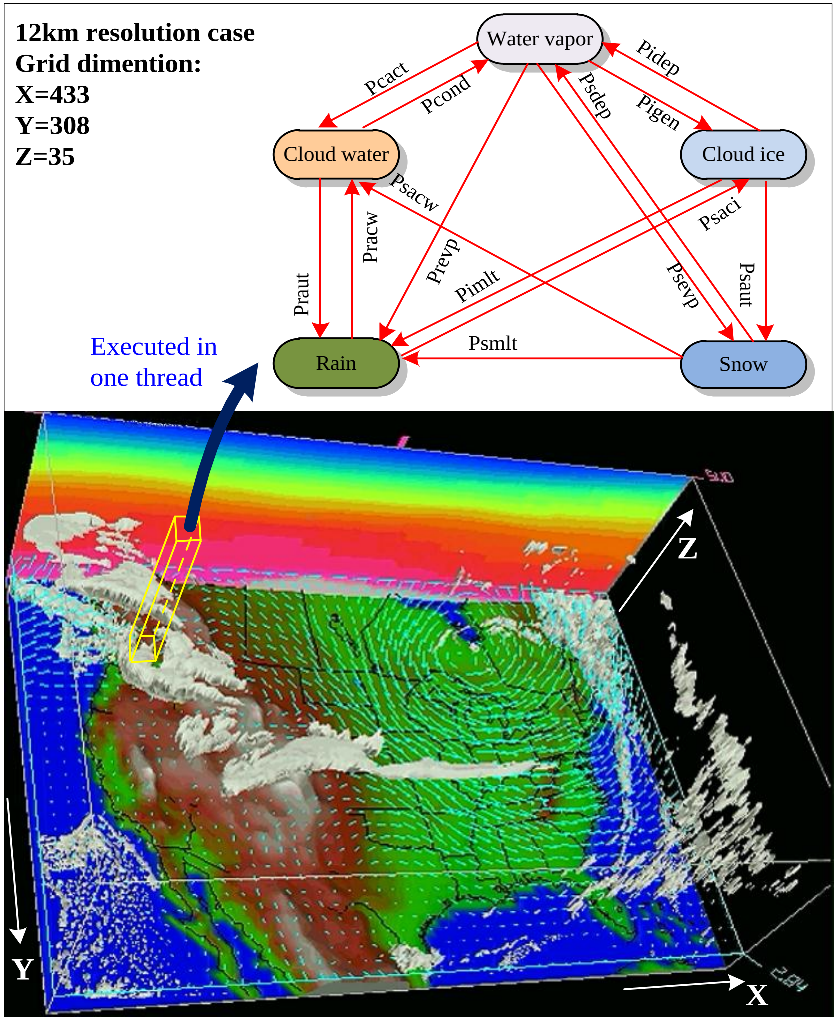
CLAVR-X Cloud Effective Radius from NOAA-19 AVHRR

16th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)

Progress and Plan for the Development of a Research-to-Operation High-Performance and Low-Cost GPU-Based Satellite Data Processing and Application Enabling Technology



WRF Module Name	GPU Speedup
WSM6 Cloud Microphysics	475x
WSM5 Cloud Microphysics	350x
WDM5 Cloud Microphysics	206x
Eta Cloud Microphysics	252x
Purdue-Lin Cloud Microphysics	598x
SBU 5-Class Cloud Microphysics	693x
Kessler Cloud Microphysics	435x
Dudhia Shortwave Radiance	409x
Goddard Shortwave Radiance	142x
BMJ Convective Scheme	105x

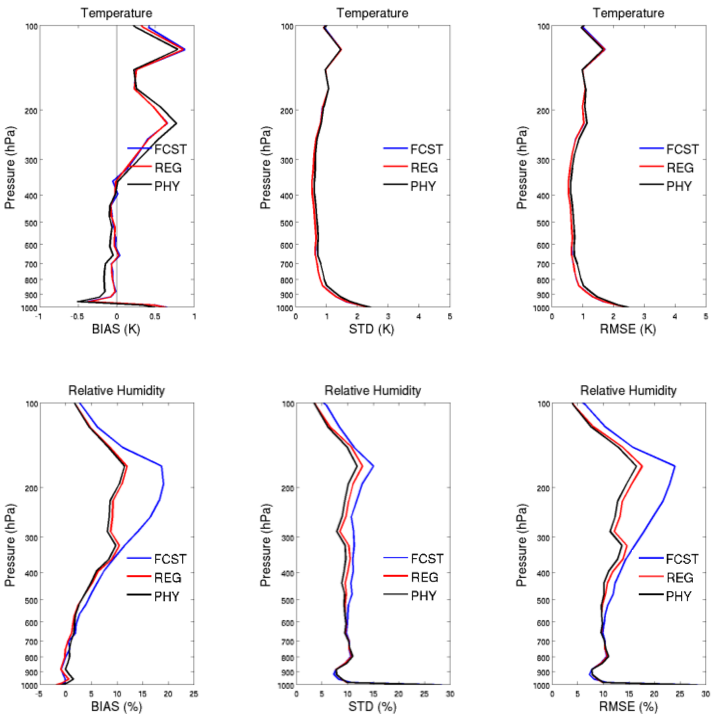


Validation of GOES-R LAP algorithm with GOES-13 Sounder and Validation Tool with deep dive capability

P.319

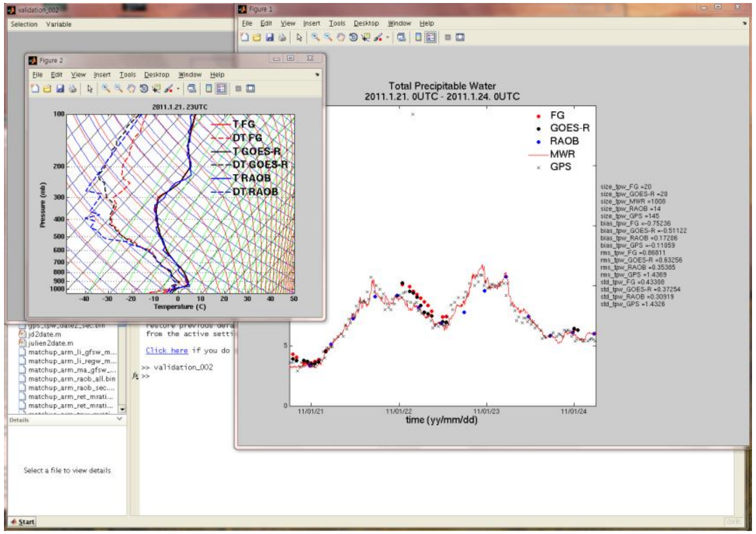
Yong-Keun Lee, Zhenglong Li, and Jun Li
CIMSS, UW-Madison

GOES-R LAP algorithm application on GOES-13 measurement



Statistical values (BIAS, RMSE, and STD) of GFS (FCST, blue), regressed profiles (REG, red) and retrieved profiles (PHY, black) from GOES-R LAP algorithm compared to radiosonde measurement.
Upper panel: Temperature, Lower panel: Relative humidity

Validation Tool of GOES-R LAP algorithm with deep dive capability

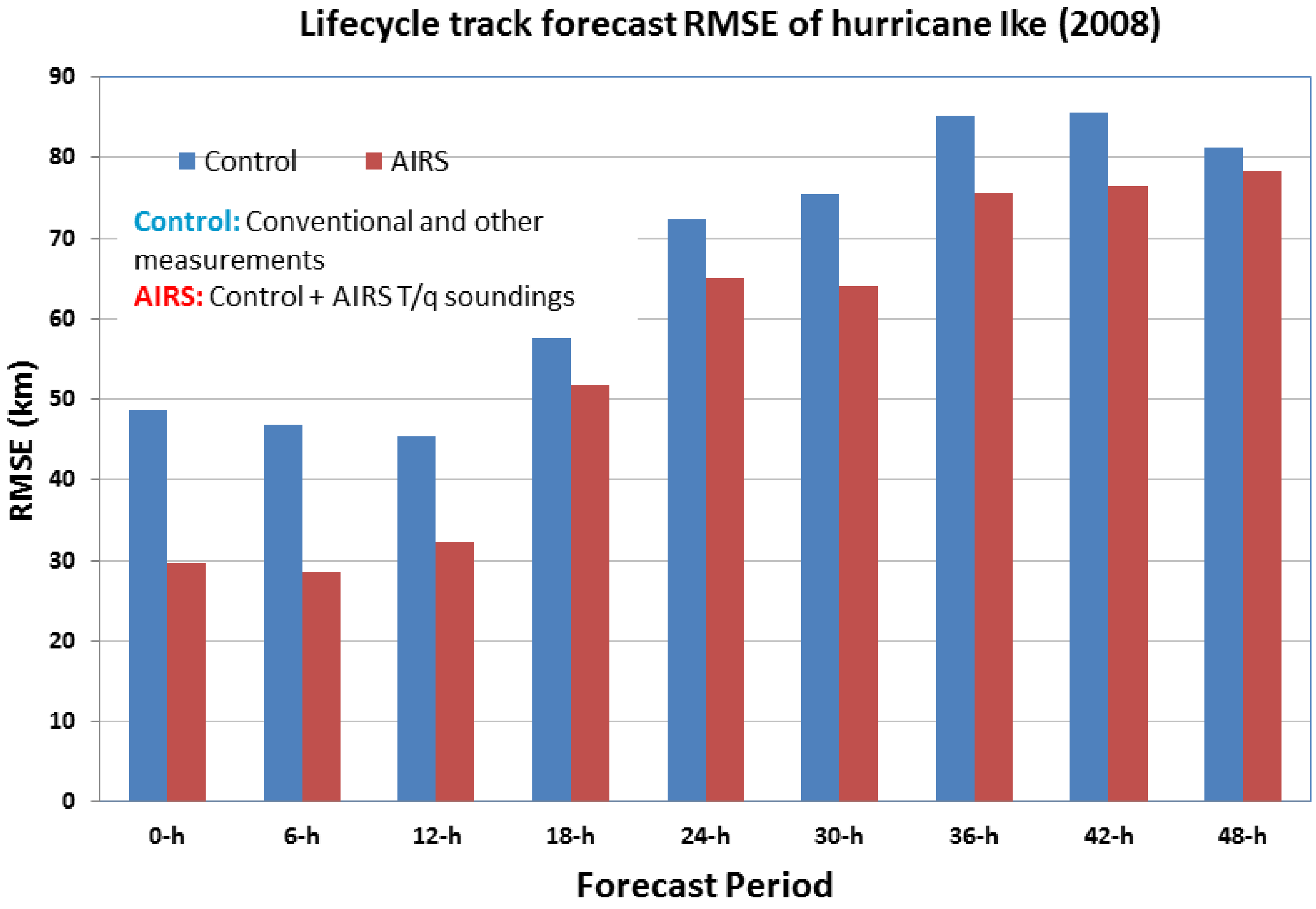


Deep dive capability is available in Validation Tool. Deep dive capability is shown in Time series of 1-dimensional variables, TPW and 5 stability indices.
Time series of 1-demnsional variable will provide the sizes of the data, and their statistical values (bias, rms, std) compared to the truth.
Once "Time series" and one of six 1-dimensional variables are selected, Validation Tool will show the time series figure and ask if the user wants to see the atmospheric environment for any specific time (upto 3 specific times). If the user decide to see the detail of any specific time, Validation Tool will show skew-T diagram of temperature and dewpoint temperature at corresponding time.

5.2

Improving high impact weather forecasts through assimilating the satellite advanced infrared soundings in regional NWP models

Jun Li (CIMSS), Jinlong Li (CIMSS), Hui Liu (NCAR), Jing Zheng (CIMSS), and Tim Schmit (STAR)



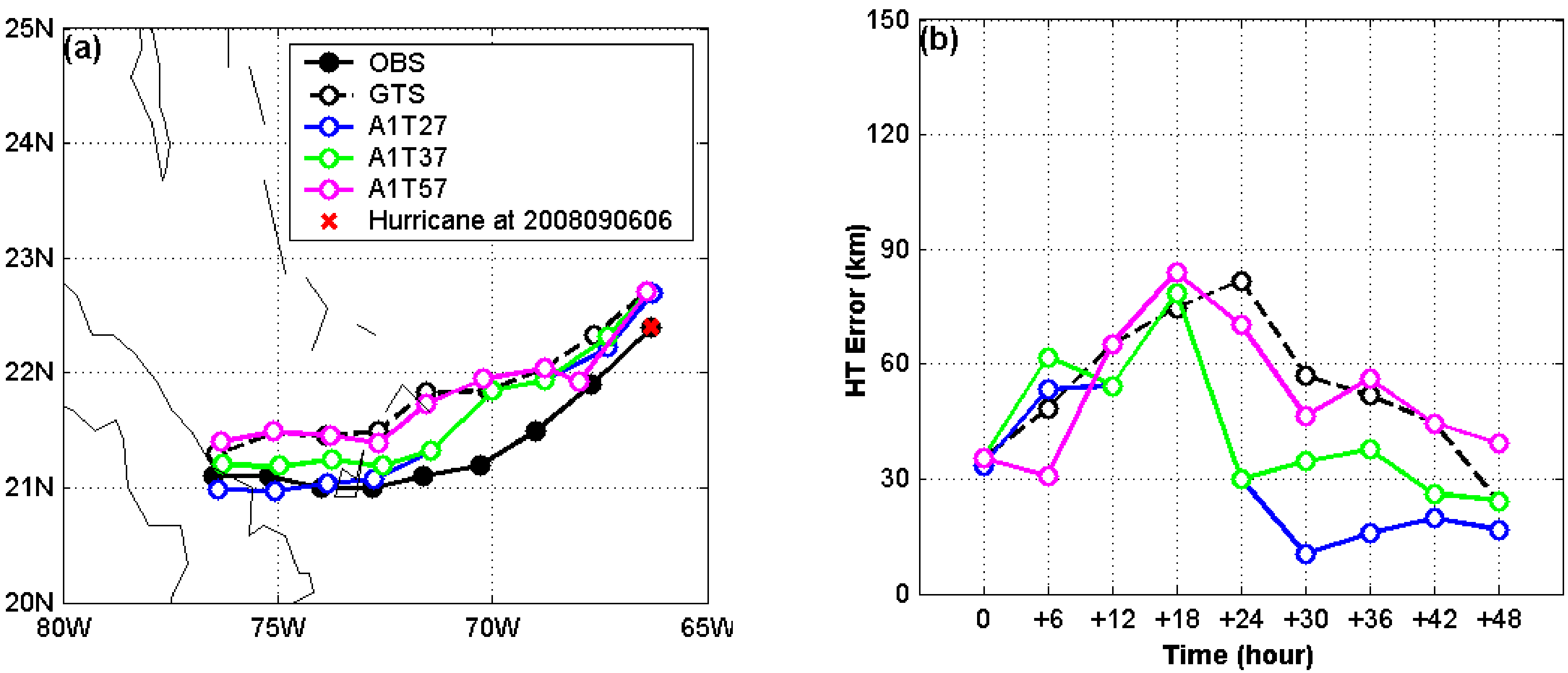
AIRS single FOV soundings in clear skies are used. WRF/3DVAR forecasting and assimilation system with 12 km resolution is used. Assimilation is done every 6 hours. 0-h is from analysis, others are forecasts.

TJ16.2

Evaluation and application of JPSS products through assimilation in regional NWP models

Jun Li (CIMSS), Mitch Goldberg (JPSS), Jinlong Li (CIMSS), Jing Zheng (CIMSS),
Chris Barnet (STAR), Lihang Zhou (STAR), and Tim Schmit (STAR)

CrIMSS provides not only the high vertical resolution information but also good spatial information. In-situ measurements (e.g., radiosondes) provide less spatial information that is also needed for validation purposes. An impact study through assimilating NPP/JPSS soundings in regional NWP models can help the evaluation of both the spatial and vertical information, as well as evaluation of the soundings over the ocean and areas where in-situ measurements are rare. AIRS soundings are used as proxy at this moment.



Hurricane Ike (2008) 48 – hour track forecasts (left) and track error (right). The conventional data (GTS), atmospheric temperatures between 200 – 700 hPa (A1T27), 300 – 700 hPa (A1T37), 500 – 700 hPa (A1T57) from AIRS are assimilated, respectively. Temperatures between 200 – 700 hPa provide best track forecast in this case. The GTS data are always included when AIRS soundings are assimilated.

A fast physical algorithm for hyperspectral sounding retrieval

Zhenglong Li[#], Jun Li[#], Timothy J. Schmit[@] and M. Paul Menzel[#]
[#]Cooperative Institute for Meteorological Satellite Studies (CIMSS), University of Wisconsin-Madison
[@]Center for Satellite Applications and Research, NESDIS
Email: zhenglong.li@ssec.wisc.edu

- A new fast physical algorithm to simultaneously retrieve T/Q/O3/ε/T_s using hyperspectral infrared (HIR) radiance measurements is developed by performing retrieval in Eigenvector space of radiances
- The new algorithm reduces the computation by 83 %
- The new algorithm could improve the moisture retrieval quality.

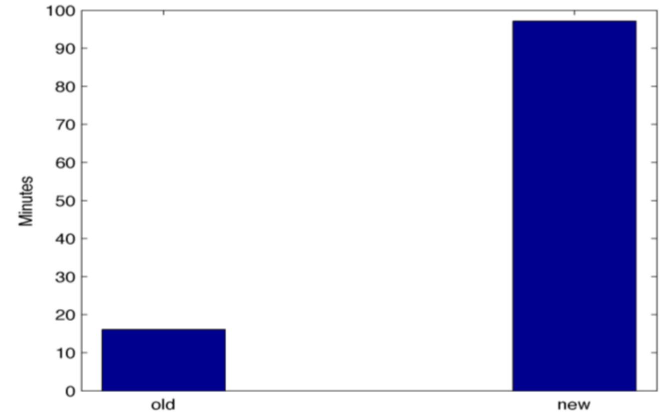


Figure 1. Time to process the IASI granule of 20080901003559 using the old and the new techniques.

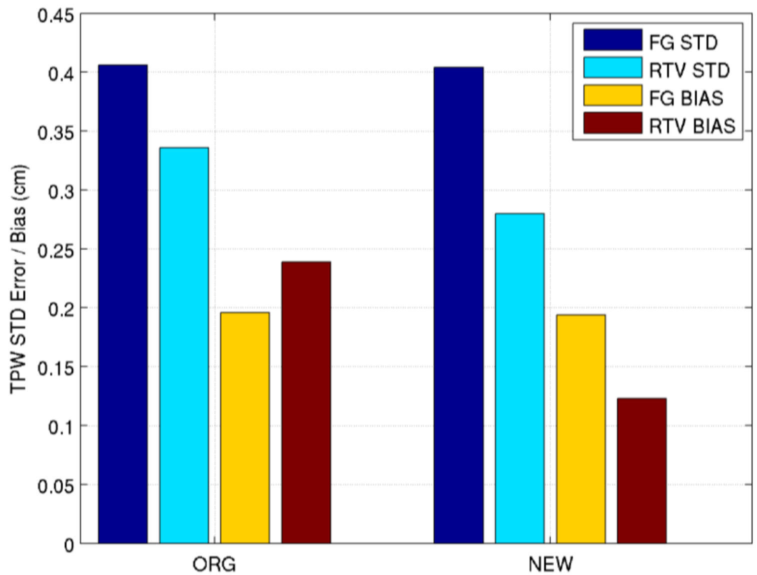


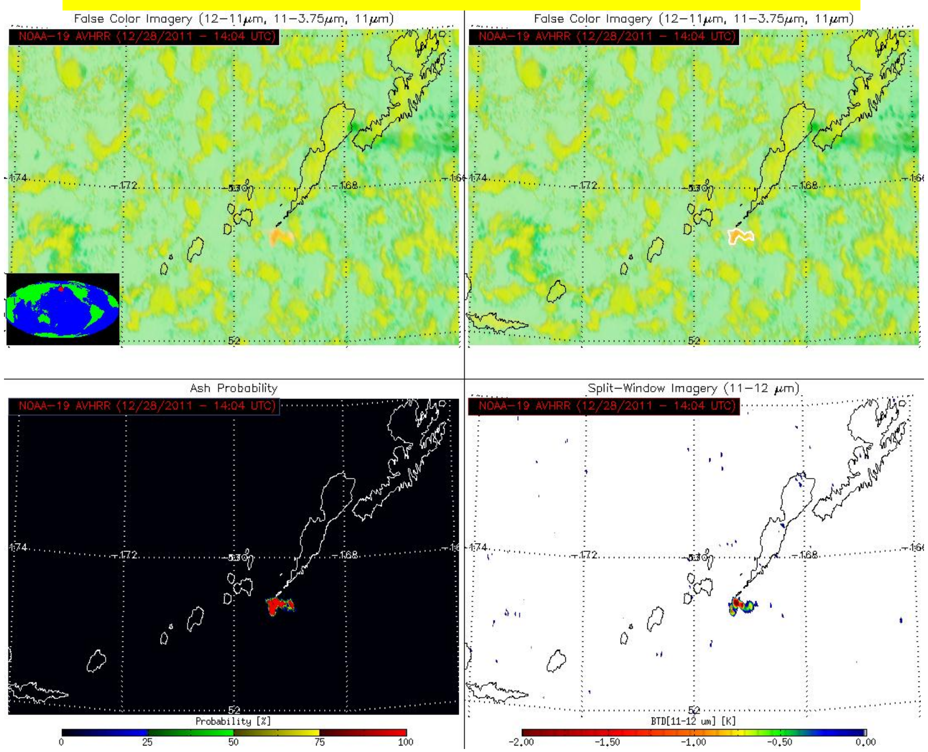
Figure 2. AIRS TPW retrievals validated using ECMWF of Granule 176 on Sep 6 2008.

New Quantitative Volcanic Cloud and Fog Products for GOES-R

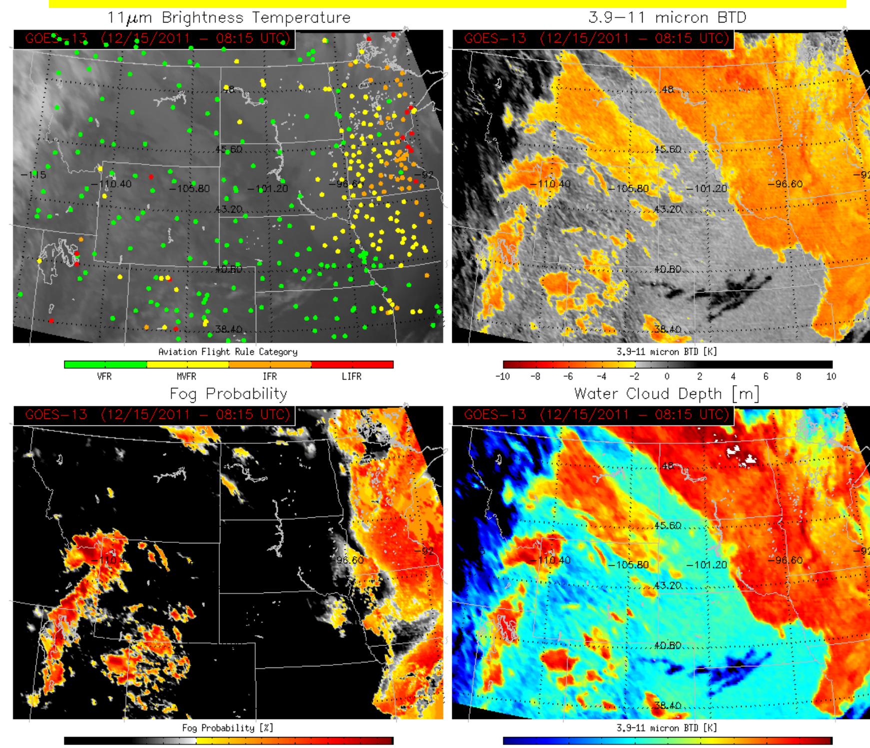
M. Pavolonis (NOAA/NESDIS/STAR), C. Calvert (CIMSS), and J. Sieglaff (CIMSS)

- This talk will feature examples on how satellites (GOES-R in particular) can be used to quantitatively characterize hazards such as volcanic clouds and low cloud/fog
- Topics: automated volcanic cloud alerts, quantifying volcanic cloud properties, assessing the probability of low cloud ceilings

Automated Volcanic Cloud Alerts



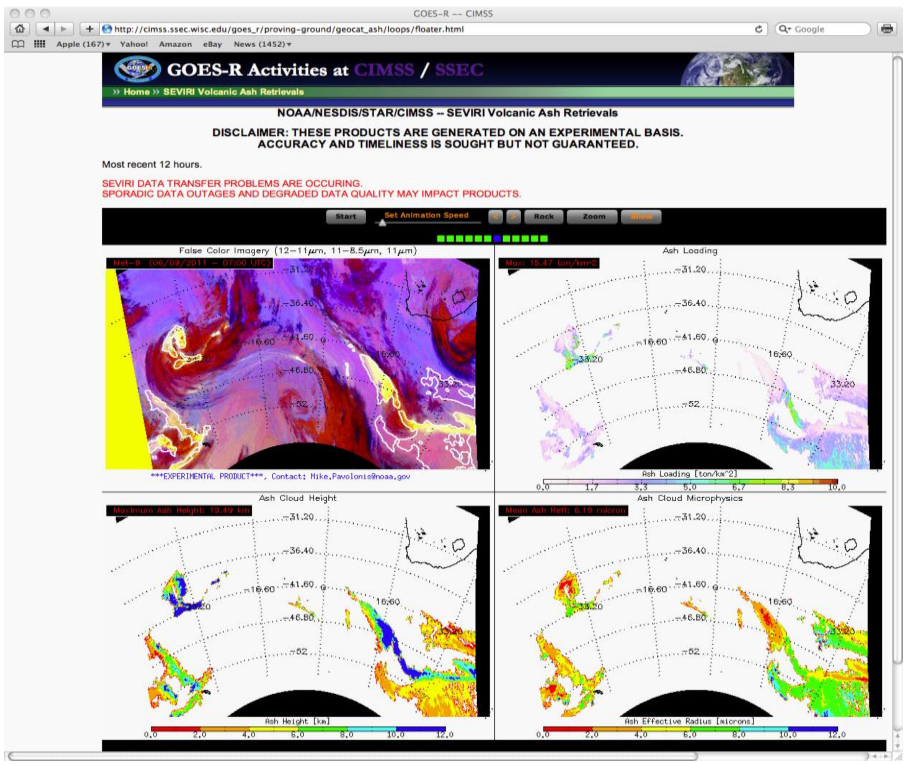
Identifying Low cloud Ceilings

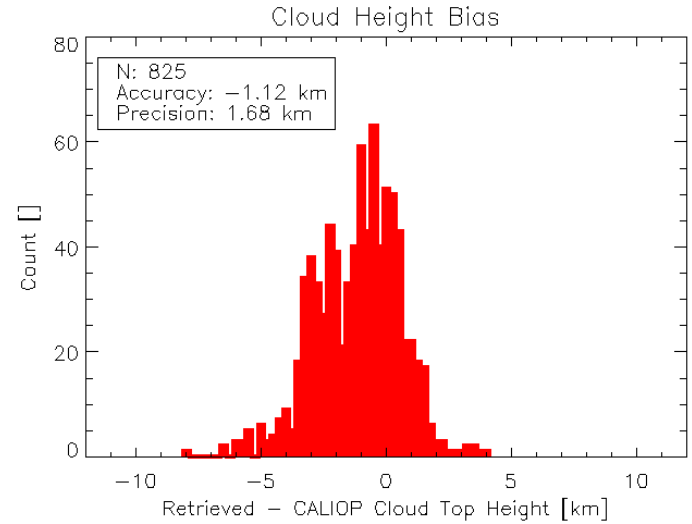


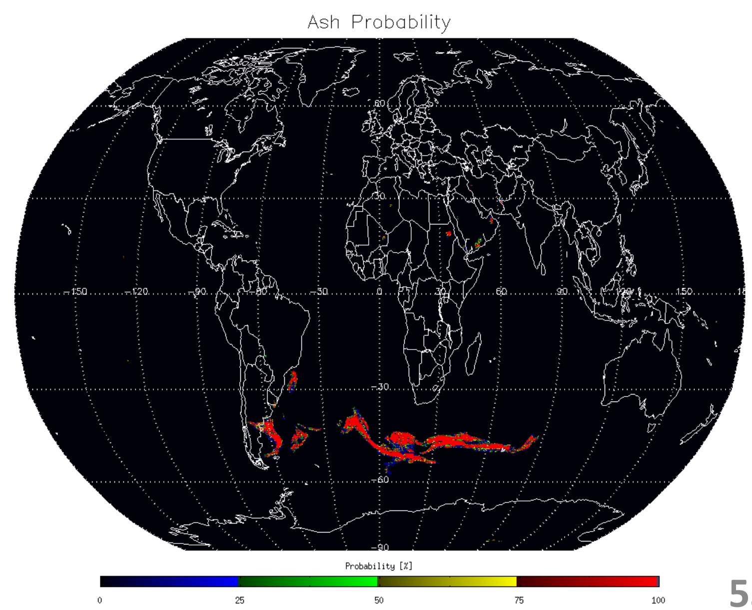
Satellite Retrievals of Volcanic Ash Cloud Properties:
Evaluation of near Real Time Results and Suggestions for Improving Operational Satellite Products

M. Pavolonis (NOAA/NESDIS/STAR) and J. Sieglaff (CIMSS)

- **Overview of satellite-based volcanic cloud products produced in near real-time**
- **Validation efforts**
- **Working towards improving satellite-based volcanic ash products**







8th Annual Symposium on
Future Operational Environmental Satellite Systems:

Oral – "The ABI on GOES-R"

Tim Schmit and colleagues

- Instrument Noise
  - Comparable
  - With finer resolutions
- Image Navigation
  - ~ 2 times improved
- Spectral
  - ~ 3 times improved
- Spatial
  - 4 times improved
- Temporal
  - 5 times improved

ABI Band	Freq (um)	Spec (K)	Worst Case Estimate*	GOES-12 Band	Freq (um)	Spec (K)	Measured (PLT)
7	3.9	0.1	0.10	2	3.9	1.4	0.13
8	6.185	0.1	0.06				
9	6.95	0.1	0.09	3	6.5	1.0	0.15
10	7.34	0.1	0.11				
11	8.5	0.1	0.04				
12	9.61	0.1	0.04				
13	10.35	0.1	0.05				
14	11.2	0.1	0.04	4	10.7	0.35	0.11
15	12.3	0.1	0.05	5	12.0	0.35	-
16	13.3	0.3	0.14	6	13.3	0.32	0.19

8th Annual Symposium on Future Operational Environmental Satellite Systems:

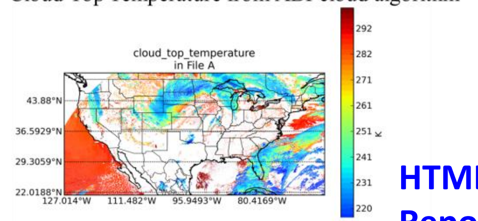
Poster – "GRAFIIR: An Efficient End-to-End GOES-R ABI Product Performance Analysis, Implementation, and Validation System"

UW-Madison/CIMSS: Hong Zhang, Mat Gunshor, Allen Huang, Eva Schiffer, William Straka…

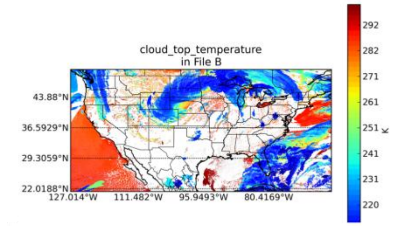
- ABI Waiver analysis
  - Impact of instrument effects on products and their ability to meet reqs.
- ABI Instrument Effects
  - Simulating effects in data
    - (noise, nav., cal.,…)
- "Connecting the dots"
    - Product algorithms, proxy data, frameworks,…
- GOES-R ABI Validation
  - Clouds, soundings, winds, etc; implementation

GRAFIIR Does Cal/Val with Glance

Cloud Top Temperature from ABI cloud algorithm

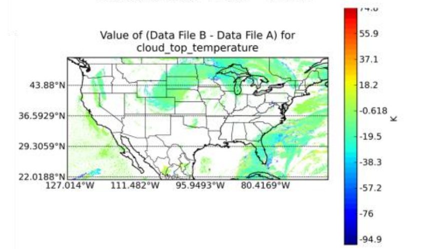


Cloud Top Temperature from WRF



HTML Report

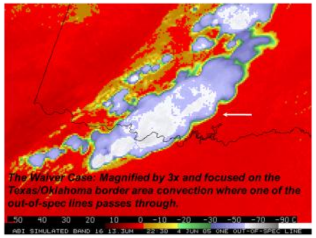
Difference: WRF - ABI

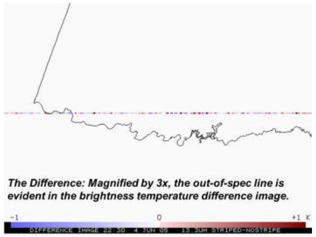


Statistics from Glance:

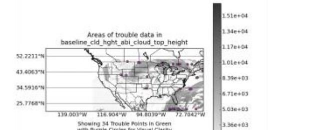
Numerical Comparison Statistics correlation : 0.8433
diff_outside_epsilon_count : 965566
diff_outside_epsilon_fraction : 1
max_diff : 98.64
mean_diff : 12.69
median_diff : 9.739
mismatch_points_count : 1359122
mismatch_points_fraction : 0.4191
perfect_match_count : 0
perfect_match_fraction : 0
r-squared correlation : 0.7112
rms_diff : 18.97
std_diff : 14.11

GRAFIIR Responds to ABI Waivers:





Product	Trouble Points	Trouble Point Fraction	Max Difference	Mean Difference
Height (500m)	34	1.048e-05	6,456	0.2491
Pressure (50hPa)	14	4.317e-06	280.3	0.01163
Temperature (3K)	50	1.542e-05	47.47	0.002161
Cloud Mask	0	0	0	0
Cloud Phase	0	0	0	0
Cloud Type	0	0	0	0



Pixels with differences exceeding 500m are marked on the image.

5.4

16th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)

Assimilating AIRS Soundings with WRF/3DVAR for Hurricane Forecast Improvement

Jing Zheng[1], Jun Li[1], Jinlong Li[1], Timothy J. Schmit[2], Zhiquan Liu[3]

[1]*Cooperative Institute for Meteorological Satellite Studies (CIMSS), University of Wisconsin—Madison*

[2]*Center for Satellite Applications and Research, NESDIS/NOAA*

[3]*National Center for Atmospheric Research (NCAR)*

- Satellite products, such as T and Q, can be directly assimilated in the NWP models to capture the initial conditions, thus to improve the forecasts.
- Quality control is the essential step to start with.
- Results from the experiments with AIRS profiles from single field-of-view (SFOV) research product show some positive impacts and encouraging improvements on the HT, SLP and SPD forecasts for Hurricane Ike (2008).

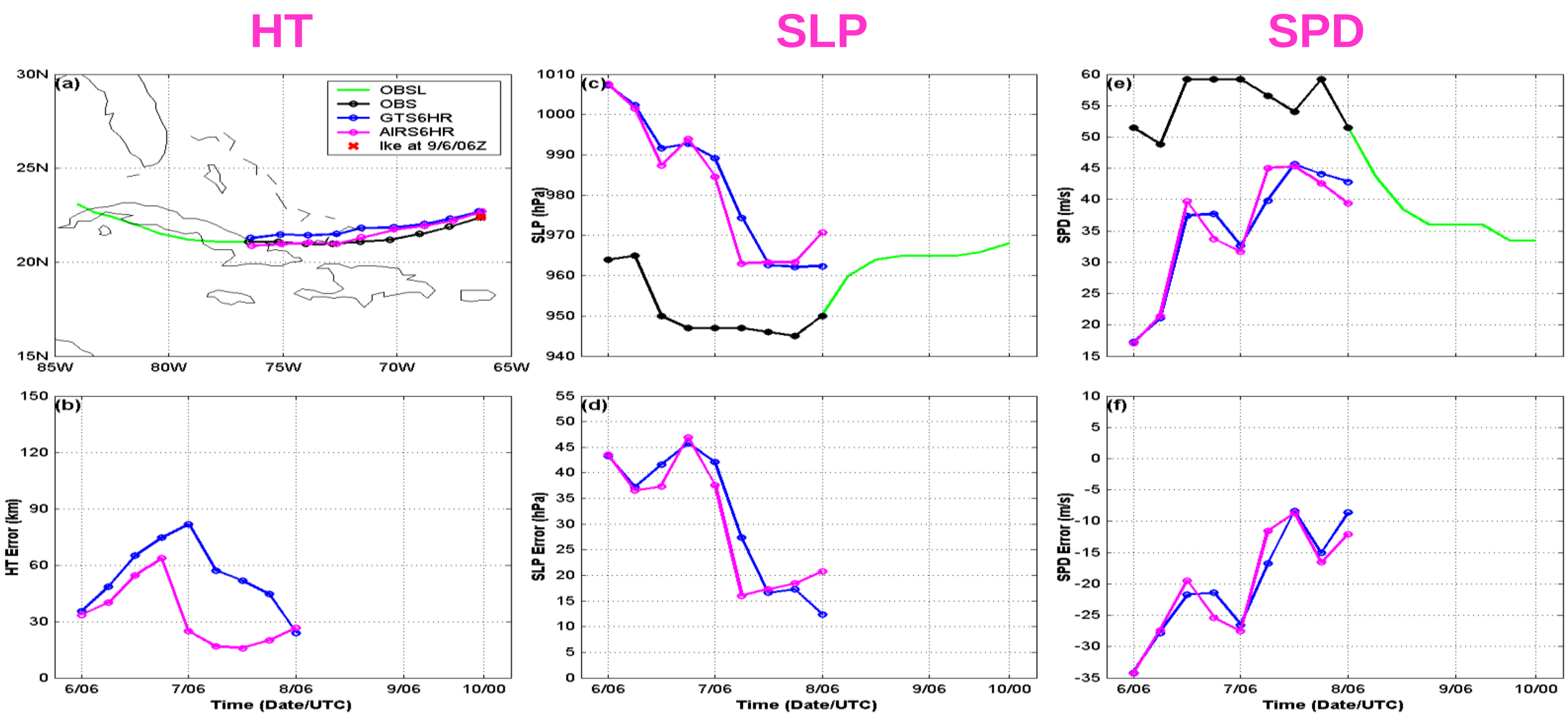


Figure 1. Observed and simulated 48-hour hurricane track (HT), minimum sea level pressure (SLP), maximum low-level wind speed (SPD) and their biases.

Regional and Mesoscale Modelling Branch and CIRA

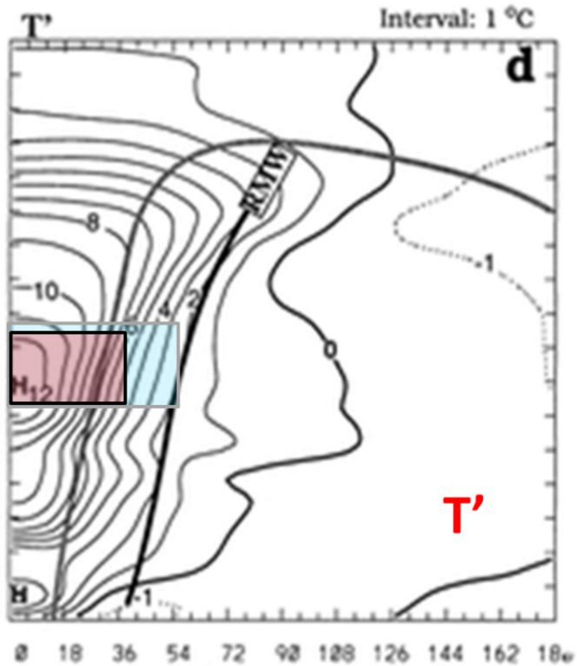
- DeMaria
- Hillger (2)
- Lindsey (2)

8th Symposium on Future Operational Satellite Systems:

Oral Presentation – Applications of ATMS/CrIS Soundings to Tropical Cyclone Analysis and Forecasting

Mark DeMaria and John Knaff (NOAA/STAR)
Andrea Schumacher, Jack Dostalek, Robert DeMaria, Dan Welsh (CIRA/CSU)

- **Hurricane Applications of ATMS/CrIS soundings**
- **Conversion of operational hurricane products from AMSU**
  - **Intensity/structure estimates**
- **New applications for intensity forecasting**
- **AMSU examples from Hurricane Irene**



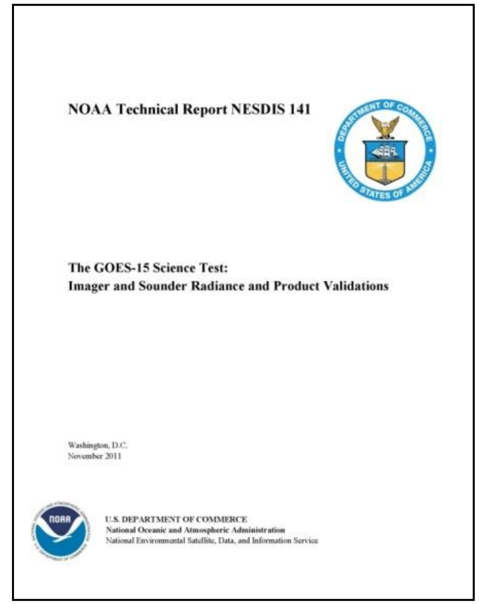
Caption: r-z cross section of hurricane warm core from model simulation and AMSU (blue) and ATMS (red) footprint size near nadir

18th Conference on Satellite Meteorology, Oceanography, and Climatology:

Oral – “GOES Science Tests: Results of the last two of the current GOES series”

Don Hillger and Tim Schmit

- *NOAA Technical Report NESDIS 141* released
  http://rammb.cira.colostate.edu/projects/goes-p/
- Hillger, D.W., and T.J. Schmit, 2011: Imager and Sounder Radiance and Product Validation for the GOES-15 Science Test, NOAA Technical Report, NESDIS 141, (November), 101 pp.
- Report contributors are noted on the inside cover page
- The Science Test part of Post Launch Testing for GOES-15 occurred in Aug/Sep 2010
- Science Test coordination involved CIRA, CIMSS, NASA/MSFC, SAB, and OSPO (and others)
- Several GOES-15 instrument-related issues were addressed
- Data flow was tested to the AWIPS/NWS level
- Comparisons with AIRS and IASI have found a bias of Imager bands 3 and 6; subsequently mitigated
- Unique 1-minute rapid scan imagery acquired
- GOES-15 went operational on 6 December 2011
- Recommendation for a one-year checkout of GOES-R Advanced Baseline Imager (ABI)



NOAA Technical Report NESDIS 141

The GOES-15 Science Test:
Imager and Sounder Radiance and Product Validations

Washington, D.C.
November 2011

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service

NOAA Technical Report NESDIS 141

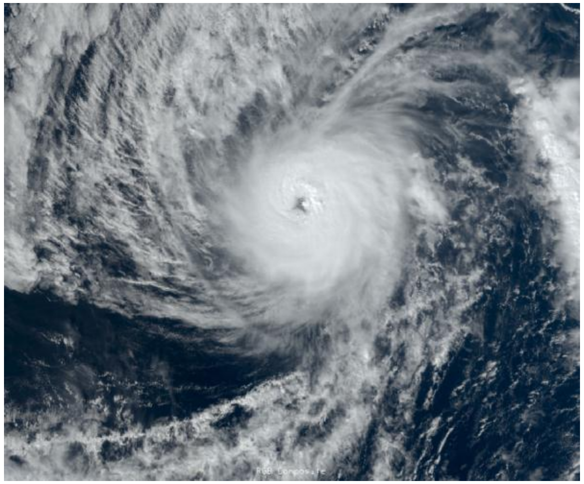
Significance: The NOAA Science test is a critical function to ensure the GOES-P/15 Imager and Sounder are ultimately operational. There are many goals of the Science Test, including to assess the GOES-15 data, generate products, investigate instrument changes, and collect unique rapid-scan imagery.

8th Symposium on Future Operational Satellite Systems:

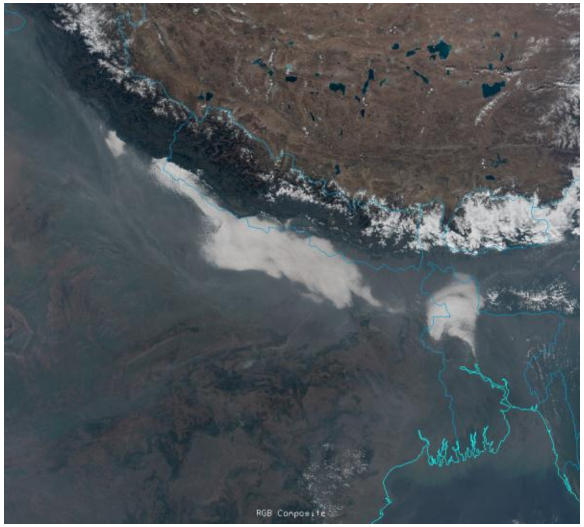
Oral – "First images and products from VIIRS on NPP"

Don Hillger (NOAA/STAR) and Tom Kopp (Aerospace)

- **VIIRS EDR Imagery and Visualization Team** (includes scientists as several sites: CIRA, CIMSS, NRL, NGDC, NIC, Aerospace, AFWA, and Northrop Grumman)
- VIIRS includes:
  - 5 high-resolution (375 m) "I" bands
  - 16 lower-resolution (750 m) "M" bands
  - 1 day-night band (375 m)
- Checkout of **NPP VIIRS Imagery** (qualitatively and quantitatively)
  - Visible/reflective imagery
  - Infrared/thermal imagery
  - Day Night Band (DNB), aka near-constant contrast (NCC) imagery
- First imagery examples, including **true-color imagery** of interesting phenomena



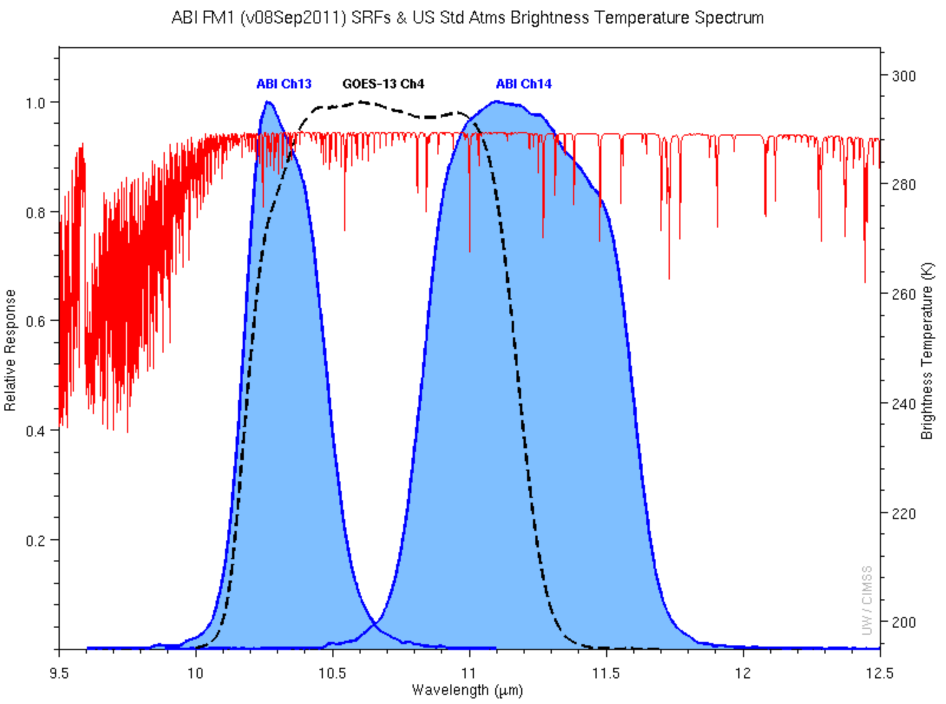
True-color (RGB) of Hurricane Kenneth from 22 November 2011



True-color (RGB) of smog south of the Himalayas from 14 December 2011

8th Annual Symposium on Future Operational Environmental Satellite Systems:
Oral Presentation – "The 10.35 µm Band: A More Appropriate Window Band for the GOES-R ABI Than 11.2 µm?"
D. Lindsey, W. MacKenzie, Jr., C. Jewett, T. Schmit, M. Gunshor, L. Grasso

- The ABI will have 2 window IR bands: 10.35 and 11.2 µm
  - What are the relative advantages of each?
- The 11.2 µm band has more water vapor absorption, but 10.35 µm has a little ozone and CO_2 absorption
- In this talk, we argue that GOES-R algorithms should actually use *both* bands

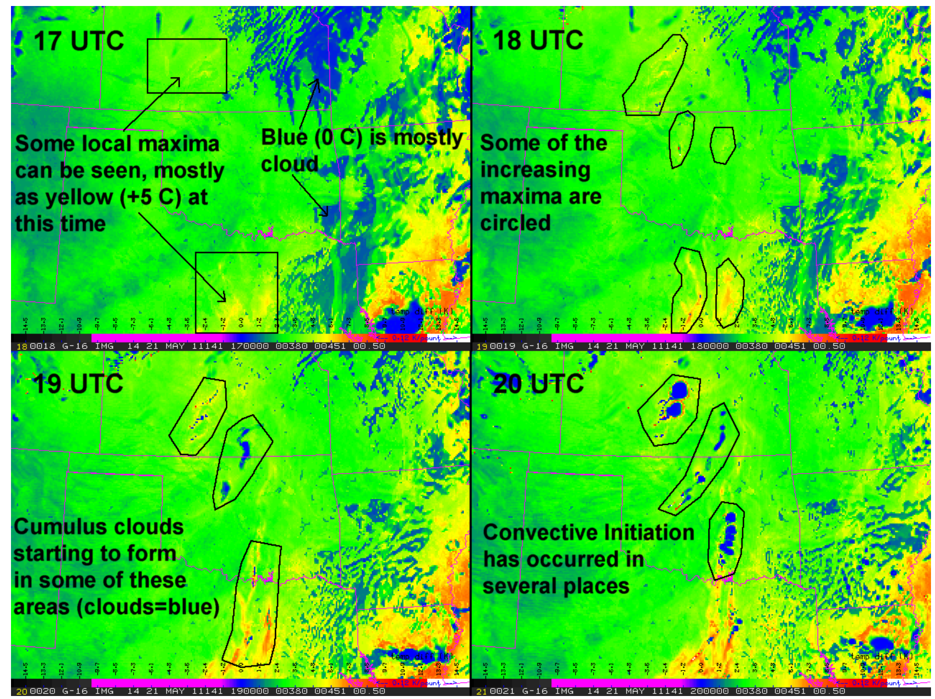


8th Annual Symposium on Future Operational Environmental Satellite Systems:

Poster Presentation – "Predicting Where Convective Clouds Will Form with the GOES-R ABI"

Dan Lindsey and Louie Grasso

- The split window difference (10.35-12.3 μm) is tracked with time to identify areas of deepening low level moisture
- These regions often pinpoint where convective clouds, and sometimes storms, will form hours in advance
- This work is part of a larger multi-group project to improve Convective Initiation forecasts 1-6 hours in advance
  - See the Mecikalski et al. poster (299) in the same session



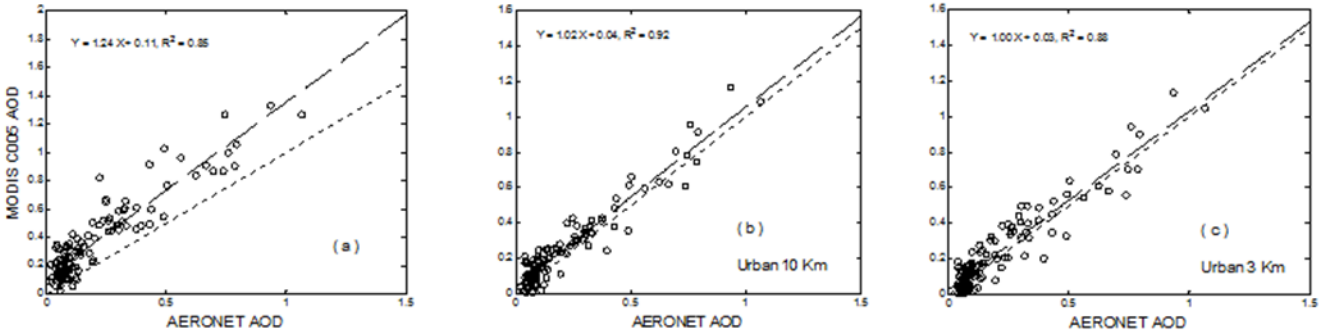
[17th Conference on Air Pollution Meteorology with the A&WMA]

Oral– "PM2.5 Retrieval Improvements Over Urban Scenes by Refining Surface Albedo Model"

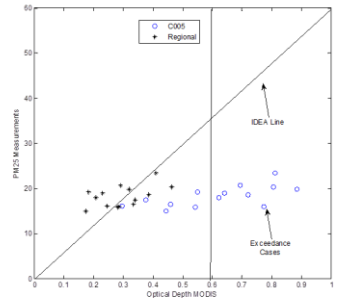
A. Picon, B. Madhavan, B. Gross, F. Moshary, S. Ahmed, R. Levy, I. Laslzo

- MODIS C005 algorithm often overestimates AOD over urban areas
  - A regional model based on surface retrievals using combined MODIS and AERONET data improves accuracy and resolution
- Current algorithm cannot distinguish between bright urban and soils
  - Consistent with direct spectral mixing models between vegetation and urban materials
- Removal of AOD Bias based on regional tuning can remove difficulties with PM2.5 estimates and remove incorrect exceedances

Regional Tuning improves AOD retrieval and resolution



Removal of biases makes False exceedences go away

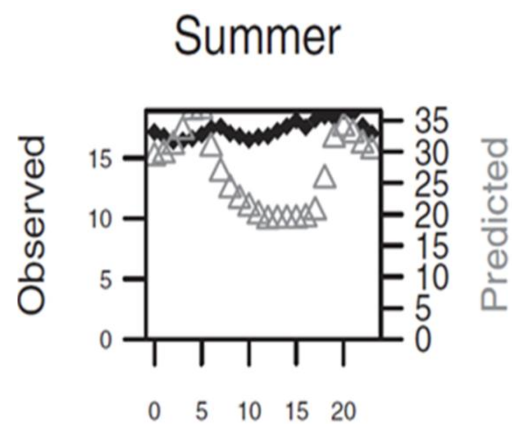


17th Conference on Air Pollution Meteorology with the A&WMA

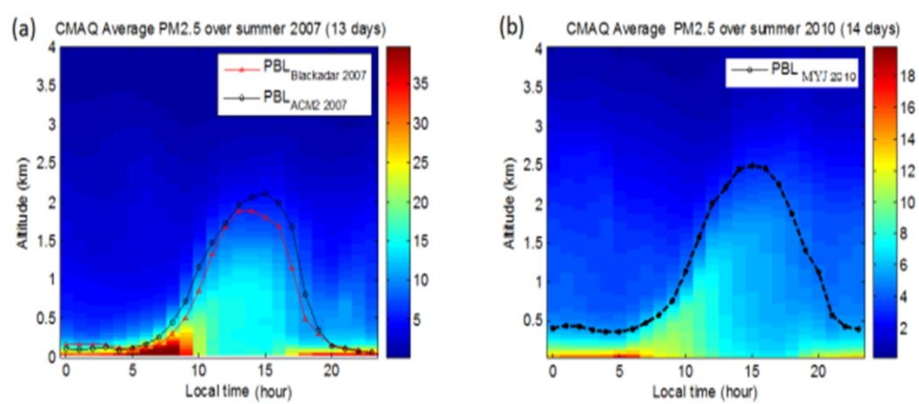
Oral– “Application of Active Optical Sensors to Probe the Vertical Structure of the Urban Boundary Layer and Assess Anomalies in Air Quality Model PM2.5 Forecasts”

Chuen-Meei Gan, B. Gross, Y. Wu, B. Madhavan, F. Moshary, M. Ku

- The WRF model (12km x 12km) coupled with the CMAQ model for the urban New York City area shows strong biases that need to be explained
  - We show that vertical sounding measurements from lidar / ceilometer can explain the root issues of these anomolies.
- Boundary Layer Height Dynamics is shown to be well modeled during the intense mid day period where convective forces dominate
- On the other hand, prior to onset of convection, CMAQ model forecasts do not properly distribute pollutants vertically through the boundary layer
  - This finding is the central cause of model overestimates of PM2.5



Pre/dawn – Post Sunset Anomalies in Model



[Fourth Symposium on Aerosol-Cloud-Climate Interactions]

Oral– "Quantifying the Aerosol-Cloud Interaction From Ground Based Observations"

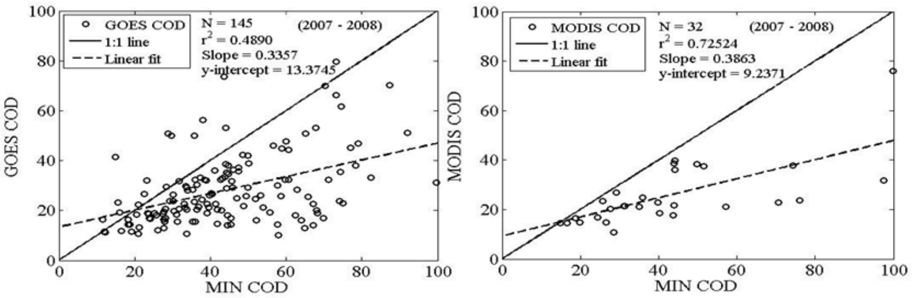
L.Bomidi, J. He, N. Pujols, B. Gross, F. Moshary, S. Ahmed, Q. Min, G. Feingold

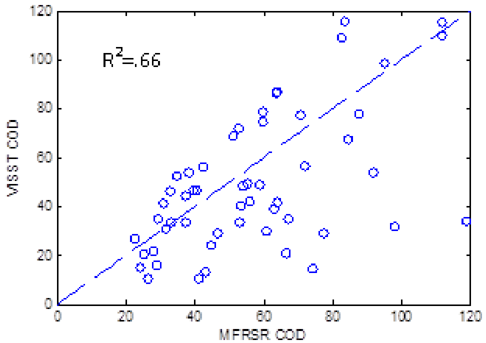
- Indirect aerosol cloud mechanisms are hard to quantify and uncertainty arising in these mechanisms result in largest uncertainty in Earth's radiation budget for climate studies.

- We focus on combining ground based measurements from different instruments to provide simultaneous measurements of aerosol and cloud properties.

  - We verify COD retrieval algorithms against several models using SGP Data
  - Results for COD for CCNY consistent with the matchups.
  - Biases in matchups consistent with sub-pixel variability.

Preliminary Matchups of COD Consistent with SGP matchups



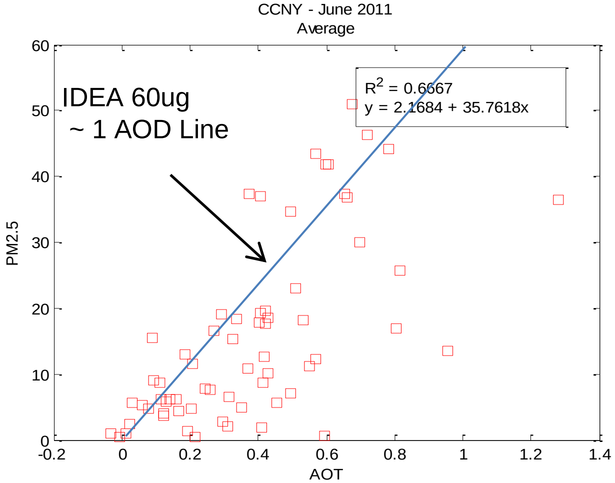


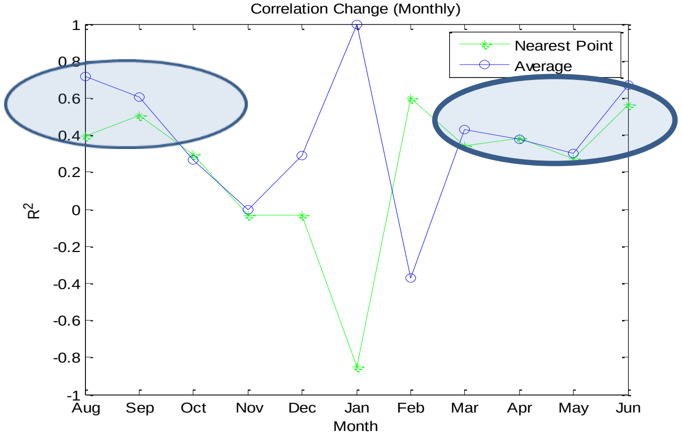
Eighth Annual Symposium on Future Operational Environmental Satellite System

Poster- Potential Difficulties for GOES-R to Extract Aerosol Optical Depth and Surface PM2.5 in An Urban Environment

Yuzhe He, A. Picon, L. Cordero, B. Madhavan, B. Gross, F. Moshary, P. Ciren

- The GOES-R aerosol retrieval over land surface heavily relies on the heritage of MODIS retrieval algorithm since the ABI of GOES-R are similar to MODIS bands.
  - The MODIS algorithm has shown difficulties in retrieving AOD in urban regions because of the bright surface.
  - AOD often overestimated due to poor surface estimation and possible aloft plumes
  - The PM2.5 estimation from GOES-R may be affected too.
- Preliminary assessment with operational retrieval shows good correlations for summer months
  - Regional models were applied but regional aerosol model close to operational in the VIS band so corrections for summer were found to be small



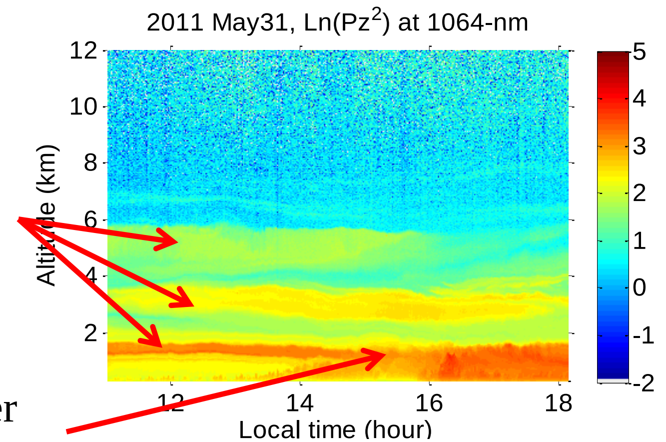


Ignore Winter months since satellite data is almost totally unavailable

[17th Conference on Air Pollution Meteorology with the A&WMA]
Oral– "Smoke plume optical properties and transport
observed by a multi-wavelength lidar, sunphotometer and satellite"
Lina Cordero, Yonghua Wu , Barry Gross , Fred Moshary ,Sam Ahmed

- Local Air Quality Can be affected by long scale smoke plume transport
  - Multiwavelength lidar , sun radiometers and satellite imagery identify the events unambiguously
  - Consistent Optical Properties across different instruments obtained
- Lidar shows clear smoke intrusions into PBL
  - Local PM2.5 spikes are observed to occur with the intrusions
- PM2.5 estimates connected to column AOD's strongly affected by plumes
  - Lidar filtering and compensation is needed.

Three plume layers



Lowest layer mixed into PBL