Poster Preview

Timothy J. Schmit (tim.j.schmit@noaa.gov)

NOAA/NESDIS/Satellite Applications and Research

Advanced Satellite Products Branch (ASPB)

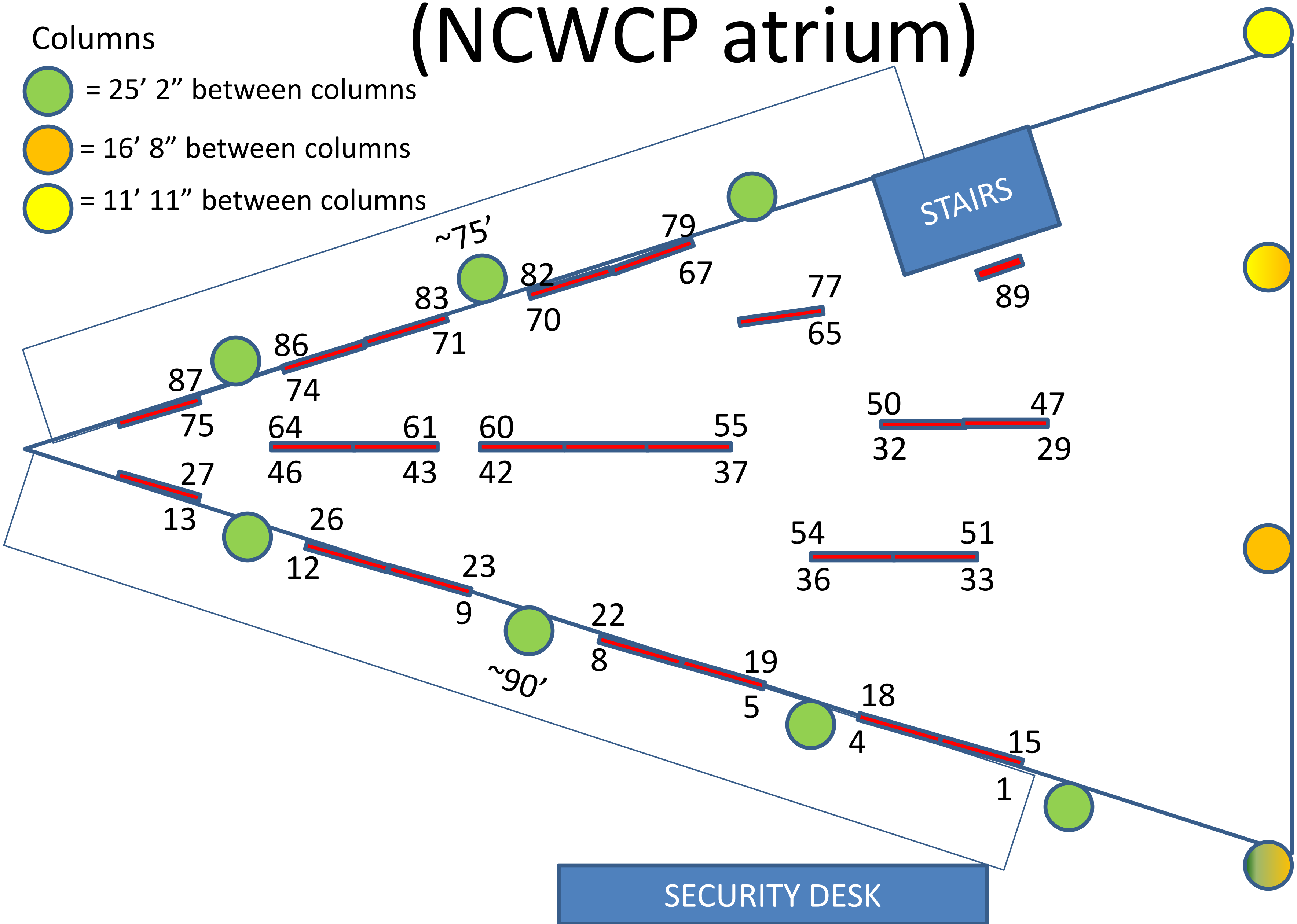
Madison, WI

Thanks to all the poster presenters!

2013 NOAA Satellite Conference
College Park, MD

April 10, 2013

NSC-2013 Poster Plan (NCWCP atrium)



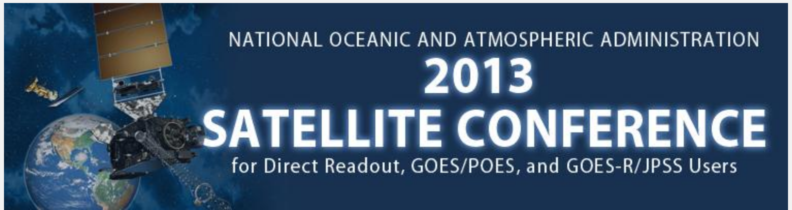
Application of DoDAF 2.0 and Underlying UPDM Model Based Systems Engineering Capability

Alan Jeffries, Jeffries Technology Solutions, Inc.

- Captures and manages the complex data processing required to transform JPSS sensor data into a wide variety of Weather and Climate products.
- The Poster illustrates the fidelity achievable in defining the cascade of space-based and ground-based data that is processed in stages to produce the critical information.

W-03

JPSS



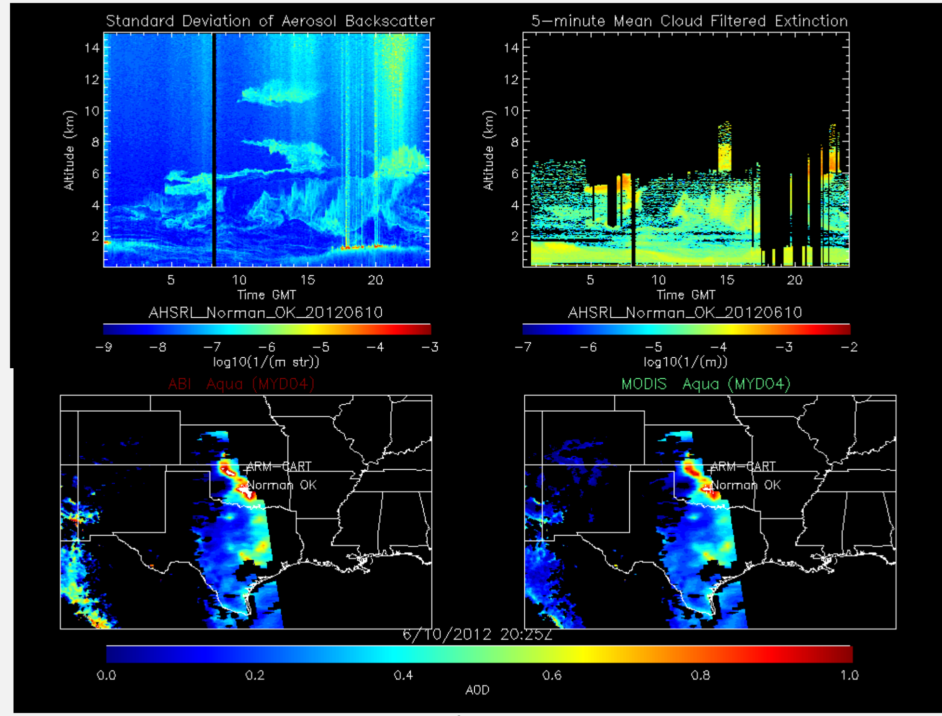
JeTSI

GOES-R Cloud and Aerosol Validation during the NSF DC3 field mission

Wayne Feltz[1], R. Bradley Pierce[2], Ed Eloranta[3], K. Sebastian Schmidt[4], Andrew Heidinger[2], Shobha Kondragunta[5], Andi Walther[1]

[1]Cooperative Institute for Meteorological Satellite Studies (CIMSS), Space Science and Engineering Center (SSEC), University of Wisconsin – Madison, Wisconsin 53706, U.S.
[2]NOAA/NESDIS/STAR/CoRP Advanced Satellite Products Branch (ASPB) Madison, WI
[3]Space Science and Engineering Center (SSEC), University of Wisconsin – Madison, Wisconsin 53706, U.S.
[4]University of Colorado, Laboratory for Atmospheric and Space Physics (LASP), Boulder, CO, 80309
[5]NOAA/NESDIS/STAR/SMCD, Sensor Physics Branch College Park, MD

- This poster focuses on validation of GOES-R Advanced Baseline Imager (ABI) aerosol and cloud retrievals using surface measurements
  - Cloud height and aerosol optical depth validation was performed using ground based High Spectral Resolution (HSRL) measurements deployed at Norman, OK
  - Cloud microphysical validation was performed using ground based high-spectral resolution Solar Spectral Flux Radiometer (SSFR) measurements of solar irradiance at Boulder, CO



Norman, OK AHSRL, ABI and MODIS AOD on June 10, 2012

W-05

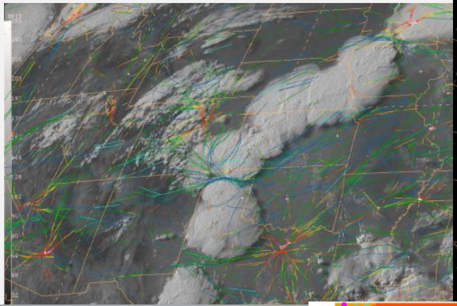
Overview of UW-Madison SSEC/CIMSS GOES-R Proving Ground Activities

Wayne F. Feltz et al.
SSEC/CIMSS University of Wisconsin – Madison
Madison, WI

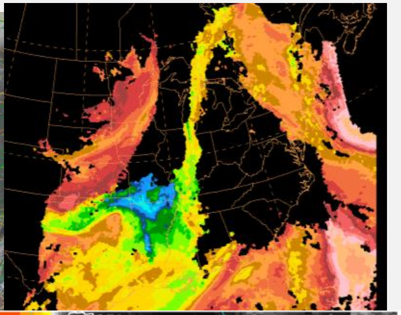
Providing multiple near real-time GOES-R proxy decision support products for evaluation at NOAA demonstration/testbed sites :

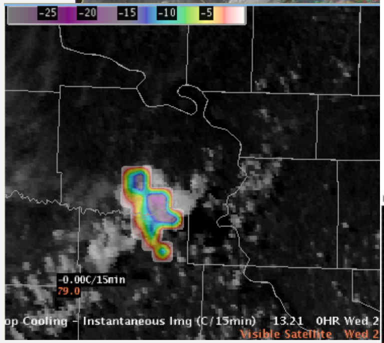
- Fog/cloud detection
- Convective cloud top cooling
- WRF simulated satellite imagery
- Convective overshooting-top
- Hurricane intensity estimation
- Fires
- Cloud properties
- Nearcasting
- Volcanic ash
- …

Overshooting tops and Aviation Routes

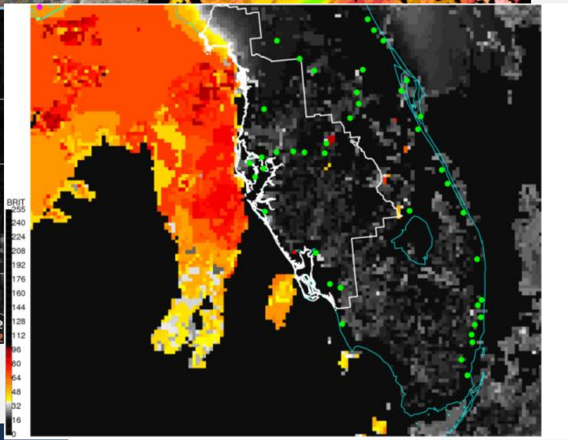


Nearcasting Convective Instability

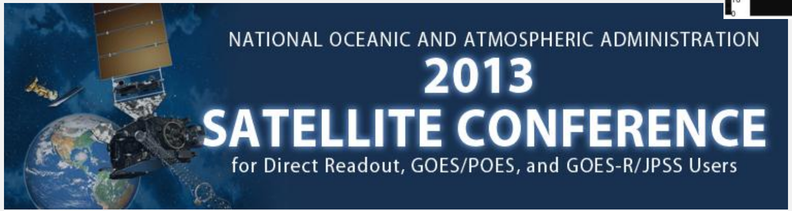




Convective Cloud Top Cooling



Fog/Low Cloud Decision Support

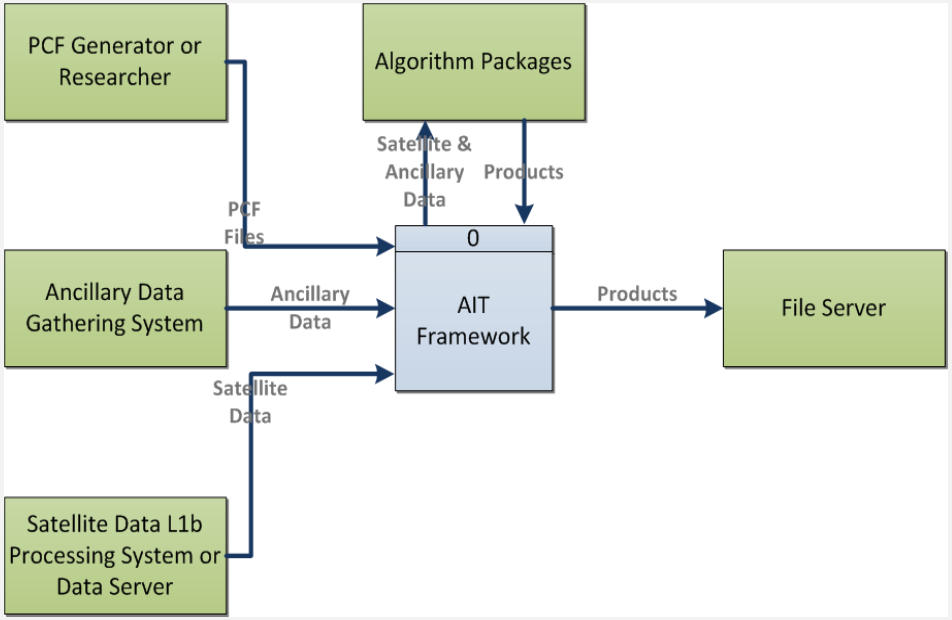


W-05

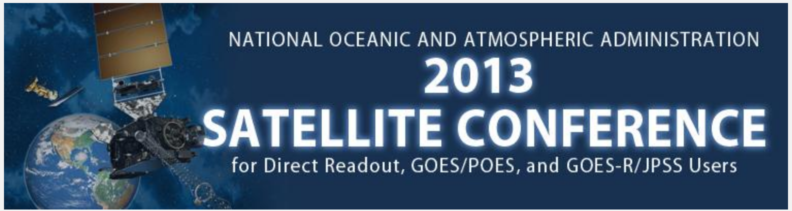
GOES-R AWG Product Processing System Framework: Current Capabilities and Future Plans

Walter Wolf, S. Sampson, X. Liu, A. Li, T. Yu, R. Garcia, G. Martin, W. Straka, E. Schiffer, and J. Daniels

- The framework has enabled the development and testing of the Level 2 Advance Baseline Imager (ABI) and the GOES-R Lightning Mapper products
- Currently being run near real-time to support algorithm verification and validation
    - Support activities include: product monitoring, process monitoring, product visualization, and algorithm maintenance
- Being used to transition the GOES-R AWG Derived Motion Vector Winds algorithm into operations for both GOES and Visible Infrared Imaging Radiometer Suite (VIIRS)



GOES-R AIT Framework Context Diagram



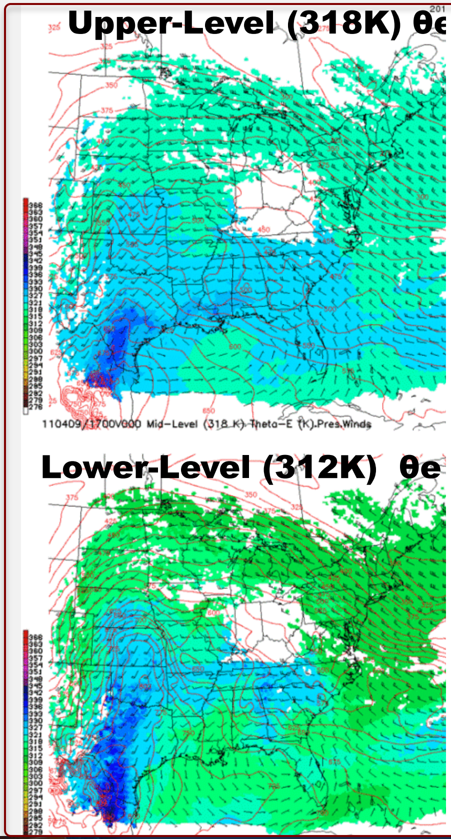
W-07

Improving very-short-range Forecasts of the Pre-Convective Environment and Heavy Precipitation Events using operational Satellite Observations

Ralph A. Petersen[1], William Line[1] and Robert Aune[2]
CIMSS, University of Wisconsin-Madison
NOAA/NESDIS Advanced Satellite Products Branch (ASPB)
Madison, WI

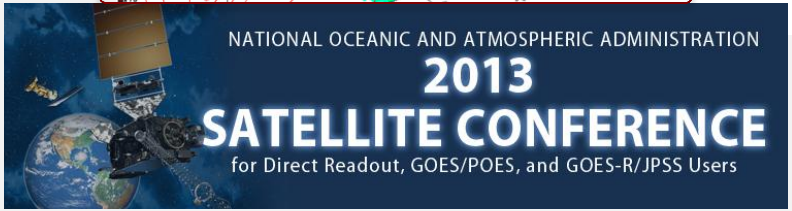
Introducing a new, Isentropic Version of the CIMSS NearCasting Model

- Builds upon recommendations from GOES-R Proving Grounds experiments
- <u>Is consistent with where GOES soundings are best:</u>
    - Cloud-free areas (no latent heating)
        - <u>Adiabatic flow</u>
- Isentropic coordinates implicitly include vertical motions
    - Upward transport at lower-levels can indicate potential lifting mechanisms
    - Downward transport of upper-level dryness enhances gradients and Convective Instability signatures
- Covariance of static stability and moisture fields helps differentiate Heavy Precipitation events from Severe Convection



April 9, 2011 – Tornado near Mapleton, IA (western Iowa)
Heavy Precipitation in Southern MN

W-09

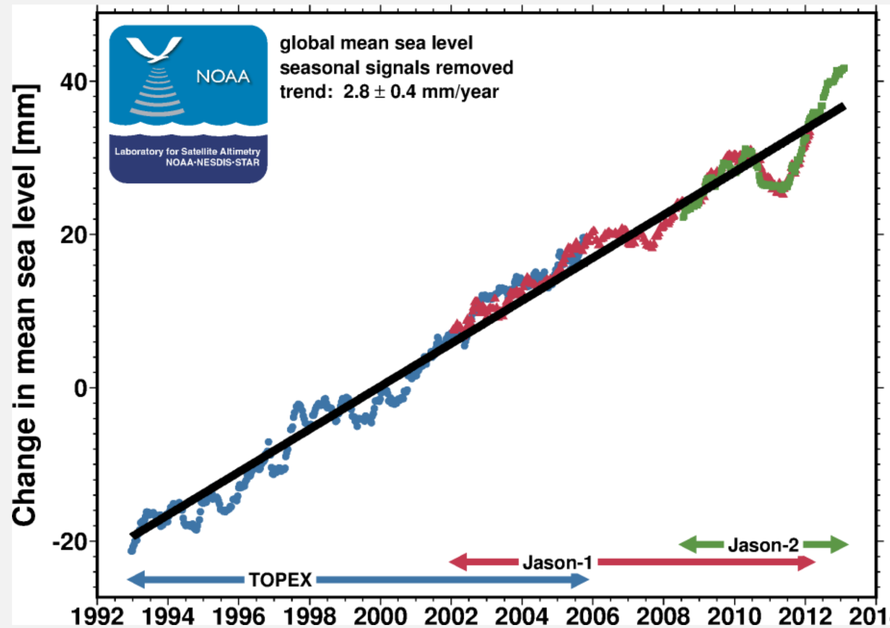


Jason altimetry and NOAA's Sea Level Climate Data Record

Eric Leuliette[1], Remko Scharroo[1,2], John Lillibridge[1], Gary Mitchum[3], Deirdre Byrne[4], Laury Miller[1]
[1]NOAA/NESDIS/STAR/Laboratory for Satellite Altimetry, [2]Altimetrics LLC,
[3]University of South Florida, [4]NOAA/NESDIS/NODC

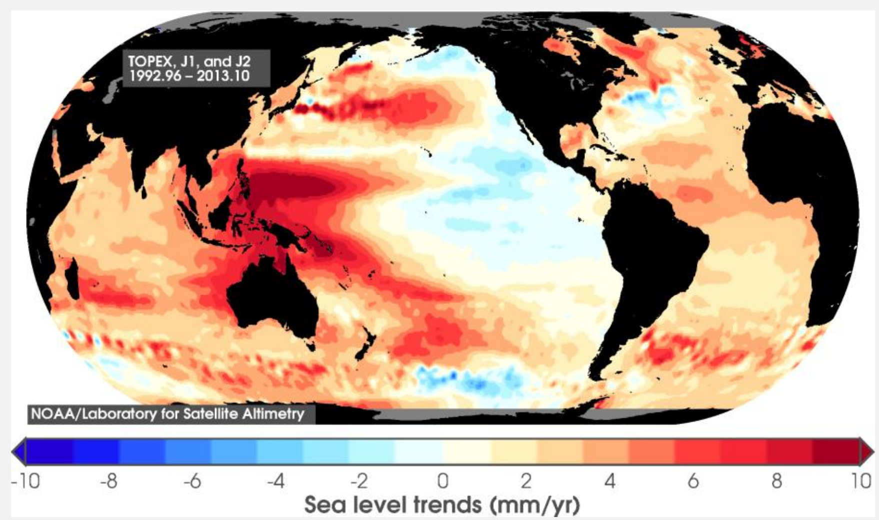
Sea level observations from the Jason series of altimeters are essential to building a climate data record

- Measures global mean sea level to ~1 mm each ten days
- The observation strategy includes a rigorous inter- satellite calibration and calibration with a global network of tide gauges.



Satellite Altimetry Reference Missions

TOPEX	1992–2005	NASA/CNES
Jason-1	2001–	NASA/CNES
Jason-2	2008–	NASA/CNES/NOAA/EUM
Jason-3	2015	NOAA/EUM/NASA/CNES
Jason-CS	2019	EUM/ESA/NOAA/CNES/NASA

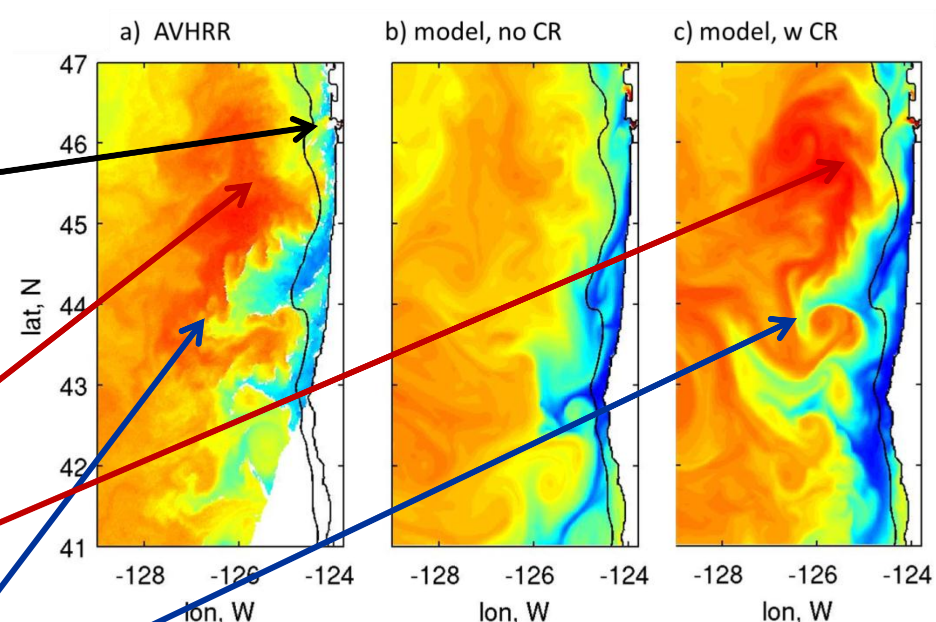


W-11

Partnerships in the use of GOES SST In the Continental US

[1]Alexander Kurapov, [2]David Foley, [3]Eileen Maturi, [4]Andy Harris & [1]Ted Strub
[1]CIOSS (Oregon State University), [2]UC Santa Cruz, [3]NOAA/NESDIS/STAR, [4]CICS

- Assimilation of GOES SST into coastal ocean forecast models improves when the Columbia River outfall is included.
- Figure: SST during a strong upwelling event: (left to right, AVHRR SST for verification, model without CR, model with CR)
- The model with CR reproduced better:
- warmer temperature within the plume;
- separation of the coastal current between 43°-45°N

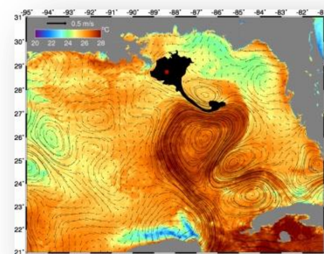


W-11

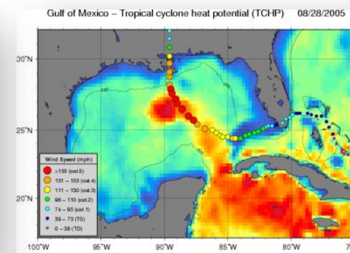
The Jason Altimetry Missions - NOAA/EUMETSAT Operational Products & Applications

John Lillibridge, David Donahue, Julia Figa-Saldaña, and Olivier Thépaut

- Satellite Altimetry Reference Mission:
  - Topex: 1992 - 2005 NASA/CNES
  - Jason-1: 2001 - NASA/CNES
  - Jason-2: 2008 - NASA/CNES/NOAA/EUM
  - Jason-3: 2015 NOAA/EUM/NASA/CNES
  - Jason-CS: 2019 EUM/ESA/NOAA/CNES/NASA
- NOAA & EUM share Near Real-Time operations
  - Each generates NRT products from its ground stations
  - Data disseminated via EUMETCAST, GTS (BUFR) & FTP
  - NODC, ESPC/DDS, CLASS: NOAA access & archive
- Examples of Operational Applications
  - Monitoring open ocean maritime conditions
  - Hurricane intensity forecasting
  - Assimilation into ocean models
  - Validation of wave models

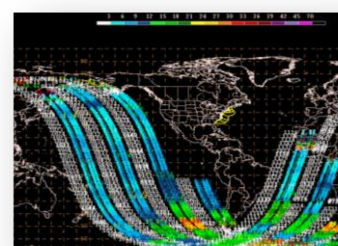


Ocean Model Assimilation

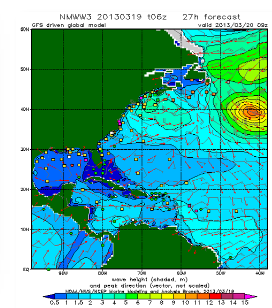


Hurricane Intensity

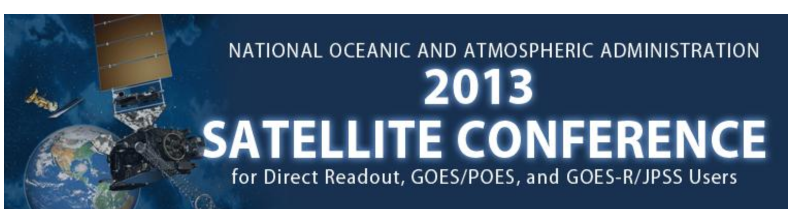
Maritime Monitoring



Wave Model Validation



W-14

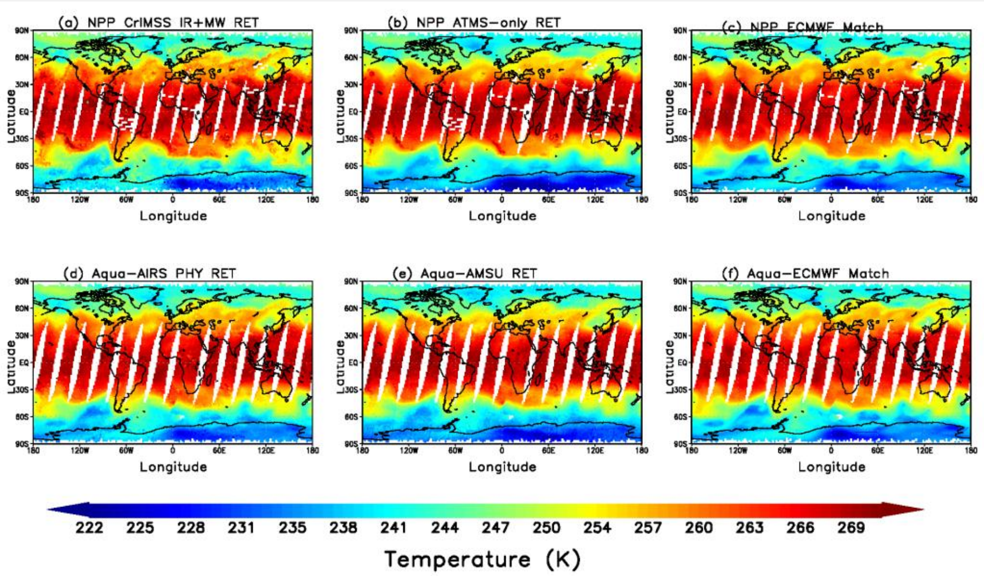


The CrIS, IASI and AIRS:

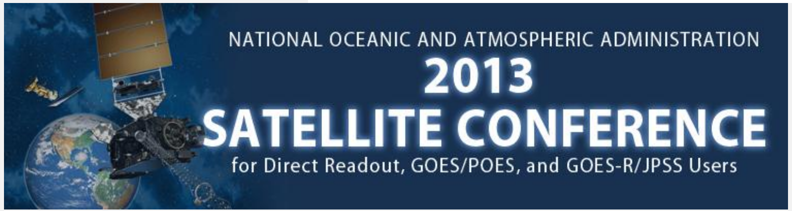
A Perspective on Hyper Spectral Infrared Sounder Retrievals, Validation, and Applications

Murty Divakarla[1], C. Barnet[2], M. Wilson[1] ,E.Maddy[2],
A. Gambacorta[1], N.Nalli[1], C. Tan[1], X. Xiong[1], and Mitch Goldberg[2]
[1]IM Systems Group, Inc., [2]STCorporation., [3]NOAA/STAR
5830 University Research Court, College Park, MD 20737

- High quality hyper-spectral infrared observations from CrIS (S-NPP), IASI (MetOp), and AIRS (Aqua) enable retrieval of atmospheric temperature, moisture, and many trace gas profiles.
- Validation of the sounding products with model analysis fields and truth measurements provides confidence on:
  - ✓ Cloud-cleared radiances for future NWP assimilation
  - ✓ Climate quality data sets generation
- Performance evaluation and characterization of various retrieval algorithms with a common data sets helps to optimize retrieval algorithms for future product generation.



850 hPa temperature product for May 15, 2012
- *CrIMSS IR+MW (upper left) and MW-only (upper middle)*
- *AIRS IR+MW (lower left) and AMSU-only (lower middle)*
- *Co-located ECMWF for CrIS (upper right) and AIRS (lower right)*



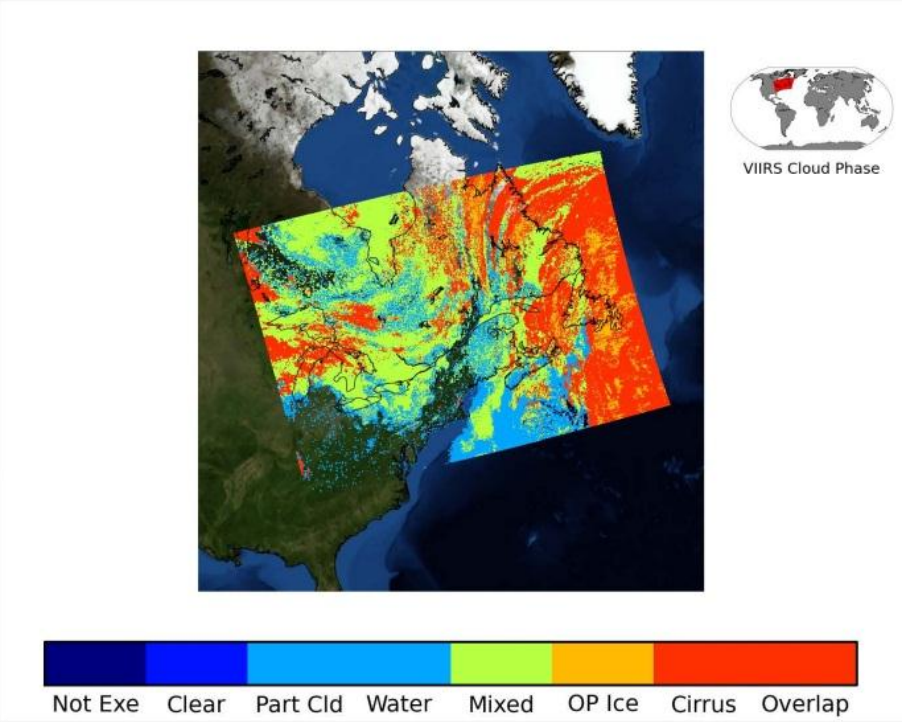
W-17

VIIRS Atmospheric Products in the Community Satellite Processing Package (CSPP)

Geoff Cureton

CIMSS, University of Wisconsin - Madison
Madison, WI

- The VIIRS EDR module in CSPP will provide...
  - A means of running the NOAA operational code (Cloud Mask, AOT, SST, VI...) on granules from Operations or from Direct Broadcast
  - CSPP runs on x86 Linux machines with reasonable memory requirements (~16Gb at most)
  - Enough flexibility to develop and test custom algorithms.



CSPP VIIRS Cloud Optical Phase

NOAA/NESDIS Operational Satellite Precipitation Products and Services

Limin Zhao[1], Ralph Ferraro[2], and Robert J. Kuligowski[2]

[1]NOAA/NESDIS/OSPO

[2]NOAA/NESDIS/STAR

- **NOAA/NESDIS Operational Precipitation Products**
  - Available from a variety of satellites, including both polar (LEO) and geostationary (GEO) satellites, etc.
  - Considerable utility to support NWS operations from short-term forecasts and warnings (e.g., flash floods, rainfall potential from tropical systems, etc.) to long-term climate studies (e.g., seasonal to inter-annual variability).
- **LEOs Products**
  - **MSPPS:** Instantaneous rainfall and snowfall rates derived from AMSU-A/MHS on board N18, N19 and Metop-A
  - **MiRS:** Instantaneous rainfall rate derived from AMSU-A/MHS on board N18, N19 and Metop-A, and also from SSMIS on board DMSP F16 and F18
- **GEOs Products**
  - **GHE**: Instantaneous rain rate and multi-hour and multi-day rainfall derived from GOES-E, GOES-W, MTSAT, Meteosat-7 & -9
- **Blended Products**
  - **Blended RR:** Multi-sensors/algorithms merged rain rate product
  - **Blended TPW:** Multi-sensor/algorithms merged total precipitable water product
  - **eTRAP:** 24 hour ensemble mean rainfall accumulation and probability of rainfall exceeding different threshold values
- **Data Access**
  - **ESPC DDS:** http://www.ospo.noaa.gov/Organization/About/access.html
  - **Internet:**

    MSPPS - http://www.ospo.noaa.gov/Products/atmosphere/mspps

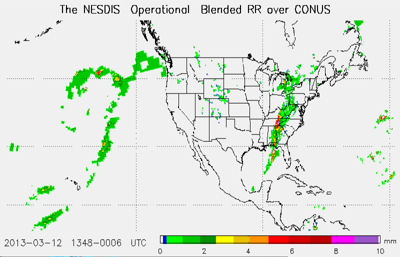
    MiRS - http://www.ospo.noaa.gov/Products/atmosphere/mirs

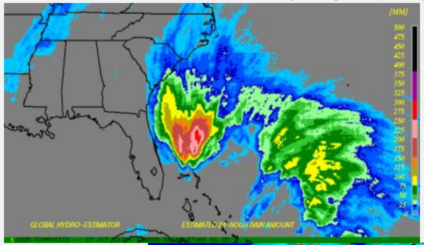
    GHE - http:// ://www.ospo.noaa.gov/Products/atmosphere/ghe

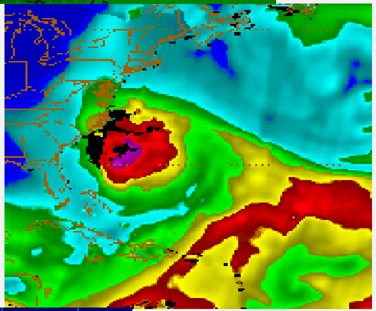
    bRR - http://www.ospo.noaa.gov/Products/atmosphere/brr

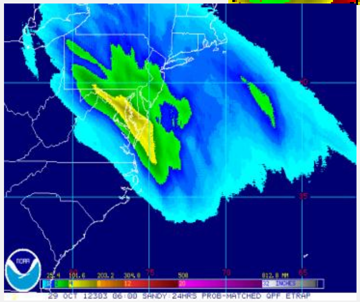
    bTPW - http://www.ospo.noaa.gov/bTPW

    eTRAP - http://www.ssd.noaa.gov/PS/TROP/etrap.html









W-22

NESDIS Operational Blended TPW Products System

Limin Zhao[1], Stanley Kidder[2], Sheldon Kusselson[1], John Forsythe[2], Andrew Jones [2], Ralph Ferraro[3], Jiang Zhao[4], Clay Davenport[5]

[1]NOAA/NESDIS/OSPO/Satellite Products and Service Division

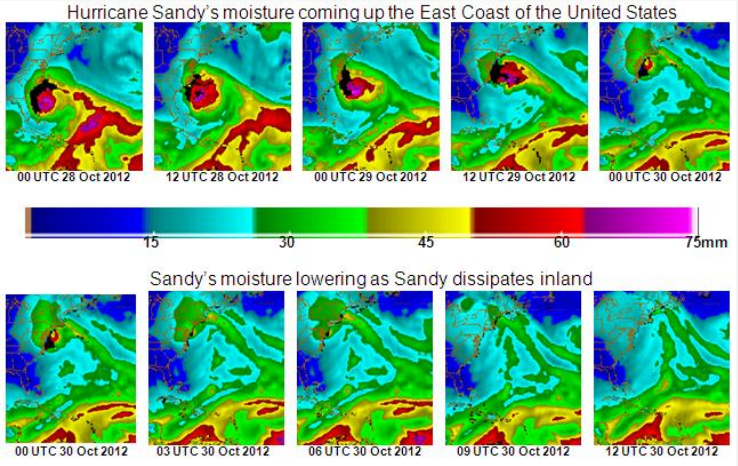
[2]Cooperative Institute for Research in the Atmosphere, [3]NOAA/NESDIS/STAR; [4]NASA/JPSS , [5]SGT

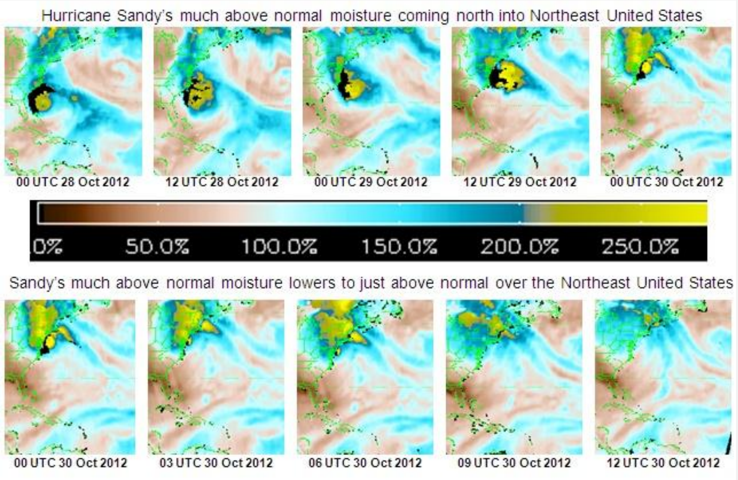
- **Blended Total Precipitable Water (TPW) - a multi-sensor merged product**
  - Eliminates the bias of retrievals from various sensors/retrieval algorithms through histogram matching (Kidder and Jones, 2007)
  - Provides a unified, meteorologically significant moisture field for satellite analysts and weather forecasters.
  - Its companion product - Percentage of TPW Normal derived from climatology

- **Data Sources**
  - **Ocean** – TPW from NOAA-15, -16, -17, -18, -19 and Metop-A, DMSP F16 and F18
  - **Land** – TPW from NOAA-18, -19 and Metop-A over global, and also GOES-West & East and GPS-Met over CONUS
  - **Upcoming**: Metop-B, NPP, Megha-Tropiques, GCOM AMSR-2 to be included in next couple of years
  - **Beyond**, JPSS, GOES-R, GPM, etc.

- **Applications**
  - Improving analysis and prediction of heavy precipitation and flash flood
  - Getting more timely and continuous spatial information about moisture transfer/ "surges".
  - Monitoring of the "atmospheric rivers" (ARs)

- **Coming to see our poster for more details on products, their applications and data access**





Hurricane Sandy observed from bTPW

W-23

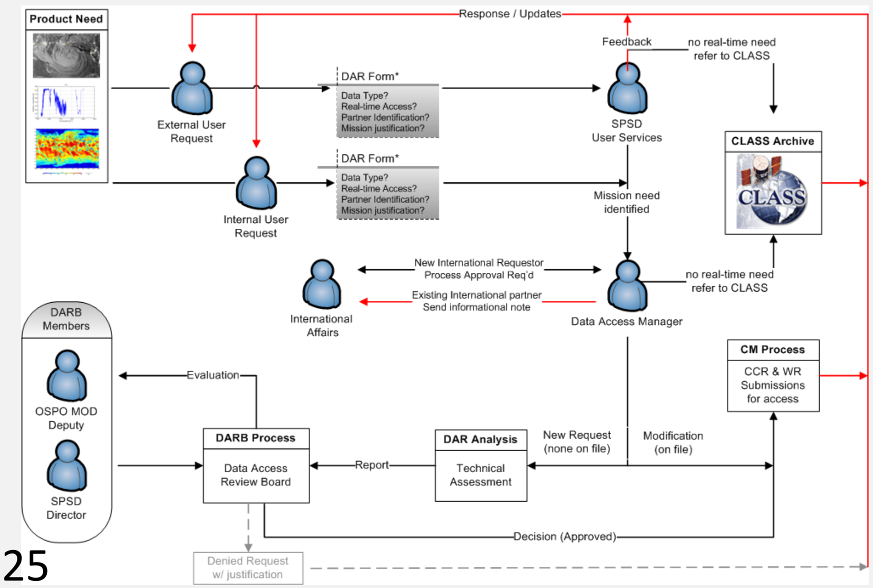
SNPP/JPSS Data Access Process and Operational Products in Development at NOAA/NESDIS

Shuang Qiu, Christopher Sisko, Antonio Irving and Jingsi Gao

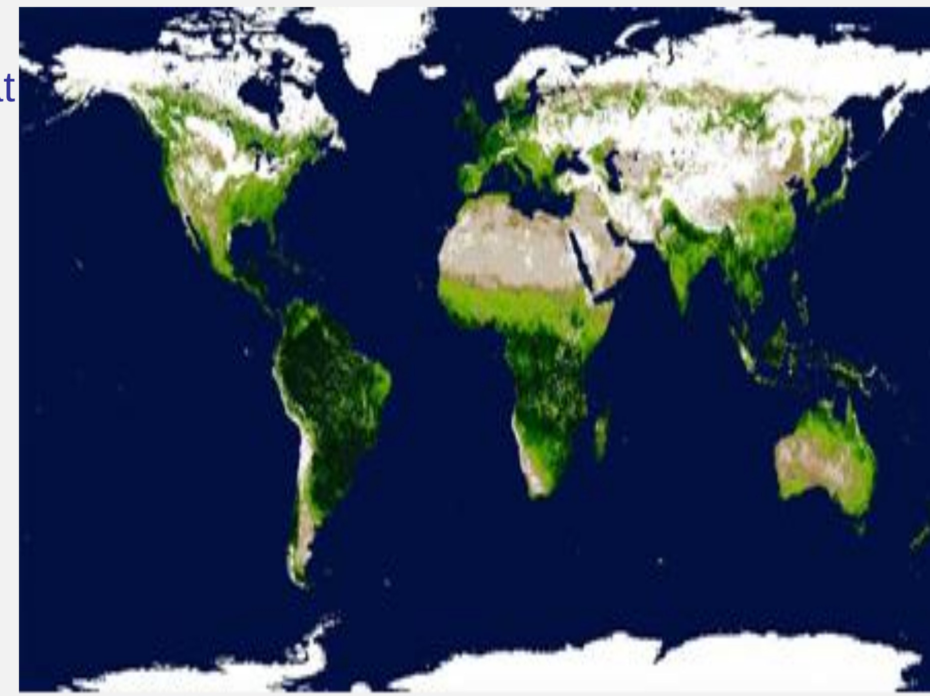
NOAA/NESDIS Office of Satellite and Product Operations (OSPO), College Park, MD

- SNPP/JPSS provides observation continuity and new capabilities:
  - OSPO policy on data access and distribution of environmental satellite data and products guides SNPP/JPSS data access via an established process.
  - Operational products of SNPP serving user community are currently underway.
  - Product generation and distribution of large volumes of data are a significant challenge for the existing infrastructure.
- NESDIS OSPO Data Access Policy available at

  http://www.ospo.noaa.gov/Organization/About/access.html



- SNPP/JPSS products under development:
  - ACSPO SST
  - Green Vegetation Fraction
  - Polar Winds
  - MiRS
  - NUCAPS
  - Blended products e.g. SST, rainrate, etc.



Weekly 4-km Green Vegetation Fraction map from VIIRS GVF team

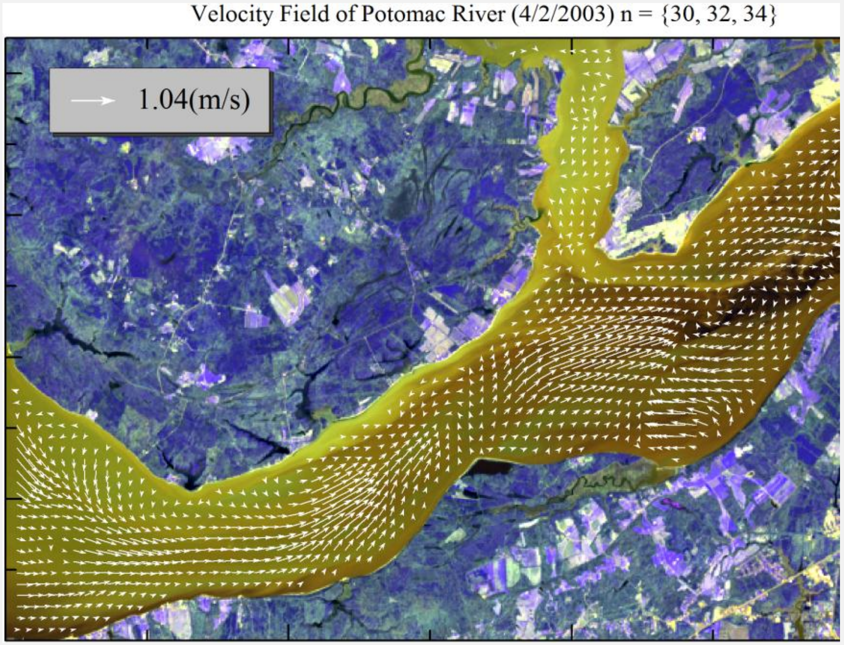
W-25

Estimation of Surface Velocity from Geostationary Satellite Multiband Imagery

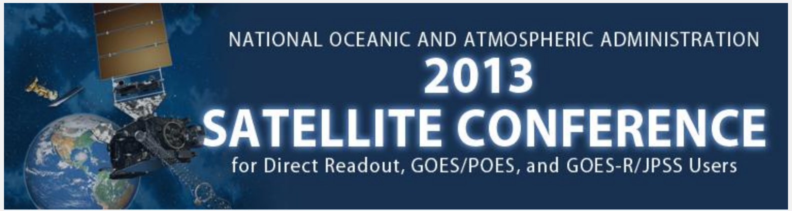
Wei Chen and Richard P. Mied

Naval Research Laboratory, Remote Sensing Division, Washington, DC

- A New Inverse Model for Retrieving Velocities
  - Employ multiband images for complementary looks at the coherent structures
  - Constrain velocity field to satisfy nonlinear surface tracer conservation equation
  - Develop a unified adaptive framework to solve the nonlinear system of equations
  - The retrieved velocities are the Global Optimal Solution (GOS)



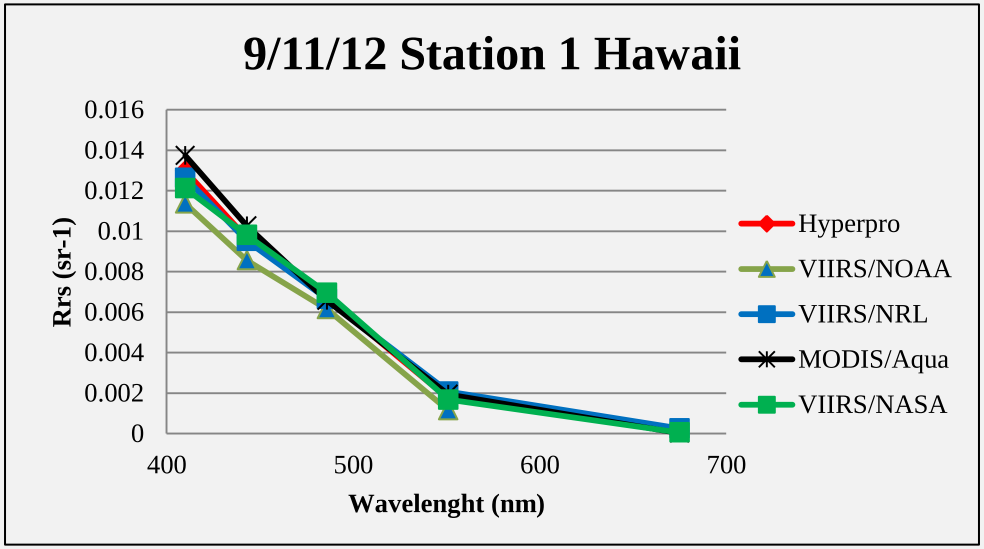
Retrieved Velocities from LandSat and ASTER Images



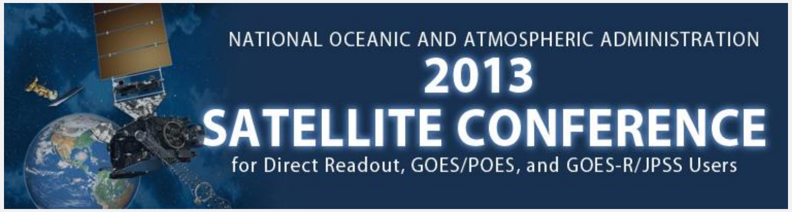
Coastal Optical Characterization Experiment (COCE) Activities at STAR

Michael Ondrusek and Eric Stengel
NOAA/NESDIS/STAR/SOCD, College Park, MD

- VIIRS Ocean Color In Situ Validation
  - Florida Keys
  - Hawaii
  - Chesapeake Bay
- Ocean Color Applications
  - Total Suspended Matter
  - Chesapeake Bay Runoff
  - Red Tide Characterization



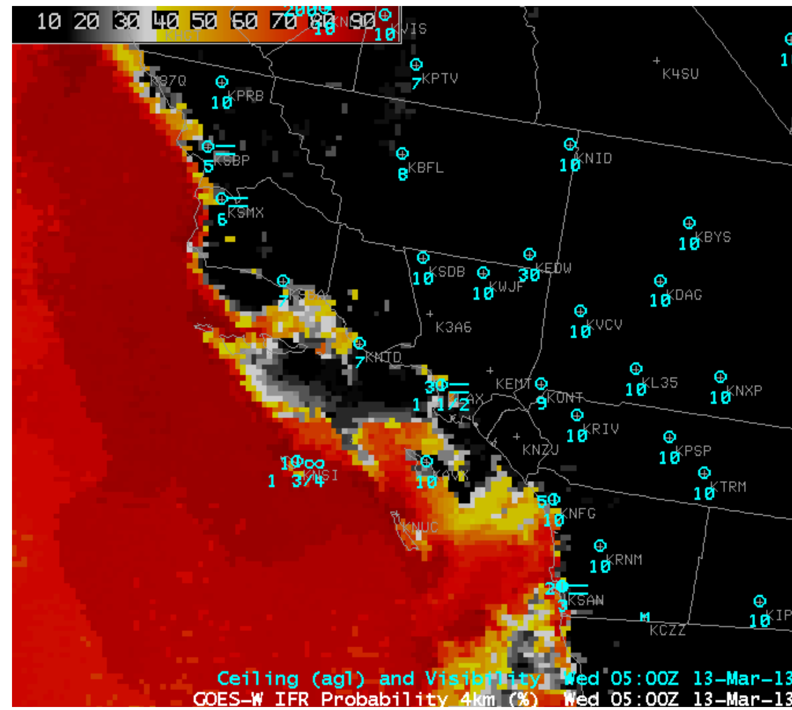
VIIRs validation, Hawaii, September 11, 2012



Introduction of a New Suite of Fog/Low Stratus (FLS) Products into NWS Operations via the Satellite Proving Ground

Michael Pavolonis, Corey Calvert*, Scott Lindstrom* and Chad Gravelle**
NOAA/NESDIS Center for Satellite Applications and Research Advanced Satellite Product Branch, Madison, WI
*Cooperative Institute for Meteorological Satellite Studies, Madison, WI
** Cooperative Institute for Meteorological Satellite Studies, Kansas City, Missouri

- **Algorithm fuses satellite with other data sets (e.g. NWP, SST, etc…) to estimate the probability of different aviation flight rule categories and estimate the thickness of fog layers**
- **A summary of forecaster feedback and some examples of how the products are being used will be presented**



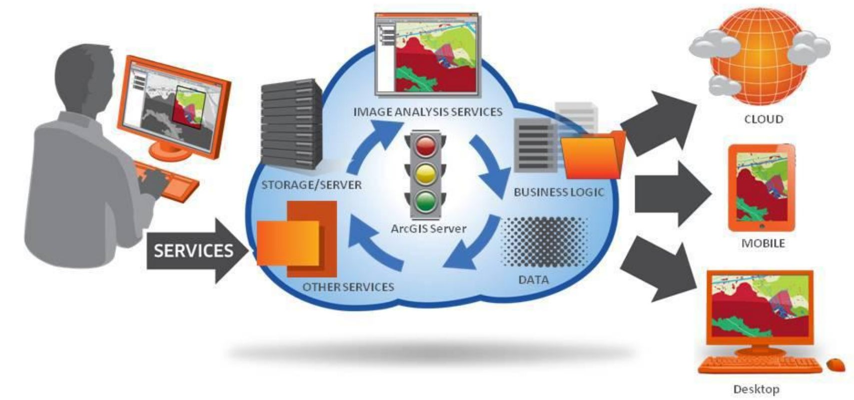
GOES-R IFR probabilities offshore Southern California

W-35

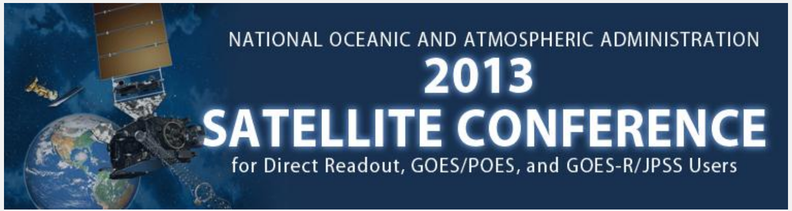
ENVI & IDL Services Engine: Earth and Planetary Image Processing for the Cloud

Thomas Harris
Exelis Visual Information Solutions, Boulder, CO

- Enterprise deployment of COTS Earth Science Geospatial Platform
  - Existing IDL and ENVI code can be published for use in the enterprise
  - Large-scale parallel computation is accessible via master/worker architecture
  - Easy-to-use HTTP-based RESTful messaging for



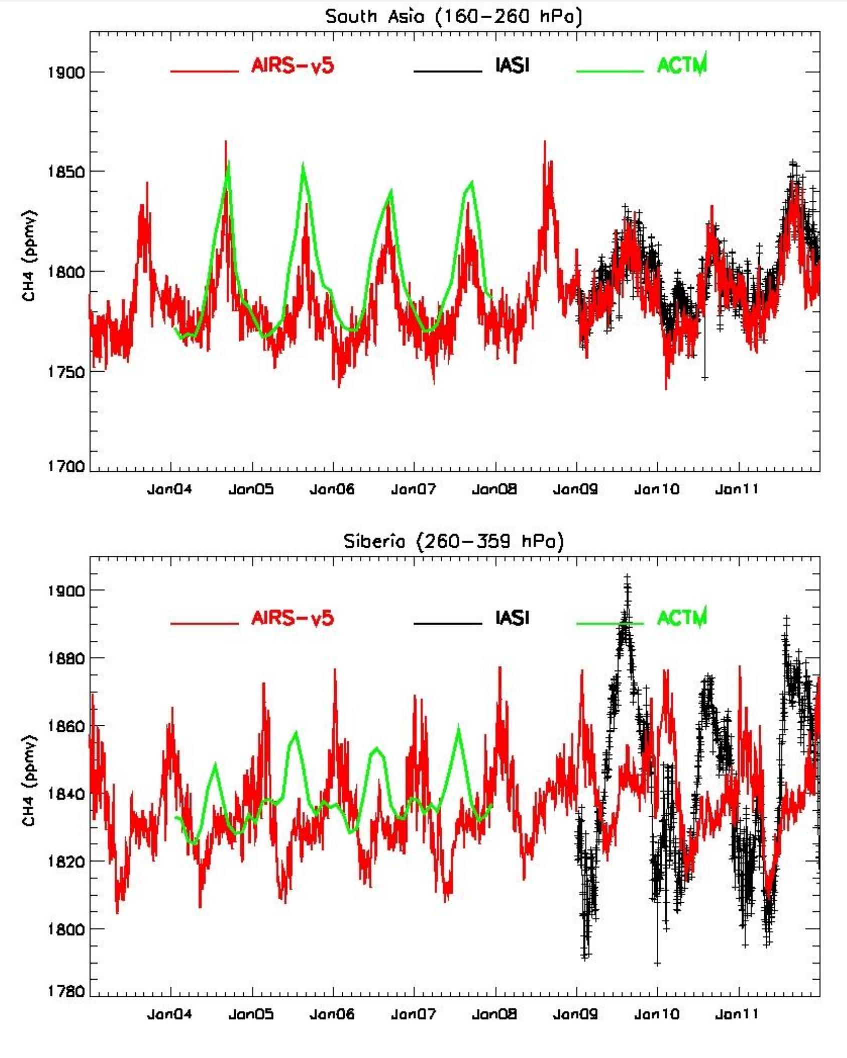
IDL and ENVI Service Authoring, Deployment & Consumption



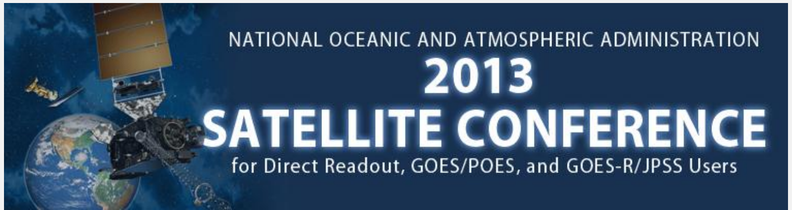
Satellite Observations of Mid-upper Tropospheric Methane using CrIS and its comparison with AIRS and IASI

Xiaozhen Xiong, Chris Barnet,
Antonia Gambacorta, Eric S. Maddy, Thomas.S.King

- Atmospheric Methane (CH_4) from CrIS on NPP and JPSS, in conjunction with AIRS and IASI will provide a monitoring of CH_4 change and its feedback with climate change over 20 years
  - Retrieval of CH_4 from CrIS on NUCAPS is characterized;
  - It is expected the full spectrum will improve CH_4 retrieval;



W-41

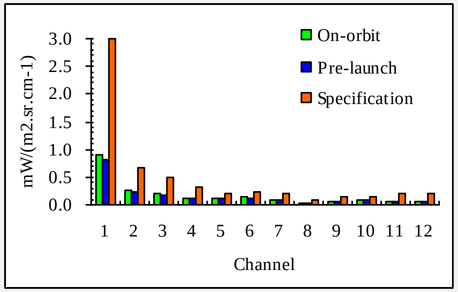


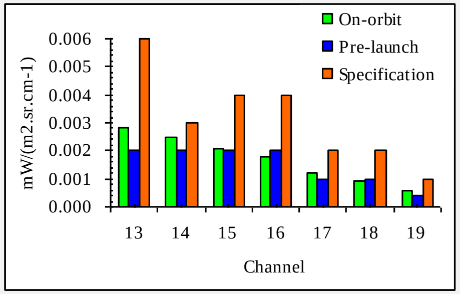
Metop-B HIRS Cal/Val Summary

University of Maryland/ESSIC, NOAA/NESDIS/STAR

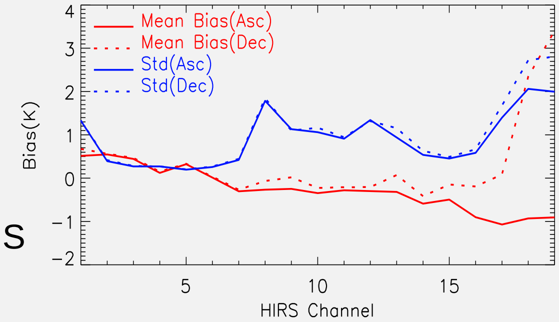
- Metop-B HIRS on-orbit SIOV & Cal/Val activity started on 16 Oct, test results reviewed on 28 Nov as scheduled.
- Test tasks including: BB temperature, channel noises, L1B data assessment, Geo-location evaluation, ICVS trending, et al.
- NEdN of all IR channels and NEdA of VIS channel meet specification(top figure).
- HIRS L1B data are evaluated with CRTM model simulation(middle figure) and NPP/CrIS observation(bottom figure) and reached coincident conclusion, biases are within 1K for all IR channels except ch1 and ch16.

NEdN

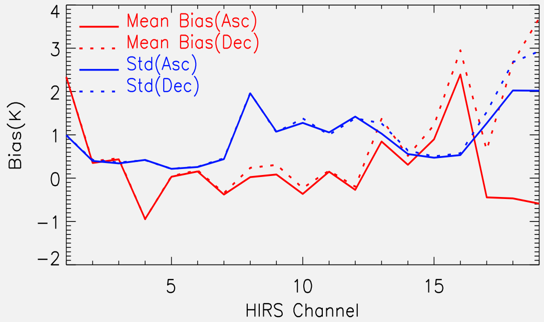


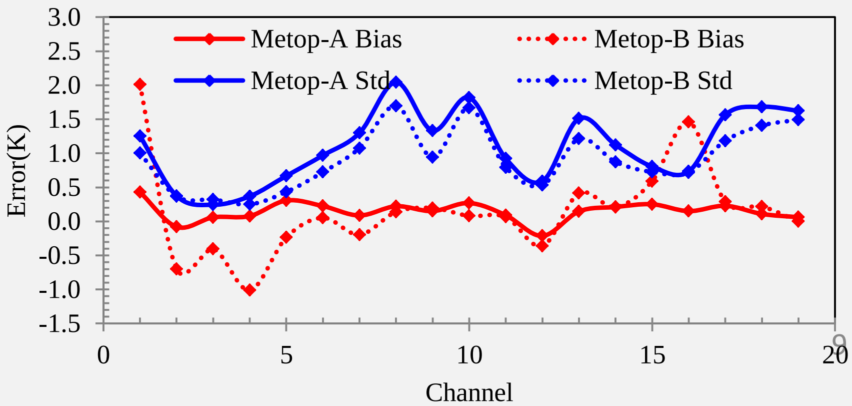


Metop-A

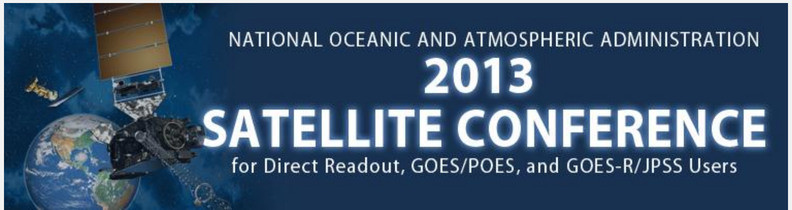


Metop-B





W-42

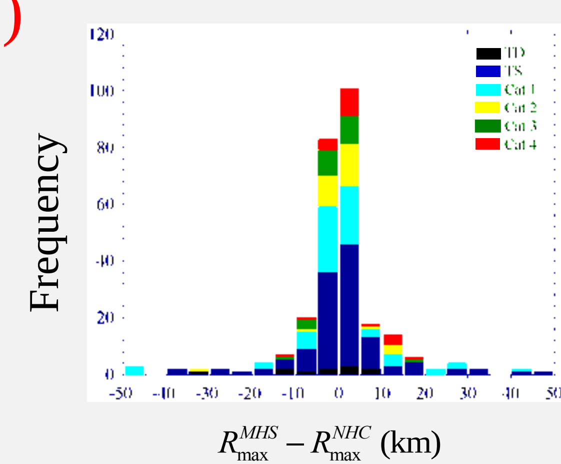


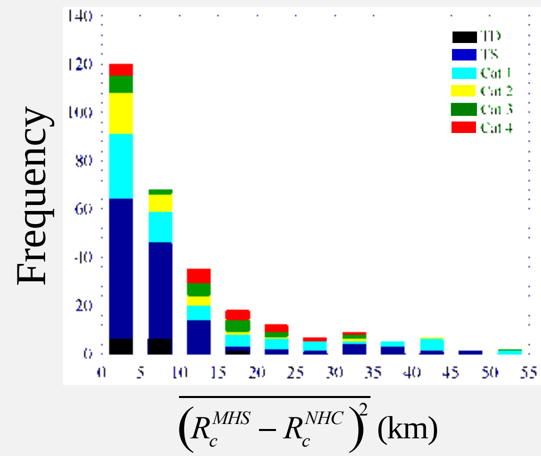
ATMS/AMSU Humidity Sounders for Hurricane Study

Xiaolei Zou[1], Qi Shi[1], Zhengkun Qin[1], and Fuzhong Weng[2]

[1]Department of EOAS, Florida State University
[2]NOAA/STAR/NESDIS, Washington D. C.

- The ATMS (channels 17-22) and MHS provide useful information within and around hurricanes

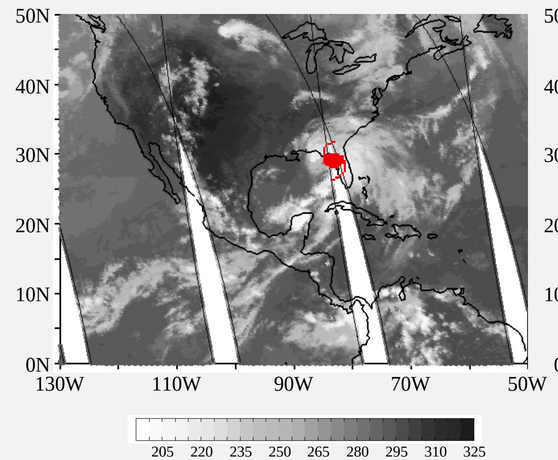




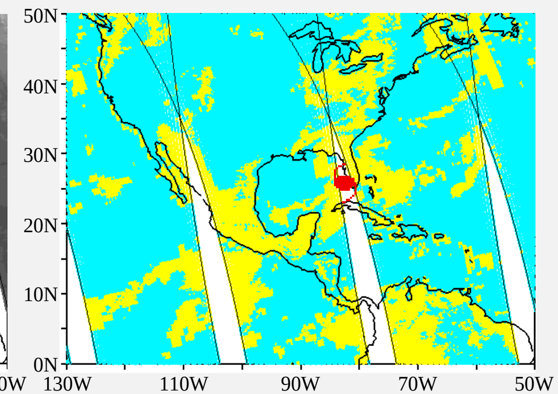
✓ TC location and radius of maximum wind can be determined from MHS channel 2 (157 GHz)

✓ A new cloud detection algorithm is developed for ATMS/MHS and can be implemented into HWRF

GOES-13 Ch4



Cloudy Points

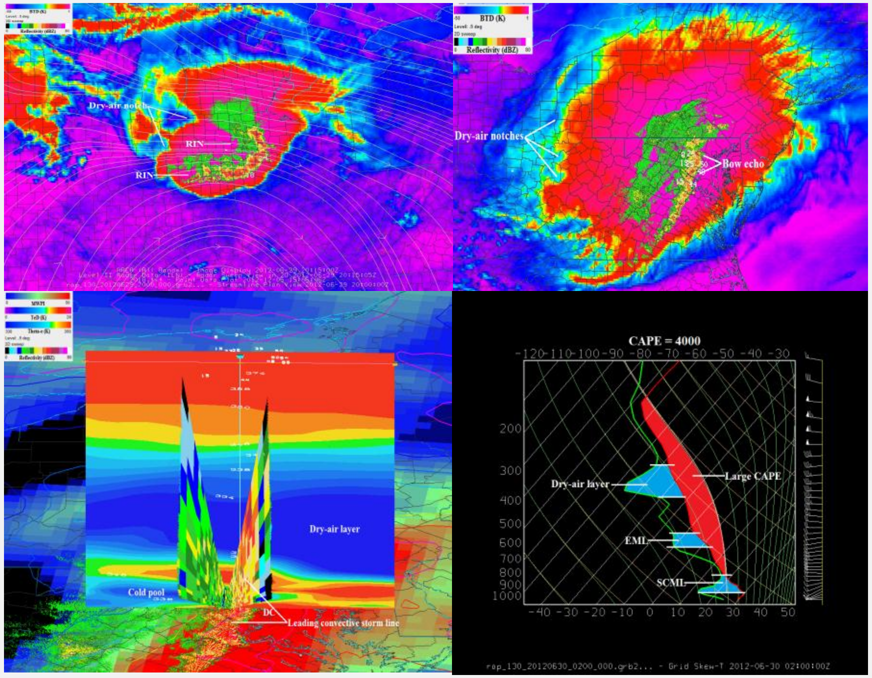


A Downburst Study of the June 2012 Derecho

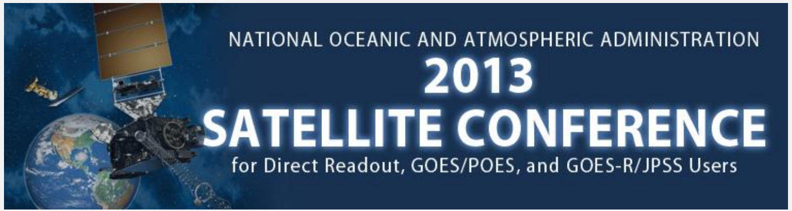
Kenneth L. Pryor and Colleen Wilson

NOAA/NESDIS Operational Products Development Branch (OPDB)/
Dept. of Atmospheric and Oceanic Science, Univ. of MD
College Park, MD

- GOES-13 and NEXRAD observed widespread downburst activity with the June 2012 Derecho
  - Severe downburst events from the time of initiation over northern Indiana to the time that the derecho moved over the Atlantic coast have been documented.
  - Downburst clusters were primarily responsible for regions of enhanced severe winds.



GOES WV-IR BTD-NEXRAD composite imagery (top); NEXRAD-Theta-e cross section (bottom left), RAP model sounding profile over Reston, Virginia (bottom right)

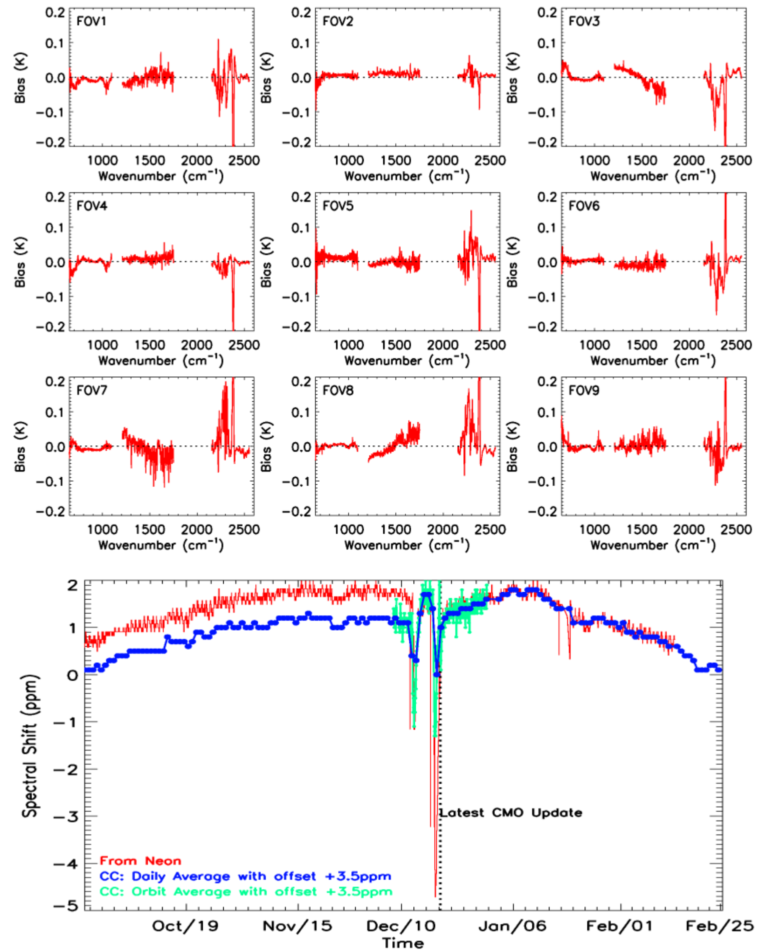


Assessment of S-NPP CrIS Radiometirc and Spectral Accuracy using Community Radiative Transfer Model

Yong Chen[1], Yong Han[2], and Fuzhong Weng[2]

[1] UMD/ESSIC, [2]NOAA/NESDIS/STAR, College Park, MD

- CrIS SDR meets the high quality standard for the usage by NWP and the scientific community
  - FOV-2-FOV variability is small (less than 0.1 K); The sweep direction bias among FORs is also small. Results from the double difference with IASI show that the differences are within ±0.2 K for most of channels.
  - About 3 ppm and 4 ppm uncertainty are found in CrIS SDR data in band 1 (LWIR), and band 2 (MWIR), respectively.

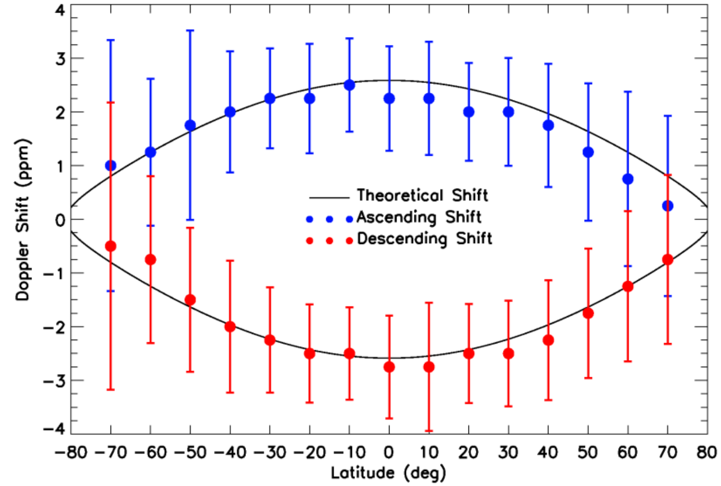


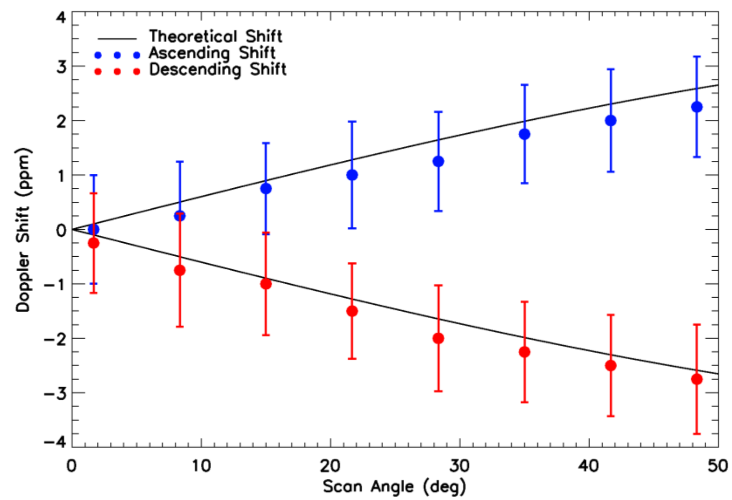
FOV-2-FOV variability and long-term spectral shift

Detection of Earth-rotation Doppler Shift from S-NPP Cross-track Infrared Sounder

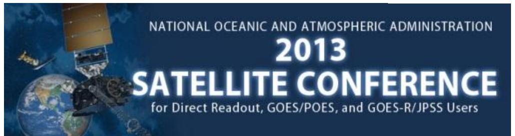
Yong Chen[1], Yong Han[2], and Fuzhong Weng[2]
[1] UMD/ESSIC, [2]NOAA/NESDIS/STAR, College Park, MD

- The Doppler shift detected from CrIS observations is very close to theoretical Doppler shift, which indicates that the spectral stability from CrIS instrument is very high.
  - The observations from CrIS exhibit a relative Doppler shift up to 2.5 part per-million (ppm) due to the Earth's rotation near the Equator and at the satellite scan edge for field of regard (FOR) 1 and 30.
  - The magnitude of the Doppler shift varies with the latitude and the scan position of the observation.



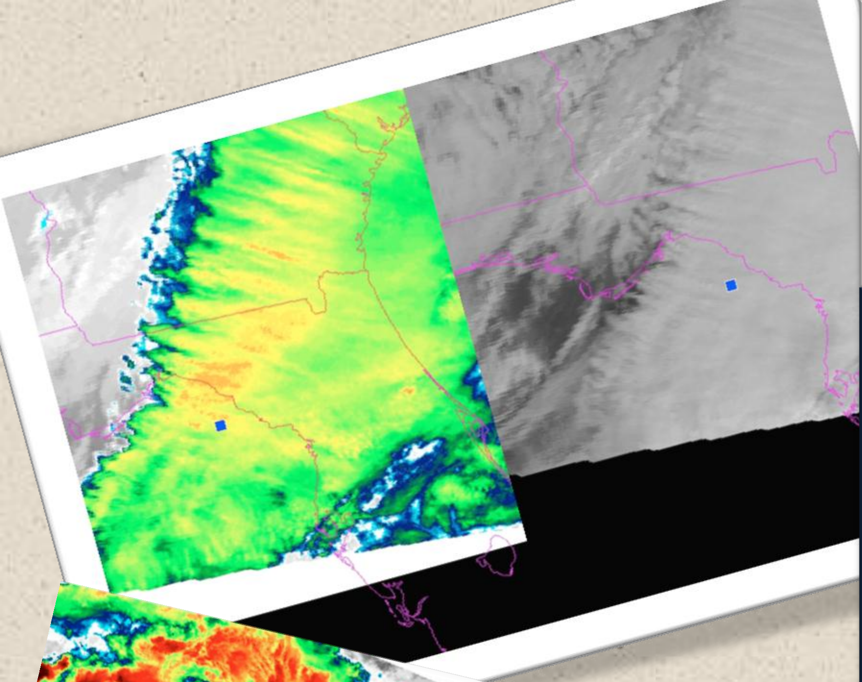


Doppler shift detected from CrIS observations



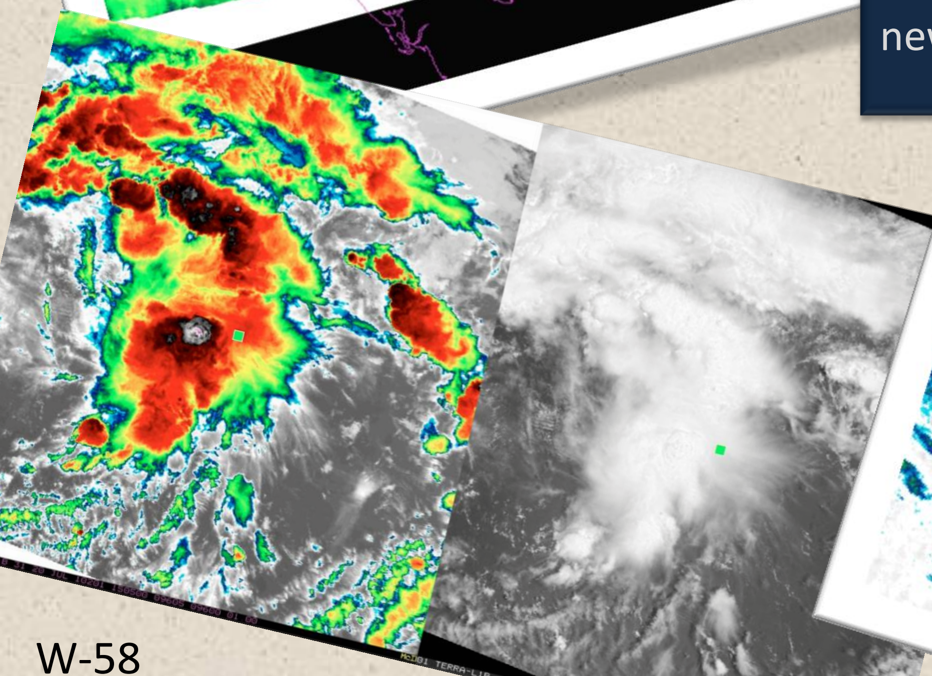
Satellite-Observed Signatures Associated with Moderate to Severe Turbulence Events

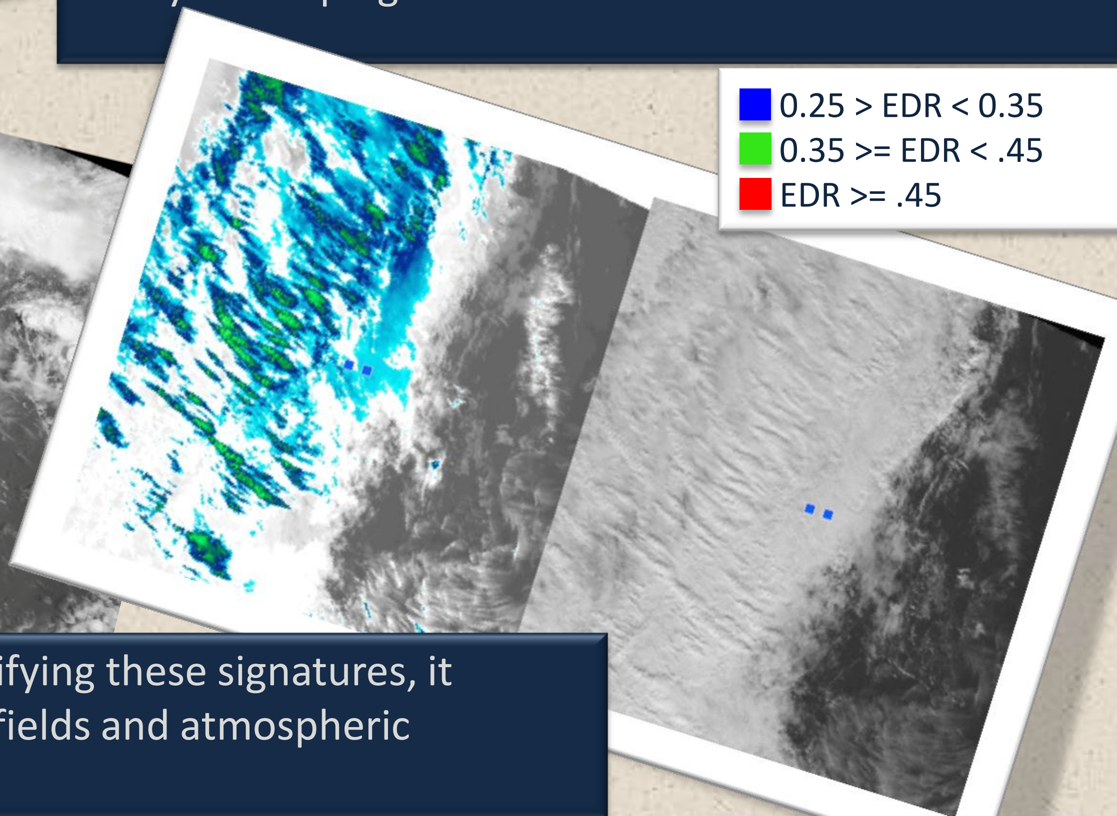
Amanda Terborg – UW CIMSS/SSEC and AWC, Kansas City, MO
Kristopher Bedka – SS&A at NASA LaRC, Hampton, VA



- The most prominent source of MOG turbulence reports from 2010-2011 were the mountain/gravity wave and transverse banding features
- The majority of reports were well away from the robust convective cores, but were often associated with newly developing convection

0.25 > EDR < 0.35
0.35 >= EDR < .45
EDR >= .45





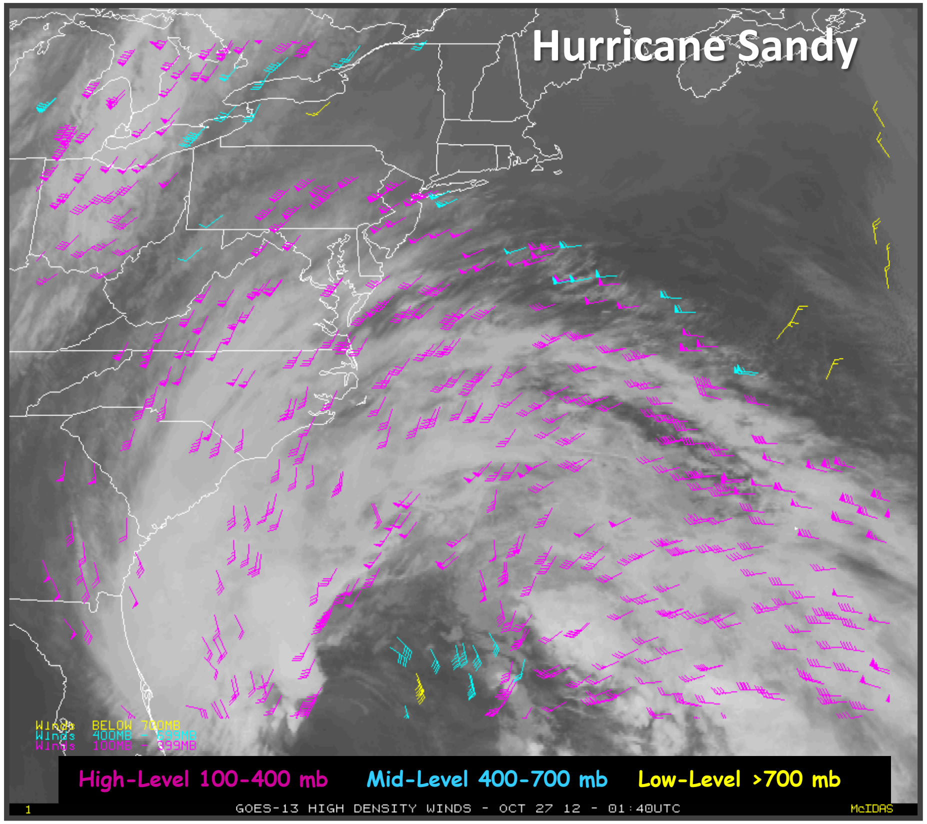
W-58

- While satellite data is very useful in identifying these signatures, it **should not** be used as a standalone. NWP fields and atmospheric conditions must also be analyzed

Atmospheric Motion Vectors Derived from the Future GOES-R Advanced Baseline Imager (ABI): Methods and Error Characteristics

Jaime Daniels, Wayne Bresky, Steven Wanzong, Andrew Bailey, Chris Velden

- New, innovative approach to derive atmospheric motion vectors
- Development, testing, and validation done with GOES, Meteosat/SEVIRI, and simulated ABI data
- Significant reduction in the slow speed bias typically observed with satellite-derived winds
- <u>Major Goal</u>: Improve the impact of AMVs on Numerical Weather Prediction (NWP) forecast skill



Cloud-drift winds derived from 15-minute GOES-13 11um imagery over Hurricane Sandy over the period October 27 (0140 UTC) through October 30 (1240 UTC) , 2012

W-60

Quantifying Power Outages after Severe Storms using the S-NPP/VIIRS Day Night Band Radiances

Changyong Cao[a], Xi Shao[b], and Sirish Uprety[c]

[a]NOAA/NESDIS/STAR, College Park, MD, USA

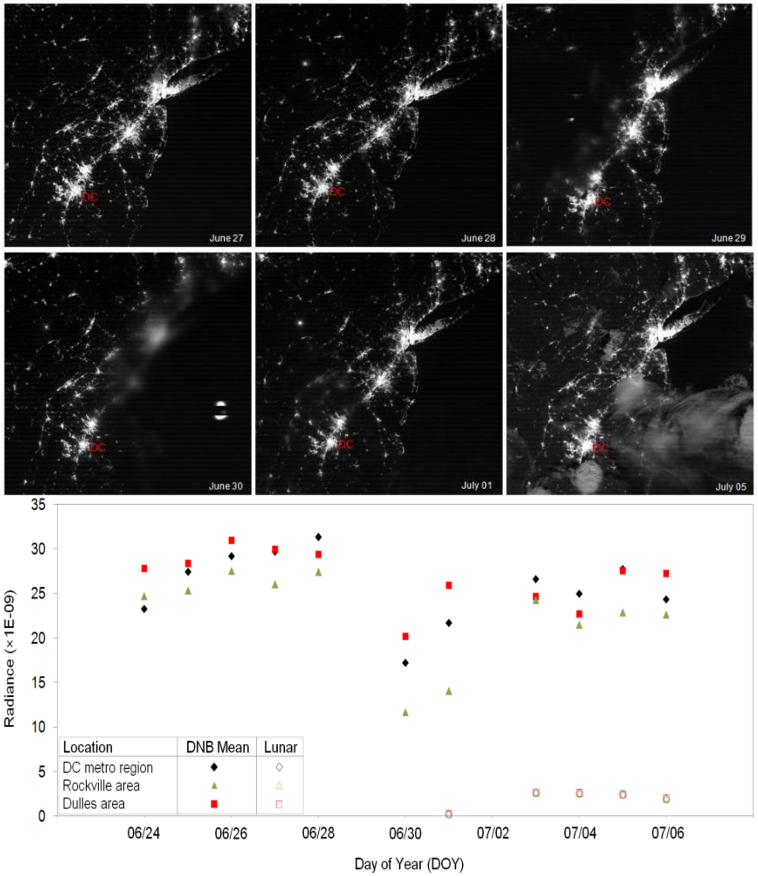
[b]Department of Astronomy, University of Maryland, College Park, MD, USA

[c]CIRA, Colorado State University, CO, USA

- This study explores the use of the well calibrated VIIRS Day/Night Band (DNB) for quantifying power outages due to the Derecho storm in the Washington DC metropolitan area in June 2012, and Hurricane Sandy at the end of October 2012 on the east coast of United States.

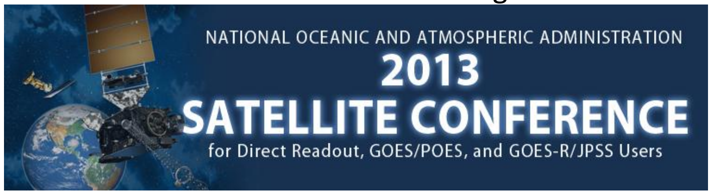
- The results show that the DNB data are very useful for quantifying power outages through light loss detection, but also with some challenges due to clouds, lunar illumination, and straylight effect.

- Comparison of power outage and recovery trend determined from DNB data with power company survey shows reasonable agreement, demonstrating the usefulness of DNB for independently verifying and complementing the statistics from power companies.



VIIRS DNB Images and time series of corrected mean DNB radiance during the Derecho storm in Washington DC metropolitan region.

W-61



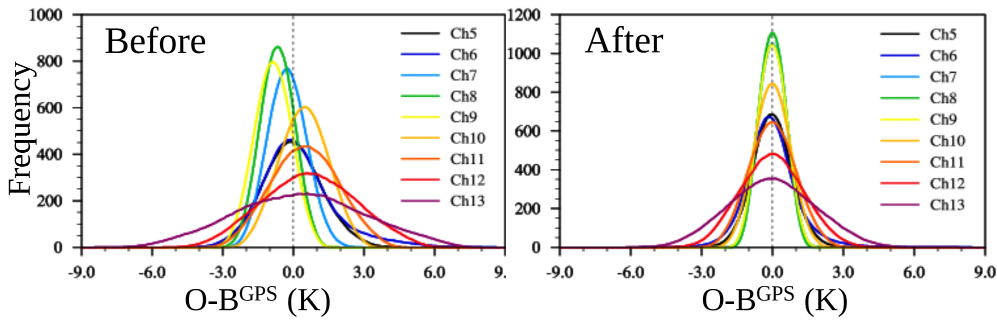
Absolute Calibration of ATMS Upper Level Temperature Sounding Channels Using GPS RO Observations

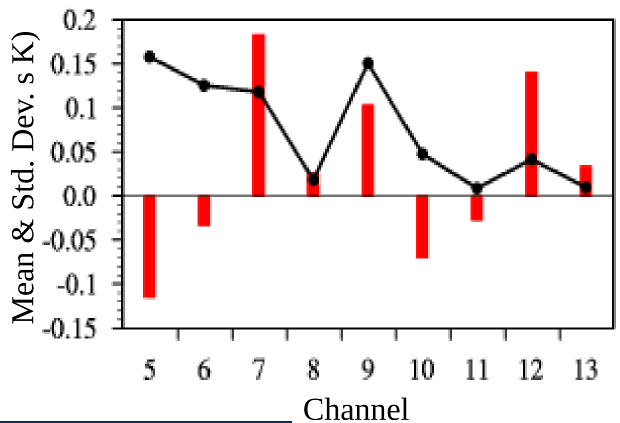
Xiaolei Zou[1], Lin Lin[2], and Fuzhong Weng[2]

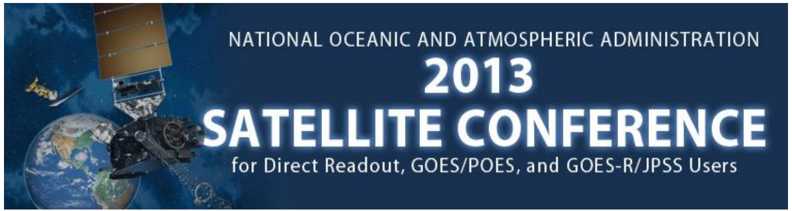
[1] Department of Earth, Ocean and Atmospheric Sciences, Florida State University, U.S.A.

[2] NOAA/NESDIS/STAR, College Park, Maryland, U.S.A.

- The COSMIC RO data are used to estimate ATMS TDR absolute accuracy for chs 5-13.
  - Mean biases of observed TDR are positive for chs 6, 10-13 and negative for chs 5, 7-9, with magnitude less than 0.7K
  - After bias removal, the residual errors have normal Gaussian distribution
  - The difference of simulations from measured SRF versus Boxcar SRF using LBL RTM is around 0.2K







W-63

Real-time Access to Weather Satellite Data and Products on Mobile Devices

D. Santek, D. Parker, R. Dengel, S. Batzli, N. Bearson
University of Wisconsin-Madison
Madison, WI

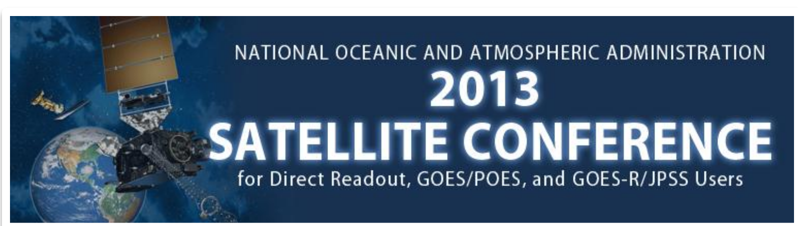
WxSat

Available on the App Store

- Over 150 weather products
  - View on mobile & desktop browsers
- Global satellite imagery
  - Full resolution visible, infrared, and water vapor composite images
  - Updated hourly
  - View with free iPhone/iPad App

http://wms.ssec.wisc.edu/app

Visible image on iPhone



W-64

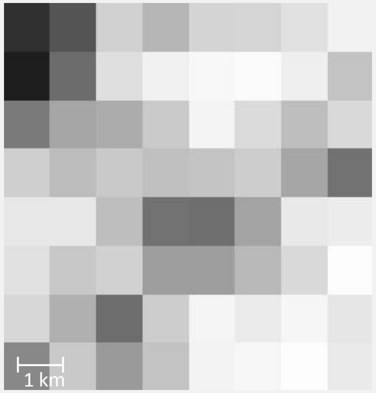
Upscaling of *in situ* Land Surface Temperature for Satellite Validation

Robert Hale[1], Yunyue Yu[2], and Dan Tarpley[3]

[1]CIRA/Colorado St. Univ., [2]NOAA/NESDIS STAR, [3]Short & Assoc.

- Mismatches in scales of measurement between *in situ* and coarse-resolution satellite LST data result in errors that adversely affect validation efforts
  - Regression models have been developed in an effort to reduce these errors
  - Statistically significant error reduction is seen at U.S. Climate Reference Network sites, though absolute reduction is fairly small (~0.2 K)

USCRN Site
FOV: 1.6 m



Satellite LSTs
Resolution: 1km

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
2013
SATELLITE CONFERENCE
for Direct Readout, GOES/POES, and GOES-R/JPSS Users

W-65

W-66. Angular Anisotropy of Satellite Observed Land Surface Temperature

Konstantin Y. Vinnikov, Yunyue Yu, Mitchell D. Goldberg, Dan Tarpley, Peter Romanov, Istvan Laszlo, Ming Chen. *University of Maryland and NESDIS/NOAA*

We developed a technique to convert directionally observed LST into direction-independent equivalent physical temperature of the land surface. The anisotropy model consists of an isotropic kernel, an emissivity kernel (LST dependence on viewing angle), and a solar kernel (effect of directional inhomogeneity of observed temperature). Application of this model reduces differences of LST observed from two satellites and between the satellites and surface ground truth - SURFRAD station observed LST.

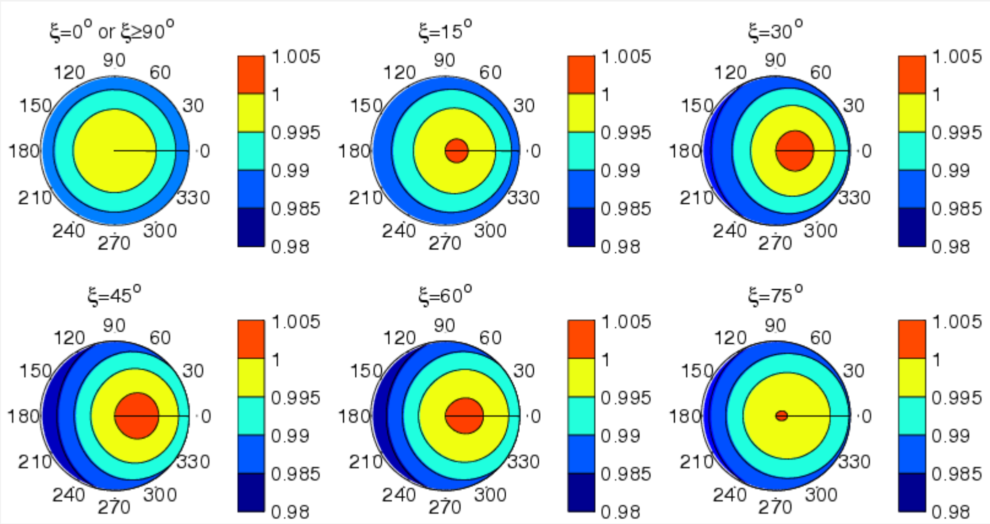
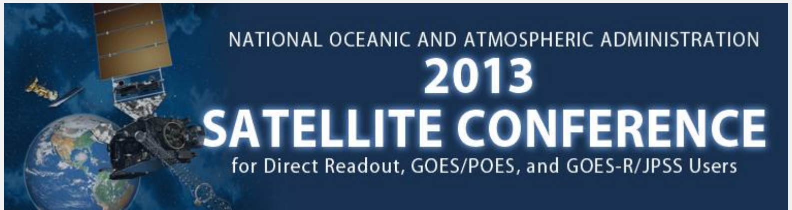


Figure . Estimated universal angular dependence of satellite observed LST for different solar zenith angles ξ. $T(\gamma,\xi,\beta)/T_0$ is displayed in a polar coordinate system (viewing zenith angle γ – radial coordinate 0-90º, relative azimuth β - angular coordinate 0-360º). The value of this function at the center of each subplot ($\gamma=0$) is equal to one, by definition.

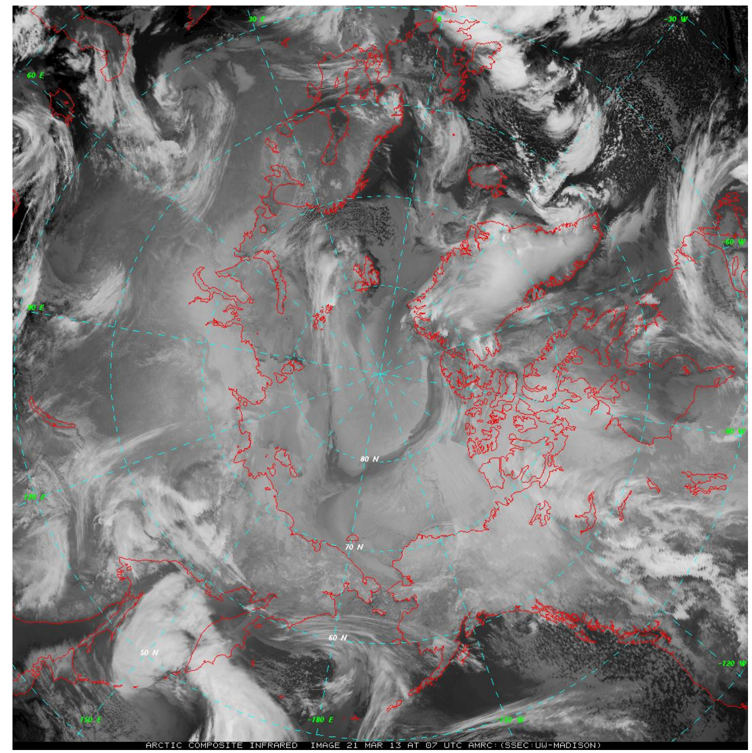
Publication: Vinnikov, K. Y., Y. Yu, M. D. Goldberg, D. Tarpley, P. Romanov, I. Laszlo, and M. Chen (2012), Angular anisotropy of satellite observations of land surface temperature, Geophys. Res. Let. , 39, L23802, doi:10.1029/2012GL054059



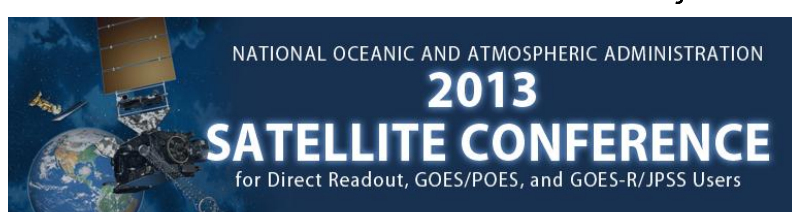
Arctic and Antarctic Satellite Composites: Construction and Applications

Matthew Lazzara, Dave Santek, Rick Kohrs, Brett Hoover, & Dave Mikolajczyk
Antarctic Meteorological Research Center, Space Science and Engineering Center, CIMSS, University of Wisconsin-Madison, Madison, WI

- A satellite mosaic using both Polar-orbiting & Geostationary Satellites
  - Made hourly at 4 km resolution over both polar regions, 5 channels (IR, WV, Vis, LWIR, SWIR)
  - Made considering limb darkening, pixel resolution, observation time, etc.
  - Applications in forecasting, research, including making Atmospheric Motion Vectors (AMVs) from a version of the composite



Arctic Infrared Composite Satellite Image



W-68

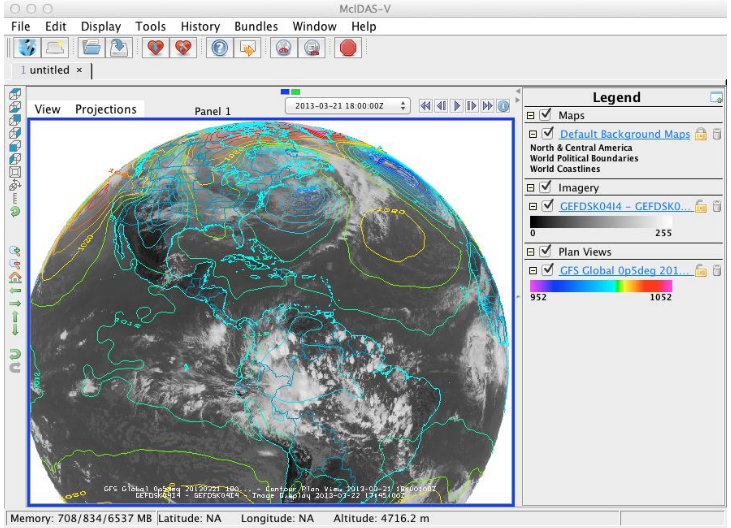
McIDAS-V: A Powerful Visualization and Data Analysis Tool for Geostationary Environmental Satellites

D. Santek, T. Achtor, T. Rink, W. Straka, J. Feltz, R. Schaffer

University of Wisconsin-Madison

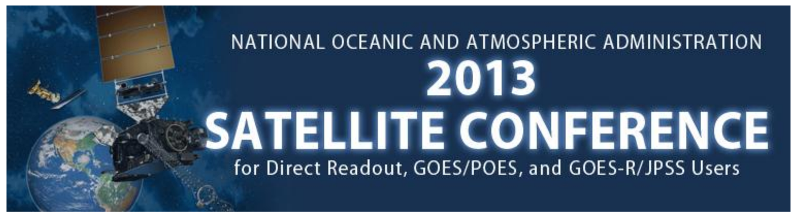
Madison, WI

- Data Analysis and Visualization
  - Free, open-source software
  - Import data from GOES, MSG, MTSAT, FY2, GOES-R
  - Overlay grids and observations
  - Use with data from EUMETCast and GEONETCast Americas



McIDAS-V screenshot

http://www.ssec.wisc.edu/mcidas/software/v/

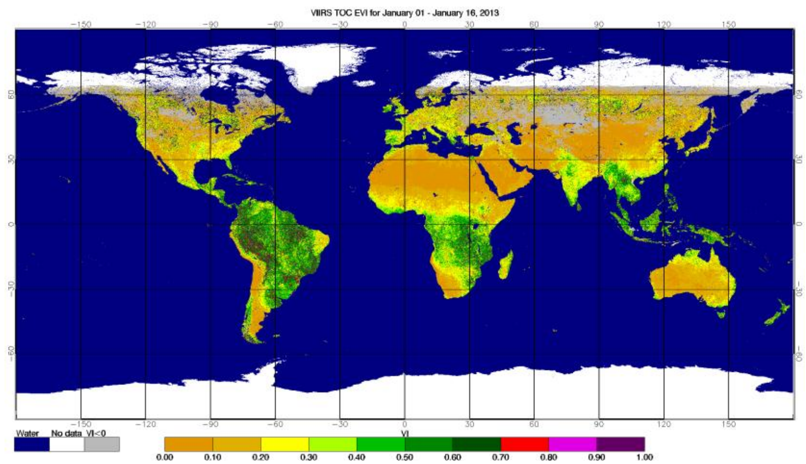


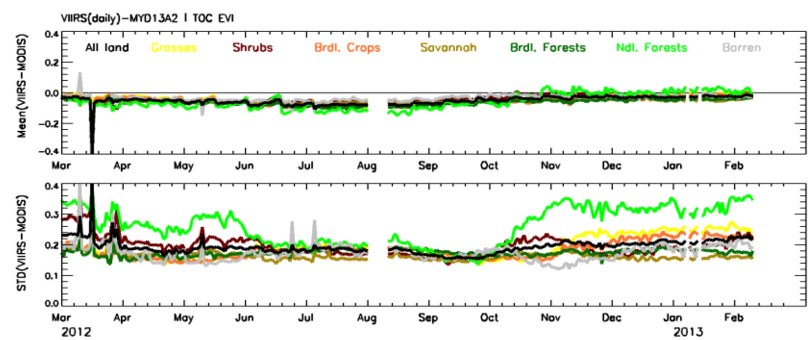
W-69

Monitoring Quality of VIIRS Vegetation Index (VI) EDR Retrievals With MODIS and AVHRR VI Data Using a Web-based Tool

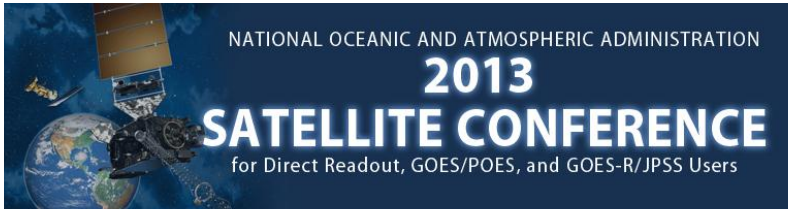
Nikolay V. Shabanov and Marco Vargas
NOAA/NESDIS/STAR/SMCD, College Park, MD

- The VIIRS VI EDR product (TOC EVI and TOA NDVI) is operational since November 2011
- A Near Real Time (NRT) web-based automated tool has been set up at STAR to continuously monitor VIIRS VI global time series (statistical performance, potential anomalies/artifacts, impact of environmental conditions, including residual clouds, aerosols, view/observation geometry, etc). http://www.star.nesdis.noaa.gov/smcd/viirs_vi/Monitor.htm
- Major component in assessment of VIIRS VI product accuracy is comparison with with key heritage data sets from MODIS and AVHRR.
- The VIIRS VI-EDR reached Beta Maturity Status in February 06 2013. The product will be available to the public with a Beta level quality as of May 02, 2012





Top panel: 16-day composite of VIIRS TOC EVI for Jan1-16, 2013. Bottom panel: Statistics on consistency between VIIRS and MODIS VI- time series of mean and STD) of per-pixel difference between VIIRS and MODIS Aqua TOC EVI, calculated over all land and individual vegetation types (7 biomes).



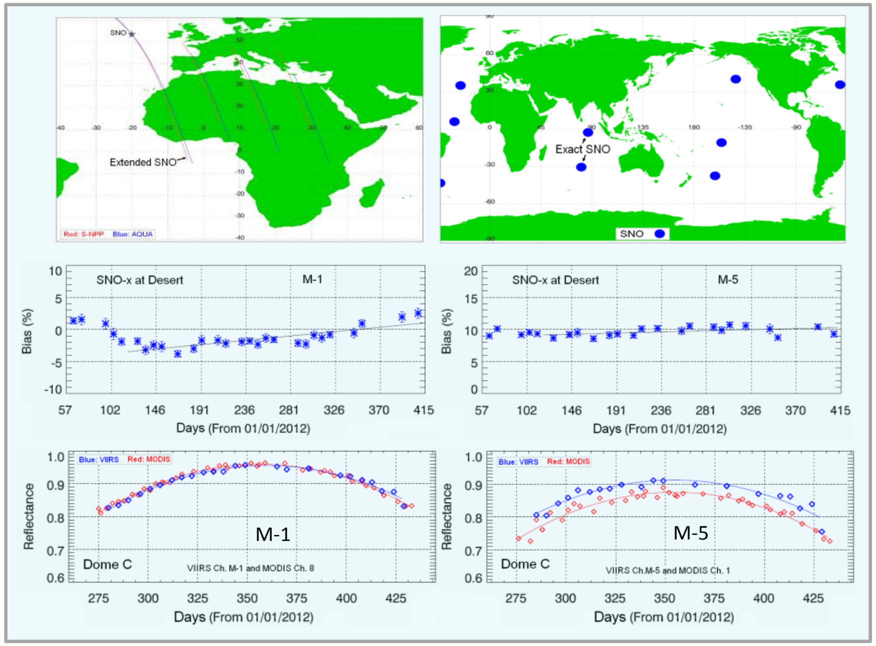
W-74

Radiometric Comparison between Suomi NPP VIIRS and AQUA MODIS using Extended Simultaneous Nadir Overpass in the Low Latitudes

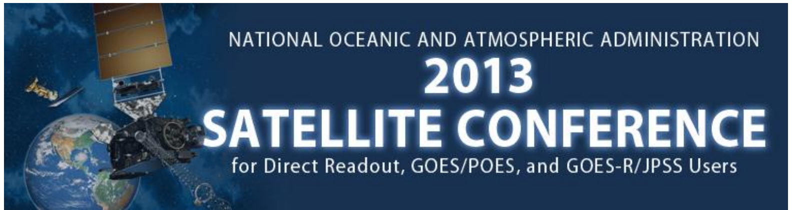
Sirish Uprety[a] Changyong Cao[b] Slawomir Blonski[c] Xi Shao[d]

[a]CIRA, Colorado State University, [b]NOAA/NESDIS/STAR, [c, d]CICS, University of Maryland

- Extended Simultaneous Nadir Overpass (SNO-x) approach for quantifying radiometric accuracy and calibration stability of S-NPP VIIRS
  - Extends SNO orbits to low latitudes for inter-comparing sensors over a wide dynamic range (analyzed over desert and ocean).
  - VIIRS measurements for VNIR radiometric bands agree with MODIS within 2% (uncertainty < 1%).
  - Antarctica Dome C site can be used to evaluate and verify the calibration stability and radiometric bias calculated using SNO-x approach.



Top: SNO-x Events Mid: VIIRS Bias using SNO-x
Bottom: VIIRS Bias at Antarctica Dome C



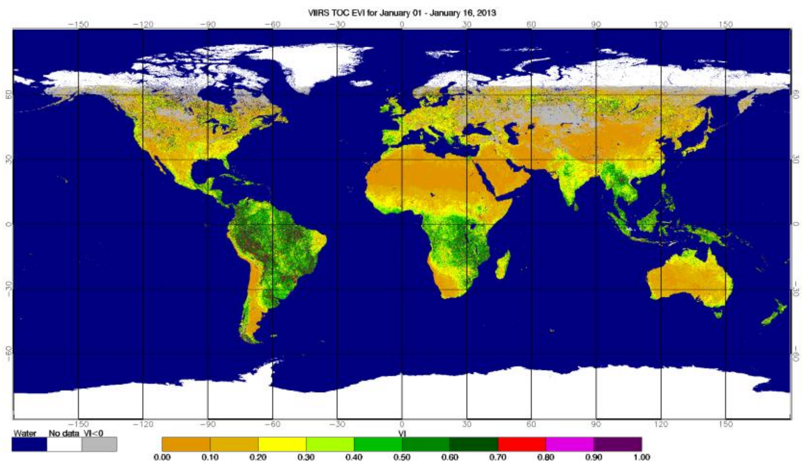
W-75

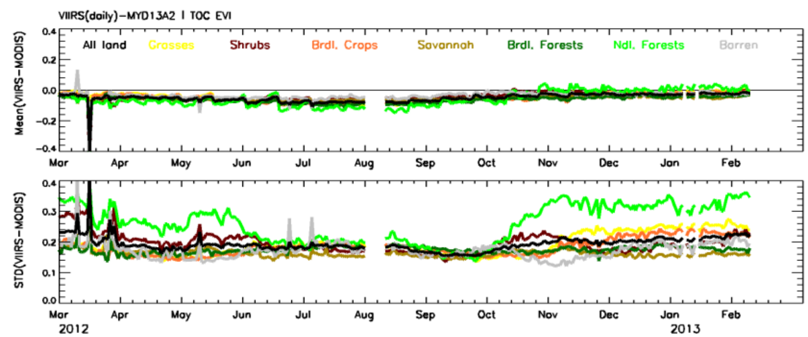
Monitoring Quality of VIIRS Vegetation Index (VI) EDR Retrievals With MODIS and AVHRR VI Data Using a Web-based Tool

Nikolay V. Shabanov and Marco Vargas

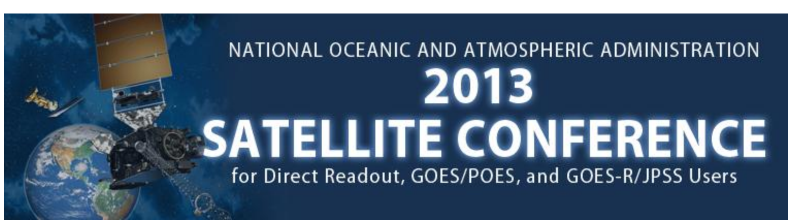
NOAA/NESDIS/STAR/SMCD, College Park, MD

- The VIIRS VI EDR product (TOC EVI and TOA NDVI) is operational since November 2011
- A Near Real Time (NRT) web-based automated tool has been set up at STAR to continuously monitor VIIRS VI global time series (statistical performance, potential anomalies/artifacts, impact of environmental conditions, including residual clouds, aerosols, view/observation geometry, etc). http://www.star.nesdis.noaa.gov/smcd/viirs_vi/Monitor.htm
- Major component in assessment of VIIRS VI product accuracy is comparison with with key heritage data sets from MODIS and AVHRR.
- The VIIRS VI-EDR reached Beta Maturity Status in February 06 2013. The product will be available to the public with a Beta level quality as of May 02, 2012





Top panel: 16-day composite of VIIRS TOC EVI for Jan1-16, 2013. Bottom panel: Statistics on consistency between VIIRS and MODIS VI- time series of mean and STD) of per-pixel difference between VIIRS and MODIS Aqua TOC EVI, calculated over all land and individual vegetation types (7 biomes).



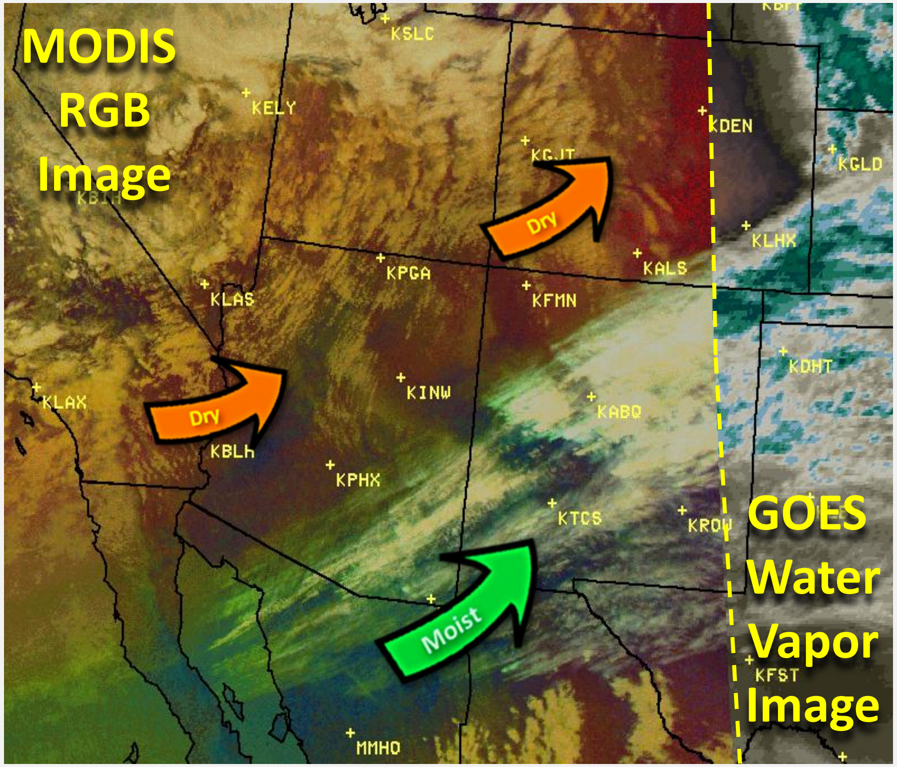
Operational Impacts of NASA SPoRT Products

Brian J. Guyer & Deirdre Kann

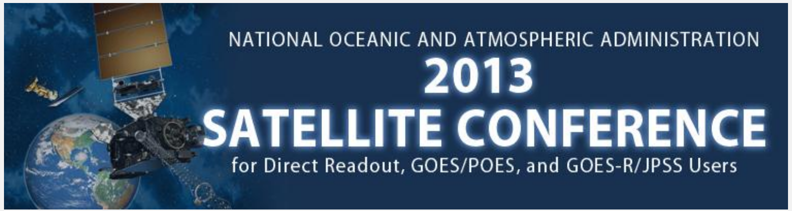
National Weather Service

Albuquerque, NM

- The partnership between NWS Albuquerque & NASA SPoRT has transitioned innovative satellite imagery into forecast operations.
  - SPoRT products supplement data void areas, improve various office forecast programs, and enhance decision support services.
  - The products serve as an effective training tool for future capabilities of GOES-R.
  - One of our recent efforts focuses on the evaluation of a suite of RGB products and their impact on the detection of critical fire weather patterns.



MODIS Airmass Red-Green-Blue (RGB) Image
200pm Friday, February 8, 2013



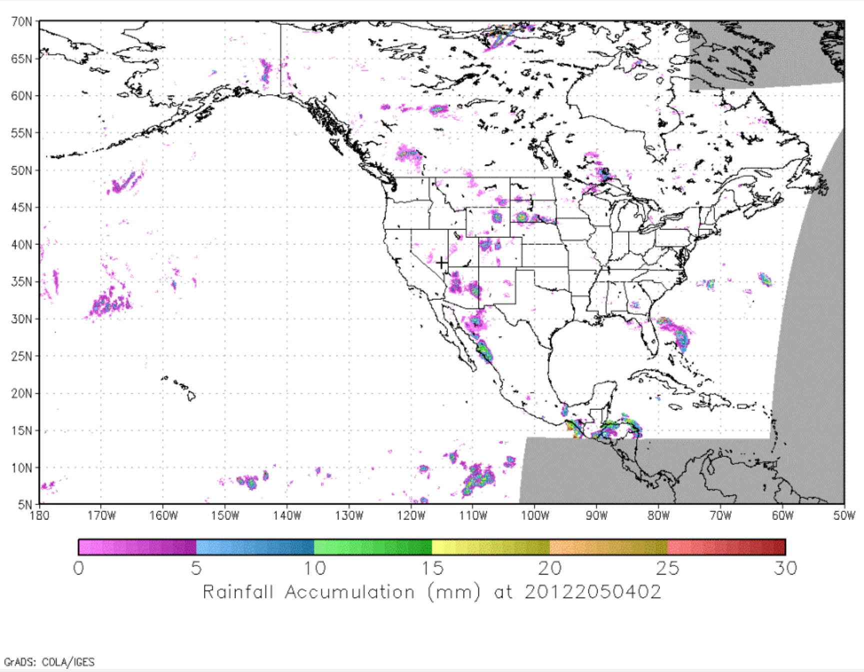
W-79

Validation and Improvement of the GOES-R Rainfall Rate Algorithm

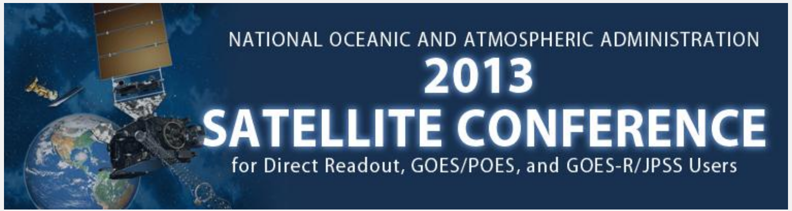
Robert J. Kuligowski, Yaping Li

NOAA/NESDIS/STAR Satellite Meteorology and Climatology Division (SMCD)
College Park, MD

- A simplified GOES-R Rainfall Rate algorithm applied to current GOES:
  - Supports GOES-R Proving Ground and working with users for feedback
  - Has been used to identify significant false alarms in their algorithm and their causes
  - Will also be used to evaluate further algorithm improvements



Loop of the current-GOES version of the GOES-R Rainfall Rate algorithm during 23 July 2012.



NASA SPoRT GOES-R Proving Ground Activities

Kevin Fuell, Gary Jedlovec, Andrew Molthan, Matthew Smith, Geoffrey Stano, Kevin McGrath, and Brad Zavodsky

Short-term Prediction Research and Transition (SPoRT) Center
Huntsville, Alabama

SPoRT provides a suite of products to collaborative WFOs and National Centers to demonstrate the future utility of ABI and GLM products

Forecast issues / applications:

- severe weather and lightning safety
- reductions in ceiling / visibility due to low clouds and fog
- dynamical structure of storms
- convective initiation
- QPE
- Improved situational awareness

Table at right indicates the offices that are receiving the various Proving Ground products

GOES-R Proxy and Demonstration Products transitioned by SPoRT

	Total Lightning (PGLM)	Date of Product Availability
HWT, SPC, AWC, SRH/MRX	PGLM flash initiation, max density, max extent density	HWT (Apr 10), SPC, AWC (Jun 12), SRH/MRX (Apr 13)
	ABI Demonstration Imagery from existng Polar Orbiting Instruments	
SRH (7 WFOs), WRH, ARH, PRH	GOES-POES Hybrid	SRH/WFOs (Dec 10); AWIPS2 (Feb 13); WRH/ARH/PRH (Fall 12)
	ABI Demonstration RGB Imagery from existing Polar Orbiting Instruments	
SRH (6 WFOs), ERH(RAH)	MODIS/VIIRS - TrueColor, AirMass, Dust, Night-time MicroPhysics	MODIS (Aug 11), VIIRS (Nov 12), AWIPS2 (Feb 13)
	ABI Demonstration Products from EUMETSAT SEVIRI instrument	
NHC	SEVIRI Air Mass, Dust, Natural Color RGBs, Aerosol (UW), Pseudo Nat Color (UW), SAL (UW)	SEVIRI RGBs (Jan 11), UW (May 12)
OPC/HPC/SAB	SEVIRI Air Mass, Dust, Natural Color, Night&Day Microphysics, DayTime Storms, Snow/Fog RGBs	(Jan 11)
	GOES-R ABI Future Capability Product from AWG	
HWT, HPC/OPC/SAB, AWC	Convective Initiation (UAH)	HWT (Apr 11), AWC (Jun 12), HPC/OPC/SAB (Jul 12)
SRH (4 WFOs)	Convective Initiation (UAH)	(Aug 11)
	GOES-R ABI Baseline Products from AWG	
ARH/ARFC, PRH (HFO)	Quantitative Precipitation Estimate (NESDIS)	(Aug 12)

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Operational Ozone Products Available from NOAA/NESDIS

Vaishali Kapoor

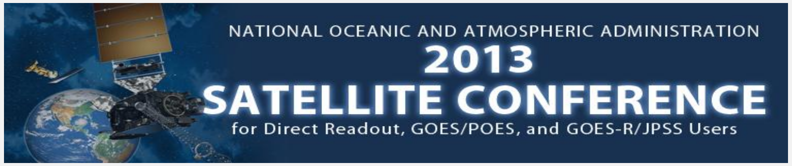
NOAA/NESDIS /OSPO/Satellite Products Services Division(SPSD)

There are many agencies, groups and instruments making ozone products from satellites. This poster explains the operational ozone products produced by the US National Oceanic and Atmospheric Administration (NOAA), National Environmental Satellite, Data, and Information Service (NESDIS) that are available to support near-real time operations. These products are used by United States and international environmental modeling groups for input into weather models, into other satellite algorithms to enhance radiative transfer models, for UV forecast models, and for climate monitoring. These products are available to users in a variety of formats such as BUFR, Binary, GRIB, GRIB2, and ASCII. Poster will also provide information on how to obtain operational access to the following products.

NOAA currently produces near-real-time (NRT) total ozone and profile ozone products from the SBUV/2 instruments designed to measure scene radiance in the spectral region from 160 to 400 nm on the NOAA Polar-orbiting Operational Environmental Satellites (POES) N16 and N17, and N19.

The GOME-2 instrument was designed by the European Space Agency to measure radiation in the ultraviolet and visible part of the spectrum (240 - 790 nm) and derives measurements of atmospheric ozone and other trace gases. It is a scanning instrument (scan width 1920 km) with near global coverage daily. The field-of-view on the ground is 80 km X 40 km.

TOAST is a near real-time operational ozone map generated by combining Advanced TIROS Operational Vertical Sounder (ATOVS) tropospheric and lower stratospheric (4 to 23 km) ozone retrievals with SBUV/2 spatially smoothed mid-to-upper stratospheric (24 to 54 km) layer ozone retrievals. Daily products are created in imagery (png), binary or GRIB format.



W-85

NOAA/NESDIS SOUNDING SYSTEMS DATA PRODUCTS AND SERVICES

A.K. Sharma NOAA/NESDIS/OSPO/SPSD/SPB (NCWCP)

NOAA/NESDIS Sounding Systems

ATOVS (NOAA-15, 18, 19, Metop-1 and Metop-2),
GOES Sounders (GOES-East and West),
IASI (Metop-1, and Metop-2)

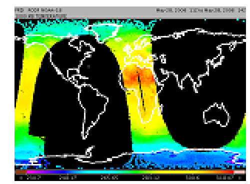
Operational Sounding Products

ATOVS - Near real-time atmospheric temperatures at 42 levels (from surface to 0.1 mb) and water vapor mixing ratios at 19 levels (from surface to 200 mb) with a 40 km horizontal resolution derived from the AMSU-A and HIRS measurements on board the NOAA polar orbiting and European Metop satellites series. AMSU-A brightness temperatures, HIRS channels radiances, layer temperatures and layer thicknesses (15 layers with 40 km resolution), geopotential heights, tropopause pressure, tropopause temperature, total ozone, cloud amount, cloud top temperature, cloud top pressure, layer precipitable water, cloud liquid water and total precipitable water in binary and BUFR format.

GOES - The products include standard imagery which is an image product of the raw sounder data and derived level 2 products (Clear-sky Radiances, Layer & Total Precipitable Water, Cloud-top retrievals (pressure, temperature, cloud amount), Surface Skin Temperature, Temperature and Moisture Profiles, Atmospheric Stability Indices, water Vapor Winds and Total Ozone.

IASI - Temperature and humidity profiles with vertical accuracies of 1 degree Kelvin and 10 % per 1-km layer respectively, water vapor mixing ratio, Ozone mixing ratio, mixing ratio of CO, CO2, CH4, trace gases, and the cloud cleared radiances (CCR) on a global scale.

ATOVS Sounding

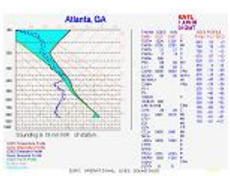


POES

Skew-T Profiles

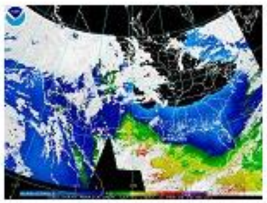
POES

Skew-T Profiles



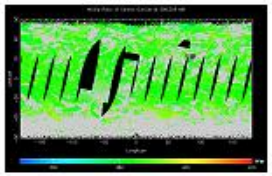
GOES

Sounder DPI



GOES

IASI Sounding



POES

Satellite Cloud Product (SCP)

SATELLITE CLOUD PRODUCT

TCUS41 KNES 261720
SCPCR1
SATELLITE-DERIVED CLOUD INFORMATION FOR MI
HIGH LEVEL (CLD TOPS ABOVE 400 MB)
(OCT)

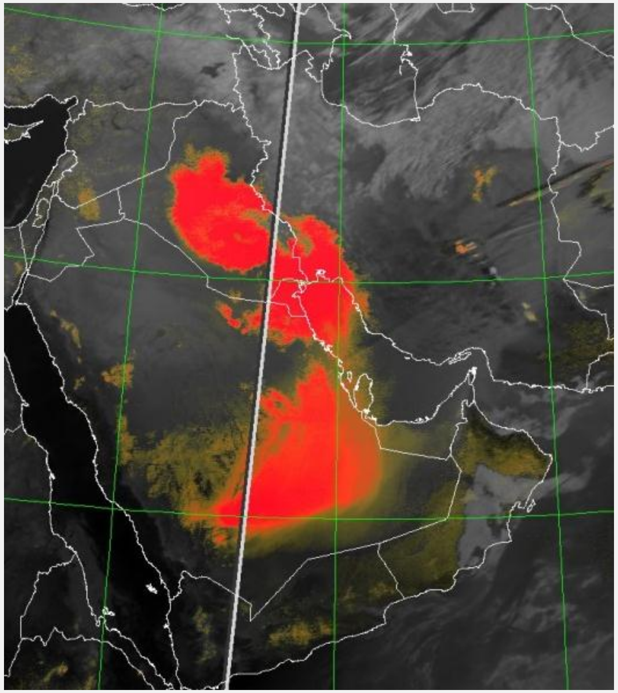
STA	DA/TIMEZ	MID	HIGH	CLD TOP	ECA
CO					
AFAC1	26/1657	CLR			0
KO4V	26/1658	SCT		130-170	36
K20V	26/1655	BKN		130-200	67
K4BM	26/1656	SCT		130-170	28

A Dynamic Enhancement Background Reduction Algorithm (DEBRA) Applicable to GOES-R ABI

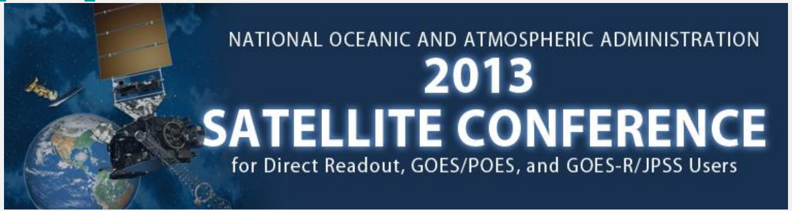
Steven D. Miller

Cooperative Institute for Research in the Atmosphere, Colorado State University
Ft. Collins, CO

- GOES-R ABI will offer new and improved dust detection capabilities
  - Traditional 12-11 μm ‘reverse split-window’ augmented by 8.5-11 μm and daytime 0.47 and 1.38 μm
  - Uses surface emissivity and temperature climatology to reduce land-surface false alarms
  - Provides quantitative detection confidence factor [0-1]



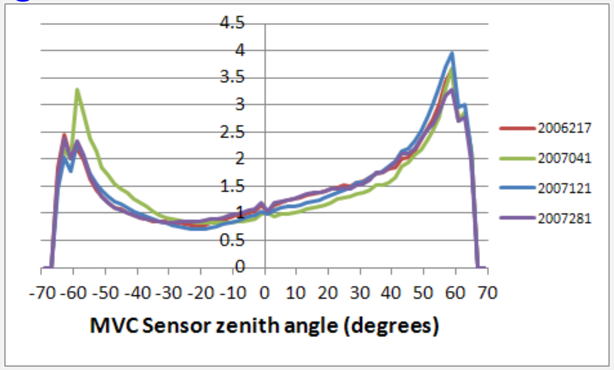
Example DEBRA Enhancement over the Middle East

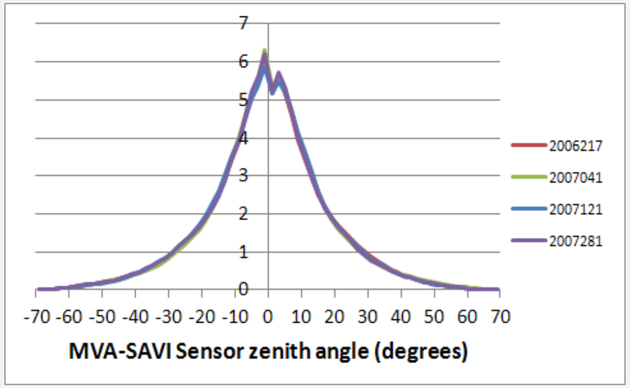


Developing a compositing algorithm for retrieval of green vegetation fraction from the Suomi NPP satellite

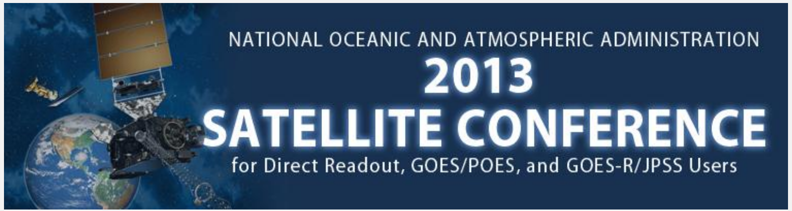
Zhangyan Jiang, Junchang Ju, Marco Vargas, Ivan Csiszar
NOAA/NESDIS /STAR College Park, MD

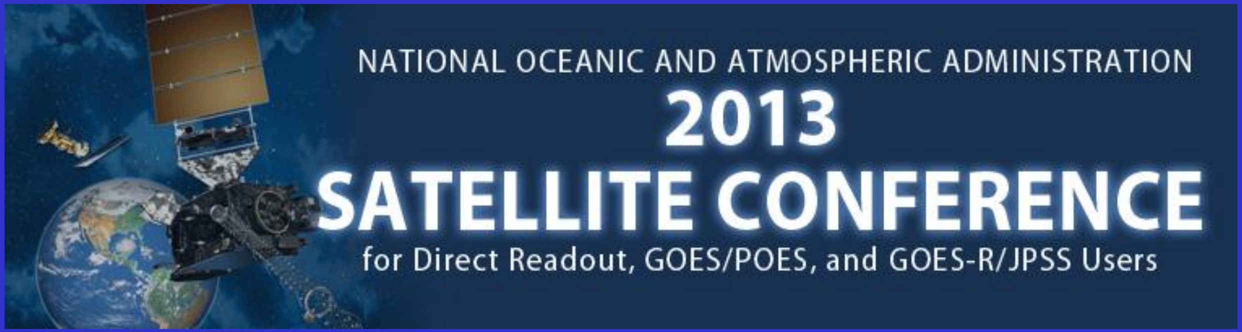
- A Maximum View-angle Adjusted SAVI (MVA-SAVI) compositing algorithm is developed for the SNPP GVF system
  - Select high quality observations from low view zenith angles
  - Favor observations close to the nadir view
  - High but not necessary maximum vegetation index values are selected





Histograms of global sensor zenith angles composited by MVC and MVA-SAVI algorithms





Poster Preview

Thanks to all the poster presenters!

Note the large range of activities!

Thanks to the whole poster committee!