National Aeronautics and Space Administration

The SPoRT
REPORT

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Short-term Prediction Research and Transition (SPoRT) Center
NASA Marshall Space Flight Center (MSFC), Huntsville, AL
http://weather.msfc.nasa.gov/sport/

The SPoRT Center is a NASA-funded project to transition unique observations and research capabilities to the operational community to improve short-term weather forecasts on a regional scale. While the direct beneficiaries of these activities are selected Weather Forecast Offices (WFOs) in the Southern Region, the research leading to the transitional activities benefits the broader scientific community.

Quarterly Highlights

SPoRT GOES-R Proving Ground Activities with Total Lightning

North Alabama Lightning Mapping Array (NALMA) observations are one of the unique products SPoRT provides to several partner Weather Forecast Offices (WFOs). First started in May 2003, the effort now includes five WFOs, including Birmingham and Huntsville, Alabama, Peachtree City (Atlanta), Georgia, as well as Morristown and Nashville, Tennessee. SPoRT's efforts are expanding to other partners with access to total lightning observations. These data offer forecasters improved situational awareness and enhanced warning decision making to improve lead times for severe thunderstorm and tornado warnings.

The NALMA is limited by range, which is approximately 230 km with a corresponding drop in detection efficiency. This limitation is faced by each total lightning network in the United States. Therefore, only WFOs near a network can benefit from total lightning observations. The Geostationary Operational Environmental Satellites (GOES)-R satellite addresses this limitation with the Geostationary Lightning Mapper (GLM). Scheduled for launch in 2015 the GLM will provide continuous coverage of lightning activity across the continental United States. The trade off is a lower resolution of approximately 10 km compared to 1 to 2 km with the current ground based networks. SPoRT is coordinating with the GOES-R Lightning Algorithm Working Group (AWG) to generate proxy data that simulates what the satellite sensor would observe based on ground–based data from various lightning mapping arrays (LMAs). With the AWG's expertise, SPoRT has developed two end products; the flash origin and flash extent density. These products are being integrated into the NWS' next generation display system, AWIPS II. SPoRT will use these products to train forecasters on the capabilities of the GLM and foster feedback to develop additional products, visualizations, and requirements beneficial to end users' needs.

An example of the flash extent product (left) derived from the NALMA is presented on the next page. This GLM proxy is compared to the NALMA's own source density product (right). Although the GLM proxy resolution is inferior, the proxy shares several features in the

source density product. This includes the wide spatial coverage of lightning across northwest Alabama and the location of intense activity in central Alabama. SPoRT is working to create this product in real time and demonstrate the proxy with our WFO partners. These efforts will be shared with the Proving Ground for the 2010 Spring Program in Norman, Oklahoma.
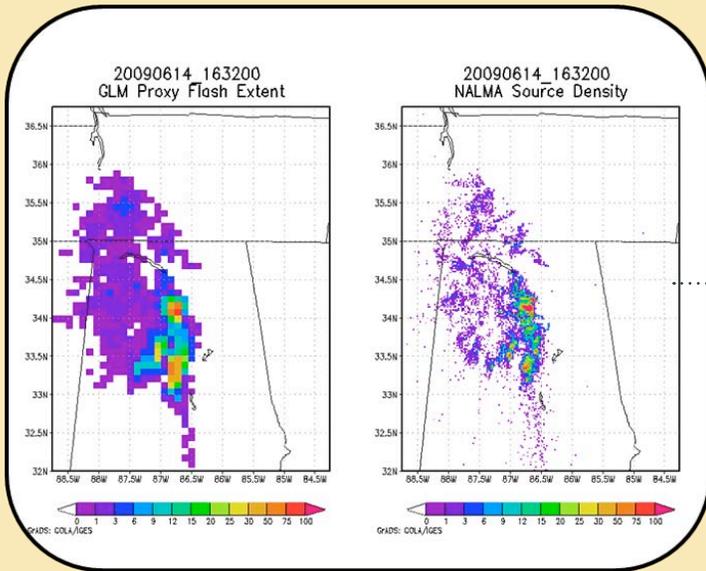
A sample comparison from the web of the GOES-R Lightning Mapper proxy flash extent density product produced by SPoRT using NALMA data (left) and the corresponding NALMA source density product currently available (right). While lacking the fine detail of the source density product, the proxy does give a good view of the spatial extent of lightning activity and the location of the most intense cells.

2009 North Alabama Lightning Mapping Array (NALMA) Assessment

During May and June, four National Weather Service offices (Birmingham, Huntsville, Nashville, and Morristown) participated in an assessment of the utility of total lightning data from the North Alabama Lightning Mapping Array (NALMA). In preparation for the assessment, a series of conference calls were conducted to articulate the scope and objective of the assessment and to review training materials on the interpretation and use of NALMA data (http://weather.msfc.nasa. gov/sport/training/). The objective of this intensive period of assessment was to expand the amount of feedback from our WFO partners and to look for additional opportunities for training and visualization. There is growing interest in the use of the NALMA data with our WFO partners. This is a direct result of SPoRT's efforts to engage in additional training and the efforts of forecasters within each office to test out the data and promote it. Additionally, while the assessment period did not uncover grand new findings, it did support earlier assessments of the NALMA data. There were two recurring themes of the impacts. The NALMA data continues to have significant utility in moderate severe weather cases. The NALMA data are useful to "tip the scales to give a forecaster confidence to issue a warning." In one case in the Morristown county warning area, the NALMA data were used to not issue a warning. The NALMA data is also a good situational awareness tool. In many events during the two month period, forecasters reported that the NALMA data were key to providing insight into which storms were intensifying versus those which were not. This helped forecasters determine which storms needed additional attention and whether or not lightning was an active threat to the public at large.

NALMA data is also being use for lightning advisories and safety. Two cases in particular stood out and have been posted on the Wide World of SPoRT Blog (http://www.nsstc. uah.edu/sportblog/) in the Lightning Mapping Array section. To summarize, the Huntsville WFO used the NALMA during Memorial Day weekend to assist county emergency managers with lightning safety. "Radar showed that the storm was clearly building, and we were able to provide additional lightning information to the [Morgan County] EMA with about 20-25 minutes of lead time." Additionally, the Morristown WFO used the NALMA data a day later to update the Terminal Aerodrome Forecast (TAF). "The national [cloud-to-ground] lightning data did not have any lightning strikes with a line of convection moving north out of Georgia. However, the NALMA did pick up on the growing number of [intra-cloud] flashes, which gave me a heads-up to include thunder in the TAF."

Discussions with the NWS forecasters raised two major requests. The initial request is for a form of detection efficiency plot. As storms move closer to (or away from) the center of the network, the total lightning activity may change when in actuality, no change is occurring. SPoRT

is investigating several simple displays to help forecasters maintain awareness of this. The other request, which has been raised in the past, is the need for a real-time product displaying the source density trending. Currently, in AWIPS, forecasters must keep a mental picture of how a storm has changed with time. A real-time graph of the source density trending would greatly assist with situational awareness in the warning decision making process. One route SPoRT is exploring is to implement work developed by Mamoudou Ba of the Meteorological Development Lab in Silver Spring, MD. His work allows for this graph to be created in the System for Convection Analysis and Nowcasting (SCAN) software of AWIPS. Additional trending capabilties in AWIPS II are being explored as well.

NSSTC Data Assimilation Workshop

SPoRT hosted the 1st National Space Science and Technology Center (NSSTC) Data Assimilation (DA) Workshop on Tuesday, May 5, 2009. The workshop was designed to bring research scientists from NASA, USRA, UAH, and Ensco Inc. working to assimilate remotely-sensed observations into numerical predication models together for an information and technique exchange and encourage additional collaborations in ongoing research or new proposal activities. In all, there were 14 presenters and approximately 35 attendees. Applications employing DA techniques such as successive correction, 3DVAR, ensemble Kalman Filtering, and nudging were all discussed.

The workshop was divided into four topical areas. Presentations on land surface data assimilation described the various techniques used in land surface models to incorporate satellite observations from MODerate resolution Imaging Spectroradiometer (MODIS), Advanced Microwave Scanning Radiometer-EOS (AMSR-E), and Geostationary Operational Environmental Satellites (GOES) Imager/Sounder sensors. DA applications for air quality and chemical modeling presentations described how chemical models for air quality and chemical dispersion forecasting are updated using satellite observations from Ozone Monitoring Instrument (OMI) and MODIS. Applications of data assimilation techniques for atmospheric modeling described how clouds, hurricanes, and precipitation forecasts can be improved using satellite observations from GOES and Atmospheric InfraRed Sounder (AIRS) and radar observations from Doppler radars. An additional topical area focused on unique

technologies for DA. Presentations in this sections discussed innovative methods for data reduction and use of scripting and web service protocols to perform real-time satellite DA activities.

The workshop included time for informal discussions on technical approaches and future research strategies to obtain additional funds to grow the DA activities at the NSSTC. The group decided that the NSSTC DA identity should be defined by use of satellite observations to improve short-term regional forecasts and that the NSSTC DA researchers should promote this expertise to outside partners in an effort to enhance collaborations. SPoRT scientists agreed to lead this effort to bring together collaborative efforts within the NSSTC DA community. One such outcome was the implementation of an NSSTC DA email distribution list <nsstc-data-assimilation@lists.nasa.gov> through which announcements regarding external speakers, recent conference and peer-reviewed publications, and proposal opportunities can be disseminated. Please contact Brad Zavodsky <brad.zavodsky@nasa.gov> if you would like to be added to this mailing list to receive updates on the NSSTC DA activities. Presentations from the workshop can be viewed on the SPoRT Web Site at <http://weather.msfc.nasa.gov/sport/workshops/#2009DA>.

Recent Accomplishments

Microphysical Adjustments in WRF Using CloudSat

Efforts to improve WRF forecasts for cold-season precipitation continue, with an emphasis on data obtained during the Canadian CloudSat/CALIPSO Validation Project (C3VP). The passing of a mid-latitude cyclone and upper level shortwave lead to widespread snowfall during the period of January 21–22, 2007, and these data are being used to validate and improve the performance of the NASA Goddard six-class, single-moment microphysics scheme. Improvements to a single-moment scheme in cold-season precipitation will benefit future retrievals of cloud properties based upon radar and passive microwave satellite data, as well as contributing to better representation of microphysical processes relevant to operational forecasts of cloud cover and precipitation. Aircraft data continue to be analyzed, with size distribution parameterizations fit in order to compare against the results of previous campaigns. In addition, surface data are now being included to supplement the aircraft profiles, which are limited to altitudes of roughly 1 km and above, due to flight safety

restrictions. Experimental forecasts suggest that a temperature-based parameterization may be ideal. Furthermore, comparisons to CloudSat data require the use of single scattering characteristics for true snow crystal habits, rather than the assumption of scattering by Mie spheres. In reality, snow crystals are not spheres, therefore, their scattering characteristics must be properly accounted for when simulating CloudSat reflectivity. Proper simulation of CloudSat reflectivity is required in order to use observations from space, so that the comparisons are fair and not biased by poor assumptions within the simulation of radar reflectivity.

WRF LIS Studies

Efforts continue on the analysis of sensitivity results, comparing a set of Control WRF simulations using initial land surface and SST data from the National Centers for Environmental Prediction (NCEP) North American Mesoscale (NAM) model to a set of experimental runs using Land Information System (LIS) land surface and MODIS SST initialization data. Using the object-based verification methods in the Meteorological Evaluations Tools (MET) package, analysis has shown that the WRF runs using the LIS and MODIS data resulted in a 4% increase in the matched precipitation areas (i.e. forecast "hits"), while simultaneously decreasing the unmatched precipitation areas also by 4% (forecast "misses"). These results were presented at a seminar that Mr. Case delivered to the Joint Center for Satellite Data Assimilation on May 20. He also presented these results during a poster session at the 10th WRF Users workshop. Work continued work toward a real-time LIS run on SPoRT's cluster, with a goal of providing high-resolution LIS initialization data to SPoRT partners for local/regional modeling applications. A few technical hurdles still need to be overcome prior to running LIS in parallel on the cluster. During a site visit to the GSFC in May, Dr. Kumar of the LIS group and Mr. Case made a correction to the LIS interpolation scheme for the North American Land Data Assimilation System forcing dataset. The error in the interpolation scheme only showed up on SPoRT cluster, and not on Goddard supercomputing cluster.

Collaboration with NSSL on WRF Forecasts

With the help of SPoRT collaborations prior to the Spring Experiment 2009, the Air Force Weather Agency (AFWA) provided a WRF modeling member that included LIS land surface initialization data on the exact NSSL WRF domain. In addition, Mr. Dembek configured a parallel NSSL WRF simulation using SPoRT's MODIS SSTs that ran for the

duration of the 2009 Spring Experiment from May 1 to June 5. These model output were made available throughout the Experimental Forecast Program (EFP) component of the 2009 Spring Experiment. Mr. Case attended the EFP during the week of May 26. During each day of the EFP, visiting scientists would examine the forecast situation each day, and construct preliminary and final convective outlooks (similar to the Storm Prediction Center's outlooks) for two time windows valid from 2000–0000 UTC and 0000–0400 UTC. The visiting scientists made use of more than twenty convection-allowing numerical weather prediction ensemble members produced by the Center for Analysis and Prediction of Storms, AFWA, NSSL, and the Global Systems Division. Each day also involved an evaluation of the previous day's convective outlook, and examination of model verification, emphasizing convective and mesoscale precipitation systems and the object-based verification technique in MET.

WRF/SST Forecast Impact Studies

Instructions to run the WRF Environmental Modeling System (EMS) using MODIS SSTs to initialize the sea surface have been developed. Originally designed for version 2 of the WRF EMS, this document was updated for version 3 of the WRF EMS to reflect the numerous changes that have taken place.The draft instructions document was released to the NWS offices at Miami, FL and Mobile, AL for testing during their upgrades to the EMS version 3. SPoRT is currently awaiting feedback from these NWS offices.

AIRS Profile Assimilation:

A final version of the AIRS profile assimilation paper is nearly complete. Results suggest that analyses in the lowest levels are consistently warmed with the addition of AIRS profiles, but mid-level temperatures from AIRS still lead to improved temperature analyses. Due to the geopotential height is an integrated quantity calculated from the surface, the low-level warming leads to increased height biases at all levels regardless of mid-troposphere temperature analysis improvements. Forecast results still show improvement in temperature and height forecasts in later forecast hours with the addition of AIRS data; however, this improvement now appears to be caused by a cool bias in the model shortwave radiation scheme that reduces temperatures and height compared to verification data sets during daytime forecast hours. In preparation for future data assimilation research, WRF Version 3 and its components (i.e. WRFDA, WPS, WPP) have been installed on the SPoRT lc2 and Goddard NCCS Discover Linux clusters. This version contains updated physics schemes and

compatibility upgrades to new NCEP grib2 data formats. A script which runs WRF forecasts in cycling mode is currently under development. Additionally, code and instructions for running a stand-alone version of the GSI on the Goddard NCCS Discover Linux Cluster were obtained from GSFC to support upcoming profile and radiance assimilation activities. Implementation of that code will continue throughout the summer.

Lightning Forecasting

Work continues on a project to apply the WRF lightning threat algorithm to an ensemble of CAPS WRF simulations for selected days from the Spring 2008 storm season. The first case studied, May 2, 2008, featured severe storms that were located in northern Mississippi, at the edge of the area of good coverage by the North Alabama LMA network. Thus, flash rate densities may have been slightly higher than indicated by the NALMA data. Application of the McCaul et al. (2009) algorithm to the CAPS ensemble from May 2, 2008 shows that the peak flash rate density based on the graupel flux is, as expected because of the coarser 4 km grid mesh of the CAPS runs, somewhat reduced compared to the NALMA observed peak flash rate density. The peak flash rate density based on vertically integrated ice is closer to the NALMA observations, but slightly elevated relative to them. Although a limited number of cases are available in both the NALMA data and the CAPS simulations, work is underway to analyze another day, May 11, 2008, which features additional severe weather closer to Huntsville. The latter day will be scrutinized to see whether the VII-based lightning forecast still overshoots the NALMA observations. It may be that the VII-based threat is not subject to significant mesh-dependent biases, and might be the basis for calibrating the amplitudes of the graupel-flux-derived threat. Both threats should exhibit the same peak flash rate densities in order to be said to be properly calibrated, and useful for the threat blending proposed by McCaul et al. (2009).

AWIPS II

As AWIPS II slowly replaces AWIPS during the next year, the ability to handle our SPoRT data streams (particularly McIDAS data) with the new software package becomes more critical. A McIDAS Decoder module, called a plug-in, is being developed by Jason Burks, the SIO at the Huntsville WFO and SPoRT staff. Geoffrey Stano has made outstanding progress with the real-time lightning data from the North Alabama LMA. We will soon be able to display LMA data from any of the LMA networks side-by-side on both AWIPS and AWIPS II.

GOES-R Proving Ground Activities

SPoRT has partnered with NOAA/NESDIS in the GOES-R Proving Ground (PG) activity to test, demonstrate, and transition GOES-R proxy or demonstration products to operational forecasters at WFOs throughout the region. This activity will use GOES-R products provided by specific AWGs and the Proving Ground Team to address specific forecast problems of the WFOs. The PG and AWG teams will develop algorithms to produce a variety of products from existing satellite, aircraft, and ground-based sensors, and model forecasts to mimic those from the GOES-R instruments. SPoRT will contribute to this development activity in areas of expertise such as the generation of multiple channel combinations of image data, composite product development, WRF-based lightning threat studies, and assimilation of real and proxy data into numerical weather analyses and forecasts for improved diagnostics and short-term forecast improvement as demonstrated in past program activities. Current focus has concentrated on total lightning measurements for (NALMA) and other ground-based networks from around the country. SPoRT provided data from three of these networks to the Spring Program conducted as part of the Hazardous Weather Testbed (HWT) activities this year. Use of this data during the Experimental Warning Program was observed by Dr. Geoffrey Stano, who has subsequently developed an initial flash density product as a proxy for the Geostationary Lightning Mapper on GOES-R. These products are now being integrated into the AWIPS for real-time display.

The SPoRT lightning team responded to the GOES-R3 "Call for new proposals: Innovative ideas for multi-instrument blended satellite products" by submitting a research letter of intent (LOI) entitled "Combined GLM/ABI Lightning Warning Product". The current lightning warning product being developed for R3 only uses observations from the GLM, therefore lightning has to be occurring before a forecast can be made. The current LOI proposes to add satellite cloud-top observations to develop a probabilistic forecast map prior to lightning activity. This would then be blended into the lightning only product. This would be a useful extension since many lightning fatalities occur early in a storms' life cycle, before people try to get to shelter. This proposal was down selected and Dennis Buechler will travel to the GOES-R3 meeting in College Park, MD at the end of July to present the proposal to the GOES-R3 committee.

MODIS Data Used in the GFE

The National Weather Service is continually creating forecasts using digital grids via the Graphical Forecast Editor (GFE) software. Recently, Brian Carcione of the Huntsville, AL WFO collaborated with SPoRT to ingest some of the MODIS data. In particular the MODIS sea surface temperature (SST) composite, the land surface temperature (LST), and cloud mask are useable in the GFE. With the data in digital form, the NWS can use the MODIS data to initialize a grid, add mesoscale structure to the forecast, guide a diurnal interpolation of forecast grids, or as verification of gridded forecasts to form running bias and error statistics. For example, the code has been provided to Jeff Medlin (SOO) and Steve Miller (Forecaster) at the Mobile, AL WFO. They are now able to use the high resolution structure observed in the MODIS SST composite to initialize a grid of SSTs for publication to their website for use by the marine community. The Huntsville WFO is interested in the MODIS cloud mask to help verify and guide their sky cover grid, and several WFOs with variable terrain may find the MODIS LST useful for night-time temperature grid verification or initialization.

Enhanced SST Composite

SPoRT, in collaboration with the Jet Propulsion Laboratory (JPL), is developing an enhanced SST composite incorporating MODIS and the Advanced Microwave Scanning Radiometer—Earth Observing System (AMSR-E). The approach generates composites over a given region at four times each day corresponding to Terra and Aqua equator crossing times (i.e., Terra day, Aqua day, Terra night and Aqua night). Day-time (night-time) AMSR-E SST data from Aqua are used with both Terra and Aqua MODIS daytime (night-time) SST data-sets. For a given day and region, the SSTs from the previous seven days form a collection used in the compositing. At each 1km pixel data from the collection (both AMSR-E and MODIS) cloud-free SST values are used to determine a weighted average based on their latency and quality. In this way recent SST data is given more weight than older data. Since MODIS SSTs can not be derived in the presence of clouds, a MODIS only composite is limited during times of long-term cloud cover This increases the latency of the data and consequently reduces the accuracy of the SSTs present in the composite. By incorporating AMSR-E (25km resolution) data, latency decreases as this product provides accurate SSTs in areas of persistent cloud cover.

We are currently evaluating the enhanced composite product using four case study periods to validate the approach. Each case is from a challenging region and time of year in order to rigorously test the performance. The case studies include regional Florida waters (June–July 2007), the western Atlantic, Gulf of Mexico and Caribbean (December 2008), the Atlantic hurricane region (August 15–September 15, 2008) and the eastern Pacific (June–July 2009). Studies include comparisons of buoy and other in situ observations to various algorithm forms and implementation methods. SPoRT and JPL are working together to settle on a consensus algorithm to be used as a real-time composite posted on the SPoRT webpage to monitor. Before the end of the year, the plan is to transition the final algorithm to the Physical Oceanography Distributed Active Archive Center (PODAAC) at JPL for formal operations and dissemination to the public.

Personnel

Expanded Civil Service Workforce

In an effort to bring young scientists into the Earth science civil service workforce, NASA recently hired Brad Zavodsky to lead the SPoRT data assimilation activities. Mr. Zavodsky previously worked with the SPoRT program as a Research Associate with UAHuntsville since 2005. His responsibilities will include continuing data assimilation research, outlining and planning ideas for new projects, and submitting proposals to support data assimilation activities at SPoRT.

Summer Intern Evaluates Enhanced Composite SST

The SPoRT project hosted a summer intern, Mr. Luke Schiferl, who began comparing a version of the enhanced MODIS SST product using data from both MODIS and AMSR-E against the original MODIS SSTs during June and July 2007. These two months were chosen because during the Miami, FL WRF/SST modeling project, these months experienced substantial data latency in the original MODIS SSTs due to extensive cloud cover and convection. The original and enhanced MODIS SSTs were verified at observation sites in the Gulf of Mexico and the Atlantic Ocean near Florida. Preliminary results indicate that the enhanced MODIS/AMSR-E corrected much of the latency problem of the original MODIS composites, and verified better than both the original MODIS and RTG.

Matt Rigney Joins the SPoRT Team

Matt Rigney, who completed his Master of Science degree in atmospheric science at Texas A&M University in May, joined the SPoRT Team as a UAH Research Associate. Mr. Rigney brings experience running an Ensemble Kalman Filter data assimilation technique as well as an understanding of data assimilation theory. His projects with SPoRT will include production of an objective analysis MODIS/AMSR-E composite SST product and implementation of Ensemble Kalman Filter techniques.

NSSL Spring Program–Stano, Fuell, Case

Dr. Geoffrey Stano, Mr. Jon Case, and Mr. Kevin Fuell were invited to this year's Experimental Warning Program in Norman, Oklahoma as forecasters and subject matter experts. This program, part of the larger, annual Spring Program, brings forecaster from around the country to Norman to participate in real-time forecaster operations with experimental and test-bed products.

Meetings Attended

- GOES-R Proving Ground at the Hazardous Weather Testbed Spring Program, Norman, OK, April 27–June 12
- NOAA USWRP Testbed Workshop, Boulder, CO, April 27–28.
- NPOESS Training Development Workshop, Boulder, CO, May 12–14
- GOES-R Proving Ground Meeting, Boulder, CO, May 15

Proposals Submitted:

- "Combined GLM/ABI Lightning Warning Product", Co-Is: Dennis Buechler, Geoffrey Stano and Gary Jedlovec. GOES-R3: Innovative Ideas for Multi-instrument Blended Satellite Products Solicitation.

- "GOES-R SST Composite Product for Weather Forecasting and Validation Studies" , Co-Is: Frank LaFontaine, Gary Jedlovec, and Jackie Shafer. GOES-R3: Innovative Ideas for Multi-instrument Blended Satellite Products Solicitation.

- "Ice/Snow Cover Product with Snow Water Equivalent from a Multi-Satellite/Modeling Platform", Co-Is: Gary Jedlovec, Clay Blankenship, Frank LaFontaine, Kevin Fuell, and Jon Case. GOES-R3: Innovative Ideas for Multi-instrument Blended Satellite Products Solicitation.

Proposals Won:

- "Integrated Modeling of Aerosol, Cloud, Precipitation and Land Processes at Satellite-Resolved Scales"– Co-PIs: Christa Peters-Lidard, Wei-Kuo Tao, and Mian Chin and Co-Is: Scott Braun, Jonathan Case, Sujay Kumar, William Lau, Toshihisa Matsui, Tim Miller, Joseph Santanello, Jr., Jainn Shi, David Starr, Qian Tan, Benjamin Zaitchik, Jing Zeng (ROSES08–MAP)— provide improvements to an integrated modeling system at satellite-resolved scales.

- "Extending AWIPS II Visualization and Collaboration Capabilities for Enhanced Decision Making using NASA Data within NOAA NWS and FEMA". PI: Dave Jones, Co-Is: Gary Jedlovec, and Brian Baldauf—focuses on the transition NASA earth science research results into daily operations of NWS and FEMA using Envirocast® Vision™ TouchTable (EVTT) technologies.

- "Enhancing a Decision Support Tool Using NASA and other Data for the Gulf of Mexico Alliance (GOMA)". PI: Dave Jones, Co-Is: Gary Jedlovec—This project will transition NASA Earth science research results into daily operations of the Gulf of Mexico Alliance partners using Envirocast® Vision™ TouchTable (EVTT) technologies.

Recent Publications and Presentations

Journal Articles

Published
- McCaul, E. W., Jr., S. J. Goodman, K. M. LaCasse, and D. J. Cecil, 2009: Forecasting lightning threat using cloud-resolving model simulations. Wea. Forecasting, 24, 709-729. (also highlighted as a Paper of Note in Bull. Amer. Meteorol. Soc., 90, June issue)

Accepted
- McCarty, W.R., G.J. Jedlovec, and T.L. Miller, 2009: The Impact of the Assimilation of AIRS Radiance Measurements on Short-term Weather Forecasts. Accepted for publication in J. Geophys. Res.
- Darden, C. D. Nadler, B. Carcione, G. Stano, and D. Buechler , 2009: Utilizing Total Lightning Information to Diagnose Convective Trends—accepted as a BAMS Map Room article.
- Jedlovec, G., 2009: Chapter on "Automated detection of clouds in satellite imagery". Geoscience and Remote Sensing, IN-TECH, Vienna, Austria, ISBN 978–953–7619–X–X

Conference Papers/Presentations
- Case, J.L., Impacts of High-Resolution Land and Ocean Surface Initialization on Local Model Predictions of Convection, 1st NSSTC Data Assimilation Workshop, Huntsville, Alabama, May 5, 2009.
- Rigney, M. Ensemble Statistics and Error Covariance in a Rapidly Intensifying Hurricane, 1st NSSTC Data Assimilation Workshop, Huntsville, Alabama, May 5, 2009.
- Zavodsky, Bradley, Shih-Hung Chou: Impact of AIRS Profiles on Short-Term WRF Forecasts. 1st NSSTC Data Assimilation Workshop, Huntsville, Alabama, May 5, 2009.
- Zavodsky, Bradley, Shih-Hung Chou, Gary Jedlovec: Data Assimilation and Regional Forecasts Using Atmospheric Infrared Sounder (AIRS) Profiles. 7th Joint Center for Satellite Data Assimilation Workshop, May 12–13, 2009, Baltimore, MD.
- Ed Szoke, Steve Miller, Mark DeMaria, Scott Bachmeier, Russ Schneider, Jim Gurka, Steve Goodman, Kevin Fuell; An overview of the GOES-R Proving Ground: current forecaster interactions and future plans. 23rd Conference on Weather Analysis and Forecasting/19th Conference on Numerical Weather Prediction, June 1–5 2009, Omaha, Nebraska
- Case, J. L., S. V. Kumar, J. Srikishen, and G. J. Jedlovec, 2009: Initializing the land surface with the NASA Land Information System to improve WRF predictions of summertime convection. Preprints, 10th Annual WRF Users' Workshop, Boulder, CO, National Center for Atmospheric Research, P2B.7. Available online at <http://www.mmm.ucar.edu/wrf/users/workshops/WS2009/abstracts/P2B-07.pdf]
- Chou, Shih-Hung, Bradley Zavodsky, and Gary Jedlovec: Improving Regional Forecast by Assimilating Atmospheric InfraRed Sounder (AIRS) Profiles into WRF model. 10th WRF Users' Workshop, Boulder, Colorado, 23-26 June, 2009.

Other Presentations
- Jon Case (May 20th): to Joint Center for Satellite Data Assimilation. "WRF simulations initialized with both LIS land surface and MODIS SST".
- Gary Jedlovec (June 17th) to Joint Center for Satellite Data Assimilation. "High-Resolution MODIS /AMSR-E Composite SST for Regional Weather Prediction".
- Gary Jedlovec (April 28-29th)The SPoRT Center – Infusing NASA Technology Into NWS WFOs, NOAA USWRP Testbeds Workshop, Boulder, CO.

Visitors:
- Leslie Miller (Talking Video, Inc.), April 23, to video SPoRT marine weather activity
- Daniel Dix—TWC May 8, 2009—to discuss use of NASA data for on-air tropical weather segment
- Matt Rigney—Texas A & M Univ., May 4–5—learn about SPoRT, make Kalman Filter seminar presentation

Upcoming Events:
- Southern Thunder workshop in Cocoa Beach, FL, July 27–30, 2009
- NASA Sounder Science Team Meeting, Greenbelt, MD, October 13–16, 2009
- National Weather Associate Annual Meeting, Norfolk, VA, October 17–22, 2009
- GOES-R Users Workshop, Madison, WI, November 2–6, 2009
- SPoRT Science Advisory Committee (SAC) Meeting, Nov 18–20, Huntsville