



SPoRT Quarterly
April–June 2014

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- and NOAA-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) and National Centers, the research leading to the transitional activities benefits the broader scientific community.

Quarterly Highlights

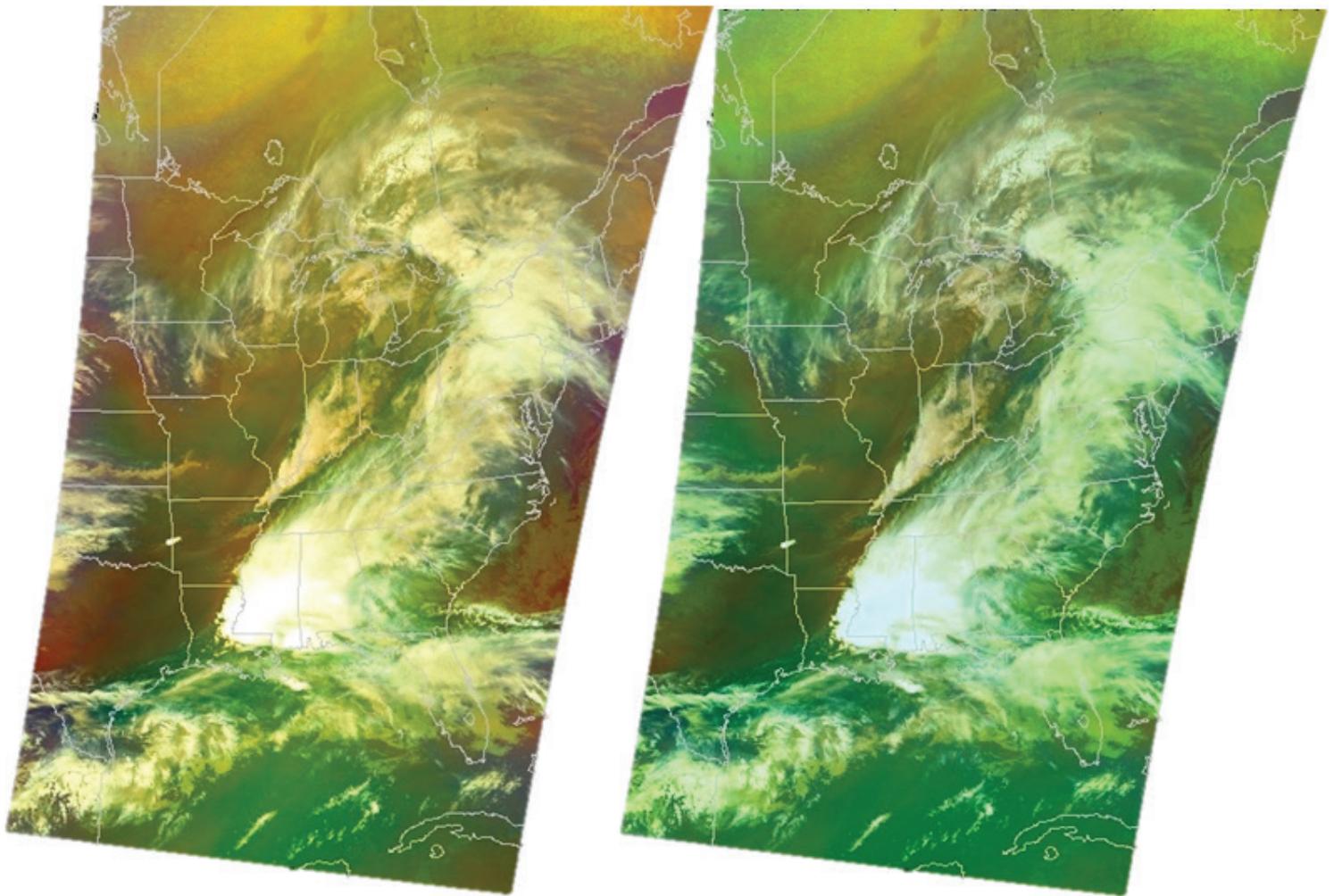
Improvements in RGB Air Mass Imagery

SPoRT produces and disseminates a suite of Red-Green-Blue (RGB) composite images from MODIS, VIIRS, and SEVIRI sensors to address particular forecast problems. These products are currently produced at SPoRT and brought into AWIPS as 8-bit images. Future RGB product generation will be done in AWIPS II and displayed as 24-bit imagery (see “EPDT RGB Working Group” article in Recent Accomplishments section below). These composites are used by forecasters at WFOs and National Centers in their weather applications and help prepare the forecasters for more regular use when these products are available from the Advanced Baseline Imager on GOES-R. SPoRT has recently made two improvements to the MODIS RGB Air Mass product to address inconsistencies in the interpretation of the colors.

First, there were color discrepancies between the Air Mass RGB product from MODIS instruments on the Terra and Aqua satellites resulting from subtle spectral channel differences. SPoRT addressed this issue by applying a brightness temperature bias correction to the three individual channels that make up the Air Mass RGB image so that the temperature histograms, and thus the color ranges, for the two instruments are consistent. To obtain this correction, channels from nadir views (looking straight down, with minimum path length through the atmosphere) from both MODIS instruments were compared to equivalent channels from the geostationary MSG SEVIRI instrument over the eastern Atlantic. Therefore, MODIS passes in that region with a nadir point close to SEVIRI nadir were

used for the comparison and an overall bias calculated. This bias correction and normalization to the SEVIRI channels will allow better use of the Air Mass RGB product between these three sensors, making the colors and therefore feature interpretation more consistent between all three instruments.

The second issue was a misrepresentation of features near the edge of the polar orbiting RGB imagery due to the limb effect. This limb effect introduces a cross-track gradient due to changes in absorption and scattering along the increasing path length that can hinder interpretation of the colors in the RGB imagery. The issue is that the water vapor and ozone channels used in the RGB tend to “cool” toward the edge of the MODIS swath. This is due to the fact that the



instrument is looking through a longer path of atmosphere that tends to have more water vapor and ozone and results in greater absorption in those channels. A limb correction has been applied to each of the three RGB channels so there is no scan-angle dependence in the imagery. Again, the SEVIRI instrument is compared to values of MODIS, but at the edge of the swath. A non-linear correction is applied going from nadir, with no correction, to the edge of the MODIS swath with the full limb correction value. As a result, the interpretation of the colors is now more consistent across the swaths. The included figure shows the MODIS Air Mass RGB product before and after the correction. Note that the color is more consistent going across the swath in the east-west direction, particularly in the cloud-free area near the southern edge of the swath.

On 13 May 2014, SPoRT replaced the current product with a “corrected” product. End users are receiving the new product with no need for any new ingest or display configurations, and no change in filename format. End users should be seeing two main improvements: namely, no color differences between Terra and Aqua passes, and less false coloring on the edge of the satellite images. While these issues are less obvious in the new “corrected” product, users may still notice some subtle color differences and limb effects present.

These products are also included in the Hybrid GEO/LEO imagery SPoRT creates. The Hybrid combines GOES Water Vapor with the MODIS Air Mass RGB so that users see the RGB within the context of a loop of GOES images and do not have to look for a separate, less frequent LEO product.

NASA SPoRT Aqua MODIS Air Mass RGB product for 7:40 UTC 28 Mar 2014. Left: uncorrected. Right: with limb correction.

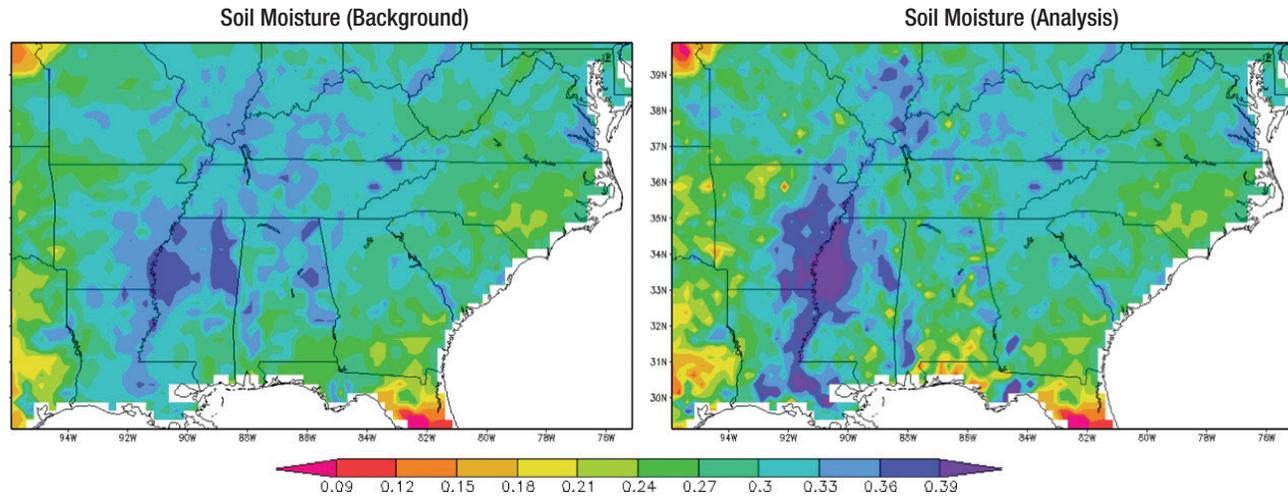
Recent Accomplishments

Soil Moisture Data Assimilation

The SPoRT Modeling and Data Assimilation Group has been active in implementing the assimilation of surface soil moisture retrievals into the Noah Land Surface Model within the NASA Land Information System modeling framework. SPoRT currently runs Noah in near-real time to produce surface soil moisture conditions and moisture and energy fluxes for NWP model initialization and situational awareness. The new work takes advantage

of observations from the European Space Agency's Soil Moisture/Ocean Salinity (SMOS) instrument, a microwave radiometer that is used to retrieve soil moisture near the surface. The SMOS data assimilation scheme has been implemented in LIS and these code changes were provided to the LIS development team at Goddard Space Flight Center. In addition to improving modeled soil moisture fields, incorporation of the SMOS data prepares

for the use of data from NASA's Soil Moisture Active-Passive (SMAP), slated for launch in October. This work supports SPoRT's role as a member of the SMAP Early Adopters Program, which holds regular teleconferences and workshops allowing SMAP data users to interact with instrument developers and members of the SMAP Science Team.



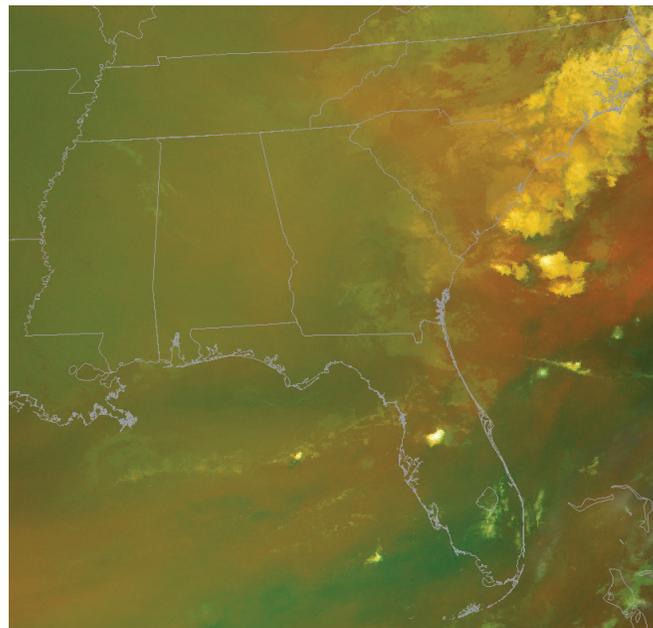
Noah 0-10 cm soil moisture field at 0:00 UTC on 1 April 2013 before (left) and after (right) assimilation of SMOS data. The analysis (right panel) captures irrigated rice fields near the Mississippi River that were missing in the background model field.

EPDT RGB Working Group

SPoRT formed the Experimental Products Development Team (EPDT) in early 2012 to focus on the creation of advanced capabilities for the use of experimental research data in AWIPS II. Following the first EPDT

workshop in 2013, bi-weekly conference calls were conducted by EPDT team lead, Jason Burks. During these conference calls, the team split into smaller groups to focus on specific brainstorming projects.

a 24-bit RGB composite of the imagery. The RGB plug-in (henceforth referred to as the NASA/EPDT/RGB plugin) was further modified to display GOES satellite imagery, including pre-calculated components of the CIRA GOES Sounder Air Mass product.



One of the EPDT projects focused on extending AWIPS II's ability to display multi-spectral 24-bit RGB products. The working group consists of Kevin McGrath (SPoRT), Nate Smith (WFO Huntsville ITO), Matt Smith (SPoRT), Deb Molenar (CIRA), and Nancy Eustice (WFO Riverton ITO). The RGB working group met for an initial code sprint September 2013 here at Huntsville, AL. The team utilized a baseline RGB visualization plug-in for high-resolution VIIRS bands and was able to display

The latest Code Sprint, in April, focused on extending the capabilities of the NASA/EPDT/RGB visualization plugin. The team added functionality to generate the Air Mass RGB product using single-band MODIS source data and EUMETSAT's standard Air Mass "recipe." Configuration changes were made to display the 24-bit imagery in CAVE (Common AWIPS Visualization Environment).

The EPDT/RGB team will continue to work on expanding the NASA/EPDT/RGB plugin to add more RGB recipes, menus, and source data from additional satellites. When incorporated into the AWIPS II environment, RGB composites will be an excellent addition to tools available to forecasters.

A 24-bit MODIS Air Mass RGB product produced from individual 8-bit imagery in AWIPS II.

Transitions and Assessments:

Summary of Assessments

As part of the product assessment process, SPoRT compiles results from the user feedback (online form), blog postings, and relevant user communications into a report and makes this available for users, program managers, product developers and other groups with research-to-operations interests. Assessments reports on the following topics have been completed within the last quarter:

- GOES-R CI assessment (involving Southern Region WFOs — see article on following page)
- MODIS and VIIRS RGB imagery for aviation needs (Southern Region WFOs)
- GOES-R QPE and CIRA LPW (west coast, Alaska, and Puerto Rico forecasters and hydrologists)
- NESDIS Snowfall Rate (select Eastern and Southern Region WFOs)
- VIIRS Nighttime imagery (Front Range WFOs)

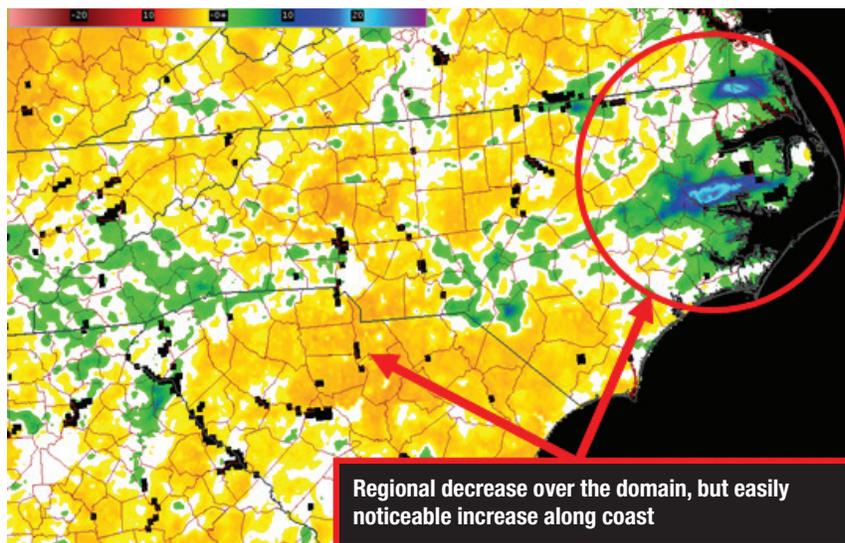
These reports provide a synopsis of the user feedback as well as some quantitative results from survey questions. In addition, SPoRT provides recommendations for product changes/improvements and next steps based on these user collaborations.

LIS Training and AWIPS II Configuration

An assessment of the real-time Land Information System (LIS) run at SPoRT is scheduled from mid-summer to early autumn. The focus of the assessment will be determining the potential utility of LIS soil moisture grids for decisions involving drought monitoring and evaluating areal flooding potential based on antecedent soil moisture conditions. To prepare for the LIS assessment, SPoRT personnel prepared and finalized two training modules and a Quick Guide, and configured AWIPS II to ingest and display LIS grids in real time. The training includes a “LIS Primer” module which provides background information on the LIS and how SPoRT runs the LIS in real time, as well as an “Applications” module that illustrates how LIS output can be used when making decisions about drought categorization and assessing areal flooding potential. A set of instructions and configuration files were tested and delivered to participating offices in order to ingest and display the LIS fields with unique and correct naming conventions within AWIPS II. SPoRT will conduct the assessment with the NWS forecast offices in Huntsville, Houston, and Raleigh to obtain feedback on product utility to make future product enhancements and improvements for monitoring drought and areal flooding potential.

The 2014 Total Lightning Assessment (May–July)

Dr. Geoffrey Stano received a GOES-R Visiting Scientist award entitled “Expanding Total Lightning to Forecast Office and Aviation Applications.” As part of this program, Dr. Stano visited the Boulder, Cheyenne, and Houston WFOs, the Spaceflight Meteorology Group, the Denver and Houston Center Weather Service Units (CWSU), and the Albuquerque CWSU and WFO. These visits established new collaborations with forecasters whose forecast regions now had access to lightning mapping array observations. SPoRT provided on-site training and confirmed the data flow and display at each location’s decision support system. These visits also prepared the end users for a total lightning evaluation which began in May and runs through July. The effort includes these new partners as well as SPoRT’s more established total lightning partners (e.g., WFOs Huntsville, Melbourne, Morristown, and Nashville). Preliminary feedback has been provided in over thirty surveys covering topics from severe weather, aviation forecasting, lightning safety, and impact decision support. The assessment is also being supported by summer students at WFOs Boulder and Cheyenne who are looking at previous cases. The assessment will continue at least through the end of July, with a likely extension of one additional month to better cover the active monsoon season in New Mexico.



Depiction in AWIPS II of the one-week change in LIS total column relative soil moisture with annotations, as presented in the quick guide developed for the LIS assessment.

Convective Initiation Assessment Report

SPoRT has finalized the report for last fall's GOES-R Convective Initiation assessment, compiling results from NWS-WFOs Albuquerque, Corpus Christi, Huntsville, and Miami. This assessment tested the product's use of model data to achieve 0-2h nowcasts of convection for situational awareness. This was also the first assessment of the GOES-West version of the product. Throughout the intensive two month evaluation, forecasters made recommendations for GOES-R CI, including improving the GOES-West version's detection of CI in orographically induced convection and improving the product's detection of CI under thin cirrus cloud cover. From forecaster feedback, product developers at UAHuntsville have already implemented a thin cirrus correction and are working on other suggested improvements. This report is available on the SPoRT website under "Assessments."

Pseudo Geostationary Lightning Mapper at the Hazardous Weather Testbed

This spring marked the fifth year that the Pseudo-Geostationary Lightning Mapper (PGLM) product developed by SPoRT was evaluated at the Hazardous Weather Testbed's Experimental Warning Program. The PGLM has been serving as the primary, real-time training tool on the use of total lightning in forecast operations in preparation for the launch of GOES-R. Since 2013, the PGLM used an updated plug-in for AWIPS II which is compatible with the most recent release as well as incorporating new networks, such as the Langmuir Lab lightning mapping array in New Mexico. The PGLM was received very well by forecasters and demonstrated the importance of providing training, as total lightning is not currently a standard product available to forecasters. Overall, the flash extent density remained the most popular product. Furthermore, after the training and having the opportunity to use PGLM data in real-time, 57% of the respondents rated their confidence in understanding the PGLM as high to very high and that total rose to nearly 80% at medium to very high. About 52%

of the respondents ranked the utility of the PGLM as high to very high, although 28% ranked the PGLM data as having no utility. Investigating this negative response revealed that many of the cases given a "no utility" response were due to the lack of available PGLM data for the particular case, either from being outside the PGLM domain or due to an outage in data from one of the lightning mapping arrays used to produce the PGLM. Several responses indicated that the PGLM data was one of the most useful products evaluated, thanks to the ability to highlight developing storms and storms that were likely to become severe.

In addition to the PGLM, SPoRT and the Meteorological Development Laboratory implemented a version of the "Moving Trace Tool" as an upgrade to the previous "Lightning Tracking Tool." This was the tool's second year at the Hazardous Weather Testbed and the upgrade included several major changes since 2013. The most important was that the Moving Trace Tool could now be used on other data sets beyond the PGLM, including radar, model, and satellite data. Forecasters liked the ability to plot a time trend of quantitative observations in real-time.

WFO Corner

Huntsville

WFO Huntsville participated in the Total Lightning Assessment that began in mid-May. The Huntsville WFO's experience with total lightning data is longer than most, going back to the spring of 2003. Survey participation from the office was fairly heavy, comprising just over one third of the total respondents so far. The HUN office will continue to participate in this assessment through mid July.

While forecasters have been utilizing source densities since the inception of total lightning data at the Huntsville WFO, flash extent density data have been available to the Science and Operations Officer (Brian Carcione) and the Applications

Integration Meteorologist (Kris White) since last year. During that time, forecasters have conducted local research and analysis, and have worked with SPoRT to develop a training module with the goal of preparing forecasters for the flash extent density data.

The WFO is also helping SPoRT prepare for the upcoming Land Information System (LIS) assessment. Initial testing of the LIS data took place at the Huntsville WFO during the late winter and early spring of this year. Instructions for LIS data inclusion in AWIPS II were developed at HUN in collaboration with the SPoRT team and were recently sent to WFO partners at Raleigh (RAH) and Houston

(HGX). For several years, the Huntsville WFO has been informally evaluating several LIS soil moisture variables for use in weekly drought assessments and input to the U.S. Drought Monitor as well as determining the risk for areal and/or river flooding.

Houston, Raleigh

Both WFOs are ingesting LIS soil moisture fields for display in AWIPS II and in preparation for an assessment of LIS application to drought monitoring and flooding potential. WFO staff are reviewing training modules and user feedback questions, as well as planning for the assessment period.

Satellite Proving Ground Activities

Total Lightning

Total lightning applications continue to be a focus of SPoRT's GOES-R Proving Ground (PG) activities. The pseudo-GLM product was provided to the NOAA/HWT and received very positive feedback from forecasters. SPoRT is also working with AWC and SPC to create a mosaic pseudo-GLM for use in AWIPS II. On a related note, the Operations PG in Kansas City conducted an assessment of the "Moving Trace Tool" (joint project between SPoRT, MDL, OPG, and NWS users), which is able to track lightning activity of individual storms. Developers of the tool were in attendance to provide support and modification of code. At the WFO and CWSU level, SPoRT is conducting an assessment of total lightning data to support incident and aviation weather needs.

GOES-R/JPSS RGB Imagery

The assessment report of the Nighttime Microphysics RGB imagery by southern and western CONUS forecasters has been completed. Both MODIS and VIIRS were used to create this product for use in aviation and cloud analysis challenges. In particular, 2/3 of users indicated "some" to "very large" impact of the product to differentiate low clouds and fog. Similar feedback from Alaska forecasters is leading to the transition of new RGB products more suited to the extreme cold of high latitude winter, with a new assessment planned for January 2015. This and other RGBs are being made available to WFOs in AWIPS II and a SPoRT EPDT subgroup continued to develop 24-bit RGB capabilities (see related article). For National Center users, SPoRT continues to create a suite of RGB imagery from SEVIRI, MODIS, and VIIRS, as well as passive microwave sensors (e.g. ATMS). SPoRT is also working with NHC to prepare for the Tropical PG demonstration, including expanded coverage of the VIIRS Day-Night Band in RGB form.

Quantitative Precipitation Estimate

The GOES-R Quantitative Precipitation Estimate (QPE) assessment report was completed. This collaboration with Alaska and Puerto Rico WFOs and RFC was the second assessment conducted for this product. The report can be viewed via the SPoRT Assessment Web page. QPE has been transitioned to Hawaii users and plans for a late 2014 assessment are being made as well as a future assessment of QPE using the Himawari imagery, which is nearly the same as the GOES-R ABI instrument. SPoRT is working with other AWGs to support the transition of GOES-R Convective Initiation and aerosol products to WFOs with AWIPS II and National Centers.



Lightning near Harvest, Alabama.
(Image copyright Kevin M. McGrath,
mcgrathimages.com. Used with permission.)

Pacific Region GOES-R Visiting Scientist (May 5–9, 2014)

A SPoRT visit to initiate collaborations with the National Weather Service's Pacific Region Headquarters and Honolulu Weather Forecast Office (WFO) was selected and funded by the GOES-R / JPSS Visiting Scientist Program. This trip was an excellent opportunity to face-to-face discussions for SPoRT and these organizations to learn about each other and develop a plan for collaborations. The visit focused on the Pacific Region's use of the NESDIS Quantitative Precipitation Estimate (QPE), a product developed by Dr. Bob Kuligowski. SPoRT provided training on the QPE product and fixed several AWIPS display issues with the QPE and SPoRT's high-resolution sea surface temperature product. Discussions with individual forecasters at WFO Honolulu highlighted many of the unique forecast issues and challenges faced by the WFO. These discussions indicated that the VIIRS day night band RGB composite and the MODIS/VIIRS nighttime microphysics RGB composite are strong candidates for future collaborations. The visit established a tentative timeline to develop improved QPE training using local examples ahead of a potential evaluation of the QPE product this fall. Further discussions focused on how data from Japan Meteorological Agency's Himawari satellites could be used to evaluate GOES-R applications in Pacific Region.

Blog Summary

The SPoRT blog received over 2,500 views during the second quarter of 2014, pushing the total number of views to well over 58,000 since the blog's inception. The great majority of views came from the United States (2,030), with Canada (59 views), South Korea (45 views), Germany (38 views), the United Kingdom, and Tanzania (tied-29 views) rounding out the top five. The international viewing of the Wide World of SPoRT blog indicates the broad reach of the SPoRT program.

Fourteen posts were made to the SPoRT blog during the spring quarter. The most popular post of the quarter, made by Jordan Bell of the SPoRT team, included true color imagery of the EF-4 tornado track that affected Louisville, MS on May 4. This imagery was obtained from the SERVIR Environmental Research and Visualization System (ISERV) aboard the International Space Station. The post also included links to an online mapping viewer and to the SERVIR Global page, featuring before and after imagery of the tornado track. A popular post submitted by the Albuquerque, NM WFO on April 30 showcased a great use of the Dust RGB product to help identify a large dust storm event in the southern plains. On April 29, strong northerly winds swept across the southern high plains, a region in the throes of severe to exceptional drought conditions (D2-D4) at the time, generating widespread blowing dust. Low clouds accompanied the chilly air mass, which made dust detection by conventional imagery rather difficult. The post detailed the ease with which the dust could be seen in the RGB imagery versus the conventional visible or true color imagery.

While all the posts made during the quarter cannot be highlighted, the SPoRT team is very appreciative of the efforts of all of our collaborative authors. Please visit the Wide World of SPoRT blog to see these and other posts when you can, at <http://nasasport.wordpress.com>. Also, you can follow us through Facebook (NASA SPoRT Center) and Twitter (@NASA_SPoRT). If you would like privileges to post on the SPoRT blog, please send an email to Kris White (kris.white@noaa.gov). Thanks and we hope you'll keep reading!

Seminars

- Bell, J., 2014: "Using Satellite Imagery for Tornado Damage Track Identification from the 27 April 2011 Severe Weather Outbreak," 9 April 2014, NASA/UAH Brown Bag Seminar.

Presentations

- Berndt, E. B., B. T. Zavodsky, and G. J. Jedlovec, 2014: Development and Application of Hyperspectral Infrared Ozone Retrieval Products for Operational Meteorology. Virtual Presentation, STAR/JPSS Annual Science Team Meeting, May 14, 2014
- Berndt, E. B., B. T. Zavodsky, and G. J. Jedlovec, 2014: Applications using Satellite Sounder Products at the NASA SPoRT Center. Virtual Presentation, STAR/JPSS Annual Science Team Meeting, May 14, 2014.
- Zavodsky, B. T., C. Blankenship, and J.L. Case, 2014: Data assimilation of SMAP observations, and impact on weather forecasts in a coupled simulation environment, 3rd SMAP Applications Workshop, Boulder, CO, April 9, 2014.
- Blackwell, W., A. B. Milstein, B. T. Zavodsky, and C. B. Blankenship, 2014: Neural Network Estimation of Atmospheric Thermodynamic State for Weather Forecasting Applications, 16th International Conference on Human-Computer Interaction, Heraklion, Greece, 22-27 June 2014.
- Case, J. L., C. B. Blankenship, B. T. Zavodsky, J. Srikishen, and E.B. Berndt, 2014: NASA SPoRT Modeling and Data Assimilation Research and Transition Activities using WRF, LIS, and GSI, 15th Annual WRF Users' Workshop, Boulder, CO, June 23-27, 2014.
- Case, J. L., F.J. LaFontaine, S. V. Kumar, C. D. Peters-Lidard, J. R. Bell, and B. T. Zavodsky, 2014: Real-time Green Vegetation Fraction for Land Surface and Numerical Weather Prediction Models (poster), JCSDA Workshop, College Park MD, May 21-23, 2014.
- Zavodsky, B. and J. Srikishen, 2014: Use of MODIS Cloud Top Pressure to Improve Assimilation Yields of AIRS Radiances in GSI (poster), JCSDA Workshop, College Park, MD, May 21-23, 2014.
- Zavodsky, B., J. Srikishen, E. Berndt, X. Li, and L. Watson, 2014: Development and Implementation of Dynamic Scripts to Execute Cycled GSI/WRF Forecasts (poster), JCSDA Workshop, College Park, MD, May 21-23, 2014.
- Li, X., J. Mecikalski, B. Zavodsky, and J. Srikishen, 2014: Assimilation of Dual-Polarimetric Radar and GPM Observations with GSI in Regional WRF (presentation), JCSDA Workshop, College Park, MD, May 21-23, 2014.
- Case, J. L., C. B. Blankenship, B. T. Zavodsky, J. Srikishen, and E. B. Berndt, 2014: NASA SPoRT modeling and data assimilation research and transition activities using WRF, LIS, and GSI. 15th WRF Users' Workshop, Boulder, CO, NCAR, P64. [Available online at <http://www2.mmm.ucar.edu/wrf/users/workshops/WS2014/WorkshopPapers.php>]

Proposals

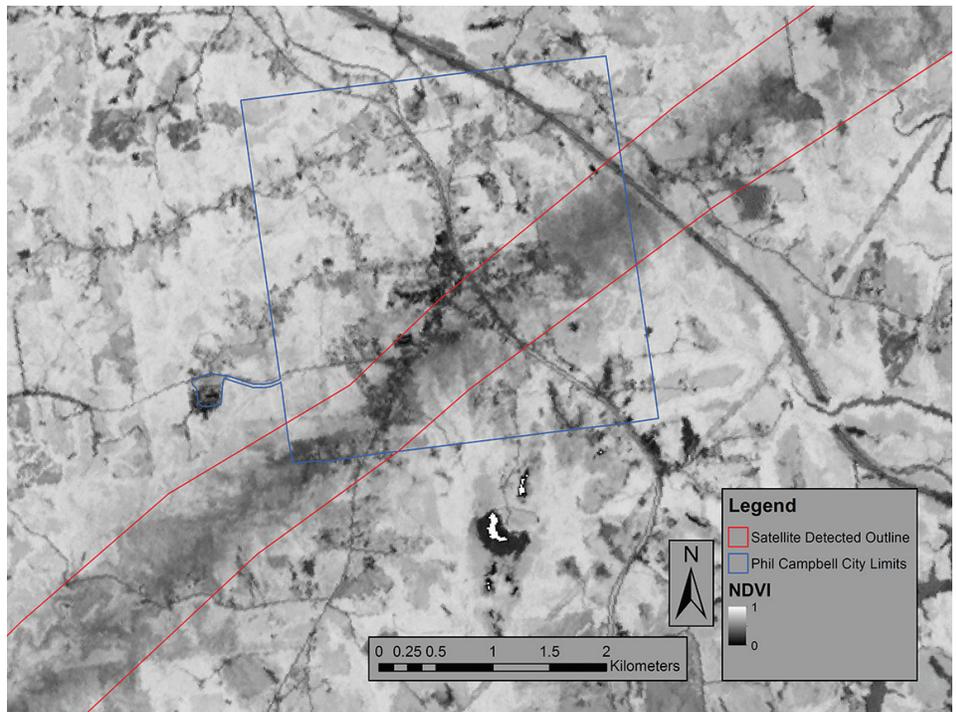
A SPoRT proposal entitled "Enhancement of the NWS Storm Damage Assessment Toolkit with Earth Remote Sensing Data" was funded. This Stage II follow-on to "Feasibility to Decisions" (ROSES 2011 A.31 Disasters) will support a complete transition of various NASA, NOAA, and commercial remote sensing data sets for inclusion and use within the DAT for storm survey processes. PI: Gary Jedlovec; Co-Is: Andrew Molthan, Kevin McGrath, Lori Schultz, Frank LaFontaine, Jordan Bell, and Tony Cole.

Publications

Case, J. L., F. J. La Fontaine, J. R. Bell, G. J. Jedlovec, S. V. Kumar, and C. D. Peters-Lidard, 2014: A Real-Time MODIS Vegetation Product for Land Surface and Numerical Weather Prediction Models. *IEEE Trans. Geoscience and Rem. Sensing*, 52: 3. pp. 1772-1786.

Molthan, A. L., J. R. Bell, T. A. Cole, and J. E. Burks, 2014: Satellite-based identification of tornado damage tracks from the 27 April 2011 severe weather outbreak. *J. Operational Meteor.*, 2 (16), 191-208.

Molthan, A. L., J. L. Case, J. Venner, R. Schroeder, M. R. Checchi, B. T. Zavodsky, A. Limaye, and R. G. O'Brien, 2014: Clouds in the cloud: Weather forecasts and applications within cloud computing environments. Submitted to *Bull. Amer. Meteor. Soc.*



Terra ASTER image showing damage track from an EF-5 tornado on April 27, 2011 near Phil Campbell, AL. From Molthan, Bell, Cole, and Burks 2014.

Visitors

Visit from Tallahassee WFO

Senior Meteorologist Parks Camp (WFO Tallahassee, FL) visited the SPoRT Center on June 17-18 to discuss ongoing collaborations related to the recently awarded NASA Applied Sciences: Disasters proposal that will continue and extend the distribution of Earth remote sensing data in support of severe weather damage assessments. During the visit, numerous technical discussions were held to explore the various ways that the SPoRT Center can effectively organize, manage, and distribute data to be displayed and used within the Damage Assessment Toolkit. The team highlighted opportunities for further work and extension of the DAT software and outlined a strategy for further discussion at a broader Technical Interchange Meeting (TIM) on the DAT to be held in Huntsville from July 29-31. Participants in the various discussions believed that they were highly successful and the SPoRT team looks forward to working with Parks in the three-year work plan outlined in the proposal activity.

Calendar of Events

- July 23-24, 2014: Visit from Southeast River Forecast Center, Huntsville, AL
- July 28-31, 2014: CONUS Proving Ground Meeting, Honolulu, HI
- July 29-August 1, 2014: JPSS OCONUS R2O Interchange Meeting, Honolulu, HI
- July 29-31, 2014: Technical Interchange Meeting to discuss the NASA/NOAA Disasters proposal activities and the Damage Assessment Toolkit, Huntsville, AL
- July 30, 2014: WRF Regional Climate Tutorial, NCAR, Boulder, CO
- August 26-28, 2014: SPoRT Science Advisory Committee (SAC) Meeting, Huntsville, AL
- September 22-26, 2014: EUMETSAT Meteorological Satellite Conference, Geneva, Switzerland
- September 23-24, 2014: LANCE User Group Meeting, Greenbelt, MD
- November 18-20, 2014: Suomi-NPP Applications Workshop, Huntsville, AL
- December 15-19, 2014: AGU Fall Meeting, San Francisco, CA
- January 4-8, 2015: AMS Annual Meeting, Phoenix AZ
- March 4-6, 2015: 3rd International A-Train Symposium, southern CA

National Aeronautics and Space Administration

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