



NEWSLETTER

**National Weather
Association**

NO. 11 – 7 JULY 2011

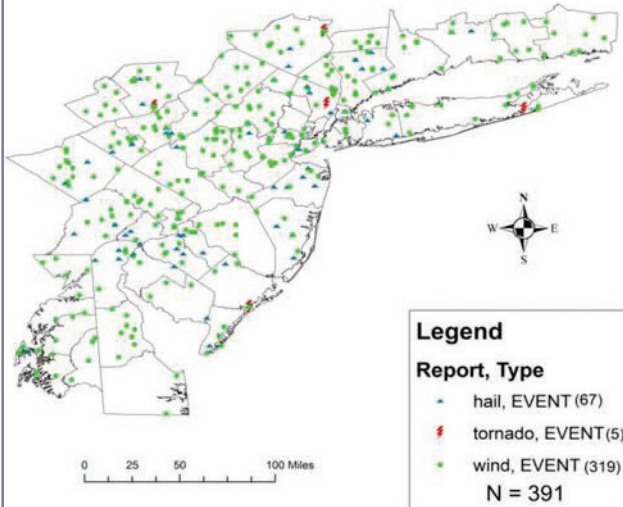
Morphologic Investigation of Thunderstorm Initiates and GIS Attributes with Testing for Improved Operational Nowcasting of Thunderstorms and their Severity in New Jersey

A study of thunderstorm initiation across New Jersey and the surrounding region has recently yielded clues to their observed patterns, intensity and variations during the summer season. Based on a 10-year data set constructed by the co-authors, diagnostic composite maps were prepared to help forecasters in the determination and specification of when and where thunderstorms are expected to originate, whether those storms may be severe and how much of the area may expect to see activity on any given day.

This information is critical given the myriad of impacts from thunderstorms – lightning, heavy rainfall and gusty winds – that affect outdoor venues including sporting events, beaches and parks, and industrial or commercial activities. These are an even greater concern when thunderstorms are severe as they have the



**Distribution of Severity for Cold Front
Convective Event Days: 00-09**



Distribution of severe storm reports across New Jersey and the surrounding region for cold front days occurring after 1500 UTC in the summers of 2000-2009.

high pressure systems and cold fronts were the most commonly occurring conditions, they did not produce the same distribution of convection across the area. The reasons for these differences were most evident when diagnostic composite charts for several

potential to impact a large number of people, given the high population density of the region, as well as multiple modes of transportation and services in the region that have a ripple-effect on other parts of the nation. Such far reaching impacts require forecasts that give more precise information than a “40 percent chance of showers and thunderstorms” across a large portion of a forecast region. Therefore, thunderstorms occurring during the daytime hours (1200-0000 UTC) in the summer seasons of the period 2000-2009 were selected for this study.

Radar data was used to create composite charts of initial thunderstorm activity according to the prevailing flow at 500 mb (i.e., N, NW, W, etc.) and surface features (i.e., High Pressure, Cold Front, etc.). While 500-mb southwesterly flows, surface

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*Will the summer of 2010
be remembered for its
record breaking highs??*

See THUNDER, page 7

Tornadoes Producing Damage on the Ground Detectable by Dual-Polarization Radar

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Senior Scientist
NOAA National Severe Storms Laboratory

Recent analysis of data from the National Oceanic and Atmospheric Administration (NOAA) National Severe Storms Laboratory (NSSL) prototype dual-polarization radar showed debris from tornadoes that occurred during a significant tornado outbreak in central Oklahoma on May 10, 2010. This critical information can help a forecaster confirm the presence of a rain-wrapped tornado, or a tornado at night causing damage on the ground.

Current National Weather Service (NWS) radars transmit a horizontal electromagnetic wave. When the wave bounces off an object in its path, it travels back to the radar and gives a measurement of the horizontal size of that object. Dual-polarization radar transmits both horizontal and vertical electromagnetic wave fields, giving a forecaster a measure of the size and shape of the object. Combining and comparing these measurements can categorize rain, hail, snow, birds, insects and tornado debris.

NSSL research showed dual-polarization radar data identifies debris signatures differently from radar echoes. Leaves, shingles or insulation are randomly oriented, while precipitation echoes behave fairly predictably.

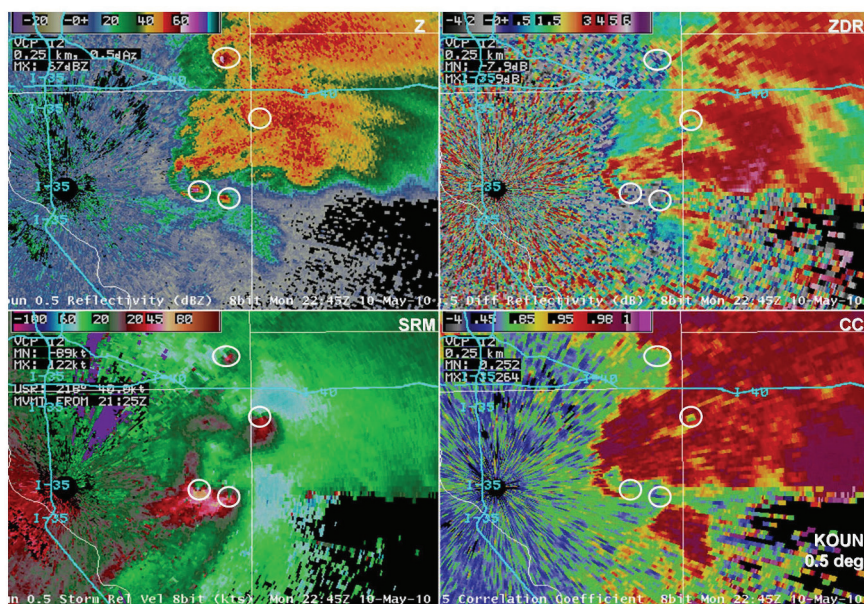
During the tornado outbreak on May 10, 2010, NWS meteorologists issued tornado warnings based on four rotation signatures in the radar velocity data. Because the radar beam was above ground level, they could not confirm the tornadoes were causing damage on the ground. However, NSSL researchers studying the event were able to identify tornado debris signatures in the dual-polarized radar data indicating multiple damaging tornadoes were occurring.

In the figure, the circles indicate tight rotation couplets detected in the storm relative velocity data, which is shown in the bottom left panel. The low values of differential reflectivity (Zdr - top right) coincident with velocity couplets indicate that the tornado is lofting debris. The bottom right panel shows the correlation coefficient (CC): the correlation between the reflectivity at horizontal polarization and reflectivity at vertical polarization. The decreased CC values coincident with the rotation couplets also indicate debris. It is only when velocity

couplets detected by Doppler velocity data are coincident with the decrease in Zdr and CC values that we can be sure a tornado is causing damage.

NSSL developed, tested and evaluated dual-polarization technology over the past 25 years, culminating in a demonstration project that convinced the NWS to upgrade all their radars with this technology. NWS radars in Phoenix, Ariz., Morehead City, N.C., Wichita, Kan., and Pittsburgh, Pa., have been the first to receive dual-polarization capabilities this year. The upgrade is expected to be complete by the end of 2013.

*Contributed by Ken Carey
Chair, NWA Professional Development Committee*



Dual-polarization data from the radar on May 10, 2010, showing the tornado debris. Top left panel: Reflectivity field Z in dBZ scale depicted on the color bar. Tornado locations are indicated with circles. Elevation angle is 0.5 degrees and the interstate roads I-35 and I-40 are superposed (cyan lines). Bottom left panel: Storm Relative Velocity field in knots as depicted on the color bar. The tight encircled couplets of negative (green -toward the radar) and positive (red -away) velocities indicate circulation. Top right panel: The differential reflectivity in dB. The color bar encompasses values between -4 and 6 dB. Bottom right panel: Correlation Coefficient between horizontal and vertical returns. The color scale is indicated on the bar.

Dual-Polarization Training Resources

www.wdtdb.noaa.gov/courses/dualpol/Applications/TDS/player.html

www.wdtdb.noaa.gov/courses/dualpol/Outreach/

President's Message – Mid Year Council Meeting Highlights

On June 10-11, our National Weather Association Council met in Kansas City for its Mid-Year Business Meeting. Much was discussed and decided, and I am using this venue to apprise you of a few of the issues that were addressed by the Council.

The NWA exists, in part, to serve its members, and it is the membership that currently sustains our organization. This may sound a bit strange to some, but it is largely our membership dues that fund the NWA and its activities. We do have investments in reserve, and a few other sources of income. We also have corporate sponsors and partners, but they are currently few in number; this is an area where we hope to see significant growth in the coming years. With these ideas as a backdrop, let's have a look at some of the Council's work.



NWA Council members attending the 2011 mid-year meeting in Kansas City, June 10-11.

Left to right, front row: Bruce Thomas, Ruth Aiken, Liz Quoetone, Jeff Craven, Pat Market, Bernard Meisner, Steve Listemaa. Back row: Rusty Billingsley, Jordan Gerth, Faith Borden, and Steve Zubrick. Not pictured: Wendy Schreiber-Abshire, Jeff Evans, Dave Freeman, Frank Brody, Nezette Rydell and Steve Harned.

Speaking of committee work, a number of changes occurred in our committee leadership this summer. The new NWA Committee Chairs are:

- Brad Herold - Information Technology Committee
- Greg Carbin - Professional Development Committee
- Wayne MacKenzie - Remote Sensing Committee
- Pat Spoden - Specialized Operations
- Rich Okulski will assume the role of Commissioner of Committees

Congratulations to each of these individuals for this well-deserved recognition. Also, we extend our thanks to those who are rotating out of these leadership positions.

Our Strategic Planning Committee has been formulating a 5-year vision for the organization with an eye toward three key goals:

1. Develop and execute a formalized marketing plan that strengthens overall market awareness and attracts and retains new members.
2. Strengthen the NWA's short-term financial condition and develop a longer-term plan that ensures financial

At the beginning of June, our budget and investments were all looking good for 2011. For the first time in several years at a mid-year Council meeting, our mid-year budget balance sheet was on the positive side. Regarding our investments, we had approximately half of our annual operating expenses in reserve — this is ideal for an organization like the NWA. Our entire portfolio was up 8 percent.

We have seen a surge in NWA membership thanks to the exemplary jobs by our Membership and Marketing Committee who have promoted the benefits of joining our organization. Consequently, from the start of the year through early June, we added 364 new members so far for this year alone — compared to a total of 355 new members in all of 2010!

viability for the future.

3. Enhance the NWA's operational responsiveness to the needs of its membership through improved web-based access and personal communications.

With regard to goal number 2, much of the Council discussion focused on the organization's need for long-term sponsorship by and partnership with corporate entities. That dialogue is ongoing.

Among the other work done by our Membership and Marketing Committee are two items to watch. First, a new NWA Logo should be appearing on the horizon in the next few months. Our last logo revision was in the mid 1990s, so some would say it is overdue for a renovation. Second, an *ad hoc* Social Media Committee was formed to accomplish, among other things, more rapid and timely communication with NWA members via Facebook, Twitter and LinkedIn.

The Council decided that, due to strong local support, the 2013 Annual Meeting would be held in Charleston, S.C. Also, the success of several NWA-hosted webinars this past spring has emboldened the leadership to look more deeply into offering more of these informative venues in the future. Finally, the

See MARKET, page 6

The NWA Welcomes Members
Who Joined in June!

Regular/Military/Retired

Javier Acosta
Bryan Bachman
Victoria Baird
Matthew Bloemer
Brian Bridges
David Bright
Amber Brouillard
Joseph Camp
Dave Chapman
Michael Draper
Wyatt Everhart
John Farris
Jeffrey Fournier
Marissa Gonzales
John Guiney
Leonard Langlois
Eric Laufenberg
Marty Mindnich
Craig Mroczka
Robert Rabin
Rebecca Rosenstiel
Ryan Snider
Donald Van Dyke
Renny Vandewege
Michael Walsted
Eric Wise

Students

Ben Alonzo
Erika Arrazcaeta
John Bartlett
Brett Carlson
Elissa Coams
John Crocker
Christina Fischer
Lance Franck
Adam Frumkin
Linda Gilbert
Alycia Gilliland
Brandy Hamilton
Molly La Fond
Brian Matilla
Todd Murphy
Geoffrey Sego
Jeremy Smith
Lawrence Spencer
Scott Thrasher
Travis Washington
Jacob Ziegler

36th NWA Annual Meeting
Oct. 15-20, 2011 - Birmingham, Alabama
Get Ready! Get Set! And Register Now!

*The weekend of Oct. 15 - 16 are filled
with a scholarship golf tournament
and the Broadcasters Meteorology
Workshop. General sessions — Oct. 17
to 20 — will consist of both oral and
poster sessions targeting our theme.
See page 5 for registration details!*

**The End Game - From
Research and Technology
to Best Forecast and
Response**

NWA Posts Reduced Operating Loss for 2010

As a result of savings from providing electronic access to publications for members in return for lower dues payments and the associated reduction in printing and postage costs, NWA operating expenses dropped by over \$40,000 from 2009 to 2010. However, due to membership losses totaling more than 200 and higher than anticipated costs associated with the Annual Meeting in Tucson, the NWA did post an operating loss of almost \$28,000 for 2010. Investments increased over \$6,000 in value leading to a reduction in NWA net worth of just under \$22,000. This was about half the loss seen in 2009.

The good news is that 2011 is on track to provide an operating surplus for the NWA. New membership is soaring and the Annual Meeting in Birmingham will likely be our largest ever both in numbers of attendees and revenues collected.

For details, please refer to the table which is drawn from the NWA 990 IRS tax return filed in May.

NWA 2010 - IRS Tax Return Details

INCOME

Dues, contributions, grants	107,203
Program service revenue*	138,087
Investment income	5,424
Other income	2,719
Total Revenue	253,433

NET WORTH

Dec. 31, 2010	177,563
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EXPENSES

Salaries	86,960
Annual Meeting	70,447
Publications	51,555
Scholarships/Grants	11,507
Professional Svcs**	7,737
IT	2,702
Office/Admin	22,332
Travel	6,190
Other printing/postage	6,444
Insurance	1,636
Service Charges	5,168
Other	8,704
Total Expenses	281,382

Operating deficit for 2010	-27,949
Increase in value of investments	6,235
Reduction in Net Worth	-21,714

- * Program service revenue
- Annual meeting income
 - Broadcast certification income
 - Subscriptions
 - Digest author page charges

- ** Professional services
- Member portal Web site upgrade

Pre-register for the 36th NWA Annual Meeting by Sept. 30

Main meeting page: www.nwas.org/meetings/nwa2011

The preregistration fee includes a preprint volume with program and abstracts. For the period of days registered, it also includes: admission to all oral presentations, poster sessions and exhibit sessions plus coffee/refreshment breaks. Full registration includes the Wednesday Awards Luncheon. Registration after the preregistration period will result in higher fees. Non-members will be eligible for member rates if they join now!

2011 PREREGISTRATION FEES: (through Sept. 30)

Sunday, Oct. 16: Broadcast Workshop and Tape Swap
8 a.m. – 11 p.m.

\$125 NWA members and presenters
\$55 students and retired members
\$175 for non-members
\$105 for non-member students and retired

Sunday, Oct. 16: Student Seminar and Resume
night session 1 p.m.-11 p.m.

\$35 NWA student members and presenters
\$55 for non-member students

Monday-Thursday, Oct. 17-20:

General Sessions/Activities

\$295 NWA members and presenters
\$130 students and retired members
\$350 for non-members
\$190 for non-member students and retired

Special One-Day Rates for period Oct. 17-20

\$125 NWA members and presenters
\$55 students and retired members
\$180 for non-members
\$90 for non-member students and retired

Special, All events Sunday-Thursday

\$385 NWA members
\$475 for non-members

Student Special, All events Sunday-Thursday

\$150 NWA members
\$225 for non-members

Program Committee, All events Sunday-Thursday

\$95 Program Committee members

PREREGISTRATION ONLINE by credit card (AmEx, Discover, MC or Visa):

Attending Broadcast workshop and/or most of the
General Session: www.nwa-registration.org/register.shtml

Attending Broadcast Workshop and only one or two days
of the General Session:
www.nwa-registration.org/registerbyday.shtml

PREREGISTRATION BY MAIL:

Complete this form and email it OR mail it with full payment of fees by Sept. 30, 2011 to: NWA Meeting, 228 West Millbrook Road, Raleigh NC 27609-4304 USA. Make payment to "NWA" in U.S. funds by a US bank check, money order or government/institution purchase order.

Name (Preferred for nametag): _____

Employer, School or other Affiliation (for nametag): _____

City/State (for nametag): _____

Telephone number and e-mail address: _____

Arrival Date at meeting: _____ Departure Date from meeting: _____

Pre-registration fees (see above): _____

Number of extra Luncheon tickets (\$40 each): _____

I am attending Oct. 17 Icebreaker - Monday evening (Free): _____

I am attending the 9th annual "Golfing for Scholarships" event, Sat., Oct 15th (\$95): _____

Total funds enclosed: _____

Circle all that apply:

☐ NWA Member ☐ NWA Local Chapter Member ☐ NWA Broadcast Seal Holder ☐ Non-member ☐ Student ☐ Retired

☐ Session Chair ☐ Presenter ☐ Program Committee Member ☐ Local Arrangements Committee Member

☐ I will bring a DVD to the DVD Swap ☐ I'll attend the DVD Swap but not bring a DVD

☐ I'm a student wishing to have broadcast DVD critiqued at Sunday Resume/DVD session

New Concepts and Methodology in Lightning Forecasting

The NWS in Grand Junction, Colo., has created a lightning potential index (LPI), a graphical product designed for public use. Improving lightning forecasts benefits many including those in the public safety, aviation and fire weather communities; but one motivating factor to create such a product is that many outdoor recreationalists are passionate about hiking the numerous 14,000-plus foot mountain peaks (fourteeners) in Colorado. The LPI was an experimental product in 2008, but became operational in 2009. This product defines the lightning risk from 9 a.m. to 9 p.m. local time for the current day and includes an outlook for the next day. The LPI is created around midnight each day using the 0000 UTC GFS40 and NAM12 model data (Figure 1).

The ingredients necessary for lightning to occur are fairly well understood (e.g., moisture, lift and instability); however, generating a useful lightning forecast for the end user is a challenge due to its high spatial and temporal variability. Studies have examined stability indices, such as the Lifted Index, to determine their usefulness as lightning predictors. Observations indicate that stability indices are not a good lightning forecast tool in terms of spatial or temporal coverage. Recent research and experiments suggest that high relative humidity at the levels with temperatures in the -12°C to -18°C range promote stronger negative charging, which strengthens the electric field that precedes lightning. In addition, qualitative observations have indicated that moisture is the most important meteorological parameter when forecasting lightning. In this methodology, moisture is defined as a combination of precipitable water, relative humidity from 0 to 3 km above ground level, and the relative humidity layer that includes the ice crystal growth regime. The bulk vertical wind shear, when combined with moisture as defined above, refines the area where lightning becomes favorable. Qualitative verification may be performed by overlaying the one-hour lightning data with the lightning potential parameter data derived in the Advanced Weather Interactive Processing System (AWIPS) (Figure 2).

Python scripts within the NWS Graphical Forecast Editor (GFE) in AWIPS allow forecasters to manipulate model data to create gridded data. Using the methodology described above, a python script calculates the LPI with the output displayed in GFE and subsequently transferred to the NWS Grand Junction LPI web page.

The results from this methodology suggest that lightning is not a random event and that it is possible to forecast lightning spatially and temporally with some skill. More research is required, but with ongoing studies, observations and verification, skillful lightning prediction will improve and become extremely valuable to the public, aviation and fire weather community, and especially for those who plan a day hike to summit a Colorado fourteener.

Paul Frisbie, Mike Meyers, Jeff Colton and Jim Daniels
NWS Grand Junction, Colo.

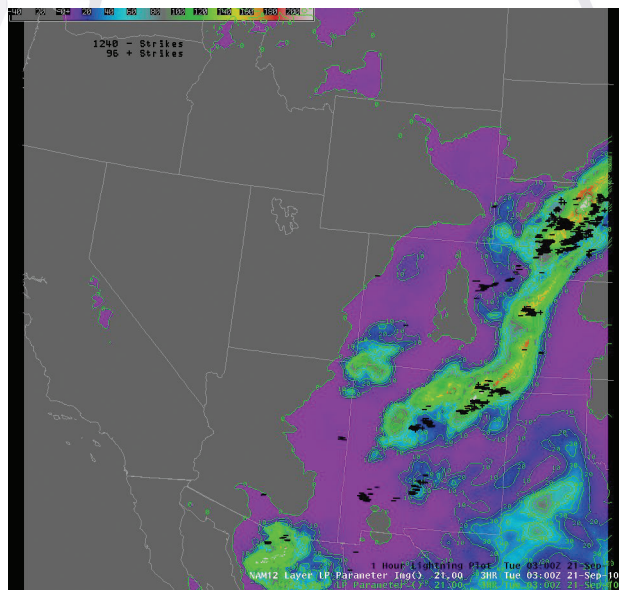
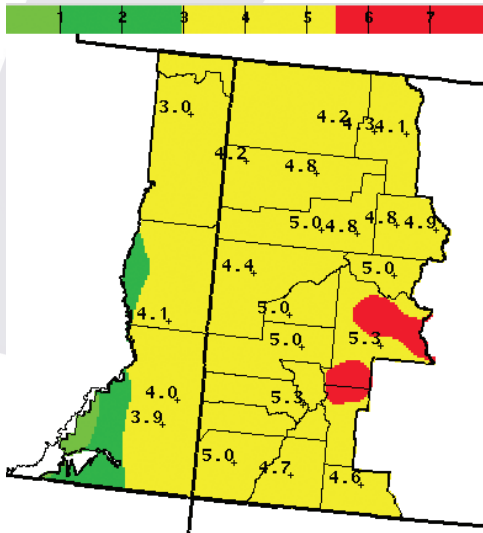


Fig. 2. The AWIPS lightning potential parameter overlaid with one-hour lightning data (black symbols) over the southwestern United States.



Color Key and Explanation

Low Risk	Low Risk: The lightning threat may either be negligible or low. Isolated thunderstorms may occur, but the probability of thunderstorms is low.
Moderate Risk	The lightning threat is considered moderate. Isolated thunderstorms are expected within the green area.
High Risk	The lightning threat is considered high. Expect scattered thunderstorms within the yellow area. Plan accordingly, as there is a high probability of lightning in the yellow area. Be aware of lightning safety guidelines.
Extreme Risk	Lightning in the red area will occur. Practice lightning safety, as the threat of lightning is imminent.

Fig. 1. An example of the LPI derived at the NWS Grand Junction office.



MARKET from page 3

early word on our upcoming Annual Meeting in Birmingham this October is that it is on track to be the biggest conference we have ever hosted.

Of course, much more was discussed at the Mid-Year Meeting, but time and space prohibit a more detailed discussion here. Council meeting minutes are available from NWA Headquarters in Raleigh. Please email a request to exdir@nwas.org. Additionally, if you have any questions, feel free to contact me at president@nwas.org.

Patrick Market
NWA President

The National Weather Association presents

The 9th annual
Scholarship Golf Outing

Saturday, October 15, 2011

Bent Brook Golf Club
Birmingham, Alabama

Join fellow Annual Meeting attendees for an
afternoon on the links, and help the
NWA's Scholarship Fund.

\$95 per golfer
Includes golf fees, cart, lunch and donation.

Please contact Betsy Kling to sign up
betsykling@wkyc.com

NWA Sponsored Annual Meetings/Conferences

Oct. 15 – 20: 36th National Weather Association Annual Meeting

Scheduled for Birmingham, Ala. See page 5 for more.

www.nwas.org/meetings/nwa2011/

Oct. 20 – 21: 7th GOES Users' Conference

This conference will be held in the Wynfrey Hotel in Birmingham, Ala., with the first day being a joint meeting with the 36th Annual NWA Meeting.

www.nwas.org/meetings/nwa2011/ and http://directreadout.noaa.gov/GUC_VII/

Feb. 27 – March 1, 2012: 2nd National Flood Workshop

Organized by Weather Research Center (private, non-profit education and research center) in Houston Texas, workshop will bring together agencies, emergency managers, academia, and professionals from across the nation to encourage dialogue on various aspects of flooding. For more, visit www.nationalfloodworkshop.net, call Weather Research Center at (713)539-3076 or email wrc@wxresearch.org.

Other Meetings & Conferences

Oct. 3 – 5: Ice and Freezing Fog Workshop

Environment Canada will host a workshop on ice and freezing fog in St. John's, Newfoundland, Canada. http://collaboration.cmc.ec.gc.ca/science/arma/FRAM_2

Oct. 31 – Nov 2: 15th Great Divide Weather Workshop

NWS Offices in Great Falls and Missoula will host this workshop. This year's theme is "Sharing Innovative Science and Service".

www.wrh.noaa.gov/wrh/greatdivide/welcome.php

Jan. 22 – 26, 2012: 2nd Annual AMS Meeting

The meeting will be in New Orleans, La. www.ametsoc.org/MEET/annual/

Jan. 22, 2012: AMS Short Course On Art & Science of Forensic Meteorology

New Orleans, La. Co-organizer is Steve Harned, NWA Executive Director. <http://annual.ametsoc.org/2012/index.cfm/programs-and-events/short-courses/ams-short-course-on-the-art-science-of-forensic-meteorology>

THUNDERform page 1

parameters were constructed to show the patterns and mean parameter values associated with the thunderstorm activity (e.g., precipitable water). This provides information needed to distinguish between days producing thunderstorms and null days. All of these analyses were posted online for use by forecasters on a trial basis during the summer of 2010.

In testing the results of the study, forecasters had a success rate of 80 to 90 percent in identifying both the occurrence of thunderstorm activity and its initial location and were able to more clearly indicate the nature of convective activity anticipated for the day. Project work is presently focusing on how forecasters may separate severe from non-severe thunderstorms based on the same type of information and how much of the region may receive coverage from the thunderstorm activity. Each of these has made use of geographic information system (GIS) tools with an integrated GIS database that includes local information about land use/cover, population and other factors. These will be correlated in order to better specify the relationship between thunderstorm activity, its locations of occurrence and the prediction of local impacts – all as related to the local physiography of the region.

More information about the project may be found on the beta version of the Kean University operational website (<http://hurri.kean.edu/~keancast/thunder/thunder.html>).

**Paul J. Croft (NWA Past President),
Danielle Fadeski, Alexis Ottati, Jackie
Parr, Amy Wuestenberg, Justin
Schulte, Matt Villafane, Steve Sosna,
Melissa Rod, Justin Ryan, Mike
Sczepanski, Steve Koenigstein, Nivash
Rampersad, Ben Crocker,
and Ryan Grantuskas
School of Environmental and
Life Sciences Meteorology Program,
Kean University, Union, N.J.**

**Alan Cope
NWS Philadelphia SOO**

The Time Crunch for Alabama is NOW!

The 36th Annual NWA Meeting : Oct. 15 – 20, Birmingham, Ala.



Sept. 21 – Last day to obtain NWA rate at the Wynfrey Hotel (rooms going fast - reserve early!)

Sept. 30 – Last day for discounted pre-registration fees

See pages 5 for full meeting details!
<http://www.nwas.org/meetings/nwa2011>

Dates **2** Remember

Oct. 15 - 20: 36th National Weather Association Annual Meeting, Birmingham, Ala.

Oct. 20 - 21: 7th GOES Users' Conference, Birmingham, Ala.

Oct. 31 - Nov. 2: 15th Great Divide Weather Workshop, Bozeman, Mont.

Jan. 22 - 26, 2012: 92nd Annual AMS Meeting, New Orleans, La.

Jan. 22, 2012: AMS Short Course on Forensic Meteorology, New Orleans, La.

Feb. 27 - March 1, 2012: 2nd National Flood Workshop, Houston, Texas.

See page 7 for more important dates and events.

NWA Newsletter (ISSN 0271-1044)

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Members receive the Newsletter and *National Weather Digest* as part of their regular, student or corporate membership privileges. Printed Newsletter subscriptions are available for \$25 per year plus extra shipping costs outside U.S. Single copies are \$3. **Address, phone number, email and affiliation changes can now be made online: member.nwas.org.**

Connecting operational meteorologists in pursuit of excellence in weather forecasting, communication, and service.

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