

Aware

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to enhance communications within the Agency
and with the emergency management community.

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Climate, Water, Weather

Successful Collaboration Enhances Local Climate Services

By Dennis McCarthy, Director, Office of Climate, Weather and Water Services

Over the past few years, NWS has been making a significant effort to improve its level of climate services delivered through local Weather Forecast Offices (WFO). Regional Headquarters and WFOs have identified climate service focal points on their staffs and Climate Services Division (CSD) at NWS Headquarters has facilitated workshops and other training opportunities to help these focal points improve local climate services. Much of the work has been in collaboration with the Regional Climate Centers (RCC), NOAA's National Climate Data Center (NCDC) and State Climatologists. These efforts are an important part of the integrated service concept: linking climate, water and weather.

In September, the NWS Climate Prediction Center (CPC), one of nine elements of the National Centers for Environmental Prediction, announced El Niño conditions were developing in the tropical Pacific. CPC states these conditions are likely to persist into early 2007, bringing typical El Niño effects to North America during the upcoming winter season. These effects include "...warmer-than-average conditions over western and central Canada and over the western and northern United States." In addition, "Wetter-than-average conditions are likely over portions of the U.S. Gulf Coast and Florida, while drier-than-average conditions can be expected in the Ohio Valley, the Pacific Northwest, and most of the U.S.-affiliated islands in the north tropical Pacific." For more details, go to www.noaanews.noaa.gov/stories2006/s2699.htm.

Local impact information for these seasonal outlooks is now available on an experimental basis in the new Local 3-Month Temperature Outlook for 1,000 sites in the Continental U.S. This climate forecasting product provides probabilistic local forecasts of 3-month average daily mean temperatures for 13 consecutive 3-month periods (January-February-March, February-March-April, etc.). These products are available in several formats including tables, text discussions and graphics. This experimental product (developed jointly by CSD, CPC, and region and field personnel) extends CPC's national 3-Month Temperature Outlook to approximately 10 observation sites in each WFO's area of responsibility. The forecasts are available by going to www.weather.gov, clicking near your location, and then selecting the "climate" link in the left navigation bar. Once in the climate section, select "Climate Prediction."

In addition to the 3-month product, NOAA Online Weather Data (NOWData) has already been available for some time through your local office climate link. NOWData, a joint project of NWS, NCDC and the RCCs, provides web access to climate data from nearly 4,000 NOAA observing stations. Data provided include temperature, precipitation, snowfall, heating, cooling and growing degree days for the past 2 years, extremes for a station's period of record and normals for 1971-2000. These data were previously available only with a paid subscription to an RCC or NCDC publication.

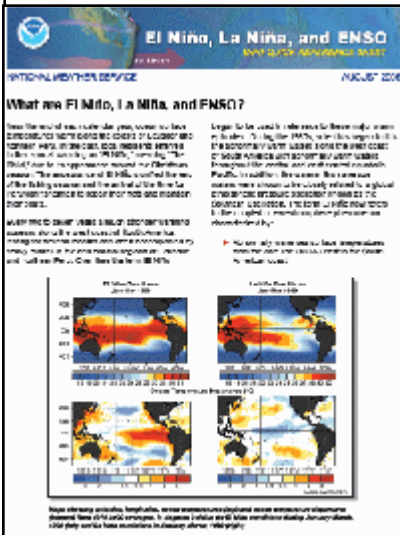
If you have not checked out these new services, consider doing so. Better information could help mitigate impacts of events such as the developing El Niño. ❄

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Climate Resources



Drought, El Niño and Other Climate Topics

By Robert E. Livezey and Diana Perfect, NWS Climate Services
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In response to growing customer demand for climate information, NWS has just released new easy-to-use handouts on major climate topics: Drought, El Niño/La Niña and El Niño/Southern Oscillation. Additionally, short- and long-version handouts on the new Local 3-Month Temperature Outlook (L3MTO) products are now available. The L3MTO products are currently available online in experimental mode, with a planned official release of January 18, 2007. These products are useful for any temperature sensitive activities such as commerce, agriculture, industry, the energy sector and recreation.

These color handouts range in length from 3 to 11 pages and offer clear, brief summaries on their respective topics. Each handout also offers links to more in-depth study of these topics. To download these products, go to: www.weather.gov/os/brochures.shtml#climate. *

Digital Services

Aware

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NDFD Technical Workshop Scheduled For November 2

By Andy Horvitz, Digital Services Transition Staff
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The number of new NWS products and services from a National Digital Forecast Database (NDFD) continues to grow. This database consists of local and national forecaster-generated gridded weather elements that are made available as national and regional scale mosaics.

To better understand these products, NWS invites you to attend a Technical Workshop in Silver Spring, MD, this fall. The primary goal of the workshop is to provide NWS customers and partners an opportunity to interact with NWS technical staff. This is your chance to discuss near-term and future requirements for enhancements to the NDFD electronic interfaces. NWS wants to hear what's working and what isn't.

The workshop will offer updates on the latest analysis and techniques NWS has recently implemented, including experimental Geographic Information Systems (GIS) and Internet Extensible Markup Language (XML) applications. Ken Graham, NWS Acting Services Evolution Director, will be the keynote speaker, addressing: "Why Your Needs Are Important to Us."

Please register early at the site below. Seating is limited. The registration deadline is October 27, 2006. To register go to: <https://apps.weather.gov/ndfd.php>

If you have questions regarding the workshop, please contact: Andy Horvitz at 301-713-1858, ext.166, Andy.Horvitz@noaa.gov; or John Simensky, 301-713-0463, ext.150, John.Simensky@noaa.gov *

NDFD Plans Improvements and Additions for Fall

By Chris Alex, Digital Services Transition Staff
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This fall, NWS plans to add a new element to the NDFD; change the time the NDFD is extended by 24 hours; and improve the NDFD family of web pages. Something for almost everyone.

New Experimental Element for Hawaii:

On November 1, precipitation forecasts for Hawaii will be added to the NDFD on an experimental basis. Precipitation, also known as Quantitative Precipitation Forecast (QPF), is already available on an experimental basis in NDFD for the conterminous U.S. (CONUS) and Puerto Rico/the Virgin Islands. See Technical Implementation Notice (TIN) 06-66 (http://www.weather.gov/os/notification/tin06-66ndfd_hawaii.txt) for more information.

Changing the Time the NDFD is Extended by 24 hours:

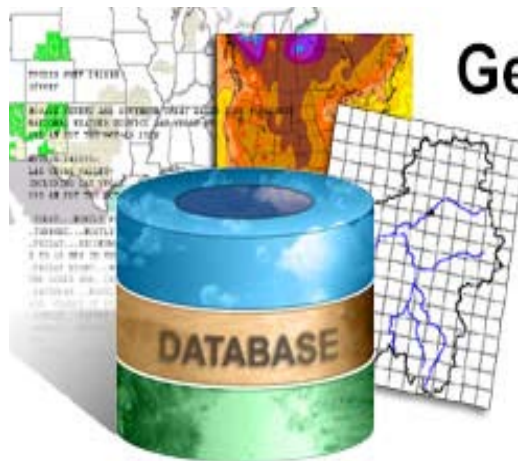
On November 28, the time the NDFD is extended by 24 hours (adding a new Day 7 forecast to the database, for example) will change from 1800 Coordinated Universal Time (UTC) to 2200 UTC. Shifting the update time to 2200 UTC will allow NWS forecasters to assimilate the most recent forecast models and national centers guidance into their forecast, and collaborate more with neighboring NWS offices. The result will be more accurate and coherent forecasts across the country and in NDFD. See TIN 06-51, <http://www.weather.gov/os/notification/tin06-51ndfd.txt>, for more information about this change.

As a by-product of this change, the elements covering Days 4 through 7 will be updated five times per day: 0000 UTC, 0600 UTC, 1200 UTC, 1800 UTC, and 2200 UTC. The Days 1 through 3 portion of the NDFD will continue to be updated hourly.

NDFD gridded binary (GRIB2), http://www.weather.gov/mdl/NDFD_GRIB2Decoder/, files for Days 4 through 7 are available about h+45 minutes, at the update times mentioned above. Days 1 through 3 element files are posted around the top of the hour (updated hourly). For example, the 1800 UTC update for Days 4 through 7 is posted to the anonymous file transfer protocol (ftp) server about 1745 UTC. The associated updated Days 1-3 files are posted near 1800 UTC. NDFD graphics are generally updated 10 to 15 minutes after the corresponding GRIB2 files are posted.

Improvements to the NDFD Family of Web Pages:

Based on customer feedback, we have begun updating the NDFD website, <http://www.weather.gov/ndfd/>. In September 2006, Last month, we added a new page to consolidate all NDFD-related Product Description Documents and Service Description Documents. The new web page is: <http://www.weather.gov/ndfd/pdd.htm>. Look for additional changes to the NDFD web pages this fall. If you have suggestions on improvements for the NDFD web pages, please email them to me. ❁



General Information

NDFD
NWS National Digital
Forecast Database

HazCollect Follow-On Operational Acceptance Test Scheduled

*By Herb White, NWS Dissemination Services Manager
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Software fixes addressing discrepancies identified during the HazCollect Operational Acceptance Test (OAT) this summer have been completed. Unit and regression testing for HazCollect continues through mid-October. Another OAT is scheduled from late October into November.



At the same time, similar work is on-going for a v2.3.3 maintenance release of the Disaster Management Interoperability Services (DMIS) Desktop Toolkit. The Department of Homeland Security (DHS) expects to complete the new release in October.

Emergency managers familiar with the DMIS Toolkit in California, Florida and Kentucky will take part in the follow-on OAT. During the testing, select emergency managers and NWS staff will send test messages, as well as any actual emergency messages, using the DMIS Toolkit.

To originate Non-Weather Emergency Messages (NWEM), emergency managers will need to use the DMIS desktop client, or other government or commercial incident management software application, to interface with the Disaster Management Open Platform for Emergency Networks (DM-OPEN).

To send NWEMs through HazCollect and other NWS systems, government and commercial incident management applications must interface with DM-OPEN and be Common Alerting Protocol-enabled. DM-OPEN enables secure data exchange for sharing emergency alerts or incident-related information through the use of standards-based messages. NWS is working with the DHS to develop and test the HazCollect Applications Program Interface needed for the Commercial Off-the-Shelf and Government Off-the-Shelf systems to interface with DM-OPEN. There is no charge for the use of these Federal government interfaces.

NWS expects HazCollect to be available nationwide, through the DMIS Toolkit, this winter. Emergency managers may learn more about DMIS by going to the DMIS website at www.dmi-services.org/. To register for DMIS, click on "Register" in the menu on the left.

NWS expects HazCollect registration to begin by the end of 2006. Go to www.weather.gov/os/hazcollect/ for updates now and to register for HazCollect later this year. ❄

EMWIN-N Satellite Tests Completed

*By Robert Wagner, NWS Office of the Chief Information Officer
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The Emergency Managers Weather Information Network (EMWIN-N) transition has reached another milestone: the successful test of the prototype EMWIN-N receiving system. The test was conducted September 6-15 at the NESDIS Command and Data Acquisition (CDA) Station in Wallops, VA. The final test report validates the proof-of-concept for the EMWIN-N system, and indicates it is ready for further development by prospective manufacturers.

The EMWIN-N broadcast from the NOAA Geostationary Satellite (GOES-13) operates at twice the data rate of the old EMWIN-I system, but uses only about one-quarter of the power of the

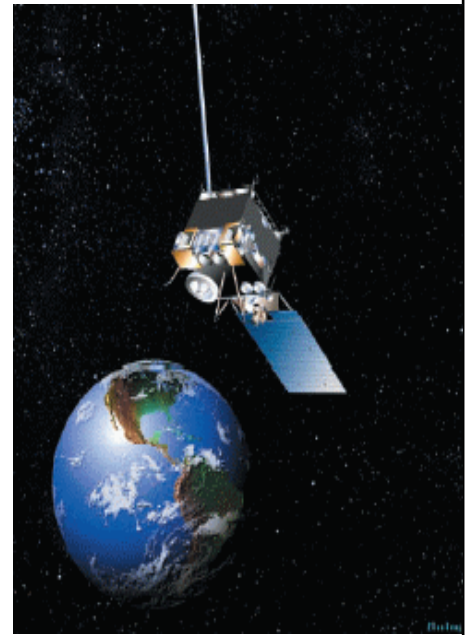
older system. The EMWIN-N receiver prototype uses new software-defined radio technology. This software is relatively new to NOAA dissemination systems.

During the test, an uplink transmitter at the Wallops CDA beamed an EMWIN-N test signal to the recently orbited GOES-13 satellite, previously known as GOES-N. The system then retransmitted a broadcast signal back to Wallops where it was decoded by the prototype EMWIN-N receiver. The test data showed that the performance fully met the design criteria. The test report is now available on the EMWIN Web site.

The GOES-13 satellite is currently located near 90 degrees west. Its EMWIN-N test broadcast will remain available to prospective manufacturers until early December 2006. The broadcast coverage area for GOES-13 includes the continental United States, allowing anyone with a receiver comparable to the NOAA prototype to receive the test signal. These successful tests now open the way for another user/vendor conference. Look for the schedule and other details on the EMWIN website once they become firm.

In other developments, the EMWIN team is working with NWS International Affairs Office to develop a pilot project supporting the Third Border Initiative. This project would supply current generation EMWIN systems to several Caribbean Island nations. NWS will provide training and technical support on the installation and use of EMWIN receivers to a small group of meteorological and emergency management representatives from each of those nations.

To keep abreast of new developments in the EMWIN transition, go to: iwin.weather.gov/emwin/index.htm. ❄



GOES Satellite

Update on VTEC for Selected Flood Watches, Warnings, Advisories

By Tom Donaldson, Hydrologic Services Branch
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We are now into the sixth month of a Risk Reduction (RR) Activity for RiverPro software. Selected NWS offices began issuing operational Flood Warnings, Watches and Advisories for Forecast Points with Experimental VTEC, using the X code, this past April. The products involved include:

- Flood Warning for Forecast Points (FLW)
- Flood Statement: Follow-up for Flood Warning for Forecast Points (FLS)
- Flood Advisory for Forecast Points (FLS)
- Flood Watch for Forecast Points (FFA)

WFOs prepare these products using the RiverPro software application on AWIPS. The formal Operational Test and Evaluation (OT&E) for these products, which began in late June, has been extended through November. The extension allows a mid-course correction to the software problem identified in the test. Pending a successful OT&E, a post Ot&E report to the Operation Committee of the Corporate Board, and subsequent approval of the Operations Committee, the products will become operational nationwide in July 2007. NWS plans, in 2007, to test other products containing Hydrologic VTEC, such as Flash Flood Warnings.

For more information on the Risk Reduction and OT&E schedules, including the offices taking part, go to www.weather.gov/os/vtec/hydro_vtec.shtml.

For more information on VTEC, including the phenomenon and significance codes associated with these hydrologic products, go to www.weather.gov/os/vtec/. ❄

Statewide Radio System Provides Valuable Communication Pathway in Emergency

By Stan Keefe, NWS Aberdeen, SD
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In 2002, South Dakota began operating a digital trunked radio system. State radio is a network of radio towers covering nearly the entire state. Like cell phone technology, the network uses towers to communicate; however, this system actually operates like a VHF radio, allowing only one user to talk on a given channel at a time.

As described by South Dakota's Department of Public Safety, the state radio interagency talk groups are intended to improve communications between agencies such as a firefighters and highway patrols; an ambulance operator talking to a department of transportation truck; or officials of different towns or counties who need to interact during emergencies.

NWS Aberdeen has its own channel labeled NWS-C/NE. Emergency managers, first responders, fire crews, and others, can contact the NWS office at any time using their state radio. The system allows NWS to exchange information efficiently with its users.

The state radio interagency talk groups are intended to improve communications between agencies such as firefighters and highway patrols; an ambulance operator talking to a department of transportation truck; or officials of different towns or counties who need to interact during emergencies.

The Aberdeen office began broadcasting a daily weather briefing on its channel in March 2005. The briefing includes a discussion of weather concerns, primarily affecting wildland fire crews and emergency managers, as well as the possibility of severe weather over the next 7 days. This briefing also provides an opportunity for users to ask questions and discuss upcoming weather.

On August 24, 2006, tornadic supercells approached parts of the Northern Plains. Several days ahead of time, forecasters were highlighting the possibility of severe weather through the Hazardous Weather Outlook (HWO).

The state radio network allowed forecasters to brief emergency managers at the daily 10:05 a.m. briefing about the expected severe weather. The morning of the event, the Storm Prediction Center in Norman, OK, upgraded parts of the region to a moderate risk of tornadoes. Forecasters delivering the morning briefing informed emergency managers of the increased risk. To heighten awareness of this event, a second briefing was scheduled for 2:00 p.m.

By late afternoon, thunderstorms had developed across central South Dakota and were moving eastward. One supercell pushed across Sully, Hyde, and Hand Counties, in the Aberdeen NWS county warning area. This storm produced five tornadoes, including one rated F2. As these storms moved through the area, the state radio allowed emergency managers and forecasters in the Aberdeen office to quickly exchange information.

A deputy sheriff in Sully county kept Aberdeen staff informed when the funnel cloud became a tornado as well as when it lifted. NWS forecasters provided the deputy sheriff with storm motion estimates to keep him safely away from the storm. The Hyde county emergency personnel were updated on the status of the storm by listening to the NWS channel through conversations between the deputy sheriff of Sully County and NWS. South Dakota State radio proved to be an invaluable network in this event, providing timely and efficient communication between the NWS and emergency managers. ✱

Flood Safety

Flood Safety Awareness Week Scheduled for March 19-23, 2007

By Larry Wenzel, NWS Hydrologic Services Branch
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Mark your calendars. NWS has scheduled its third annual Flood Safety Awareness Week for March 19-23, 2007. As in the past, each day will highlight a different element of the hydrology program. Topics range from Ice Jams to Flash Floods. NWS hydrology staff continues to add safety information and audiovisuals to the flood safety website. One of the newest additions is a link to a wealth of information from FEMA's FloodSmart. For more information, go to: www.weather.gov/floodsafety/. *

**FLOODING AHEAD
TURN AROUND
DON'T DROWN**

Survey Completed on Hydrologic Services and Products

By Larry Wenzel, NWS Hydrologic Services Branch
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In an effort to improve hydrologic services, NWS contracted with Claes Fornell International to provide an online survey for customers of hydrologic services and products. The survey's purpose was to determine how satisfied customers are with hydrologic services and products and to solicit suggestions for improvement. The survey ran from mid-August to mid-September. By the end of October, NWS will post an Executive Summary of the results online at www.weather.gov/os/water/index.shtml. *

Hurricane Awareness

La Seguridad de Tiempo: Los Huracanes New Hurricane Flyer Now Available in Spanish

By Melody Magnus, Editor
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NWS has translated its new 2-page hurricane safety flyer into Spanish. This flyer offers quick tips for residents in hurricane prone areas:

- What to do before, during and after a hurricane
- What you should bring to a shelter if you must evacuate
- Differences between a Hurricane Watch and Warning



Some new information in the flyer includes revised policies on pets. Owners were previously told to leave pets home. After the enormous loss of life in Hurricane Katrina, many hurricane shelters are now allowing owners to bring pets. Owners are asked NOT to leave them home to fend for themselves. Numerous other updates were made from older publications that did not refer to newer technology such as cell phones. You can download La Seguridad de Tiempo: Los Huracanes at www.weather.gov/os/hurricane/pdfs/hurricane-flyer-esp.pdf. ❄

Revised Hurricane Publication Now Online

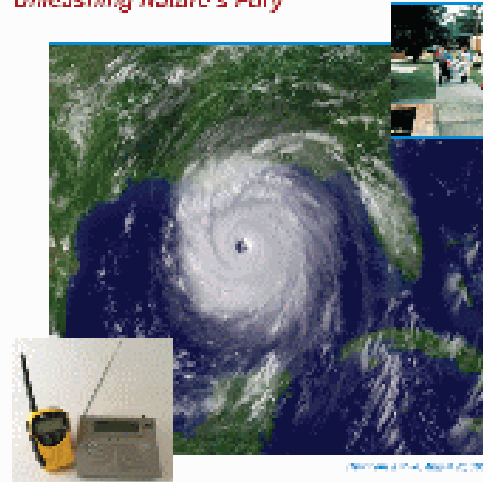
By John Simensky, NWS Outreach Branch
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NWS has updated its publication, "Hurricanes...Unleashing Nature's Fury." You can download the revised version on the NWS publications website at www.weather.gov/os/brochures.shtml.

The new version includes updated information and illustrations from the active 2004 season and the record-breaking, horrific 2005 hurricane season. Printed copies will be available from local NWS offices later this fall. ❄

Hurricanes...

Unleashing Nature's Fury



Marine Services/Rip Currents

Two New Marine Weather Training Modules Released For NOAA Staff, Partners and Emergency Managers

By Richard May, NWS Marine and Coastal Weather Services Branch
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The Marine and Coastal Weather Services Branch continues to work with COMET and marine forecast experts to produce marine weather forecaster training modules. These online classes are open to NWS staff, emergency managers and other partners. Earlier in 2006 the COMET Program released the **Wave Life Cycle II: Propagation and Dispersion** module, the third in a series of training modules on open-water waves.

Shallow-Water Waves is the fourth module on open-water waves. This 1.5-hour course discusses the basics of shallow water waves, their behavior and the transformation the waves undergo as they move from deep to shallow water. A new estimation tool, the "Shallow Water Wave Calculator," is used to answer exercise questions throughout the module and may be used as a tool for forecasting in the nearshore environment.

Rip Currents: Forecasting is the third and final module in the series aimed at training operational weather forecasters and others on factors leading to rip current development and

how to predict daily risk level of this hazard. This module takes about 2.5 hours to complete. The next modules planned for completion are **Winds in the Marine Boundary Layer** and **Understanding the Marine Forecast Customer**.

The two new modules, along with all of the other marine weather modules, are posted at the COMET website at www.meted.ucar.edu/topics_marine.php. These modules are also in NOAA's e-learning system at e-learning.doc.gov/noaa/. Forecasters are encouraged to take all of the marine weather modules on NOAA's e-learning system for proper credit. ✱

Outreach and Education

Amateur Radio Operator Receives NWS Special Service Award

*By Steve Drillette, WCM, NWS Amarillo, TX
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In a surprise presentation, NWS Amarillo, TX, MIC Jose Garcia and I presented Juannah Brice with a Special Service Award for her many years of voluntary service as a HAMS Skywarn spotter and Net Control Operator. Juannah, a longtime member of the Potter/Randall Counties Amateur Radio Emergency Services organization, is also a science teacher at Highland Park High School. She has served as the primary HAMS Net Control Operator at the Amarillo NWS office since 1999. She is often dispatched from work when storm spotter activation is required.

MIC Jose Garcia also credited the Highland Park Administration: "We really appreciate the administration and staff at Highland Park for allowing Juannah to leave her teaching duties to respond to this critical and potentially life-saving service." Vernon Alexander, the immediate past president of the Potter/Randall Counties ARES organization, also praised Juannah and Highland Park School officials for their sacrifice and dedication in making the Texas and Oklahoma panhandle areas a safer place. ✱



NWS Amarillo, TX, WCM Steve Drillete, MIC Jose Garcia and Storm Spotter Juannah Brice at a surprise Special Award Presentation recognizing Juannah's support as a HAMS radio operator and Storm Spotter.

Science Center Seminars Focus on Weather

*By Jim Kramper, WCM, NWS St. Louis, MO
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To promote weather safety, I recently started working with the St. Louis Science Center to organize a series of lunch time seminars at the St. Louis Science Center. The first seminar, held August 29, dealt with preparing for and recovering from major weather disasters. Presenters looked at and compared the Great Flood of 1993, Hurricane Katrina and the heat wave and storms that affected St. Louis this past July.

The next seminar, entitled “Lunch and a Movie,” will be held on October 10. The presentation will focus on severe weather that affects St. Louis, why it occurs and what to do about it. The seminar will be followed by a screening of the OMNIMAX film “Forces of Nature.” More weather-related lunch time seminars, at which box lunches are provided, will be scheduled in the future. So far this approach is proving an innovative way to increase severe weather awareness. ❄

Weather and Society Integrated Studies: The Summer WAS*IS Experience Targets Collaboration

By Kevin Barjenbruch, NWS Salt Lake City, UT
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In July, the WAS*IS workshop hosted 31 attendees at the third in a series of workshops aimed at integrating weather and social science. The workshop brought together public, private and academic attendees with backgrounds in meteorology, geography, anthropology, journalism, economics, hydrology, sociology, environmental studies and more. Six NWS staff members from NWS field and headquarters offices were selected to take part.

What exactly is WAS*IS? It is a grassroots movement to make social science an integral part of meteorological research and applications. WAS*IS works to change from “what WAS” to “what IS,” the future of integrated weather studies. The workshop presenters focused on:

- Addressing challenges and develop new ideas and methodologies for effective socioeconomic applications
- Teaching and emphasizing communication strategies and evaluation techniques
- Building strong, productive collaborations among group members

The WAS*IS organizers emphasize strengthening lifelong collaborations in addition to learning social-science tools. This two-pronged approach helps ensure societal impacts of weather are recognized and addressed in a real, sustained way. Participants in the summer WAS*IS workshop are working on several collaborative projects. Areas the group particularly focused on include:

- Assessing the public’s sources, perceptions of and responses to warnings
- Exploring ways to improve warning services
- Investigating alternative perspectives of warning verification

The WAS*IS group also evaluated impacts of weather events, gauging understanding and use of weather forecast uncertainty information, and improving communication among all sectors of the weather enterprise, particularly between the government and private sectors.

WAS*IS plans to offer additional workshops to further opportunities for change in the weather enterprise. The next workshop is planned for Mount Macedon, Victoria, Australia, in early 2007. There are tentative plans for another workshop in Boulder next summer.

For more information on the workshops, including other WAS*IS participant projects, check out the WAS*IS web page at www.sip.ucar.edu/wasis/. ❄



Move to Storm-Based Warnings Gains Momentum

By John Ferree, NWS Severe Storms Service Leader
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Warnings for tornadoes, severe thunderstorms and flash floods are some of the most important products issued by the NWS. Currently, these warnings include entire counties or parishes, even though the risk of severe weather may only affect a small portion of a county. In some instances, large segments of the population are needlessly warned to take shelter from the storm. The size of a warning can be especially problematic in the West where some counties are larger than some small states in the East. (San Bernardino County, CA, is 13 times larger than the state of Rhode Island.)

To resolve this problem, NWS is moving to smaller, “storm-based” warnings, also called “polygon” warnings. The storm-based system will allow the NWS to warn small portions of one or more counties, warning only those in the path of the storm. Forecasters will define the storm-based warning area by a set of latitude and longitude points easily ingested by graphical applications such as Geographic Information Systems.

During 2005, several NWS Weather Forecast Offices tested the use of these smaller-than-county areas for convective warnings. The results were positive. Offices taking part in the test averaged a reduction of 70 percent in the area covered by warnings. Emergency management and other disaster response agencies served by these warnings were able to focus limited resources on smaller areas. Forecasters reported the ability to communicate severe weather threats to the public with increased specificity and clarity. ✱

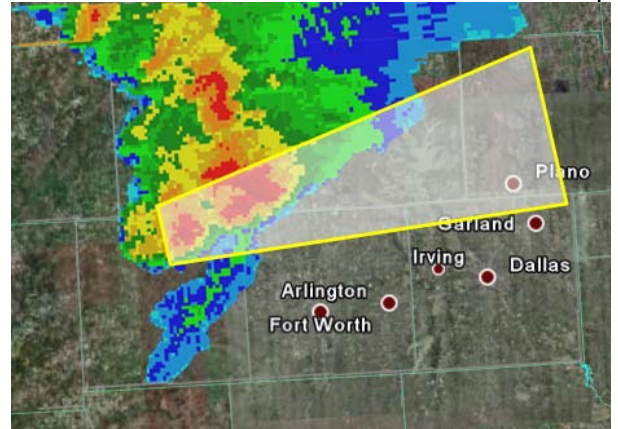


Figure 1: Most of the Dallas/Fort Worth metropolitan area is correctly omitted from this storm-based tornado warning. New siren systems could be selectively activated only for those areas within the shaded storm-based warning.

Technical Workshop on Storm-Based Warnings Scheduled for December 5-6 in College Station, TX

By John Ferree, NWS Severe Storms Service Leader and
Gerry Creager, Professor of Meteorology, Texas A&M University
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As detailed in the article above, NWS plans to implement a major change to convective warnings, including tornado, severe thunderstorm and flash flood warnings. Currently, these warnings are issued for counties, parishes and independent cities. As early as October 2007, NWS plans to issue these warnings for smaller areas not restricted by county boundaries. By focusing on the true threat area, these “storm-based” warnings will improve NWS warning accuracy and quality and instill higher public confidence.

For the past several years, convective warnings have included a list of latitude and longitude points outlining the area of greatest risk. Advances in digital and personal display technology (e.g., GIS, XML, Real Simple Syndication (RSS), High-Definition TV, personal digital

assistants and cell phones) now allow NWS to send images of these outlined areas directly to customers. The plan is to make this outlined area, or polygon, the warning area rather than entire counties.

To ensure the format of the storm-based warnings meets the needs of public and private sectors, Texas A&M University is hosting a collaborative technical workshop December 5-6 in College Station, TX. The workshop's purpose is to facilitate discussion between the public sector (NWS, FEMA and emergency managers) and private sector companies on technical format requirements for the storm-based warnings.

Storm-based warnings are well placed to take advantage of modern dissemination technologies. For example, the new Digital Emergency Alert System (DEAS) could be used to send the graphical storm-based warnings over a variety of media including digital television, personal digital assistants, cell phones and basic telephone service via reverse 911 capabilities. The Association of Public Television Stations and DHS recently successfully demonstrated the ability to transmit data over the digital broadcast signal of public TV stations (See the last *Aware*, www.weather.gov/os/Aware/pdfs/aware-summer06.pdf). Currently, 99 percent of American households receive a signal from one or more public TV stations.

In many communities, the public relies heavily on siren systems. Some cities have recently purchased siren systems capable of selectively alerting neighborhoods. Instead of sounding sirens for an entire metropolitan area, emergency managers could use storm based warning to selectively sound sirens only for those in the path of a dangerous storm.

More information will be online by mid-October at the following website: mesonet.tamu.edu/workshop2006/, or contact Gerry Creager at Gerry.Creager@tamu.edu or John Ferree at John.T.Ferree@noaa.gov. ❄

F3 Tornado in Warroad, MN: When Good Plans Come Together

By Greg Gust, WCM, NWS Grand Forks, ND
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The tornadoes that struck Warroad, MN, on August 5 were certainly frightening residents and summer vacationers in the beautiful borderland by the fabled Lake of the Woods, but for almost everyone they were not a surprise. Thanks to a wonderful convergence of infrastructure, training and response, the tornado didn't kill or seriously injure a single person.

The storms struck on a Saturday afternoon while the Roseau County Amateur Radio (HAM) Club was having its annual picnic at Warroad's Lakeview Campground and Park, known locally as *The Point*. NWS Grand Forks, ND, sent out Tornado Warnings and in response, many HAM Club members mobilized as NWS SkyWarn Spotters. Others club member remained at *The Point* to assist the Warroad Fire and Police Departments as they evacuated hundreds of campers, swimmers, boaters and picnickers to the city storm shelters.

The first tornado sightings, 8 miles west of town, were quickly radioed into the network operators at NWS Grand Forks. NOAA All-Hazards Radio transmitters were rippling with details. The Emergency Alert System was sounding throughout the area. Local sirens were activated and local AM radio station KKWQ in Warroad began running non-stop storm coverage.



Tornado approaching Warroad, MN, August 5, 2006.

At the northwest corner of Warroad, the Marvin Window and Door Company factory was buttoning down for the storm. Marvin's has hosted SkyWarn Spotter classes for many years and regularly ensures each shift has a designated SkyWarn Spotter on duty. At the eastern end of town, the decision was made early to open storm shelters and evacuate. A radio-capable contingent of Amateur Radio Emergency Services (ARES) operators and the Coast Guard Auxiliary were ready and helped to smooth the evacuation process.

The tornado that struck Warroad produced an F3 damage path nearly 3 miles long and 600 yards wide. It was one of four tornadoes that touched down within Roseau County that day. The tornado ripped across the Marvin factory grounds, clipped the north edge of residential housing and slammed into the normally busy recreation area. Travel trailers, vehicles, shops and service structures were decimated—but not one person was seriously injured! Folks were largely in shelters and safe.

When looking over the damage wrought by the storm, Roseau County Emergency Manager Gracia Nelson was convinced that with just a few minutes less warning, or with fewer first responders at the ready, there would have been serious injury or death.

While parts of town were cordoned off to sightseers, and the tough tasks of search and recovery were still underway, Northwest Minnesota Regional Emergency Manager Mary Hilbrand was proud to see just how well a myriad of agencies and volunteers had come together. They had all practiced their response plans many times over the years; in this case practice made nearly perfect.

Existing Internet technologies, such as XML and RSS, were used to push storm-based warnings over the Internet and directly to web pages and email. This combination of digital dissemination technologies has the potential of directly reaching a much larger portion of the population.

Despite the success, one challenge is to improve service currently provided to those receiving warnings over the radio, including NOAA Weather Radio All Hazards. Descriptive text of the area under warning, storm location and storm movement is more difficult than graphic depiction. The importance of location accuracy must be balanced with the ability of the user to understand the location.

NWS has already made some changes; warnings now include directional delimiters, for example, "A Tornado Warning is in effect for Southwestern 'X' County." NWS staff also plan to consider additional format changes such as including additional communities, landmarks and even highway mile markers. These options will be reviewed by partners in the media and private sector before additional planned testing in 2007.

A critical element of this proposal is a strong commitment to collaboration between NWS, academia, emergency managers, broadcast meteorologists and private sector companies involved in the dissemination of warnings. This collaboration will help ensure storm-based warnings are both effective and properly used, resulting in successful protection of life and property. In support of that collaboration, Texas A&M University is hosting a collaborative technical workshop. Details of this workshop are included in a separate article in this addition of *Aware* (see Page 10). *



*Sorting through the wreckage of a gift shop at The Point, in Warroad MN.
Photo taken August 6 2006.*

Norman Forecasting Operations Complete Smooth Moves

By Keli Tarp, Public Affairs Specialist, NOAA Weather Partners
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The NWS/NCEP Storm Prediction Center (SPC) and the NWS Norman, OK, Forecast Office have recently moved to facilities in the new National Weather Center in Norman. The 244,000-square-foot National Weather Center is a unique partnership of NOAA and the University of Oklahoma's (OU) weather research and operations programs. Construction began on the NWC in August 2003 and the building was dedicated last month. The NWC is an OU building with NOAA as the primary tenant. Three other NOAA organizations are also located in the building:



SPC Activity Chart: www.spc.noaa.gov

- National Severe Storms Laboratory
- Warning Decision Training Branch
- Applications Branch of the Radar Operations Center

Other occupants will include:

- NOAA/OU Joint Institute
- Cooperative Inst. for Mesoscale Meteorological Studies
- UO College of Atmospheric and Geographic Sciences
- UO School of Meteorology
- Center for Analysis and Prediction of Storms,
- Center for Spatial Analysis
- Center for Natural Hazard and Disaster Research
- Oklahoma Climatological Survey

The SPC was the last organization to move into the building. SPC's move was done one forecaster at a time to ensure services were never interrupted. Previously, the SPC was housed in cramped quarters with some staff in trailers.

The NWS Norman office moved earlier in the summer, transferring operations to NWS Tulsa for 4 days. Less than an hour after resuming operations, Norman forecasters issued a severe thunderstorm warning. The SPC and WFO are located a few steps from each other, separated by the NOAA Hazardous Weather Testbed, a space for forecasting experiments shared with NSSL. All phone numbers have changed due to the move. Below are a few key numbers:

Storm Prediction Center Info:	405-325-2040
Joe Schaefer, Director:	405-325-2057
Dan McCarthy, WCM:	405-325-2080
Peggy Stogsdill, Admin. Officer:	405-325-2067
Norman WFO Info:	405-325-3816
Mike Foster, MIC:	405-325-3318
Rick Smith, WCM	405-325-3395
Keli Tarp, Public Affairs:	405-325-6933. ❄️

Timmy the Twister: A New Character in Town

By Richard Okulski, WCM, and Jim Belles, MIC, NWS Memphis, TN
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Smokey Bear, the beloved character of the USDA Forest Service, inspired several staff members from NWS Memphis, TN, and the Lower Mississippi River Forecast Center (LMRFC) to create “Timmy the Twister.” Like Smokey, who notifies the public of fire danger, Timmy helps prepare the public by announcing the potential for severe weather.

NWS Memphis, TN, Meteorologist-In-Charge Jim Belles kicked the concept around with staff members Dan Valle and Scott Cordero (now at NWS Corpus Christi, TX). They finalized a vision of the character they wanted and Amanda Roberts with the Lower Mississippi River Forecast Center put flesh to the Timmy graphic.

NWS Memphis has partnered with the communities of Caruthersville, MO; Pontotoc and Ecu, MS; and the Agri-Center in East Memphis to use Timmy the Twister in a sign announcing the daily severe weather outlook. Every morning someone checks the local Hazardous Weather Outlook and places the appropriate outlook—none, slight, moderate, or high—on the Timmy the Twister sign board.

Caruthersville placed its Timmy the Twister sign in front of the local fire station on March 13. Less than 3 weeks later, an F3 tornado moved through the city and damaged 500 homes. In a testament to StormReady awareness and preparedness, no one died in the event.

City Emergency Manager and Fire Chief Charlie Jones credits the heightened awareness to the city’s Timmy the Twister sign. Charlie was recently awarded the StormReady Community Hero Award by NWS Director D.L. Johnson for his work above and beyond the call of duty during this event (see article next page). The Weather Channel and MSNBC included the Timmy the Twister sign in their broadcasts from Caruthersville in the aftermath of the April 2 tornado event.

WFO Memphis regularly receives requests for Timmy the Twister signs and information on the character’s campaign. We provide the template to interested communities at no cost and seek to partner with other government agencies to fund signs and spread the word. ❄



Timmy the Twister signs help alert local residents and visitors to the risk of tornados in the area. The campaign recently helped save numerous lives in Tennessee.

StormReady/TsunamiReady

StormReady Recognizes Two Heroes, Tops 1100 Sites

By Melody Magnus, Aware Editor
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The count of the StormReady communities nationwide hit 1,100 in September, making gains throughout the continental United States. The program also added its first site in Guam. Guam, which was also granted TsunamiReady status, is subject to a broad range of weather problems ranging from typhoons and tsunamis to wildfires and flooding. In addition to Guam, NWS gained its third government site, BWXT Pantex in Texas; its fourth Indian Reservation,

Mille Lacs Band of Ojibway, MN; and its sixth Military Installation at Fort Sill, OK.

The biggest program gains in the last few months are two StormReady Hero recognitions. NWS has awarded only two other Hero Awards in the program's 7-year history.

Iowa Emergency Managers and Church Staff Act Quickly

NWS presented the first Hero Award of 2006 to four citizens of Iowa City, IA, for their actions during a tornado outbreak last spring. The award was presented to Tom Hansen and Sue Faith of Johnson County Emergency Management Communications Dispatch, and Rev. Rudolph Juarez and Rev. Jerome Miller of St. Patrick's Catholic Church. NWS Central Region Director Lynn P. Maximuk commented that the actions of these four people saved more than 50 lives when a tornado hit.



StormReady Heroes, July 2006: Lynn Maximuk (left) NWS Central Region Director and Stephan Kuhl (right) WFO Quad Cities MIC, pose with StormReady Community Hero Award recipients in front of St. Patrick's Catholic Church at a ceremony in Iowa City, IA, on July 7, 2006.

"Johnson County Emergency Management officials and dispatchers followed their procedures to perfection to relay advance warning of the approaching tornado," Maximuk said. "Pastor Rudolph Juarez and Deacon Jerome Miller took quick action to protect their parishioners. These people are the epitome of StormReady Community Heroes."

When the strong F2 tornado swept through the heart of Iowa City, its random path of destruction included the Johnson County Sheriff's Office and St. Patrick's Catholic Church.

On April 13, NWS forecasters issued the first tornado warning for Johnson County at 7:58 p.m. Just 1 minute later, following approved procedures, local officials activated the Indoor Warning System created to relay NWS warnings to occupants of buildings.

Outdoor tornado sirens were activated at 8 p.m. The tornado warning was updated at 8:10 p.m. and 8:31 p.m. All updates were followed by activation of tornado warning sirens.

At 8:20 p.m., Deacon Miller was leaving St. Patrick's when he heard the tornado sirens. He immediately went back inside to notify Father Juarez, who was conducting a service.

The service was stopped immediately and more than 50 parishioners took refuge in the basement of the nearby rectory.

The tornado slammed into the church just minutes later at about 8:35 p.m., collapsing the steeple and southern portion of the roof, including the choir loft, directly onto where the parishioners had been moments before. The rectory building also sustained significant damage, but parishioners sheltering in the basement escaped unharmed.

"Advance planning led by Tom Hansen and Sue Faith at Johnson County Emergency Management and the quick reactions of Father Juarez and Deacon Miller saved dozens of people from serious injury or worse," said Steve Kuhl, Meteorologist in Charge of the NWS Quad Cities office. "It is very encouraging to our staff to be able to congratulate these heros for their attention to detail rather than having to extend condolences to all those families."

Missouri Hero Goes Beyond Job to Save Lives

The second 2006 Hero Award was given to the Caruthersville, MO, Emergency Manager and Fire Chief Charlie Jones for his courageous, lifesaving actions when a tornado ripped through the city on April 2. "Our national Community Hero Award is intended to recognize individuals within a StormReady community who go above and beyond what would be expected of them and whose actions directly result in saving lives," said NWS Director David L. Johnson. "Not only

did Chief Jones take action to save lives that day, but he did so at great personal risk.”

Jones was storm spotting at the edge of town when the NWS Memphis office issued a Tornado Warning for Pemiscot County at 6:49 p.m. Disseminated via the National Warning and Alert System, the warning noted Caruthersville was in imminent danger from the tornado. Jones immediately ordered the city’s sirens to be sounded and, in an unusual move, ordered them to be blown in repeated cycles, thereby enhancing the public response. He also increased the public’s sense of urgency by using the local fire communications frequency to further disseminate the warning, adding the phrase: “This is the real thing... Take Cover Now!”

By the time the F3 tornado struck the city at 7:07 p.m., most of its 6,700 citizens had already found shelter. Nearly two-thirds of the buildings, including 500 homes, were damaged, and an estimated 2,000 people would have been at great risk of injury or death if not for Jones’s early and repeated warnings. While the tornado was part of a major outbreak that claimed more than two dozen lives in eight states, not one person died in Caruthersville.

“Although Jones’s actions helped keep injuries to a minimum, ironically, he was one of the injured,” said Bill Proenza, Director, NWS Southern Region. “Despite his personal injury, he persisted in his heroic actions during the tornado event and continued to coordinate recovery efforts afterward. By any standard, he was a community hero that night.”

Charlie Jones was also the driving force behind Caruthersville’s recognition as a StormReady community. Jones’s vision, dedication and leadership helped create a storm spotter network and communication protocols. He led the activation of sirens and the community’s preparedness and prompt response to the tornado.

NWS is proud to play a part in these two heroic episodes by providing its StormReady and TsunamiReady program framework and support. For more information about these programs, go to www.stormready.noaa.gov/. ✨



StormReady Hero, August 2006: From left, NWS Director David L. Johnson, StormReady Community Hero Charlie Jones, NWS Southern Region Director Bill Proenza Photo by Zwemer Ingram, WFO Memphis.

Climate, Water and Weather Links

Aviation Weather:	aviationweather.noaa.gov/
Education/Outreach:	weather.gov/os/edures.shtml
Flooding/Water:	www.floodsafety.noaa.gov/
Hurricane Awareness:	weather.gov/os/hurricane/index.shtml
Lightning Safety:	lightningsafety.noaa.gov/
Marine Weather:	weather.gov/os/marine/home.htm
MIC/WCM/SOO/DOH List:	weather.gov/os/wcm-soo.pdf
Natural Hazards Statistics:	weather.gov/os/hazstats.shtml
National Digital Forecast Database:	weather.gov/ndfd/
NOAA Weather Radio Information:	weather.gov/nwr/
Past Weather/Climate:	lwf.ncdc.noaa.gov/oa/ncdc.html
Rip Current Awareness:	www.ripcurrents.noaa.gov/
StormReady Home Page:	stormready.noaa.gov/
Severe Weather Safety:	weather.gov/os/severeweather/index.shtml
Tsunami Information:	www.tsunami.gov
Winter Weather Information	weather.gov/os/winter/index.shtml