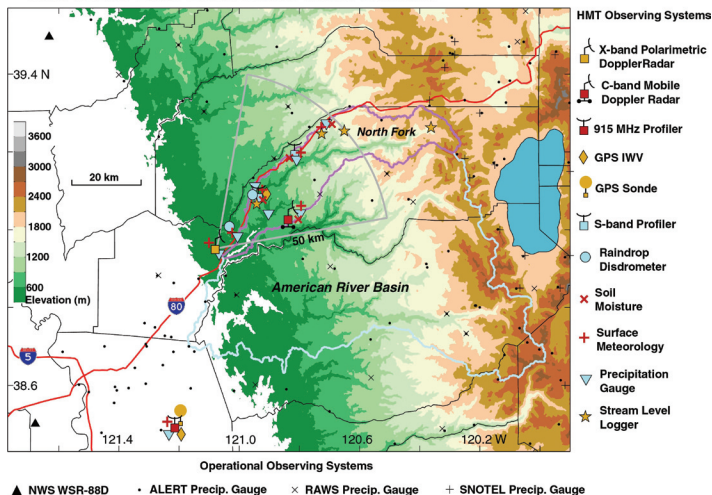


NSSL Briefings



HMT-WEST 2005-2006: Basin Scale Domain



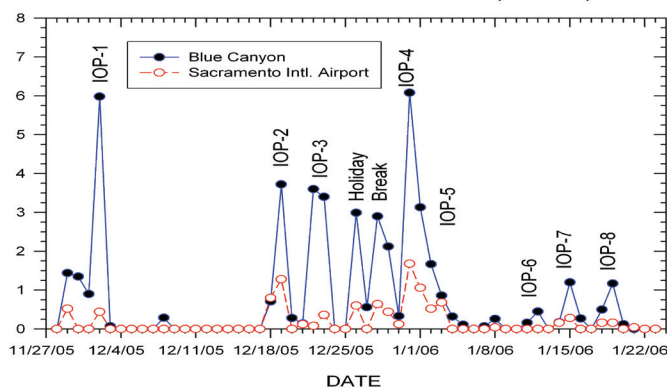
Laboratory), the NOAA ESRL/Global Systems Division (formerly Forecast Systems Laboratory), and NSSL.

NSSL provided one of its SMART-Radars to supplement the coverage of the X-Band polarimetric radar, provided by ESRL/PSD. Their goal was to see how the quantitative precipitation estimation (QPE) coverage provided by the national WSR-88D network could improve. The SMART-R site was in the small town of Foresthill, CA, at an elevation near 3000 feet. Based on a 48-hour forecast of rain over the basin, a two-person team deployed from NSSL to operate the radar during the storm. At the conclusion of the rain event the team returned to NSSL to await the next storm.

The ESRL/PSD transportable X-Band polarimetric radar was placed in Auburn, CA, northeast of Sacramento and about 27 km from the SMART-R. These sites were carefully chosen to provide excellent low-level coverage of the basin as well as to allow for some dual-Doppler analyses for selected cases. The data from both radars will eventually be input to NSSL's national radar mosaic system (Q2) in order to compute QPE over the basin. Detailed intercomparison with rain gages in the basin will provide a metric for evaluating improvements to QPE.

By December 2005, the American River Basin had already received more than 42 inches of precipitation, three times the climatological average for the month. These early-season storms caused flooding on nearby watersheds including the Russian, Napa, and Sacramento Rivers in California. Interstate 80 between Reno and Sacramento was closed for a time due to debris flow. These examples illustrate why flood data research is critical. The HMT team will use proof-of-concept results to enhance NOAA's current observing and modeling capabilities and improve predictions of location, timing, and amounts of rainfall. ♦

Daily Precipitation During HMT06
ALERT/HMT Gauges
24-Hr Accumulations at 4 a.m. PST (12 UTC)



Sacramento and Blue Canyon precipitation during the first part of HMT06.

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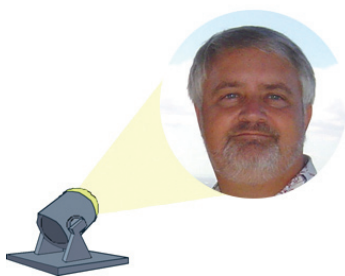
Global distribution of severe weather

National Weather Festival draws a crowd

American River Basin flooding targeted by the HydroMet Testbed project

The city of Sacramento, CA, has been battling the threat of flooding ever since it was founded at the convergence of the American and Sacramento Rivers during the Gold Rush in 1849. The city continues to expand within the floodplain, and much of the current population lives behind levees. A close-call came as recently as 1997 when a storm struck the American River Basin, causing the Sacramento River to peak within a half a foot of the record level set in 1986. Sacramento was spared only because the fury of the storm was centered 40 miles north, but nearby towns flooded when levees failed.

The flood-vulnerable American River Basin was targeted this winter by the HydroMet Testbed (HMT) research project. The project team tested and improved streamflow models and learned what is required to make better predictions of where, when, and how much rain will fall. The HMT ran from December 1, 2005 through March 1, 2006, and involved the NOAA National Weather Service (NWS) and several NOAA/OAR labs including the NOAA Earth Systems Research Laboratory (ESRL)/Physical Science Division (formerly the Environmental Technology



Spotlight on: Gary Skaggs

Gary Skaggs, jack-of-all-trades: ham radio operator, scuba diver, pilot-in-training, golfer, vocalist - and these are just his hobbies! "Mr. Happy" has repaired pianos, worked in a music library, at churches and machine shops, in the oil field, and has done janitorial work -- a little bit of everything.

Gary's real passion is music. His "mongrel" past includes a degree in Vocal Music Education from

East Central University in Ada, OK, and almost an M.S. degree in Church Music from Southwestern Seminary (minus the comps and thesis). Meteorology was Gary's "second love," and he decided a career in meteorology could help fund his love for music. He took coursework at OU for two years, but was lured away to Arizona to become a full-time music and education minister at a church in Kingman, AZ.

After a year and a half Gary returned to OU, fitting in what coursework he could and still work full time as the supervisor of the NOAA Weather Radio folks in the Oklahoma City NWSFO. His radio expertise caught the attention of NSSL, and Gary was brought on to support the Interim Operational Testing & Evaluation (II), a field verification experiment for NEXRAD. Back in the days before cell phones, communication between the teams in the field was mostly by radio - and his expertise was invaluable. He continued to do a lot of field work - SWAMP in 1990, SWAMP-II in 1993, and VORTEX '94-95 until he began to make the shift to networking. "It was completely on-the-job training," Gary says, and he eventually ended up managing the IT department at NSSL. "IT people work hard," Gary says, "If no one says anything, you're doing a good job." Gary is now working to get the communications network in the new building ready to go. It is a project he has been working on for six years, and he looks forward to seeing it all come together.

Though he made the switch to meteorology in his career, Gary still pursues his first love. He is the volunteer music minister at his church, leading worship, sanctuary choir, and orchestra. For many years, Gary has also been a part of the "Singing Churchmen of Oklahoma" - a group of over 280 ministers of music in the state who are dedicated to ministry through music. Gary and the Churchmen have traveled all over the world at their own expense, performing at venues from the Theater of the Red Army in Moscow, to the Shanghai Conservatory of Music and the Sydney Opera House--experiences that will stay with him forever. Golfing at St. Andrews in Scotland is another memorable experience, but that's a whole other passion!

Gary found one of his favorite places while scuba diving 80 feet below the surface of the Caribbean on the Santa Rosa Wall off Cozumel; another favorite place is Mather Point at the Grand Canyon at sunrise.

Gary, who fills in for Santa Claus at NSSL family Christmas parties, and his wife Linda, NSSL's Administrative Officer, have been married for seven years and have two cats--one a refugee from the May 3, 1999, tornado. Gary offers this insight on life and work: "No one at NSSL is one-dimensional - they all have a life outside of here with kids, hobbies, etc. What we do here is important, but not consuming, which is a good perspective for all of us to have." ♦

National Weather Festival draws a crowd

A sunny Saturday in November brought crowds of about 1000 curious weather enthusiasts to NOAA's current facilities in Norman, OK for the National Weather Festival, sponsored by the Norman Chamber of Commerce Weather Committee. NSSL staff were on hand to explain the latest phased array radar technology, and while computer screens showing weather and radar data attracted the attention of grown-ups, a tornado model with simulated damage to a farm and the surrounding landscape drew the interest of children. ♦

News briefs

Comings and goings

J.J. Gourley accepted the federal hydrometeorologist position in WRDD. J.J. recently returned from a year in France where he shared his expertise in polarized radar.

Joan O'Bannon retired from CIMMS after 26 years of service. Joan was responsible for creating most of the graphics at the lab before desktop publishing became commonplace. She then shifted her focus to web development and design and eventually became Webmaster for the OAR website while continuing to help manage the website at NSSL. We aren't letting her go far--she continues to work part-time for NSSL under the INDUS contract.

Beth Clarke, formerly a CIMMS research associate at NSSL working with the hydrometeorology team, joined Weather Decision Technologies (WDT) as a hydro-meteorologist.

James Murnan joined NSSL as an audio/video and production specialist working for INDUS. He will provide support for the visualization lab in the new National Weather Center and will continue shooting and producing videos.

Awards and honors

Suzanne Van Cooten has received the NOAA Bronze Medal as part of a group being honored for their leadership in establishing the Coastal Storms Program and successfully completing the first pilot program in Florida. Suzanne worked at the NOAA/NWS National Data Buoy Center at Stennis Space Center, MS, before coming to join NSSL's hydrometeorology program.

John Lewis was recently elected a Fellow of the American Meteorological Society. The election to Fellow is based on outstanding contributions to the atmospheric or related oceanic or hydrologic sciences or their applications during a substantial period of years.

2006 Severe Weather Workshop

NSSL was a co-sponsor of the sixth annual National Severe Weather Workshop held March 2-4, 2006 in Midwest City, OK. The three-day workshop was designed to enhance partnerships between severe weather forecasters and researchers, emergency managers, broadcast meteorologists, businesses, storm spotters and other weather enthusiasts.

Sequel DVD raises money for the American Red Cross

The American Red Cross was recently presented a check for \$5,708.71 from the Central Oklahoma Chapter of the American Meteorological Society. The money was raised through profits from the new "Storms of 2005" DVD, the sequel to the very successful "Storms of 2004." Both DVD's were produced by Greg Stumpf (NSSL/MDL) and Jim LaDue (NWS Warning Decision Training Branch). More information can be found at www.stormsof2005.org.



<http://www.nssl.noaa.gov>

Since 1995, NSSL Briefings has been published from the National Severe Storms Laboratory to provide federal managers, staff, and other colleagues in the meteorological community with timely information on our activities. This newsletter also contains information about NSSL's scientific collaborations with the OU Cooperative Institute for Mesoscale Meteorological Studies (CIMMS). If you would like to be added to the NSSL Briefings mailing list, or have a change in your address, please forward requests to Kelly Lynn, NSSL, 1313 Halley Circle, Norman OK, 73069; by phone: (405) 366-0429 or by email: kelly.lynn@noaa.gov.

NSSL STAFF

Director.....Jeff Kimpel
 Deputy Director.....Kevin Kelleher
 Administrative Officer.....Linda Skaggs
 Chief, Forecast R&D/FOFS.....Dave Rust
 Chief, Radar R&D.....Doug Forsyth
 Chief, Warning R&D.....Dave Jorgensen
 Information & Technology.....Jeff Horn
 CIMMS/NOAA Relations.....Randy Peppler
 Public Affairs.....Keli Tarp

NEWSLETTER

Writer/Editor.....Susan Cobb

Kimpel receives Presidential Rank Award



We are proud to announce that Jeff Kimpel, NSSL Director, recently received the Presidential Rank Award, one of the highest awards given within the U.S. Federal Government. The citation reads:

Dr. James F. Kimpel is renown for his scientific vision, his leadership skills, and his talent in putting together coalitions of federal, academic, and private partners to address complex challenges in order to save lives, protect property, and reduce economic loss from severe weather events. At NSSL, Dr. Kimpel provides the scientific direction, creative work environment, and financial stability to improve science, technology, decision tools, and training materials aimed at advancing the goals of the National Weather Service. Beyond NOAA, he helps create and skillfully manages diverse partnership programs to improve information for decision makers in coping with hazards such as tornadoes, hail, winds, flash floods, ice storms, and heavy snowfalls. For leading research efforts through to completion in support of the NOAA mission, successfully transferring research into operations, and building multifaceted coalitions, Dr. Kimpel's achievements rank in the sustained accomplishment category for the Meritorious Presidential Rank Award.

Radar enhancement collaboration thrives between the Radar Operations Center (ROC) and NSSL

WWII radar technology was designed to detect and locate hostile aircraft. Nuisance storms picked up by the radar obscured valuable data. Eventually users realized this information could actually be useful. Researchers began to study radar data as a weather tool rather than a defense tool. This became the foundation of today's NSSL as scientists continued to work to maximize the use of the original WSR-57 surveillance radars for the U.S. Weather Bureau (now the NOAA National Weather Service.) Since then NSSL has stayed on the edge of technology with the development of the WSR-88D as the next generation of weather radar and the exploration of the many varied and exciting uses of phased array radar.

A significant part of these more recent contributions is the behind-the-scenes framework of a memorandum of understanding (MOU) in existence for almost 20 years. It began when the Interim Operational Test Facility (IOTF) was placed in Norman to help continue and accelerate the WSR-88D technology transfer process following the successful Joint Doppler Operational Project (JDOP). The IOTF eventually became part of the Operational Support Facility (OSF), now called the Radar Operations Center (ROC). The OSF realized the need for continuing support from NSSL researchers on issues of hardware and software development and enhancement, correct radar operation, interpretation of WSR-88D data, and assistance with training courses for radar technicians and operators/forecasters. As a result, the ROC/NSSL Technology Transfer Memorandum of Understanding (MOU) was established. The MOU has been in continuous existence since 1987, assuring continuity in improvement of radar hardware, software, and applications.

Over the years, the MOU has been fine-tuned into an effective and efficient way to transfer research into operations. Needs and priorities are identified by the users, and MOU managers (one from NSSL and one from the ROC) strategize to address



(continued on next page)

Radar collaboration...continued

the highest priority projects. Updates are given throughout the year to management on each project's progress and resource utilization. A final report is generated yearly for all MOU activities.

The ROC/NSSL Technology Transfer MOU has enjoyed great success over the nearly two decades of its lifespan. Many of the applications that are now a part of the WSR-88D baseline were developed through the MOU process, including all the severe weather algorithms. In more recent years, the MOU has evolved to support increased emphasis on data quality and the transition of NEXRAD to open-systems concepts. The development of new and more elaborate scanning strategies, better data quality, and the introduction of new



capabilities such as polarization diversity are direct results of the MOU process.

Important current MOU activities (those associated with dual polarization enhancement and others) continue the transfer of important and exciting research into better operational products and services. Attractive new areas of potential radar technology, including spectral process application, phased array radar and boundary layer radar, will likely become topics for technology transfer beyond the end of the current decade. Through the NSSL/ROC MOU technology transfer process, new research will continue to benefit the American public for years to come. ♦



Estimating the global distribution of severe thunderstorms and tornadoes

Severe thunderstorms are a hazard not just in the United States, but around the world. Our understanding of their distribution in space and time is limited by problems in our physical understanding of the processes, and in the observational databases. Even the best severe thunderstorm database, the US record of tornadoes, is incomplete and inconsistently collected. As a result, estimating the distribution of severe thunderstorms from the reports is practically impossible.

One way around the problem is to use the kinds of relationships between large-scale environmental conditions and severe thunderstorm occurrence, originally developed to help in forecasting, to estimate where severe thunderstorms and tornadoes are likely. A popular method is to use observations from weather balloons and relate observed weather to the observed conditions in which the weather forms. Since the large-scale conditions are observed more consistently, the occurrence of severe thunderstorms can be inferred from the observation of favorable environments.

To extend this work around the world, scientists at NSSL used global reanalysis data from the National Center for Atmospheric Research and the National Centers for Environmental Prediction. This dataset estimates the global environmental conditions every six hours starting in 1957. Analysis of the distribution of environments favorable for significant severe thunderstorms (2 inch or larger diameter hail, hurricane force winds, and F2 or stronger tornadoes) and significant tornadoes (F2 or greater) shows where those events are more likely to occur. Severe thunderstorm environments are concentrated to the east of north-south mountain ranges, such as the Rockies and the Andes. The tornado distribution is dominated by the central part of the United States.

This work is the beginning of a process to look at possible climate change effects on severe thunderstorms, occurrence and distribution. ♦

Mean Annual Severe Environment Days (1980-1999)

