

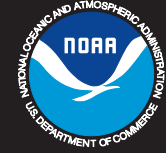


# NSSL Briefings

Volume 3

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A newsletter about the employees and activities of the National Severe Storms Laboratory

## WDSS provides support during Sydney Olympics

NSSL was one of four international participants in a World Weather Research Project in Australia during recent months. As part of a Forecast Demonstration Project, known as Sydney 2000, elements of the Canadian Atmospheric Environment Services, United Kingdom Met Office, National Center for Atmospheric Research (NCAR), and NSSL provided experimental warning, nowcast, and forecast information to the Sydney Bureau of Meteorology during the 2000 Olympics. An NSSL staff person (on a rotating schedule) was onsite in Sydney during a several month period to assist in the operation of NSSL's Warning Decision Support System (WDSS). Although convective activity was sparse during the Olympic games, the WDSS was highly praised for its storm tracking and hail indication products. Toward the end of Sydney 2000, the WDSS was judged important in detecting and correctly tracking a supercell storm that produced three tornadoes in the western Sydney suburbs outside of the Olympic areas.

In addition, NSSL was involved in a weather workshop conducted by the Bureau of Meteorology Research Center (BMRC) in October/November. NSSL staff provided training on the components and use of the WDSS in severe weather warning operations. At the end of the workshop, NSSL also participated in a World Meteorological Organization (WMO) Meeting. A special session on Sydney 2000 is planned for the upcoming American Meteorological Society (AMS) Radar Conference in Munich, Germany this summer. NSSL will continue to collaborate with the Australian BMRC in Melbourne through a technology transfer project that will integrate WDSS into the Australian Integrated Forecast System over the next two years. ♦ *By Don Burgess*



*Participants in the WMO Sydney 2000 Meeting view World Weather Research Project demonstration workstations located in the Melbourne Forecast Office. Shown are (from the left) Don Burgess, NSSL; Keith Browning (bending) WMO Committee Chairperson, United Kingdom; Chris Collier, University of Salford, United Kingdom; and Jim Wilson, NCAR.*



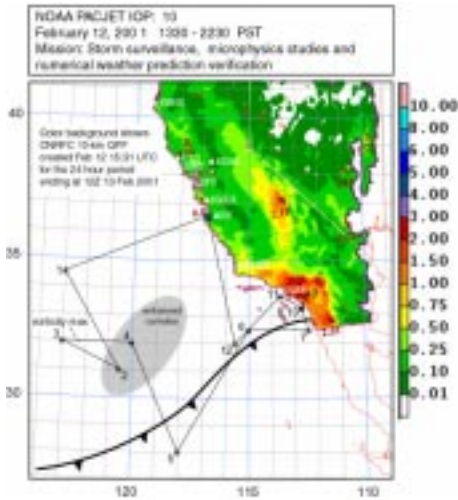
*Photo taken during STEPS by Jeremy Smith.*

## STEPS sheds light on storm electricity

The Severe Thunderstorm Electrification and Precipitation Study (STEPS) had two broad goals concerning storm electricity: (1) to improve understanding of how severe storms become electrified and (2) to better understand how variations in the type and flash rate of lightning relate to the type of severe storm and its evolution. Of particular interest were severe storms that produce unusual lightning activity. Unusual lightning includes ground flashes that lower positive charge to the ground instead of the usual negative charge and cloud flashes whose polarity of electric current is reversed from the polarity normally found in a given storm region.

STEPS collected data from May 22-July 16, 2000 near the Colorado-Kansas border, a region of the country with the highest incidence of positive ground flashes. Besides wanting to learn what electrical characteristics a storm must have to produce positive ground flashes, scientists wanted to confirm and learn why positive ground flashes often are associated with the production of large hail. They also wanted to study how changes in the dominant polarity of ground flashes are associated with changes in the structure of a storm relative to its potential for tornadoes and other severe weather.

STEPS also collected data to discover if inverted-polarity cloud flashes are caused by storms having unusual electrical structures. Inverted-polarity cloud flashes have only recently been discovered by new technology for mapping lightning inside clouds, but an extraordinary number appear to have occurred during STEPS. An initial assessment of STEPS observations is that the electrical structure of at least a few storms was completely inverted throughout the entire storm depth. Though scientists have searched for electrically inverted storms for many years, the few observations supporting their existence have been inconclusive. STEPS data are capable of providing conclusive evidence. To verify that such storms occur and to try to explain why, scientists are beginning a detailed intercomparison of electrical structure, lightning location and structure, wind structure, and the distribution of various types of precipitation inside storms. ♦ *By Dave Rust and Don MacGorman*



Flight plan for 12 February 2001

## PACJET focuses on landfalling winter storms in western U.S.

Emphasis has been growing on improved understanding and forecasting of flash floods, windstorms and heavy snows that result from the interaction of frontal systems with steep terrain. NSSL has been involved in previous orographic precipitation studies including the COAST, MAP, and IPEX field programs. This past winter, NSSL participated in the Pacific Landfalling Jets Experiment (PACJET), conducted along and offshore of the U.S.'s extensive Pacific coastline from far southern California to Washington state.

PACJET's mission is to improve short-term forecasts and warnings of floods, damaging winds and other severe weather spawned by storms originating over the data-sparse Pacific Ocean. The experiment was based out of Monterey, CA, and conducted from 20 January to 4 March 2001. PACJET was supported by NSSL's involvement in 17 eight to ten hour missions by the NOAA P-3 aircraft. These P-3 flights covered a domain stretching from the steeply rising coastal mountains to 1000 km or more offshore, allowing interception and surveillance of landfalling storms well in advance of their detection by the coastal WSR-88D network. A particularly innovative aspect of PACJET was the transmission of P-3 observations including flight-level data, dropsonde profiles and radar imagery to NWS forecasters across the Western Region in near real-time via a satellite-relay communications system. On select occasions, multiple dropsonde profiles obtained along the P-3's track were transmitted for assimilation into NCEP's operational models.

During PACJET, NSSL's Brad Smull, based at the University of Washington in Seattle, and Dave Jorgensen, chief of NSSL's Boulder division, served as airborne mission scientists and Doppler radar operators aboard the P-3. John Daugherty (NSSL-Boulder) was in charge of field data management and operations center logistics for PACJET, and was assisted by Bob Hueftle (NSSL-Boulder) during initial set-up of operations in Monterey. Those interested in further details on these field activities, including examples of the real-time radar imagery transmitted to the NWS, may check the PACJET website at <http://www.etl.noaa.gov/programs/pacjet/>. ♦ *By Brad Smull*

## National Weather Center

In a few years, Norman will become home to a world class center for Operational and Research Meteorology. One building will house both government and university entities including NOAA's SPC, NSSL, NWSFO, Radar Operations Center (ROC), Warning Decision Training Branch (WDTB), and OU's CAPS, CIMMS and OCS as well as OU's School of Meteorology. The effort, called the Norman Consolidation Project, will create a meteorological powerhouse to improve hazardous weather forecasts and warnings through education, research and service. NSSL's Doug Forsyth is the Program Manager for the Norman Consolidation Project. He has spent countless hours working to create the best design that will help all groups achieve their goals. ♦



NSSL's Harold Brooks in his overstuffed office.

## News briefs

### Retirements:



**Chuck Doswell** has retired after 14 years at NSSL and 31 years in Federal Service. Chuck's interests have included, but are not limited to tornadoes, severe weather, and

flash floods. Chuck's legacy at NSSL is his relentless pursuit of the connection between scientific research and its application to forecasting. He will continue his work with CIMMS on a part-time basis as a Senior Research Scientist.



**James "Mac" McGowen**, retired from NSSL after 21 years of service. Mac was one of our electronic technicians who maintained our PC's, printers and

telephone system and was involved in radar development and maintenance, warehouse management, and property custodian.

### Comings and goings

NSSL welcomes **Meg Carr** as an Editorial Assistant for the AMS's journal "Weather and Forecasting" during Dave Stensrud's tenure as editor. She has previously held this job for the journals "Monthly Weather Review" and "Journal of the Atmospheric Sciences."

**Bill Conway** and **DeWayne Mitchell** have left NSSL to join Weather Decision Technologies. While at NSSL Bill was most recently involved with the training and use of the WDSS during the 2000 Olympic Games in Sydney, Australia. DeWayne first joined NSSL as a student and in recent years lead the group that provided support for all of the WDSS and RIDDS systems. DeWayne also co-developed the WDSS's Tornado Detection Algorithm.

**Loretta McKibben**, a programmer and also part of NSSL's computer support group, has left to join the Microbiology Department at OU.

## News briefs, continued

### Phased Array Radar

The SPY-1 Phased Array radar project has received additional funding from the FAA and the U.S. Navy. NSSL staff met recently in Atlantic City, NJ to discuss the roles of the groups involved. The SPY-1 technology will be tested and enhanced at NSSL for use as a possible upgrade to the WSR-88D radar. Using electronically controlled beams, phased array radar reduces the scan time of severe weather from six minutes for current WSR-88D technology to only one minute.

### AUITI (Acronyms Used In This Issue)

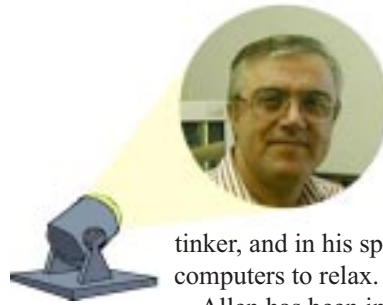
AMS - American Meteorological Society  
 CAPS - Center for Analysis and Prediction of Storms  
 CIMMS - Cooperative Institute for Mesoscale Meteorological Studies  
 COAST - Coastal Observations and Simulations with Topography  
 IPEX - Intermountain Precipitation Project  
 MAP - Mesoscale Alpine Project  
 NASA - National Aeronautics and Space Administration  
 NCEP - National Centers for Environmental Prediction  
 NOAA - National Oceanic and Atmospheric Administration  
 NSSL - National Severe Storms Laboratory  
 NWS - National Weather Service  
 NWSFO - National Weather Service Forecast Office  
 OCS - Oklahoma Climate Survey  
 OU - University of Oklahoma  
 ROC - Radar Operations Center  
 SPC - Storm Prediction Center  
 WDTB - Warning Decision Training Branch  
 WSR-88D - Weather Surveillance Radar - 88 Doppler, same as NEXRAD

NSSL's web site can be found at:  
<http://www.nssl.noaa.gov>

*NSSL Briefings* is a publication from the National Severe Storms Laboratory intended to provide federal managers, staff, and other colleagues in the meteorological community with timely information on activities and employees. If you would like to subscribe to *NSSL Briefings*, or change your address, please notify Kelly Lynn, NSSL, 1313 Halley Circle, Norman OK, 73069; by phone: (405)360-3620; or email: [kelly.lynn@nssl.noaa.gov](mailto:kelly.lynn@nssl.noaa.gov).

### NSSL STAFF

Director.....Jeff Kimpel  
 Deputy Director.....Kevin Kelleher  
 Administrative Officer.....Jon Domstead  
 Chief, Forecast R&D/FOFS.....Dave Rust  
 Chief, Radar R&D.....Doug Forsyth  
 Chief, Warning R&D.....Don Burgess  
 Information & Technology.....Gary Skaggs  
 Assistant Director, CIMMS.....John Cortinas  
 Public Affairs.....Keli Tarp  
**NEWSLETTER**  
 Writer/Editor.....Susan Cobb



## Employee Spotlight: Allen Zahrai

As a child, his room used to look like a junkyard of old televisions, radios, and other electronic devices. The first thing he took apart--when he was eight years old--was an old radio. He wanted to see how each part worked, but he couldn't put it back together. Allen still loves to

tinker, and in his spare time he works on cars, motorcycles and his computers to relax.

Allen has been in Oklahoma for 31 years, after planning to stay only one. Transferring from George Washington University to OU because it was a cheaper place to take care of prerequisite courses, Allen fell in love with Oklahoma. He got his B.S. and M.S. from OU in Electrical Engineering, and a few years later got his M.S. in Computer Science. As a graduate student, Allen worked on a project for NASA designing an acoustic profiler to examine the boundary layer for launch pads. The project required regular consultation with Dick Doviak, who was Allen's introduction to NSSL.

Allen was initially hired at NSSL to work on a digital signal processor for NSSL's first Doppler radar. Allen helped develop color raster scan displays and other techniques that were developed at that time to replace black and white displays. These display techniques and color schemes were transferred to the WSR-88D. Allen also helped convert the Cimarron radar to a dual-polarization radar, bringing it online in the early 1990's. He considers this his biggest success, and the Department of Commerce awarded Allen the Bronze Medal for his work.

Switching jobs, Allen worked for the Operational Support Facility for five years as a system engineer to improve and enhance the capabilities of the WSR-88D. He returned to NSSL in 1996 to lead a group that was redesigning the 88D Open System Platform. His next goal is to implement dual-polarization in the 88D.

Allen loves his work, and says, "It is rewarding. The people at NSSL are talented and likeable, and the work is challenging. It feels like what I do serves the public. When I see a warning issued by the NWS because of something they saw on radar, I feel like I have contributed in some small way." Being a public servant is important to Allen, and so is his granddaughter. In his free time Allen says his favorite thing to do is play with her and her toys. ♦ *By Susan Cobb*

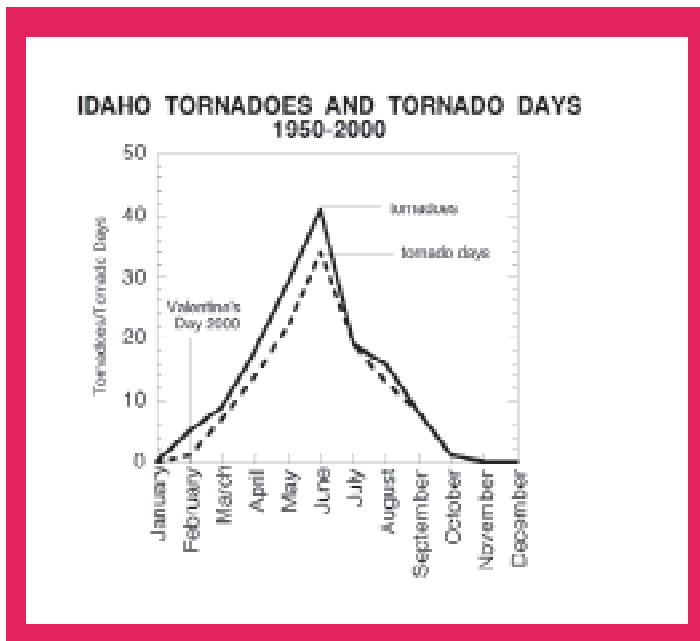


Logo provided by David Gershman, Manager of Art and Design, AMS

## Kimpel's term as President of the AMS ends, Schultz and Lilly receive honors

Jeff Kimpel, Director of NSSL, completed his term as President of the AMS during the organization's 81st Annual Meeting in Albuquerque, New Mexico January 14-19, 2001. Among his many duties as President, Kimpel oversaw planning for the meeting that attracted more than 3,000 of the world's leading meteorologists, atmospheric scientists and hydrologists.

Two NSSL scientists were recognized during the proceedings. NSSL's **Dave Schultz** was presented with the AMS Editor's Award. Schultz was recognized "for providing extremely thorough, timely and constructive evaluations of a large number of manuscripts over a diverse range of topics, and for special assistance to the editors in evaluation of controversial issues" for the *Monthly Weather Review*, one of nine AMS scientific journals. **Doug Lilly**, a distinguished senior scientist with NSSL and emeritus professor of meteorology at OU, was named an honorary member of the AMS. ♦



Annual climatology of tornadoes in Idaho. Also identified is the earliest tornado day in Idaho during the last 51 years, which occurred on Valentine's Day 2000 during IPEX.

## IPEX scientists at work

Data collected during last winter's Intermountain Precipitation Experiment (IPEX) is being analyzed by NSSL, SPC and University of Utah scientists. Several projects are under way using this data to better understand orographic winter precipitation in the Intermountain West. Dave Rust took advantage of the opportunities provided by IPEX to collect electric field profiles in continental winter storms for the first time. Along with IPEX co-PI Jeff Trapp, Dave is comparing the profiles of electric-field measurements to coordinated radar scans from the Doppler-on-Wheels. Their results indicate maximum electric fields of 10-30 kV per meter, values substantially less than those in summer convective storms.

An unusual killer squall line and tornadic bow echo that occurred in Idaho and northern Utah on Valentine's Day is being investigated by IPEX co-PI David Schultz, along with Trapp, SPC forecasters Jon Racy and Jeff Evans, and Jim LaDue in WDTB. Schultz has compiled a climatology of tornadoes in Idaho, showing this was the earliest tornado day in Idaho during the past 51 years. They surmise the topographic channeling of the low-level wind in the Snake River Valley helped to create the conditions for tornadoes. These and other IPEX research results can be found on the IPEX web page <http://www.nssl.noaa.gov/~schultz/ipex/>. ♦ *By David Schultz*

## NSSL announces reorganization

NSSL has restructured its internal organization and moved several people to new positions to better reflect the organization's current and pending research programs.

The reorganization, which became effective January 1, includes expansion from two to three science and technology divisions. In addition, it includes a plan to improve information technology services for all employees, provides managerial assistance to Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) employees working at the lab, increases the visibility of the field observing facilities, and presents a clearer picture of exactly what NSSL is and does to its customers and the community.

**Kevin Kelleher** was promoted to deputy director. He will be responsible for the day to day operation of the laboratory as well as managing the administrative and information technology services groups.

The Stormscale Research and Applications Division has been split into two divisions. The first is the Warning Research and Development Division, managed by **Don Burgess**. The division performs research to gain understanding of severe and hazardous weather; identifies severe weather signatures in observational data; and develops and transfers new scientific understanding, applications and techniques to the NWS and other customers.

The second is a new group, the Radar Research and Development Division, managed by former deputy director **Doug Forsyth**. The division will develop advanced radar systems such as dual polarized radar and phased array radar. They continue to lead the NWS's development and migration of the NEXRAD (WSR-88D) radar to open systems technology. In addition,

Forsyth has been named NSSL's executive director for facilities and strategic planning and will continue in his role as program manager for the Norman Building Consolidation Project, representing all five NOAA Weather Partners in the planning of the proposed National Weather Center facility.

The Mesoscale Research and Applications Division has been renamed the Forecast Research and Development Division and will continue to be managed by **Dave Rust**. The division conducts basic and applied research that leads to the improvement of forecast services within the NWS for hazardous and severe weather events. The division uses a combination of observations and modeling to conduct its research and test new forecast techniques. In addition, Rust will be the leader of the Field Observing Facilities and Services Group (FOFS).

The Central Support Services Group and the general computer support functions within all other divisions merged to form a new group called Information and Technology Services. **Gary Skaggs** was named group leader. ITS will provide assistance and support to all of NSSL in the areas of computing, data management, networking, outreach, technical support, Internet/Intranet Web pages, graphic resources, field project support and other support services.

In conjunction with the reorganization, research meteorologist **John Cortinas** was promoted to assistant director of CIMMS. His responsibilities include helping with CIMMS proposals, grant and contract administration, and overseeing the annual performance appraisal process for CIMMS employees.

More information about NSSL is available online at <http://www.nssl.noaa.gov>. ♦ *By Keli Tarp*