



NSSL Briefings

Volume 3

Fall 2000

Number 3



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



NSSL researchers stop for gasoline and to evaluate their storm intercept strategy in Canadian, Texas on the evening of June 13, 2000, while a supercell thunderstorm capable of producing a tornado approaches the town. Photo by Daphne Zaras

STEPS dissects storm for over two hours

NSSL researchers involved with the Severe Thunderstorm Electrification and Precipitation Study (STEPS) field program held operations on 27 days during an eight-week project near the Colorado-Kansas border. Scientists from nine institutions made a wide range of meteorological and electrical observations of supercell thunderstorms to better understand supercell physics. The most significant cases included two major downburst storms, two low-precipitation storms, two tornadic storms, and three supercells.

One of the top cases of the project occurred on June 29 when STEPS observed a supercell thunderstorm for more than two hours. The storms were scrutinized by Doppler radar, four electronic field meter launches, T-28 aircraft penetrations, visual observations of precipitation and a tornado, mobile mesonet instrument readings, and supporting sounding measurements by several mobile sounding systems. The Lightning Mapping Array reported flash rates of one per second at times. ♦

Dual mobile C-band Doppler radars under development

A coalition of researchers from Oklahoma and Texas have pooled their expertise to design, build and deploy a mobile dual-radar system known as the Shared Mobile Atmospheric Research and Teaching Radars (SMART-R). Scientists will use SMART-R to take measurements of cloud-scale and mesoscale kinematics, dynamics, and cloud-precipitation physics to better understand tornadic thunderstorms, squall lines, hurricanes, and the role of surface boundaries in the initiation of storms. The SMART-R partners include NSSL scientists Conrad Ziegler, Lou Wicker and Erik Rasmussen, with Professors Michael Biggerstaff (Texas A&M University), Tim Doggett (Texas Tech University) and Jerry Straka (University of Oklahoma). Funds to build the SMART-Rs were provided by combining research grants with

discretionary funds and in-kind support from the four parent institutions.

The radars are being developed in two phases: 1) fabricating two mobile C-band Doppler radars, with tentative completion in April 2001, 2) converting at least one SMART-R to dual polarization capability beginning in December 2001. Phase 1 is nearly completed, with antenna-pedestal assembly finished, radar hardware and software components and two diesel trucks delivered, and a SMART-R technician hired at NSSL to support system development and maintenance. A paper reporting details of the design and fabrication of the SMART-R's was presented at the American Meteorological Society's 20th Conference on Severe Local Storms. ♦

ORPG Status

NSSL continues to work in partnership with the NWS Radar Operations Center and Office of Science & Technology to complete the Open Systems Radar Product Generator (ORPG). Earlier this year, the project experienced a setback when the manufacturer of the communication server selected to support the legacy communication protocols went out of business. A suitable replacement communication server was selected and software development has been ongoing. Development has been strongly dependent on manufacturer-provided software modifications needed to satisfy several of the ORPG communication requirements. Delivery of these modifications to the Government is due

in late November 2000. Completion of the communication server work is expected in January 2001.

The ORPG continues to undergo extensive testing. Defects in the system are being identified and repaired and performance of the system is being tuned. The additional time afforded the project due to the communication server replacement is being put to good use and is resulting in a more stable and robust system. Formal System Test is currently expected to begin early in 2001 with operational deployment of the ORPG scheduled to begin during the summer of 2001. ♦

News briefs

Retirements

Don Howard retired after 11 years as NSSL's Administrative Officer and over 28 years of federal service. Don is one of our most dedicated and conscientious employees. He remains with NSSL on a part-time basis through CIMMS, NSSL's cooperative institute with the University of Oklahoma.



Rusty Devericks, NSSL's "jack of all trades" retired after 17 years at the Lab. Rusty was our overall utilities person and security officer who also did everything from sorting mail and handing out supplies to shoveling snow off the sidewalks. He went out of his way to assist employees and visitors alike. It was Rusty's mission to make sure all NSSL's visitors had a positive experience. Rusty was one of a kind.



New Administrative Officer

Jon Domstead comes to NSSL as our new Administrative Officer from the Oklahoma Employment Security Commission where he was an internal audit manager. Jon has a B.S. in accounting from the University of Central Oklahoma and is a Certified Public Accountant. He lives in Norman with his wife Dana, who teaches at Lakeview Elementary and two sons, Grant (7) and Ryan (5).

Keli Tarp honored for feature writing

Keli Pirtle Tarp, APR, Public Affairs Coordinator with the NOAA Weather Partners in Norman, OK, was honored recently with the Upper Case Award in the feature story category by the Public Relations Society of America, Oklahoma Chapter. Her entry was an article titled, "The Oklahoma Tornado Outbreak" published in the Amateur Radio Journal "QST".

NSSL reaches out to students through mentoring

NSSL scientists mentored five undergraduate students during the Research Experience for Undergraduates (REU) this summer:

Harold Brooks - Tracy McCormick, Lyndon State College

Studied the regional and the national tornado variability in the United States to help model the variability of significant tornado occurrence in the U.S.

Mike Douglas - Annaliese Sherer, Penn State University

Analyzed the Pan-American Climate Studies Sounding Network data of a low-level jet over the Yucatan Peninsula in comparison with winds measured across southeastern Mexico.

Kim Elmore and DeWayne Mitchell - Nicholas Eckstein, Bowling Green State University

Thunderstorms producing wind, hail, and tornado damage were compared with thunderstorms that produce no damage in the Pittsburgh, PA, WSR-88D radar coverage area by investigating various parameters in the output of the NSSL Mesocyclone and Tornado Detection Algorithms.

Dave Schultz - Russ Schumacher, Valparaiso University

The spatial and temporal occurrence of inertial instability in the upper-troposphere was explored, as was the hypothesis that regions of inertial instability may be related to the occurrence of severe convective storms.

Dave Stensrud - Craig Lengyel, Lyndon State College

Compiled a case list of 17 derechos and 26 proximity soundings and calculated and analyzed characteristics of the storm system.

The REU program is designed to attract talented undergraduates to careers in mathematics, science and engineering through an active research program and the mentorship of those who work in these fields.

In addition to the REU program, **Bob Rabin and Daphne Zaras** co-mentored **Shanavia Brannam**, a student from Clark Atlanta University as part of the CIRE (Collaborative Initiative for Research in Education) program at OU/CAPS. Shanavia, a computer science major, took an OU Meteorology course for credit in addition to completing her paper and presentation. She worked on a continuing project using Java applications in research. The CIRE program is a National Science Foundation-funded program intended to establish long-term research and education relationships between minority-serving institutions and NSF-supported facilities and centers.

NSSL, OU and Clark Atlanta have also worked together on a program that would award students a "3+2" degree from both universities earned by spending three years at Clark Atlanta and two years at OU. This program would give NSSL additional ways to mentor students through employment as undergraduates. ♦

NSSL hosts open house

Over 800 people turned out for the NOAA Weather Partners Open House on October 14. NSSL staff answered questions, gave tours, and



Visitors to NSSL crowd around one of the mobile research vehicles.

demonstrated how research equipment is used. The visitors came from local towns and surrounding states including Arkansas, Kansas, Louisiana and Texas. ♦

Employee spotlight: Daphne Zaras



Daphne knows that the Nabisco Oreo recipe is so secret that the cookies and cream filling are made at separate locations. The pieces are then sent to another factory to be assembled. She knows how to check the jelly in Fig Newtons, and that they weigh the Teddy Grahams before and after the sugar coating is applied.



From a summer college job learning cookie secrets to NSSL Webmaster, Daphne's career path has evolved over time. In junior and senior high school in Ohio, she had planned to be a teacher. Her parents, both teachers, encouraged her to major in her area of interest and explore all the options of a science degree before deciding to teach.

Daphne majored in physics at Anderson University in Indiana and was selected to spend 10 weeks working on a research project at the Indiana University Cyclotron Facility in Bloomington, Indiana. Her experience left her thinking that she liked research, but she wasn't sure if nuclear physics was the answer.

Daphne completed her B.A. in physics at Anderson and decided to go to graduate school at the University of Wisconsin-Madison where she earned her M.S. in meteorology. She had several offers to continue her education towards a Ph.D. but decided to take time off from school.

For a year and a half, Daphne studied ozone chemistry at NASA's Langley Research Center, then moved to Washington D.C. to work for NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) using satellite data to help predict heavy rainfall and flooding events. Daphne found her work interesting but was enticed by a job opening at NSSL that mentioned both satellite expertise and severe weather in the job description. She came to NSSL in 1995.

Daphne considers her pursuit of NSSL's Webmaster job two years ago to be her biggest success; "It is the perfect job where I can work with computers (including programming, which I enjoy), be around science and scientists, and also use my natural teaching skills to communicate science and interact with people." In addition to her Web duties, she talks with visitors and answers questions about severe weather and tornadoes from anyone who calls or sends email to us.

From bug-collecting camping trips with her mom to visiting the Great Sand Dunes in Colorado, Daphne says most of her meaningful experiences in life have to do with nature. And her favorite way to handle stress is to go out late at night and watch the sky. From their house in the country, she and her husband Jim LaDue can see the Milky Way, and she says a nightly meteor is almost guaranteed. ♦

News briefs, continued

John Daugherty honored

NSSL's **John Daugherty** received the Outstanding Service Award from the National Association of Environmental Professionals for his work with the Board, the publications committee and the annual conferences over the last several years.

Contributors to this issue:

Ken Howard Kevin Kelleher
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AUITI (Acronyms Used In This Issue)

- AMS - American Meteorological Society
- CAPS - The Center for the Analysis and Prediction of Storms
- CIMMS - Cooperative Institute for Mesoscale Meteorological Studies
- GIS - Geographic Information System
- NCEP - National Center for Environmental Prediction
- NOAA - National Oceanic and Atmospheric Administration
- NSF - National Science Foundation
- NSSL - National Severe Storms Laboratory
- NWS - National Weather Service
- NWSFO - National Weather Service Forecast Office
- OU - University of Oklahoma
- QPE-SUMS - Quantitative Precipitation Estimation and Segregation Using Multiple Sensors
- ROC - Radar Operations Center
- REU - Research Experience for Undergraduates
- SPC - Storm Prediction Center
- UCAR - University Corporation for Atmospheric Research
- WDSS-II - Weather Decision Support System - Integrated Information
- 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 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) 360-3620; or email: kelly.lynn@nssl.noaa.gov.

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A local Cub Scout troop helps with the launch of a weather balloon during the NSSL Open House.



Flash flood north of Guthrie, TX in 1989. Photo by James G. LaDue

NSSL collaborates with Sea Grant Extension and NWS to improve flood warnings

NSSL will bring its advanced flood warning and monitoring technologies to the coastal Carolinas as part of a demonstration project sponsored by the National Sea Grant College Program, the North and South Carolina Sea Grant Programs, the National Weather Service Forecast Office in Wilmington, N.C., and NSSL. The goal of this collaboration is to enable NWS forecasters and emergency managers to improve flood and flash flood warnings and forecasts along river basins located at coastal and inner

coastal areas. If fully funded, the project will accomplish this using advanced radar-based decision support tools, Web-based displays, and outreach activities.

At the focus of the collaboration is a suite of software and related display concepts called QPE-SUMS, which is encompassed within NSSL's WDSS-II workstation development. QPE-SUMS has the capability to monitor, in real-time, precipitation amounts in watershed basins as small as 2.5 square miles. To do this, QPE-SUMS utilizes WSR-88D data, GOES satellite imagery, and gauge rainfall, along with GIS information and tools. QPE-SUMS rainfall maps can be fed into a distributive hydrological model for accurate river flow predictions. In addition, QPE-SUMS and the distributive model will be used for historical post-event analysis and mitigation planning. QPE-SUMS is currently undergoing real-time testing in Arizona and Oklahoma.

As part of the collaboration, Ken Howard and Kevin Kelleher are working to expand testing of WDSS-II software using QPE-SUMS modules in a coastal environment by installing a WDSS-II system in Wilmington, NC. The NWS in Wilmington offered space and technical help to host the WDSS-II system using their own WSR-88D radar. The equipment installation for the initial WDSS system was completed in November 2000. The NWS Eastern Region is sponsoring an NSSL meteorologist to train forecasters at the Wilmington Office. ♦

NSSL receives funding to develop a national prototype

The 120 Doppler weather radars recently installed by the NWS were originally viewed as real-time surveillance systems. However, archived and real-time WSR-88D Level II (base) data have been found to be valuable in both numerical prediction and radar based decision support systems. As a result, all radars were retrofitted with an 8mm robotic tape cartridge recording system; technology that is costly, inefficient, and unreliable.

The NOAA ESDIM program has recently funded a three-year project led by NSSL to address the compelling need for real-time and archive WSR-88D base data. NSSL, working with OU's CAPS and School of Computer Science, the NWS Radar Operations Center, and National Center for Data Control (NCDC), will leverage an existing base data ingest project (CRAFT). The goal is to design a prototype system for a nationwide direct digital ingest and archival of base data at the NCDC via existing network infrastructures (Abilene, NGI, Internet2) in a manner consistent with the NOAA Networking Architecture.

The project involves the investigation of radar data compression algorithms, transmission of the WSR-88D data to NCDC in real-time for direct archival, and support of UCAR's Unidata Local Data Manager features to make these data available in real-time to universities and government researchers, creation of web-based browsing and data mining capabilities to examine and extract data, and demonstrations of the usefulness of real-time base data in numerical forecast models and decision-support systems. ♦

For more information contact Kevin Kelleher at Kevin.Kelleher@nssl.noaa.gov

NSSL sponsors cover for SLS Conference

NSSL sponsored and designed the cover for the 20th Conference on Severe Local Storms held recently in Orlando, Florida. Jeff Kimpel opened the conference with a keynote address on "Perspectives on the Future of Severe Local Storms Research and Operations." NSSL scientists were lead authors on 22 papers presented, participated in 15 poster displays, and chaired nine sessions. Jeff Trapp was program chairperson. ♦