

Greetings, Alumni and Friends!



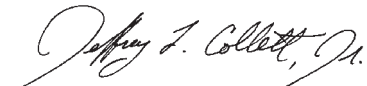
It is my pleasure to welcome you to this edition of the newsletter! In the pages that follow, you will learn about some of the exciting work under way in the department and the outstanding achievements of some of our faculty, staff, students, and alumni. I think you will be pleased to see how research and educational activities in the department continue to thrive. The department remains an international leader in research and education in weather, climate, and atmospheric chemistry.

The newsletter features summaries of recent awards, accomplishments, and milestones. Short articles are included highlighting activities by some of our outstanding young faculty members and recent activities at the CHILL National Radar Facility and the Center for Multiscale Modeling of Atmospheric Processes, an NSF Science and Technology Center. Special congratulations are due to CMMAP, which earlier this year was renewed by NSF for a second, five-year term. The newsletter also contains personal updates from alumni and a listing of the outstanding new graduate students enrolled this year.

2012 promises to be an exciting year. The department turns 50, and a series of celebrations is planned. The celebration began in Fall 2011 with special 50th anniversary colloquium presentations by a number of noted alumni. More of these presentations are planned for 2012, along with an anniversary reception at the AMS Annual Meeting in New Orleans, and an on-campus conference and celebration in July 2012. These events are described in more detail in the adjoining column on this page. I hope that each of you will consider participating in these exciting events.

Before closing, I'd like to take this opportunity to thank Dick Johnson for his years of dedicated service as department head. I'd also like to acknowledge the outstanding career of Bill Cotton, who retired from teaching this year but continues to lead an active research program in the department.

It has been my privilege to begin an appointment as head of this outstanding department. In this capacity, I look forward to the opportunity to meet many of you and keep you informed about the exciting things happening here in Fort Collins. Meanwhile, I wish you all an enjoyable new year!


Jeffrey L. Collett Jr.

CSU Department of Atmospheric Science Plans 50th Anniversary Celebration

The Department of Atmospheric Science was formally established at Colorado State University in 1962, two years after our founder and first department head, Professor Herbert Riehl, started planning courses and recruiting our founding faculty: Professors Elmar Reiter, Ferdinand Baer, William Marlatt, Lewis Grant, and Bill Gray. We invite present and former faculty and staff, alumni, and friends of the department to join us for our 50th Anniversary Celebration in 2012 during a special anniversary weekend, July 12-15. This will be a wonderful time to get together with new and old friends, reminisce about graduate school days, learn about the department's current and future research directions, and become reacquainted with Fort Collins and Colorado – a great place to spend a summer weekend with your family.

Our planned activities will begin with our Anniversary Conference at the Hilton Hotel on Friday, July 13, 2012. Morning and early afternoon will be filled with invited research-themed talks by ATS alumni speakers, with a catered luncheon for attendees. Our lunch program will include a celebration of the Colorado Climate Center and its contributions to CSU, the state, and the nation. The conference will conclude with a poster session that includes contributions from attendees, ATS students, and ATS, CCC, and CIRA research staff.

Families are invited to join us for an Anniversary Banquet at the Hilton on Friday evening. The evening will include a sit-down dinner and a program that honors the history of the Department of Atmospheric Science, led by noted alumnus and history of science expert, Dr. Jim Fleming, '73.

Everyone is invited to the ATS campus on Saturday, July 14. We will present an informal program that includes a brunch buffet, tours of our facilities, "meet-the-faculty-and-students" sessions, and hands-on science activities for the kids. Additional plans for the weekend are evolving and will be noted on our website as they become available. We will notify you when registration goes live, early in the New Year.

The yearlong commemoration of our founding began with our 50th Anniversary Colloquium Series, featuring an alumni speaker each month, and with the rollout of our new website that includes an ATS history timeline and archival photos: www.atmos.colostate.edu/timeline_only.php. We welcome your photos and captions for the timeline. Forward them to Jamie Schmidt at Jamie@atmos.colostate.edu. You may also update your contact information online at www.atmos.colostate.edu/anniversary.php#.

Current ATS faculty, staff, and students are looking forward to welcoming you to campus this summer! Meanwhile, if you will be in attendance at the AMS Annual Meeting in New Orleans, please be sure to stop by the CSU ATS reception. Our celebration will be held in the headquarters hotel, the Hilton New Orleans Riverside, on Tuesday, Jan. 24, 2012, starting at 6:30 p.m.

Save the Date!

**CSU Atmospheric Science 50th Anniversary
Alumni and Friends Reception**
during the 92nd AMS Annual Meeting, New Orleans, La.
Tuesday, Jan. 24, 2012

Jefferson Room at the Hilton New Orleans Riverside Hotel
5:30-6:30 p.m. Prospective students meet faculty
6:30-9 p.m. 50th Anniversary Celebration
with hors d'oeuvres, a hosted bar, and live music!

New Professor Joins Department



Russ Schumacher returned to CSU to join the faculty in the fall of 2011. He received his Ph.D. from the department in 2008 under the mentorship of Richard Johnson, with his dissertation research on the topic of extreme rainfall from mesoscale convective systems. Schumacher then spent a year as a postdoctoral fellow in the Advanced Study Program at the National Center for Atmospheric Research in Boulder, before accepting a faculty position in the Department of Atmospheric Sciences at Texas A&M

University. He spent two years teaching and conducting research at Texas A&M before returning to Colorado State. In 2010, Schumacher received a CAREER award from the National Science Foundation.

Schumacher's primary research interests are in mesoscale meteorology, with a particular focus on the processes that lead to heavy precipitation in the warm season. He has also studied the influence of tropical cyclones on midlatitude rainfall and the development of banded snowfall downstream of the Rockies. Schumacher also has interests in the societal impacts of weather, and led a study in collaboration with CIRA and NCAR scientists that examined warning communication during the May 2008 tornado that struck Windsor, Colo. Schumacher will be teaching courses in synoptic and mesoscale meteorology.

Featured Professor: Sue van den Heever



Sue van den Heever received her B.S. in mathematics and her M.S. in climatology from the University of the Witwatersrand in Johannesburg, South Africa. She conducted research in the Climatology Research Group of the University of the Witwatersrand before coming to Colorado State University to pursue her Ph.D. After earning her Ph.D., she spent two years as a postdoctoral student and several years as a research scientist at Colorado State University before joining the faculty as an assistant professor in 2008.

The focus of van den Heever's research group is convective cloud processes, with a particular emphasis on the feedbacks between cloud microphysics and storm dynamics. Changes in ambient conditions, such as relative humidity, vertical wind shear, and aerosol concentrations, influence the size and numbers of cloud droplets and ice crystals within convective storms, and hence microphysical processes such as nucleation, collection, vapor growth, and riming. These processes in turn influence the rates of latent heat release, evaporation and melting and, ultimately, the strength and organization of updrafts and downdrafts. As microphysical processes are strongly dependent on the strength and organization of updrafts and downdrafts, feedbacks between microphysics and dynamics are thus established.

While it is generally accepted that microphysical-dynamical feedbacks exist, the magnitude of these feedbacks are still not well understood. For example, do variations in the drop size distributions and the associated evaporation rates lead to stronger, longer-lived storms or weaker, more rapidly dissipating storms through the associated changes to the cold pool forcing? Is microphysically induced convective invigoration sustained, or do the concomitant changes in the anvil microphysical characteristics modulate the updraft strength through radiative forcing? Is the latent heat released in

association with microphysical processes sufficient to offset the impacts of lateral entrainment and mixing on the vertical transport of energy through deep convective towers?

The goal of the van den Heever research group is to investigate the response of microphysical-dynamical feedbacks in tropical and midlatitude storm systems to changing environmental conditions, particularly with respect to cold pool dynamics, anvil radiative forcing, convective transport, microphysical budgets, and land surface responses. Given the role played by convection in the vertical distribution of clouds; the transport of energy, water vapor, and trace gases; and the production of precipitation, the response of convective storm systems to changing environmental conditions has implications on scales ranging from the mesoscale to that of climate.

Faculty and Staff Awards

Thomas Birner Receives the 2011 Outstanding Professor of the Year Award



This year's Outstanding Professor Award was presented at the new-student picnic. One recipient is chosen by department students each year. Professors are selected for the award based on teaching excellence, including an ability to motivate and inspire students and to provide help in and out of the classroom. Thomas Birner is from Germany, completed his Ph.D. at the University of Munich, and did research at the German Aerospace Center and postdoctoral work at the University of Toronto in Canada. Since joining the department in 2008, Birner

has taught Atmospheric Dynamics I (ATS 601), Middle Atmosphere Dynamics (ATS 708), and Introduction to Weather and Climate (ATS 350).

Birner's research group studies dynamics and transport of the coupled troposphere-stratosphere system. A growing body of evidence points to the importance of troposphere-stratosphere coupling for climate variability and change, with implications for surface climate, and the need for IPCC type climate models to fully represent this coupling. However, the complex interplay between radiation, dynamics, and chemistry, in particular near the interface between the troposphere and stratosphere, is still far from being understood in sufficient detail and remains a challenge for climate models.

Dynamically induced variability in the stratosphere has been shown to robustly impact variability in the troposphere down to the surface on monthly time-scales. At the heart of this stratospheric variability are supposed sudden stratospheric warmings. These are dynamically driven events in the polar winter stratosphere that are associated with abrupt regime shifts from strong westerly flow, around the so-called polar vortex, to weak westerlies or even easterlies, as well as a sudden increase in polar cap temperature. SSWs lead to as much as 50 K warming within a few days with important consequences for ozone chemistry, among other things. Birner's group seeks to better understand how SSWs are produced, as well as how their dynamical signature is communicated downward to the surface.

Another research focus of Birner's group is the so-called tropical tropopause layer – the gateway to the stratosphere. The TTL sets the boundary condition for atmospheric constituents entering the stratosphere, such as many ozone-depleting substances. The extreme cold temperatures (often below -80 C) near the tropical tropopause lead to freeze-drying of the vertically ascending air and therefore determine the stratospheric water vapor content. However, the relative importance of different dynamical processes, from deep convective plumes overshooting into the TTL to planetary-scale circulations, in setting the temperature structure of the TTL is still not well understood. Birner's group uses a combination of observational analysis and modeling to improve our understanding of TTL dynamics and transport of air into the stratosphere.

Dr. William Cotton Named American Geophysical Union Fellow and Retires from Teaching



Bill Cotton joined CSU's Department of Atmospheric Science in 1974, and is an expert in the areas of clouds and storm systems, including aerosol impacts on clouds, storms, and climate. His current research focuses on the observation and modeling of aerosol impacts on winter clouds and precipitation, and convective storms including tornadoes and hurricanes. The department celebrated his retirement from 37 years of teaching in August.

Cotton has held positions at the U.S. Department of Commerce, National Oceanic and Atmospheric

Administration, Experimental Meteorological Laboratory, under the direction of Dr. Joanne Simpson. He earned his bachelor's in mathematics and his master's in meteorology from the State University of New York-Albany and his doctoral degree in meteorology from Pennsylvania State University.

His numerous awards include the Jack E. Cermak Distinguished Advisor Award, Engineering Dean's Council Award for Excellence in Atmospheric Research, and the College of Engineering Abell Faculty Research and Graduate Program Award, all from CSU. He is a Fellow of the American Meteorological Society and CSU's Cooperative Institute for Research in the Atmosphere.

Nolan Doesken Receives 2011 President's Award From the Colorado Foundation for Water Education



Nolan Doesken, a longtime weather researcher in the Department of Atmospheric Science, state climatologist, and founder of CoCoRaHS, the Community Collaborative Rain, Hail, and Snow Network, has received the 2011 President's Award from the Colorado Foundation for Water Education.

New AMS Fellows in the Department



Professor Sonia Kreidenweis was elected Fellow of the American Meteorological Society for 2011. The award was presented at the 91st Annual AMS Meeting in Seattle, Wash., January 2011. Only two-tenths of one percent of the AMS membership is approved as Fellows each year.

Kreidenweis joined the Department of Atmospheric Science in 1991 and is a leader of the department's atmospheric chemistry program.



Christian Kummerow, professor in Colorado State Department of Atmospheric Science and director of the Cooperative Institute for Research in the Atmosphere, has been named a 2012 Fellow of the American Meteorological Society. Kummerow was named a Fellow for his research into obtaining a better understanding of global and regional climate change through the use of spaceborne missions.

Kummerow has been a professor in the Department of Atmospheric Science since 2000. He was named director of CIRA in September 2010.

CMMAP News

By Melissa Burt

The Center for Multiscale Modeling of Atmospheric Processes, a National Science Foundation Science and Technology Center, was renewed for an additional five years by the NSF in July 2011. CSU atmospheric science Professor David Randall serves as CMMAP director. CMMAP continues to perform as a well-integrated team of scientists, educators, and administrators. The Center has demonstrated and applied a radically new approach for representing clouds in numerical prediction models, called super-parameterization, in which simplified cloud-resolving models are used in place of conventional parameterizations. Researchers are using super-parameterization to study the current climate, past climates, and future climate change. A key accomplishment of the Center is its integration of research and education. The Center's educational activities cover "K to Gray," including K-12, undergraduate, and graduate education, as well as public outreach. CMMAP's knowledge transfer activities and accomplishments include the publication of the book, *The Development of Atmospheric General Circulation Models*, and the conception and creation of the *Journal of Advances in Modeling Earth Systems*, recently adapted by the American Geophysical Union. *JAMES* is the AGU's first open-access journal, and this is the first time that the AGU has ever adopted a journal developed elsewhere.

For more information on CMMAP, please visit: www.cmmap.org.





*Dennis Shea, M.S., '72,
and Richard Johnson*

2011 Atmospheric Science Distinguished Alumnus Honor Goes to Dennis Shea

Dennis Shea, M.S., 1972, was presented the 2011 Distinguished Alumnus Award in Atmospheric Science in a ceremony on May 23 at the ATS Foothills Campus. Shea currently works in the Climate and Global Dynamics Division at NCAR. The citation for the award is as follows: Shea has become a landmark in the field of atmospheric science, one of the brighter products of CSU. His career and wide-ranging contributions that have flowed from it are widely recognized across not only the National Center for Atmospheric Research, but also much of the climate community. Shea has not only made direct scientific contributions to the atmospheric science field by publishing seminal works in tropical dynamics, ocean-atmosphere interactions, and solar variability, but he also has served as a key bridge between the scientific community and sphere of computing technology. For example, Shea has fostered development of the NCAR command language, a comprehensive analysis and visualization language that is unparalleled in its ability to access, display, and interpret climate and meteorological data. NCL now has a user base of about 12,000 users and growing. Shea's service to the climate community has been profound, and his efforts enable NCAR and community scientists to be productive. He has honored the College of Engineering and Department of Atmospheric Science during an exemplary 40-year career of industry and service, contributing to the advancement of our science.

Dennis Shea Reminisces [Sept. 1969-March 1972]

In early September 1969, I boarded my first-ever flight. I flew from Boston to Denver then on to Fort Collins. Suffice it to say it was quite a shock to a sophisticated (ha! ha!) 21-year-old guy from "Beantown."

While growing up, I had experienced several hurricanes, and I developed an interest in hurricane research. CSU's atmospheric science department had two well-known hurricane researchers: Dr. Herbert Riehl and Dr. William (Bill) Gray, who became my adviser.

The first nine months were quite an experience. There were abrupt weather changes. For example, in mid-October temperatures dropped from the mid-80s to near 10 degrees accompanied by two successive record snowstorms. The political climate during the spring of 1970 was also very turbulent. Anti-Vietnam war sentiment was significant, and frequent student protests and strikes were taking place. On May 1, I was at a small party near Laurel and Mason streets. Someone came rushing in and yelled "Old Main is burning." Immediately, we went outside. It was an inferno. Even though we were on the north side of Laurel, we had to step back due to the intense heat. It was an

extremely sad moment in CSU history. Subsequently, it was reported that the atmospheric science department had defense funding, and anonymous threats were made. As a result, for about a month, atmospheric science students and faculty guarded the building. I recall taking night shifts on the roof!

I shared an office with Knox Williams, who was a year ahead me and a fellow Gray advisee. Knox was investigating cloud clusters, and I was beginning my work on hurricanes using aircraft data. A vivid memory was hearing Dr. Gray emerge from his office and sprint down the hall. He would burst into our office, spread his arms wide in wonderment, look us in the eye and say, "What have you got to show me TODAY?" I must say that Dr. Gray's enthusiasm about hurricane research was contagious. He had a wonderful insight into the physics of hurricanes and I had many fruitful discussions with him.

Dr. Gray arranged for me to spend the summer of '70 at the National Hurricane Center. I worked on "Project Stormfury" (feasibility of weakening hurricanes by seeding with silver iodide). The most exciting aspect for me was getting to fly in the "hurricane hunter" planes where I operated a cloud nuclei counter. However, my real task was to manually extract hurricane wind speeds from reams of printed computer output and fill out "many" pages of punch card coding forms.

In August 1970, Dr. Gray began a year sabbatical at Imperial College (London, England). Dr. Gray returned in late summer 1971. I had what I thought was a good first draft. Silly me! He liked it, but there was still work to be done. Dr. Gray did dispense one piece of advice after reading the draft, which I remember to this day: "If you want to make a point, use short, declarative sentences!"

I must say that I enjoyed all the classes I took at CSU. The professors (Bill Gray, D.B. Rao, Steve Cox, Tom Vonder Haar, and others) were excellent. My favorite course was "Geophysical Hydrodynamics" taught by Bernard Haurwitz in the fall of 1971. I still have copies of his handwritten notes.

I finished my thesis ("The Structure and Dynamics of the Hurricane's Inner Core Region") in the fall of 1971. It was published in two parts in the *Journal of Atmospheric Science*. Later, it was awarded the department's Christiane Gallet Memorial Award as the best master's thesis over the period 1967-1974.

What to do next? I wanted to take a few years off before pursuing a Ph.D. I had grown up "blue collar," and I wanted to earn some "big bucks." Dr. Gray tried to dissuade me but I was determined. I chose NCAR because the job fit my plans for a two-year break and a "big bucks" salary (\$10,800). Specifically, I was going to work on the Tropical Wind, Energy Conversion and Reference Level Experiment. The projected lifetime of the experiment was mid-1972 to mid-1974, which was perfect. Suffice it to say, I worked in a group with world-class scientists, including Chester Newton, Harry van Loon, Paul Julian, Jim Fankhauser, and Roland Madden. More important, they were world-class people. As is often the case, the satellite project was delayed and my "perfect" schedule was gone. When all was settled, almost four years had passed. Life happens! I was offered a permanent position and decided to stay at NCAR. It has been more than 38 years and, like my time at CSU, I have enjoyed every minute of it.

Let me end with two "short, declarative sentences":

(a) Dr. Gray was a wonderful adviser.

(b) I thoroughly enjoyed being a student in the atmospheric science department.

Atmospheric Scientists Research Phenomenon in Indian Ocean

A phenomenon known as the Madden-Julian oscillation, or MJO – a massive convection system along the equator – occurs with varying intensity throughout the year and affects weather around the globe. The oscillation is named in part for Roland Madden, who earned his doctoral degree from Colorado State.

Oceanographers and atmospheric scientists haven't found an easy way to model these processes, so researchers from Colorado State and other universities and federal agencies are headed to the middle of the ocean south of India and Sri Lanka to physically monitor and record data in a large field project called DYNAMO. About 20 CSU graduate students and research staff are participating in the experiments, which include everything from monitoring weather from radars on ships and atolls to launching and taking measurements of the atmosphere using weather balloons.

"When the ocean heats up, we think that triggers widespread convection, which may cause strong ocean currents that come and go," said atmospheric science professor Steven Rutledge, whose staff and graduate students are on a ship monitoring a Doppler radar that observes all storms in the area.

The radar will document how rainfall from storms feeds back to the ocean, the nature of any rainfall that occurs, and the size and depth of clouds and how they vary with sea surface temperature and ocean currents.

"We're hoping to learn the physics of the MJO and how it interacts with the Atlantic and Pacific so it can be better represented in models and the impacts on worldwide weather can be better understood," Rutledge said. "The MJO affects monsoons in Asia and in North America, and it affects the frequency and intensity of hurricanes in Atlantic and Pacific basins. We don't know why or what causes the MJO to form or when."

Separately, faculty members Dick Johnson and Eric Maloney headed to Malé and Gan Island in the Republic of Maldives, and their students headed to



M.S. student James Ruppert launching first weather balloon with two contractor meteorologists on Diego Garcia.

Other participants in the Indian Ocean studies include the National Center for Atmospheric Research, the University of Miami, Oregon State University, the University of Washington, and Texas A&M. The program also includes international participation from more than 10 countries, including meteorologists from the Maldives.

CSU researchers anticipate the trip will be a good experience for students who are learning from some of the top researchers in their fields. "Big projects such as DYNAMO really give our students the experience to be leaders," Rutledge said.



Ph.D. student Nick Guy viewing the R/V Roger Revelle (from Scripps Institution of Oceanography).

the island of Diego Garcia to study cloud systems with weather balloons and radars and to help interpret some of the large-scale meteorological conditions.

"With the Madden-Julian oscillation, which develops every 40-50 days or so, there's a blowup of an area of intense precipitation in the Indian Ocean that generally starts near the equator," Maloney said. "After it forms, it moves very slowly eastward. Every second, this whole complex shifts five meters. It perturbs global wind patterns, not only in the Indian Ocean and West Pacific Ocean, but also the East Pacific, Atlantic, and related areas such as the Gulf of Mexico and the Caribbean Sea.

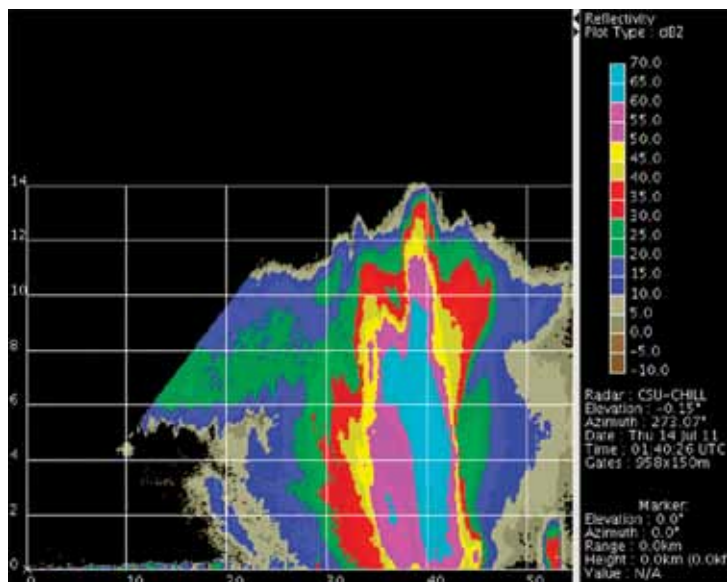
"When these large-scale wind patterns reach the Americas, they can affect hurricane activity," Maloney said. "We need to understand the large-scale preconditions associated with these events. We might be able to improve forecasts of Atlantic winds that affect hurricane activity."

Welcome New Graduate Students

| Name (M.S./Ph.D.) | Adviser | Undergraduate/Graduate Univ. |
|----------------------------|----------------|------------------------------------|
| Spring 2010 | | |
| Biljana Orescanin | Denning | University of Belgrade |
| Fall 2011 | | |
| Kira Arnold (Ph.D.) | Collett/Ham | Kansas State University |
| Nicholas Beavis (M.S.) | Rutledge | Colorado State University |
| Alexandra Boris (Ph.D.) | Collett | Portland State University |
| Michal Clavner (Ph.D.) | Cotton | Hebrew University of Jerusalem |
| Nicholas Davis (M.S.) | Birner | University of Washington |
| Kimberly Erickson (M.S.) | Vonder Haar | Colorado State University |
| Christopher Eldred (Ph.D.) | Randall | Carnegie Mellon University |
| William Foust (M.S.) | Thompson | North Carolina State |
| Brody Fuchs (M.S.) | Rutledge | St. Cloud State University |
| Nicholas Geyer (M.S.) | Denning | Pennsylvania State University |
| Leah Grant (M.S.) | Van den Heever | University of Wisconsin, Milwaukee |
| Samantha Lynch (M.S.) | Schumacher | Texas A&M University |
| Christina McCluskey (M.S.) | Kreidenweis | Coastal Carolina University |
| Aaron Pina (M.S.) | Denning | Texas A&M University |
| Ahmed Samman (M.S.) | Cotton | King Abdulaziz University |
| Christopher Slocum (M.S.) | Schubert | Pennsylvania State University |
| Vanessa Vincente (M.S.) | Schumacher | Valparaiso University |
| Brandon Wolding (M.S.) | Maloney | University of Cape Town |
| Charles Yost (M.S.) | Schumacher | Texas A&M University |
| Spring 2011 | | |
| Morgan Phillips (M.S.) | Cotton | Colorado State University |

The CSU-CHILL National Radar Facility

By Professor Steven Rutledge, Scientific Director, and Pat Kennedy, Facility Manager



CSU-CHILL reflectivity data in an RHI scan on the 273° azimuth at 0140 UTC on July 14, 2011 (locally, 1940 MDT on the 13th). Axes units are km. The echo core at a range of 40 km is located over southern Fort Collins. Multiple spotter reports of hail diameters between 1.0 and 1.75 inches were received within five minutes of this scan time.

The CSU-CHILL national radar facility continues to be an active entity in the department. The facility collected data for a wide variety of interests during the last year. Projects directly funded by the NSF included the Deep Convective Clouds and Chemistry instrumentation tests and the Research Experience for Undergraduates program. During the DC-3 test project, the CSU-CHILL radar supplied real-time data to the flight scientist during a series of shakedown missions conducted by the NSF / NCAR GV research aircraft. These flights were designed to verify the operational capabilities of several airborne chemistry instruments that are critical to the DC-3 project's objectives. The REU project, directed by Professor V. Chandrasekar, hosted six undergraduate students during the summer. The students participated in various on-site activities at the radar, and they completed individual research projects involving CHILL data.

In addition to providing service for NSF-sponsored activities, the CHILL also extended support to NASA. The NASA N-Pol research radar system had recently undergone a major upgrade, including the acquisition of a new dual-polarization antenna. To verify the data quality produced by the upgraded equipment, N-Pol was temporarily installed within 2 km of the CSU-CHILL site during October 2010-January 2011. CSU researchers then used the N-Pol radar during MC3E, Midlatitude Continental Convective Clouds to observe convective storms in Oklahoma during May and June 2011. As part of MC3E, the high-altitude NASA-ER2 research aircraft overflew the CHILL operating area on May 24 to study a late-season upslope rainstorm.

The CHILL facility also collected data for a number of "20-hour" projects. During the past year, such projects were conducted to obtain data on aircraft icing (for Dr. J. Hubbert at NCAR), flash flooding (for Dr. D. Gochis at NCAR), and polarimetric data quality verifications for the Doppler on Wheels radars (for Dr. J. Wurman at CSWR).

Beyond data collection associated with specific field projects, target-of-opportunity radar operations were also conducted when phenomena of suitable interest were available. One such target-of-opportunity operation took place during the evening hours of July 13, 2011, when a severe hailstorm struck the southern portions of Fort Collins. The storm was quite intense as it entered the city with reflectivity values of 60 dBZ extended to heights of ~10 km AGL (Fig. 1). Analyses of the evolution of this storm's polarimetric signatures and lightning production patterns are ongoing.

A major technical upgrade to the CSU-CHILL facility started in the fall of 2011 through the acquisition of a two-frequency feed horn for the dual-offset Gregorian antenna. This horn will allow the antenna to simultaneously radiate at X-Band (3 cm wavelength) in addition to the S-Band (11 cm) wavelength that has previously been used. Since a common reflector system is used for both frequencies, the centerline axes of the main beam patterns at the two wavelengths will be identical. The interaction of the X-band radiation with the S-Band-sized reflectors will produce an extremely narrow (0.3° wide) main lobe pattern, permitting high-resolution cloud studies. Test dual-frequency operations should begin in December 2011. The facility will be an integral part of the upcoming DC3 experiment during May and June 2012. In DC3, the NSF G-V and NASA DC-8 aircraft will be used to sample the outflow and inflow properties of convective storms. The CSU-CHILL will provide airflow and remotely sensed microphysical measurements. These types of observations will be made in Colorado, Oklahoma, and Alabama – all part of DC3. To support DC3 (in particular to study the generation of NO_x by lightning), a permanent, 15-station Lightning Mapping Array is currently being set up around the CSU-CHILL by researchers from the New Mexico Institute of Mining and Technology. The LMA will be able to map the 3-D characteristics of lightning in clouds. Finally, the facility was selected last year as a CSU Specialized Facility and will receive direct funding from the CSU Vice President for Research for the next two years. The facility also renewed its base support with a new NSF Cooperative Agreement for three years.

Student Fellowships and Awards 2011-2012

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|---|--|
| Alumni Award | Angela Rowe |
| Herbert Riehl Award | Todd Jones |
| David L. Dietrich Honorary Scholarship | Ezra Levin |
| AGEP Fellowship | Elliott Foust, Vanessa Vincente |
| AMS Fellowship | Leah Grant |
| 14th AMS Conference on Mesoscale Processes Best Oral Presentation Award | Rebecca Selin |
| AMS's 91st Annual Meeting | Robert Seigel (2nd) and Rebecca Selin (3rd) in place in oral presentation category |
| CEAS Fellowship | Adam Davis, Sarah Ringerud |
| CIRA Fellowship | Leah Grant, Todd Jones |
| CMMAP Diversity | Elliott Foust Gabriel Williams |
| DOE | Amanda Sheffield |
| DOE KRELL | Chris Eldred |
| Gates Millennium Scholarship | Matt Paulus, Isaac Medina |
| IGERT | Vanessa Vincente Isaac Medina Aaron Pina |
| NSF GRFP Fellowship | Gavin Roy |
| NSF EAPSI | Walter Hannah, Misha Schurman |
| PRSE | Nick Davis, Clayton McGee |
| 2011 Environmental Science Communication Fellows | Katharine Benedict Parker Kraus Rachel McCrary |
| SOARS | Alex Gonzales |

Alumni News

Scot Heckman (M.S., '91) retired as a Colonel in the Air Force in August 2010 and now works for The Aerospace Corp. in Chantilly, Va. He is working on weather satellite architectures and radio spectrum management for the Department of Defense and NOAA.

Jim Fleming (M.S., '73) was recently elected a Fellow of the American Meteorological Society. He is also the editor of AMS historical monographs. Fleming's book, *Fixing the Sky: The Checkered History of Weather and Climate Control* (Columbia University Press, 2010) received the 2011 Sally Hacker Prize from the Society for the History of Technology, awarded to recognize the best book in the history of technology directed to a broad audience of readers, including students and the interested public. Fleming is slated to speak on the history of meteorology at the Atmospheric Science Department's 50th Anniversary Banquet on July 13, 2012.

Don Hillger (M.S., '76; Ph.D., '83) received a Silver Medal award from the Department of Commerce, <http://www.star.nesdis.noaa.gov/star/index.php>. He is currently working for NOAA/NESDIS at CIRA.

Todd Ellis (M.S., '05; Ph.D., '08) is currently an assistant professor at SUNY Oneonta in Oneonta, N.Y. While maintaining a full undergraduate teaching load, he has been fortunate to lead an NSF CCCLI/TUES grant for improving undergraduate education in meteorology and recently received a NASA EPOESS award for helping to develop a model for putting NASA data in the hands of middle and high school teachers to help them create authentic science research projects. He is also serving as the new lead for education and public outreach for the CloudSat mission. He lives in Otego, N.Y., with his wife, Allyson.

Leigh Munchak (M.S., '09) has a new job at NASA developing and testing new algorithms for the MODIS aerosol optical depth product. Feel free to contact her if you ever use that product and have questions or complaints!

Paul T. Quelet (M.S., '06) worked for Front Range Community College in Longmont and Fort Collins, teaching mathematics, physics, and meteorology for 4½ years until May 2011. He is now at Siemens Energy Inc. at the Boulder, Colo., Wind Turbine R&D Center, where he started in October 2010.

Brian Griffith (M.S., '00; Ph.D., '06) is the head of the Department of Physics, at the U.S. Air Force Academy in Colorado Springs, Colo.

Molly Woloszyn (M.S., '09) began working at the University of Illinois in July 2011 as an extension climatologist with the Midwestern Regional Climate Center and Illinois-Indiana Sea Grant, in Champaign, Ill.

David Starr (M.S., '76; Ph.D., '82) is head of the mesoscale Atmospheric Processes Branch at NASA's Goddard Space Flight Center, a science study lead with NASA's Aerosols, Clouds, and Ecology Mission, Tier-2 Decadal Survey Mission, lead for Validation of VIIRS Aerosol & Cloud Environmental Data Records Secretary, and on the International Commission of Clouds and Precipitation.

Luke Van Roekel (M.S., '06; Ph.D., '10) has been appointed to a tenure-track position as an assistant professor of atmospheric science at Northland College in Ashland, Wis., beginning Fall 2011. Previously, he worked as a postdoctoral researcher at the Cooperative Institute for Research in Environmental Science. His most recent research focuses on analyses of how small-scale ocean processes influence the entire ocean as well as the climate. At Northland, Van Roekel will be a faculty member in the environmental sciences department.

Dr. Thomas J. Kleespies (M.S., '77) recently retired after 17 years with the NOAA/NESDIS Center for Satellite Applications and Research, and the Joint Center for Satellite Data Assimilation, where he was a senior scientist. Prior to that, he spent 15 years working for the Department of Defense, first at what is now NRL Monterey, and later at what was then known as the Air Force Geophysics Laboratory.

Rick Graw (M.S., '90) had a 20-year detour in the private sector. Five years ago, his career got back on track when he began working for the U.S. Forest Service as an air resource management specialist. This past spring, he was promoted to regional air quality program manager. The job entails monitoring, evaluating, and protecting forest ecosystems from the adverse effects of air pollution. This past summer, he was involved with monitoring smoke from wildfires, sampling aquatic ecosystems for mercury, and reducing haze in the Columbia River Gorge.

Tom Greenwald (Ph.D., '94) was recently promoted to senior scientist at the University of Wisconsin's Cooperative Institute for Meteorological Satellite Studies in Madison. He is currently involved in research in the GOES-R program, the Joint Center for Satellite Data Assimilation, and the U.S. Weather Research Program's Joint Hurricane Testbed.

Courtney (Gorin) Taylor (M.S., '05) of AECOM will be part of the team selected to conduct wintertime ozone modeling for the Wyoming Department of Environmental Quality and the Bureau of Land Management, Utah State Office. These two projects will evaluate the performance of two different photochemical grid models for wintertime ozone in the Upper Green River Basin in Wyoming and in the Uinta Basin in Utah. These modeling studies are the first comprehensive effort to assess the models' ability to reproduce observed wintertime ozone episodes. Observations of elevated ozone concentrations during winter were initially detected in Wyoming in the winter of 2005. Since then, multiple ambient air monitoring studies have been conducted in Wyoming and Utah, which will provide a rich dataset for model evaluation. In winter of 2011, monitored ozone concentrations exceeded the Environmental Protection Agency's standard of 75 parts per billion averaged over eight hours: in Wyoming the eight-hour average concentrations exceeded 120 ppb and in Utah the eight-hour average concentrations exceeded 130 ppb. As part of the modeling studies, the better-performing model will be used to assess potential future control strategies.

Congratulations to 2012 AMS Award Winners

Stephen Munchak (Ph.D., '10), Jim Fleming (M.S., '73), and Viswanathan Bringi (professor, Electrical and Computer Engineering; co-PI CHILL Radar)

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40 years

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50 years

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