



WeatherZine



Sponsored by the U.S. Weather Research Program

Number 30
 October 2001

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Inside this issue:

Editorial	1
Vulnerability and Risk Assessment: A Contribution of the Weather Research Community in Developing an Effective Response to Terrorism By Bobbie Klein	
Guest Editorial	2
Building the Policy-Competency of the Atmospheric Community By William Hooke	
WeatherZine News	4
<ul style="list-style-type: none"> • Introducing the WeatherZine's Student Editorial Editor • Introducing the ASPEN Program • Committee on Partnerships in Weather and Climate Services 	
Correspondence	5
Research Highlight	6
Comparing Hurricane and Earthquake Policies	
Education Highlight	6
University of Oklahoma School of Meteorology MS in Professional Meteorology Degree Program	
Jobs	7
Subscription Information	8

Editorial

Vulnerability and Risk Assessment: A Contribution of the Weather Research Community in Developing an Effective Response to Terrorism

The death toll from the September 11 terrorist attacks on the World Trade Center and Pentagon is approaching 5,000. It has been years since so many fatalities resulted from a single event in this country. Until now, the greatest conflict-related loss on American soil occurred in 1862 during the Civil War battle along Antietam Creek, when over 3,600 lost their lives in a single day. Approximately 2,390 perished in the Pearl Harbor attack.

In the 19th and early 20th centuries, severe weather events in the U.S. caused enormous human losses. As many as 12,000 people were killed by the Galveston hurricane of 1900, and 2,200 perished in the 1889 Johnstown flood. Our hemispheric neighbors still experience natural disaster-related losses of this magnitude. Hurricane Mitch killed upwards of 11,000 Central Americans in 1998, and the 1999 Venezuelan landslides and flooding resulted in 30,000 deaths.

The U.S. avoided these kinds of losses in the late 20th and early 21st centuries. Tornado deaths declined from around 1.8 per million people in 1925 to approximately .12 per million today. The last hurricane with a death toll in the thousands struck in 1928. The potential for sizeable hurricane-related fatalities remains significant, however. Improved forecasting, advanced warnings, better communications, public awareness, spotter networks, evacuation, construction techniques, building codes, and infrastructure—as well as climate

fluctuations, demographic changes, and luck— have all played a role, although the contribution of each of these factors is not well understood.

With such a large amount of experience dealing with disasters, what contributions can the weather research community make in developing an effective response to terrorism? The weather research community's expertise in both risk assessment—characterizing the *threat* of harm—and vulnerability assessment—characterizing the *susceptibility* to be harmed—can help form the intellectual backbone of the nation's response to terrorist attacks.

Risk refers to the potential for loss of life, property, business capacity, societal and political stability, and environmental quality. A risk assessment determines the likelihood of adverse impacts from a specific hazard to the built, natural, business, and social environments by estimating the chance that an event will occur and the consequences if it does occur.

Vulnerability refers to the level of exposure of human life, property, and resources to damage from a hazard. A vulnerability assessment of the built environment in the context of severe weather would examine factors such as the concentration of populations and development relative to a severe weather risk; the value of exposed property and the proportion that is insured; how well existing buildings have been constructed to withstand hazard forces; the resiliency of transportation, utility, and

communication links and facilities; and what mitigation measures are in place. A societal vulnerability assessment would look at the vulnerability of people of different income levels, ages, genders, skills, and experiences to a hazard. A business vulnerability assessment explores issues such as whether a business has an up-to-date disaster plan, proper disaster supplies, and business interruption insurance. Risk and vulnerability assessment helps decision makers develop and prioritize appropriate responses to disasters such as investments in research, mitigation, disaster planning, and recovery efforts.

The dramatic reduction in loss of life from hurricane-related storm surge in the U.S. over the last 30 years is an excellent example of the weather community's successful use of risk and vulnerability assessment. Until 1970, storm surge was responsible for 90% of hurricane-related deaths near the U.S. coast. Yet from 1970 to 1999, only six deaths out of 600—a total of 1%—have been linked to storm surge. While climate and good luck may account for some of this change, much of the success can be attributed to changes in hurricane policies and operations such as the development of risk assessment technologies based on modeling of potential storm surge inundations. These projections are used to develop emergency preparedness plans and actions – a form of vulnerability assessment – for coastal areas.

The U.S. General Accounting Office (GAO), an arm of the Congress, recommends that threat and risk assessment play a key role in the development of a national strategy for responding to terrorism. The first step of such an assessment would be for a multidisciplinary team of experts to identify and evaluate threats in terms of a terrorist's capability and intent to attack, the likelihood of a successful attack, and its consequences. While natural hazard risk is often estimated quantitatively through a combination of scientific analysis and historical data, terrorism risks would have to be estimated qualitatively from the best available intelligence information. The next step would be to create a list of potential terrorist attack scenarios. The final step is a prioritized list of risks based on threat-asset-vulnerability combinations that are used to select countermeasures. As of August 2001, four states had completed such assessments, and the FBI is coordinating two national-level threat (but not risk) assessments.

It is likely that over \$1.8 billion will be budgeted to fight bioterrorism in the next fiscal year. Congress has already enacted a \$40 billion emergency spending package in reaction to the September 11 attacks. Allocations likely will increase as the "war on terrorism" expands. The information obtained from risk and vulnerability assessment can assist decision makers in determining how to allocate resources to reduce society's vulnerability. Without such assessments, countermeasures may be based on worst-case scenarios, resulting in the overfunding of some programs and the underfunding of programs addressing more likely threats. For example, the Department of Health and Human Services has in the past stockpiled certain drugs and vaccines that were not responsive to the intelligence community's assessment of the most likely chemical and biological threats. The weather research community's expertise in risk and vulnerability assessment is a resource of knowledge and experience that should be tapped in developing effective responses to the threat of terrorism.

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Guest Editorial

Building the Policy-Competency of the Atmospheric Community

Over several decades, weather and climate service providers and the supporting scientific community have made great strides. Never in our history have we been able to contribute more to public safety

and national security; to agriculture, energy, transportation, and other weather-sensitive sectors of the economy; and to protection and wise use of the environment, ecosystems, and water resources.

At the same time, however, societal needs for meteorological information have grown dramatically in scope and complexity. Hurricane evacuations are growing in duration, regional impact, and extent. Business demands weather and climate forecasts of increasing accuracy, over more extended time horizons. After several years of improvement, air quality is declining, especially in important urban areas. Military requirements for weather support are escalating. Weather and climate service providers and the research community have been struggling to keep pace. Moreover, our continuing ability to keep pace in future years is by no means assured.

In large measure, this is because the challenge is more than a matter of scientific innovation and service provision *per se*. Whether our science and services can be put to good use, not just today but for years to come, depends on public policy. More and more, we must work with Congress, federal agencies, and natural constituencies to put into place, maintain, and exercise supportive national policy frameworks. Increasingly, public policy determines the success or failure of efforts to develop and maintain observing systems, telecommunications, and computing infrastructure; international data sharing agreements; federal support for R&D and the transfer of research progress into concrete services; and meteorological and scientific education.

To operate effectively in the policy arena, the meteorological community (broadly construed) must take several steps including the development of present and future leaders who have an understanding of and facility with the policy process, familiarity with current policy issues and the major players, and an ability to network with others to achieve common goals.

The American Meteorological Society has conceived and organized the Summer Policy Colloquium as a means toward these ends. The first Colloquium, held in Washington, DC from June 3-12, 2001, brought together 37 meteorologists, oceanographers, and hydrologists. Some 23 of these came from the private sector, government, and academia. Another 14 were graduate students in meteorology and related fields, selected on the basis of a

national competition from universities across the United States. Their participation was fully supported by the AMS (using Development Funds) and the University Corporation for Atmospheric Research. All participants were chosen because of their leadership contributions and potential.

Participants began their preparations well before assembling in Washington. They pored over hundreds of pages of advance reading – introductory material on the policy process, recent articles and relevant books, and two major case studies. Roger Pielke, Jr., and Robert Landis, respectively, prepared the case studies for the Colloquium. The first dealt with the establishment of the Global Change Research Program and subsequent congressional oversight. The second examined international data sharing issues as they shaped the World Meteorological Organization's Resolution 40, adopted in 1995.

Participants met and dialogued for nine intense days, including several evening sessions. Some 60 presenters including congressional staffers, political consultants, executive branch officials, private sector business leaders and entrepreneurs, and policy researchers and scholars also participated.

The first modules treated the basics of the prevailing federal policy framework, emphasizing the budget process. Participants visited Capitol Hill, and met with Senate and House staffers, as well as with representatives from OSTP and OMB. The group then worked through each of the case studies in two steps. First, the case developers used the Socratic method to lead participants through the cases. Then, in follow-up sessions, participants dialogued for several hours with the senior policy officials responsible for developing the GCRP, and for developing Resolution 40, respectively. Participants also worked through an initiative exercise designed to simulate today's inter-agency competition for federal funds.

In other modules, the group met with policy researchers to gain familiarity with current policy issues. They heard from former presidential science advisor D. Allan Bromley. High-level executives at NOAA, USGS, FEMA, and Capitol Hill, as well as from the private sector, surveyed the changing

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<http://sciencepolicy.colorado.edu/socasp/feedback.html>

Or send an email to:

weatherzine-admin@sciencepolicy.colorado.edu

And include your name, organization, and email address.

landscape with respect to energy, climate, and natural disaster reduction.

Throughout, participants examined the linkages between the private and public sectors and their associated implications for policy. They looked at the role of the aerospace industry in shaping the GCRP. They studied the impact of country-to-country differences in the public and private meteorological services on international data sharing. On the final day of the Colloquium, four entrepreneurs from the private sector gave presentations covering the history of their respective companies and their role in service provision.

The Colloquium occurred early in the Bush Administration, on the eve of the president's first trip to Europe, and amidst announcements of NAS/NRC findings with regard to the IPCC reports and administration climate change policies. This timing provided additional immediacy. Jo Anne Barnhart led the first day's discussion of the legislative policy process. It was announced later that week that she was President Bush's choice to be Commissioner of the Social Security Administration. Elbert "Joe" Friday, from the National Research Council, met the group the day after the Academy released its report to the President on the IPCC findings. Allan Bromley strongly hinted to the group that the President was close to selecting a science advisor, just days before John Marburger's name was announced. Roger Pielke, Jr. joined the group on Friday to discuss his Senate

briefing of that morning.

All participants would agree that this first Summer Policy Colloquium, in and of itself, was of great value. However, the Colloquium will achieve a far greater impact over the coming years. As the number of case studies swells by two to three each year, they will grow to be an increasingly valuable resource for policy centers and departments of environmental science across the nation. As the participants rise to positions of greater responsibility in government and the private sector, their influence is expected to grow. The American Meteorological Society is planning to provide continuing opportunities for Colloquium participants at future AMS Annual Meetings.

The Atmospheric Policy Program will conduct its next Summer Policy Colloquium in Washington, DC, from June 2-11, 2002. Further details will soon be available on the AMS web site.

In August 1999, Roger Pielke, Jr., wrote an editorial for WeatherZine entitled "[Weather policy? What's that?](#)". Hopefully, as the atmospheric community becomes better versed in policy matters over the next few years, that question will no longer need to be asked.

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WeatherZine News

Introducing the WeatherZine's Student Editorial Editor

A big welcome to the WeatherZine's new Student Editorial Editor, Russell Chibe. Russ grew up in the Chicagoland area, where he became fascinated by tornadoes at a young age. While he knew he wanted to be a meteorologist since the fifth grade, he also developed a love for politics. He pursued both of these interests at Valparaiso University where he graduated with a degree in meteorology and minors in both political science and math, and as an associate of VU's multi-disciplinary honors college. He spent a semester studying in Reutlingen, Germany. This past August Russ began his first semester at Colorado State University's department of atmospheric science, where he is supported by an American Meteorological Society graduate fellowship. He spent his last two summers researching at the NASA-Goddard Space Flight Center in Greenbelt, MD.

Russ's research interests are varied, with experience in boundary-layer convection, turbulence, and severe storms. He has examined the public's perception of severe weather frequency, and what it can tell us about the impact of high false-alarm rates. While pursuing his master's degree, Russ

will be involved in modeling boundary-layer processes. He plans a career in weather policy.

When he's not deriving the equations of motion in cylindrical coordinates, Russ can be found pursuing his musical interests. His roles have ranged from pianist in the Valparaiso University jazz band to lead singer/guitarist in a punk band.

He is also an amateur musicologist, having presented a paper on a Thelonious Monk composition at the Butler University Undergraduate Research Conference. Other interests include various sports (both as a spectator and a participant) and graphic design.

As Student Editorial Editor for 2002, Russ will be responsible for writing one editorial and soliciting and selecting five editorials from students all over the country, beginning with the December issue. We look forward to adding this valuable perspective to the WeatherZine. For more information, contact Russ at rchibe@atmos.colostate.edu.

WeatherZine News

Introducing the ASPEN Program

With the move of the WeatherZine to the Cooperative Institute for Research in the Environmental Sciences at the University of Colorado, we are reorganizing our activities as a new program. The Atmospheric Sciences Policy Education and Network (ASPEN) Program is focused on weather policy research, education, and outreach. It is supported by the U.S. Weather Research Program. In addition to the WeatherZine, the ASPEN Program presently

consists of the Societal Aspects of Weather WWW portal, the online Use and Value of Weather and Climate Forecast Bibliography, the weather-policy email discussion group, and the Extreme Weather Sourcebook. In the near future we will be enhancing these activities and introducing a range of new activities related to weather policy research, education, and outreach. We welcome your feedback and suggestions for improving the ASPEN Program!

WeatherZine News

Committee on Partnerships in Weather and Climate Services

The National Research Council has formed a Committee on Partnerships in Weather and Climate Services to study the relationship of the public and private sectors in the provision of weather and climate services. The Committee describes its scope as follows: "Weather and climate extremes have profound impacts on the United States; weather and climate information is essential to prepare for and ameliorate these impacts. The provision of weather and climate services in this nation has evolved from an almost exclusive governmental function to one carried out by a combination of public sector, private sector, and academic entities. This change has resulted in better weather services for the

United States. It has also raised questions about the proper roles and missions of the various players and the potential for actual or perceived conflict among the providers. This study will examine the current roles and missions of the public, private, and academic sectors in the provision of weather and climate services; the barriers to communication among the sectors; and opportunities for improving service in each of the sectors to serve the public interest. It will also examine weather and climate information sharing policies in the Internet age." You can learn more about the Committee and its members, provide input, and have access to a range of material on the subject of its study at [the Committee's website](#).

Correspondence

Dear WeatherZine,

As an avid reader of WeatherZine I noted the link posted to the Weather Channel/Project Safeside (and other links) site about lightning safety. The Project Safeside site includes a section "A Warning is Issued." WRONG!! In spite of the national lightning network, which has been in place for years, and the availability of real time data in WFOs, there are NO criteria or current planning for lightning warnings. Today in Washington we had very "hot" cells throughout the area with 4,000 cloud-ground stokes per hour within 75 miles of DC. There was a severe storm warning issued for one cell, when the 88D algorithm tripped for 3/4" hail . . . unfortunately 2 people were killed tonight by lightning, not 3/4" hail.

We have criteria for warnings and advisories for everything from cold to heat, floods, ice, wind, snow, frost, freeze,

visibility, probably even sunshine. . . every weather event but the one storm-related weather that kills more people than floods—lightning. How about allowing line forecasters the discretion of issuing severe thunderstorm warnings for high cloud-ground flash rates for storms in populated areas? We break into programming and run crawls regularly for weather events that don't mean much to most people. What is our false alarm rate for 3/4" hail anyway? How about getting around to coming up with criteria for warnings we have the skill to provide. . . and the lives to possibly save.

Bob Ryan
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ed.: [The Project Safeside site](#) discusses what to do if a severe thunderstorm warning is issued.

Correspondence Continued

Dear WeatherZine,

Your editorial "[Ka-ching!! Dealing with Financial Conflicts of Interest](#)" was right on the mark and dealt with a current and still unfolding issue. The examples you presented are real. When I hear of these new public-private partnerships, I have the same discomfort as, I am sure, many of us on the public side feel.

I agree that policy guidance is needed. The American Meteorological Society (AMS) is a logical choice to develop

such guidance. I might also suggest the National Research Council and its Board on Atmospheric Science and Climate (BASC) as another choice. In fact, I suggest a possibly unprecedented joint effort between BASC and the AMS policy group to develop a guidance document. Applying their combined impact and expertise to this important issue would be significant.

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Research Highlight

Comparing Hurricane and Earthquake Policies

The US Federal Emergency Management Agency (FEMA) report (February 2001) titled [HAZUS99 Estimated Annualized Earthquake Losses for the United States](#) estimates that US earthquake exposure (capital losses) is \$3.5 billion. This compares apples-to-apples with an estimated US annual hurricane exposure of \$5.1 billion (based on Pielke and Landsea 1998, [updated data](#)). Policies in response to earthquakes and hurricanes share some interesting similarities and differences. For insight take a look at the following:

An analysis of federal earthquake and hurricane policies can be found in the April 2000 WeatherZine editorial by Thomas Birkland entitled [Earthquakes and Weather: Lessons for Policy and Science](#) and his paper Factors Inhibiting a National Hurricane Policy, *Coastal Management* 25 no. 4 (1997): 387-403.

A discussion of earthquake science and policy can be found in Nigg, J. 2000. Predicting Earthquakes: Science, Pseudoscience and Public Policy Paradox, Chapter 7 in D. Sarewitz, R. A. Pielke, Jr., and R. Byerly (eds.), **Prediction: Decision Making and the Future of Nature** (Washington, DC: Island Press).

The origins of national hurricane policy are discussed in Simpson, R. H., 1998. Stepping stones in the evolution of a national hurricane policy, *Weather and Forecasting* 13:617-620.

Articles related to various aspects of the use and value of weather and climate forecasts can be found in our online [bibliography](#).

Education Highlight

University of Oklahoma School of Meteorology MS In Professional Meteorology Degree Program

During the past decade, the private sector has experienced rapid and sustained growth as both a provider and consumer of weather information and technology. To provide its students a unique opportunity to prepare for rewarding careers in private industry, or in organizations whose mission is directed primarily toward customer service and/or product development, the School of Meteorology at the University of Oklahoma has established the Master of Science in Professional Meteorology (MSPM) Degree Program. Similar in concept to an MBA, the MSPM Program allows students to focus on a specific area of meteorology as well as earn graduate credit in a secondary area such as business, computer science, finance, communications, economics,

public policy, public relations, and marketing.

For more information visit the [School of Meteorology](#) site or contact:

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Jobs

***Climate/Atmospheric Change
Department of Atmospheric Sciences/Department of Civil
and Environmental
Engineering/Environmental Council
University of Illinois at Urbana-Champaign***

The Departments of Atmospheric Sciences and of Civil and Environmental Engineering, together with the Environmental Council at the University of Illinois at Urbana-Champaign, seek a faculty member at the Assistant or Associate Professor level (tenure-track or tenured) to study climate/atmospheric change focusing on the potential impacts of, mitigation of, or adaptation to such change, and on related public policies. The successful candidate must have a Ph.D. or equivalent in an appropriate scientific or engineering discipline and demonstrated expertise in the designated field of study. The position is available August 21, 2002. To ensure full consideration, candidates should apply by November 1, 2001 by submitting a current curriculum vita and publication list, short statements of research, teaching, and public policy interests, and the names and contact information of at least four references to:

Dr. Stephen P. Long, Chair
Search Committee
Environmental Council
University of Illinois
1101 W. Peabody Drive, Room 350
Urbana, IL 61801
ph: (217) 333-4653
fax: (217).333-8046
environ@uiuc.edu

For more information visit the [Environmental Council website](#).

***2002–2003 American Meteorological Society
Congressional Science Fellowship***

Are you fascinated by what goes on in Washington, DC? Are you content with how Congress and the President make science policy? Would you like to become involved - to make a difference?

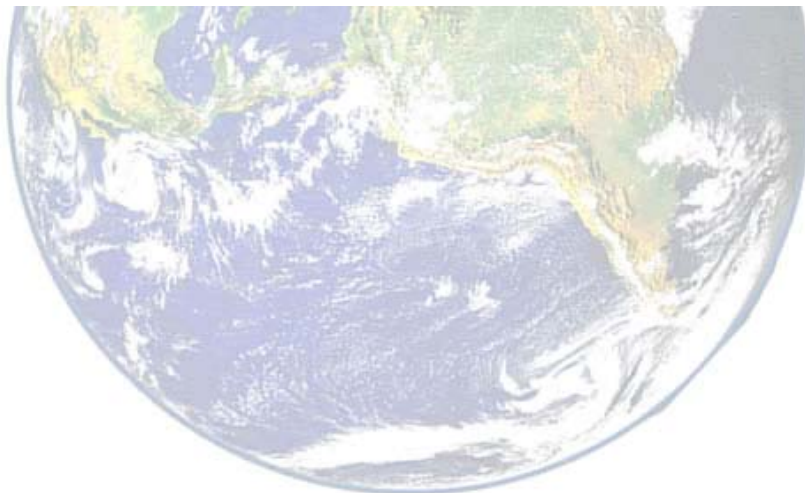
For those scientists who would like to contribute to public policy by working on Capitol Hill, the AMS Congressional Science Fellowship allows you to spend a year working for a member of Congress or a congressional committee.

The AMS Congressional Science Fellowship program will permit you to spend a full year in the U.S. Congress working on science policy issues. The Fellowship term is from September 1, 2002 to August 31, 2003. Each fellow is free to choose from a wide variety of positions within Congress. He or she will spend the year on Capitol Hill with over 30 fellows from other professional societies. A stipend of \$47,000 and up to \$10,000 for moving, travel, and other expenses are provided.

WHO IS ELIGIBLE: Applicants must have a Ph.D. or equivalent in the atmospheric or related sciences, be a member of AMS (or applying), be a U.S. citizen, and be comfortable working with people from diverse professional backgrounds and under demanding deadlines. Federal employees are not eligible.

HOW TO APPLY: Applications are due to the AMS by MARCH 1, 2002. Visit the [AMS website](#) to see application details or call Doug Stone at the AMS (202) 737-9006 or email stone@dc.ametsoc.org for an application.

The fellowship is supported jointly by the AMS and University Corporation for Atmospheric Research (UCAR).



Jobs Continued

CIRES Visiting Faculty & Postdoctoral Fellowships

The Cooperative Institute for Research in Environmental Sciences (CIRES) under the sponsorship of the National Oceanic and Atmospheric Administration is offering up to six one-year Visiting Fellowships at the University of Colorado in Boulder.

This is open to scientists with research interests in the areas of the new [CIRES Research Themes](#) developed to better explain and illustrate both the broad range of CIRES' science as well as the interdisciplinary nature and connectedness of our research.

Advanced Observing and Modeling Systems
Climate System Variability
Geodynamics
Planetary Metabolism
Regional Processes

ELIGIBILITY: Ph.D. scientists at all levels and faculty planning sabbatical leave. Recent Ph.D. recipients and those affiliated with minority institutions are especially encouraged to apply. Selections for this Visiting Fellows

Program are based in part on the likelihood of interactions between the Visiting Fellows and the scientists at CIRES and the degree to which both parties will benefit from the exchange of new ideas. To further this goal, priority is given to candidates with research experience at institutions outside the Boulder scientific community.

The program is open to scientists of all countries, and appointments can begin at any time during the year. Salary is commensurate with qualifications, current salary and cost of living considerations. The Fellow will be eligible for benefits, office space, telephone and computer facilities, and a small moving and start-up allowance. Visiting Fellowships are potentially renewable for a second year, provided supplemental funding is available.

Applicants are encouraged to contact the CIRES Fellows and other scientists to refine their research proposals. For application instructions, see the [CIRES](#) website. The deadline for receipt of application materials is December 15, 2001

The University of Colorado at Boulder is committed to diversity and equality in education and employment.

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Primary support for the *WeatherZine* comes from the U.S. Weather Research Program.

On-Line version

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