WeatherZine

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Environmental and Societal Impacts Group

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In This Issue

Our New Look

A few changes to report as a result of continuing heroic effort by our webmaster, Jennifer Oxelson and a new addition to our staff, Bobbie Klein: we have updated the *Societal Aspects of Weather* Web site, including adding a dedicated search engine and new content, and reorganizing the pages according to what our users have visited most frequently. Please take a moment to check out the new site and give us your feedback on how we might improve it. It is a continuous work in progress. This month we have also begun to produce the *WeatherZine* in Adobe Acrobat PDF format for those of you who would like to print out the bimonthly newsletter. We are also seeking to include more guest editorials, commentary, and news of interest to the community, so if you are interested in contributing, just let us know!

About Us

WeatherZine is a bimonthly newsletter on the societal aspects of weather. It contains opinion pieces, news, and a brief summary of developments at the *Societal Aspects of Weather* Web site.

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Editorial

Weather policy? What's that?

We have become familiar with policy related to various aspects of the atmospheric sciences, such as climate policy, ozone policy, acid rain policy, flood policy, and related areas such as space policy, ocean policy, and marine affairs. But there does not seem to be much attention paid at all to the issue of "weather policy."

Weather policy has two inter-related components. One is "policies for weather research and decision making." This includes government policies about weather research, forecast operations, and responses focused primarily on the National Weather Service (www.nws.noaa.gov/), but more broadly constituted would include the Department of Agriculture (www.usda.gov/), Federal Emergency Management Agency (www.fema.gov/), Small Business Administration (www.sbaonline.sba.gov/), and other agencies that deal with weather and its impacts. It also covers the private sector, notably including providers of weather information and the insurance industry. Of course, an important aspect of weather policy is the relationship between the public and private sectors.

A second component of weather policy is "weather research for decision making" and refers to the connections between research and the actions taken in preparation for and response to weather. This aspect of weather policy is variously called "forecast use and value" and "connections of research and operations." There is a small but significant body of literature in this area, but for the most part it has not been discussed in terms of policy as it has been in the climate and ocean areas.

A search of Yahoo! for "weather policy" results in 856 Web pages, essentially all of which seemingly refer to "inclement" or "hazardous" weather policies for school or business closures. While these are certainly examples of weather policies, I found only a few pages that discuss weather policy explicitly as defined above, on the National Weather Service's and the American Meteorological Society's Web sites. In contrast, a search for "climate change policy" returns 1,670 pages, almost all of which refer to decision making and impacts related to global climate change. Searches for "space policy" and "marine policy" return 4,525 and

1,607 hits respectively.

As the impacts of weather events in the United States continue to grow, driven by growing population and wealth, there will be increasing demand by the public for effective responses. Such demands will pressure the research and operations communities to demonstrate their contributions to the nation's weather problems. These factors, coupled with a national disposition for governmental accountability and rapid advances in tools and technologies (like weather derivatives and increasingly accurate private sector forecasts), would seem to indicate that "weather policy" is on the verge of becoming an important subset of United States science policy, much like climate change policy did in the 1980s.

This month we have added to the *Societal Aspects of Weather* Web site a page dedicated to "Weather Policy" (www.dir.ucar.edu/esig/socasp/policy.html). The purpose of the page is to provide a centralized resource for information on policies for weather research and decision making. Please send us your feedback on what we should add and what would be most useful to you. In the next issue of *WeatherZine*, we will roll out a (hopefully) comprehensive bibliography on the use and value of weather and climate forecasts.

--Roger A. Pielke, Jr.

Guest Editorial

Are warning lead times the most important issue in tornado events?

--Chuck Doswell

There is no doubt that tornado warning lead time is important, but it is not the *only* and, in some cases, not even the most important factor in saving lives. The outbreak of tornadoes in Oklahoma and Kansas on 3 May 1999 is an excellent example of warnings at their best, with up to 32 minutes of lead time for Oklahoma City. It's hard to imagine a need for warnings with lead times longer than 32 minutes! (In fact, longer lead times could be *less* effective because they might not convey a strong enough sense of urgency. There is very little concrete information about what might be the most effective warning strategy.) Supercell storms producing significant tornadoes are not difficult to recognize and track, and the National Weather Service (NWS) (www.nws.noaa.gov/) has a pretty good record in such events. The fatalities associated with such events usually are not the result of inadequate lead times!

Instead, other factors influence the casualty counts: for example, structural integrity (www.fema.gov/mit/bpat/) of buildings, prior participation in tornado preparedness programs, availability of proper shelters, and warning dissemination (www.wildstar.net/~doswell/NWR_rant.html).

In central Oklahoma, most homes don't have basements and only a few homeowners have tornado shelters. Was it a coincidence that another violent tornado on 3 May 1999 in Kansas where basements and shelters are much more common, resulted in significantly fewer fatalities? In less intense tornadoes, the ordinary precautions (www.fema.gov/library/tornadof.htm) advocated in the absence of a basement or shelter generally will be effective. Unfortunately, for *violent* tornadoes, only a proper shelter offers a reasonable expectation of avoiding serious injury or death. Even in central Oklahoma, with a relatively high level of severe weather awareness, a certain amount of complacency (www.wildstar.net/~doswell/Tornado_essay.html) tends to set in as the years since the last tornado go by. But this has not led most citizens to build shelters. Perhaps complacency is an inevitable outcome of the relatively low probabilities (www.wildstar.net/~doswell/tor_probs/vtornado_prob.html) of experiencing the winds in a violent tornado. Although the investment in a proper shelter is relatively modest, it can be argued that the odds favor a "do nothing" strategy as the most cost-effective one, even in central Oklahoma.

Unfortunately, the odds are not of much comfort if you're in the path of a violent tornado, especially in those parts of the country where violent tornadoes are sufficiently infrequent that most citizens believe "tornadoes just don't happen here!" Such erroneous assumptions result in a pronounced lack of preparation, such as in the Worcester, Massachusetts, tornado of 9 June 1953 that killed 94 people. Whereas Worcester has a pretty low violent tornado probability, it is distinguishable from zero. A true zero probability is only an abstraction; even New England's violent tornado probability is high relative to, say, Antarctica, and is low enough that we have only a fuzzy knowledge of those probabilities in comparison to violent tornado probabilities in Oklahoma. It's only a matter of time before *another* violent tornado creates a major disaster in New England, and it's quite possible to imagine even worse outcomes than on 9 June 1953.

Another factor to consider in public response to warnings is the "Cry Wolf" or "Chicken Little" syndrome. It's possible that warnings are actually more effective in regions with relatively low tornado frequencies; hearing warnings regularly may lead to a lack of confidence in tornado warnings.

At the moment, I see only two ways to decrease the false alarm rate and, at the same time, increase the detection frequency: (a) an unprecedented commitment to forecaster training (www.wildstar.net/~doswell/training_rant.html), or (b) some currently unforeseen scientific breakthrough. Scientifically absurd goals set by NWS officials notwithstanding, there just is no other way to mandate a reduction in false alarms without inevitably increasing the detection failures. At present, the only way to decrease false alarms is to increase the number of tornadoes that strike literally without warning, which I don't believe anyone wants. Lead times for warnings are closely related to uncertainties about which storms, if any, are going to produce tornadoes. Uncertainty translates into angst over whether or not to "pull the trigger" on a tornado forecast or warning. In turn, agonizing over the decision can result in reduced lead times. There clearly are asymmetric penalties associated with the decision to warn or not to warn; a false alarm is unlikely to kill anyone. Hence, false alarms are favored heavily by forecasters over failures to detect.

Harold Brooks and I think the answer to the very correct public perception that most tornado forecasts and warnings are false alarms is to rethink our whole approach to forecasts and warnings in order to accommodate our uncertainty via some sort of probabilistic approach (www.nssl.noaa.gov/~doswell/probability/Probability_2.html). Certainly, improvements in weather-forecasting-related science can improve our track record (www.wildstar.net/~doswell/integrity.html) but, unless some unforeseen breakthrough occurs, if we persist in categorical forecasting and warning strategies, I don't look for the reality of mostly false alarms to change in my lifetime.

A transition to an improved forecast product will not be easy and should include a careful study done in collaboration with psychologists and sociologists. I do not claim to know precisely how to do this. We need to test our ideas with the help of people who really know how to gauge public perception and response. The NWS has a tradition of making default assumptions about what "the public" (whoever that might be) wants and needs. This is a bad tradition. We weather folks need to overcome our prejudices about the value of contributions from outside of meteorology and embrace a comprehensive, substantive, and empirically validated look at how we can best serve the users of weather information. Let's replace speculation and opinion with facts. If we weather professionals make the choice to commit to a transition to probabilistic forecasts and warnings, then we will need to employ a wide range of skills outside of meteorology to test and evaluate how to make such a change with the least difficulty. It won't be quick or simple to do, but I believe that, in the long run, it will be the right thing to have done.

Comments? thunder@ucar.edu

Selected Web Site Additions

Insurance: Organizations and Agencies

Institute for Business & Home Safety (IBHS)
www.ibhs.org/

IBHS is an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses and human suffering caused by natural disasters.

Bibliography: Bibliographic Resources

Disasters by Design: A Reassessment of Natural Hazards in the United States - A Bibliography
www.Colorado.EDU/hazards/assessbib.html

Emergency Management: Federal Agencies and Resources

FEMA/ESRI Hazards Maps On-Line
www.esri.com/hazards/

FEMA and ESRI signed a Project Impact National Partnership agreement to offer multi-hazard maps and information via the Web site beginning June 8, 1999. Flood hazard maps are available for all areas where FEMA has prepared Q3 flood data. Zipcode entry will produce generalized flood hazard mapping.

Floods: General Resources

FEMA Consumer Guide to Reducing Flood Risks
www.fema.gov/nwz99/99159.htm

FEMA's Surviving the Storm: A Guide to Flood Preparedness outlines measures individuals and business owners can take to protect their families, property and communities in the event of flooding.

Hurricanes: General Resources

The 1999 National Hurricane Operation Plan
www.ofcm.gov/nhop/99/nhop99.asp

Injury and Damage Statistics

The Hidden Costs of Coastal Hazards

www.heinzctr.org/Update.htm

The Hidden Costs of Coastal Hazards is an in-depth study that considers the costs of hazards to natural resources, social institutions, business, and the built environment. Using the case study of Hurricane Hugo, which struck South Carolina in 1989, it provides for the first time information on the full range of economic costs caused by a major coastal hazard event.

Subscription Information

The *WeatherZine* is produced both as both a Web page and an email message. Subscribing to the *WeatherZine* will add you to our distribution list and you will receive email messages whenever the *WeatherZine* is released.

To submit an item to the *WeatherZine,* use the on-line form at: www.dir.ucar.edu/esig/socasp/forms/join.html or send email to thunder@ucar.edu, and include the following information:

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