

In This Issue

Changes to the WeatherZine Editorial	1
Ka-ching!! Dealing with Financial Conflicts of Interest	1
Guest Editorial	
Mobile Homes and Weather: Left to the Elements?	3
Correspondence	4
Job Opportunities	5
Selected Web Site Additions	5
Subscription Information	6

Center for Science and Technology Policy Research, University of Colorado/CIRES (cires.colorado.edu) at pielke@colorado.edu. We'll start the Student Guest Editorial soon thereafter.

The other new sections will include a Research Spotlight and an Education Spotlight. The former will include studies, papers, reports, etc. of particular relevance to the WeatherZine's focus. The latter will focus on courses, programs, and faculty with interesting approaches to teaching and research of particular interest to WeatherZine subscribers. We welcome your submissions to these new sections!

Changes to the WeatherZine

Help Wanted!

The WeatherZine is going through some changes. As of October 2001 the Zine will be issued from the University of Colorado's Cooperative Institute for Research in the Environmental Sciences (CIRES). CIRES is a "Cooperative Institute" between the National Oceanic and Atmospheric Administration and the University. The Zine will continue to be supported by the U.S. Weather Research Program.

Thus, WWW links will change, but thanks to our friends at the National Center for Atmospheric Research we will set things up so the old ones will forward you to the right places for a while.

We are going to be adding three new sections to the WeatherZine in the coming issues. The first will be an editorial column devoted exclusively to student essays. We are looking for a student who is willing to serve as the WeatherZine's "Student Editorial Editor" for a one-year term (6 issues). The Student Editorial Editor will have responsibility for writing one editorial and soliciting and selecting student guest editorials in collaboration with the WeatherZine staff.

To apply for the position of "Student Editorial Editor" please submit a letter of application of less than 250 words letting us know why you are interested. The deadline is September 30, 2001. Applications should be emailed to Roger A. Pielke Jr.,

Editorial

Ka-ching!! Dealing with Financial Conflicts of Interest

Many atmospheric sciences professionals are overjoyed at the realization by industry and the public that their science has real economic value. Many atmospheric scientists have argued this for years, but today the difference is that a growing number of people *outside the discipline* agree. The first responses of the atmospheric sciences community to this dawning realization are evocative of actress Sally Field's speech upon winning an Oscar – "We have value! We really have value!"

But after the initial excitement wears off, there is a dawning realization that with relevance comes obligations. Among these obligations are questions of the actual size and distribution of societal benefits, a desire by policy makers and other stakeholders to shape research and development in directions that affect the sorts of benefits that actually occur, and a desire by those who expect to benefit to participate more fully in the process of research. Each of these new demands creates "growing pains" for those more familiar with operating under the rules of "basic research" – i.e., no expectation of direct societal benefits.

Another issue requiring attention is the potential for financial conflict of interest at the interface of research and commerce. As the fruits of atmospheric sciences research become increasingly valuable, the question is not if such a potential exists, but when and where and,

more importantly, what to do about it. This is a sensitive topic because it involves money and money is often a difficult issue to discuss openly. Fortunately, other professions have grappled with this issue and have much to offer the atmospheric sciences in terms of experience and precedent.

In 1993, Harvard's Dennis Thompson defined conflict of interest in *The New England Journal of Medicine*:

A conflict of interest is a set of conditions in which professional judgment concerning a primary interest (such as a patient's welfare or the validity of research) tends to be unduly influenced by a secondary influence (such as financial gain).

Thompson argues

The secondary interest is usually not illegitimate in itself, and indeed it may even be a necessary and desirable part of professional practice. Only its relative weight in professional decisions is problematic. The aim is not to eliminate or necessarily to reduce financial gain or other secondary interests (such as preference for family and friends or the desire for prestige and power). It is rather to prevent these secondary factors from dominating or appearing to dominate the relevant primary interest in the making of professional decisions.

The question to be addressed, then, is not whether the boundary between research and commerce should blur – it has and it will. Indeed, the United States has a long history of using policy to intentionally blur this boundary, using technology policies to stimulate economic growth via public support for research, development, and technology transfer. The question facing the atmospheric sciences instead is what policies and procedures to promulgate and implement given present trends in the discipline.

Consider the following hypothetical examples and ask yourself what potential conflicts may exist:

- A professor develops an observing system using the latest advances in nanotechnology that allows for comprehensive observations of the features of storms. She patents the technology (carefully following the appropriate University Intellectual Property regulations) and starts a company called MicroSee. Every sale of a MicroSee observing platform results in a financial gain to the professor. She is an advocate on scientific panels for using MicroSee technology to advance scientific understanding of storms and publishes widely in the discipline.
- A University meteorology department engages in a research partnership with Acme, Inc. The terms of the deal are that Acme, Inc. will invest \$10 million in the department and the department will sponsor research that benefits Acme in particular. Acme will have ready access to research, data, and infrastructure that many of its competitors do not. As a result of the partnership, several faculty members in the department will have ample opportunities to consult for fees with Acme on their latest research results. The University's Acme-sponsored research is published in disciplinary journals.
- Leaders of a non-profit corporation sponsored exclusively by federal funds decide to aggressively accelerate the transfer of science and technology into commercial opportunities by capitalizing and spinning off a new company. In this case each of the individual participants has a financial stake in the new company, which is carefully created under the organization's existing intellectual property regulations that prescribe a split in realized gains between the researcher and the corporation. Each participant is in a position to influence the scientific priorities of the broader organization, of which only a sub-set is relevant to the new company.
- Using federal grants, a professor develops a meteorological model to predict the weather. The model's source code is in the public domain. The professor creates a consulting company to fine-tune the model and provide forecasts to paying customers. The professor relies on graduate students, working on authorized degree programs, to develop improvements to the model based on feedback from his consulting clients. The professor has access to datasets not generally publicly available, which enhance the relative value of the consulting services to his customers. The professor and his students routinely publish the results of their work in peer-reviewed journals.

In each of these hypothetical cases it seems pretty clear that there exists a *potential* for a financial conflict of interest, some involving individuals and some institutions. But it also seems pretty *unclear* as to what sorts of rules, regulations, and disclosures would make sense in each of these cases. Fortunately, since the mid-1980s several disciplines, the medical profession being the most prominent, have been engaged in discussion and debate about conflict-of-interest policies and procedures. (See the references listed below for discussion of some of these lessons.) We in the atmospheric sciences have much to learn from these debates.

As a first step, it would be worthwhile for the American Meteorological Society to establish a high-level

committee to review these debates and determine what lessons are appropriate for the atmospheric sciences community to discuss and then adopt.

Dealing with potential conflicts-of-interest may seem to some like an unnecessary or invasive burden on a field that traditionally has expressed little concern over such things. Times have changed. As the atmospheric sciences have increased their actual value to decision makers, so too has the potential for conflict of interest increased. This is a healthy sign of a maturing science improving its connections with society. Maintaining scientific integrity in the atmospheric sciences likely requires a few prudent, proactive steps to ensure that public faith in our work continues.

For further reading:

Thompson D. F., 1993. Understanding Financial Conflicts of Interest. *The New England Journal of Medicine*, 329:573-576.

Krimsky, S. and L. S. Rothenberg, 2001. Conflict of interest policies in science and medical journals: editorial practices and author disclosures. *Science and Engineering Ethics* 7:205-218.

Angell, M. and J. P. Kassirer, 1986. Editorials and conflicts of interest. *The New England Journal of Medicine*, 335:14.

– Roger A. Pielke, Jr.

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Guest Editorial

Mobile Homes and Weather: Left to the Elements?

In 1890, photographer Jacob Riis's book "How the Other Half Lives" documented the appalling conditions in the tenements that then housed three-quarters of the people of New York City. Riis helped generate public outrage and, eventually, the political will to transform the system that regulated housing in New York and across the nation.

Today, some 21 million U.S. residents – over 7 percent of the public – live in mobile homes (or manufactured homes, as the industry prefers to call them). These homes fill an important niche. Affordable housing is more and more difficult to find in many areas. People who could never afford to purchase a traditional single-family home can build equity in a free-standing structure of their own. The pull of "God's little acre" is a powerful one in America.

Yet, when not heaping scorn on the residents of trailer parks, society at large seems content to ignore them. When was the last time you saw a TV series with a continuing character who lived in a mobile home? Even more disturbing is the willingness of government to overlook the safety of a substantial number of our citizens. Weather poses a risk to mobile home residents in several ways, not all of them obvious. For example, many mobile homes are sited in or near flood plains. In the devastating July 1997 flash flood in Ft. Collins, Colorado, four out of the five residents who died lived in a single mobile home park.

The best-known weather risk for mobile homes is tornadoes, and with good reason. According to the NOAA Storm Prediction Center, out of 829 total tornado fatalities that occurred between 1985 and 1999, 334 (or about 40 percent) occurred in mobile homes. Assume that an average of 6 percent of the U.S. population lived in mobile homes during this period. If all other Americans had died at the same rate as mobile home residents in tornadoes, then the toll for that 15-year period would have been more than 5,500 people. The statistical disparity was even greater in the year 2000, when 29 out of 40 U.S. tornado deaths were linked to mobile homes.

Of course, most people are aware that mobile homes are risky in tornadoes, as evidenced by the pop notion of mobile homes as "tornado magnets." On its Web page, the Manufactured Housing Institute explains the tornado-magnet idea in a puzzling way. The MHI claims that the impression occurs because "manufactured housing is most abundant in rural and suburban areas where meteorological conditions favor the creation of tornadoes."

The MHI adds that "a direct hit from a tornado will bring about severe damage or destruction of any home in its path – site-built or manufactured." Indeed, in an F5 tornado on the Fujita scale (top winds exceeding 260 mph), conventional homes are removed from their foundations. But only about one in a thousand U.S. tornadoes is this strong. About 25 percent are rated F2 or F3 (winds of 113 to 206 mph). Winds at this strength can demolish mobile homes without destroying conventional homes. According to Tom Schmidlin (Kent State University), it appears that even parked autos – which are designed to be aerodynamic and sit closer to the ground – may be safer than mobile homes in tornadoes of this strength. Schmidlin's survey of 180 vehicles struck by tornadoes in 1996 and 1997 found that only 15 percent were tipped over by F3-level wind, and less than half (39%) of the vehicles sustained enough damage to cause serious injury to potential occupants.

Any strategy to reduce the number of fatalities in mobile homes from tornadoes could begin with mobile

home parks (or "manufactured housing communities"). The concentration of many homes in a small area hikes the risk for a major tornado disaster. Slightly less than half of all mobile homes are sited in such parks. Nobody knows how many of the parks have shelters. Minnesota now requires shelters to be built in new mobile home parks, but such requirements are virtually absent in other states. A soon-to-be-published survey by Schmidlin indicates that a high percentage of parks in the Great Plains have shelters of some sort, while most of those in the Deep South don't. Yet a disproportionate number of tornado deaths overall occur in the South, in part because tornadoes there are more likely than in other regions to strike at night.

Other questions abound: Are shelters always accessible by residents, or are they locked at critical times? How many people can comfortably fit in a shelter for an hour or so? How many shelters are recreation centers or other multi-use structures unsuited to stand up to a tornado? And how often do people actually use these shelters? In the catastrophic May 1999 tornado that struck the south Oklahoma City suburbs, my sister-in-law and nephew drove a few blocks to take shelter at his school rather than going to their mobile home park's shelter. The tornado missed their home by three blocks but struck the upper part of the school, leaving them uninjured but rattled.

In March the U.S. House overwhelmingly voted to make mobile home parks eligible for Community Development Block Grants for building tornado shelters. Under current law, site-built homes, schools, and apartment buildings have been eligible for such grants, but not mobile homes (another sign of their residents' political invisibility). The bill has yet to be considered in the Senate. Its passage would be a step in a much-needed direction, although it still falls short of mandating shelters – something that in other contexts might be considered a matter of basic public safety.

This is only part of the equation, though. Millions of mobile homes are sited on private lots, largely in rural areas. Their owners may not have any suitable shelter for miles around. Current safety practices encourage them to take shelter in a ditch. However, as Schmidlin has noted, ditches are not exactly an inviting haven. Floods can rush through, snakes and other animals may pose a threat, and trees and power lines can crash down. If in fact taking shelter in a parked car is the safest nearby option for residents of isolated mobile homes, this message – counterintuitive as it is – could be put to work saving lives.

Aside from the congressional action, there are other encouraging signs. The MHI launched an initiative in 1999 to offer NOAA weather radios at a 50 percent discount to people who live in MHI-affiliated

communities. However, a tornado warning does little good unless people know how best to respond. Information is critical, and the public (including mobile home residents) is often poorly served. For instance, the U.S. Housing and Urban Development department strengthened its standards for mobile home construction in coastal areas following the massive destruction of Hurricane Andrew in 1992. Several news stories since then have inaccurately stated that new mobile homes across Tornado Alley are built to withstand 100-mph winds. In fact, the upgrade to that level was limited to Florida and to a strip just inland of the Gulf and East Coasts. In the Plains and Midwest, the federal standard remains as it has for decades: 60 to 75 mph.

Whether clustered in communities or dispersed in rural America, mobile homes remain out of sight for a large part of the public – and certainly for many policy makers. Time will tell whether we learn to see their weather-vulnerable residents as "the other half" who deserve safe shelter from storms as much as the rest of us.

– Robert Henson
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Correspondence

Dear WeatherZine,

In regard to your editorial "Reflections on Science and Policy" (www.esig.ucar.edu/socasp/zine/28/editorial.html) and the need for scientists to adopt an appropriate role with policy makers, the Intergovernmental Panel on Climate Change (IPCC) Fourteenth Session, Vienna, 1-3 October 1998, has offered the following principle:

"The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. IPCC reports should be neutral with respect to policy, although they may need to deal objectively with scientific, technical and socio-economic factors relevant to the application of particular policies."

Only by protecting our objectivity and policy-neutrality can we hope to be effective. If we can produce and

share valid scenarios, maybe then we won't be so skeptical of those whom we are trying to influence.

– Chris Doyle
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Job Opportunities

Program Specialist II, Job #1260

This is a new full-time, two-year term position with possibility of extension. THIS POSITION IS LOCATED IN WASHINGTON, DC. Initial consideration will be given to applications received prior to August 31, 2001, but applications will be accepted until the position is filled.

Basic job function: This position provides experienced professional level support to the U.S. Climate Variability and Predictability (CLIVAR) office (www.usclivar.org) in support of the U.S. CLIVAR program. This position reports to the Director of the U.S. CLIVAR Office.

Duties include: Coordinates the development, implementation, and promotion of a vigorous U.S. CLIVAR program. Develops outreach and informational articles, web content, and reports describing program activities and highlighting scientific advances. Identifies program opportunities consistent with the U.S. CLIVAR Project Office mission. Interacts with national CLIVAR planning committees and federal funding agencies, as well as other research and operational programs, to assess and improve progress toward U.S. CLIVAR objectives. Plans and develops successful CLIVAR workshops and conferences. Plans and staffs meetings of the various U.S. CLIVAR planning committees and assists the director in all aspects of advancing the U.S. CLIVAR program.

Requirements include:

Education and Experience:

- Bachelors degree in relevant discipline and two years' experience.

Knowledge, Skills and Abilities:

- Knowledge of the theories, principles and concepts in ocean, atmosphere, and/or climate research.
- Interest and experience in science management.

- Skill in synthesizing and summarizing scientific and/or technical information.
- Skill in developing web pages and web content (including graphics).
- Strong skills in oral and written communication, including the ability to give technical presentations.
- Computer proficiency in using word processing, spreadsheet, and database software.
- Ability to communicate and interact with a diverse group of scientists.
- Skill in performing tasks requiring organization and attention to detail.
- Willingness to travel.

Desired (but not required):

- Masters degree and at least one year's experience.

Position Announcement and application procedures:
www.fin.ucar.edu/hr/employment/1260.html

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Selected Web Site Additions

Lightning

Project Safeside - Lightning
www.weather.com/safeside/lightning/

This web site of the Weather Channel and American Red Cross's Project Safeside includes a section about lightning. Topics include are you at risk, what to do if a warning is issued, lightning myths, preparation, and information about what to do after a storm.

Lightning Safety 2001 Homepage
www.vdem.state.va.us/01light/

"Whether you see lightning or hear thunder, you need to seek safe shelter. Thunderstorms, and the lightning they can bring, are not something to take lightly. As we enter the peak season for outdoor activities, it is especially important to learn how to protect yourself and your family." This site from the Virginia Department of Emergency Management (VDEM) includes VDEM resources such as lightning news releases, statistics, sports-related policies and reports, and survivors' stories, as well as links to other Internet sites related to lightning.

Lightning Kills, Play It Safe
205.156.54.206/om/wcm/lightning/

“Summer is the peak season for one of the nation's deadliest weather phenomena – lightning. Safeguarding U.S. residents from dangerous lightning is the goal of NOAA's new public awareness campaign – "Lightning Kills, Play it Safe." The campaign is designed to lower lightning death and injury rates and America's vulnerability to one of nature's deadliest hazards.” The campaign's web site includes lightning facts, survivor stories, photos, and more.

National Weather Service, Melbourne, Florida
Lightning Information Center
www.srh.noaa.gov/mlb/litgcenter/intro.html

“This internet site is intended to serve as a resource of lightning information for east-central Florida. Becoming more educated about lightning, along with some basic safety rules, can help you and your family avoid needless exposure to the dangers of lightning.”

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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Subscription Information

The *WeatherZine* is produced as a Web page, a PDF newsletter, a plain text newsletter, 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 subscribe to the *WeatherZine*, use the on-line form at: www.esig.ucar.edu/socasp/forms/join.html or send email to oxelson@ucar.edu, and include the following information:

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How you heard about the *WeatherZine*

For additional information, please contact the Webmaster at oxelson@ucar.edu