WeatherZine

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In This Issue

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Editorial

Who Lives and Who Dies

"Policy decisions determine who lives and who dies." Policy analysts sometimes use such grave imagery to emphasize that decision makers are faced with choices that actually matter in a profound way in people's lives. In the policy literature you'll see this sort of imagery in discussions of health policy. You probably won't see it in discussions of environmental observational systems for scientific research and operations, but you should.

Observational data is to science what air is to breathing. For example, daily weather forecasts depend critically upon timely and reliable observational data that are assimilated into forecast models. The growing industry of "weather derivatives" is based upon a reliable historical record of observations and continued data collection. For a wide spectrum of research and applications, observational systems collect data about the environment, i.e., atmosphere, oceans, land, sun, ecosystems, social systems, etc. (see, e.g., NASA's Global Change Master Directory). These data are collected from space, the earth's surface, and places in between (e.g., aircraft observations). Because of the important role played by data in the environmental sciences, just about every scientific report you will come across, e.g., from the National Research Council, will include a passionate call for more and better observations.

As a result, a tremendous amount of resources are devoted to collecting observations. A comprehensive accounting of environmental observation programs and their budgets is not readily available. However, we can piece together a ballpark estimate. According to a 1997 estimate by Charles Kennel and colleagues, about $30 billion (not-inflation adjusted) was spent in the 1990s on non-military, space-based observations (Kennel, and Earth Observations From Space). For the plethora of *in situ* observational programs (see, e.g., the comprehensive list at NASA's Global Change Master Directory) it is not unreasonable, and is likely conservative, to suggest a comparable total. Thus, an order of magnitude estimate of annual resources devoted to environmental observations is $10 billion. This neglects the additional resources needed for processing, archiving, and using the data.

Given the significant resources devoted to observations and the constant demands for more resources, a number of questions naturally arise. Is the current mix of observational platforms effective? With respect to what criteria should "effectiveness" be measured? Given the demands of scientists for even more data, what additional resources should be devoted to observations? Should these demands for new information be traded off against present capabilities? What new areas hold the greatest promise for benefits to environmental decision-making? The scientific and policy communities currently have no systematic mechanism to answer such questions, meaning that observations policy is determined on an ad hoc, political basis.

Here is a practical example. The Tropical Rainfall Measurement Mission (TRMM, pronounced "Trim" (see TRMM Web site), is a NASA satellite that, as its name suggests, collects data from space on tropical precipitation. These data have proven useful in improving predictions of rainfall (see NASA News Archive). The TRMM satellite is nearing the end of its orbital life, and NASA must decide how to terminate it (compare January 14, 2000 news item, and June 4, 2000 news item). NASA has two choices. It can let the satellite run out of fuel and reenter the atmosphere in an uncontrolled fashion, or it can maneuver the satellite to a controlled reentry. Because the second scenario involves using TRMM's finite fuel supply to control the reentry, it would mean that the satellite would be collecting data for about three years less than if NASA simply let it run out of gas.

The decision on how best to de-orbit TRMM has some interesting consequences (see United Nations report). On the one hand, if TRMM reenters in an uncontrolled fashion, it could land in a populated area, causing damage (see Lost in Space) or even casualties (see Reentry FAQ). In addition to these risks, NASA would also undoubtedly suffer public criticism and perhaps political ramifications. On the other hand, if TRMM is deorbited in a controlled fashion, three years of data transmission would be lost. If in fact these data are necessary for improved operational forecasts, then forecasts will be degraded as a result of the data's absence. Consequently, there is a risk that degraded forecasts will themselves lead to otherwise preventable damage or casualties. In a very tangible sense, then, the decision about how and when to deorbit TRMM is about who lives and who dies.

NASA has in place means to estimate the risk of casualties of deorbiting satellites (NASA Safety Standard). For TRMM, it was recently estimated that there would be a casualty risk of 1 in 2500 for an uncontrolled reentry. One criterion for allowing TRMM to remain in orbit for three additional years would be whether its absence would create a casualty risk greater than 1 in 2500. However, NASA does not have a means to estimate the risks of *not having* the TRMM data in the forecast process.

The TRMM satellite is one example of a more general problem that plagues the universe of environmental observations: decision makers lack knowledge necessary to prioritize observational programs and plans according to their contributions to science and society. Absent such information, observational decisions are often made on an ad hoc or even political basis. One result is that unhealthy competition for scarce resources develops: scientists compete with other scientists (e.g., weather versus climate), research vies with operations (e.g., NASA versus NOAA), and various platform advocates coalesce into warring "tribes" (e.g., satellite versus *in situ*). Although the connections between observational decision-making and "who lives and who dies" usually seem far removed, the TRMM example indicates that such decisions can have profound implications.

Decision makers would benefit from an ongoing effort devoted to the "technology assessment of observing systems" that would seek to evaluate the broad costs and benefits of alternative observing strategies for both science and society (for examples of such assessments in a wide range of science and technology areas see The OTA Legacy). A framework for such an effort was developed by the US Weather Research Program for weather observations (PDT #7), and easily could be extended to other observational contexts.

Decision makers lack such knowledge in part because Congress terminated its own Office of Technology Assessment in the early 1990s (see Filling the Policy Vacuum Created by OTA's Demise, and The Restless Mummy). This means that it is necessary for the observational community itself to provide decision makers with knowledge of the costs and benefits of alternative observational strategies (compare OTA Publications). The alternative is a continued cacophony of voices pleading for ever more observations, potentially leading decision makers to conclude that the scientific community is but another special interest looking for its piece of the pie (see Six Heretical Notions About Weather Policy). The availability of scientifically rigorous knowledge related to who lives and who dies as a consequence of alternative observational strategies would be one way to get decision makers' attention and to focus science on important matters of societal benefit.

– Roger A. Pielke, Jr.

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Guest Editorial

Why the Weather Research and Private Sector Weather Communities Need to Work Together

All too often over the past few years members of the professional weather community, which includes research, government, and the private sector, have worked at cross-purposes. All have viewed the weather universe to be comprised exclusively of these three parts. Each has viewed the other with suspicion, confident that they could ignore the needs and desires of the other members of the community and focus on their own interests. This is a view of the world as a zero sum contest, where for someone to win (funding, support, business), someone else has to lose.

The reality is that the weather community is a very small player in a very large economy. We in the community recognize the very important role weather plays in many economic and societal decisions, but only a few (albeit a growing number) of people outside of our community do. The weather community needs to focus its efforts on communicating the vital and substantial role weather plays in all sectors of the economy and society. If we are able to increase our community's visibility so that others can discover its importance, then all will benefit.

The Commercial Weather Services Association (CWSA) has come to this conclusion. After years of complaining about, and fighting against encroachment from government and academia, last year the CWSA

Board of Directors took a long hard look at how successful we had been. The conclusion was “not very.” Most of our effort was consumed educating policymakers and others about who we were and how the weather community works, not about our narrower interests.

While there always will be conflicts over roles, CWSA has decided that we need to spend as much effort working with other entities in the community as we do working for our own goals. Furthermore, we recognize that we are dependent on the other parts of the community, and that when they succeed, we benefit as well. Part of our effort has to involve raising the public level of awareness of the capabilities of the weather community.

This recognition that there are broader goals is prevalent in other parts of the community as well. Both government and private sector representatives were invited to a United States Weather Research Program (USWRP) program in December in Palm Springs, CA. The theme that emerged from this conference was that we all need to work together to communicate the capabilities and possibilities that better weather information can provide to the public and the economy as a whole.

There was one eye-opening example of the potential impact on the economy presented at the USWRP meeting. Representatives from several energy trading companies reported that over $3 billion in weather derivatives were traded in 2000. This is an industry that did not exist five years ago. This kind of money will get the attention of policymakers and others in a hurry. But what will they hear? Will they only hear about the shortcomings of one research program versus another, or about the role of the National Weather Service vis-à-vis the private sector, or will they hear about the terrific improvement in short-term forecasting that has taken place in the past decade and be offered that as an example of what could happen?

Each player in the weather community, public or private, academic or operational, needs to recognize that our biggest challenge is not scientific but perceptual. If we as a community can articulate the value weather knowledge and information brings to society, then the stature and visibility (and funding) of the entire weather community will increase substantially. No individual player or element can accomplish this alone. It can only happen if we all work together.

– Jim Block
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Correspondence

Dear WeatherZine,

Regarding your article about prediction and forecast (see February 2001 WeatherZine, Guest Editorial) several authors have dealt with these concepts. For example, the next issue of "La houille blanche" will publish a French version of my last article about these concepts. I will provide the abstract in English.

Title: "About some definitions of risk and its consequences for forecasting, prediction, and prevention". Abstract: "Among numerous definitions of natural risk, this article examines the most widespread. Only three definitions attract attention; the first was provided by Diderot and D'Alembert between 1751 and 1772. Later the jurists described acts of God as unforeseeable and compelling. Nowadays UNESCO defines natural risk as the intersection of natural hazard and vulnerability. Definitions provided by dictionaries or insurance companies are either inadequate or morally unacceptable and should be ignored. These three definitions address foreseeability/forecast, foretelling/prediction, and prevention. In addition, this article points out the role of historical studies in natural hazards and vulnerability."

Notions such as forecast, prediction, and prevention have been tackled by Cinna Lomnitz in “Fundamentals of earthquake predictions" (John Wiley and Sons). To proceed from forecast to prediction several questions have to be asked:

1. What is the waiting period? (When?)
2. What will be the intensity of the hazard? (How?)
3. What area will be devastated? (Where?)

The conditions for achieving a true prediction are rarely met.

– Lucien Coste
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Weather Related News

Announcing the first AAAS Workshop on Science and Technology Policy Careers

An informal gathering for the rising generation of Science and Technology (S&T) policy professionals will be held at the American Association for the Advancement of Science (AAAS) in Washington, DC, on Saturday, May 5, 2001. The program follows the 26th Annual AAAS Colloquium on Science and Technology Policy on May 3-4.

The workshop will provide a forum for the next generation of S&T policy professionals to discuss careers in and the future of S&T policy. Speakers will include both early career professionals and leaders in the field. The intended audience is the rising generation of science policy professionals, especially students and those within five years of their final degree. Goals of the workshop are:

1. To provide a forum for rising professionals in S&T policy to meet and exchange views and information related to science policy careers.
2. To provide rising professionals with an opportunity for networking with other S&T policy professionals.
3. To provide an opportunity to explore future activities.

The event will be free of charge and open to the public, and it will be held 8:30 am - 12:45 pm on Saturday, May 5, 2001, in the AAAS Auditorium, 1200 New York Avenue, NW, Washington, DC (main entrance at the corner of 12th and H Streets, one block north of the Metro Center metro station). The workshop is sponsored by the AAAS Committee on Science, Engineering and Public Policy. Please RSVP at the workshop's Web site so that we can gauge attendance. Questions may be directed to ssingh@aaas.org.

The workshop is scheduled so that participants can also attend the 26th Annual AAAS Colloquium on Science and Technology Policy, which will be held on May 3-4, 2001, at the Omni Shoreham Hotel in Washington, DC.

Preliminary Agenda

(More program details will posted on the workshop's Web site as they become available.)

8:30 am	Sign-in and coffee
9:00-9:05	Welcome
9:05-9:45	Keynote Address (Speaker TBA)
9:45-10:45	The Yellow Brick Roadmap: S&T Policy Career Paths Panelists will share their experiences in the S&T policy arena – where they are, how they got there, and where they are going. o *Moderator:* Julie E. Fischer, Senate Committee on Veterans' Affairs, Democratic Staff Speakers TBA
10:45-11:00	Break
11:00-12:00	The Future of the S&T Policy Profession Specific topics covered will include gender issues, the role of S&T policy in society, and what federal agencies will expect from S&T policy professionals. o *Moderator:* Jacque-Lynne Schulman, National Institutes of Health o *Speakers:* Jim Dietz, National Science Foundation, Victoria Friedensen, National Academy of Engineering, Richard H. Smith, II, Coates & Jarratt, Inc.
12:00-12:40	Where do we go from here? A discussion about the next steps and an agenda for future conferences. Is there a need to establish a society for S&T policy professionals? o *Discussion Leader:* Elmer Yglesias, Georgia Institute of Technology
12:40-12:45	Concluding Remarks o Willie Pearson, Jr., Chair, AAAS Committee on Science, Engineering and Public Policy
12:45	Professional Networking Lunch Ad hoc groups will form to continue the day's discussions over lunch in nearby restaurants – a list of venues will be provided.

AMS–UCAR Summer Policy Colloquium Program Taking Shape; Applications Still Being Accepted

The AMS and the University Corporation for Atmospheric Research (UCAR) are putting the finishing touches on the Summer Policy Colloquium, to be held in Washington, D.C., 3–12 June. The colloquium will bring together a select group of scientists, federal managers, private-sector executives, students, and faculty in Washington, D.C., for an intense immersion in atmospheric public policy.

The Colloquium will bring together future leaders in the field of atmospheric sciences. Participants will be drawn from midlevel to senior managers from government and the private sector, as well as university faculty. Graduate students, selected competitively, along with a few top undergraduate students, will also prominently participate.

Participants will visit Capitol Hill and the White House to learn and to engage staff in dialogue. Through case studies on the creation of the U.S. Global Change Research Program (USGCRP) and how the World Meteorological Organization is working with the question of free and open data exchange, through role-playing exercises, as well as through other interactive instruments, participants will develop an understanding of the policy process, and at the same time contribute to building the public policy capabilities of the weather and climate community, broadly defined.

Also included in this period is a one-day meeting of corporate members with policy-level agency officials of the Bush administration, scheduled for 11 June. The final day of the colloquium, 12 June, will be devoted to presentations and dialog on the role of policy, weather and climate events, and entrepreneurial vision in fostering the development of the private sector.

Applications are still being accepted – register as soon as possible to facilitate pre-colloquium planning and communications with participants. Complete details on the colloquium and the application process are available on the AMS Web site (under the Atmospheric Policy Program link) or contact Dr. William Hooke at (202) 682-9006, email: hooke@dc.ametsoc.org.

Selected Web Site Additions

Floods

Evaluation of CRS Credited Activities During Hurricane Floyd

Following Hurricane Floyd, FEMA funded a study to evaluate the effectiveness of a variety of flood mitigation activities that had been implemented in North Carolina. The results of that study are now available in the report, "Evaluation of CRS Credited Activities During Hurricane Floyd."

National Hydrological Assessment Flood Threat Map

This map is intended to depict locations where hydrometeorological conditions either enhance the potential for flooding or make it less likely. It is possible that local conditions could vary from those shown on the map. National Weather Service offices in the area of interest should be consulted for more detailed or specific information on local conditions.

Are Flood Warnings Futile?

Flood warnings often don't work well and too frequently fail completely - and this despite great effort by the responsible authorities. This paper examines flood warnings and offers several policy, practice, and research suggestions.

Map Service Center's Online Access to National Flood Insurance Program Products

This site is just one of a suite of online services planned to expedite the dissemination of FEMA's flood map and insurance products that support FEMA, its customers, and the user community. MSC products include: Digital Flood Insurance Rate Maps (DFIRM), Flood Insurance Rate Maps (FIRMs), Flood Insurance Study reports (FIS reports), Digital Q3 flood data, Community Status Book, Flood Map Status Information Service (FMSIS), Letters of Map Change (LOMCs), and NFIP Insurance.

Technical Mapping Advisory Council Final Report

This is the final report of FEMA's Technical Mapping Advisory Council, encapsulating 5 years of work by a council created by Congress through the 1994 National Flood Insurance Reform Act. The following recommendations are deemed by Council consensus as the most important:

- Acquiring additional financial and technical resources for map programs;
- Building constituent interest and public support for modernizing the mapping program using a process that includes public education and public outreach;
- Building partnerships among various Federal, State, and local governments, universities, and the private sector to accomplish NFIP objectives; and
- Creating a fully digital environment for floodplain mapping and all related information.

Emergency Management

Hazard Mitigation Planning

FEMA established this unit in 1998 to provide guidance and resources to States and local communities to promote and support the hazard mitigation planning process.

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.

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About Us

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