



In This Issue

Editorial

A Transition Document for President Bush

1

Guest Editorial

Prediction versus Projection – Forecast versus Possibility

3

Correspondence

4

Weather Related News

5

Web Site Additions

6

Subscription Information

6

Comments? Send us email at thunder@ucar.edu

Editorial

A Transition Document for President Bush

Not wanting to appear out of step with the times, we here at the WeatherZine have decided to submit this "transition document" to President Bush. Our transition document is prepared in the tradition of neither "compassionate conservatism" (www.salon.com/politics/feature/2000/08/03/goldsmith/) nor "pragmatic idealism" (washingtonpost.com/wp-srv/politics/campaigns/wh2000/stories/dlc120398.htm). Nor does it contain advocacy for this or that program, justified by eye-catching (but sketchy) benefit-cost ratios.

Instead, we offer what Thomas Paine (www.bartleby.com/133/) described as "simple facts, plain arguments, and common sense; and have no other preliminaries to settle with the reader, than that [you] will divest [your]self of prejudice and prepossession." Okay, if that sounds a bit highfalutin, we are sure that the three suggestions that follow are larrupin' (www.texasmonthly.com/ranch/sayings/) good ideas for how you, Mr. President, might dramatically improve the contribution of the atmospheric and related sciences to the needs of society in the 21st century.

- Settle once and for all the debate over the respective roles of the public and private sectors in

the provision of weather services. This debate has been ongoing for decades and one reason for its lack of resolution is that participants from various perspectives have well-considered positions on which reasonable people can disagree. (A Text Box [see [Public-Private Weather Debate](#) text box on page 2] provides some links to sites with information about this debate.) Of course, like many seemingly deadlocked policy debates, this one has its share of irrationality, historical momentum, and fratricidal behavior. When most of science and technology was engaged in important, bipartisan debates about technology policy in the 1980s and 1990s, the atmospheric sciences apparently were playing hooky. The community has demonstrated that it is not prepared to resolve this issue by itself. So our suggestion is that you empower a Cabinet-level commission, perhaps led by the Secretary of Commerce and comprised of representatives of business, government, and academia from inside and outside the weather community, to study the issue and provide some recommendations. We are not suggesting what those recommendations should be, but it is clear that the middle ground is a much wider space than the debate's adherents have come to believe. The importance of weather information to the nation's economic vitality and competitiveness is too important to let this issue fester any longer.

- Decouple global climate policy from energy policy. Global climate policy, more popularly and incorrectly known as "global warming," has over time become defined as energy policy focused narrowly on international negotiations about implementation of the Kyoto Protocol to limit greenhouse gas emissions. This is unfortunate. As Frank Laird writes in the current *Issues in Science and Technology*, "Spending time fighting over the Protocol emissions targets will just delay getting to the important tasks of making desperately needed improvements in the environmental and social conditions of the world's people." It would be very easy to embrace the highly partisan status quo by pointing to scientific uncertainties and economic realities as reasons for inaction. But a better course would be to recognize that, independent of the Kyoto Protocol; there are good reasons to improve national energy policy (look no further than recent events in California). And many of these improvements would actually contribute to and coexist well with aspects of the Protocol. At the same time, the

United States and countries around the world have become in many ways increasingly vulnerable to weather and climate. Many of the actions needed to address these vulnerabilities make sense no matter what the future climate. As we have argued elsewhere, “environmental prospects for the coming century depend far less on our strategies for reducing carbon-dioxide emissions than on our determination and ability to reduce human vulnerability to weather and climate” (www.theatlantic.com/cgi-bin/o/issues/2000/07/sarewitz.htm).

There is a window of opportunity for the Bush Administration fundamentally to recast the environmental debate in this country in a way that moves beyond the “anti” or “pro” environment litmus test that “global warming” has become. Decoupling energy and climate policies is a necessary first step.

- Streamline the provision of “climate services” to the nation. After the public has spent tens of billions of dollars on climate research over more than three decades, these investments are bearing sufficient fruit to create a demand for operational “climate services,” which refers to information (sometimes, but not always, forecasts) about climate (and inter-related earth system information) that is useful to decision makers in areas ranging from insurance and agriculture to weather derivatives and catastrophe bonds. Because of the perceived usefulness of climate information, “climate services” are multiplying like rabbits across government, academia, and the private sector. While recognizing that the difference between diversity of effort/healthy competition and duplication of effort/redundancy can sometimes be hard to see, it seems obvious that the development of climate services would best be approached systematically, rather than in an ad hoc fashion. Systematic consideration of “climate services” must recognize ongoing activities (like those listed in the second Text Box [see [Climate Services](#) text box]). Other important considerations are the appropriate balance of public and private sector roles (as discussed in detail above), the proper mix of regional and federal efforts, the use and value of particular products and services, and the various mechanisms for the transfer of research results into practical products and services to end users. Reconciling these various considerations could be accomplished through the leadership of your Office of Science and Technology Policy (www.ostp.gov) and/or the President’s Committee of Advisors on Science and Technology (www.ostp.gov/PCAST/pcast.html).

Addressing the issue of climate services would help the scientific community better focus and

prioritize its limited resources, enhance the transfer of research results into useful products and services, and ultimately contribute more effectively to national needs.

By addressing these three topics you will fundamentally reshape the atmospheric sciences and their contributions to society. But if taking on these challenges isn’t appealing at the moment, let us tell you about the importance of funding the WeatherZine community; we can show an impressive benefit-cost ratio ...

Public-Private Weather Debate

www.nwseo.org/hr1553.html
www.nwseo.org/mccain.html
www.nwseo.org/lobby1.html
www.esig.ucar.edu/socasp/zine/19/guest.html
www.house.gov/science/myers_03-25.htm
www.nwseo.org/amspol.html

Climate Services

Regional Climate Centers

- www.ncdc.noaa.gov/regionalclimatecenters.html

Climate Prediction Center

- www.cpc.ncep.noaa.gov/

National Drought Mitigation Center

- enso.unl.edu/ndmc/

National Climatic Data Center

- www.ncdc.noaa.gov

State Climatologists

- www.ncdc.noaa.gov/stateclimatologists.html
- www.ncdc.noaa.gov/aasc.html

Regional Assessments

- cires.colorado.edu/wwa/
- www.ispe.arizona.edu/swclimate/

International Research Centers

- iri.ldeo.columbia.edu
- www.iges.org

Other University Centers

- ecpc.ucsd.edu
- www.coaps.fsu.edu

Other Government Efforts

- www.earth.nasa.gov/apps/
- www.ogp.noaa.gov/mpe/cdep/arcs.htm
- www.wcc.nrcs.usda.gov
- www.fema.gov/nfip/
- www.fema.gov/hazus/

Private Sector Examples

- www.air-boston.com
- www.riskinc.com
- www.i-wex.com

– Roger A. Pielke, Jr.

Comments? thunder@ucar.edu

Guest Editorial

Prediction versus Projection – Forecast versus Possibility

In public discussion about weather and climate, the words *scenarios*, *projections*, *predictions*, and *forecasts* are often used interchangeably, as if they are completely synonymous. I believe that important distinctions must be recognized if scientists are to talk clearly among themselves and communicate effectively with the media and, through them, the public. The Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Assessment have tried to recognize the distinctions, in keeping with distinctions that much of society accepts in other areas of planning for the future. However, much confusion is being created by some in our field who are not always as precise as they should be in using these terms.

Here are my views of how we should be using the various terms:

- A *prediction* is a probabilistic statement that something will happen in the future based on what is known today. A prediction generally assumes that future changes in related conditions will not have a significant influence. In this sense, a prediction is most influenced by the “initial conditions” – the current situation from which we predict a change. For example, a weather prediction indicating whether tomorrow will be clear or stormy is based on the state of the atmosphere today (and in the recent past) and not on unpredictable changes in “boundary conditions” such as how ocean temperatures or even society may change between today and tomorrow. For decision makers, a prediction is a statement about an event that is likely to occur no matter what they do.
- Related to a prediction is a *forecast*, which I would suggest is a “best” prediction made by a particular person or with a particular technique or representation of current conditions. An example of a forecast is a statement by a weather forecaster that it will rain at 3:30 PM tomorrow – that is that individual’s best judgment, perhaps drawn from a prediction that there is a 70% chance of rain tomorrow afternoon. For a decision maker, the credibility of the forecast depends critically on the credibility of the forecaster (or forecasting technique) as well as on the inevitability of the event. The recent development of “ensemble forecasts” (i.e., assembly of a set of forecasts that are each based on a separate technique or set of

initial conditions) can be considered a step toward transforming forecasts into predictions.

- In contrast to a prediction, a *projection* specifically allows for significant changes in the set of “boundary conditions” that might influence the prediction, creating “if this, then that” types of statements. Thus, a *projection* is a *probabilistic statement that it is possible that something will happen in the future if certain conditions develop*. The set of boundary conditions that is used in conjunction with making a projection is often called a *scenario*, and each scenario is based on assumptions about how the future will develop. For example, the IPCC recently *projected* a range of possible temperature changes that would likely occur for a range of plausible emissions scenarios and a range of model-derived estimates of climate sensitivity (the temperature change that would result from a CO₂ doubling). This is clearly a projection of what *could* happen *if* certain assumed conditions prevailed in the future – it is neither a prediction nor a forecast of what will happen independent of future conditions. For a decision maker, a projection is an indication of a possibility, and normally of one that could be influenced by the actions of the decision maker.
- The National Assessment was even more cautious in its statements, very carefully labeling the climate results that it used to investigate potential vulnerability as *climate scenarios from the Canadian and Hadley models*. This was done because the climate results were drawn from only two climate models (so did not represent the full possible range of climate sensitivities) and each model had treated only one particular emissions scenario. Scenarios are best thought of as “plausible alternative futures – each an example of what might happen under particular assumptions” [as explained in the National Assessment report]; scenarios are not predictions or forecasts because they depend on assumed changes in key boundary conditions (like emissions) and scenarios are not fully projections of what is likely to happen because they have considered only a limited set of possible future boundary conditions (e.g., emissions scenarios). For the decision maker, scenarios provide an indication of possibilities, but not definitive probabilities.

I believe that much of the confusion and debate about global warming is arising because not enough care is being taken in understanding these distinctions. For example, a Gallup survey of scientists about a decade ago is still cited as indicating that many scientists have low confidence in *predictions* for the 21st century. Such a result is not at all surprising given how scientists define and understand predictions. Of course, we

cannot offer a confident prediction for the 21st century because it depends on energy technologies and political decisions as well as how the climate will respond. However, without contradicting the survey results, the IPCC can report international consensus on its *projections* of a temperature rise during the 21st century if emissions follow the reported emissions scenarios. Similarly, the National Assessment is not making forecasts or predictions of what will happen during the 21st century (either nationally or regionally), but is using model results to explore the possibilities and implications of what types of consequences could occur (and it develops a lexicon of relative likelihood for these outcomes).

While these nuances easily can get lost in public discussion, I think that it is nonetheless incumbent on all of us to make sure we use the terms precisely, carefully explaining (and re-explaining) what is being done, and the limits of what conclusions can and cannot be drawn. Elsewhere in society – for example, in military and financial planning – scenario-based projections are widely used and it is understood (except perhaps by naïve investors) that these are projections of what *could* happen and not predictions of what *will* happen. Although we might all wish we could provide reliable (and verified) predictions, the complexities of society and the climate are such that we are forced to rely on projections if we want to use our understanding to look forward into the future; otherwise we are limited to advancing blindly because we can rely only on mindless extrapolations of changes that have been observed in the past.

– Mike MacCracken
U.S. Global Change Research Program
mmaccrac@usgcrp.gov

Comments? thunder@ucar.edu

Correspondence

Dear WeatherZine

I cannot resist the temptation to comment on WeatherZine # 25 (www.esig.ucar.edu/socasp/zine/25/editorial.html), which ventures into dangerously troubled waters.

First, the basic problem with U.S. politics is that there is no such thing as independent oversight of the election process at any level. It has been a highly politicized process in the past ("smoke-filled rooms" is a better guide to the process than "Dewey defeats Truman") and there is not the slightest evidence this is going to change. Jimmy Carter noted recently that the Carter Center would not have been able to certify the U.S. elections, and the recent hearings on protests of

the Florida procedures were characterized by mea non-culpas. Only if an aggrieved party has enough influence to make uniform voting and campaign procedures a priority for Congress will improvements occur.

From where is that influence to come? The black community was the most upset by the Floridian procedures but, nationally, it voted 9 to 1 in favor of Gore. Bush "won" without them, why should he offer more than gestures in the future? Likewise, the Democrats may - but probably will not - really press for reform when they may be the beneficiaries next time.

Europe, and particularly, Britain, France and the Scandinavian countries, have election processes which are, and are perceived to be, fair and independent. Why is a country that is continually preaching to the rest of the world unable to do something about its own deficiencies?

Secondly, we are constantly told that this is the greatest democracy, yet the proportion of eligible voters that actually vote is the lowest in developed countries. The obsession with long drawn-out campaigns and constant forecasts, however accurate, does not address the real issues. Another example of obsession with style over substance is the strong tendency for more prominence to be given to forecasts of economic data than to the actual data. One sometimes gets the impression that, in economics as well as in politics, one has what the famous economist once referred to as "A towering structure, based on very shaky foundations!" It's not more sophisticated media forecasting that is needed; it's more intellectual and political rigor and independence.

Finally, on the contribution of the meteorological community. At the short end – 5-day forecasts – it is clear accuracy and applicability have improved tremendously over the last two decades. This is much less clear in climate analysis. I'm not suggesting that El Nino forecasting has not improved. What I do think is that the translation of climatic information and the process of obtaining feedback from consumers and integrating that into an iterative analysis is more advanced in some developing countries (e.g., India, Argentina) than here. It seems to me that there is a strong emphasis on a prescriptive approach in the U.S. and it may be that the body of knowledge of how the agricultural (or other) communities react is good enough for that to be the correct approach, but it would be instructive to have some debate on the merits of a prescriptive versus an iterative approach, and assessment of compatibility or otherwise.

– Malise Dick
ekalnay@erols.com

Comments? thunder@ucar.edu

Weather Related News

Extreme Weather Sourcebook 2001 ***www.esig.ucar.edu/sourcebook/***

ESIG recently updated its popular Extreme Weather Sourcebook web site. The updated site provides quick access to data on economic damage from hurricanes, floods, tornadoes, lightning, and other weather phenomena in the United States and its territories. Visitors to the Extreme Weather Sourcebook will find the states and U.S. territories ranked in order of economic losses from hurricanes, floods, tornadoes, and all three events combined. A dollar figure for average annual losses in each state is also provided. Links take the reader to graphs with more detailed information on cost per year for each state and each hazard.

The following two opportunities are jointly sponsored by the American Meteorological Society (AMS) and the University Corporation for Atmospheric Research (UCAR):

AMS/UCAR ***2001 Summer Policy Colloquium*** ***June 3 through 12, 2001***

Do you find Washington policy-making fascinating?
Would you like to understand how the process works?
Do you think you might be interested in an atmospheric science policy career?

The AMS/UCAR Summer Policy Colloquium will bring a select group of meteorologists to Washington, D.C., for an intense, ten-day immersion in how atmospheric policy is made. This is an opportunity to learn the policy process, meet and network with policy makers from the executive and legislative branches, and determine whether a career in the field would be of interest.

WHEN: From June 3 – 12, 2001, the AMS Atmospheric Policy Program and the University Consortium for Atmospheric Research (UCAR) will conduct a public policy Colloquium in Washington for students and mid-career meteorologists in the public and private sectors on how decisions are made affecting the atmospheric and other sciences, and survey current atmospheric policy issues.

Much of the Colloquium will use the case study method of learning and dialogue. Case studies will primarily involve issues in atmospheric and related sciences and

services. Case studies will consist of an overview and initial discussion, brief personal perspectives from a panel of players in the case in question, and a dialogue among the panelists and the Colloquium participants.

Participants will include graduate students (and a few truly exceptional upper level undergraduates), as well as university faculty, midlevel managers, scientists, and working meteorologists. It is expected that most paying participants will be working in meteorology or related sciences. However, those in public policy interested in atmospheric issues are also welcome to apply.

Fees, which include all course materials, a daily continental breakfast and lunch, and one banquet, are \$4,000 for federal and private sector employees, as well as university faculty. Student participants will be selected competitively and will have all fees waived and travel and subsistence expenses paid by the Colloquium sponsors.

HOW TO APPLY: All student applications are due by March 10, 2001. Paying participants will be admitted on a first-come, first-served basis (so space may fill early) but in any case must have applications in no later than the same date. Applicants will be notified of their acceptance no later than April 1, 2001. For more information on the Colloquium, visit the AMS web site at www.ametsoc.org/AMS/atmospolicy/colloquiumsummer2001.html.

2001-2002 American Meteorological Society ***Congressional Science Fellowship***

For those scientists who would like to make a contribution to public policy by working on Capitol Hill, the AMS Congressional Science Fellowship allows you to spend a year working as a legislative assistant to contribute your scientific expertise to a member of Congress or a congressional committee. Each fellow is free to choose where he or she will work within the Congress and will spend the year with over 30 fellows from other professional societies. A stipend of \$47,000 is provided and up to \$10,000 for moving, travel, and other expenses.

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, 2001. Visit the AMS web site to see application details or call Doug Stone at the AMS (202)

682-9006 or e-mail stone@dc.ametsoc.org for an application. For more information on the fellowship, visit the AMS web site at www.ametsoc.org/AMS/atmospolicy/2001congressional/fellow.html.

Selected Web Site Additions

Floods

Living with the Red

(www.ijc.org/boards/rrb/frpt0012/living.html)

Although the 1997 Red River flood was a rare event, floods of the same magnitude, or even greater, can be expected to occur in the Red River basin in the future. The people and property will remain at undue risk until comprehensive, integrated, binational solutions are developed and implemented. This is a report of the International Joint Commission to the governments of the U.S. and Canada on reducing flood impacts in the Red River basin.

Insurance

Insurance Services Office, Inc.

(www.iso.com)

The web site of "the property/casualty insurance industry's leading supplier of statistical, actuarial, underwriting, and claims information" provides information such as estimates of anticipated national insured catastrophe losses for the entire insurance industry at its news page (www.iso.com/docs/news.htm), as well as timely studies on important issues facing the insurance industry and society as a whole at its studies and analyses page (www.iso.com/docs/studies.htm).

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.

Primary support for the *WeatherZine* comes from the U.S. Weather Research Program. NCAR is supported by the National Science Foundation.

On-Line version available at:

www.esig.ucar.edu/socasp/zine/

Email: thunder@ucar.edu

Editor: Roger A. Pielke, Jr. (rogerp@ucar.edu)

Managing Editor: Bobbie Klein (bklein@ucar.edu)

Webmaster: Jennifer Oxelson (oxelson@ucar.edu)

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.esig.ucar.edu/socasp/forms/join.html or send email to thunder@ucar.edu, and include the following information:

Name
Organization
Email Address
Interests & Needs

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