WeatherZine

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Environmental and Societal Impacts Group

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In This Issue

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Editorial

The Florida Flip-Flop and Weather Forecasts

As the spectacle of naming the nation's 43rd president comes to its conclusion, it is time to consider some of the less-discussed lessons of the election. Specifically, the broadcast media's action on election night in first calling Florida for Gore, then for Bush, then for neither – the Florida Flip-Flop – provides two important lessons about election-outcome forecasts and our nation's democratic process. It also provides an opportunity for the weather community to share with those in the media responsible for covering politics some of the lessons that it has learned.

First, the media need to more be more rigorous in their use of election-outcome forecasts.

The Florida Flip-Flop is the media's most embarrassing moment in U.S. presidential election history since "Dewey defeats Truman," immortalized as a headline in the November 2, 1948, photograph of jubilant president-elect Harry S. Truman holding a copy of the *Chicago Daily Tribune*.

But good came from the "Dewey defeats Truman" incident as it stimulated needed advances in polling and election-outcome forecasts. Indeed, academic political science developed a sub-field of polling and predicting elections using rigorous statistical methods. Based on this work, extrapolations from systematic surveys to election outcomes underlie the broadcast media's calls of state presidential election winners. Historically, such election-outcome forecasts are very accurate. While some might say that this track record is pretty good, this year's election clearly shows that it is not good enough.

To ensure that these errors don't happen in the future, the media should use the tools at their disposal more appropriately – by subsuming the competitive incentives to be first in calling state election outcomes to a shared agreement on when such calls should be made. To get some help in establishing thresholds and implementing methods for assessing when those thresholds have been exceeded, the media should look to the experiences of the weather forecasting community.

Weather forecasters have an impressive track record of assessing the skill of forecasts and working with the media to establish thresholds for action. The broadcast media would do well to apply these same methods and procedures to the forecasts they use on election night. Specifically, the tools of forecast verification developed by Allan Murphy and others provide a powerful set of tools for evaluating forecast "goodness." In an election context, the costs of a forecast "bust" are very high. Care should be taken such that the odds of a forecast error are miniscule. The weather community has tools that can help.

Second, because election-outcome forecasts can affect politics, the media and/or politics must change.

Unlike forecasts of tomorrow's weather, election-outcome forecasts can directly affect the processes being predicted. The major media wait – or are supposed to wait – until polls close in each state before calling the outcome, because if people knew who is likely to win in their state, they may be less likely to vote. In some circumstances this conceivably could change the election outcome.

Imagine a nightmare not too different from this year's reality: What if the networks had waited several hours to reverse their call that Florida had gone to Gore and, as a consequence, voters in closely fought western states changed their behavior? This scenario could have led to a Gore victory, independent of the outcome in Florida, if a greater number of Bush voters – disillusioned by the apparent inevitability of a Gore presidency – chose not to vote, shifting several states to Gore that should have gone to Bush. Even though

this did not occur, the current electoral mess was arguably exacerbated by the media's actions.

There are two ways to deal with this situation.

First option: change the media. If the media can agree on guidelines for issuing and conveying severe weather warnings in a manner that enhances rather than endangers public safety, surely they can also agree on ways to issue election-outcome forecasts that enhance rather than endanger democracy. In the case of weather forecasts, self-regulation is enhanced by the specter of potential legal liability for erroneous forecasts and also more-or-less generally accepted government policy for the provision of weather warnings. It is not obvious what specific rules make sense for media coverage of elections, particularly given the growth of the Internet, but collective attention to the process of election-outcome forecasts is now clearly needed. Again, the weather community's experiences, particularly in issuing hurricane and tornado warnings, can provide guidance.

Second option: change politics. For example, states could agree to coordinate the electoral process by establishing a national 24-hour period to vote that would begin and end at the exact same time for each state. This might change the incentives for the media to call individual states as polls close one after another.

There will be no shortage of proposals for election reform in the aftermath of this election as governments and academics will focus considerable attention on the Electoral College, voting mechanisms and procedures. In such retrospectives it will be important to ensure that election-outcome forecasts are in concert with the political process.

Like a hurricane that approaches the coast, revealing massive snafus in evacuation procedures, the 2000 election is a warning that our democracy does not benefit automatically by advances in political science and related technologies; it also depends on how we use the resulting knowledge and tools. Just as "Dewey defeats Truman" stimulated great improvements in the quality of political predictions, the Florida Flip-Flop should motivate improved use of election-outcome forecasts in our democratic process. Fortunately, there is a valuable body of expertise in the use (and misuse) of forecasts right here in the weather community.

– Roger A. Pielke, Jr.

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Guest Editorial

The PACJET Program and End Users

The Pacific Land-falling Jets Experiment (PACJET) addresses short-term winter weather prediction along the U.S. West Coast, emphasizing precipitation forecasting. It builds on the California Land-falling Jets Experiment (CALJET), performed during the strong El Niño of 1997/98, an earlier West Coast experiment designed to bring researchers and forecasters together to test how new data could help better predict flood-producing storms. PACJET's first field phase will be conducted in January-February 2001. Both CALJET and PACJET examine the difficult process of weather forecasting on the West Coast, including: a) the relationship between El Niño and coastal storms, b) the value of new observations to the forecast process, c) how weather forecasts affect key sectors of California's economy, and d) how affected groups interpret and use weather information.

The CALJET experiment provided forecasters with data to increase forecast lead times during a very rainy season. For example, on February 3, 1998, meteorologists at the National Weather Service's Monterey Forecast Office issued a flash flood warning for the Pescadero Creek region on the California coast six hours in advance of the actual event. Data provided by scientists flying CALJET aircraft missions hundreds of miles off the coast made it possible to issue this forecast with much greater lead time than the National Weather Service's 2005 goal of 60 minutes.

Extra time in response to a flood emergency can be significant. For example, in the case of reservoirs, decisions by managers are critically dependent on the quality and lead time of precipitation forecasts. With several hours lead-time on both the beginning and end of heavy precipitation, it is possible to make adjustments to reservoir levels that carefully avert flooding and/or dam failure. Further, these adjustments can be made *without* compromising previous decisions regarding water supply, a particularly scarce resource in the west.

Because of the value of additional lead-time, the California Department of Water Resources, the Governor's Office of Emergency Services (OES) and the San Mateo County Sheriff's Division of Emergency Response all used information from the CALJET field experiment during 1998. The intense media response to the El Niño event, in addition to the improved forecasts, led the State of California OES to request a four-week extension of CALJET. This favorable response from the state and local emergency and water management communities was a catalyst in

planning for a strong user component in PACJET. Extensive outreach and briefing activities have been conducted in response to CALJET and in planning for PACJET, with the goal of linking research to operational forecasting needs and forecast users.

To prepare for PACJET, the U.S. Army Corps of Engineers, the California Governor's Office of Emergency Services Coastal Region, San Mateo County, the California Nevada River Forecast Center, the Navy, the Pacific Coast Federation of Fisherman's Associations, National Weather Service forecasters, and private meteorological services provided input on the development of potential forecast products. In addition, two workshops focusing on all aspects of the weather research-to-operations process were held. One product for end users that emerged from the September 1999 workshop is a schematic designed to give users accurate descriptions of critical characteristics of storms offshore, outside the range of coastal observing systems, and often with their full characteristics not observed by satellite. The importance of particular storm characteristics for forecasters and forecast users helped PACJET scientists select which information should be included in the schematic. Of particular significance are the characteristics of the low-level jet. From these discussions, PACJET scientists also learned of the importance of the melting level, which is the altitude above which precipitation is in the form of snow. The melting level is important because of its impact on transportation and determining what fraction of mountainous watersheds would accumulate snow rather than produce runoff. Because no normal data sources offshore can observe the melting level, it is a key variable that PACJET seeks to measure.

Other storm characteristics that were incorporated as part of the schematic include the width and intensity of rainbands, the speed at which storms approach the coast, ocean wave conditions and other information. Hourly updates during aircraft missions could be posted on a website for easy access. The schematic is not meant to take the place of regular forecasts, watches, or warnings issued by the National Weather Service, but rather provides additional information about the characteristics of a particular frontal system that may impact the West Coast.

In addition to the workshops, PACJET planning included a series of meetings with user groups to 1) reach more groups that would benefit from PACJET data and information, 2) tap into the needs of individual groups and encourage more dialogue on how those needs might be met through PACJET, and 3) develop better methods for transferring weather information to users. Here are examples of positive outcomes from these meetings:

- Several meetings held with emergency managers in both California and Washington introduced the program to a wider audience of potential users and identified geographical regions that could benefit from the experiment. Consequently, the program is poised for a dramatic increase in the number of counties utilizing PACJET weather products.

- Based on a PACJET briefing at the Army Corps of Engineers District offices in San Francisco, it was recommended that a PACJET working group of individuals and agencies who manage federal and state reservoirs should be formed in the near future. Better quantitative precipitation and melting level forecasts would impact decisions these managers must make regarding adjustment to reservoirs.

- Based on an initial request for more information after a CALJET briefing at the California Weather Symposium in 1999, a broadcast meteorologist from Sacramento now participates in planning sessions for PACJET. As a result, her station is planning to beta-test a new format for wind profiler data, including monitoring of the melting level for transportation applications.

Outreach efforts have been built into CALJET and PACJET from their inception. They address a key challenge in meteorological research: exploring the relevancy of promising new research to the real world that decision-makers operate within. Most important, however, is the emphasis on creating a continuous feedback loop whereby new ideas from research can be combined with the real-world needs of forecasters and forecast users to help identify new directions for both research and applications.

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Correspondence

Dear WeatherZine,

I have been a fan of the WeatherZine, but I have to admit the last one (WeatherZine#24, www.esig.ucar.edu/socasp/zine/24/editorial.html) left me cold. After I read your report on stakeholders, I

couldn't figure out the point, so I read it again, and still couldn't. I hope you try to restate it in terms more obvious to the academic community.

To the extent I did understand it, I was disappointed to see no hint of support for basic research; that is, studies for which the application is not at all obvious. While that too must be held accountable, the approach to that accountability has to be across the whole scientific community or, in our case, across all physical sciences.

Of course even the definition of basic or fundamental science is somewhat nebulous, and the usual justification is based on a few specific successful examples, without consideration of how much support has been wasted. Admittedly it may not matter too much, since the present and future contributors to fundamental science tend to be self-selected and not too sensitive to financial incentives. I am not too concerned about the perceived tendency for smart students to go into business, law, or economics rather than science. The real nerds, including weather junkies, will mostly still be there, provided they are given above-starvation incentives.

– Doug Lilly
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Another view:

Dear WeatherZine,

I thought you were right on target with your editorial (WeatherZine#24, www.esig.ucar.edu/socasp/zine/24/editorial.html) in WeatherZine.

– Elliot Abrams
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Weather Related News

How Well did the 2000 Hurricane Season Forecasters Do? (Pretty good! Check out these links)

- William M. Gray, Christopher W. Landsea, Paul W. Mielke, Jr., Kenneth J. Berry, and Eric Blake [with advice and assistance from Todd Kimberlain and William Thorson], typhoon.atmos.colostate.edu/forecasts/2000/nov2000/index.html

- NOAA, www.noaanews.noaa.gov/stories/s534.htm

How is the 2001 Hurricane Season Shaping Up?

William Gray and his associates at Colorado State University are calling for a season slightly below the long-term average. For 2001, they forecast nine named storms, five hurricanes and two major (Saffir-Simpson category 3-4-5) hurricanes. This compares with a 1950-90 average of 9.3 named storms, 5.8 hurricanes and 2.2 major hurricanes a year, which is only half the average seasonal activity of the last three years.

Gray, a professor of atmospheric science at Colorado State, warned that while the 2001 season seems likely to be milder than five of the past six years, it should still exceed storm activity in the surprisingly quiet period of 1970-94, when population and property grew at a rapid pace along the southeast U.S. coast and the Florida Peninsula. "We're not as confident about this forecast as we were about last year's, but we anticipate a weak to moderate El Niño event beginning next summer, and that and several other indicators should produce a significant reduction in next year's Atlantic Basin (North Atlantic, Caribbean Sea and Gulf of Mexico) storms," Gray said. Gray and his colleagues believe that an El Niño, a body of relatively warm, equatorial water in the eastern Pacific, is due in 2001. A characteristic of El Niño is westerly winds in the upper troposphere that act to shear the tops off potential forming Atlantic easterly (barometric) waves, preventing them from growing into named storms or hurricanes.

Gray estimates the probability of one or more major (Saffir-Simpson 3-4-5) hurricanes making landfall along the entire U.S. coastline in 2001 at 63 percent (the past century's average is 52 percent). For the U.S. East Coast and Florida peninsula, the 2001 average will be 43 percent (vs. 31percent for the past century). The Gulf Coast, from the Florida Panhandle westward to Brownsville, has a major storm landfall probability of 36 percent compared with 30 percent for the century. Because of the difficulty of estimating landfall probabilities for Caribbean landmasses, Gray offered no probabilities but said next year the chances of a major storm coming ashore in this region are about average.

"We have been lucky that upper-level trough frequency over the U.S. East Coast has been above average," Gray said. "This has led to the steering of most major Atlantic Basin hurricanes away from the mainland." The situation on the East Coast and Florida peninsula is even more skewed. The first six decades of the 20th century have averaged 3.4 times more landfalling major hurricanes per year than have the last four decades. "Climatology will eventually right itself and we must expect a substantial increase in landfalling major hurricanes on the U.S. East Coast and peninsular Florida in the coming few decades," he said.

"Due to the great increase in coastal population and property values in the southeast in recent years, we should expect to see hurricane damage at levels never before experienced." "We believe we are in a new era when El Niños will not suppress hurricane activity as they have in the recent past," Gray said.

Gray Research Team Hurricane Forecast for 2001 Season: Initial December 2000 Forecast:

Named Storms (9.3)*	9
Named Storm Days (46.9)	45
Hurricanes (5.8)	5
Hurricane Days (23.7)	20
Intense Hurricanes (2.2)	2
Intense Hurricane Days (4.7)	4
Hurricane Destruction Potential (70.6)**	65
Net Tropical Cyclone Activity (100%)	90

* Number in ( ) represents average year totals based on 1950-1990 data.
** Hurricane Destruction Potential measures a hurricane's potential for wind- and ocean-surge damage. Tropical Storm, Hurricane and Intense Hurricane Days are four six-hour-long periods where storms attain wind speeds appropriate to their category on the Saffir-Simpson scale.

For more information, see:
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- William M. Gray, Christopher W. Landsea, Paul W. Mielke, Jr., Kenneth J. Berry, and Eric Blake, typhoon.atmos.colostate.edu/forecasts/2001/fcst2001/index.html

- Benfield Greig Hazard Research Centre, Dept. of Space and Climate Physics, University College London, forecast.mssl.ucl.ac.uk/

Job Opportunities

2001 NOAA Climate and Global Change PostDoc Program

The NOAA Climate and Global Change PostDoc Program for 2001 is now soliciting applications from postdoctoral candidates. The applications are due on January 15, 2001. Along with several areas in the physical sciences, the program is interested in encouraging applications from those researching the human dimensions of climate variability and change. The program specifically requests applications that address the following: improving our understanding of how humans adapt to climate, which includes the social and economic responses to both current climate variability and potential long-term changes in climate, as well as the potential use of climate information to improve human welfare. This is an extremely competitive program.

Applications should be submitted to UCAR. For more information see: www.vsp.ucar.edu/01cgc.html

Selected Web Site Additions

El Niño / La Niña

www.esig.ucar.edu/un/
Lessons from the 1997-98 El Niño: Once Burned, Twice Shy?

This United Nations study asserts that thousands of human casualties and tens of billions of dollars in economic damage will continue to befall the world's developing countries every two to seven years until an investment is made to improve forecasting and preparedness against El Niño.

Emergency Management

www.usgs.gov/sndr/
Subcommittee on Natural Disaster Reduction (SNDR)

The SNDR, a subcommittee of the Committee on Environment and Natural Resources (CENR) of the National Science and Technology Council, is made up of representatives from Federal government agencies addressing natural hazards from the points of view of assessment, mitigation, and warning. The goal of the SNDR is to create a sustainable society, resilient to natural hazards. The recently released publication “Effective Disaster Warnings,” which provides a report on public and private sector R&D capability to provide early warning of natural or technological hazards that threaten the safety of the Nation, is available at www.nnic.noaa.gov/CENR/cenr.html.

165.158.1.110/english/ped/pedtm3en.htm
Disasters: Preparedness and Mitigation in the Americas

Disasters: Preparedness and Mitigation in the Americas is the quarterly newsletter of Pan American Health Organization (PAHO)'s Emergency Preparedness Program. It provides news about disaster preparedness activities in the countries of the Americas.

www.mentalhealth.org/cmhs/EmergencyServices/
The Emergency Services and Disaster Relief Branch (ESDRB) of the Center for Mental Health Services (CMHS)

ESDRB works in partnership with the Federal Emergency Management Agency in overseeing national efforts to provide emergency mental health services to survivors of presidentially declared disasters.

www.ema.gov.au/
Emergency Management Australia

EMA is the federal agency responsible for reducing the impact of natural and human-caused disasters on the Australian community. It is also the lead agency for coordinating federal disaster response. Its updated web site provides information about the agency's activities and emergency management in general.

www.animaldisasters.com/
Animal Management in Disasters

This site provides a resource to professional emergency managers and animal care providers who have an interest in improving the care of animals and their owners in disasters.

www.eclacpos.org/sustdev/CARLINKS/dislink.htm
ECLAC/CDCC Caribbean Sustainable Development

This site of the Economic Commission for Latin America and the Caribbean (ECLAC) contains links to information about natural and environmental disasters in the Caribbean.

General Weather Resources

www.disasterlinks.net/
CBS News - Disaster Links

An extensive collection of links to numerous weather and disaster-related topics.

library.thinkquest.org/C003603/
Forces of Nature

This site introduces forces of nature such as drought, flooding, fog and mist, hurricanes, monsoons, severe storms, tornadoes, and windstorms. Included are descriptions of the physical phenomena, their impacts, recent occurrences, historical case studies, and interviews, as well as guidelines and tips for event prediction, preparation, and prevention.

Lightning
www.crh.noaa.gov/pub/ltg/
crh_colo_ltg_res_center.html
Colorado Lightning Resource Center

This site is a resource for lightning information for the state of Colorado. Topics covered include lightning facts, safety, statistics, links, and photographs.

Summer / Winter

www.undp.org/seed/unso/news.htm
The United Nations Development Program (UNDP)
Office to Combat
Desertification and Drought (UNSO)

This site provides links to weekly articles related to drought and desertification.

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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