

Testable Hypotheses and the Societal Impacts Discussion Board

by Jeff Lazo*

At some point in the past, at least by the time of Aristotle, philosophers recognized that a fundamental distinction should be drawn between two kinds of scientific knowledge—roughly, knowledge that and knowledge why. It is one thing to know that each planet periodically reverses the direction of its motion with respect to the background of fixed stars; it is quite a different matter to know why. Knowledge of the former type is descriptive; knowledge of the latter type is explanatory. It is explanatory knowledge that provides scientific understanding of the world. (Salmon, 1990)

It is an interesting phenomenon that after every severe weather event the *Societal Impacts Program Discussion Board* (<http://www.rap.ucar.edu/forums/phpBB2/>) is filled with discussions about why people reacted the way that they did, about what they should have done differently, about whether or not they received the warning or forecast, about if they did receive it why didn't they respond, about if they didn't receive it why they didn't, about

There is inevitably a passionate discussion about what the weather community can do to get people to do what they "should do" when there is a severe weather event, about what role social media plays, about how sirens do or don't work, about whether or not people should have shelters, about how to improve the spatial scale of warnings, about ...

And many of the same issues, questions, concerns come up again and again with every new event.

With the devastating tornado, flood, and wildfire season we've experienced so far this year, there has been no shortage of similar discussions on the Board. While I admit I haven't been able to keep up with all of the posts, I have seen enough to know that there has been much enlightening and thoughtful discussion. All of these discussions are in keeping with the purpose of

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*Mammatus clouds light up a summer sky near Indianola, Nebraska.
(Photo by Scott Blair)*

the Board – “for societal impacts researchers, forecasters, policy makers, and other interested parties to post and receive information relevant to the societal impacts of weather and weather forecasting.”

I feel sometimes, though, that we are covering the same ground and that a certain level of frustration exists that we don't have answers to many of the discussion points.

I would like therefore to offer one approach that may help move some discussions forward.

I can't take credit for the idea but borrow an approach George Youngs used at the Red River and Devils Lake Integrated Warning Team workshop in Fargo, N.D., this June. George is a sociologist with the Department of Emergency Management at North Dakota State University.

During the first day of the workshop, George listened to what people were saying about their agencies, the problems they face, and issues related to flooding in the Red River and Devils Lake area. He identified a number of common themes and issues that came up during that first day. The second morning of the workshop, he presented these themes and issues—but George had transformed these “discussion points” into hypothesis that could be tested using social science research and methods.

Why did this make sense? Because by identifying problems and issues that were presented as assertions, anecdotes, frustrations, concerns, or problems and presenting them as hypotheses, he offered a way to actually deal with them. He offered the scientific method as embodied in the social sciences as a way to develop explanatory understanding that would allow decision makers to base their decisions on “knowledge” rather than continuing to feel frustrated with not knowing why people reacted they way that they did, what they should have done differently, whether or not they received the warning or forecast, if they did receive it why didn't they respond, or if they didn't receive it why they didn't.

When reading some of the recent postings on the Discussion Board, I felt that a similar approach could be taken with many of the comments there.

In a quick scan of these discussions, I have seen virtually no citations of research supporting or refuting the assertions made. Note: I am not saying that having a citation proves something is true or not but it does move it to a level where issues can be discussed based on evidence and scientific practice of evaluating evidence (i.e., the scientific process).

So ... here is my attempt to “George Youngs” some of these comments. I skimmed several of the comments and did not choose any particular issue to address or anyone in particular to pick on or support but simply chose some statements that caught my eye. Many of these are assertions that may be based on extensive personal experience or anecdotal evidence and may or may not be true. My point is not that they are or aren't correct but that we may not know whether or not they are—and we can't make sound decisions based on anecdotes.

Also, I don't know the extent to which some of these hypothesis have already been tested and valid and reliable social science research has already answered them. I would encourage more discussion on the Board about this research where it is available. I also note that many of the comments below could generate many different hypotheses, so feel free to make up some of your own!

- Assertion: "...you have to use social media to reach younger people..."
 - Hypothesis: "Social media is the primary channel by which younger people access weather warnings."

- Assertion: "... [on TV] a constant barrage of bugs, crawls, and cut-ins over-saturates viewers with information, and they basically tune things out..."
 - Hypothesis: "Increased provision of weather information by multiple methods in broadcast media causes cognitive overload."

- Assertion: "...with wall-to-wall [media coverage of an event] it becomes harder for people to distinguish between low-end storms and those like we've seen this year in Tuscaloosa and Joplin..."
 - Hypothesis: "Increased provision of weather information by multiple methods in broadcast media causes cognitive overload."

- Assertion: "...as long as ratings are involved, the thought of sharing anything will be difficult for broadcasters to swallow..."
 - Hypothesis: "Broadcast meteorologists' decision process is based on a highly competitive environment measured by ratings and, thus, they are unwilling to work cooperatively."

- Assertion: "...we just have to work on educating people on how to use that knowledge and information effectively..."
 - Hypothesis: "Providing people with educational opportunities about weather watch and warning information will increase the likelihood that they respond effectively to this information."

- Assertion: "...Talking about the broadcast media/industry: 'the industry itself is doing everything it can to push away the good guys'..."
 - Hypothesis: "The media industry is collectively working to remove high quality conscientious broadcast meteorologists."

Okay, I chose some of the comments to raise issues of the degree to which assertions—even if they are testable as hypotheses—may involve generalizations. On the other hand, if this last assertion were true, that would indicate a significant problem for the future communication of accurate and reliable weather warning information!

As you may expect, I could pull out many, many more assertions from the posts on the Discussion Board. Most of these just happened to relate to media communication.

The point is that making assertions again and again doesn't add to knowledge—in fact, it may add to frustration. By recognizing that these are assertions—perhaps based on experience and observation—and moving to formulate these as hypotheses, we take the first step toward developing knowledge. One description of four steps of the "scientific method" is:

1. Characterization from experience and observation
2. Hypothesis: a proposed explanation
3. Deduction: prediction from the hypothesis
4. Test and experiment

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Atlanta Integrated Warning Team Workshop: A WAS*IS Success

by Daniel Dix* and Jessica Fieux**

The first Atlanta Integrated Warning Team (IWT) workshop was held June 1-2, 2011, at the Georgia Tech Research Institute Conference Center in downtown Atlanta. The Atlanta workshop was based on the first IWT, inspired by the Weather and Society * Integrated Studies (WAS*IS) movement, and held in Kansas City in 2009.

This workshop brought together 65 representatives from the National Weather Service (NWS), federal, state, and local emergency management agencies including FEMA Region IV and the Centers for Disease Control and Prevention (CDC), and meteorologists from the media, academia and industry to review and further understand each group's role in the warning process and find areas for improvement. The vision of the team is to reduce weather-related fatalities and injuries by integrating meteorology and the social sciences and to work more closely together to better serve our many partners and end users.

To start off the workshop, participants learned about the different responsibilities of the main members of the team – the NWS, emergency managers, broadcast meteorologists, and the private sector. Each group was encouraged to describe not only their responsibilities, but their challenges, constraints, concerns and opportunities for working with the other groups. This was also an opportunity for groups to dispel any misconceptions about their responsibilities.

During lunch, the participants were treated to a presentation by the NWS Peachtree City (Atlanta) hydrologist about the September 2009 metro Atlanta floods which was truly the impetus for this Integrated Warning Team workshop. This was followed by a joint presentation by the NWS Birmingham and Huntsville offices on the Alabama tornado outbreak of April 27, 2011 and the many challenges of that historic day.

During the afternoon on the first day, social scientists from the University of Georgia and North Carolina State University, discussed the importance of incorporating social science into meteorology. On this team, these two fields will work together in the warning process to educate the public and understand how best to communicate severe weather information. Later in the first day, participants were divided into smaller groups and assigned one of the following tasks: map the current warning process, map the ideal warning process or describe the inter-relationships between the NWS, emergency managers, broadcast meteorologists, the private sector and the public.

Day two was started with a presentation to help participants an agency whose mission is communication. Jana Telfer, Associate Director of Communication with the CDC's National Center for Environmental Health, gave a quick lesson on multiple risk communication models. In addition, she shared what to do and what not to do in terms of communicating with the public based on her experience.

After this the participants with each of the three small groups from day one were tasked to present their results to the entire team. After each short presentation, participants were able to ask questions and have considerable time for discussion. Throughout these discussions many action items were developed. Immediately after lunch, participants were given 12 stickers to vote for the action items they felt were most important. To complete the process participants were encouraged to stick a post-

it note next to any action item they would be interested in being a sub-team member. The action items were prioritized and subset teams were created to address these. After the votes were tallied, it was determined that the top 4 action items were as follows:

- 1) Develop a permanent IWT,
- 2) Try to identify legislation that needs to be changed, removed or created that hinders public safety in regards to severe weather,
- 3) Improve the Severe Weather Statement associated with a warning,
- 4) Increase the use of pre-event preparedness, safety rules, and awareness.

This workshop is only the beginning! These subset teams or working groups (Product and Service Reinvention, Product and Service Remodel, Regulations and Guidelines, Preparedness, Communication), of the Integrated Warning Team will work to address the action items and the entire IWT will meet via conference call regularly to follow-up on their progress. The good thing is that some of these very action items are already being addressed within each participant's organization. After a year, another workshop will be held to re-evaluate the action items and plan how to proceed based on results from the first year. This workshop and subsequent working teams are just some of the ways the IWT is working towards improving the warning system in an effort to keep citizens safe and aware of the weather situations when they occur.

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*Nate Johnson, a meteorologist and executive producer at WRAL-TV in Raleigh, North Carolina, and a grad student in communication at North Carolina State University speaks at the Atlanta Integrated Warning Team workshop in June.
(Photo courtesy of Atlanta IWT workshop organizers)*



*Robby Westbrook, emergency manager for Cherokee County, Ga., and Todd Hamill of the Southeast River Forecast Center, present the results from the "Mapping the Ideal Warning Process" team. at the Atlanta Integrated Warning Team workshop.
(Photo courtesy of Atlanta IWT workshop organizers)*

Red River Devils Lake Integrated Warning Team Workshop

by Peter Rogers* and Mark Frazier**

The National Weather Service (NWS) Forecast Office in Grand Forks, N.D. hosted a first-of-its-kind, flood-focused Integrated Warning Team (IWT) Workshop June 1-2, 2011 in Fargo, N.D. Red River of the North and Devils Lake flooding pose unique challenges that require cooperation between multiple agencies and organizations. Representatives of the integrated warning team included NWS, the U.S. Army Corps of Engineers, the U.S. Geological Survey (USGS), Minnesota Homeland Security and Emergency Management, Minnesota Department of Natural Resources, Minnesota Volunteer Organizations Active in Disaster (VOAD), North Dakota Department of Emergency Services, North Dakota State Water Commission, North Dakota VOAD, local county emergency managers and city officials, media, North Dakota State University (NDSU), and University of North Dakota (UND).

The first day of the workshop focused on team building. During three discussion panels, experts from the different components of the team described how their organizations typically provide services and communicate prior to and during flood emergencies. The panels also addressed how the general public responds to those messages. Workshop participants had the opportunity to learn about other agency missions and how each part of the integrated warning team can help integrate those missions to more effectively serve the public. Small group breakout sessions built upon this concept and encouraged attendees to explore new ways to collaborate with each other for future flood events.

The second day of the workshop focused on examining the social science component of flooding. Presentations given by Dr. Jeff Lazo, director of the National Center for Atmospheric Research (NCAR) Societal Impacts Program (SIP), and Dr. George Youngs, from the NDSU Department of Emergency Management, challenged workshop participants to consider how human attitudes/behaviors and past experience affect response. For example, some of the hypotheses that were discussed included the idea that frequent experience with flooding leads to fatigue, which leads to poor response or that frequent experience with flooding leads to knowledge, which leads to better response. It was agreed that further research was needed in the social science realm.

The overarching theme of the workshop was to better understand how all of these elements are integrated and strive to more effectively serve the public and communicate a unified message. The workshop has been a springboard to partner with NDSU faculty to study public response to warning messages, examine the development of a regional Joint Information Center that crosses organizational and political boundaries, and integrate Minnesota and North Dakota VOAD into pre-flood preparedness/education campaigns.

The consensus of the participants was to continue further dialogue and work toward future "Basin Coordination" workshops on an annual or perhaps semi-annual basis. Team members can also discuss other ideas and collaborate through an online forum using Google Groups. "The workshop provided an excellent opportunity for regional flood fighting partners to share with each other and find new ways to work together as we strive to enhance public services before, during, and after flood emergencies," said Peter Rogers, Grand Forks general forecaster and organizer of the workshop. For more information, please contact Mark Frazier at the NWS office in Grand Forks at 701-772-0720.

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Conferences & Opportunities

Eighth Annual Emergency Preparedness Conference

Host: Eighth Annual Emergency Preparedness Conference

Date: September 16, 2011

Location: New Brunswick, New Jersey

For More Information: Please visit https://www.rwjuh.edu/medical_services/emergencyconference.html.

The 8th Annual Emergency Preparedness Conference will be held in New Brunswick, New Jersey, September 16, 2011, at Robert Wood Johnson University Hospital. The conference will help hospitals and emergency medicine departments prepare for large-scale incidents, learn how to assess hazard impacts, and develop policies to handle demand surge and other impacts of mass casualty events. Topics include weapons of mass destruction incidents, specialized EMS operations in large-scale incidents, mass casualty trauma operations, and radiation exposure.

Registration is \$60 and open until filled. For more information, please visit https://www.rwjuh.edu/medical_services/emergencyconference.html.

News & Announcements

View and Listen to Presentations from AMS Conference on Broadcast Meteorology and Weather Warnings

Presentations from the 39th Conference on Broadcast Meteorology and Conference on Weather Warnings and Communication, held June 22-24 in Oklahoma City, Okla., are now available online at the following link: <http://ams.confex.com/ams/39BROADCAST/webprogram/start.html>.

The recordings include the slide decks, the audio of the presentation, and usually most questions and answers at the end of each presentation. Please note that you do not need to be a member of the American Meteorological Society (AMS) to view the talks, which can be viewed at no cost.

Updated National Weather Service Spotter's Field Guide

An updated Weather Spotter's Field Guide was released by the National Weather Service (NWS) in June. The guide outlines reporting procedures, safety tips, weather basics, and information about storm movement and relevant technology for SKYWARN storm spotters. To download the field guide, please visit the following link: <http://www.nws.noaa.gov/om/brochures/SGJune6-11.pdf>.

National Weather Service announces "Weather-Ready Nation" Initiative

The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service plans to launch a comprehensive initiative to build a "Weather-ready" nation by saving more lives and protecting livelihoods as communities across the country become increasingly vulnerable to severe weather events, such as tornado outbreaks, intense heat waves, flooding, active hurricane seasons, and solar storms that threaten electrical and communication systems.

A Weather-ready nation is prepared for and responds to weather-related events. The initiative plans to turn concern into action in order to protect lives and livelihoods and support economic vitality.

In partnership with other government agencies, researchers, and the private sector, NWS plans to move toward a weather-ready nation through improved precision of weather and water forecasts and effective communication of risk to local authorities; improved weather decision support services; innovative science and technological solutions; strengthened partnerships to enhance community preparedness; and work with weather enterprise partners and the emergency management community to enhance safety and economic output and effectively manage environmental resources.

For more information on the NWS Weather-Ready initiative, please visit http://www.noanews.noaa.gov/stories2011/20110817_weatherready.html.

Methods: The Dillman Method and Mail Survey Research

by Jeffrey K. Lazo*

In the last issue of *Weather and Society Watch* (WSW), we inaugurated this Methods Section with a discussion of cash incentives in mail surveys. This issue's methods section is closely related to the issue of improved mail survey implementation, and my example is based on the same survey implementation. This time though I'll talk about what is known in the survey literature as the "Dillman Method."

As noted in the April WSW, all else equal, the higher the response rate to a survey, the more likely the data will be representative of the population that was sampled. This is important as response rates are often evaluated as indicators of the potential representativeness of survey data. Also, as noted in April, the Office of Management and Budget suggests response rates of 70% or more (OMB 2006) for surveys, in part "to ensure that survey results are representative of the target population so that they can be used with confidence to inform decisions."

In 1978 Don Dillman (University of Washington) published *Mail and Telephone Surveys, The Total Design Method*, which covers everything from how to ask a survey question to how to put a questionnaire in an envelope for mailing. The book has gone through several iterations and is now extended to cover new technologies, such as internet-based surveys and new approaches, such as mixed-methods surveys. Dillman's suggested approach for implementing the mailing of a survey, in particular, has come to be labeled "The Dillman Method."

This method was based on extensive experience and research on survey implementation to maximize response rates in mail surveys. The basic steps to enhance response rates in the Dillman Method include:

- Send a personalized advance-notice letter
- Approximately one week later, send the complete survey package with a cover letter, instructions, and the questionnaire and include a return envelope with postage
- Approximately one week later, send a follow-up postcard
- Two weeks later, send a new cover letter, questionnaire, and return postcard to those who have not responded
- Send a final contact (possibly by registered post) to request completion of the survey.

As a test of the effectiveness of the Dillman Method, in our mail survey we implemented the mailing with and without applying the method with different portions of the sample and compared response rate results.

Of the 1,400 survey packages we distributed, 850 were sent by the U.S. Postal Service. Some of the packages included a cash incentive, and we don't consider them in the current discussion (see the April newsletter edition at http://www.sip.ucar.edu/news/pdf/WSW_April_2011.pdf for the discussion about the impact of cash surveys on response rates and for more information on the topic of the survey). Of the 400 survey packages mailed without cash incentives (e.g., \$0 incentive), 150 were mailed following the Dillman Method and 250 were mailed not using the Dillman Method. The non-Dillman Method mailing was a one-time mailing of the survey packet without advance notice or any follow-up.

In the current article we compare response rates for these two groups. Table 1 shows the number of survey packages mailed, bad addresses, completed surveys returned, and the adjusted response rates for these two groups.

Mode	Distributed	Bad Addresses	Adjusted Sample Size	Completed	Response Rate
Mail – Dillman	150	30	120	41	34.17%
Mail – non-Dillman	250	23	227	60	26.43%

After adjusting for bad addresses (at least those returned by the U.S. Postal Service indicating bad address) there is a higher response rate with the Dillman Method than without. There appears to be about an 8 point bump (from 26% to 34%) by using the Dillman Method. As this could simply be by chance, we test whether or not this difference is statistically significant (e.g., how likely would it be that we would see this difference just by chance versus there is really an impact on response rates using the Dillman method?).

And as “Completed” is a categorical variable (set equal to 1 if completed and set to zero if not completed), I use a non-parametric test of whether or not the response rates are statistically different. Specifically, I test the null hypothesis (H_0) that the response rate with the Dillman Method is the same as without the Dillman Method against the alternative hypothesis (H_1) that the response rate is higher with the Dillman Method than without.

As reported in SAS, the z statistic from a Wilcoxon Two-Sample Test (with a continuity correction of 0.5) was 1.51 with a one-sided probability of 0.084. Basically this means there is an 8.4 chance, or equivalently less than about a 1 in 12 probability, that we would have seen the difference in response rates just by chance.

Our result suggests that use of the Dillman Method can lead to significantly higher response rates in mail surveys. But ... I also note that if I had tested a two-sided alternative hypothesis (H_1) that the response rates are not equal with and without the Dillman Method, the same resulting statistic has a significance of only 0.138—more than the 10% level many researchers would suggest. So ... statistics is an art as well as a science, and one’s choice of approaches can sometimes find results one is looking for.

Would I recommend, then, that all mail surveys be implemented using the Dillman Method? As noted in my April piece on the use of cash incentives, the question for a researcher is whether or not it is worth putting the extra money into implementing the survey with the extra mailings, letters, postcards, etc., that are recommended with the Dillman Method.

Depending on how important it is to get a higher response rate and how much the budget for the survey is, the researcher may consider trading off a higher response rate against a larger sample size that could be a whole new topic for future Methods!

While this and the April Methods Section focused mainly on issues related to implementation of surveys by mail, I hope the reader will realize that many similar issues arise with respect to

Resources for Planning an Integrated Warning Team Workshop

by Emily Laidlaw*

If you've read the articles highlighting the recent Integrated Warning Team (IWT) workshops in Atlanta (p.3) and Grand Forks (p. 6), you may be interested in learning more about the concept of the workshops and possibly even in spearheading a similar workshop in your area. The purpose of (IWT) workshops is to provide a venue to bring together players such as emergency managers, broadcasters, and forecasters in an area and discuss past severe weather events and foster improved communication, relationships, and planning for future severe weather events. The workshops have taken place on municipal levels (e.g. the Omaha, Neb. IWT) and on regional and state levels (e.g. the Kansas IWT).

This article provides a brief list of some resources that may be of help in learning more about the workshops and planning one of your own. Please note that the list was compiled from discussions in the Weather and Society * Integrated Studies (WAS*IS) community and is not exhaustive by any means, and that other resources also exist. This list is intended to serve as a starting reference for those interested in learning more about past workshops and establishing contact with people who have planned past workshops.

IWT Web sites:

- Kansas City Integrated Warning Team Workshop Web Page: <http://www.marc.org/emergency/iwt-presentations.htm>
- Kansas Integrated Warning Team Workshop Web Page: <http://ksiwat.readytohelp.org/>

IWT Summaries and Presentations:

- "Fostering Collaboration and Communication with Integrated Warning Team (IWT) Workshops." Daniel Nietfeld (NWS) and Andy Bailey (NWS). <http://ams.confex.com/ams/39BROADCAST/webprogram/Paper188956.html>
- Kansas City IWT Summary: http://www.powershow.com/view/35f45-MDRjM/We_Really_Are_One_Team_flash_ppt_presentation
- April 2010 Weather and Society Webinar - IWT presentations by Integrated Warning Team (IWT) presentations by Andy Bailey, Dan Nietfeld, Chad Omitt, Mike Hudson, and Krissy Scotten: <http://www.sip.ucar.edu/webinar/April2010/lib/playback.html>
- January 2010 Weather and Society Webinar - IWT Presentation by Dan Nietfeld : <http://www.sip.ucar.edu/webinar/Jan2010/lib/playback.html>

IWT Contacts:

- Andy Bailey NWS (Andy.Bailey@noaa.gov): created IWT concept
- Mike Hudson NWS (michael.hudson@noaa.gov): Kansas City IWT
- Chad Omitt NWS (Chad.Omitt@noaa.gov): Kansas IWT
- Daniel Dix Weather Channel (daniel.dix@mac.com): Atlanta IWT
- Daniel Nietfeld NWS (Dan.Nietfeld@noaa.gov): Omaha IWT
- Peter Rogers NWS (Peter.Rogers@noaa.gov): Grand Forks IWT

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Dillman (continued from pg 9)

telephone and internet-based surveys, and in-person interviews. Issues of respondent motivation, response rates, and representativeness of the sample are all important considerations in evaluating the quality of data in a survey-based study. And I'll end by noting that questions of using cash incentives or the Dillman Method for mailing a survey are only a few of the dozens of issues and decisions a researcher deals with in collecting reliable and valid data using surveys.

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Resources and References

Dillman, D.A. 1978. Mail and Telephone Surveys, The Total Design Method. New York: John Wiley and Sons.

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Johnson, T., and L. Owens. 2003. "Survey Response Rate Reporting in the Professional Literature." Paper presented at the 58th Annual Meeting of the American Association for Public Opinion Research. Nashville, TN. May. (Available at <http://www.amstat.org/sections/srms/proceedings/y2003/Files/JSM2003-000638.pdf>)

Let's recognize that many of the Discussion Board assertions are, at most, "characterization[s] from experience and observation." Building on these characterizations let's take a next step to developing hypotheses. As defined in Wikipedia "A hypothesis is a suggested explanation of a phenomenon, or alternately a reasoned proposal suggesting a possible correlation between or among a set of phenomena." This would be a first step into the world of the social sciences from the world of "societal impacts."

Applying the scientific method to experience and observations, making deductions, testing hypotheses, and building knowledge could move us from assertions and frustrations to developing approaches to reduce the societal impacts from hazardous weather. Think what we could do to improve societal outcomes if we had "explanatory knowledge" about human behavior during a severe weather to the same extent we have "explanatory knowledge" about the weather events themselves!

Remember the quote from Salmon: "It is explanatory knowledge that provides scientific understanding of the world."

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Reference

Salmon, Wesley C., *Four Decades of Scientific Explanation*, University of Minnesota Press, Minneapolis, MN, 1990.

Need to Subscribe?

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Want Postings?

Subscribe to the Societal Impacts Discussion Board and receives posts about *Weather and Society Watch* and many other societal impacts topics!.

Contribute to WSW

Weather and Society Watch is always accepting contributions!

We accept articles on planned, in-progress, or completed research projects, highlights about programs and milestones, book reviews, historical/interest articles, guest editorials expressing views about a relevant societal impacts topic, and much more. We also accept and welcome all submissions of weather photographs.

To contribute to *Weather and Society Watch*, please contact Emily Laidlaw at laidlaw@ucar.edu.

Jobs & Opportunities

Faculty Fellowship Program, Nat.Center for Atmos. Research

The Advanced Study Program (ASP) at the National Center for Atmospheric Research (NCAR) is pleased to announce that its Faculty Fellowship Program (FFP) is now accepting applications for visits that occur between May 1, 2012 and May 31, 2014. The FFP is designed to foster fruitful and lasting intellectual collaborations between university faculty and the NCAR staff. It provides opportunities and resources for faculty employed at universities to work in residence at NCAR and enables NCAR scientific staff to spend a period of time in residence at U.S. universities.

For more information, contact Paula Fisher at paulad@ucar.edu or visit the Web page at http://www.asp.ucar.edu/ffp/faculty_fellowship.php. Application deadline is October 31, 2011.

Research Associate, George Mason University

The George Mason University Department of Communication Center for Climate Change Communication (<http://aoes.gmu.edu>) invites applications for a full-time Research Associate to help manage a multi-institution TV weathercaster-focused climate change education partnership grant funded by the National Science Foundation.

Requirements include a M.S. or Ph.D. in meteorology, atmospheric science, earth systems science, communication, education or other relevant social science discipline and at least two years of progressively responsible project management experience and at least one year of experience successfully managing employees.

To apply, please visit <http://jobs.gmu.edu> for position number F9401z; complete the faculty application; and upload a letter of interest, CV, and list of three references.

About Weather and Society Watch

Weather and Society Watch is published quarterly by the Societal Impacts Program (SIP) at the National Center for Atmospheric Research (NCAR). The University Corporation for Atmospheric Research (UCAR) operates NCAR with support from the National Science Foundation and other sponsors.

The purpose of *Weather and Society Watch* is to provide a forum for those interested in the societal impacts of weather and weather forecasting to discuss and debate relevant issues, ask questions, and stimulate perspective. The newsletter is intended to serve as a vehicle for building a stronger, more informed societal impacts community.

Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of NSF or other sponsors. Contributions to *Weather and Society Watch* are subject to technical editing at the discretion of SIP staff.

Weather and Society Watch is available on the World Wide Web at: <http://www.sip.ucar.edu/news/>. Archives of WeatherZine, a previous weather impacts newsletter upon which *Weather and Society Watch* was modeled, are available on the Web at <http://sciencepolicy.colorado.edu/zine/archives/>.

Contact Us

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About SIP

All aspects of the U.S. public sector, along with the nation's economy, are directly and indirectly affected by weather. Although the economic impacts of weather and weather information on U.S. economic agents have been loosely documented over the years, no definitive assessments have been performed, and information generated from the previous studies is difficult to locate and synthesize.

SIP, initiated in 2004 and funded by NOAA's U.S. Weather Research Program (USWRP) and NCAR, aims to improve the societal gains from weather forecasting. SIP researchers work to infuse social science and economic research, methods and capabilities into the planning, execution and analysis of weather information, applications, and research directions. SIP serves as a focal point for developing and supporting a closer relationship between researchers, operational forecasters, relevant end users, and social scientists concerned with the impacts of weather and weather information on society. Program activities include primary research, outreach and education, and development and support for the weather impacts community.

For more general information on SIP, contact Jeff Lazo at lazo@ucar.edu or <http://www.sip.ucar.edu>.