



Board on Atmospheric Sciences and Climate

Newsletter

The BASC Newsletter, Volume 2, Number 1, is your update on the activities of the Board on Atmospheric Sciences and Climate of the National Academies. The Board seeks to advance understanding of the Earth's atmosphere and climate, to help apply this knowledge to benefit the public, and to advise the federal government on issues within the Board's areas of expertise.

April 2005

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1. Message from the Chairman

Dear Colleagues:

The BASC Newsletter is now beginning its second year. Based on the many favorable comments we have received, it appears to be serving a useful purpose as a means for informing the atmospheric science community about what BASC does, is planning to do, and significant issues facing us all. In addition, the Newsletter provides information on activities outside of BASC that are of general interest. We have achieved our initial goal of increasing timely dissemination of relevant information.

In the coming year we plan to expand the scope of BASC's outreach in several ways. First we want more input and participation from you, the community. We are seeking (1) broader participation on NRC study committees; (2) an expanded and broader pool of individuals who are qualified to serve on NRC committees but have not served in the past; (3) increased gender and

ethnic diversity among NRC committees; (4) broader participation in suggesting topics for our meeting forums, studies, and, especially, our annual summer workshop; and (5) thoughts on important scientific and technical challenges facing the atmospheric sciences that you think are not receiving adequate attention.

It is important that we pursue these objectives for several reasons, but in a nutshell we need to ensure that BASC and the NRC are working on important and relevant problems with the best talent possible. Here at BASC, we have enhanced our interactions with other relevant NRC Boards, looking for synergy. These include the Ocean Studies Board, Polar Research Board, Space Studies Board, Water Science and Technology Board, and Committee on the Human Dimensions of Global Change.

We also want to create opportunities for community input early in the planning process for new activities. The majority of studies conducted under BASC are requested by government agencies or Congress. However, each year we select a topic for a special workshop (often called our summer study). These workshops provide an informal atmosphere where scientists and agency staff can talk frankly about current issues. Recent workshops have highlighted lessons learned about communicating weather information accurately and, just last summer, an exploration of the challenges in representing physical processes in coupled atmosphere-land-ocean models.

The topic for the 2005 summer workshop is "Earth-Atmosphere Interactions: Understanding and Responding to Multiple Environmental Stresses." This July 25-26 workshop will explore current understanding of multiple environmental stresses and discuss the types of research needed to improve understanding of these kinds of complex, nonlinear problems. Participants have not yet been chosen, so your suggestions on themes and people to invite are most welcome. Please contact Chris Elfring at celfring@nas.edu to provide suggestions and Diane Gustafson at dgustafs@nas.edu for logistical information.

A second topic that we continue to pursue is the issue of the future of Earth science research using observations from space. This was discussed in the [August 2004 Newsletter](#) and the [December 2004 Newsletter](#), and it is the subject of an NRC study, under the Space Studies Board's leadership, which will recommend priorities for observational systems in space for the next decade. But as an additional step, within BASC we believe that a comprehensive assessment of the scientific, technical, and societal benefits that have been derived from past spaceborne observations of Earth would serve as a significant complement to the SSB study. No other NRC study, including the SSB decadal survey, provides this kind of concrete analysis of past benefits, which could be very useful to those planning future directions. Your thoughts are most welcome.

Finally, please pass this Newsletter on to your colleagues and invite them to let us know if they would like to be added to our distribution list.

Sincerely,
Bob Serafin
serafin@ucar.edu

2. Upcoming Meetings

- [Climate Research Committee, April 12-13, 2005, Washington, D.C.](#)
- [Board on Atmospheric Sciences and Climate, April 13-14, 2005, Washington, D.C.](#)
- Estimating and Communicating Uncertainty in Weather and Climate Forecasts, April 27, 2005, Washington, D.C.
- Earth-Atmosphere Interactions: Understanding and Responding to Multiple Environmental Stresses, July 25-26, 2005, Woods Hole, Massachusetts
- Strategic Guidance for NSF's Support of the Atmospheric Sciences, October 19-20, 2005,

Woods Hole, Massachusetts

3. What's New

-- New Report: *Improving the Scientific Foundation for Atmosphere-Land-Ocean Simulations: Report of a Workshop* will be released on Tuesday, April 12, 2005. The report explores and evaluates current efforts to model physical processes of coupled atmosphere-ocean-land models. It is the result of a two-day workshop held last summer in Woods Hole, Massachusetts.

-- New Report: [*Assessments of the Benefits of Extending the Tropical Rainfall Measuring Mission: A Perspective from the Research and Operations Communities*](#) (interim report) provides advice on the benefits of keeping TRMM in operation beyond 2004.

-- BASC Welcomes New Members: BASC is pleased to announce the appointment of five new members to its membership: Joan Alexander, Colorado Research Associates; Carol Anne Clayson, Florida State University; Dennis Hartmann, University of Washington; Peter Leavitt, Weather Information Company; and Thomas Vonder Haar, Colorado State University. We also gratefully acknowledge the dedication and contributions of our members who have completed their terms of service: Robert Beardsley, Woods Hole Oceanographic Institution; Rafael Bras, Massachusetts Institute of Technology; Cassandra Fesen, Dartmouth College; and John Wyngaard, Pennsylvania State University.

-- In its 2003 report *Fair Weather: Effective Partnerships in Weather and Climate Services*, the NRC recommended that "The National Weather Service and relevant academic, state, and private organizations should seek a neutral host, such as the American Meteorological Society, to provide a periodic dedicated venue for the weather enterprise as a whole to discuss issues related to the public-private partnership." In response, the AMS recently established the Commission on the Weather and Climate Enterprise (CWCE). The CWCE has been charged with developing and implementing programs that address the needs and concerns of all sectors of the weather and climate enterprise; promote a sense of community among government entities, private sector organizations, and universities; foster synergistic linkages between and among the sectors; entrain and educate user communities on the value of weather and climate information; and provide appropriate venues and opportunities for communications that foster frank, open, and balanced discussions of points of contention and concern. For more information, visit the AMS website at <http://www.ametsoc.org>

-- BASC is currently accepting applications for the position of Program Officer. The Program Officer is responsible for all aspects of implementation of the Board's work—designing studies, working with agencies and committees, analyzing complex issues, and preparing reports. For a more complete description of the position and information on how to apply, [please visit the Academies' career page](#) and click on "Jobs by Title," then "Program Officer," Requisition #050058-5.

-- The Division on Earth and Life Studies at the National Academies encompasses a wide range of activities where policy meets the realm of geo-, life- and the chemical sciences, including the environment, geography, laboratory animal use and resource issues. The division has produced reports on such high profile issues as drilling for oil on Alaska's North Slope, stem cell research, the transportation of nuclear waste, and protecting the nation's food supply—reports that have had many tangible impacts. Visit the Division's website at <http://dels.nas.edu> for updates on the latest reports, projects, and events, and to subscribe to receive updates automatically.

4. Special Feature: A ten week crash-course in science policy and policy for science

Three times a year the National Academies hosts a group of students for ten weeks through its Christine Mirzayan Science & Technology Policy Graduate Fellowship Program. Recently, BASC and the Polar Research Board were fortunate to host Claudia Mengelt of the University of California, Santa Barbara, for 10 weeks. Below is her description of the experience.

My experience as a fellow with the National Academies has been the single most rewarding and inspiring career opportunity during my graduate student years. The aim of the Christine Mirzayan Science & Technology Policy Graduate Fellowship Program is to introduce graduate students or recent Ph.D.s to the analysis that informs the creation and implementation of science and technology policy, and to familiarize them with the interactions of science and government.

There is no better way to learn about science policy, the interactions between the sciences, the public, and the government, than by immersing yourself in the process, particularly here at the National Academies in Washington, D.C. While “science policy” seemed a nebulous term before I started my fellowship, I have glimpsed the meaning behind and concrete processes involved in it. The fellowship has also taught me about the value of science in policy making and the many barriers between science and the application of it in decision-making.

The most surprising discovery during my fellowship was that of the countless exciting and prestigious career opportunities awaiting a scientist outside of academia. I felt like I stumbled upon a well-kept secret. While spending most of my life in the university setting, I was exposed almost exclusively to career role models in post-doc/tenure track positions. Consequently, I got the impression that pursuing a career other than tenured faculty was not as highly esteemed. This fellowship opened my eyes to the limitless opportunities to an intellectually fulfilling and prominent career outside the typical tenured track career. The reason I chose the science career path in the first place was my passion for researching and solving interesting questions, which is an integral part of science policy.

Regardless of whether a fellow intends to pursue a career in academia or not, this fellowship is an invaluable experience. A better understanding of the interactions between science and government will be a great asset to any career. Knowing how to contribute to the process will only increase the understanding, prestige, and visibility of the sciences

5. Recently Released Reports

[Assessments of the Benefits of Extending the Tropical Rainfall Measuring Mission: A Perspective from the Research and Operations Communities](#) (interim report) provides advice on the benefits of keeping TRMM in operation beyond 2004.

[Radiative Forcing of Climate Change: Expanding the Concept and Addressing Uncertainties](#) examines the human and natural causes of climate change, including greenhouse gases, aerosols, land-use change, and solar variability. Whereas emphasis to date has been on how these climate forcings affect global mean temperature, the report finds that regional variation and climate impacts besides temperature deserve increased attention. The report also identifies research that should be pursued to improve understanding of climate forcings.

[Review of the U.S. CLIVAR Project Office](#) evaluates the performance of the U.S. CLIVAR Project Office in fulfilling its charge from supporting agencies. The Climate Variability and Predictability (CLIVAR) program, established internationally in 1995 and expanded to include a U.S. component in 1998, focuses on improving understanding and skill in predicting climate variability on seasonal to centennial time scales. The report concludes that the project office is vital for coordinating U.S. CLIVAR activities and is effective despite limited resources. It also provides suggestions for enhancing the communications from and visibility of U.S. CLIVAR activities and for developing strategic directions for the future.

[Flash Flood Forecasting Over Complex Terrain: With an Assessment of the Sulphur Mountain NEXRAD in Southern California](#) assesses the performance of the Sulphur Mountain NEXRAD in Southern California, which has been scrutinized for its ability to detect precipitation in the atmosphere below 6000 feet. The report finds that the Sulphur Mountain NEXRAD provides crucial coverage of the lower atmosphere and is appropriately situated to assist the Los Angeles-Oxnard National Weather Service Forecast Office in successfully forecasting and warning of flash floods. The report concludes that, in general, NEXRAD technology is effective in mountainous terrain but can be improved.

[Climate Data Records from Environmental Satellites](#) provides advice on the key elements of a satellite-based climate data record (CDR) program, including lessons learned from previous attempts, important considerations for identifying an appropriate organizational framework for long-term success and sustainability, suggested steps for generating and archiving CDRs, and the importance of partnerships.

[Where the Weather Meets the Road: A Research Agenda for Improving Road Weather Services](#) examines the research opportunities and required services needed to support improved weather-related information for the nation's roadways and provides a framework and recommendations to engage the transportation and weather communities (and other stakeholders) in the development of a strategic plan to guide road weather research.

6. Studies in Progress: For more information about a specific project, click on the link provided.

[Review of the GAPP Science and Implementation Plan](#) will consider, for example, if there are gaps in the GAPP SIP. Does it support the CCSP goals for the hydrologic cycle and the goals of the CPPA? Does it support the GEWEX phase II scientific questions? What relationship does GAPP have to other programs with similar goals?

[Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product on Temperature Trends in the Lower Atmosphere](#) will review the CCSP's Product on "Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences." Among the issues the committee will consider are whether the document meets its intended objectives, whether findings are adequately supported, and whether data are handled competently.

[Estimating and Communicating Uncertainty in Weather and Related Forecasts](#) will provide findings and recommendations to guide NOAA/NWS as it improves methods used to estimate uncertainty in its weather, hydrometeorological, and short-term regional climate forecasts, with emphasis on the means used to communicate forecast uncertainty.

[Future of the Tropical Rainfall Measuring Mission \(TRMM\)](#) will provide advice on the future of TRMM and potential follow-on research and operational missions. In Phase I, the committee addressed how best to use the remaining TRMM spacecraft life. Phase II will focus on needs for satellite-based measurements of rainfall in 2006 and beyond.

[Strategic Guidance for the National Science Foundation's \(NSF\) Support of the Atmospheric Sciences](#) will provide guidance to NSF's Division of Atmospheric Sciences (ATM) on its strategy for supporting research to achieve the nation's scientific and education goals in the atmospheric sciences. In essence, the committee will consider how ATM can best accomplish its mission of stewardship of the atmospheric sciences into the future.

[Climate Data Records from Operational Satellites](#) is assisting the National Oceanic and Atmospheric Administration-National Environmental Satellite, Data, and Information Service (NOAA-NESDIS) as it designs a plan to guide satellite data utilization from existing and new instruments aboard NOAA satellites, including National Polar-orbiting Operational Environmental

Satellite System (NPOESS) instruments, for understanding, monitoring, and predicting climate variations and changes. The first report was recently released and NOAA prepared a draft science implementation plan in response. The Committee is currently reviewing that plan.

[Metrics for Global Change Research](#) will develop metrics and/or other methods for documenting progress in global change research and evaluating future performance using the objectives of global change research as articulated in the Strategic Plan for the U.S. Climate Change Science Program.

7. BASC in the Past: [Adequacy of Climate Observing Systems](#)

A little over 7 years ago, the Climate Research Committee, at the request of the U.S. Global Change Research Program (USGCRP), convened a panel to conduct a “rapid-response study” on the status of the observing capabilities of the United States for documenting climate variability and change. The panel consisted of Thomas Karl (chair), Robert Dickinson, Maurice Blackmon, Bert Bolin, Jeff Dozier, William Elliott, James Giraytys, Richard Hallgren, James Hansen, Sydney Levitus, Gordon McBean, Gerald Meehl, Philip Merilees, Roberta Balstad Miller, Robert Quayle, Ichtiaque Rasool, Steven Running, Edward Sarachik, William Schlesinger, Karl Taylor, and Anne Thompson, with ex officio members Lawrence Gates, Douglas Martinson, Soroosh Sorooshian, and Peter Webster. The panel concluded that existing observing systems for detection and attribution of climate change required “immediate action to reverse their decay and to redesign them.” In addition to highlighting ten climate monitoring principles that should be applied to climate monitoring systems, the committee recommended that the federal agencies responsible for climate observing systems should “work through the USGCRP process and higher government levels to stabilize the existing observational capability; identify critical variables that are inadequately measured; build climate observing requirements into the operational observing programs as a high priority; revamp existing climate programs and some climate-critical parts of operational observing programs through the implementation of the ten principles of climate monitoring; and establish a funded activity for the development, implementation, and operation of climate-specific observational programs.” The panel concluded that for most monitoring systems “there are clear warning signals that must be heeded if climate variability and change is to be observed with sufficient fidelity over the next decade or two.” Seven years later, it is interesting to consider how much progress has been made. Many of the themes in this report remain particularly relevant to international and national efforts on GEOSS (Global Earth Observation System of Systems), for example.

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We encourage your comments on this newsletter as well as on the reports and activities of BASC. To provide input, contact basc@nas.edu.

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BASC is a unit of the National Academies. The nation turns to the National Academies -- National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council -- for independent, objective advice on issues that affect people's lives worldwide. BASC members include: Robert J. Serafin (chair), National Center for Atmospheric Research; M. Joan Alexander, Colorado Research Associates; Frederick R. Anderson, McKenna Long & Aldridge LLP; Michael L. Bender, Princeton University; Rosina M. Bierbaum, University of

Michigan; Mary Anne Carroll, University of Michigan; Carol Anne Clayson, Florida State University; Walter Dabberdt, Vaisala Inc.; Kerry A. Emanuel, Massachusetts Institute of Technology; Dennis L. Hartmann, University of Washington; Peter R. Leavitt, Weather Information Company; Jennifer A. Logan, Harvard University; Vernon R. Morris, Howard University; William Randel, National Center for Atmospheric Research; Thomas H. Vonder Haar, Colorado State University; Roger M. Wakimoto, University of California, Los Angeles; Chris Elfring (director, BASC).

We encourage you to share this newsletter with colleagues.