



Board on Atmospheric Sciences and Climate

Newsletter

The BASC Newsletter, Volume 1, 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 2004

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1. Message from BASC

Welcome to this first issue of the Board on Atmospheric Sciences and Climate's newsletter. This newsletter is the brainchild of Bob Serafin, who took the helm as chair of BASC in January 2004. Bob challenged us to find ways to increase dissemination of our activities. We see this newsletter as one way to increase the impact of our work by getting our results to more people in a quick and easy-to-use form. The newsletter will always include links to meeting agendas, recently released reports, and information about our studies in progress. We will highlight a few special topics in "What's New" and include a short special feature that summarizes a recent activity, like this issue's discussion of our forum on workforce issues in the atmospheric sciences. The section "BASC in the Past" is a way to look back at past work and consider its current relevance. In addition, this newsletter is also meant as a mechanism to solicit input from you, the members of the atmospheric and climate sciences community. We encourage your comments on this newsletter as well as on the reports and activities of BASC, and we will do our best to respond to your input.

Chris Elfring, Director

2. Upcoming Meetings

[NEXRAD Flash Flood Forecasting Capabilities at Sulphur Mountain, California, Boulder, Colorado, May 13-14, 2004](#)

[Metrics for Global Change Research, June 8-9, 2004, Irvine, California](#)

Challenges in Representing Physical Processes in Coupled Atmosphere- Land-Ocean Models: A Workshop, Woods Hole, Massachusetts, July 12-13, 2004

3. What's New

-- National Science Foundation's Support of Research in the Atmospheric Sciences: At the request of NSF's Division of Atmospheric Sciences (ATM), BASC will appoint an ad hoc committee to engage the atmospheric science community in a study that will provide guidance to ATM on its strategy for supporting research to achieve the nation's scientific and education goals in the atmospheric sciences. In essence, the committee is asked to consider how ATM can best accomplish its mission of stewardship of the atmospheric sciences into the future. The committee nomination process is in progress, and the committee is expected to hold its first meeting this summer.

-- BASC Summer Workshop: The Board's annual summer workshop will focus on challenges in representing physical processes in coupled atmosphere-land-ocean models. Current efforts to model physical processes of these models will be explored and evaluated. The workshop will be held July 12-13, 2004, in Woods Hole, Massachusetts.

-- On January 1, 2004, Dr. Robert Serafin was appointed the new Chair of the Board on Atmospheric Sciences and Climate. Dr. Serafin is Director Emeritus of the National Center for Atmospheric Research. He is a member of the National Academy of Engineering, a past president of the American Meteorological Society (AMS), and a fellow of the AMS and the Institute of Electrical and Electronics Engineers. His technical interests are far-reaching, but include radar, remote sensing, and in situ sensing of the atmosphere. Dr. Serafin replaces Dr. Eric Barron whose term as chair of the Board concluded at the end of 2003. We are grateful to Dr. Barron for providing seven years of extraordinary vision, leadership, and energy to BASC.

-- The new Marian Koshland Science Museum opened at the National Academies in Washington, D.C. on April 23, 2004. The Museum will explore the links between scientific research and everyday life and will be the only museum in the nation's capital solely dedicated to exploring the science at the core of public policy decisions. An exhibit on climate change will reveal the science behind global warming and examine the possible implications of this phenomenon for the quality of life around the world. For more information, visit the Museum's website at <http://www.koshland-science-museum.org/>

4. Special Feature: Workforce Issues in the Atmospheric and Climate Sciences

On November 3, 2003, the BASC held an all-day forum on workforce issues in the atmospheric and climate sciences. Nine speakers were invited to the forum to discuss demographics, trends, and diversity; the educational challenges facing the community at the K-12, undergraduate, and graduate levels; and the anticipated future needs of the academic, federal, and private workforces.

Concerns about the number of students pursuing atmospheric science degrees have existed for nearly a decade. What initially began as a concern of an overabundance of atmospheric scientists in a tightening job market has flip-flopped according to some; enrollment into graduate atmospheric programs decreased 8 percent per year for five years (40 percent total) through

2001. The 20 percent drop in the issuance of student visas after the September 11 terrorist attacks only compounds the matter, and threatens the chance for alleviating the starkly lopsided distribution of diversity in the field. Although some argue that the perceived lack of interest in the field should not automatically cause concern, the fact that the federal workforce is aging and that large numbers of employees will soon begin retiring each year cannot be disregarded.

Some speakers suggested that student apathy about atmospheric and climate sciences may stem from the lack of exposure they receive to the field. In general, science is hard to sell as a viable, lifelong career, but that little to no geoscience education is provided in schools only exacerbates the challenge the atmospheric science community faces in recruiting its fair share of bright students. Unfortunately, the trend in K–12 education toward accountability via student exams—none of which include geosciences—limits the ability of teachers to expose their students to “peripheral” subjects like meteorology, making it all the more difficult to engage children at a young age.

For those who do pursue a career in atmospheric sciences, the field is becoming increasingly interdisciplinary, necessitating a parallel adjustment in students’ education. Beyond research, broader professional development is needed to acquire competencies in telecommunications, product design and delivery, data processing, and so forth. Although some university programs and employers are responding to these needs via partnerships, internships, and internal learning programs, an increase in the existence and availability of such programs is needed so that students and employees remain adept as the field evolves.

5. Recently Released Reports

[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.

[Understanding Climate Change Feedbacks](#) characterizes the uncertainty associated with feedbacks in the natural climate system that are important for projecting the evolution of Earth’s climate over the next 100 years and defines a research strategy to reduce the uncertainty associated with these feedbacks, particularly for those feedbacks that are likely to be important and for which there appears to be significant potential for scientific progress.

[Critical Issues in Weather Modification Research](#) reviews the current state of the science of weather modification and the role of weather prediction as it applies to weather modification; identifies the critical uncertainties limiting advances in weather modification science and operation and future directions in research and operations for improving the management of water resources and the reduction in severe weather hazards; and suggests actions to identify the potential impacts of localized weather modification on large-scale weather and climate patterns.

[Tracking and Predicting the Atmospheric Dispersion of Hazardous Material Releases: Implications for Homeland Security](#) examines the observational and modeling tools used for tracking the atmospheric dispersion of chemical, biological, and nuclear agents and to assess the value of dispersion forecasts for providing useful information to emergency responders and the general public.

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

[Radiative Forcing Effects on Climate](#) will examine the current state of knowledge regarding the individual direct and indirect radiative forcing effects of gases, aerosols, land-use, and solar variability on the climate of the Earth's surface and atmosphere and it will recommend strategies for improving our understanding.

[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 is now drafting a science implementation plan. The Committee expects to review that plan in late fall.

[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.

[Assessing NEXRAD Flash Flood Forecasting Capabilities at Sulphur Mountain, California](#), will evaluate whether the ground-based weather surveillance Doppler radar (Sulphur Mountain NEXRAD) located in Ventura County, California, fulfills its intended purpose to provide timely and accurate data for assisting local NWS meteorologists in forecasting flash flood events.

7. BASC in the Past: Carbon Dioxide and Climate: A Scientific Assessment

Almost 25 years ago, in response to a request from the Office of Science and Technology Policy, the Academies' convened a study group to assess the scientific basis for projection of possible future climatic changes resulting from man-made releases of carbon dioxide into the atmosphere. The Ad Hoc Study Group on Carbon Dioxide and Climate met in Woods Hole, Massachusetts, in July 1979. The group was composed of Jule Charney (chair), Akio Arakawa, D. James Baker, Bert Bolin, Robert Dickinson, Richard Goody, Cecil Leith, Henry Stommel, and Carl Wunsch. The conclusions of this brief but intense investigation "may be ... disturbing to policy makers. If carbon dioxide continues to increase, the study group finds no reason to doubt that climate changes will result and no reason to believe that these changes will be negligible. The conclusions of prior studies have been generally reaffirmed. However, the study group points out that the ocean, the great and ponderous flywheel of the global climate system, may be expected to slow the course of observable climate change. A wait-and-see policy may mean waiting until it is too late."

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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.

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; Frederick R. Anderson, McKenna Long & Aldridge LLP; Robert C. Beardsley, Woods Hole Oceanographic Institution; Rosina M. Bierbaum, University of Michigan; Rafael L. Bras, Massachusetts Institute of Technology; Mary Anne Carroll, University of Michigan; Walter Dabberdt, Vaisala Inc.; Kerry A. Emanuel, Massachusetts Institute of Technology; Cassandra G. Fesen, Dartmouth University; Jennifer A. Logan, Harvard University; William Randel, National Center for Atmospheric Research; Roger M. Wakimoto, University of California, Los Angeles; John C. Wyngaard, Pennsylvania State University; Chris Elfring (director, BASC).

We encourage you to share this newsletter with colleagues.