

The BASC Newsletter, Volume 3, 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. This newsletter can be viewed in its entirety at the [BASC website](#).

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1. Message from the Director

Dear Colleagues:

Carved in stone at the door to the Keck Center of the National Academies here in Washington is a quote from Albert Einstein: "The right to search for truth implies a duty; one must not conceal any part of what one has recognized to be true." It was obviously chosen carefully because it is the perfect reminder to every volunteer who comes here for a committee meeting and to those of us on the staff who guide the committees through our consensus study process and our other activities.

As most of you know, there are three general ways that topics come to BASC (and all units of the National Academies) for attention: requests from Congress, requests from agencies (federal, regional, or state), and ideas that start with Board members or our community that then evolve to gain agency or other interest. Keeping an eye to the future to identify emerging issues, problems, or controversies where our independent analysis might assist is one of the primary responsibilities of BASC members. As part of this responsibility, every three years BASC hosts a strategic planning retreat where Board members and our agency liaisons gather in an informal setting to brainstorm and then characterize a range of possible upcoming issues.

When we held our first planning retreat in the summer of 2003, we generated a compendium of about 20 topics defined to be "challenges in the atmospheric and climate sciences." This list became our guidebook when seeking topics for discussion forums at BASC and Climate Research Committee meetings and the BASC summer workshop (held most summers except when we have a planning retreat). We shared it with our agency liaisons. Of the 20 topics, we took action on half over the past three years: six were used as topics for Discussion Forums at BASC and CRC meetings, two became BASC summer study workshops (the 2004 workshop on coupled models and the 2005 workshop on multiple environmental stresses), and two evolved into full consensus studies (our studies on global change assessments and on communicating uncertainty in weather and climate forecasts). The staff found it very useful to have this sense of priorities as we carried out the Board's day-to-day operations.

The 2006 BASC planning retreat will be held August 8-9 at the National Academies Woods Hole conference center. It is an opportunity to step back from our regular routine and think "bigger." What are tomorrow's big challenges? Participants will include BASC and CRC members and former members, some of our most active committee members, and many of our agency liaisons. This year, we are striving to encourage more agency representatives to participate so that they are equal partners in generating ideas, thus ensuring that we are truly serving their needs. In a future newsletter we will share some of the results of the retreat. If you would like to have input, you are welcome to email me your thoughts on "challenges for the atmospheric and climate science" in the next 5-10 years. In no more than a page, provide a title, a paragraph of context, and no more than six questions or needs that you believe our community faces on that subject. I'll make sure that all ideas are incorporated into the retreat.

Sincerely,
Chris Elfring
celfring@nas.edu

2. Upcoming Meetings

- [Board on Atmospheric Sciences and Climate, April 5-6, 2006, Washington, D.C.](#)
- [Strategic Guidance for NSF's Support of the Atmospheric Sciences, April 5-7, 2006, Washington, D.C.](#)
- [Analysis of Global Change Assessments, May 25-26, Washington, D.C.](#)
- [Board on Atmospheric Sciences and Climate, August 8-9, 2006, Woods Hole, Massachusetts](#)

3. What's New

--New Study: [Surface Temperature Reconstructions for the Past 2,000 Years: Synthesis of Current Understanding and Challenges for the Future](#) will describe and assess the state of scientific efforts to reconstruct surface temperature records for the Earth over approximately the past 2,000 years. The committee will summarize current scientific information on the temperature record for the past two millennia, describe the main areas of uncertainty and how significant they are, describe the principal methodologies used and any problems with these approaches, and explain how central the debate over the paleoclimate temperature record is to the state of scientific knowledge on global climate change.

-- New Study: [Archiving and Accessing Environmental and Geospatial Data at NOAA](#) will assist NOAA as it develops plans to meet its data archiving and data access requirements. The committee will first produce a letter report that includes a preliminary list of principles and guidelines that NOAA can use to begin planning specific archiving strategies for the data streams it currently collects. This preliminary set of principles and guidelines for data archiving will be refined and expanded using community input in a final report that also addresses the extent to which a wide variety of data sets should be made available. The final committee report will also include specific examples of how these principles and guidelines could be applied to existing and planned data streams across NOAA.

-- New Study: [Analysis of Global Change Assessments](#) will identify lessons learned from past assessments to guide future global change assessment activities of the U.S. Climate Change Science Program (CCSP). To do so, the committee will conduct a comparative analysis of past assessments that have stated objectives similar to those of the CCSP and identify approaches and products that are most effective for meeting the CCSP's stated objectives for assessments.

-- The Polar Research Board released [Toward an Integrated Arctic Observing Network](#). This report outlines the potential scope, composition, and implementation strategy for an arctic observing network (AON). The AON will collect, check, organize, and distribute arctic

observations while taking the necessary measures to continuously adapt and improve the network. Because many potential components of the network already exist or are being planned, and because of the surge of activity during the International Polar Year, there is an immediate opportunity for major progress.

4. Special Feature: Earth Science and NASA's Budget Request for FY 2007

The federal budget approval process has begun for FY 2007, causing researchers and the Congress to focus on science at NASA. To help inform NASA's budget request for FY 2007, the National Academies' [Committee on Earth Science and Applications from Space](#) released an interim report in April 2005 with the recommendation to continue the planning schedule for the Global Precipitation Measurement (GPM) mission without delay. NASA Administrator Michael Griffin testified on February 16, 2006 before the U.S. House of Representatives Science Committee. Mary Cleave, NASA's Associate Administrator for Science, testified on March 2, 2006 before the U.S. House of Representatives Science Committee.

NASA's FY 2007 budget request provides \$5.33 billion for all four areas of Science Mission Directorate: Astrophysics, Earth Science, Heliophysics, and Planetary Science. According to congressional testimony given by Associate Administrator Cleave, this budget request reflects 1.5 percent growth compared to the amount appropriated in FY 2006 and accounts for 1 percent growth per year thereafter through FY 2011. The Earth Science component of the FY 2007 science budget is \$1,530.7 million. The budget for research and analysis (R&A) has been reduced by 15 percent. The launch of the NOAA Polar Operating Environmental Satellite Series (NPOESS) Preparatory Project (NPP) is delayed until April 2008, and the launch of GPM is delayed to the end of 2012. The Hydros mission and the Deep Space Climate Observatory have been cancelled.

In her written remarks, Associate Administrator Cleave reported:

At the recent NASA Advisory Council meeting, the Science Committee requested a review of the R&A program to ensure that it is properly oriented toward the future, and provides adequate funding for younger researchers. We intend to discuss this issue further with the NASA Advisory Council, with representatives of the science community, and the [National Academies'] Space Studies Board, and will seek their advice to ensure that we maintain an appropriate mix within each SMD Divisions between R&A, small-, medium-, and large-class missions.

To help inform NASA's future Earth science priorities, the Committee on Earth Science and Applications from Space will release its final report by the end of the year.

5. Recently Released Reports

[Strategic Guidance for the National Science Foundation's Support of the Atmospheric Sciences: An Interim Report](#) provides preliminary guidance to the National Science Foundation's Division of Atmospheric Sciences (ATM) on its strategy for achieving its goals in the atmospheric sciences. The report reviews how the atmospheric sciences have evolved over the past several decades, analyzes the strengths and limitations of the various modes of support employed by ATM, and offers some preliminary recommendations regarding future directions for ATM.

[Review of NOAA's Plan for the Scientific Stewardship Program](#) provides input to NOAA on its draft "Scientific Data Stewardship (SDS) Implementation Plan." The SDS program will be responsible for processing, archiving, and distributing observations from satellite and supporting ground-based platforms for monitoring, diagnosing, understanding, predicting, modeling, and assessing climate variation and change. This report outlines ways to improve the draft plan.

[Review of the GAPP Science and Implementation Plan](#) provides a review of the GAPP Science and Implementation Plan, outlining suggestions to strengthen the plan and the GAPP program overall. The Global Energy and Water Cycle Experiment (GEWEX) Americas Prediction Project (GAPP) was established in 2001 to improve how changes in water resources are predicted on intraseasonal-to-interannual time scales for the continental United States.

[Review of the U.S. Climate Change Science Program's Synthesis and Assessment Product on Temperature Trends in the Lower Atmosphere](#) provides a review of the U.S. Climate Change Science Program (CCSP) synthesis and assessment report *Temperature Trends in the Lower Atmosphere: Understanding and Recognizing Differences*, which focuses on understanding reported differences between independently produced data sets of temperature trends for the surface through the lower stratosphere and comparing these data sets to model simulations.

[Thinking Strategically: The Appropriate Use of Metrics for the Climate Change Science Program](#) lays out a framework for creating and implementing metrics for the Climate Change Science Program (CCSP), which, along with its predecessor U.S. Global Change Research Program, has sponsored climate research and observations for nearly 15 years. However, the overall progress of the program has not been measured systematically. Metrics offer a tool for measuring such progress; improving program performance; and demonstrating program successes to Congress, the Office of Management and Budget, and the public. A general set of metrics provides a starting point for identifying the most important measures, and the principles provide guidance for refining the metrics and avoiding unintended consequences.

[Assessment 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. This report is the product of Phase I of a two-phase study on rainfall measuring missions. (See "Studies in Progress" below for information about Phase II, The Future of Rainfall Measuring Missions.)

[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.

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

[Earth-Atmosphere Interactions: A Workshop on Understanding and Responding to Multiple Environmental Stresses](#) will explore current understanding of multiple environmental stresses in the earth-atmosphere system on natural, managed, and socio-economic systems, and discuss the types of research needed to improve integrated understanding of these kinds of complex, nonlinear problems.

[Estimating and Communicating Uncertainty in Weather and Climate 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.

[The Future of Rainfall Measuring Missions](#) will provide advice on potential follow-on research and operational missions. In Phase I, the committee addressed how best to use the remaining TRMM spacecraft life (see [Assessment of the Benefits of Extending the Tropical Rainfall Measuring](#)

[Mission: A Perspective from the Research and Operations Communities](#)). 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. (See the committee's interim report [Strategic Guidance for the National Science Foundation's Support of the Atmospheric Sciences: An Interim Report.](#))

7. BASC in the Past: [Critical Issues in Weather Modification Research](#)

In 2000, BASC organized a workshop to gauge the need for a renewed look at the issue of weather modification research and operation, since the last NRC report on that topic had been published in 1973. The workshop resulted in a NOAA funded NRC study, chaired by Mike Garstang and composed of the following committee members: Roscoe Braham, Jr., Roelof Bruintjes, Steven Clifford, Ross Hoffman, Douglas Lilly, Bob Serafin, Paul Try, and Johannes Verlinde. The committee concluded that (1) despite a long history of human attempts to modify the weather, no convincing scientific proof of the efficacy of intentional weather modification could be found, mostly due to limited research efforts in weather modification; (2) with the progress in observational capabilities great opportunities exist to fill critical gaps in the understanding of physical processes leading to rain, snow, and hail; (3) instead of initiating large-scale operational weather modification programs, a coordinated effort in weather modification research should be designed to conduct basic research in the physical processes involved; and lastly, (4) that such basic research would also improve our understanding of how humans are inadvertently changing weather and climate.

The release of this report in 2003 met some fairly strong opposition from the Weather Modification Association (WMA) particularly in regards to the first and last conclusion mentioned above. As a result, three members of the committee (M. Garstang, R. Bruintjes, and R. Serafin) and four members of the WMA (H. Orville, B. Boe, W. Cotton, and J. Warburton) convened a workshop in May 2004 to discuss opposing opinions, which were summarized in a BAMS article (Garstang et al. 2004).

The latest chapter in the life of this report began last year with the introduction of the Bill S.517 in Congress by Senator Hutchison (R-Tx), with the goal to establish a Weather Modification Operations and Research Board. Dr. Garstang testified on behalf of the NRC committee during the senate hearing on this bill on November 10, 2005. The bill had incorporated the report's recommendation for a nationally-coordinated research effort and called for the establishment of a board composed of representatives from the American Meteorological Society, National Academy of Sciences, NOAA, universities, a state with operational weather modification research, and the American Society of Civil Engineers. While the November hearing was the latest discussion of this bill, the topic of weather modification efforts may well regain momentum in the public arena following severe droughts or active hurricane years.

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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, NorthWest 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 Inc.; Jennifer A. Logan, Harvard University; Vernon R. Morris, Howard University; F. Sherwood Rowland, University of California, Irvine; Thomas H. Vonder Haar, Colorado State University; Roger M. Wakimoto, National Center for Atmospheric Research; Chris Elfring (director, BASC).

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