

The BASC Newsletter, Volume 3, Number 3, 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](#).

December 2006

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1. Message from the Chair

Three years have passed very quickly and in December I will conclude my three-year term as Chair of the BASC. When I began as chair, the board was very healthy, so my experience has been pleasant without major stresses. My job was made easy by a wonderful and dedicated staff and outstanding board members.

We did institute some new initiatives, aimed at better communications with the community and at achieving broader community participation in BASC activities. The first mailing of the BASC tri-annual newsletter was in April 2004. We increased informal interactions with federal agency representatives through an annual breakfast in association with the spring BASC meeting. Publication of short summaries of BASC reports (two to four pages with illustrations) have been effective in providing information to the U.S. Congress, agency sponsors, the media, and the general public. We also instituted the practice of holding some meetings away from Washington, in order to provide opportunities for more scientists to attend BASC meetings and to provide input to us.

Of course the principal contributions from BASC are its detailed reports, providing advice on science, technology, and policy. If you take a few moments to examine the BASC website (<http://dels.nas.edu/basc/>), I'm sure you'll agree with me that the quality, quantity, relevance, diversity, and balance of the studies undertaken under BASC and its standing committee, the Climate Research Committee, are impressive. There is no doubt that the work of BASC is heard and its recommendations adopted. Moreover, BASC reports serve as authoritative references for research and education.

BASC's next chair will be Professor Sherry Rowland, an outstanding scientist and person. Sherry is exceptionally well qualified to lead BASC at a time when the atmospheric sciences are more important to the nation than ever before. Please join me in congratulating Sherry on his selection and thanking him for agreeing to serve.

Let me close by saying that it has been an honor to serve as chair. The experience was rewarding in many ways, but especially because of the opportunity to get to know and work with some great people. I extend my sincere thanks to the board and staff and wish them all continued success in the future.

Sincerely,
Bob Serafin
serafin@ucar.edu

2. Upcoming Meetings

- [AGU Union Session on "Surface Temperature Reconstructions Covering the Past Two Millennia," Moscone Center, December 11, 2006, San Francisco, California](#)
- [AGU Town Hall on "Scientific Accomplishments of Earth Observations from Space," Moscone Center, December 14, 2006, San Francisco, California \(see details under "What's New"\)](#)
- [Developing Mesoscale Meteorological Observational Capabilities to Meet Multiple National Needs, January 3-4, 2007, Washington, D.C.](#)
- [Scientific Accomplishments of Earth Observations from Space, January 24-25, 2007, Washington, D.C.](#)
- [Scientific Accomplishments of Earth Observations from Space, March 5-6, 2007, Irvine, California](#)

3. What's New

-- New Report: [Strategic Guidance for the National Science Foundation's Support of the Atmospheric Sciences](#) provides guidance to NSF's Division of Atmospheric Sciences (ATM) on its strategy for achieving its goals in the atmospheric sciences, including cutting-edge research, education and workforce development, service to society, computational and observational objectives, and data management. The report reviews how the atmospheric sciences have evolved over the past several decades and analyzes the strengths and limitations of the various modes of support employed by ATM. It concludes that ATM is operating in an environment that is ever more cross-disciplinary, interagency, and international, making a more strategic approach necessary to manage activities in a way that actively engages the atmospheric sciences community. At the same time, ATM should preserve opportunities for basic research, especially projects that are high risk and potentially transformative. Finally, ATM needs to be more proactive in attracting highly talented students to the atmospheric sciences as an investment in the ability to make future breakthroughs.

-- New Report: [Understanding and Responding to Multiple Environmental Stresses, Report of a Workshop](#) explores current understanding of multiple environmental stresses in the earth-atmosphere system on natural, managed, and socio-economic systems, and discusses the types of research needed to improve integrated understanding of these kinds of complex, nonlinear problems.

-- New Report: [NOAA's Role in Space-Based Global Precipitation Estimation and Application](#) is the second in a 2-part series on the future of rainfall measuring missions. The report recommends that NOAA begin its Global Precipitation Measurement (GPM) mission preparations as soon as possible and develop a strategic plan for the mission using the Tropical Rainfall Measuring Mission (TRMM) experience as a guide. The first report in the series, [Assessment of](#)

[*the Benefits of Extending the Tropical Rainfall Measuring Mission*](#) (December 2004), recommended that the TRMM mission be extended as long as possible because of the quality, uniqueness, and many uses of its data. NASA has officially extended the TRMM mission until 2009.

-- New Study: [Characterizing, Communicating, and Incorporating Scientific Uncertainty in Climate Decision Making](#) will review the U.S. CCSP's draft Synthesis and Assessment Product 5.2 entitled "Best-Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Climate Decision Making." The purpose of SAP 5.2 is to synthesize the current state of understanding about the characteristics and implications of uncertainty related to climate change and variability, and provide recommendations for best practices for characterizing, analyzing, and communicating that uncertainty. The NRC committee will provide a peer review of CCSP SAP 5.2.

-- AGU Union Session: Members and staff of the National Research Council's Committee on Surface Temperature Reconstructions for the Last 2,000 Years will chair a Union Session at the upcoming 2006 American Geophysical Union Fall Meeting in San Francisco titled "Surface Temperature Reconstructions Covering the Past Two Millennia" on Monday, December 11. The session includes contributions on the various types of proxy evidence and methods used to derive large-scale climate reconstructions for the past 2,000 years. Of special interest are updated proxy records or new proxy data from under-sampled regions, the spatial and temporal extent of past temperature anomalies as well as their central locations and timings, and reconstructions of solar and volcanic forcing, precipitation, or other climate variables over the past two millennia. There will be two sets of oral presentations beginning at 8:00 a.m. followed by a poster session in the afternoon. Further information can be found at the AGU Fall Meeting website: <http://www.agu.org/meetings/fm06/>.

-- AGU Town Hall: The National Research Council's Committee on the Scientific Accomplishments of Earth Observations from Space will hold a Town Hall at the upcoming 2006 American Geophysical Union Fall Meeting on Thursday, December 14, at 7:30 p.m. in Salons 1-3 at the Moscone Center in San Francisco, California.

NASA has asked the National Academies to form an ad hoc committee to identify the major scientific accomplishments, which were enabled by the unique vantage point of satellite observations of the Earth system. The development and use of satellites has allowed for an integrated Earth system science perspective, which was difficult to achieve before. The committee seeks broad input from the research community that develops and uses remote sensing observations of the Earth in research areas such as the atmosphere, biogeochemical cycles, ecosystems, climate variability and change, solid earth, hydrosphere, and cryosphere. At the town hall, members of the committee will seek input from the scientific community, which is involved in developing and using remote sensing observations of the Earth, on the following two questions: (1) How have satellite observations uniquely contributed to the scientific understanding of the atmosphere, ocean, land, biosphere, hydrosphere, and cryosphere? and (2) How did satellite observations contribute to the ability to predict variations in the Earth system (e.g., weather, climate variability, water availability, earthquakes, volcanic activity, etc.)? And how could we use satellite observations to improve future Earth science research?

If you are unable to attend the town hall meeting, submissions can be emailed directly to earth@nas.edu. For submissions to be considered by the committee, the following information is required: (1) Brief title; (2) Why is this considered a major accomplishment (new discovery? transformed the field? etc.—please provide a short paragraph); (3) How have satellite observations uniquely contributed? (4) Relevant key citations (at least 2-3 papers).

-- Call for Nominations: BASC is currently seeking nominations for new members of the Board. The volunteers who serve on BASC help design and oversee all of our activities, identify issues for study, provide oversight to ongoing activities, serve on study committees, and provide the

intellectual leadership for our program. Board meetings and “summer studies” also provide opportunities to raise science and policy concerns and foster discussion between scientists and decision makers. At this time we are particularly interested in people with expertise in climate modeling/numerical simulations, atmosphere-biosphere interactions, observation-based research, technology and instrumentation, synoptic meteorology, weather and climate services, science policy or law, science communications, or science management. Please submit your nominations to basc@nas.edu or by fax (202-334-3825) by Wednesday, January 3, 2007. Include the candidate’s name, affiliation, area of expertise, and a few sentences describing why the nominee is appropriate.

4. Special Feature: The Climate Research Committee Celebrates 25 Years

Since 1981, the Climate Research Committee (CRC) and associated ad hoc committees have done much to help shape the climate research agenda in the United States and internationally. On the evening of November 30, 2006, current CRC members, former CRC chairs and staff, BASC members and staff, members of the sponsor community, and other guests from the climate research community joined together to mark the CRC’s 25th anniversary. Following opening remarks by CRC Chair Antonio Busalacchi, BASC Chair Robert Serafin, and BASC Director Chris Elfring, attendees were invited to share their thoughts about the CRC’s history. Past chair Robert Dickinson, who led the committee from 1987 to 1990, remarked on how climate research activities have greatly expanded in scope and complexity in the intervening years, making the job of the CRC that much more challenging. Eugene Rasmusson, who chaired the committee from 1999 to 2003, reminisced about his time on CRC, in particular efforts to provide feedback to the World Climate Research Programme (WCRP) about their programs.

CRC has had a hand in nearly 40 publications over its tenure, on topics ranging from the adequacy of climate observing systems to climate modeling capabilities, from El Niño timescales to decadal-to-centennial climate change. The CRC has provided timely input on climate research programs organized in the United States as well as those undertaken by the WCRP. Whereas in years past the CRC authored reports itself, the committee’s primary role today is to enhance integration of a broad suite of climate-related activities at the National Academies. CRC works closely with its parent Board on Atmospheric Sciences and Climate (BASC), which has been an important partner in providing oversight to climate activities. CRC also collaborates with other entities across the National Academies in conducting studies, holding forums, and in other activities.

The CRC membership reflects the breadth of disciplines relevant to both natural climate variability and forced climate change. With interests ranging from basic to applied research and backgrounds spanning academic, public, and private sectors, the CRC is well-positioned to approach issues in climate research and applications in a highly integrative manner. Looking to the future, the CRC will continue to serve as an important link between the climate science community and those who organize and sponsor research at the national and international levels.

The current CRC membership includes: Antonio J. Busalacchi, Jr. (Chair), Lee E. Branscome, James A. Coakley, Jr., Clara Deser, Gabriele Hegerl, Robert J. Lempert, Roger B. Lukas, Linda O. Mearns, Gerald A. Meehl, Joyce E. Penner, Peter B. Rhines, W. James Shuttleworth, Taro Takahashi, Lonnie G. Thompson, and Hassan Virji. Past chairs of CRC are Joseph Smagorinsky (deceased, chair from 1981-1987), Robert Dickinson (chair from 1987-1990), Eric Barron (chair from 1990-1996), Tom Karl (chair from 1997-1999), Eugene Rasmusson (chair from 1999-2003).

5. Recently Released Reports

[Strategic Guidance for the National Science Foundation’s Support of the Atmospheric Sciences](#) provides guidance to NSF’s Division of Atmospheric Sciences (ATM) on its strategy for achieving

its goals in the atmospheric sciences, including cutting-edge research, education and workforce development, service to society, computational and observational objectives, and data management.

[Understanding and Responding to Multiple Environmental Stresses, Report of a Workshop](#) explores current understanding of multiple environmental stresses in the earth-atmosphere system on natural, managed, and socio-economic systems, and discusses the types of research needed to improve integrated understanding of these kinds of complex, nonlinear problems.

[NOAA's Role in Space-Based Global Precipitation Estimation and Application](#) is the second in a 2-part series on the future of rainfall measuring missions. The report recommends that NOAA begin its Global Precipitation Measurement (GPM) mission preparations as soon as possible and develop a strategic plan for the mission using the Tropical Rainfall Measuring Mission (TRMM) experience as a guide. The first report in the series, [Assessment of the Benefits of Extending the Tropical Rainfall Measuring Mission](#) (December 2004), recommended that the TRMM mission be extended as long as possible because of the quality, uniqueness, and many uses of its data. NASA has officially extended the TRMM mission until 2009.

[Surface Temperature Reconstructions for the Last 2,000 Years](#) describes and assesses the state of scientific efforts to reconstruct surface temperature records for the Earth over approximately the last 2,000 years using proxy data such as tree rings, ice cores, and historical documents. The report summarizes current scientific information on the temperature record for the last two millennia, describes the principal methodologies used to produce large-scale surface temperature reconstructions and the uncertainties associated with these approaches, and explains why the paleoclimate temperature record is not the primary evidence for the conclusion that climatic warming is occurring in response to human activities.

[Completing the Forecast: Characterizing and Communicating Uncertainty for Better Decisions Using Weather and Climate Forecasts](#) explores how to improve the generation, communication, and potential use of uncertainty information for hydrometeorological forecasts and makes recommendations for improvements. Uncertainty is a fundamental characteristic of weather, seasonal climate, and hydrological prediction and no forecast is complete without a description of its uncertainty. Effective communication of uncertainty helps people better understand the likelihood of a particular event and improves their ability to make decisions based on the forecast.

[Preliminary Principles and Guidelines for Archiving Environmental and Geospatial Data at NOAA: Interim Report](#) provides preliminary principles and guidelines that NOAA and its partners can use to begin planning specific archiving strategies for the data streams they currently collect. For example, the report concludes that the decision to archive environmental or geospatial data should be driven by its current or future value to society, and that funding for environmental and geospatial measurements should include sufficient resources to archive and provide access to the data these efforts generate. The preliminary principles and guidelines in this interim report will be refined and expanded in the final report that also address data access issues.

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

[Characterizing, Communicating, and Incorporating Scientific Uncertainty in Climate Decision Making](#) will review the U.S. CCSP's draft Synthesis and Assessment Product 5.2 entitled "Best-Practice Approaches for Characterizing, Communicating, and Incorporating Scientific Uncertainty in Climate Decision Making." The purpose of SAP 5.2 is to synthesize the current state of understanding about the characteristics and implications of uncertainty related to climate change and variability, and provide recommendations for best practices for characterizing, analyzing, and communicating that uncertainty. The NRC committee will provide a peer review of CCSP SAP 5.2.

[Developing Mesoscale Meteorological Observational Capabilities to Meet Multiple National Needs](#)

will develop an overarching vision for an integrated, flexible, adaptive, and multi-purpose mesoscale meteorological observation network and seek to identify specific steps to help develop a network that meets multiple national needs in a cost-effective manner. The study will focus primarily on mesoscale observational requirements over the United States and adjacent coastal zones, with emphasis on characterizing the planetary boundary layer, forecasting on time scales up to 48 hours, and the needs of urban areas. It will provide a practical approach, stressing applications and how to design and implement a system that will significantly improve users' decision making. The study will also address the roles of federal, state, and local government and by commercial entities.

[Scientific Accomplishments of Earth Observations from Space](#) will document major scientific accomplishments resulting from the unique vantage point provided by satellite observations of the Earth system. The study's main objective will be to document, using examples and explanation, how satellite observations uniquely contributed to scientific understanding of the atmosphere, ocean, land, biosphere, and cryosphere. The study will also address how satellite observations have contributed to the ability to predict variations in the Earth system (e.g., weather, climate variability, water availability, earthquakes, volcanoes, and tsunamis) and comment on opportunities to improve future Earth science research enabled by the vantage point of space. See the AGU town hall announcement under "Upcoming Meetings" for instructions on how to submit suggestions of major accomplishments for the committee to consider.

[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.

[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. A preliminary set of principles and guidelines for data archiving developed in the Committee's interim report, [Preliminary Principles and Guidelines for Archiving Environmental and Geospatial Data at NOAA: Interim Report](#), 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 committee's final report will also include specific examples of how these principles and guidelines could be applied to existing and planned data streams across NOAA.

7. BASC in the Past: Research and Education in Meteorology (*also known as "the blue book"*)

During the World War II years, educational programs in meteorology in the United States were expanded rapidly in response to the strong demand from the military for weather forecasters. After the War, many of those trained officers returned to their pre-War careers in other scientific and mathematical fields. However, the seeds were sown for the rapid expansion of meteorology into a research-oriented scientific discipline. The need for further advances in the understanding of atmospheric processes grew even greater with the onset of the Cold War. It was in this framework that in April 1956 the NRC convened the Committee on Meteorology "For the purpose of bringing together scientists from meteorology and related physical and geophysical fields to view in broad perspective the present position and future requirements of meteorological research and to recommend the general outline of a program which would accelerate progress in this important field." The Committee was chaired by Lloyd V. Berkner of Associated Universities and included Horace Byers, Henry Booker, Jule Charney, Hugh Dryden, Carl Eckart, Paul Klopsteg, Thomas Malone, and Edward Teller.

The Committee met six times during 1956 and 1957, working under the belief that “Meteorology [stood] on the threshold of a truly exciting and productive era—one in which man’s understanding of his environment [was] about to increase at a rapidly accelerating rate.” To that end, the Committee boldly recommended an immediate and sustained one-hundred percent increase in federal funding for university-based basic research in meteorology, and the establishment of a national institute for atmospheric research with a capital investment of \$50M and an annual budget of \$15M to provide research facilities and capabilities beyond the reach of a university department. The Committee also found that meteorology was facing an acute shortage of people power with the retirements of World War II veterans. It thus recommended that the national institute should further serve as a center of intellectual activity and be located in close proximity to universities having established programs in physical sciences, in order to facilitate the education and training of graduate students in meteorology.

The recommendations of the Committee on Meteorology had impacts that to this day shape the fundamental character of the atmospheric sciences. The National Center for Atmospheric Research was established in Boulder, Colorado in 1960 and continues its pre-eminent role in research in the atmospheric and related sciences. In 1956 only seven universities in the United States granted a doctorate degree in meteorology. Today six dozen universities have doctoral programs in the atmospheric sciences. As a result of these developments, meteorology has grown from a field that trained primarily weather forecasters into a richly diverse and mature scientific discipline.

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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. To unsubscribe, 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; 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).

We encourage you to share this newsletter with colleagues. If they would like to be added to the email list, a simple request to basc@nas.edu is all that is needed.