

The BASC Newsletter, Volume 5, Number 2, 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:

BASC is charged to look ahead and identify issues of importance to our communities. Our primary mechanism for addressing topics is to conduct focused, ad hoc studies. But we also use our Board meetings to explore issues. In June 2008, in place of the Board's traditional "summer study," (funding was not available this year), BASC elected to host an exploratory Discussion Forum on the topic: "Recent Developments in the Observation, Understanding, and Prediction of Severe Weather." This was a chance for in-depth discussion on severe storms, tornadoes, mesoscale convective complexes, flash floods, and winter storms. We heard about a variety of programs and asked about progress, future opportunities, and lingering challenges. Discussions were broken into three sessions: (1) Field Campaigns in Support of Improved Understanding and Prediction Capabilities, (2) New Operational Products and Services, and (3) New Observational Systems and Capabilities. We had 14 speakers and about 30 participants from various institutions and agencies. A meeting summary is being produced and will be posted on the BASC website in mid-September. The participants stressed the importance of continuing to further integrate the social sciences, particularly decision-making and public communication, into all facts of severe weather research and forecasting.

BASC would like to take this opportunity to thank the BASC members who ended their terms this summer: M. Joan Alexander, Northwest Research Associates; Carol Anne Clayson, Florida State University; Dennis L. Hartmann, University of Washington; Peter R. Leavitt, Weather Information Company. Without the vision and direction of our volunteer members, the Board could not operate. Each brought us an important perspective and I will count on them for continued advice in the future.

We also welcome our next class of members: Xubin Zeng, University of Arizona, Tucson; John T. Snow, University of Oklahoma; Kirk R. Smith, University of California,

Berkeley; Kimberly Prather, Scripps Institution of Oceanography; Raymond T. Pierrehumbert, The University of Chicago; Arthur Lee, Chevron Texaco Corp.; Isaac Held Geophysical Fluid Dynamics Laboratory, NOAA; Antonio J. Busalacchi, Jr., University of Maryland; Gregory S. Forbes, The Weather Channel, Inc.; Richard T. Carbone, The Institute for Integrative and Multidisciplinary Earth Studies, NCAR, and Kirstin Dow, University of South Carolina. These new members are joining BASC at a critical time: the importance of the Board as an independent and honest voice for science in the fields of weather and climate has never been more relevant.

Chris Elfring, Director

2. Upcoming Meetings

- October 20-21, 2008: Committee on the Significance of International Transport of Air Pollutants, Cambridge, MA
- October 30-31, 2008 (Tentative): Global Climate Change Study Committee Meeting, Washington, DC
- November 6-7, 2008: Board on Atmospheric Sciences and Climate, Washington, DC

3. What's New

New Report: [**Evaluation of the Multifunction Phased Array Radar Planning Process.**](#)

The year 2008 marks the 20th anniversary of the finalization of the design of the approximately 150 ground-based, mechanically rotating radars that comprise the Next Generation Radar (NEXRAD) network, known formally as the Weather Surveillance Radar 1988-Doppler (WSR-88D) network. This is the primary radar network in use by the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service for operational surveillance of meteorological phenomena. The design of the newest systems of the nation's civilian network of radars for aircraft surveillance and tracking, operated by the Federal Aviation Administration (FAA), was established at about the same time; some radars in the aircraft network were installed more than 40 years ago. This has prompted agencies including NOAA, the FAA, the Department of Defense, and the Department of Homeland Security to undertake planning for possible upgrades to or replacing of these existing "legacy" systems.

At the request of the Office of the Federal Coordinator for Meteorological Services and Supporting Research, the National Research Council convened a committee to evaluate the planning process for a proposed replacement system known as the Multifunction Phased Array Radar. The committee's report concludes that development efforts for the Multifunction Phased Array Radar, a system that could fulfill both weather and aircraft surveillance needs, should go forward, and that continued research should resolve key technical issues and determine whether the system could operate cost-effectively.

4. Recently Released Reports

[Earth Observations from Space: The First 50 Years of Scientific Achievements.](#)

Over the past 50 years, thousands of satellites have been sent into space on missions to collect data about the Earth. Today, the ability to forecast weather, climate, and natural hazards depends critically on these satellite-based observations. At the request of the National Aeronautics and Space Administration, the National Research Council (NRC) convened a committee to examine the scientific accomplishments that have resulted from space-based observations. This report describes how the ability to view the entire globe at once, uniquely available from satellite observations, has revolutionized Earth studies and ushered in a new era of multidisciplinary Earth sciences. In particular, the ability to gather satellite images frequently enough to create "movies" of the changing planet is improving the understanding of Earth's dynamic processes and helping society to manage limited resources and environmental challenges. The report concludes that continued Earth observations from space will be required to address scientific and societal challenges of the future.

[Environmental Data Management at NOAA: Archiving, Stewardship, and Access.](#)

NOAA collects, manages, and disseminates a wide range of climate, weather, ecosystem and other environmental data that are used by scientists, engineers, resource managers, policy makers, and others in the United States and around the world. The increasing volume and diversity of NOAA's data holdings—which include everything from satellite images of clouds to the stomach contents of fish—and a large number of users present NOAA with substantial data management challenges. NOAA asked the NRC to help identify the observations, model output, and other environmental information that must be preserved in perpetuity and made readily accessible, as opposed to data with more limited storage lifetime and accessibility requirements. This report offers nine general principles for effective environmental data management, along with a number of more specific guidelines and examples that explain and illustrate how these principles could be applied at NOAA.

[Analysis of Global Change Assessments: Lessons Learned.](#) Global change assessments inform decision makers about the scientific underpinnings of a range of environmental issues, such as climate change, stratospheric ozone depletion, and loss of biodiversity. Dozens of assessments have been conducted to date by various U.S. and international groups, many of them influencing public policies, technology development, and research directions. This report analyzes strengths and weaknesses of eight past assessments to inform future efforts. Common elements of effective assessments include strong leadership, extensive engagement with interested and affected parties, a transparent science-policy interface, and well defined communication strategies. The report identifies 11 essential elements of effective assessments and recommends that future assessments include decision support tools that make use of information at the regional and local level where decisions are made.

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

[The Significance of International Transport of Air Pollutants](#) will summarize the state of knowledge regarding the international flows of air pollutants into and out of the United States and across its various regions, on continental and intercontinental scales. It will also consider the impact of these flows on the achievement of environmental policy objectives related to air quality or pollutant deposition in the United States and abroad and impacts on regional and global climate change. The pollutants to be considered include ozone and its precursors, fine particles and their precursors, mercury, and persistent organic pollutants.

[Global Climate Change Study and Summit](#). The National Academies are planning to conduct a series of coordinated activities designed to advance the US response to climate change. These activities will:

- build on an extensive foundation of previous and ongoing work, including past NRC studies, current NRC activities, assessments and reports from other national and international organizations (including the Intergovernmental Panel on Climate Change, the U.S. Climate Change Science Program, and a wide range of nongovernmental organizations and private sector groups), and the scientific literature;
- tap experts and stakeholders from a range of communities including academia, business and industry, different levels of government, nongovernmental organizations, and the international community;
- analyze and assess different options and strategies for limiting the magnitude of future climate change, adapting to the impacts of climate change, advancing the science of climate change, and informing effective decisions and actions related to climate change;
- provide an integrated, cross-cutting assessment of important short-term actions and long-term strategies and investments, the most significant impediments to progress, and the major scientific and technical advances needed going forward; and
- produce forward-looking, action-oriented reports and derivative products that provide useful advice to decision makers at all levels and across the many sectors facing critical decisions related to climate change.

[Ecological Impacts of Climate Change](#). The Board on Life Sciences (BLS) has been asked by the United States Geological Survey to develop a booklet on the ecological impacts of climate change, similar to other booklets recently published by DELS on stem cells ([Understanding Stem Cells](#)) and microbial ecology ([Understanding Our Microbial Planet](#)) that were based on BLS reports. The “Ecological Impacts of Climate Change” booklet will be based on a NRC committee-authored report that will summarize and draw examples from published consensus documents like the recent report "Climate Change 2007: Impacts, Adaptation and Vulnerabilities" by Working Group II of the Intergovernmental Panel on Climate Change, as well as other NRC reports and published literature.

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.

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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: F. Sherwood Rowland (chair), University of California, Irvine; Rosina M. Bierbaum, University of Michigan; Antonio J. Busalacchi, Jr., University of Maryland; Richard (Rit) Carbone, National Center for Atmospheric Research; Walter F. Dabberdt, Vaisala Inc.; Kirstin Dow, University of South Carolina; Greg S. Forbes, The Weather Channel, Inc.; Isaac Held, National Oceanic and Atmospheric Administration; Arthur Lee, Chevron; Kirk R. Smith, University of California, Berkeley; John T. Snow, The University of Oklahoma; Thomas Vonder Haar, Colorado State University; Xubin Zeng, University of Arizona; 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.