January 3, 2013

MESSAGE FROM THE DIRECTOR

2012 was a busy year for BASC, particularly the late summer and fall. We completed 5 major projects this year, including reports such as A National Strategy for Advancing Climate Modeling and Weather Services for the Nation. Details of these and all our 2012 reports follow in this newsletter. If I look back over our portfolio of work over the year, some quick lessons jump to mind:

- The volunteer experts who make up our Board and its Committees and those who share their knowledge as invited speakers and workshop participants are amazing in their generosity (time and knowledge).
- The tight fiscal environment is a reality at all levels and we will need to demonstrate the added value of our work. We need to communicate in clear language, talk to wider audiences, and give guidance that can be implemented. Look to see us do new kinds of activities, in shorter timeframes, for more diverse audiences, across the spectrum from technology to policy.
- Climate remains controversial at the political level and this continues to affect what we are asked to do.

If I had two "wishes" for things the Board would be asked to do in 2013, they would be (1) to explore societal readiness for reacting to predicted extreme weather and (2) to explore the strengths and weaknesses of different ways of providing actionable climate information at the scales required by local and regional decision makers, whether for adapting to climate change or preparing ourselves to be a more resilient society.

Note that my wish is for someone to ask us to do these things. BASC has limited ability to be proactive in doing studies; we are structured and funded in such a way that the majority of our work has to be requested of us by agencies or others willing to fund the activity. In a previous newsletter, I described how the National Academies does its work because how we work is key to the credibility and impact of our studies. The next logical questions about our process are how are activities requested and how do we turn an idea into an activity.

Ideas for BASC activities can come via a variety of routes. Some activities are requested by Congress, and Congress directs an agency to provide the support. Many studies are requested and funded by federal agencies (sometimes one and sometimes multiple agencies with shared interests). Some projects are requested and funded (in whole or in part) by state agencies, professional societies,
private corporations, and foundations. Finally, ideas are also
generated by the volunteer members of BASC, based on community
input and their own sense of the issues. Despite our congressional
charter, we are a private nonprofit organization and not a government
entity: we do not receive funds via any regular government budget.
Instead, we have to raise the funds needed to do any project. This is
one of the great challenges of how we work: while we can generate
ideas and identify problems, we can only do in-depth work if
someone requests it and the requestor is willing to fund the activity.

Many projects start with a phone call or a briefing at a Board
meeting, where some group seeking advice explains what they
need. Once an idea is proposed—whether by BASC members or
others—the Board outlines the potential scope of the project. Often, a
small "action group" works with the requestors to develop the
questions to be addressed (the "statement of task"), identify the
expertise needed, and design a workplan. We interact with the
sponsor and other experts to ensure that we are asking the right
questions and doing a project that is timely, nationally important,
and scientifically valid. This can involve significant give and take,
until all parties agree that the project is properly scoped.

Different kinds of activities take different lengths of time: some
simple "meetings of experts" can be convened and held in a matter
of weeks; a full study might take 18 months. Costs can range from
$200,000 to $500,000 or more for a full consensus study with
recommendations. All board and committee members serve as
volunteers, so the funds are used for staff time, travel, and direct
expenses. Project work cannot start until we have received funding
and, frankly, sometimes the slowest part of the process is simply
waiting for the funds to arrive.

An Academy study can feel like a luxury in this time of constrained
budgets, but we think the value added, the independence, and the
credibility of our work outweighs the costs.

Finally, it is with mixed emotions that I write this message, as it will
be my last as director of BASC. While I will remain with the National
Academies, at the end of January I will step down from my roles with
BASC (and the Polar Research Board) and take a new position here,
leading our new program to work on issues in the Gulf of Mexico. It's
an exciting opportunity and a new way to help science have impact
on societal problems, but I will miss the regular contact with the
wonderful people of the climate and atmospheric science
communities.

Chris Eifring, BASC Director

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**BASC-Related Activities at the AMS Meeting**

Further information on the 93rd American Meteorological Society
Annual Meeting may be found on the [AMS website](http://www.ametsoc.org).

**Urban Meteorology: Forecasting, Monitoring, and Meeting
Users' Needs**

Tuesday, 8 January 2013; 8:45 AM
Room 19A (Austin Convention Center)
Although all weather is driven by large scale weather patterns, the characteristics of urban settings—such as buildings of varying heights and large areas of paved streets and parking lots—can generate a unique urban weather environment. Given that three out of five people worldwide are expected to live in an urban environment by 2030, accurately forecasting urban weather is becoming increasingly important to protect these densely-populated areas from the impacts of adverse weather events and ensure urban systems—transportation, energy, water—function effectively and economically. Currently, the diverse needs of users of meteorological data in the urban setting, such as emergency managers, urban planners, traffic managers, and utility services are not being well met by the scientific community, mainly because of limited communication between the two communities. Users of urban meteorological information need high-quality information available in a wide variety of formats that foster its use, within time constraints set by users’ decision processes. By advancing the science and technology related to urban meteorology with input from key end user communities, urban meteorologists can better meet the needs of diverse end users. A clear mechanism to help the urban meteorological community better identify user groups, reach out to them, and maintain an ongoing dialogue would lead to better urban weather forecasting and planning in the future.

This National Research Council report assesses what is needed to better meet end user needs and is intended to inform federal agencies and others responsible for planning and funding the next generation of research and development efforts in the field of urban meteorology. In this presentation, we will discuss both short-term needs, which might be addressed with small investments but promise large, quick returns, as well as future challenges that could require significant efforts and investments.

**Town Hall Meeting: National Climate Assessment: Further Defining Actionable Information**

Wednesday, 9 January 2013; 12:15-1:15 PM
Room 15 (Austin Convention Center)

As a follow-on to the National Climate Assessment Special Session, a lunchtime panel discussion will be organized to address defining "actionable" climate information around the various Assessment themes. The panel will also address how such information can be delivered to the public to better manage risk and guide adaptation. This panel discussion will build upon the 2011 WCRP Open Science Conference session, Climate Science in Service to Society: Private Sector Needs and Opportunities. BASC Chair Antonio Busalacchi, University of Maryland Council on Environment, and Nancy Colleton, Institute for Global Environmental Strategies, will organize the panel and include several public and private sector representatives.

**Estimating the Ecosystem Benefits of Urban Forestry: A Workshop**
This workshop, organized by the National Research Council, will examine the following:

- Current capabilities to characterize and quantify the benefits ("ecosystem services") provided by trees and forest canopy cover within a metropolitan area, including air pollution mitigation; water pollution mitigation; carbon sequestration; urban heat island mitigation; reduced energy demand from shading of buildings. The discussions may also consider benefits to public health and well-being.
- Key gaps in our understanding, and our ability to model, measure, and monitor such services; and improvements that may be needed to allow tree planting to be sanctioned as a "creditable" strategy in official regulatory control programs (i.e. for air quality, water quality, climate change response).
- Current capabilities for assigning quantitative economic value to these services, and strategies for improving these capabilities (in order, for instance, to allow for rigorous cost/benefit analyses, and for policies that compensate landowners for good forestry conservation and planting practices).
- The challenges of planning/managing urban forests in a manner that optimizes multiple ecosystem services simultaneously (e.g. synergies, trade-offs in selecting tree species, determining planting locations)
- Opportunities for enhancing collaboration and coordination among federal agencies, academic researchers, and other stakeholders.

See the BASC Website for more information.

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Media from BASC Webinars

On December 10, 2012, Dr. Henry Vaux, chair of the authoring committee of the NRC report *Himalayan Glaciers: Hydrology, Climate Change, and Implications for Water Security*, discussed the committee's analysis and conclusions about water supply in the Himalayan region.

- [Listen to the recording of the webinar](#)
- [View the presentation slides](#)

A slideshow of stunning images and data-rich maps is also available.

At the webinar on the NRC report *Urban Meteorology: Forecasting, Monitoring, and Meeting Users' Needs*, held on June 26, 2012, committee co-chairs John Snow and Xubin Zeng discussed the report's conclusions about the needs of end user communities, focusing in particular on needs that are not being met by current
Employment Opportunity: Future Earth Interim Director

Future Earth is looking for an Interim Director to lead the program during the transition phase to it becoming fully operational in 2014, starting as soon as possible and lasting 18 months. The closing date for applications is February 15th. Future Earth is a 10-year international program on Earth system research for global sustainability. Its goal is to develop the knowledge required for societies worldwide: to face challenges posed by global environmental change and to identify and implement solutions and opportunities for a transition to global sustainability.

Further information may be found at the ICSU website: http://www.icsu.org/news-centre/jobs-at-icsu/vacancy-future-earth-interim-director

Recent Reports

A National Strategy for Advancing Climate Modeling

As climate change has pushed climate patterns outside of historic norms, the need for detailed projections is growing across all sectors, including agriculture, insurance, and emergency preparedness planning. *A National Strategy for Advancing Climate Modeling* emphasizes the needs for climate models to evolve substantially in order to deliver climate projections at the scale and level of detail desired by decision makers, this report finds. Despite much recent progress in developing reliable climate models, there are still efficiencies to be gained across the large and diverse U.S. climate modeling community. Evolving to a more unified climate modeling enterprise—in particular by developing a common software infrastructure shared by all climate researchers and holding an annual climate modeling forum—could help speed progress.

Throughout this report, several recommendations and guidelines are outlined to accelerate progress in climate modeling. The United States supports several large global climate models, each conceptually similar but with components assembled with slightly different software and data output standards. If all U.S. climate models employed a single software system, it could simplify testing and migration to new computing hardware, and allow scientists to compare and interchange climate model components, such as land surface or ocean models. *A National Strategy for Advancing Climate Modeling* recommends an annual U.S. climate modeling forum be held to help bring the nation's diverse modeling communities together with the users of climate data. This would provide climate model data users with an opportunity to learn more about the
strengths and limitations of models and provide input to modelers on their needs, as well as provide a venue for discussions of priorities for the national modeling enterprise, and bring disparate climate science communities together to design common modeling experiments.

In addition, *A National Strategy for Advancing Climate Modeling* explains that U.S. climate modelers will need to address an expanding breadth of scientific problems while striving to make predictions and projections more accurate. Progress toward this goal can be made through a combination of increasing model resolution, advances in observations, improved model physics, and more complete representations of the Earth system. To address the computing needs of the climate modeling community, the report suggests a two-pronged approach that involves the continued use and upgrading of existing climate-dedicated computing resources at modeling centers, together with research on how to effectively exploit the more complex computer hardware systems expected over the next 10 to 20 years.

- Read/Purchase

**Weather Services for the Nation: Becoming Second to None**

During the 1980s and 1990s, the National Weather Service (NWS) undertook a major program called the Modernization and Associated Restructuring (MAR). The MAR was officially completed in 2000. No comprehensive assessment of the execution of the MAR plan, or comparison of the promised benefits of the MAR to its actual impact, had ever been conducted. Therefore, Congress asked the National Academy of Sciences to conduct an end-to-end assessment. That report, *The National Weather Service Modernization and Associated Restructuring: A Retrospective Assessment*, concluded that the MAR was a success.

Now, twelve years after the official completion of the MAR, the challenges faced by the NWS are no less important than those of the pre-MAR era. The three key challenges are: 1) keeping pace with accelerating scientific and technological advancement, 2) meeting expanding and evolving user needs in an increasingly information centric society, and 3) partnering with an increasingly capable enterprise that has grown considerably since the time of the MAR.

*Weather Services for the Nation: Becoming Second to None* presents three main recommendations for responding to these challenges. These recommendations will help the NWS address these challenges, making it more agile and effective. This will put it on a path to becoming second to none at integrating advances in science and technology into its operations and at meeting user needs, leading in some areas and keeping pace in others. It will have the highest quality core capabilities among national weather services. It will have a more agile organizational structure and workforce that allow it to directly or indirectly reach more end-users,
save more lives, and help more businesses. And it will have leveraged these capabilities through the broader enterprise. This approach will make possible societal benefits beyond what the NWS budget alone allows.

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- Report in Brief

**Himalayan Glaciers: Climate Change, Water Resources, and Water Security**

Scientific evidence shows that most glaciers in South Asia's Hindu Kush Himalayan region are retreating, but the consequences for the region's water supply are unclear, this report finds. The Hindu Kush Himalayan region is the location of several of Asia's great river systems, which provide water for drinking, irrigation, and other uses for about 1.5 billion people. Recent studies show that at lower elevations, glacial retreat is unlikely to cause significant changes in water availability over the next several decades, but other factors, including groundwater depletion and increasing human water use, could have a greater impact. Higher elevation areas could experience altered water flow in some river basins if current rates of glacial retreat continue, but shifts in the location, intensity, and variability of rain and snow due to climate change will likely have a greater impact on regional water supplies.

*Himalayan Glaciers: Climate Change, Water Resources, and Water Security* makes recommendations and sets guidelines for the future of climate change and water security in the Himalayan Region. This report emphasizes that social changes, such as changing patterns of water use and water management decisions, are likely to have at least as much of an impact on water demand as environmental factors do on water supply. Water scarcity will likely affect the rural and urban poor most severely, as these groups have the least capacity to move to new locations as needed. It is predicted that the region will become increasingly urbanized as cities expand to absorb migrants in search of economic opportunities. As living standards and populations rise, water use will likely increase-for example, as more people have diets rich in meat, more water will be needed for agricultural use. The effects of future climate change could further exacerbate water stress.

*Himalayan Glaciers: Climate Change, Water Resources, and Water Security* explains that changes in the availability of water resources could play an increasing role in political tensions, especially if existing water management institutions do not better account for the social, economic, and ecological complexities of the region. To effectively respond to the effects of climate change, water management systems will need to take into account the social, economic, and ecological complexities of the region. This means it will be important to expand research and monitoring programs to gather more detailed, consistent, and accurate data on demographics, water supply, demand, and scarcity.

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- Report in Brief
Urban Meteorology: Forecasting, Monitoring, and Meeting Users’ Needs

According to the United Nations, three out of five people will be living in cities worldwide by the year 2030. The United States continues to experience urbanization with its vast urban corridors on the east and west coasts. Although urban weather is driven by large synoptic and meso-scale features, weather events unique to the urban environment arise from the characteristics of the typical urban setting, such as large areas covered by buildings of a variety of heights; paved streets and parking areas; means to supply electricity, natural gas, water, and raw materials; and generation of waste heat and materials.

*Urban Meteorology: Forecasting, Monitoring, and Meeting Users’ Needs* is based largely on the information provided at a Board on Atmospheric Sciences and Climate community workshop. This book describes the needs for end user communities, focusing in particular on needs that are not being met by current urban-level forecasting and monitoring. *Urban Meteorology also* describes current and emerging meteorological forecasting and monitoring capabilities that have had and will likely have the most impact on urban areas, some of which are not being utilized by the relevant end user communities.

*Urban Meteorology explains* that users of urban meteorological information need high-quality information available in a wide variety of formats that foster its use and within time constraints set by users' decision processes. By advancing the science and technology related to urban meteorology with input from key end user communities, urban meteorologists can better meet the needs of diverse end users. To continue the advancement within the field of urban meteorology, there are both short-term needs—which might be addressed with small investments but promise large, quick returns—as well as future challenges that could require significant efforts and investments.

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- Report in Brief

A Review of the U.S. Global Change Research Program's Strategic Plan

"Global change research" engages agencies and departments across the federal government in many diverse activities, coordinated by the U.S. Global Change Research Program (USGCRP). The USGCRP is developing a 10-year Strategic Plan to strengthen the Program's role in sustaining a strategically-driven, coordinated national effort. As independent advisor to the Program, a National Research Council committee has reviewed the draft Plan. The committee encourages the Program's intent to broaden its focus, to address not only
climate change, but also climate-related global changes, and the committee identifies a number of key issues regarding the Program's scope, goals, and capacity to meet those goals over the coming 10 years.

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The National Weather Service Modernization and Associated Restructuring: A Retrospective Assessment

During the 20th century, the National Weather Service was unable to keep up with the pace of technological advances and as a result was nearly obsolete by the 1980s. Between 1989 and 2000, the nation invested an estimated $4.5 billion to modernize and restructure the National Weather Service. Efforts to modernize the National Weather Service succeeded in achieving major improvements for the weather enterprise. This report assesses the modernization effort and identifies lessons learned from the process.

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- Report in Brief

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Studies in Progress


Understanding and Monitoring Abrupt Climate Change and its Impacts. This study will address the likelihood of various physical components of the Earth system to undergo major and rapid changes (i.e., abrupt climate change) and, as time allows, examine some of the most important potential associated impacts and risks. This study will explore how to monitor climate change for warnings of abrupt changes and emerging impacts.

Visit the BASC Website at http://dels.nas.edu/basc.

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