

**Testimony Regarding Fiscal Year 2012 Funding for  
Federal Science and Technology Programs  
Submitted to the Subcommittee on Commerce, Justice, Science and Related Agencies  
Committee on Appropriations  
United States House of Representatives  
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**Submitted by  
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On behalf of the University Corporation for Atmospheric Research (UCAR), I submit this testimony to the House Appropriations Subcommittee on Commerce, Justice, Science and Related Agencies for the Committee record. UCAR is a consortium of over 100 research institutions, including 76 doctoral-degree granting universities, that manages and operates the National Center for Atmospheric Research (NCAR) for the National Science Foundation.

***On behalf of the geosciences research community represented by UCAR, we urge the Subcommittee to support the President's request for science funding in the Fiscal Year 2012 Commerce, Justice, Science and Related Agencies Appropriations Act, including \$7.767 billion for the NSF, \$5.017 billion for the Science Mission Directorate of the National Aeronautics and Space Administration (NASA), and at least \$5.498 billion for the National Oceanic and Atmospheric Administration (NOAA).***

At a time when our nation is facing both significant economic challenge and the need for fiscal restraint, preserving and strengthening our nation's talent and investments in scientific research is prudent and more necessary than ever. Since World War II, federally-funded scientific research and development (R&D) produces innovations that spawn new industries and reinvigorate existing industries, driving the engines of worker productivity, job growth, and the economy. Countless economic studies over the years have demonstrated this link between federally-funded science R&D and economic vitality and competitiveness.

The bipartisan National Commission on Fiscal Responsibility and Reform noted: "While we should cut red tape and unproductive government spending that hinders job creation and growth, we must invest in education, infrastructure, and high-value research and development to help our economy grow, keep us globally competitive, and make it easier for businesses to create jobs."

In the field of atmosphere sciences, research programs funded by NSF, NASA and NOAA improve our ability to forecast weather that impacts key sectors of our economy such as agriculture, transportation, and aviation; understand how long-term weather trends will affect public health and national security; help communities, businesses, and the nation as a whole become more resilient to extreme weather, predict the effects of solar storms on global communications networks; and contribute to the search for solutions to the challenge of delivering energy, food, and water in more sustainable ways. In short, NSF, NASA and NOAA help meet the pressing economic and environmental challenges of our times. I would like to comment in some detail on the budget requests for these agencies:

**National Science Foundation.** NSF provides for over 60 percent of the nation's basic, non-health research conducted at U.S. colleges and universities, including close to 70 percent of the nation's basic geosciences research. Nearly all of this work is funded through a competitive, peer review process that ensures that grants and cooperative agreements are awarded for the best proposals. In total, NSF supports almost 300,000 researchers, fellows, teachers, and students every year. It is indispensable to our nation's scientific R&D enterprise.

We urge the Subcommittee to support the President's ongoing commitment to double NSF funding, consistent with the America COMPETES Act of 2010, which Congress passed last year with bipartisan support. ***The President's \$7.767 billion FY 2012 budget request for NSF keeps the agency on track to reach this goal. We urge you to support this overall NSF request and to fund the \$979 million request for NSF's Geosciences Directorate (GEO).***

GEO supports a broad and diverse academic field that contributes to our understanding of long term weather, extreme weather, dynamics of water resources, effects of the Sun on the Earth, effects of space weather on global communications, interactions of the Earth's systems, energy resources, geologic hazards, and all aspects of the global oceans. GEO's Atmospheric and Geospace Science (AGS) program supports research that saves lives and property through better prediction and understanding of weather-related and other natural hazards such as tornados, hurricanes, snow storms, droughts, and solar storms. Cities, communities, and businesses use this research to prepare for and mitigate the effects of these and other hazards.

***Within GEO, we urge you to support the President's AGS FY12 request of \$286.3 million and the \$100.0 million request for the National Center for Atmospheric Research (NCAR).*** NCAR is the national hub for research for the atmospheric sciences community, and the entire community depends on having access to its facilities, data, and research collaborations. While we are supportive of NSF's efforts to create interdisciplinary cross-directorate programs, without adequate overall funding these activities come at the expense of base programs like NCAR. Thus, we urge you to support the President's full request of \$100 million for NCAR as well as the requested additional funds to support new activities.

**National Aeronautics and Space Administration – Science Mission Directorate.** The research conducted and data collected by NASA's Science Mission Directorate are essential to atmospheric sciences research and global Earth observations. Through the use of space observatories, satellites, and other probes, NASA helps us achieve a deeper understanding of Earth, including answers to how the Earth's long-term weather patterns may be changing. ***We urge the Subcommittee to support the President's FY 2012 budget request of \$5.017 billion for NASA's Science Mission Directorate, including \$1.653 billion for Earth Science.***

As the federal government and NASA prioritize among competing priorities, the National Academy of Sciences decadal survey, *Earth and Science Applications from Space: National Imperatives for the Next Decade and Beyond*, released in 2007, continues to provide a critical set of recommendations of the most compelling needs in Earth observation in the years to come. After years of study and risk reduction, we commend NASA and Congress for enabling the implementation of this report and with it the measurements, science, and applications needed to meet societal needs.

The anticipated launches in 2011 and ongoing development of new satellites as recommended by the scientific survey will contribute to essential support of national priorities regarding the mitigation, assessment, and response to catastrophic natural hazards on the rise globally as well as environmental change observations needed to develop appropriate national and regional responses in the future. Given the critical importance of these measurements to scientists, state and city planners, first responders, and governors, the nation must not allow any further delay in the deployment of these resources needed for our states and localities to wisely and appropriately adapt in the decades to come.

The **Orbiting Carbon Observatory 2 (OCO-2)**, **Landsat Data Continuity Mission (LDCM)**, and the **Global Precipitation Measurement (GPM) Mission**, are in preparation for launches in FY 2013, and FY12 funding must be sustained to ensure that prior taxpayer investments are leveraged for the full benefit of society. The OCO-2 is being designed to make precise, time-dependent global measurements of atmospheric carbon dioxide that should greatly expand our understanding of the sources, sinks, and behavior of this key greenhouse gas.

FY12 will initiate the first two decadal survey missions, the **Soil Moisture Active & Passive (SMAP) Mission**, which will map soil moisture and freeze / thaw states from space, and the **Ice, Cloud, and Land Elevation Satellite-2 (ICESat-2)**, which will quantify polar ice sheet contributions to sea level change and collect better data on the characteristics of sea ice. At the same time, it is a disappointment that a delay is proposed for two critical probe missions: the **Deformation, Ecosystem Structure and Dynamics of Ice (DESDynI) Mission**, a dedicated U.S. InSAR and LIDAR mission optimized for studying hazards and global environmental change; and the **Climate Absolute Radiance and Refractivity Observatory (CLARREO) Mission**, which will monitor the pulse of the Earth to better understand climate change. We urge speedy development of these valuable probes.

I want to thank the Committee for its past support of **Global Learning and Observations to Benefit the Environment (GLOBE)** at \$5 million and ask that you fund its inclusion in both the NASA and NOAA budgets. This proven, experiential program supports the collaboration of students, teachers, and scientists on inquiry-based investigations of the environment and the Earth system involving more than 1 million students, 50,000 teachers and 20,000 schools around the world. NASA and NOAA have both supported this important program for many years. In FY11, NOAA was willingly directed by the Congress to rejoin the program. This renewed partnership between NASA and NOAA has been critical for the program and for the fulfillment of both agency missions relating to education. However, NOAA was directed to treat GLOBE as a congressionally directed project and to zero out NOAA's \$3 million commitment to NASA for FY12. We ask that those GLOBE funds of \$3 million, preferably as a stand-alone item, or be restored from NOAA's Competitive Education Grants Program in order to keep this proven global education program operating.

**National Oceanic and Atmospheric Administration.** Last fall, well before the temperatures dipped and the snow and ice assaulted much of the nation, NOAA issued its winter forecast, calling for a season of extremes – blizzards, ice storms and heavy snow were predicted far enough in advance to warn the public to take the necessary steps to prepare for disruptive weather. This is the type of economically beneficial and life-saving activity provided to the nation by this agency.

Without ongoing collaborations with universities and industry partners, NOAA would struggle to meet the needs of the nation, given inadequate funding for numerous activities. **For FY 2012, the President requests a total of \$5.498 billion for NOAA, roughly the same as the current fiscal year's request – definitely not enough for this critical service and research agency.** Following are programs of the highest priority to the broad atmospheric sciences research community that supports NOAA's mission:

*National Environmental Satellite Service (NESS) – The Joint Polar Satellite System (JPSS) is NOAA's portion of the restructured National Polar-orbiting Operational Environmental Satellite System (NPOESS). **UCAR urges the Committee to provide the requested \$1.07 billion for JPSS in FY 2012.** JPSS is a national priority, with the capacity to meet civil and military needs for weather-forecasting, storm tracking and the study of long-term weather trends. This investment will improve warning lead times for severe storms; information used by such sectors as agriculture, transportation, and energy production. The system will address NOAA's requirement to provide global environmental data used in operational weather prediction models used for near-term (1-3 day) and mid-term (3-5 day) forecasts. Because of the lack of an FY11 appropriations bill, the launch of JPSS has slipped two years to 2016. *To meet the increasingly dire needs of the nation, JPSS must ramp up immediately before current systems fail.**

JPSS instruments will provide critical atmospheric measurements of sulfur dioxide, nitrous oxide, water vapor, methane, ozone, soot, carbon dioxide, aerosols, and solar energy reaching the Earth's atmosphere and the Earth's reflected and radiated energy. These data were identified in 2007 as the top priority by the joint NOAA-NASA climate assessment of the National Research Council. The Total Solar Irradiance Sensor, the Clouds and Earth's Energy System and the Ozone Mapping and Profiler Suite-Limb sensors will provide critically important continual data to researchers and decision-makers. ***We urge you to support the President's request of \$30.4 million for Joint Polar Satellite System instruments.***

Also within NESS, the COSMIC program is an example of a cost effective means of improving weather forecasts. The COSMIC-1 proof of concept using GPS Radio Occultation proved so successful five years ago, that NOAA is committed to transitioning it to operational use. Currently, approximately 1,000 weather balloons are launched in the world each day, typically over land. COSMIC-1 provides more global coverage with an additional 2,000 soundings per day that have an even distribution and accuracy rate over the ocean and land. COSMIC-2 will provide over 8,000 soundings per day, resulting in significantly more accurate long range forecasts. ***UCAR urges the Committee to appropriate the requested \$11.3 million for COSMIC-2 in FY 2012.*** This program has been delayed considerably; further delay could jeopardize the funding of international partners including Taiwan, an ally that is providing the bulk of the program funds. This is an excellent leveraging opportunity that must not be lost.

*Climate Service Office – Decision-makers spanning diverse sectors – from recreation to water use – have been asking for better, more concise information about climate variability. NOAA has responded to the demands for climate information by proposing a reorganization that would shift relevant resources from various line offices to this new office. **UCAR supports NOAA's forward-thinking and responsive reorganization, and encourages Congress to approve it.***

The proposed Climate Service line office will manage the Competitive Research Program in which NOAA funds climate science to advance understanding of the Earth's climate system and its atmospheric, oceanic, land, and snow and ice components. Grants in the FY 2012 budget will address priority research topics in the areas of climate monitoring; earth system science; modeling, analysis, predictions, and projections; and climate and societal interactions. ***UCAR urges the Committee to provide \$64 million for NOAA's Competitive Research Program.***

*Office of Oceanic and Atmospheric Research (OAR)* – Among OAR's responsibilities is the successful extramural U.S. Weather Research Program (USWRP). The university community plays a pivotal role in this research program that works in close collaboration with the National Weather Service to transition research to useful weather and air quality applications. University collaboration in this work leverages what OAR can accomplish with minimal resources. The FY11 request for USWRP was \$5.5 million. ***UCAR urges the Committee to appropriate \$5.5 million for the U.S. Weather Research Program.***

OAR includes also the Integrated Ocean Acidification (OA) program. There is evidence that rising atmospheric carbon dioxide concentrations will cause changes in the ocean's chemistry, and that those changes will affect some of the most fundamental biological and geochemical processes of the sea. Seawater chemistry may change in coming decades and centuries that will dramatically alter marine life. NOAA's Integrated Ocean Acidification program will provide mitigation and adaptation strategies to address such changes. ***UCAR asks the Committee to provide the requested \$11.6 million for Integrated Ocean Acidification in FY 2012.***

*National Weather Service (NWS)* – NWS is a 24/7 operation, and is this nation's sole authoritative source for issuing warnings and forecasts related to weather, severe weather, and long term weather trends. Every day for the U.S., its territories, adjacent waters and ocean areas the NWS provides vital information regarding transportation safety, marine conditions, fire weather, air quality, agriculture, and flooding. ***The value of the National Weather Service cannot be overstated, and UCAR urges Congress's continued strong support for its many critical activities.***

In upcoming years, solar activity, including flares that release immense magnetic energy that can harm power grids, electronic communication, and satellite systems, is predicted to peak. NOAA's Space Weather Prediction Center (SWPC), part of NOAA's National Weather Service, is the nation's official source of space weather forecasts, alerts, and warnings. With a solar max expected in 2013, this is a critical time when NOAA must continue to provide alerts, watches, warnings, and forecasts to customers to ensure the nation's infrastructure is not disrupted. ***UCAR asks the Committee to provide the requested \$11.6 million for NOAA's Space Weather activities in FY 2012.***

Thank you for your service to our nation's scientific enterprise and for the opportunity to express these views on behalf of the geosciences community.