05 November 2015

Dear Member of Congress:

On behalf of the American Geophysical Union (AGU) and its 60,000 members – Earth and space scientists working for the benefit of humanity, we would like to thank you for your support in reducing the detrimental effects that sequestration has had on the American scientific effort. As you begin crafting a budget that meets the new requirements of the *Bipartisan Budget Act of 2015*, we urge you to recognize that investing in geoscience research is essential to the well-being and prosperity of the United States and its citizens.

The *Bipartisan Budget Act of 2015* provides a 5.2% increase in discretionary spending for FY 2016. We encourage you to enact spending bills that provide a parallel increase in funding for our federal science agencies, including NASA, NSF, NOAA, and USGS. A 5.2% increase in funding would help the U.S. to retain its leadership in innovation and remain prosperous economically. Without this level of growth, our federal science agencies will be unable to maintain cutting-edge research in all fields, train enough future scientists to fulfill national needs, provide better weather forecasts or begin new programs. Here are a few examples of the types of critical missions that additional funding will allow NASA, NSF, NOAA, and USGS to pursue for the benefit of the nation:

- NSF is responsible for funding the majority of our nation's basic research and ensuring the global competitiveness of the US scientific enterprise. NSF funds 20% of all university-based research and 64% of all basic geoscience research done at universities. Over the past 5 years, the NSF Geosciences Directorate (GEO) has awarded over $138 million dollars to scientists in Texas. In the mid-1980s, Dr. Kitty Milliken received an NSF grant to fund her basic research into mud at the University of Texas. Dr. Milliken, who had been recently laid off from an oil company, began an "esoteric" study into tiny crystals found in mud. Thirty years later, this research underlies breakthroughs in the shale oil and gas industry. In 2013, Texas' shale produced 29% of America's natural gas, and so far, the shale oil and gas industry has contributed over $300 billion in economic activity to Texas.

- Additionally, NSF funding is critical for supporting our future science and engineering workforce through grants for graduate and undergraduate level students. For example, in the summer of 2013, the NSF Geosciences Directorate (GEO) funded 728 research experience for undergraduates (REU) grants, which was only 8.7% of the applications NSF GEO received by students seeking research experience that summer – with the result that NSF was forced to turn away many hundreds of highly qualified students. Field research is critical to a career in many industries - such as the oil and gas industry. With an expected shortfall of 150,000 trained geoscientists by 2022 - without strong federal support of NSF and programs like REU, industries may begin to look outside of the U.S. to fill these positions. Earth science provides an invaluable talent pool for innovative research, public and

2000 Florida Avenue, NW, Washington, DC 20009-1277
Tel: 202.462.6900
Fax: +1 202.328.0566
www.agu.org

environmental safety, and natural resources exploration and management, including America's oil and gas industry. Twenty-eight percent of geoscience graduates pursue careers in oil and natural gas extraction. Texas leads the nation in the number of geoscience graduates and current geoscience students and employs more geoscientists than any other state in the U.S.

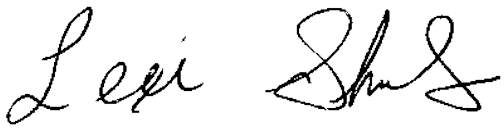
- Earth science within NASA provides a broad array of benefits and applications across the public and private sectors. In the wake of the 2010 Deepwater Horizon oil spill, for example, NASA's UAVSAR (Uninhabited Aerial Vehicle Synthetic Aperture Radar) project allowed response teams to characterize the type of oil that was spilled, track the movement of the oil into coastal waterways, and assist in monitoring the impact and recovery of affected areas along the Gulf of Mexico. These capabilities were critical for assessing the potential harm and targeting response efforts. UAVSAR continues to monitor the Gulf of Mexico to ensure that the Deepwater Horizon site has no additional leaks.

- NOAA's Verification of the Origins in Tornadoes Experiment in the Southeast U.S. (VORTEX-SE) is a new research program aimed at improving tornado forecasts and warnings in the Southeast U.S. (including Texas) and will build off of best practices and knowledge gained from earlier research projects in the Great Plains. The project aims to better evaluate what environmental factors affect the intensity and path of tornadoes as well as understand how the public perceives and reacts to tornado warnings, improving evacuation efforts. Collectively, this project has the capability of better protecting our homes and citizens from destructive and deadly tornadoes. VORTEX-SE is funded under a one-time Congressional allocation for FY 2015, but that funding only covered deployment, operation, and data analysis; the allocation does not cover the cost of development or acquisition of any instruments. Fourteen instruments were identified as important to the project, however eight of those instruments are not guaranteed or unlikely to be part of the project.

- On 30 October 2015, USGS field crews measured record flooding after intense rainfall in parts of central Texas. USGS crews will keep tracking the movement of the floodwaters as rains continue and the water moves downstream. This information is critical for resource managers and emergency responders to help protect life and property. There are about 520 USGS-operated streamgages in Texas that measure water levels, streamflow and rainfall. When flooding occurs, USGS crews make numerous discharge measurements to verify the data USGS provides to federal, state and local agencies, as well as to the public. To make sure the public and businesses are aware of dangerous water conditions in their area, USGS also maintains up-to-date warnings and information through WaterAlert and Streamer, two apps the public can use to monitor local water levels. Without adequate funding, our country will be less aware and less able to prepare for extreme weather events, such as flooding.

In order to continue crucial and cutting edge research initiatives and put America back on a path to scientific growth and progress, we ask that you provide at least a 5.2% increase in funding across NASA, NOAA, NSF, and USGS. When drafting appropriations legislation, we also urge you to avoid policy riders that deprioritize the geosciences, limit the ability of federal scientists and researchers to attend scientific and technical meetings, or restrict the use of climate data. Such riders impede the rate of scientific progress, slow economic growth, and put our national security at risk. America's economic strength, public safety, and national security depend on our commitment to invest in the Earth and space sciences.
Thank you for your consideration of our requests.

Sincerely,



Alexandra Shultz
Public Affairs Director
American Geophysical Union (AGU)