

Weather and Climate in the FY 2016 Budget

Paul A.T. Higgins

[American Meteorological Society](#) [1]

Shalini Mohleji

[American Meteorological Society](#) [1]**In this chapter:**

- [NOAA, NASA, and NSF](#) [2]
- [DOE, DOI, and USDA](#) [3]
- [EPA and USGCRP](#) [4]

HIGHLIGHTS

- The President proposes relief from sequestration, which will otherwise return in FY 2016. A return to sequestration would constrain non-defense discretionary funding, which includes weather and climate related research, relative to FY 2015.
- The National Aeronautics and Space Administration (NASA) requests a large proportional increase in funding (over 30 percent) for its Applied Science Program (ASP), which promotes the application of results from NASA's observations and research for societal benefit through partnerships with public and private organizations.
- The National Science Foundation (NSF) has prioritized resilience to extreme events through PREEVENTS (Prediction of and Resilience against Extreme Events), a new agency-wide focus on risk and resilience.
- The U.S. Global Change Research Program (USGCRP), which coordinates and integrates research over 13 executive branch departments and agencies, would receive \$2.7 billion.

INTRODUCTION AND POLITICAL BACKGROUND

Weather and climate information helps society manage risks and realize opportunities associated with existing weather patterns and changes to the climate system (natural and human caused). Information with respect to weather and climate results primarily from scientific observations, modeling, and research. Weather and climate services help apply that information for societal benefit.

Weather and climate services typically include weather forecasts and warnings, flood and drought prediction and monitoring, natural hazard preparedness and response, public health monitoring, disease prevention and control, assessment and management of fire risk, and decision support for water resources, agriculture, transportation, and other key economic sectors. In some instances, funding for services versus research is difficult to distinguish.

Furthermore, weather and climate research spans multiple disciplines including atmospheric science, oceanography, hydrology, biology, and cryology. Understanding the societal impacts of weather and climate events also requires input from social sciences, including (but not limited to) economics, sociology, history, and political science. Policy choices must also consider ethical concerns, value judgments, philosophical views, and uneven distributional consequences. Given this level of interdisciplinary complexity, accurately and comprehensively describing the weather and climate-related R&D in the President's budget request is challenging and requires at least some subjective judgments.

The President's request for non-defense discretionary (NDD) spending of \$526 billion exceeds by \$33 billion the proposals created by Republican leadership in the House and Senate of \$493 billion, but remains roughly \$15 billion (2.8 percent) below FY 2010 levels (assuming a rate of inflation of 1.7% per year). The differences in NDD between the Administration and Republican budgets do not necessarily reflect the differences in the level of funding that would go to weather and climate research (which could differ more or less) because the proportion of NDD that goes to weather and climate research can also conceivably shift.

For weather and climate research in FY 2016, the Administration has identified earth observations and global climate change as priorities for executive departments and agencies.

The President's budget allocates funds to the agencies for earth observations ranging from satellites to sensors that collect data on the environment. Executive departments and agencies are prioritizing global climate change through the President's Climate Action Plan. This includes efforts to focus on extreme events and improve resilience.

[Back to top](#) ^[5]

PROGRAMS, DEPARTMENTS, AND AGENCIES

National Oceanic and Atmospheric Administration (NOAA)

Table 1: Weather and Climate-related R&D in the Federal Budget
(budget authority in millions of dollars)

	FY 2014	FY 2015	FY 2016	Change FY 15-16	
	Actual	Estimate	Budget	Amount	Percent
NOAA	5,323	5,449	5,983	534	9.8%
Oceanic & Atmospheric Research	424	446	507	61	13.6%
R&D	386	411	471	60	14.6%
Nat. Env. Satellite, Data & Info Service	2,087	2,223	2,380	157	7.0%
R&D	24	26	26	0	0.0%
National Weather Service	1,063	1,088	1,099	11	1.0%
R&D	18	19	26	7	36.8%
National Ocean Service	498	536	574	38	7.1%
R&D	74	74	78	4	5.4%
NASA	17,647	18,010	18,529	519	2.9%
Earth Science	1,825	--	1,947	--	--
Earth Science Research	457	--	485	--	--
Applied Sciences	35	--	48	--	--
Earth Systematic Missions	837	--	895	--	--
Earth System Science Pathfinder	257	--	268	--	--
National Science Foundation					
Geosciences	1,321	1,304	1,365	61	4.7%
Atmospheric and Geospace	251	251	263	12	4.7%
Earth Sciences	178	177	188	11	6.2%
Integr. & Collab. Educ. & Research	84	84	95	12	13.7%
Ocean Sciences	356	356	370	14	3.8%
Polar Programs	453	436	450	13	3.0%
Department of Energy					
Office of Science R&D	5,131	5,067	5,340	273	5.4%
Biological and Enviro. Research	594	592	612	20	3.4%
-climate and enviro. sciences	290	292	318	26	8.9%
Department of the Interior					
USGS	1,034	1,082	1,196	114	10.5%
Climate Variability Science	54	58	83	25	43.4%
Land Use Change	78	78	109	31	39.4%
USDA					
Agricultural Research Service	1,148	1,203	1,424	221	18.4%
Environmental Stewardship	201	201	206	5	2.5%
Environmental Protection Agency					
Science & Technology	8,200	8,140	8,592	452	5.6%
Air, Climate and Energy (ACE)	759	735	796	61	8.3%
Air, Climate and Energy (ACE)	99	92	100	8	9.1%

Source: Agency budget justifications, budget supplements, and other agency communications.
Figures rounded to nearest million. Changes calculated from unrounded figures.

With its FY 2016 budget, NOAA seeks to build resilience, including community, economic, water, ocean and coastal resilience; evolve the National Weather Service; improve observational

infrastructure (particularly satellite programs and ocean vessels); and achieve organizational excellence. Weather and climate related research occurs in NOAA primarily through the Office of Oceanic and Atmospheric Research (OAR), the National Environmental Satellite, Data, and Information Service (NESDIS), the National Weather Service (NWS), and the National Ocean Service (NOS).

NOAA is working to develop extreme weather outlooks on climate timescales and provide data and tools for the President's Climate Action Plan through the U.S. Climate Resilience Toolkit.

National Aeronautics and Space Administration (NASA)

NASA Earth Science funds weather and climate-related research through Earth Science Research (ESR) and Applied Sciences (AS), and satellite observations through Earth Systematic Missions (ESM) and Earth System Science Pathfinder (ESSP).

NASA Earth Science Research funds competitive grants to the research community in six areas: (1) climate variability and change; (2) atmospheric composition; (3) carbon cycle and ecosystems; (4) water and energy cycles; (5) weather; and (6) the Earth surface and interior. Grants in these areas are primarily for research and analysis of NASA satellite data.

NASA satellites provide information relating to climate variability and change as well as existing weather patterns, including measurements of the atmosphere (e.g., composition, temperature, pollution, clouds, precipitation, and radiation); ocean (e.g., surface temperature, salinity, circulation, sea-surface height, and sea ice); and land surface (e.g., land cover and forest density). NASA has a wide range of satellite missions on orbit and scheduled for launch over the next several years.

National Science Foundation (NSF)

NSF's Geosciences Directorate supports weather and climate research through its divisions on Atmospheric and Geospace Sciences, Earth Sciences, Ocean Sciences, and Polar Programs.

Notably, Congress excluded NSF's Geosciences Directorate from any of the funding increase that went to NSF in FY 2015, whereas the President's request for FY 2016 includes a 4.7 percent increase to NSF's GEO. This illustrates a potential divergence in views between the President and Congress on the importance of the geosciences to innovation and societal advancement.

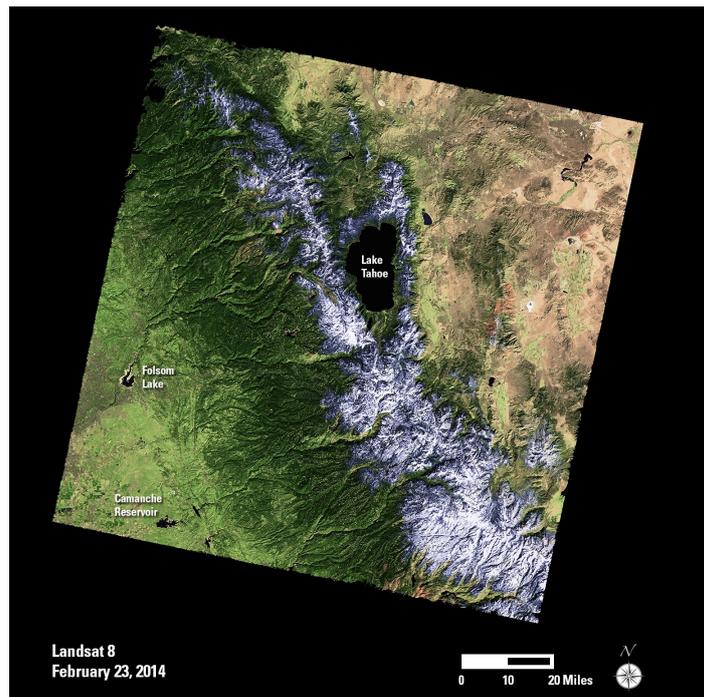
The NSF has also prioritized resilience and extreme events through PREEVENTS (Prediction of and Resilience against Extreme Events), a new agency-wide focus on risk

and resilience. The PREEVENTS effort spans multiple NSF directorates with the Directorate for Geosciences receiving the largest amount of funding. While PREEVENTS gets underway, the SEES (Science, Engineering and Education for Sustainability) effort continues to wind down with a closing out expected in FY 2017. SEES is also a cross-cutting program, one that promotes capabilities and discoveries needed to inform societal actions related to environmental and economic sustainability.

[Back to top](#) [5]

Department of Energy (DOE)

DOE's Office of Science supports basic research in atmospheric sciences, terrestrial ecosystems and climate modeling through the Office of Biological and Environmental Research (BER). The President's FY 2016 request proposes an overall 3.4 percent increase for BER.



Drought Conditions in California as Viewed by Landsat | Credit: USGS

Department of the Interior (DOI)

Within the Department of the Interior, the U.S. Geological Survey runs the Climate and Land Use Change activity, which includes a focus on earth observations and the implementation of the President's Climate Action Plan. In the FY 2016 budget request, Land Use Change receives a substantial 39.4 percent increase. The activity also funds the Land Remote Sensing program for Landsat science products, which are used in environmental assessments, the Big Earth Data Cube, and USGS' collection of coastal data. Additional research efforts focus on climate events and impacts such as drought and land cover changes.

The Department of Agriculture (USDA)

The USDA climate priority falls within the agency's research arm of the Agricultural Research Service (ARS). The ARS maintains a climate initiative that emerges in programs agency-wide with specific interest in climate change impacts on agriculture. One major FY 2016 priority focuses on creating adaptive strategies and technologies to address the impacts of climate change on agriculture. This includes collaborations with the USDA Regional Climate Hubs for research on regional climate effects and transfers of new technology, as well as data management efforts including resources for big data infrastructure.

[Back to top](#) ^[5]

Environmental Protection Agency (EPA)

EPA's first of five goals for its FY 2016 budget is *Addressing Climate Change and Improving Air Quality* by developing climate change mitigation and adaptation strategies as well as strategies to protect air quality. Most of the EPA's climate efforts are through regulatory and partnership programs. However, the Air, Climate, and Energy (ACE) research program funds research on the impacts of air pollution, climate change, and biofuels on environmental and human health. Overall, ACE would receive \$100 million (a 9.1 percent increase).

United States Global Change Research Program (USGCRP)

The USGCRP coordinates climate research and its applications over 13 Executive Branch departments and agencies. The total requested budget for FY 2015 that falls within the scope of the USGCRP is \$2.7 billion. As of this writing the detailed breakdown of USGCRP related funding is not available. It is also important to note that funds counted within the USGCRP framework are allocated directly to the agencies and each agency has discretion in what it counts as being within the framework. Therefore, funding reported for USGCRP does not account for all climate-related research and year-to-year

changes in USGCRP funding can reflect accounting changes rather than actual changes to agency requests.

© 2015 AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE | 1200 NEW YORK AVE, N.W.
WASHINGTON, D.C. 20005 | 202 326 6500

<http://www.aaas.org/Uio>

Links:

[1] <http://www.ametsoc.org/>

[2] <http://www.aaas.org/fy16budget/weather-and-climate-fy-2016-budget#noaa>

[3] <http://www.aaas.org/fy16budget/weather-and-climate-fy-2016-budget#doe>

[4] <http://www.aaas.org/fy16budget/weather-and-climate-fy-2016-budget#epa>

[5] <http://www.aaas.org/fy16budget/weather-and-climate-fy-2016-budget#top>