FY 2006 President's Request

Climate Research

NOAA Mission Goal

To understand climate variability and change to enhance society's ability to plan and respond

What is requested?

NOAA Research requests a net increase of +$19.0 million for Climate Observations and Services, including +$11.0M for the Climate Change Research Initiative (CCRI). The President has committed to providing resources to build climate observation systems and proposed an international joint venture to develop state-of-the-art climate modeling that will improve our understanding of climate change and its potential impacts. This budget request represents the third year of the President's program.

Why do we need it?

The changes in climate greatly affect our society and environment. Policy-makers and business leaders are increasingly dependent on climate information to manage water resources, agriculture, energy use, and human health. The data collected worldwide by NOAA researchers aids our understanding of, and ability to forecast changes in, complex climatic systems. The program increases will provide a broad-scale look at the climate system, help us determine uncertainties in predicting climate system behavior, reveal the regional impacts of climate change, and allow NOAA to analyze key scenarios for policy-makers.

What will we do?

These programs are needed as the foundation for NOAA's participation in the interagency U.S. Climate Change Science Program by providing the base support fundamental to the success of activities conducted under the Climate Change Research Initiative. This funding includes: Climate Research and Observations, Climate Data and Information, Climate Operations, and the Climate Change Research Initiative.

What are the benefits?

The requested increase for Climate Observations and Services will ensure continuation of climate observing networks and long-term climate records, such as the highly-regarded Climate Reference Network and NOAA's Baseline Observatories. These programs are essential to today's climate research and will further the development of operational climate products and services. NOAA will be able to ensure critical monitoring of long-term trends in important climate variables and to improve forecasting capabilities and applications development over timescales from weeks to seasons.

Climate Research At-a-Glance

What: $188.0M Total for Climate Research Programs

Why: To better observe and understand the climate system, improve forecasts, and allow society to better respond and adapt to climate variability and change.

Office of Oceanic & Atmospheric Research, Climate Research

FY 2006 Climate Program Changes

- **$3.2M for Climate Research and Observations** will:
    - Support research activities such as long-term monitoring of key climate variables, improving forecasts and more sophisticated applications of climate information, and cutting-edge scientific assessments and information products. These activities are central to NOAA's provision of end-to-end climate services and products.
    - Support continued participation in the Dobson total ozone global network and ensure continuation of long-term climate monitoring of atmospheric properties critical to tracking changes in long-term trends (*e.g.* carbon dioxide), stratospheric ozone depletion, and surface radiation.
    - Develop the decision support tools needed to better prepare for and mitigate the effects of drought as called for in the National Integrated Drought Information System plan through the eight current Regional Integrated Sciences and Assessments teams. The implementation includes conducting applied research to develop these tools to solve drought-related problems facing State officials in water, land, and ecosystem management, as well as fire mitigation strategies.
    - Disseminate information products that serve our Nation's environmental decision makers, *e.g.*, Intergovernmental Panel on Climate Change reports, World Meteorological Organization Ozone Assessments, and U.S. Climate Change Science Program synthesis and assessment products.
    - Support forecast improvements on a scale shorter than a season that would benefit operational water resource forecasting, collaborations with the U.S. Geological Survey, and the development of data assimilation strategies at the NOAA National Weather Service (NWS) National Centers for Environmental Prediction.
- **$3.3M for Climate Data and Information** will:
    - Support the U.S. Climate Reference Network, the development of reference satellite data sets, and the Observing System Monitoring Program for continued long-term climate monitoring of surface temperature and precipitation. This will enable NOAA to reactivate and commission 12 stations and install four new stations as part of the U.S. Climate Reference Network, whose reference measurements are critical to NOAA's development of an Integrated Surface Observing System, integrating both ground station and satellite measurements along a common reference scale.
    - Enhance the Observing System Monitoring Program's ability to identify and communicate early warnings of network problems that can adversely affect our ability to track variations and changes in climate, which also allow for a fully functional integrated observing system.
    - Provide NOAA the processing capability to merge data from NOAA, NASA, and other satellites, enabling scientists to track changes in global cloud cover, a crucial component in understanding climate and whose resolution is required for many energy-related applications.
- **$0.9M for Climate Operations** to:
    - Provide the operational interface between users and developers of reliable climate products and services.
    - Transfer new forecasting techniques to the NWS to improve operational settings, particularly in the areas of short- and medium-range climate forecasts.
    - Support local weather forecast office efforts to provide a full-range of customer services for NOAA climate products, including new local forecast products, through residence training courses for field personnel and the NWS Partnership Program, which brings potential external partners into NOAA to explore more effective climate services.

The Climate Change Research Initiative (CCRI) request focuses on support for products for the interagency Climate Change Science Program. The net $11.0 million (both Operations, Research & Facilities; and Procurement, Acquisition, and Construction) CCRI increase includes:

- **+ $6.7M for Global Ocean Observing System (non-ARGO)** request consists of two components:

    - **+$3.5M for Ocean Observations for Climate** to continue building and maintaining a global ocean observing system to document climate-scale changes in ocean heat, carbon, and sea level. This request is part of a multi-year, phased implementation to achieve 99% completion by FY 2009. This effort will complete 55% of the ocean observing system, keeping us on track with our international commitment of completing the ocean climate observing system by 2010. Expansion of the ocean observing system will ultimately enable society to better anticipate and respond to changes in the Earth's climate system, through improved observations of oceanic indicators of climate change and more accurate initial conditions for seasonal climate forecasts.

    - **+$3.2M for Tropical Buoy Expansion** for the Tropical Atmosphere Ocean (TAO) and Pilot Research Moored Array in the Tropical Atlantic arrays. This funding will expand the TAO array into the Indian Ocean and support the technological development of the next generation of moored buoys. These cost effective efforts will enhance TAO's capability to accurately document the state of ocean climatic conditions and improve our seasonal forecasting capability. Expansion will improve seasonal-interannual forecasting, improve accuracy of buoy data, and improve understanding of the effects of ocean-atmosphere interactions on hurricane development.

- **+$2.1M for Aerosols, Clouds, and Climate Change** for a multi-year program of observations to quantify how aerosols (airborne fine particles) influence climate change by their interactions with clouds. The observations will be used to test, validate, and improve aerosol-cloud and global climate models. This will assess and improve the reliability of future climate projection scenarios associated with anthropogenic activity for the Climate Change Science Program and the Intergovernmental Panel on Climate Change, as well as help develop the next generation of decision-support needs.

- **+$0.8M for Regional Integrated Science Assessment Program** for a multi-year effort to strengthen research in a program that supports eight integrated regional research teams addressing complex climate sensitive issues relevant to decision-makers. This funding will initiate a multi-year research effort to improve information in regional communities currently served, expand information to regions not currently supported by NOAA, and work across regions on climate-sensitive research issues that affect larger areas, such as national drought management issues in the Colorado River System. These actions will support research in such NOAA mission areas as improved wildfire forecasting and response, water systems management, enhanced agricultural management, improved vulnerability assessment and management option development, and continued applied research on climate-related health issues (*e.g.*, West Nile Virus, Hanta Virus, and respiratory ailments.)

- **+$2.0M for Explaining Climate Conditions to Improve Predictions** to provide for enhanced climate prediction capabilities that will enable regional and national decision makers and resource managers to better plan for impacts of climate extremes, variability, and change. This effort represents a key NOAA contribution to the interagency U.S. Climate Change Science Program goal of improving knowledge of the Earth's past and present climate and environment, including its natural variability, and improving understanding of the causes of observed variability and change. These datasets will substantially reduce current uncertainty about historical climate variations and improve our ability to analyze and detect interannual-to-decadal variability and weather-climate trends for the 20th century (vs. current capacity to do so for just the second half of the 20th century). Finally, NOAA's climate attribution research will greatly improve our ability to interpret causes of observed climate variability and, thereby, provide policy-makers with critically needed explanations of current and future regional climate conditions, including major droughts, floods, prolonged warm or cold conditions, climate trends and extremes, and multi-decadal variability.

- **-$1.0M for Global Climate Atmospheric Observing System** as a partial offset to the climate increases being proposed in FY 2006.

The Climate Supercomputing (Procurement, Acquisition, and Construction) request of +$1.0M has two components:

- **+$0.4M for Climate Modeling Center (part of CCRI request)** to provide funding for a very large, scalable computer system in support of the Intergovernmental Panel for Climate Change (IPCC) and other national and international climate assessments at NOAA's Geophysical Fluid Dynamics Laboratory (GFDL).

- **+$0.6M for Climate Research and Supercomputing** to provide funding for the development and utilization of comprehensive Earth System Models being developed jointly by GFDL and its university partners.

NOAA Research Climate Request
(Dollars in Millions)
CCRI Request in Italics

Operations, Research & Facilities (ORF) Program	FY05 Enacted	FY06 Current Program*	FY06 Request	FY06 Req – FY05 Enact	FY06 Req – FY06 C.Prgm.
Laboratories & Joint Institutes	**46.0**	**47.9**	**47.9**	**+1.9**	**0**
Climate and Global Change Program	**67.5**	**57.4**	**57.4**	**-10.1**	**0**
Climate Obs. & Services Program	**53.1**	**51.2**	**69.2**	**+16.1**	**+18.0**
A. Climate Research & Obs.	13.7	14.3	17.5	+3.8	+3.2
B. Climate Data & Information	0	0	3.3	+3.3	+3.3
C. Climate Operations	0	0	0.9	+0.9	+0.9
D. Climate Change Res. Init. (CCRI)	39.4	36.9	47.5	+8.1	+10.6
i. Global Climate Atmos. Obs. Sys.	*[3.9]*	*[4.0]*	*[3.0]*	*[-0.9]*	*[-1.0]*
Ii .Global Ocean Obs. Sys.-non-ARGO	*[12.4]*	*[9.4]*	*[16.1]*	*[+3.7]*	*[+6.7]*
iii. Global Ocean Obs. Sys.-ARGO	*[2.7]*	*[2.7]*	*[2.7]*	*[0.0]*	*[0]*
iv. Aerosols, Clouds, & Climate	*[5.2]*	*[5.3]*	*[7.4]*	*[+2.2]*	*[+2.1]*
v. Reg. Integrated Science Assess.	*[1.0]*	*[1.0]*	*[1.8]*	*[+0.8]*	*[+0.8]*
vi. Explaining Climate Conditions to Improve Predictions	*[0]*	*[0]*	*[2.0]*	*[+2.0]*	*[+2.0]*
vii. Climate Modeling Center	*[5.3]*	*[5.4]*	*[5.4]*	*[+0.1]*	*[0]*
viii. Carbon Monitoring	*[2.0]*	*[2.1]*	*[2.1]*	*[+0.1]*	*[0]*
ix. Carbon Cycle Atmos. Obs. Sys.	*[6.9]*	*[7.0]*	*[7.0]*	*[+0.1]*	*[0]*
Arctic Research Office	**5.0**	**3.0**	**3.0**	**-2.0**	**0**
Partnership Programs	**5.7**	**0**	**0**	**-5.7**	**0**
Procurement, Acquisition, and Construction (PAC)					
Climate Research & Supercomputing	**6.3**	**6.4**	**7.0**	**+0.7**	**+0.6**
Climate Modeling Center	***3.5***	***3.1***	***3.5***	***0***	***+0.4***
GRAND TOTAL (ORF & PAC)	**186.7**	**169.0**	**188.0**	**+1.3**	**+$19.0**

* The FY 2006 Current Program is the FY 2005 congressionally enacted level, less terminations, plus adjustments to base.

For more information:

NOAA Research
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301.713.1495

FY 2006 Climate Change Research Increases:

- Climate Research and Observations
- Climate Data and Information
- Climate Operations
- Climate Change Research Initiative
  - Ocean Observations
  - Tropical Buoy Expansion
  - Aerosols, Clouds and Climate Change
  - Regional Integrated Science Assessment Program
  - Explaining Climate Conditions to Improve Predictions
  - Supercomputing