

Earth Sciences in the FY 2006 Budget

*Emily Lehr Wallace, Linda Rowan and Katie Ackerly,
American Geological Institute*

HIGHLIGHTS

- **Department of Energy (DOE):** Natural gas and petroleum research accounts are slated for elimination in the President's request. Geoscience research within the Basic Energy Sciences account would decrease slightly.
- **U.S. Geological Survey (USGS):** The President has requested a 0.2 percent cut for the agency. Similar to the President's FY 2005 request, the minerals program is poised to take a major cut.
- **National Science Foundation (NSF):** The Geosciences Directorate is funded at a 2.2 percent increase over FY 2005. The Major Research Equipment and Facilities Construction (MREFC) account includes \$50.6 million for the fourth installment of the EarthScope initiative.
- **National Aeronautics and Space Administration (NASA):** The total Science budget request is \$5.5 billion, dropping \$51 million from the FY 2005 enacted level. Among Earth science programs, the Earth Systematic Missions program is slated for a 40 percent cut, stalling the Glory Mission, which was planned to address climate change.

INTRODUCTION

The earth sciences cover a broad range of the R&D spectrum, running the gamut from fundamental research into the internal processes of Earth's interior to highly applied, interdisciplinary investigations that address environmental contamination, natural hazards, and sustainable resource development. Although this chapter focuses on earth science programs in four key departments and agencies, earth science activities

can be found in 16 other departments and agencies spanning nearly 300 separate programs.

Taken as a whole, the President's budget favors fundamental earth science research programs over more applied R&D. The success of the EarthScope initiative at NSF -- the first-ever Major Research Equipment and Facilities Construction project for the earth sciences -- contrasts with stagnant or decreasing support in the President's request for applied programs, with the hardest hit being those related to oil and natural gas in the Department of Energy.

Table 1: Budget request for principal agencies and programs supporting earth-science R&D (budget authority in millions of dollars).

Agency / Program	FY 2004 Enacted	FY 2005 Enacted	FY 2006 Request	% Change FY 05-06
Department of Energy				
<i>Basic Energy Sciences</i>				
--Chemical Sciences, Geosciences, & Energy Biosciences	219	239	222	-7%
<i>Fossil Energy R&D</i>				
--Natural Gas Research	43	45	10	-77%
--Petroleum Research	35	34	10	-71%
<i>Solar & Renewable Energy</i>				
--Geothermal	26	25	23	-8%
<i>Yucca Mountain Site Characterization</i>				
--Core Science	--	--	--	--
Department of the Interior				
<i>U.S. Geological Survey*</i>	944	936	934	-0.2%
--Geologic Division*	234	229	208	-9%
--Water Resources Div.*	216	142	140	-1%
NASA				
<i>Earth-Sun System</i>	--	2,156	2,063	-4%
National Science Foundation				
<i>Geosciences Directorate</i>	715	694	709	+2%
-- Earth Sciences Division	144	149	154	+4%
<i>Major Research Equip. EarthScope</i>	43	47	51	+7%

Source: Agency budget materials, Office of Management and Budget.

* - Includes non-R&D components.

As was the case last year, increased need for science in support of homeland security has not translated into increased support for relevant

EARTH SCIENCES IN THE FY 2006 BUDGET

earth science programs. Although the U.S. Geological Survey's (USGS) water-quality monitoring, geospatial information and hazard-related capabilities are in heavy demand at the new Department of Homeland Security (DHS), there are no increases associated with this theme in the USGS request or that for other earth science programs.

DEPARTMENT OF ENERGY (DOE)

Fossil Energy R&D: Historically, a majority of the earth science research funded through the Office of Fossil Energy is related to petroleum and natural gas exploration and production (E&P). Petroleum, natural gas, and gas hydrates research programs are eliminated in this year's request. Some, but not all, of the cuts requested last year were restored in the final FY 2005 appropriations. Funding for oil and natural gas R&D combined now make up only 2.6 percent of the total Fossil Energy R&D budget, most of which funds coal-related technologies. That percentage has continued to drop with each new request. Natural gas E&P would receive \$10 million, to wrap up and phase out the program. The petroleum E&P account would receive a 71 percent cut, leaving the program at \$10 million. This minimal funding would also be used to phase out the program. Although most of the coal-related research is concerned with the President's Clean Coal Research Initiative and the Clean Coal Power Initiative, there is \$67.2 million for carbon sequestration research, which is 32 percent higher than FY 2005 appropriations.

Basic Energy Sciences: To align budget accounts with the Basic Energy Sciences (BES) working structure, DOE has placed earth science research within the combined Chemical Science, Geosciences, and Energy Biosciences Research program. This program provides peer-reviewed grants to universities and DOE national laboratories for fundamental earth science research in geochemistry, hydrology, rock mechanics, and geophysical imaging -- areas with broad application to multiple DOE mission areas including oil and gas exploration and development, geothermal energy, and environmental remediation. The FY 2006 request for this program is \$222 million.

Geothermal: The geothermal research program within the Renewable Energy account funds earth-science research in materials, geofluids, geochemistry, geophysics, rock properties, reservoir modeling, and seismic mapping. Like many accounts within the Office of Energy

Efficiency and Renewable Energy, geothermal research was cut to make way for an increase in hydrogen research in response to the President's hydrogen economy initiative. In total, the geothermal account has requested \$23 million, an 8 percent decrease from last year's allocation.

Yucca Mountain Site Characterization: Yucca Mountain was approved for development in 2002 but DOE had to delay its request for a site license for construction in 2004. Submission of a license application was delayed for several reasons; however, two primary and persistent problems are a court ruling that invalidates the U.S. Environmental Protection Agency (EPA) compliance period for waste disposal and underfunding of the Yucca Mountain project by about \$1 billion over the past 10 years. In FY 2006, spending will focus on getting a license application prepared for the Nuclear Regulatory Commission, awarding a design/build contract for the 300 mile long Nevada rail line and upgrading the utilities in the exploratory tunnel system that serves as a test bed for scientific studies and experiments. Overall, the Yucca Mountain project would receive an increase of 3.4 percent from \$413 million last year to \$427 million. (For more on the DOE budget, see Chapter 9.)

U.S. GEOLOGICAL SURVEY (USGS)

Looking at the USGS as a whole, this year's request is much more favorable to the agency than last year's request but still represents a decrease from the final FY 2005 appropriations. The total request is \$934 million, a decrease of \$1.9 million from last year's level. This year the USGS budget focuses on natural hazards. One area that received a major cut is a \$29.8 million decrease in the Mineral Resources Program, which is the sole federal provider of scientific information for objective mineral resource assessments and unbiased research results on mineral potential, production, consumption, and environmental effects.

Geologic programs would receive a total of \$208 million, a 9 percent decrease from last year. The biggest hit goes to the Mineral Resources Program, which would receive a 53 percent cut for selected individual projects and lower priority mineral resource efforts. This reduction will terminate the collection of nation-wide basic geologic and mineral deposit data, the internationally coordinated global mineral resource assessment, many mineral commodity reports, and will eliminate approximately 240 full-time employee positions within the USGS. The

EARTH SCIENCES IN THE FY 2006 BUDGET

\$25 million remaining in the program will continue funding for minerals surveys and studies relevant to ongoing federal land management, regulatory, and remediation activities.

Overall, water programs would receive \$140.4 million, a 1.4 percent decrease from last year's allocation. The National Water-Quality Assessment program requested \$63 million, which is almost a \$1.5 million increase from last year's funding level. The Toxic Substances Hydrology program would receive \$13 million, a decrease of 19 percent from FY 2005. (For more on USGS, see Chapter 13.)

NATIONAL SCIENCE FOUNDATION (NSF)

Funding for the Geosciences Directorate (GEO) would receive a small boost from the FY 2005 appropriation, with a budget request of \$709.1 million. The majority of the solid earth science research within GEO is funded through the Earth Science Division (EAR) that has requested \$154.1 million.

The EarthScope initiative, comprised of the U.S. Seismic Array (USArray), the San Andreas Fault Observatory at Depth (SAFOD), and the Plate Boundary Observatory (PBO), is again included in the NSF's Major Research Equipment and Facilities Construction (MREFC) account, having received \$47 million in funding for FY 2005. This year's request is for \$50.6 million and is the fourth installment of the five-year, \$187 million project. (For more on the NSF budget, see Chapter 7.)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

Internal reorganization at NASA has left three major accounts – Science, Aeronautics and Exploration; Exploration Capabilities; and Inspector General – unchanged. However, within the Science, Aeronautics and Exploration Account, NASA has eliminated the Space Science, Earth Science and Biological & Physical Research Enterprises and combined them into one Science account. Within this new Science “Mission Directorate” are three divisions: Solar System Exploration, The Universe, and The Earth-Sun System, which houses the agency's earth science programs. Just as NASA's Earth Science Enterprise worked to develop a scientific understanding of the Earth and its response to natural and human-induced changes, so will the programs within The Earth-Sun System account.

Wallace, Rowan, and Ackerly

The Administration requested a total of \$16.5 billion for NASA in FY 2006, an increase of 2.4 percent over the \$16.1 billion provided in FY 2005. The total Science budget request is \$5.5 billion, dropping \$51 million from the FY 2005 enacted level. There is also a \$92 million cut slated for the Earth-Sun System division. Among earth science programs, the Earth Systematic Missions program is slated for a 40 percent cut, stalling the Glory Mission, which was planned to address climate change. Earth System Science Pathfinder Projects would, on the other hand, receive a 25 percent increase. (For more on the NASA reorganization and the NASA budget, please see Chapter 10.)