16

Geosciences in the FY 2015 Budget

Abigail Seadler and Maeve Boland,
American Geosciences Institute (AGI)

HIGHLIGHTS

– ***Department of Energy (DOE):*** The budget proposes increases for the Office of Science and the Office of Energy Efficiency and Renewable Energy. Fossil Energy R&D (FER&D) would see its budget decrease by about 15 percent overall; however, Natural Gas Technologies within FER&D would receive a 70 percent increase over FY 2014.

– ***U.S. Geological Survey (USGS):*** The President's FY 2015 budget request for the USGS is $1.1 billion, a modest 4 percent increase over FY 2014 levels. Funding for major geoscience program areas would remain mostly flat with small increases for geologic mapping, climate change resilience, and hydraulic fracturing.

– ***National Science Foundation (NSF):*** Funding for the Geosciences Directorate would remain constant under the proposed budget, with minimal increases for awards and infrastructure improvements.

– ***National Aeronautics and Space Administration (NASA):*** Funding for Science at NASA would decrease by 3.5 percent in the President's request. Earth Science would receive similar cuts: $1.8 billion for FY 2015, approximately $179.2 million below FY 2014, or a 3 percent cut.

INTRODUCTION

The geosciences cover a broad range of the R&D spectrum, from fundamental research into the processes of Earth's interior to highly applied, interdisciplinary investigations that address traditional and non-traditional energy resources, water resources, land-use practices, natural hazards, and environmental issues. Although this chapter focuses on

Earth science programs in four key departments and agencies, Earth science activities can be found in other departments and agencies.

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

	FY 2013 Actual	FY 2014 Enacted	2015 Budget	FY14-15 Percent
Department of Energy				
Office of Science	4,681	5,066	5,111	1%
Basic Energy Sciences	1,551	1,712	1,807	6%
Chemical Sciences, Geosciences & Energy	309	316	316	0%
Bio and Environmental	561	610	628	3%
Climate and Env. Sciences	277	298	328	10%
Office of Fossil Energy R&D	499	562	476	-15%
Coal	342	392	302	-23%
Natural Gas Technologies	14	21	35	70%
Unconventional FE Tech from Petroleum	5	15	0	-100%
Energy Efficiency & Renewable	1,692	1,901	2,317	22%
Geothermal	35	46	62	34%
Department of the Interior*				
U.S. Geological Survey	1,013	1,032	1,074	4%
Natural Hazards	124	128	128	0%
Water Resources	197	207	210	1%
Energy, Minerals, and Env.	91	92	99	8%
Mineral and Energy	72	72	73	1%
Environmental Health	19	20	26	32%
Climate and Land Use Change	133	132	149	13%
Core Science Systems	108	109	109	1%
NASA				
Earth Science	1,659	1,826	1,770	-3%
National Science Foundation				
Geosciences Directorate	1,274	1,303	1,304	0%
Earth Sciences Division	174	178	178	0%

Source: Agency budget materials and Office of Management and Budget.
Figures rounded to nearest million. Changes calculated from unrounded figures.
*Includes non-R&D components

The President's commitment to efficiency and renewable energy is reflected in his FY 2015 budget request. Although geoscience funding throughout the proposal is flat or slightly depressed, some key research areas across the Department of Energy, the United States Geological Survey, the National Aeronautics and Space Administration, and the National Science Foundation are benefitting from the Administration's

energy strategy. Fields such as geothermal energy, hydraulic fracturing, and resilience to climate change have all fared well this budget season.

DEPARTMENT OF ENERGY

Fossil Energy R&D (FER&D): The budget for FER&D is $476 million, about 15 percent below FY 2014 funding. Unconventional Fossil Energy Technologies would be completely unfunded under the new budget, cutting $15 million from FER&D. Cuts to Coal (-$90 million), including decreases in Geologic Storage Technologies (-$8 million) and Advanced Energy Systems (-$49 million), account for the rest of the changes. Instead, emphasis is placed on Natural Gas Technologies, including increased funding for Emissions Mitigation from Midstream Infrastructure (+$4 million) and Gas Hydrates (+$7 million).

Basic Energy Sciences: Funding for Chemical Sciences, Geosciences, and Biosciences within DOE's Office of Science is flat compared to FY 2014. Research would continue on improving models and risk assessments for carbon sequestration and other applications.

Biological and Environmental Research: The geosciences are a major component of the Climate and Environmental Sciences division within the Office of Biological and Environmental Research. Under the $328 million request for the division, $69 million would fund Environmental System Science, and $103 million would fund Climate and Earth System Modeling. These increases would allow for the development and validation of finer-scale climate modeling systems.

Geothermal: Geothermal Technology continues to see large increases in its budget in FY 2015. The President requests $61.5 million, a 34 percent increase, to help fund additional R&D activities. The proposed budget would also include funding for the initial site characterization of the Frontier Observatory for Research in Geothermal Energy (FORGE), a new private-public partnership between DOE, industry, and stakeholders to create a commercial pathway for Enhanced Geothermal Systems.

U.S. GEOLOGICAL SURVEY

The President's FY 2015 budget request for the U.S. Geological Survey is $1.07 billion, a 4 percent increase over FY 2014 levels. Funding for major geoscience program areas remains mostly flat with small increases for geologic mapping, climate change resilience, and hydraulic

fracturing. The President's Opportunity, Growth, and Security Initiative (OGSI) would provide an additional $75 million in R&D.

Funding for the Natural Hazards Mission Directorate would remain constant under the President's FY 2015 budget proposal. Major changes come from eliminating Geodetic Monitoring and Active-Source Seismic Profiling. The proposal would increase funds for induced seismicity research related to hydraulic fracturing. Volcano Hazards, Landslide Hazards, Geomagnetism, and the Global Seismographic Network would all receive nominal increases above FY 2014 enacted levels. Cuts to Coastal Vulnerability Studies would reduce funding for the Coastal and Marine Geology Program by approximately $700,000.

The FY 2015 budget includes $99.1 million for the Energy, Minerals, and Environmental Health Mission Directorate (EMEH); approximately 8 percent above FY 2014 enacted levels. Within EMEH, Environmental Health would receive a 30 percent increase over FY 2014, while Mineral Resources and Energy Resources would only receive a 1 percent increase. The Mineral Resources program (MRP) would receive $46.3 million, a modest 1 percent increase, to support resource assessment activities in Alaska, characterize critical mineral resources across the United States, and modernize minerals data and information capabilities. Hydraulic fracturing would receive an additional $950,000.

The Core Science Systems Mission Directorate would be funded at $109.4 million, a minor increase over FY 2014. The National Cooperative Geologic Mapping Program (NCGMP) would receive a minimal increase of $100,000 above FY 2014 to $24.5 million. Major program changes for the NCGMP include an additional $2 million for hydraulic fracturing research taken from cuts to the Glacial Aquifers Project. The National Geospatial Program would receive $60.4 million in FY 2015, a 0.5 percent increase, but would experience large program changes. Within the Geospatial Program, funding for the National Atlas and Urban Mapping would be significantly reduced as they are folded into The National Map. This in turn provides additional funds for the Survey's 3D Elevation Program (3DEP). 3DEP would systematically collect high-resolution elevation data for all 50 states and the U.S. territories over an 8-year period. Meanwhile, funding for data preservation through the National Geological and Geophysical Data Preservation program would remain stagnant.

The Water Resources Program would receive $210.4 million, approximately $3 million, or 1.5 percent, more than FY 2014 levels. The budget would grant increases to the Groundwater Resources Program (+$2.4 million), the National Streamflow Information Program (+$1.2 million), and Hydrologic Networks and Analysis (+$1.25 million), with smaller increases to Hydrologic Research and Development (+$301,000). This budget would provide funds necessary to improve streamgage R&D and to retain streamgages that would otherwise be discontinued. The National Water Quality Assessment (NAWQA) Program, the Cooperative Water Program, and the Water Resources Research Act Program would experience reductions in funding of $300,000, $264,000, and $3 million, respectively. Cuts to NAWQA would come from reductions in overall Water Quality Monitoring.

Under the $149.1 million request for the Climate and Land Use Change Mission Directorate, the President's budget would provide $25.2 million (+$4.7 million) for Climate R&D, $11.4 million (+$2 million) for Carbon Sequestration, and $10.6 million (+$100,000) for Land Change Science. The Land Remote Sensing (LRS) Program, responsible for collecting, interpreting, and providing Earth surface data and information from satellites, would receive $66.5 million, approximately $1.4 million below FY 2014, or a 2 percent decrease. This comes after the successful launch of Landsat 8 in 2013.

NATIONAL AERONAUTICS & SPACE ADMINISTRATION

NASA's Science Mission Directorate, which includes Earth Science, Planetary Science, Astrophysics and Heliophysics, would receive $5.0 billion in the FY 2015 request, a 3.5 percent decrease from FY 2014 enacted levels. The Earth Science Division (ESD) would be funded at $1.77 billion, a 3 percent decrease from FY 2014. The majority of the changes come from cuts to Earth Systematic Missions.

Global Precipitation Measurement (GPM), Soil Moisture Active and Passive (SMAP), and the Ice, Cloud, and land Elevation Satellite (ICESat-II) within NASA's Earth Systematic Missions would all experience decreases in the budget. GPM would receive a 69 percent decrease compared to FY 2014, as Japan takes responsibility for the program. SMAP would receive a 15 percent decrease from FY 2014 to continue development until its proposed launch in 2015. ICESat-II would receive a 22 percent decrease to help develop its Advanced Topographic Laser Altimeter System and undergo mission readiness testing.

The budget requests $449.9 million for Earth Science Research. This would provide increases for Earth Science Research and Analysis, as well as Earth Science Computing and Management. Earth Science Research would receive an additional $18 million under the proposed OGSI for advances in Big Earth Data and Climate Data Initiatives.

The budget includes $266.1 million for the Earth System Science Pathfinder (ESSP) program, a series of low-cost, competitively selected missions. The ESSP program funds Venture Class Missions, as well as the Carbon Observatory 2 (OCO-2) and the Carbon Observatory 3 (OCO-3), which collect space-based measurements of atmospheric carbon dioxide. OCO-3 would receive no funding, ceasing operations in FY 2014, as NASA expects other missions to provide sufficient data.

NATIONAL SCIENCE FOUNDATION

The Geosciences Directorate (GEO) includes Atmospheric and Geospace Sciences (AGS), Earth Sciences (EAR), Integrative and Collaborative Research and Education (ICER), Ocean Sciences (OCE), and Polar Programs (PLR). Under the proposed budget, GEO would receive $1.304 million in direct funding for FY 2015. This number represents a minor increase of $1 million, or 0.1 percent, over estimated FY 2014 funding levels. Emerging and existing priorities within GEO include the Science, Engineering, and Education for Sustainability (SEES) initiative, the Faculty Early Career Development Program (CAREER), and Improving Undergraduate STEM Education (IUSE), an NSF-wide activity.

Earth Sciences (EAR) would receive an increase of $150,000 over FY 2014 levels, for a total budget of $177.75 million. Increases in infrastructure funding would mean modest cuts to research across the program. Funding for EAR's two largest facilities, the Seismological Facilities for the Advancement of Geosciences and EarthScope (SAGE) and the Geodetic Facilities for the Advancement of the Geosciences and EarthScope (GAGE), would remain flat. Increased funding of $460,000 above FY 2014 levels, to $22 million, for Research Resources will allow EAR's Instrumentation and Facilities Program to provide more support for multi-user regional and national facilities.