Geosciences Directorate Overview

May 23, 2011

Directorate for Geosciences

Mission

- Support research in atmospheric, earth and ocean sciences
- Address nation's need to understand, predict and respond to environmental events and changes

Modes of Support

- Unsolicited proposals from all scientists with interests in the geosciences
- Special competitions, often interdisciplinary
- Promote collaborations with scientists in other disciplines, agencies, and nations
- Promote integration of research and education
- Long Term support for shared resources, including:
  - observational platforms
  - analytic facilities
  - computational facilities

GEO Vision
A Strategic Plan for the Geosciences

- Fostering a sustainable future through better understanding of our complex and changing planet.
  - Understanding complex Earth system
  - Reducing vulnerability and sustaining life
  - Growing geoscience workforce of the future
- Key Research Areas to achieve the Geo Vision
  - Dynamic Earth
  - Changing Climate
  - Earth and Life
  - Geosphere-Biosphere Connections
  - Water: Changing Perspectives
- Guiding Principles
  - An interdisciplinary approach
  - A commitment to research
  - Education and public understanding of the geosciences

Budget Request by Division

GEO Funding
(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted	
				Amount	Percent
AGS	$259.87	$259.80	$286.33	$26.53	10.2%
EAR	183.26	183.00	207.27	24.27	13.3%
ICER	98.87	97.92	100.92	3.00	3.1%
OCE	349.88	348.92	384.64	35.72	10.2%
Total, GEO	**$891.87**	**$889.64**	**$979.16**	**$89.52**	**10.1%**

Totals may not add due to rounding.

Division of Atmospheric and Geospace Sciences (AGS)

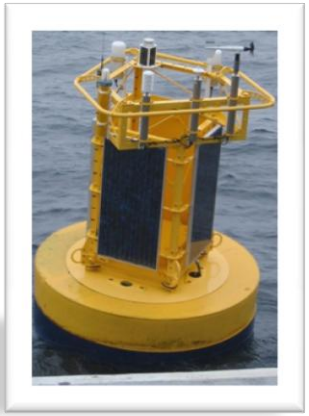
- Furthers understanding of weather, climate and the solar-terrestrial system by expanding the fundamental knowledge of the composition and dynamics of the Earth's atmosphere and geospace environment
- Supports large, complex facilities required for research in the atmospheric and solar-terrestrial sciences

Division of Earth Sciences (EAR)

- Improves the understanding of the structure, composition, and evolution of the Earth and the processes that govern the formation and behavior of the solid Earth
- Supports theoretical, computational, laboratories and field stations and state-of-the-art scientific infrastructure
- Response to earthquake in Japan
  - Participating in coordinated response through NEHRP
  - Receiving inquiries on RAPID support

Division of Ocean Sciences (OCE)

- Enhances understanding of all aspects of the global oceans and their interactions with the solid earth and the atmosphere
- Supports major shared-use oceanographic facilities including research vessels and manned deep diving submersibles



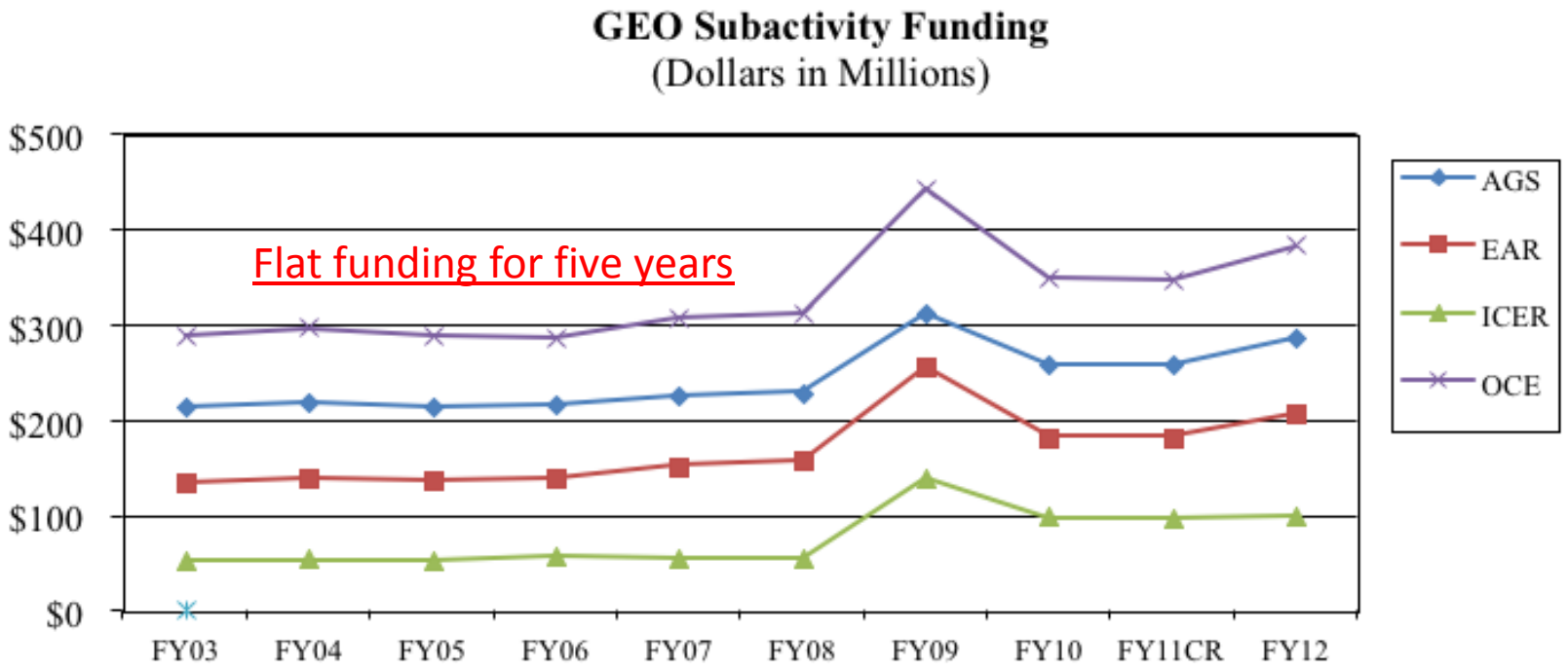
Modes of support

- Unsolicited proposals from all scientists with interests in the geosciences
  - investigator-initiated collaborative research programs
  - individual investigator-initiated research projects
- Special competitions, often interdisciplinary
- Promote collaborations with scientists in other disciplines, funding agencies, and nations
- Promote integration of research and education
- Long Term support for shared resources, including:
  - observational platforms
  - analytic facilities
  - computational facilities

FY 2012 Request

- In 2012, GEO is requesting $979,160,000
- GEO's FY2012 Budget Request provides exciting opportunities to:
  - Carry out basic fundamental geoscience research
  - Attack complex multidisciplinary challenges
  - Ignite innovation and opportunity for discovery
  - Catalyze breakthroughs across the sciences
  - Create new networks and cyberinfrastructure
  - Explore the planet in new and transformative ways

GEO Ten-year Funding History



Major Investments in 2012

- Continuing investments in Basic Research, Education & Diversity
- World class research infrastructure
- Science, Engineering and Education for Sustainability (SEES)
- Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21)
- Creating a More Disaster Resilient America (CaMRA)

Creating a More Disaster Resilient America (CaMRA)

- New, $10M GEO-wide program
- Catalyze basic research efforts in hazard-related science to improve forecasting and prediction of natural and man-made hazardous events
- Expand scope of activities beyond traditional boundaries.
- May foster new partnerships with other agencies.
- Responds to AC/GEO and NSTC/CENRS recommendations.
- A formal solicitation is planned

Science, Engineering, and Education for Sustainability (SEES)

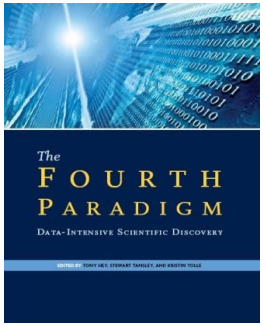
- Goal: Generate discoveries and build capacity to achieve an environmentally and economically sustainable future
- FY 2012 priorities:
  - *Advance a clean energy future*
  - *Nurture the emerging SEES workforce*
  - *Expand research, education, and knowledge dissemination*
  - *Engage with global partners*
- Environment, energy, and economy nexus
- Increase of $338 million over FY 2010 enacted level (GEO increase $87.2M)

SEES – Geosciences Foci

- Sustainable Energy Pathways
  - characterize and understand existing energy systems and their limitations (e.g. wind, geothermal, hydro)
  - understand risks and stressors associated with new and emerging energy sources (e.g. tidal, clean coal, carbon sequestration)
- Sustainability Research Networks
  - interdisciplinary research and education partnerships involving government, academe, and the private sector
  - address fundamental issues of use in improving policy and practices with regard to energy, the environment, and human well-being

Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21)

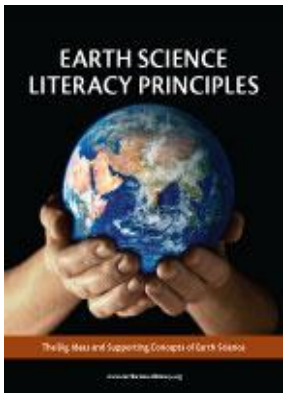
- Comprehensive, integrated cyberinfrastructure to transform research, innovation and education
- Focus on computational and data-intensive science to address complex problems
- Four major components
  - Data-enabled science
  - New computational infrastructure
  - Community research networks
  - Access and connections to cyberinfrastructure facilities
- Geosciences CIF21 investment is $16M. Interests include:
  - acquisition and use of cyberinfrastructure for the conduct of geoscience research
  - geoinformatics – the tools and techniques that facilitate data-enabled geoscience
  - enhancement of access and connections to facilities and scientific instruments



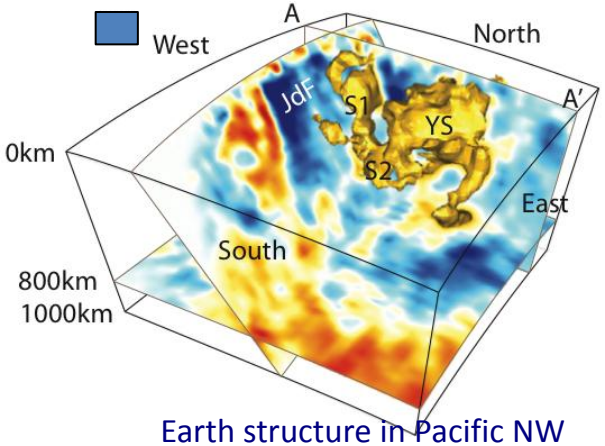
Investments in Education and Diversity

- GEO is continuing to develop the geoscience workforce of the future
  - OEDG
  - GEO Ed
  - GEO Teach
  - COSEE
  - CAREER

COSEE
CENTERS FOR OCEAN SCIENCES EDUCATION EXCELLENCE



GEO Infrastructure Investments: Recent, Underway, and Considered



Earth structure in Pacific NW
(Allen et al., 2009)

NCAR-Wyoming Supercomputing Center

- Construction began June 2010 and proceeding on schedule
- RFPs for supercomputer, data storage and data archive drafted.
- System will be 1-1.5 Pflops peak – at or above NSF "Track 2"
- Earned Value Management System data indicate satisfactory cost and schedule performance in each of the primary areas of activity.
- No significant issues or areas of concern.

NWSC Webcam, 03-25-11

MILESTONE	DATE
Completion of Construction	August 2011
Supercomputer and Data Storage Procurement	RFPs: December 2010 HPC Delivery: January 2012
Transition from Boulder	Begins: August 2011
Start of Full Operations	July 2012 (or earlier)

NSF Funding for Construction

2010	2011	Total
$31 million	$17.1 million	$48.1 million

Questions!