

Ocean Sciences



Polar Programs



Geosciences Directorate Update

Unidata Strategic Advisory Committee Meeting

Bernard M. Grant

April 22, 2015

**Atmospheric and Geospace
Sciences**



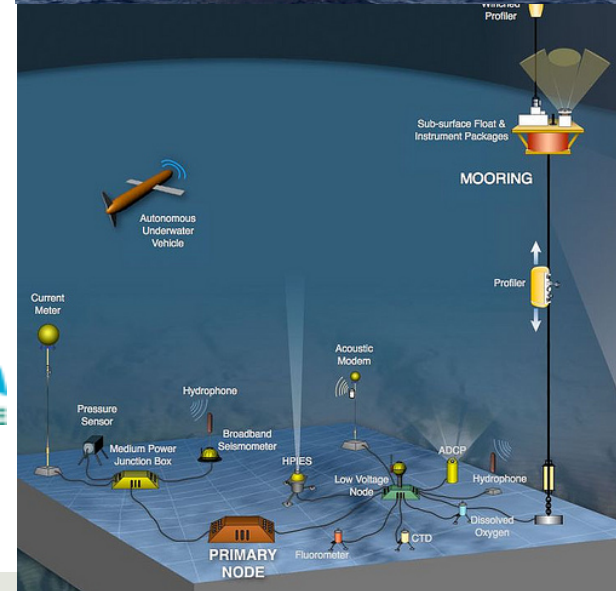
Earth Sciences



GEO Update:

.....“managing (facilities) has been made more challenging with the continued increase in O&M.....infrastructure expenses should not be allowed to escalate at the expense of core research”.....

Academic Research Fleet



SEA CHANGE

2015-2025
Decadal Survey of
Ocean Sciences

~3000 downloads 10 days after the released of the report

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

- 8 broad priority science questions with the highest potential payoff
- Perform a portfolio review of infrastructure bounded by constrained budgets
- UNOLS, OOI, IODP

*Public release –
January 23, 2015*



Dynamic Earth: GEO Imperatives and Frontiers 2015-2020

**Report of the NSF Advisory
Committee for Geosciences**

Release Date: December 16, 2014

***Important to plan when budgets are
good. Absolutely critical to plan
when budgets are constrained.***



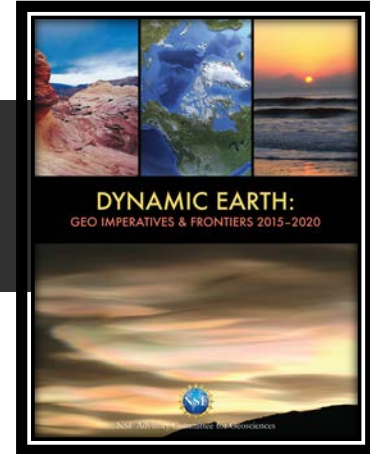
DYNAMIC EARTH:

GEO IMPERATIVES & FRONTIERS 2015-2020



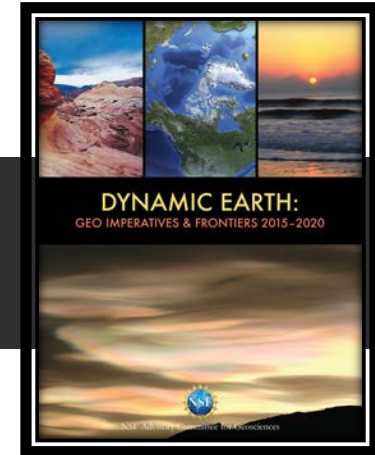
NSF Advisory Committee for Geosciences

About the "Dynamic Earth" report



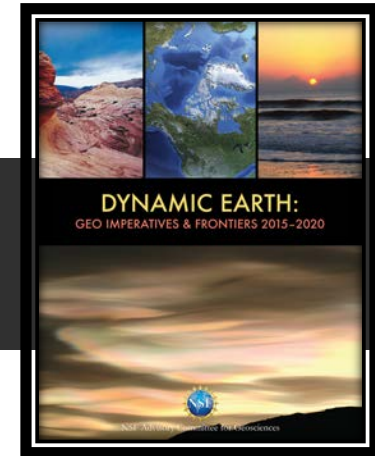
- **Articulates GEO-wide priorities not individual division plans**
- **Serves as near-term plan for geosciences research supported by NSF**
- **NSF-level strategic goals, administration-level priorities and principles, and GEO Division perspectives are captured in this "living" document.**

Research Imperatives



- **Highest Priority** - Continue strong emphasis on support of core research
- Engage in collaborative efforts to improve understanding of and resilience to hazards and extreme natural events
- Establish a collaborative effort to understand the water cycle

Community Resources and Infrastructure Imperatives



- ❑ **Maintain state-of-the-art facilities**
- ❑ **Complete construction and begin full-scale operation of the Ocean Observatories Initiative (OOI)**
- ❑ **Implement strategic plans for logistics and operations for the Polar Regions**
- ❑ **Begin conceptualization and development of next-generation sun-earth-system community models**

Research Highlights

FY16 NSF-Wide Priorities

- 1) Understanding the Brain
- 2) Broadening Participation
- 3) Risk & Resilience
- 4) INFEWS



□ PREEVENTS (*Prediction of and Resilience Against Extreme Events*)

- GEO's part of NSF's Risk and Resilience activity. (\$23.50M)

□ INFEWS (*Innovation at the Nexus of Food, Energy, and Water*)

- New interdisciplinary investment to study the food-energy-water nexus. (\$14.78M)



□ SEES (Sci, Engineering, and Educ for Sustainability)

- GEO has been a leader in NSF's SEES priority area. 2016 continues sunsetting for this investment. (\$34M, \$25M below FY15)

Prediction of and Resilience against Extreme Events (PREEVENTS)

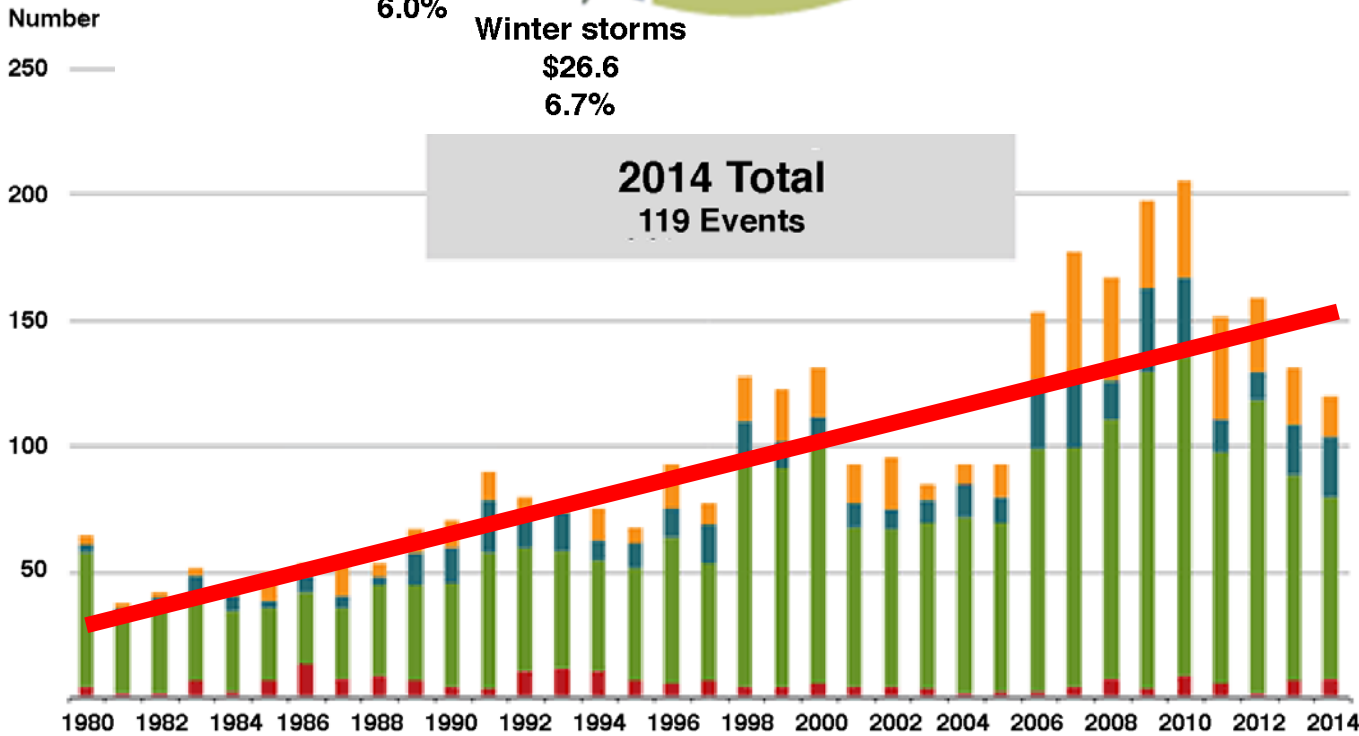
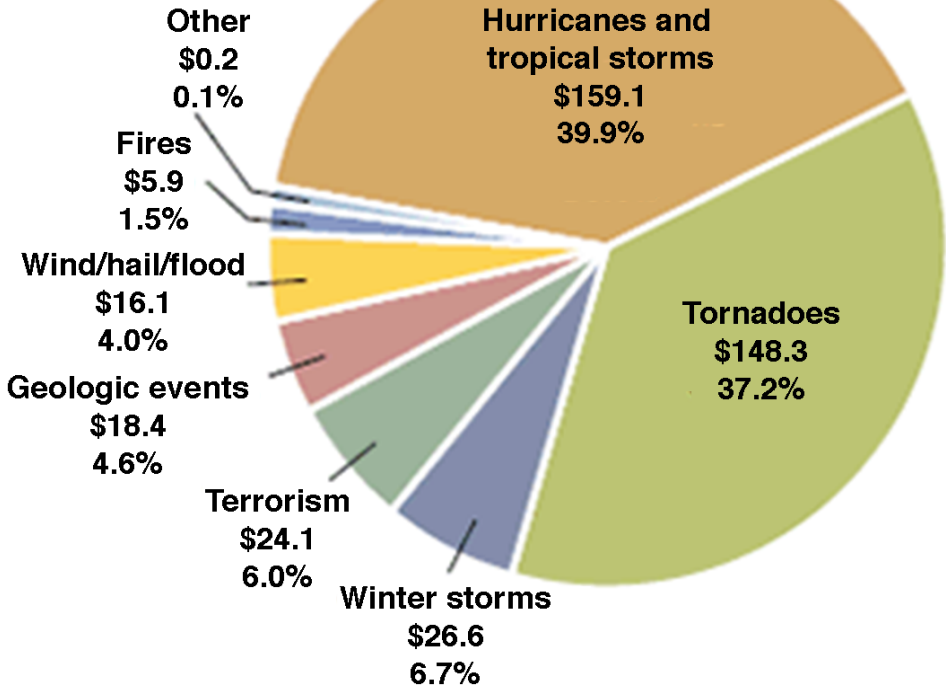
- **GEO's contribution to NSF's FY16 Risk & Resilience activity (co-lead ENG – CRISP: *Critical Resilient Interdependent Infrastructure Systems and Processes*)**
- **Focus on natural hazards and extreme events**
- **PREEVENTS is intended to:**
 - **Enhance understanding of the fundamental processes underlying geohazards and extreme events on various spatial and temporal scales**
 - **Improve models of geohazards, extreme events, and their impacts on natural, social, and economic systems**
 - **Develop new tools to enhance societal preparedness and resilience against such impacts**
- **Expecting to issue a Dear Colleague Letter announcing the upcoming program in FY15**
- **Program starts in FY16.**

Inflation-Adjusted U.S. Insured Catastrophe Losses By Cause of Loss

1994-2013

2013 \$ billion

Total:
\$398.7 billion



- **Geophysical Events**
(earthquake, tsunami, volcanic activity)
- **Meteorological Events**
(tropical storm, extratropical storm, convective storm, local storm)
- **Hydrological Events**
(flood, mass movement)
- **Climatological Events**
(extreme temperature, drought, forest fire)

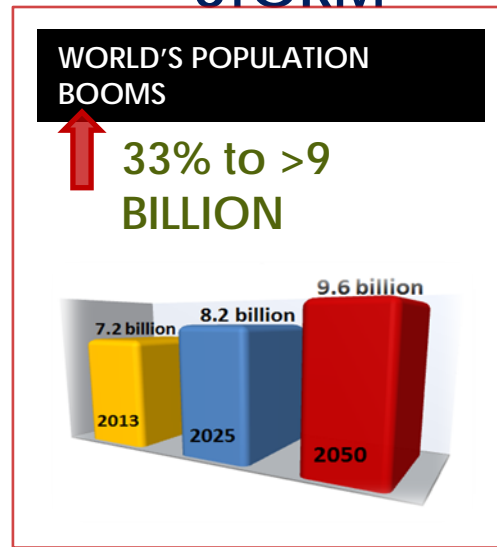
Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS)

- **INFEWS is intended to:**
 - **Support integrated research and modeling towards creating a comprehensive food-energy-water socio-technical systems model**
 - **Advance knowledge & technologies that foster more safe, secure, and efficient use of resources within the food-energy-water nexus**
- **Successor to SEES Water Sustainability & Climate (WSC)**
- **Planning began in 2014 and will continue through 2015**
- **Discussions with other agencies are ongoing**

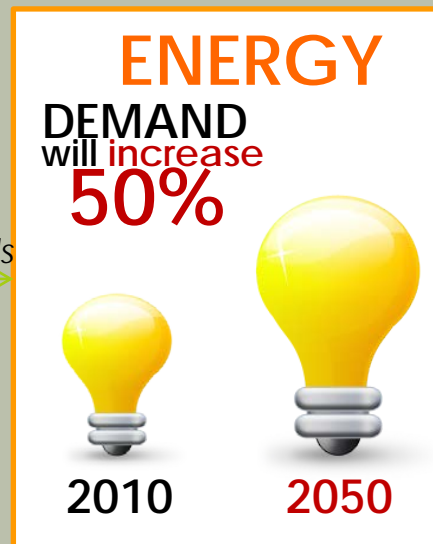
FOOD-ENERGY-WATER NEXUS: THE 2050 PERFECT STORM



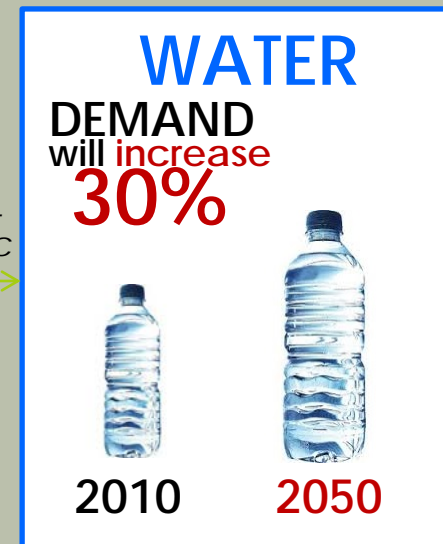
DEMAND INCREASES FOR FOOD, ENERGY & WATER

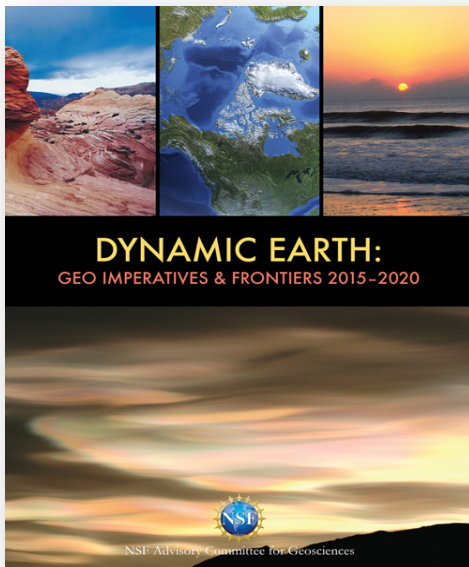


biofuels



hydro-electric





Some Illustrative Examples of Implementation of Our Plan

Support for Core Research - \$25M increment for core research in FY16 Request (accomplished by partial sunset of SEES by \$25M)

Improve understanding of and resilience to hazards & extreme events – PREEVENTS (FY16 NSF-Wide Initiative under Risk & Resilience)

Water cycle – INFIEWS (FY16 NSF-Wide Initiative)

Logistics and operations for the polar regions - AIMS

Fiscal Year 2016 Budget Request

GEO fits within NSF's Research and Related Activities Account

R&RA Funding (Dollars in Millions)

	FY 2014 Actual	FY 2015 Estimate	FY 2016 Request	Change over FY 2015 Estimate	
				Amount	Percent
Biological Sciences	\$720.84	\$731.03	\$747.92	\$16.89	2.3%
Computer & Information Science & Engineering	892.60	921.73	954.41	32.68	3.5%
Engineering	833.12	892.31	949.22	56.91	6.4%
Geosciences	1,321.32	1,304.39	1,365.41	61.02	4.7%
Mathematical & Physical Sciences	1,267.86	1,336.72	1,366.23	29.51	2.2%
Social, Behavioral & Economic Sciences	256.84	272.20	291.46	19.26	7.1%
Office of International Science and Engineering	48.31	48.52	51.02	2.50	5.2%
Integrative Activities	433.12	425.34	459.15	33.81	7.9%
U.S. Arctic Research Commission	1.30	1.41	1.48	0.07	5.0%
Total, R&RA	\$5,775.32	\$5,933.65	\$6,186.30	\$252.66	4.3%

Totals may not add due to rounding.

Fiscal Year 2016 Budget Request by Division

GEO Funding (Dollars in Millions)

	FY 2014 Actual	FY 2015 Estimate	FY 2016 Request	Change Over FY 2015 Estimate	
				Amount	Percent
Atmospheric and Geospace Sciences (AGS)	\$250.85	\$251.15	\$262.88	\$11.73	4.7%
Earth Sciences (EAR)	177.81	177.20	188.21	11.01	6.2%
Integrative and Collaborative Education and Research (ICER)	83.53	83.74	95.20	11.46	13.7%
Ocean Science (OCE)	356.27	355.95	369.61	13.66	3.8%
Polar Programs (PLR)	452.87	436.35	449.51	13.16	3.0%
<i>U.S. Antarctic Logistical Support (USALS)</i>	<i>[68.94]</i>	<i>[67.52]</i>	<i>[67.52]</i>	-	-
Total, GEO	\$1,321.32	\$1,304.39	\$1,365.41	\$61.02	4.7%

Totals may not add due to rounding.

Challenges



25 Recommendations for the Reauthorization of the 2013 America COMPETES Act

BY STEPHEN J. EZELL AND ROBERT D. ATKINSON | APRIL 2013

In particular, Congress should direct, and the administration should implement, a reallocation of NSF resources toward the kinds of science that has direct economic and industrial benefits for the United States. In particular, this means increasing NSF budgets for four key directorates: 1) math and physical sciences; 2) engineering; 3) computer and information sciences and engineering (CISE); and 4) biological sciences, while permitting research budgets for the geosciences and social sciences to shrink”

Challenges



NSF FY15 appropriations

“Any increases provided above the request and not otherwise specified below shall be applied to math and physical sciences; computer and information science and engineering; engineering; and biological sciences”

Challenges

SCIENCEINSIDER

Breaking news and analysis from the world of science policy

Earth science is not hard science, congressional Republicans declare



By Jeffrey Mervis

13 March 2015 3:15 pm

U.S. geoscientists are accustomed to being used as a punching bag by climate change skeptics in Congress, who challenge the science of global warming. But some influential Republican legislators are now going a step further, by denigrating the discipline itself.



Some Movement

Elizabeth Esty – Connecticut (D)

Dear Chairman Culberson and Ranking Member Fattah,

As you begin consideration of the FY2016 Commerce, Justice, Science, and Related Agencies Appropriations (CJS) bill, we ask that you fully fund the President's request for NSF's Risk and Resilience initiative.....

Questions?

