Advisory Committee for Geosciences  
April 11-12, 2013  
Meeting Minutes

AC GEO Attendees:

Absent AC GEO Members:

NSF Senior Staff:

**Thursday, April 11, 2013**

Welcome and Introductory Remarks. Dr. Kellogg opened the meeting and welcomed the group.

Dr. Kellogg commented that for the October meeting there will be one committee for both GEO and POLAR. Specific details remain to be worked out.

Remarks from the Assistant Director for Geosciences. Dr. Wakimoto gave a brief update on recent events, citing the FY14 budget rollout and the upcoming Assistant Directors retreat on April 15. The directorate has not received the FY13 budget figures. He noted that Congress is restricting funding for political science and this has been the subject of much internal discussion within NSF. He also stated that this fall there will be one merged advisory committee for both GEO and POLAR. In his presentation, Dr. Wakimoto emphasized that the GEO directorate advances NSF priorities: empowering discovery, preparing students for tomorrow, and improving effectiveness and efficiency. The FY14 budget is very generous to NSF and GEO, especially compared to other agencies. He gave a high-level overview of the budget at the directorate and division levels, citing major programs. NSF is also enacting a new program for STEM education – Catalyzing Advances in Undergraduate STEM Education (CAUSE).

Advisory committee members asked a broad range of questions. Regarding CIF21, this is a large NSF-wide initiative. GEO’s biggest need is data management and GEO is collaborating with CISE on EarthCube. The challenge is for community engagement and much effort has been expended to ensure this. The working group is developing a governance structure. Members asked how ICER is structured. ***[Action Item: They requested that ICER be added to the agenda for the October meeting.]***

There were several questions about the education realignment and the impact on GEO. The situation is in flux and NSF is considering how to best partner with the Smithsonian and the Department of Education. Expeditions in Education (E2) will continue under CAUSE.

The GEO-POLAR merger is proceeding relatively smoothly. There has been much interaction between staff on a daily basis. The latest hurdles have been logistical or administrative issues such as accounting codes.

There was discussion of program evaluation. NSF is undertaking a review of the COV process, particularly regarding cross-directorate programs. SEES is trying to evaluate a portfolio of activities and will put out a contract bid shortly. The AC members requested to hear more about this at the next meeting.

Open Access

Dr. Wakimoto gave a brief overview of the topic of Open Access and NSF’s efforts and the White House directive (via OSTP) to ensure availability of all publicly funded research. Given the differences in the issues, NSF created two separate subcommittees to handle data and publications. NASA and NOAA have previously struggled with these issues and can offer lessons learned. Dr. Gutmann is the NSF representative on the interagency working group. NSF will ensure engagement with the community.

Members voiced numerous concerns on this subject. They asked for clarification as to the scope and intent of the OSTP memo. There was much concern regarding the estimated costs of this activity. Comparisons were drawn with international partners and their various approaches to data access and publications. Policies and practices also vary across NSF, within directorates, and divisions. NSF is working with the National Academies to organize public listening sessions. Much remains in question but NSF is committed to meeting the August deadline.

GEO Strategic Plan and Topical Areas

Dr. Wakimoto gave a brief summary of his vision for the GEO strategic plan. He emphasized his desire for an “actionable” plan with clear goals. He hopes to complete the document to have a final document within a year to 18 months. He envisions an “organic” document focused on four broad themes: (a) Research, (b) Cyberinfrastructure, (c) Diversity and Education, and (d) Facilities. The subcommittee breakout sessions on these four topical areas will give the AC members the opportunity to address topics in more depth.

AC members noted that this strategic plan will be created in a different budget environment from past years. They asked how GEO will integrate the efforts of the four subcommittees into a more coherent picture. Dr. Kellogg advised this will depend upon the results from subcommittee sessions. A member strongly raised the importance of diversity in the geosciences, citing particularly the need for a “transformative” effort. Although there have been numerous specific programs, the impacts have been limited, localized, and neither transferable nor scalable. Dr. Wakimoto acknowledged these concerns, citing the perceived “glass ceiling” and “bamboo ceiling.”

Breakouts: Division Subcommittee Meetings

**Division Subcommittee Reports 4/11/13**

**AGS – Reported by Daniel Baker**

1. Programmatic Implementation

* Greater certainty about FY13 allegations
* Budget clarity
* It’s hard to be thoughtful about solicitations being put out without knowing funding

1. Strategic Planning

* How the decision can respond to Dr. Wakimoto’s request
* A lot of community census information is already available
* Recommend:
  + Distillation, Integrate the vast info into a divisional plan
  + Vet material w/ community and summer meeting
  + Town hall and NRC Community to understand strategic planning (late 2013 early 2014)
* Implementation plan and budget
* Internal process (survey, review – looked at for budgetary implementation)

1. Public Access

* Real intentions behind memo from OSTP?
* Difference between publication and data policies
* Possible wisdom of trying to get a request that the NRC look at issues (request made by high level staff) to get clarification on what does and does not need to be done (Interagency collaboration) Looking to get Dr.Marrett involved.

**EAR – Reported by George Hornberger**

Update from Wendy:

* New merger seismological geodeey??
* Earthscope merge
* Work load, Wendy is gathering data for discussion at October meeting
* NSB report on water
  + All divisions across division contribute; Geo is a large participant

1. New opportunities in Earth sciences

* Recommendation that NSF look at support geochronology
* Suggest having AC/GEO subcommittee look and advise

1. Earthscope (Next Big Thing)

* Large GEO investment
* Find a way to engage community
* New research opportunities of Earth Sciences (NOES)

**OCE – Reported by Susan Lozier**

\*NOTE\* Propose all committees have a virtual committee meeting prior to AC/GEO meeting. This provides the members with in-site and ability to make notes on what the subcommittees are concerned about prior to the meeting. It helps to have a more focused perspective and input.

1. OCE moved to having suggested target for ship time due in August

* Concern from scientist felt it might impact ???
* Program management to work w/ scientist
* Flexibility stressed

1. AC/GEO suggestion manage proposal pressure

* Pressure proposal from cross-directorate/ divisional programs
* Better management across divisions
* Expectation same review process for cross directorate proposals as regular division proposals.

1. OCE push forward w/ decayto ??? survey

* Complete with in the next few months
* Community input to help align priorities
* Task draft would produce desired results
* Make sure it’s a button up effort
* Look at past decade ideas that were compelling and where they are from
* Infrastructure cost exceeded cost for research program
  + Cost exceed happened in FY12
  + Driven by increase OOI cost $26 million in 2 years
  + Operation and maintenance portion of cost (bulk of cost)
* Manage proposal stress vs. Core programs
  + Implementing on the ground
* Cross cutting pertinent to GEO

Dr. Wakimoto stated that GEO has the biggest stake in SEES

* Workload
  + Responsible for reviewing a program that has been in place, discuss if GEO wants to leave the program
* Suggestions
  + Sun-setting
  + 3-4-5 initiatives and how to manage
  + Metrics for success and when to evaluate
  + Sun – setting - Turnover cross directorate funding back to core or put into initiative
* Costal SEES – 234 proposals
* Hazards – 100 proposals
* Ocean acidification solicitation proposals
* Solutions
  + More FTE’s for program officers to be hired at NSF.

AC GEO notes preparing for and Q and A with Dr. Marrett

Preparation and ordering of questions by AC

Dr. Marrett’s opening remarks:

Doesn’t have prepared remarks because wants to hear from committee. Marge absent (left sick), Kelly Faulkner absent.

Budget announcement yesterday – Administration signaled commitment to science and engineering research at NSF. Signals that NSF has role to play with cross-cutting initiatives as well as basic research. Overall, we are pleased with the budget proposal and hopes that Congress will also be pleased.

Transition to new NSF leadership and the appointment for director is made by administration, doesn’t see herself as mere caretaker, but will do whatever she can to move NSF forward.

1. Discussion on enhancing diversity in geosciences – frame it with how will the new initiatives impact diversity, and the management of increasing diversity. Included discussion (before question to Dr. Marrett) of whether there is something like ADVANCE for minorities – AC did not seem to know of OEDG. Several comments on how diversity in science is not working.

Dr. Marrett: Biological and Social Sciences have been more successful than physical sciences and engineering in encouraging diversity. What are the elements that contributed to the success? It’s not like there are not successes in GEO – look at the successes and build on them.

Would like to hear committees’ idea on this topic.

Dr. Kellogg let Dr. Marrett know we will have a subcommittee on this subject.

2. Effect of CAUSE on the Education programs – how will CAUSE impact Expeditions in Education and specific GEO Ed programs, including K-12?

Would like to hear from AC what the concerns are. The idea from administration is to increase coherence and impact, as opposed to diffuse efforts. In EHR there are programs for FY14 that are being pulled together. How do we do things coherently within NSF?

Outside NSF there should be greater integration of undergraduate education and graduate fellowships. This does not take away all that we do from K-12 and other graduate activities. NSF will continue to advance knowledge in these other areas. The money for K-12 is not being moved from NSF to Ed, but it is from other agencies to Ed.

Not sure if consolidation is the correct term. Not all programs will be moved. NASA and NOAA will not lose all of their Ed programs.

AC member: Will NSF continue to fund K-12 education?

Dr Marrett: yes, it might be that the plan that we focus on undergraduate and graduate, but we are not abandoning K-12 and other graduate programs.

What is the change then?

Dr. Marrett: the change is that this should move the nation towards more STEM teachers. Has everything been worked out with the plan? No, everything is not so clearly demarcated right now. That is why we are having conversations with groups like this to find out where things are clear and unclear. OMB and Domestic Policy Council have called meetings in last week with agencies to try to clarify. Details of implementation have yet to be worked out.

What about Expeditions is Education?

Dr. M: Marge was extremely important in E2 process. GEO is extremely important in the shaping of STEM education.

Details of CAUSE?

Dr. M: begins with consolidation of 3 programs in EHR. Why were they separate in the first place? They are quite similar, so let’s pull them together and tie in the initiatives from other directorates.

3. Management of core programs vs. cross disciplinary; GEO has contributed toward cross disciplinary programs which has increased PO workloads. Will funding sunset or go back to GEO programs?

Dr. M: good question. These are the issues we are wrestling with. On one hand, NSF responded to communities who said that there are benefits to cross disciplinary work. On other hand, there is a disconnect between NSF core disciplinary structure and the cross disciplinary programs. Need to re-examine the portfolios for overlap and decide how to manage the structure for cross disc. Roger is insisting that NSF take a closer look at how we are doing things. If it gets so burdensome, then NSF will no longer be at the cutting edge.

4. Possibility of increasing FTEs. Is there an external FTE ceiling on NSF? (Rudnick)

Biggest obstacle is the admin dollars that Congress gives us to operate. We can have a FTE ceiling, but we don’t even have enough $$ to get to the ceiling.

We spend a lot time accounting for every expenditure in admin costs in order to justify them. Right now there is not a lot support being given to federal employees, so there is a lot of skepticism for asking for more federal employees. We need help from ACs and professional societies to let Congress know that there is a need for more admin support at NSF.

What are the collaboration expectations from the community? There are institutions that reward faculty for the number of proposals submitted. There has also been pushback from BIO community on streamlining.

5. Pressure of funding large facilities vs funding research – Scott

Rising costs of maintaining facilities

Dr. M: facilities are there to facilitate research. David, how do you want me to respond?

David Conover: O&M cost come with large facilities, and will exceed construction costs over the lifetime of the facility. We can build a new ship because we can retire an old ship. But challenge is when add a brand new facility. Inflation also contributes to rising costs. The division bears the cost of these large investments in facilities. Doesn’t have answer, has big challenge with OOI O &M costs coming into division.

DR. M: Is there a community large enough to help support the facility? NSF’s divisions cannot bear the costs alone.

Discontinuation is not something that sits well with communities. When budgets are not growing, this is a big issue. There is not the money that we expected when we were thinking the budget would double.

We are reexamining what NSF should do so that a division does not have to figure out these issues alone.

6. Open access to data and publications

Dr. M: trying to keep data and publications questions separate. There is no $ in budget, but this is the time to sort out the questions of repositories, when should it be made available, etc.

Publishing associations, especially the for profit sector, also complicates the open access to publications questions.

Roger: on the data side, we are aiming for a plan for a data plan in August.

Dr. M: OSTP wants to have a plan for whole federal govt.

AC member: What is the intent, from NSF’s point of view, of access to data?

Dr. M: Two things: one is an open government issue – what the public pays for, the public should have access to. Secondly, the communities would like access available for other types of extraction. Data mining and extraction can be important for revealing complexities.

Closing remarks:

Dr. Marrett: looking for suggestions/answers not just questions. Looking for input from the issues that the committee chooses to take on. The committee can suggest paths to look at the questions.

Thanks staff for all that they are doing, let staff know have much they are appreciated.

Discussion of the NSF Strategic Plan: Cancelled

GEO AC Representative Reports

AC MPS Statistics Subcommittee, Mary Barth, NCAR

* The Task: From Ed Seidel’s August 14, 2012 letter to MPSAC: *“that MPSAC form a subcommittee to examine the current structure of support of the statistical sciences within NSF and to provide recommendations for NSF to consider”*
* Representatives for Math Sciences community as well as other NSF advisory committees. Mary Barth is the AC GEO representative.
* Working Group structure includes disciplinary challenges, existing NSF programs, management structures, non-NSF programs, community, and workforce development. M. Barth working on workforce development group
* Most meetings handled virtually. Early May, subcommittee will begin putting together their recommendations.
* Please contact M. Barth with any input for the committee.
* It was suggested that she talk to the program officers who worked on the joint DMS-GEO program on Collaborations of Mathematical Geosciences. This program ran for 6 or 7 years between 2003 and 2009.

ACCI, Lee Allison, Arizona Geological Survey

* Office of Cyberinfrastructure is now the Division of Advanced Cyberinfrastructure (ACI) within the Directorate for Computer and Information Science and Engineering (CISE)
* ACI supports cyberinfrastructure resources, tools, and related services such as supercomputers, high-capacity mass-storage systems, system software suites, and programming environments, scalable interactive visualization tools, productivity software libraries and tools, large-scale data repositories and digitized scientific data management systems, networks of various reach and granularity, and an array of software tools and services that hide the complexities and heterogeneity of contemporary cyberinfrastructure while seeking to provide ubiquitous access and enhanced usability.
* ACCI meeting on May 15-16. L. Allison will represent AC GEO.

**Friday, April 12, 2013**

Facilities Topical Subcommittee

Notes for AC-GEO Facilities Sub-committee

Overview

Challenges of supporting facilities under period of constrained budgets -balancing ?science? vs. ?infrastructure? (reality & perception) -mid-size infrastructure funding, prioritization -managing financial risk (streamlining, contingency); polar programs issues of logistics, operations and science support

Facilities important for many aspects of GEO research -some researchers are obligate facility-users, but not everyone -GEO facilities support science in other divisions, other directorates -in some cases shared with other agencies, countries

Facilities come in different flavors, sizes, scope & management approaches -MRI, Mid-sized Infrastructure (MSI), MREFC -blurry boundary between science and infrastructure (e.g., some facilities generate data; others are logistics for getting somewhere)

Recent trends

-major investments over the last decade; EarthScope, OOI, ?

-in some divisions, seeing effects large facility operation & maintenance costs; -in other divisions, growing science pressure (cross-directorate

opportunites) but is there sufficient investment in facilities?

-support for doing research on and with new facilities;

Need for strategic planning for GEO facilities -life cycle costs including -sunsetting of infrastructure (replacement vs. new) -lessons learned within from GEO across divisions; useful for Foundation -balance of funding for infrastructure vs. science -time-period consolidation?

-Different divisions have different issues

Facilities in GEO Strategic plan:

mechanisms for community input (workshops, drafts, townhalls)

Len’s Summary:

The breakout session began with a presentation of NSF Mid-Sized Infrastructure (MSI) status and concerns. The presentation highlighted a National Science Board report indicating that there was not a need for MSI to be managed by upper level leadership and that its management was best handled at divisional and program levels. The presentation described the benefits of MSI to inspiring new ideas and developing new capabilities as well as challenges inherent in the broad range of costs involved in MSI and the complications in conducting evaluations of many differing programs. The experience AGS had with their recent competition was used to emphasize the broad range of proposals and awards made for MSI.

Discussion of MSI considered Alvin as a case study and reviewed the Deep Submergence program’s numerous MSI vehicles. Comments were made regarding the OCE funded National Research Council study that was utilized to collect community input on priorities. Significant discussion of MSI costs revolved around spreading costs across multiple fiscal years; holding funds in reserve and federal policies prohibiting that; scientific community needs for MSIs (small boats, piers, longcoring capabilities, OBS’s, etc) and operational costs without increased funds. The committee discussed how attempts to factor operational costs into budgeting were made with limited ability to account for cost creep and sudden economic shifts. This conversation included management of Day Rate costs and the benefits associated with that model. MREFC’s were highlighted as a good method for avoiding risk because the funds are limited and known. This discussion concluded with a review of a need for a good mechanism for ending/sunsetting programs and why new programs need to consider their lifecycle costs.

The second presentation of the session was on Infrastructure and Science Support costs and their comparative rate of change over time. The presentation provided data on past, present and projected costs for Infrastructure and Science Support and highlighted Polar Program’s unique need to provide extensive logistics and detailed plans to protect funds for science support in Polar Program.

Discussion of this topic began by describing some aspects of cross directorate projects that are not captured in the data. There was general agreement that it would beneficial for NSF to capture the missing data in future presentations. The need for lifecycle funding to provide NSF funds to maintain its investments was mentioned and the affect new programs would have on the NSF budget with no additional funds to balance the additional work. The committee considered that infrastructure also collects data while it is working and that the data streams, physical equipment and individual science support costs may be worth considering separately. The discussion concluded with general agreement that strategic planning would be needed to leverage available resources.

The final presentation was on Managing Financial Risk and it highlighted how the lengthy federal budget processes can complicate planning because of fluctuations in commodity prices and described the limited possibility for storing contingency funds. Case studies were described, including, the HOV Alvin Upgrade, Astrophysics infrastructure, the Antarctic Program’s management of its resources as well as the changes made to the management of IODP to improve its ability to leverage ship track and save on ship-time costs.

Education & Diversity Topical Subcommittee

* Introductions
* Chair Joseph Whittaker (JW) states goal: looking at priorities from many perspectives
  + Suggests partnerships with private industry, funding agencies, and other institutions are important, particularly for MSI
  + Asks group, Can we build on established programs?
  + GEO should be a model for NSF
* Lina Patino presentation
  + We would like AC GEO to look at objectives and goals. Prioritize them and determine if they are still valid goals
* Literacy documents began with OCE 6-7 years ago. There is encouraging growth, but the knowledge being gained needs to be implemented at the student-teacher level.
* JW: There is a lack of leadership at the K-12 level
* Vicki, from Geogretown: Efforts to give geo students practical experience is in line with similar efforts in the legal community. This is the model of the future, but it is more resource intensive to give students this practical experience.
* George Hornberger: Scalability is a big issue. At UVA, teachers trained in pedagogy, but they need to understand the content. Partnering local K-12 teachers with university faculty can help them understand the content they are teaching
* JW: At Morgan they partner with the school of education to understand the pedagogy. We noticed that not many people of color were actuaries. We introduced this program at Morgan; it was fully funded by corporate. They come in to teach classes, and provide internships. The program engages minorities in mathematics, business. Morgan also partnered wih HS teachers by connecting with counselors and teachers at those schools (principals/administrators were less keen to participate). This has expanded to all of science and engineering. Also mentions that at Morgan, 11-12 graders in HS can enroll in classes at Morgan.
* Louise: Sounds like an interesting program, but many partnerships need to be made. Establishing and sustaining these partnerships is not easy, and there are hurdles. For example it is hard to collaborate with California HS because earth science isn’t counted as a science credit. Are there things that can be done to help this?
* JW: We use the selling point that these programs help prepare students for college. It took awhile before we reached the point of being able to offer college credits. Mentioned cooperative agreements, such as the one with Goddard SFC, which led to a joint degree with Johns Hopkins.
* Question (referring to slide): Are these our two goals?
* Susan: agrees with the 2 goals. Feels diversity should be the priority. What can we do to involve the whole community and scale up?
* Louise: Should diversity be elevated to the level of a 3rd goal?
* Polar PO: notes the importance of having URM’s being represented in published materials. Says we (GEO) should work more with the Office of Diversity and Inclusion.
* Susan (to NSF):Where do you think the most work needs to be done?
* Polar PO: Anything we can do with OLPA and the media office to make our science more visible
* Marcia: New science standards are a good opportunity for the earth sciences. Integrated courses in earth systems and space science have been elevated to being equal to physics/chem/bio courses. Calls for the professional development of teachers to teach the subject. We need to take advantage of this opportunity, so that kids go into college wanting to study earth science, instead of stumbling into it.
* Vicki: Are the explicit, quantitative goals for diversity?
* PO Rom: It’s hard to get these numbers (sites REU statistics as an example).
* Vicki: but do we even have a goal in mind?
* Susan: suggests using, for example, the number of minority REU participants as a goal for grad school demographics in 5 years
* Louise: How do we make diversity important for institutions? Right now, rankings such as USNews and World Report do not take diversity of students and faculty into account. No reward for schools working toward diversity.
* Polar PO, Peter: the image of polar research is white man with a beard. We work toward involving local populations.
* Vicki: NSF could ask for metrics on retaining/attracting diversity. By asking these questions, NSF could have an influence
* What’s missing is getting across the message of *why* diversity is important. Diversity has become something we have to do, not what should be done that’s strategic.
* Louise: the addition of broader impacts is one thing that NSF has done/can do to nudge institutional thought
* Susan: Can GEO tell PIs to address in BI section how they get their departments to move (diverse) people through the pipeline?
* JW: Accountability isn’t there for looking at how many students are retained in diversity programs. Doesn’t contribute to transforming an institution. For example, undergrads at HBCU’s go do internships but are lacking a way to continue research at home institution after summer is over. Very few HBCU’s have earth science courses/programs. Do we want to increase this? Minority schools don’t have the infrastructure for earth science partnerships with majority institutions. No way to continue engagement after an internship. But corporate partnerships can help.
* George H: Let’s not completely abandon the hero-model (the lone crusader in a department, trying to work towards diversity); sometimes it works. Suppose NSF could fund a half-time faculty to develop some partnership w/ corporate buy-in.
* Louise: Maybe we could make something similar to the Industry-University partnership opportunities NSF already supports.
* Marcia: let’s not forget that you need the students to make this happen. We need to attract them from K-12. AP Environmental Science is the fastest growing AP course.
* JW: that is a very long-term effort. How can we take advantage of programs already in place?
* Vicki: suggests pairing AP teachers with university faculty that understand the content. Start pilot projects with the “heros” to see what the barriers are. Then scale up.
* JW: Diversity is the thread that runs through both goals. Perhaps we should develop a vision statement to this effect.
* Lina: suggests looking at the booklet “Strategic Framework…” for more details about the two goals. Use this as a straw man. What’s missing? What should we keep? This is on AC GEO website. Lina reminds AC members to share ideas you may have with GEO Ed group.

Research Topical Subcommittee

* What is the appropriate balance of investments between special solicitations/initiatives and core programs?
* What is the appropriate balance between top-down and bottom-up driven solicitations?

General consensus that the number of special solicitations in recent past (coming from top) has been too high – they are no longer “special”. Reasons:

* + Taxes core programs
  + In past, core programs were able to fund mid-scale interdisciplinary research, loss of funds makes this more difficult
  + It may marginalize creativity from PIs (due to strain on core budget)
  + Community has a difficult time understanding differences between different solicitations/programs
  + NSF should be in the business of facilitating rather than dictating/directing science
  + Concerns expressed re motivators for special programs (e.g., politics, career advancement)
  + Special solicitations were perceived to be detrimental to young PIs because: a) they have a very hard time getting funded through them (most funded proposals are from senior “well-fed” PIs) (numbers of first-time PIs funded by special solicitations vs. core would be useful here), and b) being part of a larger collaboration is not helping them to demonstrate the leadership that will get them tenure.

On the other hand, NSF is given mandates from OMB and these must be merged with core programs and everything else. Special programs are therefore not likely to go away. In addition, GEO may gain prominence (and funding) through leadership in such special programs.

It should be noted that some special programs (esp. those coming from community?) have been great successes and have been continued.

There is a need for the performance of cross-directorate and cross-division programs needs to be evaluated in order to allow informed decisions about their effectiveness and perhaps how many to pursue in future.

* What is the optimal process through which a community-generated idea results in a solicitation?

This question met with both confusion (should read “funded proposal” vs. “solicitation”?) and also a sense of “is the system broken”?

* + One size does not fit all
  + Other programs (e.g., ENG) have programs in place that allow them to capitalize on special initiatives better than GEO does currently.
  + One path forward: PO retreats along with community workshops
* What is the appropriate balance of investments between infrastructure (including database and repository development) and research awards?

Numbers Research: IF in different GEO divisions: AGS – 50/50; OCE – 48/52; EAR -- 68/32; POL – 30/70. NSB recommendation – 75/25. Does one size fit all? Clearly not for POLAR. Should NSF be trying to reach this ideal? Main concern is that research funding is dropping in some Divisions as a consequence of funding that has to be put into infrastrutcture. Many plans made at time that NSF budget was supposed to double. Not the case and now that the research budget is flat or dropping.

* + Need for NSF-wide strategic planning in IF.
  + Difficult to plan when budget trends are not known.
  + Need for mechanism for sun-setting of some infrastructure
  + Need for support for very long-term measurements, which don’t fit into 3-year grant cycle
  + Perhaps distinguish logistical infrastructure (e.g., ships in Antarctica) from enabling infrastructure
* What is the optimal process by which a young investigator can break into the funding system?
  + General consensus that this is an important topic.
  + In general GEO does a great job in supporting young PIs, lots of outreach, small community
  + CAREER proposals used to be for first-time PIs, but now this is rare.
  + Differences in ways that ENG awards CAREERs vs. other Directorates (e.g., GEO); should GEO re-evaluate how CAREER is awarded?
  + Stress importance of mentoring by PO and at home institutions
  + Sense that cross-disciplinary initiatives are not so useful for younger (new) PIs. Yet many are encouraged to do cross-disciplinary research, so there’s an enhanced need for PO communication to guide young PIs in these endeavors.
* Where should input for defining research direction priorities be sought?

Traditional: NRC reports, town halls, workshops. What’s the best way?

* + No one way
  + Setting of priorities is an interesting process – normally large scope, less actionable priorities will be set by community (everything is a priority).
  + Setting priorities can be dangerous (provides for less flexibility to respond to emerging science questions).
  + Strategic plan is seen as “living” document that should be able to change with community input.
  + May be able to evaluate outcome of “top-down” style vs. “bottom up” style.

Cyberinfrastructure Topical Subcommittee

1. Data and Informatics Goals from GEO Vision Plan
   1. Data enabled science
   2. New computational infrastructure
   3. Connection to facilities
   4. Networks

* What’s data and what’s an archive. Keeping data available for more than 5 years is an issue. Storing data due to software changes. How long do we want to keep data
* Archive data requirements
* Akins report discussed people using the networks, to explore how they function and support the people using them
* Networking electronically needs to match how people function with each other
* Human capacity
* Most of the people using the data comes from outside NSF
* Make sure data from other sources available

Key Issues in CI environment

* OSTP public access memo
* EarthCube was in response to strategic plan
* Transition OCI into CISE/ ACI
* Computational facilities – do we have access
* Access to data
* Planning for growth in computation- intensive science
  + Visualization aspect
* Mechanisms for Implementation
  + EarthCube
  + Data policies

Access to Data

* Accessibility to cyber infrastructure
* How do we get the main stream people engaged
* Recompleting or facility, have DOI’s for each ship
* Tie DOI’s directing to the people making the assessment so that they get credit
* Possibilities with social aspect
* What is meant by digital data
  + Super raw data streams
  + Use by research scientist
  + Come up with a definition
  + Digital data resulting from federally funded scientific research
* Up to community to defend the standards of
* Model communities for definition
* Minimum time before archiving is 10 years
  + Depends on type of research

IEDA

* Make EBOP accessible
* Difficulty coordinator instead of having a contract

MAPS

* Pull of date
* Add or remove things

OSTP

* Inform them what the steps are

USAP Highlights FY 13 – Scot Borg and Brian Stone; AC GEO April 2013, Day 2

Scientific Research – fundamental knowledge of Antarctic content; Ant role in global systems; using it as a research platform (astronomy, seismology, seismic signals not distorted by effects of earth’s rotation)

Video clip on ship tracks, marine research, spots on the continent, Imagery and graphics, larger than US and Mexico combined.

Extraordinary observations

Surprises – new species of anemone on bottom of Ross ice shelf. 200-300m depth; created boreholes in ice and can sustain enclosure even when ice shelf is melting from below. Genus Edwardsiella.

Summer ocean temperature increase facilitate biological invasions (crabs and magnesium metabolism, need warmer water). Has attracted interest of commercial fisheries.

Polar geo-spatial center (PGC). Penguins from space. Training community to use modern GIS tools. NGA purchases High resolution commercial satellite imagery. Recently amended contract to allow grantees from federal research to use these images. Aerial photography, land cover information. How to extend asset to existing grantees elsewhere in NSF in a way that doesn’t create an undue advantage?

WISSARD – exploration of sub-ice sheet hydrologic system. Ice sheet usually 2Km thick. Extent of lakes, connection among water bodies is relatively recent findings. Has changed way people view the ice sheet and its dynamics. Is there life in the lakes under the ice sheet. Scientists wanting to take samples. Russians took samples at Lake Vostock. US did clean access (controlling fluid in drill hole) to a Lake in West Antarctica. Lot of interest in this kind of thing.

Technology for supporting science via overland traverse instead of flying. Primary motivation was cost of fuel for airplanes + size, complexity of stuff we wanted to put in the field increased.

WISSARD drill system fairly close to the ocean already. Taking a measured approach before considering more inland lakes. Custom-built mobile science labs were on site in the field to complete analyses. Sediment samples taken from lake.

Ice sheet coring – last season proved a technology that may be transformational in terms of sample acquisition. Replicate coring drill, able to start deviation hole from side of particular horizon of interest (instead of duplicate sample). Ability to do down-hole logging.. Possible scaled down version for smaller/lighter drills.

IPY AGAP partnership – info from a few years ago. Mountain range under the ice sheet.

Potentially very old ice --- 1M year old ice would hold record of transition from 40 k-yr to 100 k-yr glacial cycles. Is this the place?

Tectonic enigma - old mountains in the middle of a supposedly stable…

New insights into how ice sheets work – ice sheet basal melting, water re-freeze, major mass recycling, important process for ice sheet dynamics. New aspect that ice sheet dynamics modelers will need to incorporate.

ICEPOD able to fit in door of a C-130 – potential for taking these kind of data from McMurdo without having to set up a camp in the field.

Ocean-ice shelf – information to better quantify interaction between ocean and ice shelf . Key to ice-sheet stability and “the priority” for USAP 12/13.

NASA IceSat program – wanted ground based data to support satellite data near Amundsen Sea/Pine Island ice sheet (very difficult area to work in)

Ice Mass Change issue – driver for a variety of science. GRACE satellite system operated by NASA – over time can look at changing mass distribution. Issue of post-glacial rebound. Continental crust rebounds in response to glacial melt. ANET – autonomous GPS and Seismic arrays at remote sites.

Pioneering astrophysics – 10 meter radio telescope at south pole. Galaxy clusters discovered. Star formation rates much earlier in history of universe.

Largest neutrino observatory in the world. Ice Cube neutrino observatory. Cubic kilometer of ice. Where neutrinos come from is still an open question.

Partnership with E-HR – many activities including Discovery Channel’s Frozen Planet.

Responding to NRC report as part one of dual report, high-level review of Antarctic Program. Beginning dialogue with community. Will affect us going forward quite a bit. Led to blue ribbon panel report. Looking at ways to do things more efficiently, with smaller footprint.

Balloon program, meteorite collection program, work with NOAA for one of their nodes for climate monitoring sites.

Partnering with DoD, other agencies provides quite a bit of value-added activities.

How do you bound the science? Continuum between expeditionary science, makes sense to package all science together under one management structure to PI-driven science – funded ad hoc. Things have gotten more sophisticated, so cant stock all necessary equipment. How to review science independently in mainstream, core programs and then take it back and integrate it into Antarctic program.

Results from center of remote sensors for ice sheets. New data set for Greenland ice sheets.

We use renewable energy on small scale applications. Harder time installing on large scale applications. Average 26% of energy from renewables at McMurdo. We want to do more. Want to do it at Palmer Station. Want to use partnership at NREL, Dept. of Energy to increase use of renewables.

Topical Subcommittee Reports

Facilities

Framed discussion in terms of challenges of supporting facilities in periods of constrained budgets. mid-size infrastructure priorities and process. Managing risk.

Reality and perception of balance between facilities and research.

Variation – researchers who must use facilities all the time, v, not at all , v. somewhere in between.

Shared facilities – need to have broad perspective (other agencies, other countries involved in support)

False dichotomy between research and infrastructure can get us into trouble (OOI example)

Growing O&M costs really starting to impact.

Growing science pressure from cross-directorate initiatives, may not be matched with adequate increased funding for facilities.

Conclusion that we need to have a better strategic planning process across geosciences that looks at lifecycle of facilities

Time period for consolidation, how to maintain O&M costs. Different divisions have different issues.

Consensus that we need mechanisms to discuss facility needs with communities.

Research

Balance of investments between special solicitation and core, between top-down and bottom-up. Special, top-down, too high percentage in recent years. Community having difficult time understanding where they can fit in. Concerns regarding motivation for special programs. Special programs may disadvantage young researchers, as they may not have resources, network to play major role in these projects.

Mandates from OMB need to be taken into account. GEO can gain prominence from participation in special programs.

Need for performance of cross-directorate programs to be evaluated.

Optimal process through which community-generated ideas become proposals/solicitations.

Need Mechanism for phasing out programs, but also need to support long-term data collection

Support for young PIs.

GEO does good job of supporting young PIs. Importance for mentoring at NSF and home institutions.

Input for defining research directions. No best way. Need to do all of those.

Education and Diversity

Very active discussion. Didn’t get through the full spectrum of the issues.

Overview of some of the ongoing programmatic activities, highlights of model programs. Are they transferrable and scalable? Consensus that there is a long way to go. Public literacy and workforce development were highlighted for GEO. Need to be a catalyst for transformative activities.

Can develop some transformative programs with respect to diversity – interagency and intra-agency collaborations, public-private partnerships. GEO well-poised to enter into public-private partnerships.

Q – is best approach bottom-up or top-down? With bottom-up, money often dries up.

Can we use the broader impacts criterion to address diversity issues?

Good opportunity to move Earth sciences agenda forward with new Science Standards.

How to improve engagement of individuals with disabilities?

Early student engagement in HS and earlier, teacher training (pedagogy v content).

Motivation to get universities to work with public school systems.

Cyber-infrastructure

Looked at four goals that were included in existing Strategic Plan

1. Data enabled science

2. Connection to facilities

3. Networks – greater emphasis on networks of people, human interactions

4.

want to get more specific about goals.

OSTP public access memo, OCI/CISE reorganization

Data needed for beginning of analysis should be made available. Time, effort, cost,

Making data and interpretation available is a key goal but should not be included under mandate of OSTP memo.

Looking at existing resources – IRIS, UNAVCO, NCAR, EarthCube – need to be factored in, don’t want to re-invent the wheel.

Gaps in data that exist – analog maps, structural geology, paleo collections,

Data access DOIs

Computing infrastructure – agreed there is a need for robust support of computing as multiple levels. Universities, national computing centers, gap at mid-scale computing facilities

Workforce development – ability to make effective use of cycles. Further development of geoscience expertise at national computing centers; community education about available resources; need for sustained partnerships between geoscientists and computer scientists

EarthCube investment – strategy is on target in terms of reaching out to different communities, to garner input; need to look at personal overhead for people to get involved in EarthCube; perception that EarthCube is solely focused on data – there is also a computing aspect to it; need more PI buy-in, bottom-up approach

OCI/CISE – need to keep lines of communication open post-reorganization; needs to remain responsive to domain-specific science.

CI needs of polar programs, need for super-connectivity.

How do you deal with flood of data? Visualization.