Advisory Committee for Geosciences  
October 29-30, 2014  
Meeting Minutes

**AC GEO Attendees:**

Dr. George M. Hornberger (Chair)

Ms. Vicki Arroyo

Dr. Mary C. Barth

Dr. Paul Bierman

Dr. Cecilia Bitz

Dr. Mary-Elena Carr

Dr. Chihing Christina Cheng

Dr. Scott C. Doney

Dr. Karen M. Fischer

Dr. Linda Green

Dr. Linda Hayden

Mr. Orville Huntington

Dr. John Isbell

Ms. Jeanne Kosch

Dr. Dennis McGillicuddy

Dr. Jordan G. Powers

Dr. Harlan Spence

Dr. Brian Taylor

Dr. Joseph A. Whittaker

**NSF Senior Staff:**

Melissa Lane

**Wednesday, October 29, 2014**

**Welcome & Introductory Remarks**

Dr. Hornberger opened the meeting and welcomed the group and members introduced themselves.

**Update on NSF GEO Activities**

Remarks from the Assistant Director for Geosciences. Dr. Wakimoto emphasized the importance of the highlights from the divisions on the agenda and mentioned the upcoming discussions of deep ocean warming primarily in the Atlantic and Southern oceans. He also previewed the scheduled discussion of college students with disabilities conducting international field research.

Regarding broadening participation he mentioned an NSF-wide program, GEOPATHS, to coordinate education and human resources to define educational initiatives. Dr. Wakimoto also discussed GEO priorities document, which he said is one of the major purposes of this meeting. After the last meeting in April meeting, Dr. Wakimoto presented an overview of the GEO Priorities document to the National Science Board that was well received. Within the NSF there has been a groundswell of interest in the food-energy-water nexus since the April meeting. There has also been interest at the Foundation in the issue of Risk and Resiliency, which plays to the strengths of GEO.

Dr. Wakimoto discussed new leadership, including the new Division Director for Ocean Sciences, Richard Murray; Carol Frost, Division Director for Earth Sciences; and Paul Shepson, Division Director for Atmospheric Geospace Sciences. Dr. Wakimoto also discussed the retirement of Cora Marrett.

In January, ground was broken for the new NSF building and progress is being made on construction. Dr. Wakimoto also recounted his visit to the new Sikuliaq ship at Woods Hole.

Discussing the budget, Dr. Wakimoto remarked that it was largely flat, including the GEO divisions. He provided an Antarctic infrastructure update and the McMurdo Redevelopment Concept, which has received approval for consideration, with the NSB expected to be supportive.

On the Decadal Survey for Ocean Sciences, 2015-2025, it is expected by the beginning of February. A good report with strong recommendations is expected. Finally, Dr. Wakimoto asked members to think about the issue of reproducibility, including the possible pressure on PIs to cut corners.

Discussion. Advisory committee members asked a number of questions. Regarding reproducibility, it was suggested that the issue revolves around professional training and ethics and having an ethical framework to work in, adding later that it was a self-correcting problem.

Dr. Wakimoto responded to a question about how widespread the problem is by saying it was discipline specific. Another member said part of the problem is that journals do not publish negative results. Another member commented that open data access would help address the problem. Another member said more explanation of how to use the data to understand its uncertainty. Big G is a good example of how to do things. Another commenter noted the NSF program, Ethics, Education in Science and Engineering, which is a good source for resources.

**Report on GEO Priorities and Frontiers, FY 2015 - 2020**

Dr. Hornberger noted the GEO-level report has been in preparation for more than a year. After noting that the new version addresses the comments that were received, he opened the floor for comments:

* Dr. Powers suggested that the core of GEO is mentioned strongly at the beginning.
* Dr. Fischer said there was a structural problem with the report’s organization. Re the GEO frontiers, the way they are described sounds more specific, rather than a big tent picture. With Deep Earth Structures, it is mostly put in Early Earth, which is only one slice of what that broader community does. It sounds as thought available funding will be funneled into those areas and that section needs to be modified.
* Ms. Arroyo said there is a concern there is not enough funding and this is not reflected in the report and should be acknowledged.
* Dr. Hornberger noted that strategic plans have a fine line between being too general or too specific. He added that something might be added to the preface about funding but it wouldn’t be wise to lead with that idea.
* Dr. Bierman said that with limited funding, programs that span the foundation are funded at the expense of single investigator grants, which should be more of a priority. Dr. Hornberger responded that none of the foundation wide initiatives take away from the core.
* Dr. Spence said the revised version does a better job making connections between the first section and the core sections where in tight times money should be invested for future priorities. The forward also works to articulate the difference between the highest level and priorities at the next level down, but that could be articulated further.
* Dr. Wakimoto said he is asking new division directors to continue strategic priority setting. In response to a question about the refresh rate he said it makes sense to modify it when something significant comes up.
* Dr. Doney recommended a companion set from the divisions, which are not a comparably strong vision at the division level.
* Dr. Cheng recommended a strong division statement to ease nervousness.
* Dr. Shepson said it was a balancing act in deciding how far down to drill but said he was enthusiastic about engaging the community and addressing the question of finding the right balance. Dr. Hornberger said he did not envision driving it down further. But there might be a way to insert wording in the GEO plan saying that divisions rely on priority setting for advice from the organizations like the National Academies and note that several are forthcoming.
* Dr. Esperanca said these documents have to be living documents and ongoing.
* Deborah Bronk noted that Earth Sciences had a report out in recent years and the report should note how we are addressing what was in that earlier document.
* Dr. Taylor said two frontier themes (ocean atmosphere and [?] ice at high latitudes) could be combined, with North Atlantic and Southern Oceans combined in one discussion.
* Dr. Fischer suggested deemphasizing the frontiers now called out in the report and put it as a range of frontiers that might be considered with community involvement. The frontiers that have been chosen without significant input from the broader community. There should also be more transparency on how these areas were arrived at and it should be portrayed as a more fluid situation. There should also be more on who is revisiting these priorities and how much community input is involved. Also, the relationship between the frontiers and the research priorities regarding funding should be addressed.
* Dr. Spence asked, who the audience is for the frontiers. There might be a disconnect between the community and who the programs are being sold to.
* Dr. Wakimoto said he wanted to be prepared to say what the next steps are for future investment.
* Dr. Doney emphasized the importance of continuing to engage the community as the document continues to evolve.
* Dr. Wakimoto said he welcomes a more proactive exchange with the community.
* Dr. Powers added that it was important for the community to know where the document came from.
* Dr. Bitz asked if there was a plan to say how the frontiers have been successfully addressed. Dr. Wakimoto said there was.
* Dr. Hayden asked how success is measured and the baseline for graduate programs. Dr. Wakimoto answered that this is a question frequently asked, with the Foundation moving toward results and tangible metrics, including for RA’s graduate fellowships and RAUs.
* Dr. Spence asked if other directorates have similar framing documents in the works. Dr. Wakimoto said others, including SBE, are involved in a similar process.
* Dr. Taylor noted that the frontiers piece does not explicitly state that the program managers were relying on information from the communities they represent. Dr. McGillicuddy said this could be addressed by pointing in the document to the divisional planning documents to emphasize the broad community input.
* Dr. Cheng asked if community input was solicited. Dr. Esperanca said the document is a combination of community input and not and suggested linking to areas where there are many community reports. Frontiers could also link to core program activities and make people feel better how decisions are made and how program officers come out with the ideas they present.
* Dr. Huntington raised the issue of the global good that is done with the knowledge gained and research being useful to mankind in the future. Dr. Hornberger said the document tried to make that link. But Dr. Huntington said too often politics influenced the direction of research.
* Dr. Hornberger said the suggestions for revisions could be accommodated, including softening language and adding information on how the frontier areas were arrived at and asked the members if they were prepared to approve the document. Dr. Wakimotok suggested any specific written changes should be directed to Dr. Hornberger.
* Dr. Whittaker asked about the review process for potential applicants and broadening participation for the underrepresented community and matching programs to institutions that had the infrastructure required.
* Dr. Carson mentioned the current Teacup solicitation that is a partnership to address this type of structural barrier with some MSIs that don’t have geoscience degree programs or expertise.
* Dr. Doney suggested a better connection between the two advisory committees to discuss broader impacts. Dr. Wakimoto responded that more work needed to be done to make sure projects are able to be scaled on the national level and that was being closely looked at.
* Dr. Arroyo said the document does not make a clear connection between the text box on Page 19 and the plan for keeping people in the pipeline when they confront obstacles.
* Dr. Whittaker suggested that underrepresented students do not learn about careers in the geosciences and more curriculum development is needed coupled with field activities. Dr. Carson said the Geopath solicitation helps address these issues. She also said the EHR solicitation addresses undergraduate curriculum. There is also an initiative on K-12 education.
* Dr. Hornberger asked for all comments on the Imperatives and Frontier report within one week and said he will then distribute a revised version to the members.
* Dr. Spence suggested a roll out of the document at national meetings.
* Dr. Wakimoto said the report would be a highlight of the GEO Town Hall at UGU and other venues.
* Dr. Arroyo suggested adding wording in the forward to acknowledge more explicitly some of the challenges to keeping people and platforms.

**Action Item**: Dr. Hornberger asked for conditional acceptance of the document, pending suggested revisions. Dr. Taylor said the members had offered their conditional acceptance in their comments.

**AGS Subcommittee Meeting (Committee of the Whole)**

Dr. Shepson discussed the many personnel changes at the Division of Atmospheric and Geospace Sciences, including new personnel in Atmospheric, Geospace, and NCAR and Facilities. Dr. Shepson also discussed trends in the division for proposal submission and success rates. Broad agency-wide initiatives are important and connect well to the division. Without these initiatives, the trend line for proposals is relatively flat. The AGS success rate is high, with a one-third chance of success. About half of AGS programs do not operate with deadlines. Increasingly, programs are operating with deadlines and panel reviews. Once-a-year deadlines generate more proposals but the deadlines help with internal workflow management.

Dr. Hornberger noted that the foundation is looking at proposal workload and noted there are pilot experiments to reduce the number of proposals. In one case removing the deadline reduced proposal submission by half.

Dr. Shepson continued that workload is the main concern of program officers. He added that proposal decisions vary considerably in quality and he is seeking to understand this. His near-term broad priorities include re-developing the AGS Goals and Objectives document, hiring an NFS section head, filling program officer slots, portfolio review for the Geospace Section, managing assets, funding the best AGS science and communicating the critical and pressing nature of the science and the value of the scientific return to society. He went on to discuss the observed global average surface temperature, including a 15-year hiatus in the rate growth of this temperature, which indicates there is important research to understand this phenomenon. One answer is that the heat is going into the oceans, where the surface temperature is relatively flat but at 1500 meters the temperature has been increasing for most of the 20th century and is continuing. Dr. Shepson also discussed a paper that shows the hiatus could have been predicted in the early 2000s.

Another topic of Dr. Shepson’s presentation was a March 2014 document reviewed by BASC on six AGS goals and objectives. They include:

* Observe, understand and model extreme events and natural hazards;
* Advance the state of knowledge and understanding of the Earth’s climate;
* Expand knowledge of Earth’s atmospheric composition and behavior;
* Understand the sun and Geospace environment as a coupled system;
* Provide research infrastructure to advance the AGS community;
* Build a competent and diverse scientific workforce.

He added that there is an opportunity to produce a useful document that engages internal community and articulating large-scale challenges. He also described the near-term plan for the document, including defining the objectives, the target audiences, the broad content and the timeline. A final version is expected by early 2016.

Discussion. Comments included a possible asymmetry having both BASC and SSB in the review and how they map to AGS. Other questions asked about the process for community outreach and who the target audience is. In response, Dr. Shepson said he would use small and regional meetings that occur in the summer to add time for engaging subparts of the community and a possible regional roadshow at universities. Another suggestion was to use the database of those who have submitted proposals to offer them the opportunity to comment. AGS has discussed sending it out broadly to the community.

Another comment on the merit review report noted that GEO had the highest funding rate and asked about related opportunities and challenges. Dr. Shepson said it was partly due to the type of projects funded.

Further questions concerned the number of proposals and awards and how going to two solicitations a year would significantly increase the number of proposals for physical and dynamic meteorology and lower the percentage that get awards. Another question was about the structure of the document, but Dr. Shepson said it was too early have that established; he wanted to discuss what the community wants to do in terms of large-scale scientific problems. The document provides some basic and useful information for the community, along with scientific priorities and how they map to AGS resources.

Dr. Behnke continued the AGS presentation. The Geospace section is working with NASA on the Decadal Survey that provides recommendations for new directions. This prompted an examination of the balance across the portfolio of Geospace activities by looking at the Geospace portfolio and how much new funding is needed. The difficult task is considering what activities and capabilities will be lost in enabling these new activities and discontinuing current activities.

Highlights:

* A new Chair is to be selected by mid-October;
* A panel finalized;
* Criteria and a strategy developed;
* Membership finalized;
* In-person January meeting;
* Data collection;
* Teleconferences;
* A second in-person meeting;
* Write report (Sept. 2015);
* NAS review of report (October 2015);
* Final report released in November 2015.

Dr. Behnke emphasized the importance of a broad perspective and asked for help, particularly with developing broad criteria.

Dr. Wakimoto described three paths to proceed with constrained budgets and decommissioning:

1. An NRC report not constrained by the budget and generated recommendations;
2. A combination Decadal Survey and portfolio review;
3. A portfolio review with the Academy serving as a reality check, which is the option described by Dr. Behnke.

Discussion. Questions included those on the problem of comparing programs phasing out and new programs. An answer was offered that the best that can be done is to value potential impact. It was also suggested that the Decadal Survey can also be used in the process of judging programs. Astronomy had done a portfolio review of a similar magnitude 2 years ago to the one AGS is doing.

A question about workload was answered by Dr. Shepson, who recognized the importance of program support staff.

On the subject of providing communities guidance about broader impacts, it was suggested that providing examples of good broader impact activities would help the community and Dr. Wakimoto added there has been extensive discussion of saying that broader research impact should be considered. One problem with this, it was suggested, is that broader impact varies from panel to panel. It was added that identifying outcomes that are high priorities would help. Dr. Shepson responded that PIs should be encouraged to think about what broader impacts might result from their science. A program officer emphasized that broader impact is reported in the reports.

In reference to AGS’ level of success with cross-disciplinary opportunities, it was suggested that more work needed to be done to connect with social scientists. It was noted that a program called Inspire is designed to address this issue by promoting interdisciplinary transformative proposals.

**PLR Subcommittee Meeting (Committee of the Whole)**

Dr. Faulkner, Director of Polar Programs, provided an overview of personnel reassignments, additions, pending selections and vacancies. She then reviewed POLAR budgets, which are relatively flat, and highlighted the impact of the Federal sequester and the government shut down. She also announced a Town Hall meeting for December 18th.

Regarding Arctic, the US will take chairmanship of the Artic Council in April. The Council has a taskforce to enhance science cooperation among artic nations. Dr. Faulkner leads the US delegation. To increase cooperation there has been work on a legally binding document committing the artic nations to facilitate data exchange and deal with other challenges.

Dr. Stone, AIL Section Head, PLR, provided a Section update on the Antarctic Infrastructure Modernization for Science (AIMS) project, which implements recommended programs that cannot be funded through the regular operating budget and is the long-term capital plan for McMurdo and Palmer. The guiding principles include reducing costs, increasing efficiency, reducing the number of support personnel, reducing energy use and a safe and healthy work environment to support work for the next 30 years.

AIMS plans to have the design concept review in March. The station design is at the 60 percent phase.

Dr. Borg, ANT Section Head, continued the PLR presentation by discussing the update to the Committee Visitor’s Report. Because of the government shut down, PLR did not, as planned, revise the solicitation language re the need for incorporation of good project management skills and practices for complex projects (Recommendation 5). PLR is now working on a revision. PLR has engaged the National Research Council to build on the science portion of the high-level NFC review that informed the blue ribbon panel. PLR has engaged the NRC to prioritize those recommendations that should be more realistic (Recommendation 6). A draft of that report should be available in the spring and finalized before summer. Regarding the recommendation (Number 7) to bolster communications with the community, PLR is looking at a division-level newsletter and there has been an increased use of dear-colleague letters.

Dr. Stone concluded by describing new rigid hull inflatables that will positively impact research programs.

In response to a question, Dr. Stone described the concept design team’s work with Lockheed. Currently decisions are being made about the placement of labs and other facilities. There was also a survey sent last year to most of the program and results are being reviewed. Also, the Science Support Group will present at the AGU Town Hall on engagement going forward.

Dr. Falkner added, in response to another question, that the process involves review by the National Science Board, OMB, NSF’s Large Facilities Office, and other stakeholders. Mr. Stone said that the upgrades would not significantly affect research work at the sites.

Dr. Bitz continued the presentation by noting that the Subcommittee for Polar would like to have the full committee’s approval to include additional members for teleconferences to round out expertise in the PLR disciplines. These would not be members of the whole.

**Action Item**: AC/GEO approved the process without a vote.

**Integration of Polar and Geosciences Research**

Dr. Bitz discussed questions to pursue in evaluating the realignment. She began with an early history of Polar Programs. Draft evaluation questions include:

* Have the number of publications, the journals in which they are published and their impact factor been affected in a way that indicates a change in the ability to make fundamental discoveries in the Polar Regions?
* Has the visibility of NSF’s achievements in polar science changed?
* Is there a positive work environment at NSF with PLR in GEO? Has job satisfaction changed?
* Has PLR’s position of strength in negotiations for resources and contracts changed?
* Have characteristics of the scientists receiving funding (of all kinds of work but particularly field work) been altered in terms of social diversity and level of experience?
* Has the type of research receiving funding been altered in terms of breadth of research, science discipline, or interdisciplinary work?
* Has engagement with Arctic residents continued to be strong?
* Are more projects receiving joint funding between PLR and other GEO divisions?
* Are PLR activities visible and valued within GEO, especially in those areas unique to PLR such as Arctic social sciences, organism biology, and astronomy/astrophysics?

There were many questions raised about the draft evaluation questions, including:

* Publications may not change as a result of the realignment.
* Attitude surveys might be more appropriate than numerical metrics.
* How do the proposed questions match issues about increased efficiency?
* A more appropriate question for today might be whether the realignment accomplished the intended goals and have there been unintended consequences?
* Internal motivations should also be asked about.
* Some of the questions pertain to lagging indicators, rather than leading indicators, such as the number of investigator-submitted proposals.
* A possible question could be: Are there people applying elsewhere instead of Polar.
* What is the nature of the awards now vs. what they were.
* Changes in the organizational structure would not affect most of the questions (after the first four).
* There was a personnel impact and that could be measured.
* How are success and failure measured?
* The Foundation does not collect data in a way to answer the first question, though there are tools to correct that.
* Questions would be better focused on asking people how they think its going.
* The questions focus on the cost in morale vs. efficiencies.
* How would you know the merger was responsible for the outcome measured in the questions?
* A more important question might be whether Dr. Faulkner is struggling because she can’t do her job being inside Geosciences vs. when she had her own office.
* Asking about impressions on both sides will generate research questions.
* An impactful question might be: Has the organizational change caused any negative changes to relationships?

Dr. Wakimoto said he would support whatever the committee wants to do to regarding this survey and thanked those involved with the initial work in preparing survey questions.

**Meeting with NSF Director, France** **Córdova**

Dr. Córdova began her remarks by saying that this community is a critical partner in a link to the wider scientific community. In CY ‘15 she will be highlighting partnerships with other agencies, countries, foundations and with industries and GEO will be prominent. In some of those partnerships it is important to leverage investments in a flat budget and show the creativity that can emerge when combining different kinds of communities in unusual ways. Where GEO is a critical partner is in interdisciplinary research and coordination. A strength of NSF is the program officers across directorates and assistant directors who work across directorates.

She outlined her current priorities as broadening the participation of those involved to create new thinking to challenge our thinking and become more creative. To further broaden participation she would like to evaluate best practices with an eye to scaling those efforts.

Dr. Córdova said the plan GEO presented to the NSB in May was received with great acclaim; it was new to share a plan at the earliest stage.

She also reported on her trips to the University of Washington, Thompson Research Vessel, and more recently Woods Hole, where she saw an ocean observing platform’s instrumentation and other vehicles and talked with researchers and students and learned about the wealth of data and the challenges they present.

Discussion: Dr. Hornberger thanked the Director for her support of the peer review process and asked if there is anything that can be done to assist in that support.

The Director responded that some of the critiques have been taken to heart with the launch of transparency and accountability measures, which can be seen on the NSF site. One problem is titles and abstracts that are reflective of the content. She has asked program officers and the division directors to look at what is written there. The Foundation will soon release a revised edition of the grants manual to encourage investigators to write titles and abstracts that are sensible and communicative and convey the broader impact of the research.

Also, a task force will report next week on accountability measures. She is also trying merit review experiments in house, such as virtual reviews and having other proposers review proposals. The Director encouraged GEO’s feedback on these experiments.

The Director said that communication with Congress about research is important and should include highlighting students and noting the source of funding.

Asked to elaborate on opportunities and challenges to strengthen relationships to leverage the NSF mission, the Director said there have been many meetings with other agencies, including NOAA, DOE, and USDA to strengthen partnerships, including discussing expanding joint proposals for investigators in specific areas. Internationally, she referred to a recent reorganization of the Office of International and Integrative Activities to bring more attention around the world to encourage more science diplomacy and interaction with the State Department and is looking for a new leader for that office.

In response to a question about the evaluation of Polar programs the Director said it was wise to have questions that compare the differences of having programs merged or separate. She emphasized her interest in Polar programs and her upcoming visit with a congressional delegation. She said things are going very well in this area, with no concerns at her level about Polar being in Geosciences. She said the NSB was wildly enthusiastic about the Antarctic infrastructure opportunities. She would want to see how any review will be structured so as not to anticipate an answer.

Responding to a question about how NSF, given the budget realities, will best position itself for the future for making the measurements needed to advance the geosciences, the Director said she did not see support diminishing. There is a recognition on the board of the importance of facilities for this enterprise and there should be no fears on that account.

In response to a follow-up question on infrastructure costs and science costs and optimizing the balance between science and infrastructure the Director said NSF relies on its communities for the right balance between for how the investment should be parsed; the Decadal Survey will be an important contribution to this discussion. She also pointed out the importance of the cyber infrastructure and the workforce and making sure the data are robust and sustainably warehoused and accessible for broad access that can lead to new discoveries. She said Geosciences will provide the level of investment for success. But she again encouraged partnerships as the means for leveraging resources in a flat budget. She used icebreakers as an example, where a cooperation with another agency could cover the costs.

Regarding Dr. Marrett’s departure, the Director referenced recent personnel changes, including Dr. Richard Picias (SP), who she is appointing as chief operating officer. Reporting to him will be the office of information and resource management, along with the budget office and the directorates on operational matters.

Regarding a question on education and a move for reorganization at the Federal level and how NSF is dealing with issues related to geosciences, the Director said the effort on the Federal level was unsuccessful. She referenced a committee of the National Science and Technology Council, which she co-chairs on STEM workforce development. She said the Federal effort did not work well because every agency is different in both content and communities. But she said there is very good cooperation between the NSF directorates. The graduate training programs and graduate research fellowship programs are undergoing a review. She is interested in having the best model to decide whether the graduate research fellowship should be continued or whether it should be broadened so graduate students are better prepared for other careers. She also praised the plan developed by the Education Advisory Group’s strategic plan on STEM workforce and development. This is a good time for Geosciences to bring forth ideas on education and whether it is going in the right direction to achieve the desired outcomes.

On a question about the direction of the education portfolio in the geosciences, the Director deferred to Jill [LAST NAME?], who responded that the intent is for greater coherence and impact for career investments and she is optimistic about being able to address geo-unique priorities, though she added that customizing strategic investments rather than the NSF-wide approach could produce better outcomes.

The Director added that the budget situation limits a new NSF global direction. She recently asked for graphics from the budget department on how funding is distributed to see more clearly where funding is allocated, including for geosciences education. Dr. Hornberger added that it is possible to have an NSF-wide perspective and still serve the disciplines.

Discussing challenges with Congress, the Director said it was important to be aware of the worst possible thing that could happen, which would be losing the ability to set priorities for science and engineering and to select the grants that are most meritorious, a situation that it would take two decades to recover from.

The committee thanked the Director for her presentation.

**Thursday, October 30, 2014**

**Review and Approval of Committee Visitor Reports**

**Action Item**: Minutes of the last meeting were approved.

I. Integrative Programs Section Report

Dr. Houtman discussed the personnel and the programs reviewed, which included Ship Operations, Submersible Support, Oceanographic Instrumentation, Oceanographic Technical Services, Shipboard Scientific Support Equipment and Ship Acquisition and Upgrade.

The COV covered all FY 2011-2013 actions with 111 jackets reviewed with 10 years of summary data. Access to information was provided before the COV arrived on board, making the process more efficient with more open dialog. General comments of the COV included:

* Fleet utilization and science funding to support seagoing research primary concern;
* IPS Program Directors collaborate well within IPS and across GEO to maximize efficiency;
* Recent major accomplishments include R/V Sikuliaq launch and Alvin return to service;
* Additional efficiencies from combining SSSE and OI, and pooling technicians encouraged.

The COV made the following recommendations:

* Ship Operations: 3 recommendations. Suggested improvements to management practices and utilization thresholds, Program agrees with suggestions.
* Ship Acquisition and Upgrade: 2 recommendations. Focused on RCRV Project, number of vessels to be built, UNOLS Fleet Improvement Committee and Decadal Survey of Ocean Sciences input;
* Submersible Support: 7 recommendations. Cooperative Agreements support longer term planning (MOSA); assess future needs; assess operational efficiencies; establish metrics for success. Program is currently evaluating the next proposal for operations, and will incorporate suggested improvements.
* Oceanographic Technical Services: 5 recommendations. Continue Tech Pool pilot evaluation; monitor balance between shore-side and seagoing support; improve at-sea communications. Program will issue solicitation for Tech Pool management; investing in upgrades for internet connectivity.
* Shipboard Scientific Support Equipment: 6 recommendations. Concerned about reductions in funding; expand types of equipment supported; consider alternate funding model. Program will allow operators to submit consolidated Instrumentation and Equipment proposals to better assess priorities.
* Oceanographic Instrumentation: 2 recommendations. Combine SSSE and OI; use databases for improved use of instrument pools. Program will evaluate SSSE/OI (now under single PO); asset pools will be uses or expanded wherever possible and efficient.

All the recommendations will be actively worked over the next six months to one year.

Discussion: In response to a question from Dr. Arroyo about the right balance of large expenditures and other funding models, Dr. Houtman said Ocean Sciences is active in the interagency working group on facilities and infrastructure and said the Navy will continue to be the primary supporters for modernizing and replacing the large ships and he referenced a 2006 NSF Director’s commitment to funding where possible modernization and upgrade of the smaller class ships. He added that ice breakers are the purview of the Coast Guard.

II. Deep Earth Processes.

Dr. Fischer reported that the COV met in August and reviewed 181 proposal jackets. A subcommittee of 5 reviewed each of the five component programs. The individual report represents the response of each subcommittee for their respective program, with an overview of views from the review. She reported the findings and recommendations as:

* DEP programs are funding are essential with cutting-edge science, including potentially transformative research and an appropriate blend of inter-disciplinary and disciplinary projects;
* DEP POs are doing an outstanding job of running their programs. The COV was particularly impressed by the excellence of this management in the face of very high PO workloads and flat or declining program budgets;
* The proposal review process in each program is based on expert information from mail, panel and PO evaluations. It is fair, transparent, and is clearly documented;
* DEP POs have been pro-active in working with their research communities to define and develop new research directions, and they pay close attention to funding trends and concerns (e.g., large observational projects, experimental and analytical labs) and the health of the research workforce.

Elaborating on workforce issues Dr. Fischer said the percentage of new PIs is healthy, and that Deep Earth programs are supportive of early PIs. Women are represented in the PI pools and are being funded at percentages comparable to the total PI pool. It is harder to assess underrepresented minorities due to self-reporting issues. But using the numbers available, underrepresented minority PIs are successful at lower rates than for the overall PI pool. An important first step will be to get better numbers and the sources of the gap should be remediated if the trend remains in the new data.

Regarding career proposals, the number of awards and success rates have gone up in recent years.

Regarding PO workloads, when new responsibilities are taken on a there should be a review of the additional time required and that additional PO time be added. Also, information systems are antiquated and updates could reduce workloads by increasing efficiency.

She also discussed the recommendation that DEP program budgets be increased.

In response to a question, Dr. Cavanaugh said there are still restrictions on the number of people that can be appointed, with the number controlled by Congress and the overall budget.

In response to a question about women and minorities it was stated that AGU has 20 percent women and18-23 percent women in the PI pool. The percent of minority PIs is 3-4.

III. Surface Earth Processes Section

Dr. Bierman said that four programs were evaluated. This was the first COV since the sequester in 2013 and its effects were seen. The cumulative effects of lower budgets and dramatically increased proposal submissions represents an unsustainable solution for the community and POs. The findings are:

* The peer-review process of the four SEP programs reviewed is working well;
* The relative weighting of Intellectual Merit and Broader Impacts is not consistent across or within the four programs;
* The proposal load increased in all four SEP programs while total funding was level or decreased;
* Archaic data management systems made it difficult to access some additional data that could have led to more in-depth analyses;
* The SEP POs are well qualified and dedicated and doing an excellent job managing portfolios.

Recommendations include:

* Continuing to use the existing assessment methods to evaluate proposals, including ad hoc and panel reviews;
* Clarify expectations for the appropriate balance between Intellectual Merit and Broader Impacts in solicitations and communicate those expectations explicitly to ad hoc reviewers and panelists;
* Consider options to decrease proposal load and increase proposal success rates, which would lower NSF staff and PI workloads;
* Explore new data management platforms;
* Strongly support the core programs of the SEP, while also supporting Critical Zone Observations and other initiatives.

Dr. Wakimoto commented that NSF is reaching out to universities to look at issues of deadlines, pre-proposals and the pressure from some deans to submit large numbers of proposals.

IV. Geospace Section, Atmospheric and Geospace Sciences

The 10-member COV focused on five program areas and reviewed 200 jackets. The committee recognized the staff for continuous process improvement.

The findings and recommendations included:

* The COV recommended that CubeStats remain a GS-centric program in the near term, despite a 2011 report suggestion it be an NSF-wide program;
* The COV lauded GS for the re-initiation of the FDSS program, as recommended by the 2011 COV;
* Regarding interdisciplinary research, the COV found e-jackets where cross-disciplinary work was funded by GS, indicating GS is responding to the 2011 COV recommendation;
* The COV recommended a balance between virtual and in-person panels, with the possible addition of mixed virtual/in-person panels, and virtual panels with improved video conferencing;
* The COV strongly endorsed the preservation of the current GS emphasis on student access to and participation in the CEDAR, SHINE and GEM programs and workshop;
* The COV encouraged program directors to develop criteria and a strategic plan for the short-term and longer-term future of the geospace facilities and their role in achieving program goals.

Regarding conflicts of interest, no evidence was found of any issues, but clearer COI definitions could expand the number of qualified reviewers.

Regarding diversity, there was found to be a good distribution with the exception of a small program. The COV found insufficient diversity of gender and underrepresented groups a perpetual challenge in the reviewer selection pool. It found reviewers and panelists includes gender diversity, a range of seniority, geographical distribution and institutional distribution.

The COV found that Intellectual Merit should remain the primary driver for ranking proposals, with Broader Impact remaining a secondary consideration. It encouraged GS to quantify the value of BI.

The COV strongly encouraged GS to promptly undertake a vigorous, comprehensive portfolio review to prioritize various elements of the GS program for better portfolio management and address the 2011 COV comments about facility life-cycle planning that still remain as GS action items.

Dr. Behnke added that a Webex training would provide useful advance training on how to navigate the e-jackets.

Regarding a SHINE competition in which none of the PIs were awardees for several years, this has been addressed in the panel reviews with a slide on unconscious bias and emphasis on the need for diversity

**Action Item**: The Advisory Committee voted to accept the reports.

**OCE Subcommittee Meeting (Committee of the Whole)**

OCE Current Status and Challenges

Dr. Bronk opened by talking about working with staff since becoming division director and identified workload as a major issue. Recently Ocean Drilling as been moved into the Integrative Programs Section, a change that has worked very well. Remaining were two science sections, the Oceans Section, which now has Biological Oceanography and Physical Oceanography. A search is underway for an Oceans Section Head. The Section Head position is also vacant for the Marine Geosciences Section, which includes Marine Geology and Geophysics and Chemical Oceanography.

Dr. Taylor discussed the process that has been ongoing for three years about rethinking how things might work with a more deliberate and proactive approach to structuring positions with function and sustainability in mind.

Dr. Bronk said a different decision approval chain is about to be launched. No administrative review is done by section heads. Some of the workflow will be moved to the staff. Section heads will be empowered and will have final say within their sections looking at the portfolio to be more engaged in the programs. There is also a Realignment of some responsibilities, which is ongoing. There is also a review of Policy for supporting non-OCE use of ships to encourage people to use the ships and encourage other programs to support the ocean science community. The objective is to not discourage programs from using ships by requesting that other organizations pay for ship use. OCE does not have the funds to fully utilize the fleet and wants to encourage use of the ships and is moving toward having a dialog with other agencies to coordinate ship use. She described this as a softening of the current policy, with the changes applying to how directorates in NSF share the costs to optimize the tradeoff between efficient use and complete use of ships.

Dr. Bronk also provided a budget update highlighting the OCE Percentage of Science vs. Facilities Funding. She emphasized the continued need to balance, including IODP versus MG&G, OOI versus OOI science, and use of the fleet. A big concern in OCE is declining core budgets. The declines are 10-15 percent for biological oceanography and 50 percent for ocean technology. There is a concern about the effect of the decline. The soft money research community is skewed more toward chemical and physical oceanography. With declining core budgets you do not want to disproportionately affect the basic research in these two areas. One question is the distribution of the ocean science workforce. Dr. Bronk said a survey is being conducted to get data for future workforce planning.

Dr. Bronk briefly mentioned the Decadal Survey of ocean science, saying she is optimistic that this will be a very important document.

She also discussed the Coupled North Atlantic – Arctic Initiative. There has not been a big multidisciplinary project started for a long time. The focus will be on the North Atlantic to learn fundamental lessons about how the planet and ocean work and address numerous national priorities. Funding decisions are expected in the fall of 2015 and the spring of 2016.

Dr. Bronk also raised the issue of sexual harassment. She found that this is a serious problem that has gotten worse over the years. The locus of the problem involves professional meetings. This affects why women stop at the post-doctorate levels and are not reaching senior positions. Dr. Hornberger said NSF could develop best practices. He suggested best practices be put forward and he would see it was disseminated.

Dr. Fisher suggested that a productive topic for future discussion of the AC/GEO would be some of the best practices that are described in the literature.

Dr. Taylor said that in Hawaii everyone is required to go through sexual harassment training, which puts the discussion on the table and makes the issue safe to discuss.

It was also noted that GEO has been proactive in bringing the issue to attention internally to determine the role for NSF to play.

Dr. Cheng noted that all PIs with Federal funding are required to discuss ethics and said this could include the issue of sexual harassment and said case studies would be useful to help perpetrators understand what is considered harassment.

Dr. Bitz said that one problem is that universities are reluctant to punish because they don’t want the information to become available.

Dr. Bronk continued her presentation by discussing searches underway for two section heads, two MG&G POs and one Bio Ocean PO.

The discussion returned to budget issues with a question from Dr. Hornberger regarding the value of the Decadal Survey given that budgets are flat. Dr. Taylor said the challenge was prioritization and portfolio review. Dr. Bronk added that facilities costs needed to be cut, but there were numerous ways to do this and community input will provide the backing for difficult decisions and better choices.

**EAR Subcommittee Meeting (Committee of the Whole)**

A. Dr. Esperanca opened with a discussion of personnel:

* The Division Director Search was completed and Carol Frost starts in December;
* Geobiology and Low-T Geochemistry: Hailiang Dong (Deborah Aruguete);
* Hydrology: Janet Herman and Jack Sharp (Shemin Ge, Ni-Bing Chang);
* Sedimentary Geology and Paleobiology: Yusheng “Chris” Liu (Lisa Park Boush);
* “Detail” to PLR – Paul Cutler (Richard Yuretich in GLD since summer);
* Deep Earth Processes Section Program Officer: Dennis Geist (Chuck Estabrook);
* Petrology and Geochemistry: Jennifer Wade hired permanently;
* Three ongoing searches for Program Officers: Surface Earth Processes, Geophysics, Instrumentation and Facilities.

The presentation continued with a discussion of EAR’s Budget for FY 2014 for approximately $177.6 million. The request in FY 2015 is FY 14 +$150,000.

Dr. Esperanca also discussed:

* EAR Activities – NROES;
* Early Earth Workshops;
* 2 NASA/NSF;
* Part  1:  Hadean/Mid Archean (“Fecundity of the Early Earth”);
* Part 2: Earliest  Oxygenesis  through  Cryogenian (“Drivers of Complexity”);
* Next year – Planetary constraints on the Early Earth (NSF only);
* Geochronology Workshop and Town Hall;
* Goldschmidt 2014 – Needs from the providers;
* GSA 2014 – Users’ input.

Under New EAR Activities Dr. Esperanca discussed:

* EAR/HS – AGS/PDM workshop;
* 45 members of the broader community met to identify challenges in hydrometeorological-hydroclimatic-ecohydrological understanding and predictions, and to formulate consensus on science topics, observational capacity and integration of models across fields;
* The resulting white paper will be utilized as a basis of enhanced  PDM/HS collaboration;
* Tectonic Collaboratories – In TE solicitation;
* Interagency NAS report on Volcanology.

Dr. Esperanca also provided an update on the Centers for Transformative Environmental Monitoring Programs and fiber optic-based distributed temperature sensing for monitoring the environment.

She also highlighted EarthScope: Coastal Range Uplift and Ground Subside from Groundwater Use.

Dr. Esperanca related how researchers isolated which of the seven likely sources of methane leakage were responsible for drinking water contamination overlying the Marcellus Shale.

She also highlighted Collaborative Research – Earth-Life Transitions: Integrated Data-Model Analysis of CO2-Climate-Vegetation Feedbacks in a Dynamic Paleo-Icehouse.

Finally, she discussed SEP Programs (Assessment of factors impacting proposal numbers and success rates; Changes in program solicitation) and DEP Programs (Support for Large-Scale Field Projects approximately $1 million or more.

B. Discussion included the following topics:

* Merit review and success rates;
* After the COV the section had a day of discussion to address the number of proposals received;
* Dropping the deadlines seemed to work the best;
* Solicitations are being redone;
* There will be no more deadlines after April 15. The National Science Board is watching this closely. If this pilot has a dramatic impact, it might become more common across the Foundation. There is considerable support in the IPA community for not having deadlines;
* Deadline change presents opportunity for a virtual panel for 10-15 cross disciplinary proposals, which might create less burden on the community, reviewing them as they come in;
* Different divisions have conflicting deadlines that make proposals more difficult;
* Improving the success rate affects the fact that the community is resource limited;
* More data are needed on whether the quality of proposals is affected;
* It might be possible to mine these data retrospectively looking at the change from deadlines to now deadlines;
* As acceptance rates goes down is there a correlation with the average review score?
* Some people believe the low success rate discourages proposals;
* Looking at the lowest percentile might produce better data;
* Changing the behavior of a community takes time before change takes effect.

In reference to large scale field projects:

* They are becoming harder to fund;
* Contenintenal dynamics is in integrated in Earth systems;
* Earth Scope is ending in 2018;
* With tight funding there is an incentive to propose smaller projects;
* Coordination between programs is a partial solution.

EarthScope:

* Workshop next spring to discuss what science should follow EarthScope;
* A decision is needed in the next 12 months for the renewal of these facilities.

Mid-scale projects

* There is not a lot of support for mid-scale projects;
* There is concern in the community this trend is happening without intention.

**Meeting Wrap Up Action Items.**

Prioritized and categorized list of items for next AC/GEO meeting:

* Seeking input:
  + Something from the NSF-wide merit consideration
  + Report on Ocean Decadal Review
* Broader Impact:
  + Bringing in a speaker for a foundation-wide view.

**Action Items, prior to next meeting:**

* Evaluation of polar programs.
* Report on merit review group’s work to subset of AC/GEO prior to next meeting.

POs or Division Directors to present their view of how they will address balance of mid-size projects. This should include a historical perspective on mid-level projects re success and outcomes and address why worthy projects for approximately $1 million are not being proportionately funded. Also, Should Earth Sciences partition funds? Also for discussion: The makeup of the Advisory Committee for Geosciences.

**Action Items:**

* Will complete Imperatives and Frontiers document. Specific language can be submitted prior to November 5, 2014 and this will be incorporated.
* By November 10 a revised version will be distributed for approval and only minor changes will be accepted. Responses not made within two days will be considered notice of approval.
* Dr. Hornberger will chair AC/GEO for another year.
* Suggestions re membership or the agenda can be mailed in over the next few days.
* Dr. Hornberger will present the committee document at the Town Hall on December 16.
* Dr. Bitz will rewrite some of the questions on assessing the merger of Polar and GEO
* The effect of free and open access publication on investigators will be added to the agenda when clearance is received.

The AC/GEO meeting was adjourned.