

GeoPRISMS Steering and Oversight Committee Highlights, Fall 2012

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Introduction

The Fall 2012 GeoPRISMS Steering Committee Meeting focused on reviewing the recent Planning Workshops for Cascadia and the East African Rift System (EARS) primary sites and revisions to the associated sections of the Implementation Plan (IP). Extensive consideration of phased funding models for GeoPRISMS primary sites took place, informed by discussions of budgets for upcoming years.

NSF update

Deborah Bronk (VIMS) is the new head of the Ocean Section. Wendy Harrison (Colorado School of Mines) is the new director of EAR. Roger Wakimoto (NCAR) will be the new Assistant Director for GEO Directorate, joining NSF in February 2013. The Office of Polar Programs (OPP) will return to the GEO directorate in 2013.

The GeoPRISMS budget will be flat this fiscal year, at \$4.5M, although spending is limited to 80% due to a combination of the continuing resolution and the fiscal cliff. With a (one time) mortgage carryover for previous field programs of 42%, the total left over to spend is about \$2.4M.

This year's GeoPRISMS Program solicitation drew 27 proposals, requesting a total of ~\$14.4M and 127 days of shiptime. Funding decisions are still pending, but success rate is ~20-25%.

Looking ahead at the probable funding climate in the next few years, NSF would like to start planning for funding now, with the advice of the GSOC. Issues for discussion include (1) the relative priority and timing of costly field programs, including community experiments, (2) the inability to support large projects at all primary sites at the same time, requiring advance planning, for example, phased proposal submissions based on science priority, timeliness, and opportunities.

Cascadia Primary Site Workshop Summary

Brad Hacker, Susan Schwartz and Katie Kelley provided a summary of the GeoPRISMS-EarthScope Science Workshop for the Cascadia Primary Site, held in April 2012 at the World Trade Center in Portland, OR. The two-day workshop had nearly 180 participants, including about 60 graduate students and post-docs, who also took part in a one-day pre-workshop student symposium and regional field trip. Attendees were very enthusiastic about opportunities for GeoPRISMS studies in Cascadia, many of which are still ramping up – including the Cascadia Initiative. *[A workshop report can be found in the Fall 2012 GeoPRISMS Newsletter.]*

EARS Primary Site Workshop Summary

Maggie Benoit and Rob Evans reviewed the East African Rift System Planning Workshop, held on October 25-27, 2012 in Morristown, NJ. There were 110 attendees, including ~30 students and a large number of international participants. Highlights of the meeting include:

- A valuable overview of ongoing research by US and international investigators
- A panel of African participants (including students) showcasing their research and future opportunities
- Productive, phased break-out discussions, defining new and exciting directions for research, through GeoPRISMS and elsewhere.
- Student pop-up presentations, which were inspiring and successful
- The student perspective and implementation plan, which helped to define the scope for the focus areas for future research.

A clear focus area emerged from the breakout sessions and the student perspective, specifically the Eastern rift. This area was chosen because many key scientific questions could be addressed there. In addition, three targets of opportunity were identified that can leverage other efforts. [A full report on the workshop can be found on page 7 of this newsletter.] The conveners are currently finalizing the EARS Implementation Plan for release for community review.

New Zealand Primary Site Planning Workshop

Laura Wallace presented plans for the upcoming New Zealand Primary Site Workshop, to be held April 15-17, 2013 at the Te Papa Museum in Wellington, New Zealand, and requested GSOC feedback. Workshop conveners have been defined, representing a mix of US and New Zealand universities and agencies. A Science Steering Committee was established to advise on the program, including several international members. About 100 participants were expected (now revised to ~150), from the US, New Zealand, Japan, Europe, and elsewhere. Funding is from the NZ Ministry of Science (now MBEI), NSF GeoPRISMS, and InterMARGINS has been obtained, and other sources will be approached (e.g., ANZIC, US Science Support Program, InterRidge).

This workshop has great potential for leveraging international partnerships, including IODP linkages. Given the strong multinational research potential (and limitations on NSF funding in the current environment), the approach to the meeting should be to develop a “portfolio” of subduction research goals, and to define within that what GeoPRISMS can best contribute within that, vs. NZ-led and other international partners (Japan, Europe). Importantly, the workshop program should be designed to help write the IP. Speakers and break-out leaders should be given instructions about objectives. Challenges include narrowing the GeoPRISMS focus, and properly representing emerging opportunities.

Cascadia Initiative Update

Geoff Abers, the chair of the Amphibious Array Steering Committee (AASC), provided an update about the Cascadia Initiative (CI), posing some questions for consideration by the GSOC. The onshore instruments have been in place for some time, and are returning data. The offshore OBS instruments are now in year 2 of the deployment plan. The year 3 deployment will essentially follow the year 1 deployment, with the shallow instruments in a tight array around Gray’s Harbor.

All year 1 data should be released by the end of November (before AGU), allowing people to look at the data as soon as possible, to assess data quality in time for revisions to the year 3 plans. The AASC is keen to know and announce when proposals can be submitted to analyze these data. The success of this first amphibious community experiment cannot be assessed until the data are analyzed.

A mini-workshop on Cascadia Marine Geophysics is planned for AGU, reviewing a range of recent projects. The overall objectives are to inform the community of related projects and opportunities and to engender new collaborations, but also to discuss CI OBS data for the first time – to get community input about the next state of deployment.

Donna Blackman updated the GSOC about the new *Dear Colleague Letter* (DCL) explaining how to submit proposals to work with the Cascadia Initiative data. The new DCL has been signed by OCE and EAR and should get final approval before AGU. The call for data QC and metadata generation proposals has been eliminated, although NSF is willing to consider if proponents submit. The two main types of proposals are now: Type A - Derived products (using both onshore and offshore data), e.g., earthquake and tremor catalogues, and Type B - Full science proposals to work with the data. The guidelines about where to submit are provided at <http://www.nsf.gov/pubs/2013/nsf13023/nsf13023.jsp>.

The Future of the Amphibious Array Facility

Discussion turned to what might happen to the Amphibious Array after the CI data collection will be complete in 2015. There are communities interested in seeing the AA redeployed on the East Coast and

in Alaska. NSF is cautious about the costs of deploying another amphibious facility similar to the CI. The community and NSF need to meet to discuss and make decisions, A planning meeting should be held soon – in 2013, perhaps at the EarthScope National Meeting.

Community Experiments and Expeditions

The recent experience of submitting the ENAM community seismic experiment proposal was reviewed, with particular attention to the time commitment for proponents to prepare the proposal and to carry out the project, all in service to the community. There was general consensus that proponents, in particular, early career investigators, should have some priority for working with the data. Possible NSF mechanisms might include EAGER or RAPID proposals, or possibly supplements to the main community proposal.

The concept of Community Expeditions was discussed briefly for Alaska, wherein potential proponents would have the opportunity to coordinate logistics for field work in the Aleutians (similar arrangements could apply elsewhere). Ideally, this approach would decrease the individual cost per project. Proposals could be solicited for a given time window, enabling logistical coordination. NSF personnel were open to considering this model, but the details need to be worked out. *[A mini-workshop will likely be scheduled for AGU 2013.]*

Initiative Summaries & New Projects

New and ongoing Subduction Cycle and Deformation (SCD) Initiative projects include:

- The large collaborative Mt. St. Helen's imaging project, led by Bachman (now Creager, U. Washington), "Illuminating the architecture of the greater Mt. St. Helens magmatic systems from slab to surface", has started up.
- Brian Jicha (U. Wisconsin) and colleagues are carrying out a reconnaissance investigation of Aleutian Arc inception, sampling and dating rocks of different compositions to constrain the ages of the oldest records of volcanism.
- Peter Kelemen (LDEO) and others are conducting a pilot study of compositional differences between intermediate plutons and lavas in the intra-oceanic Aleutian arc, and their causes.
- Adam Kent (Oregon State U.) and colleagues are funded to study the record of explosive volcanism in the Central Oregon Cascades, to establish the long-term eruptive history over the last 15 My.
- Paul Johnson (U. Washington) and others are using multiple techniques to obtain conductive heat-flux across the offshore Cascade prism, with many graduate and undergraduate student participants.
- A reconnaissance study by Dave Chadwell (Scripps) and others will assess optimal locations for submarine geodetic measurements to determine locking of the subduction megathrust.

New and ongoing Rift Initiation and Evolution (RIE) Initiative Initiative projects include:

- Donna Shillington and James Gaherty (LDEO), and Matt Pritchard (Cornell U.) continue their work on rift-related faulting in Northern Malawi. Gaherty presented a poster on InSAR results at the EARS workshop; another presentation will take place at AGU.
- Rob Evans (WHOI) and others (Canales, Atekwana) are carrying out MT and gravity surveys of incipient rifting in the Okavango and Zambia; this project is not funded by GeoPRISMS, but is related.
- Peter Lonsdale (Scripps) and colleagues are collaborating on "Dating Submerged Continental Crust Beneath the Southern Gulf of California, and a Synthesis of the Magmatic and Tectonic

History of This MARGINS Focus Site”, obtaining U-Pb crystallization ages of volcanic and plutonic rocks recovered from submerged rifted continental crust in the southern Gulf of California.

New and ongoing Source to Sink MARGINS (S2S)-Related Initiative projects include:

- A collaborative project between Kyle Straub (Tulane U.) and Ben Sheets (U. Washington), entitled is generating a series of reduced-scale experiments to quantify the relationship between geomorphic and stratigraphic surfaces.
- Neal Blair (Northwestern University) and Laurel Childress, are involved in a project entitled “The Subduction Margin Carbon Cycle: A Preliminary Assessment of the Distribution Patterns of Multicycle Carbon”. This project compares the Alaska, Cascadia and the NZ Hikurangi margins, using Raman spectroscopy to detect thermally mature (ancient) and immature (younger) Carbon. They also are developing a biomarker approach to track terrestrial organic C across accretionary wedges.

Recent Developments at MARGINS Focus Sites

The start-up of GeoPRISMS did not shut down research activities in the previous MARGINS focus sites, and in fact, several exciting events and activities have occurred in recent years, that continue to be of interest to the GeoPRISMS community. Two of these were reviewed during the GSOC meeting, with follow-up discussion about how to integrate these topics and ongoing activities into GeoPRISMS today.

- **Arc Drilling in the Izu Bonin Mariana (IBM) Focus Site:** Bob Stern presented a summary of the Japanese-funded workshop on “Ultra-Deep Drilling into Arc Crust” that was held in Hawaii September 18-21, 2012, and reviewed the upcoming IODP plans for drilling at IBM. A report on this workshop can be found on page 14 of this newsletter.
- **September 5, 2012 Costa Rica earthquake:** Susan Schwartz summarized the September 2012 M7.6 Nicoya Costa Rica earthquake, which occurred in the Central America focus site. This earthquake was anticipated, in large part due to MARGINS research and investment. Tim Dixon, Susan Schwartz and collaborators have an article in Eos entitled “Detailed Data Available for Recent Costa Rica Earthquake” [which can be found at <http://www.geoprisms.org/events/59-costa-rica-eq/326-costa-rica-eq.html>]. GPS and seismic networks, funded by MARGINS, have provided openly available data. The authors also submitted a special session on the Nicoya Earthquake at the AGU Meeting of the Americas, which will be held in Cancun in May 2013. The title of the session was chosen to emphasize MARGINS: “The 2012 M7.6 Nicoya Costa Rica Earthquake: Seismogenic Zone Science at the Bull’s Eye in an NSF MARGINS SEIZE Focus Site.” [<http://moa.agu.org/2013/scientific-program/sessions/s09/>]

GeoPRISMS Data Portal & Updates

Andrew Goodwillie reviewed progress on the GeoPRISMS Data Portal and Resources since the Spring 2012 GSOC meeting, including updates and improvements to the Data Management Plan tool and Data Submission Form, expanded bibliography, new data additions for the Cascadia and ENAM primary sites, and more. GeoMapApp has been improved, adding new data through March 2012, and bringing centroid moment plots back. A full report is provided on page 20 of this newsletter.

Education and Outreach Updates

The Distinguished Lecture Program subscriptions continue to increase compared with previous years, with 8 speakers now scheduled to visit 32 schools within the academic year. GSOC also considered the possibility of honoring applications for speakers from international schools, but at their own

expense when feasible. The GeoPRISMS office was reminded to track down speaker presentations and host school recordings from 2005 on, and to make them accessible on the website.

The proposal submitted to NSF Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics (TUES) Program to develop new MARGINS Mini-Lessons was funded starting in September 2012. The goal of this project is to synthesize and incorporate the decade of MARGINS research into upper level undergraduate geoscience courses. Members of the MARGINS/GeoPRISMS community are invited to join this effort to contribute their expertise to the development and testing of new curriculum materials. The project was detailed in the Fall Issue of the GeoPRISMS Newsletter and also on page 8 of this newsletter.

GeoPRISMS Office Activities & Updates

The GeoPRISMS office experienced a slowdown during the summer of 2012, and several new staff were hired. Office activities, however, still included organizing two GeoPRISMS workshops: Cascadia Science Workshop in April (180 participants) and a small working group meeting for the ENAM Community Seismic Experiment in June (~15 participants). The fall was also dedicated to the organization of the EARS IP workshop held October in New Jersey. Planning has started for the NZ workshop, scheduled for April 2013. In addition, work continues on the Mini-Workshops and Townhall Meeting and other events at AGU, as well as the GeoPRISMS Best Student Presentations. The office also prepared and distributed two newsletters this year.

Integrated Ocean Drilling Program (IODP) Update

- **The New IODP:** John Jaeger provided a brief update about the new IODP, with implications for GeoPRISMS. NSF has authorized the continuation of the program for one more year. The shiptrack will be driven by proposal pressure, reviewed and previewed by NSF. Brazil is now an active member of the program. An update about IODP activities, written by John Jaeger and Liz Sreaton (University of Florida), was prepared for the Fall 2012 newsletter. The GeoPRISMS IODP mini-workshop at AGU will provide information to members of the GeoPRISMS community interested in ocean drilling. The focus will be on Northern Pacific SCD sites (Cascadia and Alaska), although people interested in NZ drilling are also encouraged to participate to hear how things are done.

- **The Chikyu+10 Workshop** will take place April 22-24, immediately after the GeoPRISMS NZ workshop. The aim of this workshop is to discuss potential future scientific missions using the Chikyu over the next 10 years. The workshop outcomes will be considered by JAMSTEC in long-range planning for Chikyu operations. Meeting goals, themes, format and the application process will be widely publicized soon. More information can be found at <http://www.jamstec.go.jp/chikyu+10/>.

Funding Strategies – Requirements and Recommendations

NSF is keen to get GSOC input about the optimal timing for funding the data acquisition and science at each of primary sites. This summary reports on the conclusions of GSOC discussions of the matter. At issue is the concern that large field programs (LFPs), viewed as critical data gathering efforts for most primary sites, also have significant impact on the overall science budget, with individual proposal costs on the order of \$2-2.5 M (not including ship time). The alternatives anticipated by NSF are:

GSOC discussion focused on how best to provide useful guidance to NSF. Recent planning workshops have provided a better sense of what is likely to happen in each location and when. However, GSOC would like to ensure that good proposals, both large and small, as well as PI- and community-driven, can emerge from the community when the time is right. GSOC recognizes that some projects will have long start-up times, some sites will have greater need for large experiments, and importantly, the entire community should be enfranchised in the process along the way.

A preferred option is to focus the GeoPRISMS solicitation each year to (a) prioritize key big projects each year, based on primary site needs and the readiness of the community and site; (b) Identify in advance and support important projects with long start-up times; and (c) anticipate and encourage non-prioritized projects to be submitted to other programs. Defining priority areas for study each year will also enable coordination, as recognized for the Alaska Community Expeditions concept. Importantly, this needs to be done in an unbiased and fair way, allowing for emergent opportunities and proposals.

During the GSOC meeting, the following approach was explored and discussed:

- Define a rough percentage breakdown for the primary sites for each year based on factors such as readiness and timeliness, necessary lead-time, and need for advanced coordination
- Phase each primary site in and out on these bases, as well as the sequence of the primary site planning workshops, in order to spread the budgets across the decadal program. For each primary site, a “window of opportunity” for proposals would be defined. Critically, GSOC recommendations would only be used to guide NSF decision-making, not to specify which proposals should be funded.

Importantly, by developing a phased funding model, the GSOC can advise the community in advance which primary sites will be accepting certain types of proposals. This will allow the community to self-organize, plan and coordinate, potentially enabling the “community expedition” concept to work.

Updates to the GeoPRISMS website

GSOC discussed ways to improve the GeoPRISMS webpages and how to integrate the archival MARGINS pages into the site, particularly with new results coming in for MARGINS focus sites. Planned updates and additions include:

- A new webpage relating to the September 5, 2012 Nicoya, Costa Rica, earthquake was added to the GeoPRISMS website. This is an opportunity to link the GeoPRISMS website to previous MARGINS primary sites content. [*The Costa Rica Earthquake web page can now be found at <http://www.geoprisms.org/events/59-costa-rica-eq/326-costa-rica-eq.html>*].
- The GeoPRISMS Office is creating a library of all GeoPRISMS-MARGINS DLP presentations to share with the science community. The presentations will be posted as soon as they are available. The goal is to expand the Education & Outreach content. [*presentations can be found at: <http://www.geoprisms.org/dlp-current-speakers.html?layout=blog>*]
- Additional features of the website can include announcements to participate on cruises (e.g., upcoming CIET cruises, per Susan Schwartz) and other field activities. Another possibility is to create an interactive map presenting the ongoing projects was discussed.