

GeoPRISMS Steering and Oversight Committee

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Edited by Anaïs Férot, GeoPRISMS Science Coordinator & Demian Saffer, GeoPRISMS Chair

Introduction

The annual GeoPRISMS Steering and Oversight Committee Meeting provides the GSOC members and NSF the opportunity to share updates on GeoPRISMS activities, research funding and outcomes, and to discuss and address program issues and planning. The Spring 2017 meeting included discussion of the program solicitation for FY18, the role of the GeoPRISMS Education Advisory Committee (GEAC), and the future of the Program after 2018, as well as a report from the GeoPRISMS Rift Initiation & Evolution Theoretical & Experimental Institute held in Albuquerque, NM. The committee also received updates on the recent GeoPRISMS office transition, current GeoPRISMS and GeoPRISMS-related research efforts via presentation of materials provided by PIs, the GeoPRISMS data portal, the draft Subduction Zone Observatory (“SZO”; re-dubbed “SZ4D”) meeting report, and AGU workshops and activities.

NSF update

Acting Section Head Eva Zanterkia, representing EAR Division Director Carol Frost, OCE Division Director Rick Murray, and Program Manager Jenn Wade (EAR) provided updates from NSF. Zanterkia discussed the important and positive impact of GeoPRISMS on EAR-Geophysics and other NSF Core Programs, highlighting that GeoPRISMS is a great example of a successful program that combines collaborative, interdisciplinary, and synthesis aspects. These strengths are viewed as high value components in strategic planning for the EAR division and broadly within NSF. Her recommendation to GeoPRISMS scientists is to share their work with NSF, and send outcomes and impacts to show taxpayers why NSF and EAR are so essential.

OCE Division Director Rick Murray also expressed his appreciation for the role GeoPRISMS plays in engaging and contributing to the Earth and Ocean Sciences; working across boundaries can be administratively challenging but GeoPRISMS remains very successful and works very well. Murray also highlighted the value of societally relevant, collaborative basic science underway within GeoPRISMS. William Easterling will join NSF beginning June 1 as the GEO Assistant Director. Debbie Smith has joined NSF as a permanent full-time Program Officer in OCE Marine Geology & Geophysics.

Wade and Murray indicated that (at the time of the GSOC meeting), the Continuing Resolution (CR) for FY17 was to end in April; as of March 2016, NSF had only 50% of FY17 funds available to spend, with the rest pending a fiscal year federal budget. As a result of this significant budget uncertainty, decisions on GeoPRISMS and other FY17 awards were delayed by several months. NSF is moving to Alexandria, Virginia in early September 2017, so the close-out of FY17 budget is planned for June (instead of July, as is usually the case). The FY18 federal budget is considerably delayed as is usually the case during presidential election years. Since the time of the GSOC meeting, a continuing resolution was passed to

carry through September 30, 2017. Overall, NSF is highly efficient in using their budget to support research and education; 94% of funds that NSF receives go out the door to investigators.

Wade provided further NSF GeoPRISMS program updates, noting that this year marked the end of the phased implementation for primary sites, with New Zealand now completed. NSF will open a new solicitation for FY18, with opportunities for synthesis efforts and field programs at a wide range of scales (see below). Wade also noted that there is substantial discussion within NSF with other programs, including PREEVENTS and EPSCOR, to leverage support for large projects. The EAR division has been reorganized into two major tracks: integrated programs, including GeoPRISMS, EarthScope, and IES; and disciplinary programs, including core funding programs. This re-organization has changed some responsibilities within NSF, but has not affected the programs themselves or levels of funding.

GeoPRISMS solicitation in FY18 and beyond

On the heels of the five-year “mid-term” review, both NSF and the GSOC recognized that the focus of the remaining funding solicitations will help to shape the legacy of GeoPRISMS, demonstrate the value of integrated multi-disciplinary science, and ensure integration across field sites and data types as the decadal program heads into its final years. The phased funding model – in which large field projects in certain sites are considered only in specific years - is now completed; an extra call for leveraging the Alaska Transportable Array was also completed in FY17. At the time of the GSOC meeting, the upcoming (FY18) solicitation was still in preparation. The draft solicitation specifically indicated that any major field projects should target gaps in existing data, and should provide justification that new data are necessary in order to make progress on key questions in the Science Plan. Targeted small-to-medium scale field projects would also be encouraged. In discussion of the funding solicitation, the point was also raised that there is strong support for proposals that use or integrate existing datasets; aligned with this idea, the draft solicitation also highlighted synthesis and integration projects.

The FY18 solicitation is now final and is available at:

https://www.nsf.gov/pubs/2017/nsf17549/nsf17549.htm?WT.mc_id=USNSF_25&WT.mc_ev=click. (see also p. 25 of the Spring 2017 Newsletter).

Rift Initiation & Evolution Theoretical and Experimental Institute report

Donna Shillington and Tobias Fischer, conveners of the Theoretical and Experimental Institute (TEI) for the Rift Initiation and Evolution (RIE) Initiative that was held in Albuquerque, NM February 7-10, 2017, provided a report on the meeting to the GSOC. The objectives of the TEI were to:

- Summarize progress and recent scientific advances related to the RIE initiative;
- Identify high-priority science for future GeoPRISMS RIE efforts; and
- Promote community building and formation of new collaborations.

A group of scientists whose expertise spanned a broad range of interests connected to the RIE Initiative, from deep geodynamic processes underlying rifting to surface processes controlling syn- and post-rift evolution, was invited to convene the meeting, give keynote lectures, and contribute to the meeting as

attendees. The complete report from the TEI was posted for community input earlier this Spring, and a final version appears in this edition of the Newsletter, on p. 8.

The TEI was attended by 133 US and international participants, including about 50% early career investigators (graduate students or postdocs), as well as a number of mid-career scientists with little or no previous engagement in the RIE initiative. A half day graduate student and postdoc symposium, attended by 65 grad students, postdocs, and a few senior scientists, was held the day before the conference. The main meeting included oral sessions spanning topics from rift initiation and evolution to geodynamics and surface processes (the full list of sessions and more details available at: <http://geoprisms.org/tei-rie-2017/>). Small group discussions were focused on the identification of high priority science questions and work needed to tackle these questions. Several poster sessions were also set up throughout the meeting, and pop-up sessions allowed attendees to introduce their posters and collaborative opportunities. The speakers and attendees covered a wide spectrum of expertise and perspectives; talks focused on the EARS and ENAM focus sites but also targeted other science within the RIE initiative.

Five high-priority science themes were identified from the discussions; within each of these, the workshop highlighted key recent findings and opportunities for near-term research progress:

1. Tracking fluids (volatiles and magmas) through the lithosphere and with time
2. Influence of pre-existing structures throughout rift development
3. Controls on strain localization
4. Time dependent rheology & dynamics
5. Surface mass fluxes & feedbacks with rift evolution

To address outstanding questions related to the themes above, the following future efforts were highlighted as particularly important:

- Collection of new geophysical, geochemical, geological data, particularly in the EAR
- Synthesis of information within and between rift systems
- Experimental (laboratory) work, possibly connecting to SCD

Allied programs and partner organizations updates

Terry Plank called in to provide update on the Subduction Zone Observatory (SZO) meeting that was held September 29 - October 1, 2016 in Boise, Idaho.

Among the 240 participants (made possible thanks to extra funding from NSF, USGS, and other international programs), 67 were early career, and 45 were from 21 non-US countries. Plank and Jeff McGuire were lead conveners for the SZO meeting, and organized the writing team to draft the workshop report.

At the time of the GSOC meeting, the SZO report (re-dubbed "SZ4D" to capture the core idea that subduction zones are complex and require observations of processes in three-dimensions and over time) was in progress, to be released for community input in April. The report highlights a number of key

themes for this initiative: (1) understanding processes that underlie geohazards at subduction zones; (2) integration of data sets and models that capture the four-dimensional evolution of key subduction processes; and (3) development of strong modeling and international collaboration elements. [The full SZ4D report has now been distributed and is available at:

https://www.iris.edu/hq/files/workshops/2016/09/szo_16/sz4d.pdf]

GSOC also heard updates about a large number of allied projects underway or planned for the New Zealand primary site, supported through Integrated Ocean Discovery Program (IODP) and NSF programs beyond GeoPRISMS. These include: three IODP drilling expeditions – two focused on slow slip events, landslides, and slope failures along the northern Hikurangi subduction margin (Expeditions 372 and 275) and one on subduction initiation (Expedition 371); a newly funded NSF Integrated Earth Systems project combining paleoseismology, active-source seismology, and geodynamic modeling to link the deep structure of the subduction zone with surface processes, slow slip and the seismic cycle; and a 3-D seismic survey community experiment aimed at studying the impact of seamount subduction on the structure and evolution of the plate interface. All of these projects involve significant international collaboration and instrumentation and/or ship time contributions from international partners.

Sarah Penniston-Dorland provided an update on the NSF-PIRE project entitled “ExTerra Field Institute and Research Endeavor (E-FIRE)”. ExTerra (Exhumed Terranes), is a self-organized group of geoscientists with the objective of investigating exhumed paleo-subduction zones to better understand the materials and processes in active systems. This large scale international project partners with a European collaborative research and training project (ZIP; “Zooming In between Plates”). The program includes support for eight PhD students and two postdocs; the two postdocs and seven of the eight students have started and have already presented posters and begun their research in collaboration with the US and European faculty. The first field institute will take place in the summer of 2017. [More info about ExTerra and E-FIRE at: <http://geoprisms.org/exterra/>]

Andrew Goodwillie provided an update on the GeoPRISMS Data Portal and recent improvements. He highlighted a number of new datasets contributed by PIs, including Gulf of California zircon U-Pb geochronology (data are available on EarthChem and GeoMapApp: <http://www.earthchem.org/library/browse/view?id=928>), an East African Rift System geodetic velocity field (2016.0a) compiled from continuous and survey mode GPS networks, and a suite of subduction zone residual gravity and residual bathymetry data sets for the Alaska-Aleutians, Cascadia, and Hikurangi margins. Also added was a suite of geodetic plate velocity solutions including EarthScope PBO and MIDAS solutions that cover the three GeoPRISMS primary sites in North America. Additionally, a new version of the basemap was released a few months ago, and includes 931 cruises and almost three million track miles. Goodwillie also noted that there is a new profile generation tool in beta form that can help with cruise planning by linking ship tracks to the bathymetry.

SCD and RIE initiative updates

GSOC members, with input from GeoPRISMS PIs, provided updates on a wide range of ongoing GeoPRISMS research projects. These updates provide a key opportunity for the GSOC and NSF Program

Officers to see the breadth of exciting science underway within GeoPRISMS, recognize potential links with other NSF and major international efforts, assess progress toward key questions in the Science Plan, and identify science gaps and new opportunities. These updates provide an important opportunity for the GeoPRISMS community to demonstrate the value of interdisciplinary and societally relevant research to NSF Program Managers in the GEO directorate.

The GSOC received updates on active projects spanning both the RIE and SCD initiatives. The SCD updates included a thematic-focused post-doctoral fellowship investigating the role of faults in the downgoing plate on forearc fluid and seismic processes through comparison of Central America, Cascadia, Nankai, and Alaska subduction zones; an effort to improve models of interseismic locking and slow slip events in Cascadia and New Zealand; a collaborative effort to understand the Aleutian megathrust from trench to base of the seismogenic zone through integration of laboratory, geophysical and geological data; a geodetic study to characterize the interseismic slip deficit in the Shumagin Islands, Alaska; and a study of fluid-mobile and volatile element (Cl, B, & Li) cycling through the forearc of the Hikurangi margin, New Zealand. It also included a wide range of ongoing studies of the Aleutian arc, with investigations focused on: the geochemical and magmatic evolution of Aleutian arc on the Alaska Peninsula; the ages and geochemical comparison of coeval plutons and volcanics from the central and eastern Aleutian arc; the geodynamic evolution of the Aleutians and adjacent Pacific and Bering Sea; magnetotelluric and seismic signatures of arc melt generation, delivery, and storage beneath Okmok volcano (see report from the Field in this issue); the origin, storage, ascent and eruption of volatile-bearing magmas in Aleutian volcanoes; the role of oxygen fugacity in calc-alkaline differentiation and the creation of continental crust at the Aleutian arc; and characterizing magma ascent and eruption in the Aleutian arc.

RIE initiative updates included a summary of ongoing science stemming from the ENAM community Seismic Experiment undertaken in 2014, which collected marine seismic reflection and refraction data, on-land seismic refraction data, and broadband seismic data onshore (EarthScope) and offshore (using the OBSIP array). These datasets are all open access. A suite of projects were funded in FY16 and FY17 to work on the data, including studies of the role of mantle melts on evolution of rifted margin lithosphere; investigation of rift evolution from basement architecture; and analysis of shear-wave splitting. The updates underscored that the early returns on the ENAM community experiment are very positive, the community is engaged, and science proposals using the community dataset have clear and distinct questions. RIE updates also included a theoretical and experimental study focused on emplacement of regularly spaced volcanic centers in the East African Rift; development of a community velocity field for East Africa; and geochemical analyses to constrain the temporal evolution of mantle plume contributions to magmatism in the Turkana Depression.

Plans for upcoming meetings

GeoPRISMS will be at the 2017 AGU Fall Meeting in New Orleans with a Townhall on Monday evening and planned Mini-Workshops for Sunday, December 10; a call for Mini-Workshop proposals has been sent out to the Community - the GSOC will select the successful mini-workshop proposals in late summer. The GSOC also discussed early planning for an Integration & Synthesis TEI recommended as

part of the mid-term review of the program, which will likely be held in late 2018. The TEI will integrate ongoing work and results across themes and/or between focus sites, with the goal of identifying advances on the cross cutting science themes in the Science Plan, and defining emerging questions. As plans for this major workshop materialize, announcements will go out via the listserv and the GeoPRISMS website, so please stay tuned.