GeoPRISMS

Newsletter - Issue No. 34, Spring 2015

In this Issue

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The GeoPRISMS Newsletter is published twice a year and is designed to provide to the GeoPRISMS community summaries of recent GeoPRISMS activities and meetings, synthesis articles, editorials, and discussion of science opportunities. Archives of the Newsletter are available on the GeoPRISMS website.

From the Chair

Dear GeoPRISMS community,

It is a great pleasure to welcome you to the 2015 Spring edition of the GeoPRISMS Newsletter. The Spring issue will remain in print and online formats; the Fall issue is now only distributed electronically. We have a great set of articles that are contributed by the community including science reports on field work in the Aleutians and around Mt St. Helens, and workshop reports following from the Amphibious Array meeting and AGU mini-workshops.

We are seeing a lot of activities in a fairly eventful year. First and foremost, you will see that in the usual Notes from NSF one name that has been synonymous with GeoPRISMS and MARGINS before that is missing. Bilal Haq has decided to fully retire from NSF starting this Fall after helping shepherd the transition in NSF program management during the last year. It's been a great pleasure working with Bil and we'll miss his active participation in the program. He will remain scientifically active and we will see him at future meetings in San Francisco, Vienna or other locals. Bon Voyage, Bil!

Bil's last activity will be to participate in the external review that our program will see at its half-way mark. We will be requesting information from you in preparation for the review. Of particular importance are the Nuggets, which are one to two page descriptions of science projects that are funded through GeoPRISMS or are closely related to the science goals. We look forward to your active participation in this.

We are also getting ready for the transfer of the Office to a new location. We are looking for a new Office Director, who will also serve as Chair of the steering committee, to start in Spring 2016. Please see the note from NSF on the next page for more information. I will be happy to provide information regarding the Director's responsibilities and Office activities to interested parties.

We'll see an earlier transition in the Office make up at Michigan. Anaïs Férot will move with husband Thomas Giachetti to beautiful Eugene, Oregon, where Thomas will start as Assistant Professor. Anaïs will remain fully involved with the Office as a member of University of Oregon department that features current GSOC member Paul Wallace and past MSC member Becky Dorsey, along with many colleagues who have been involved with GeoPRISMS and MARGINS activities. Congratulations to both of you!

In the mean time we are planning for a Theoretical and Experimental Institute (TEI) for the Subduction Cycles and Deformation (SCD) initiative. This will be held in Redondo Beach, CA (just south of LAX) in the week of October 12. The details of the program and information for application will be distributed through the listserv later this summer. We will also hold the usual AGU activities including the Student Prize and the Monday evening Townhall and Community Forum. For the Sunday before AGU we plan a full day 'mini-TEI' for the RIE initiative. Please save the date – more information will be posted during the summer.

Peter van Keken

Chair, GeoPRISMS Program

Cover Photograph:
M/V Tiglax deckhand CW navigating through a cove bounded by gabbro on Amatignak Island, AK. Photo courtesy of Brian Jicha.

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Message from NSF





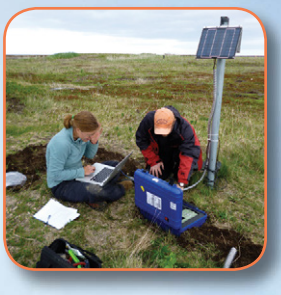







Aleutians field support - We are still on track to provide joint ship and helicopter support for a number of projects in the Aleutians this summer. Academic researchers and USGS staff will take advantage of this shared logistics platform to cover over a thousand miles of the Aleutian chain and we wish them the very best weather (as we do all our PIs in the field!)

The GeoPRISMS Solicitation - As you may have already heard, we have updated the GeoPRISMS solicitation for FY16. The most notable changes are:



1. We have transitioned from a Deadline to a Target Date, and that date this year is July 15, 2015,
2. The solicitation doesn't change the existing windows for large field projects in each primary site, though the potential for field support in Alaska in summer 2016 is mentioned,
3. Postdoc support letters can now be directly uploaded OR emailed to one of the Program Officers,
4. Individuals not associated with an institution can no longer submit proposals. Questions, as always, should be directed to the Program Directors for GeoPRISMS at NSF.

The Amphibious Array - NSF recognizes the high level of interest in further use of the Amphibious Array of seismometers and geodetic sensors, as summarized in the report from the October 2014 Snowbird workshop. Efforts to enhance EAR and OCE coordination in supporting amphibious solid Earth proposals are ongoing and have renewed focus as this is one of four Frontier areas in the 2014 GEO Vision document, which lays out Directorate priorities for the coming several years. This year some external funds will be allocated to match core program support for highly ranked proposals that fall within the 4 Frontier areas. Cross-coastal projects, including GeoPRISMS related efforts, will be among the mix of proposals put forward for consideration.

Taking on a multi-year, full Amphibious Array study is a significant investment. Scientific readiness is a dominant consideration: Are hypotheses to be tested mature and are there clear paths for data analysis to provide strong tests? Has experimental design been thoroughly explored, both in terms of optimizing data quality for the questions posed and for efficiency in acquisition and links to related data sets? Program ability to sustain support for a large, multi-year project, while also maintaining a broad portfolio of science, is also an important consideration. Both of these factors (science readiness and portfolio balance) come into play this year. It is unlikely that full Amphibious Array proposals or proposals that involve multi-year deployments would be competitive in the GeoPRISMS, Marine Geology and Geophysics, and EarthScope programs in 2015.

The GeoPRISMS Office - It will soon be time to transition the GeoPRISMS Office from the capable hands of Peter van Keken to a new steward. The Program Office is a central and essential piece of the GeoPRISMS community and we are hoping to find an office director who is as capable, enthusiastic, and as in touch with the community as Peter and his predecessors. Key activities of the GeoPRISMS Office include (but are certainly not limited to):

- maintain the website and serve as a centralized information source
- publish the newsletter twice a year
- organize the annual meeting of the steering committee at NSF
- plan and facilitate AGU activities including a Townhall meeting and workshops
- serve as a liaison between the community and NSF and related programs
- organize community workshops

The director of the office also serves as the chair of the GeoPRISMS Steering and Oversight Committee.

We are asking you, the community, for names (of others or yourselves) who you think would serve well in this position. Once the nominations are submitted to NSF we will ask those who are both nominated and interested to submit a 2-page letter of interest. NSF will seek GSOC input on the nominees. It is our goal to invite a proposal for the GeoPRISMS Office by Fall of 2015 and that a new office will be in place by Spring of 2016.

Jennifer Wade and Donna Blackman
GeoPRISMS Program Managers, National Science Foundation

Evolution of the Chemically Diverse Aleutian Island Arc

Brian R. Jicha[1] and Suzanne M. Kay[2]

[1]Department of Geoscience, University of Wisconsin-Madison, Madison, WI, [2]Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY

The Alaska-Aleutian Arc extends for more than 3500 km westward from central Alaska to the Kamchatka Peninsula. The timing of Aleutian Arc inception and subsequent compositional evolution through the initial stages of arc growth are poorly known. Early estimates of Aleutian Arc inception varied from 70 to 40 Ma (e.g., Grow and Atwater, 1970; Scholl et al., 1986), but were based on very little data. Determining precisely how and when the Aleutian Arc began to form was one of the initial goals of this project. By addressing a central question of the GeoPRISMS Program (*What are the physical and chemical conditions that control the development of subduction zones, including subduction initiation and the evolution of mature arc systems?*) we intended to help link subduction initiation in the Aleutians with similar tectonic events at subduction zones in the western Pacific.

We identified outcrops on several islands that appeared to have a high probability of providing new limits on the timing of arc inception. Specifically, we focused on mafic 'basement' rocks and intrusives that cut the mafic lavas on Amatignak, Ulak, and Amchitka Islands (Fig. 1). These islands were interpreted to host remnants of the very early growth of the Aleutian Arc prior to northward arc migration. We also aimed to acquire new samples of the Vega Bay formation on Kiska Island and investigate the Finger Bay Volcanics on Adak Island (Rubenstone, 1984; Kay and Kay, 1994) from the extensive sample suite in the collections at Cornell University.

Two reconnaissance field campaigns were conducted in the summer of 2012 and 2013 with the help of the U.S. Fish and Wildlife service vessel M/V Tiglax. In 2012, we (Jicha and Cornell Ph.D. student Ashley Tibbetts) spent two weeks in the central and western Aleutians sampling lavas from Adak, Kiska, Ulak, Amatignak, and Kagalaska islands. Initial $^{40}Ar/^{39}Ar$ incremental heating experiments and geochemical analyses revealed that most of the subaerial samples of the older portions of the central and western Aleutians are < 40 Ma and thus provide little information on subduction initiation. As a result, we refocused our priorities and aimed to constrain the along- and across-arc chemical evolution of the central and western Aleutians over the last 40 Myr of arc history (e.g., Kay and Kay, 1994).

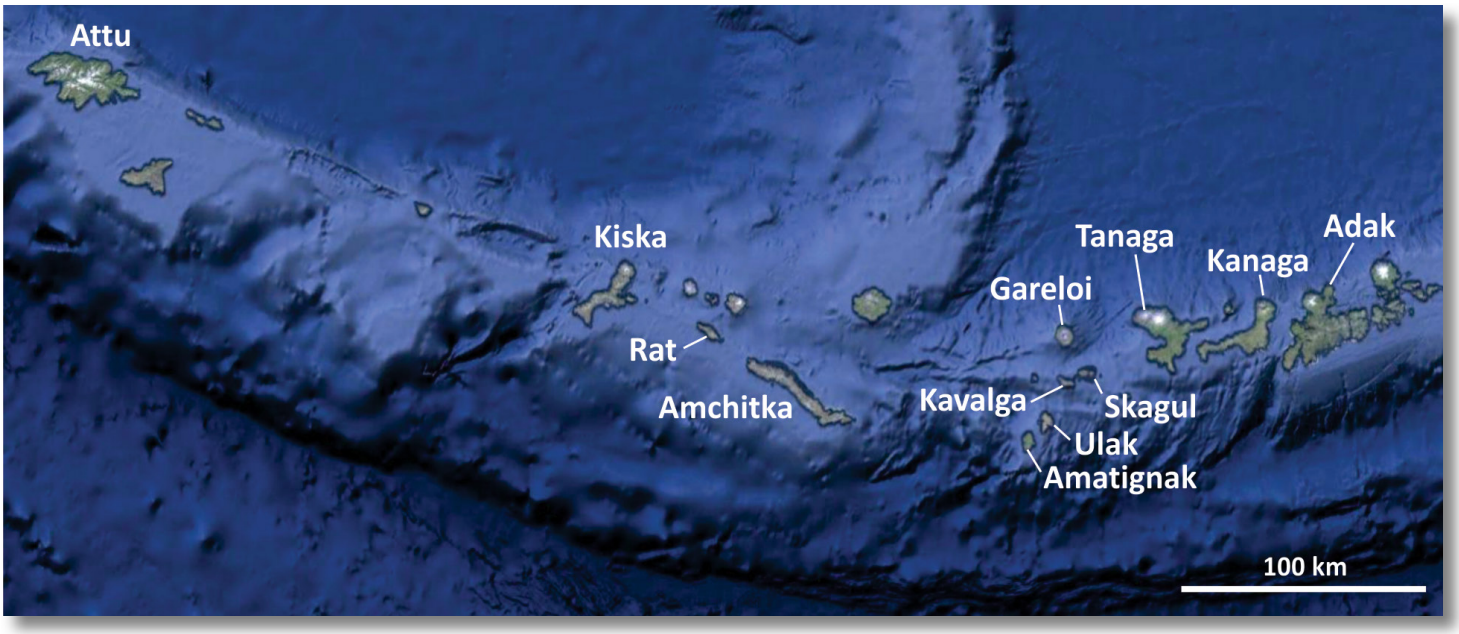


Figure 1. Google Earth image of western Aleutian arc showing islands studied as part of this project.

In August 2013, we (Jicha, Kay, UW-Madison M.S. student Allen Schaen) conducted another sampling campaign with an emphasis on two regions: a SW-NE trending transect from the southern (Amatignak and Ulak) and central (Kavalga, Ogliuga, and Skagul) Delarof Islands to the Pleistocene-Holocene volcanoes on Gareloi and Tanaga Islands, and the Rat Island to Attu island segment of the western Aleutians (Figs. 1, 2). The first transect is the focus of the Master thesis of UW-Madison student Allen Schaen, which aims to compare the temporal evolution of igneous and tectonic processes in the Delarofs with similar studies on the Adak Island to the east (e.g., Kay and Kay, 1994) and the Attu Island to the west (e.g., Yogodzinski et al. 1993). The thesis of Tibbetts focuses on the evolution of the Aleutian basement on the islands of Attu, Kiska and Rat.

Overall, we have conducted $^{40}Ar/^{39}Ar$ laser incremental heating experiments and major, trace-element, and Sr and Nd isotope analyses on more than 130 samples. A summary of the findings is provided here:

1. Twenty-two $^{40}Ar/^{39}Ar$ ages reveal that magmatism in the Delarof region spanned 37 million years and was coincident with two arc-wide magmatic flare ups in the late Eocene/early Oligocene and latest Miocene/Pliocene (e.g., Jicha et al., 2006). A significant transition in arc chemistry of the lavas in this region occurs in the Pleistocene where lavas from nearby volcanoes Gareloi and Tanaga exhibit higher sediment signatures (e.g., Th/La) and lower $^{143}Nd/^{144}Nd$ compared to older Delarof Islands closer to the trench. Similar findings from Eocene-Miocene lavas within the western Aleutians from Amchitka to Adak suggest that a sediment melt component was unavailable early in the development of the western Aleutian Arc, but has become more pronounced in the Quaternary.

Figure 2. Allen Schaen (top) and Suzanne Kay (bottom) collecting samples from Rat and Skagul Islands, respectively in 2013.

2. As part of our attempt to understand the evolution of the Central Aleutian arc lower crust we have studied and dated gabbroic composition granulite xenoliths from the Cornell collection of ~200 samples from Kanaga Island. The mafic xenolith suite is composed of plagioclase-clinopyroxene ±orthopyroxene-titanomagnetite-bearing gabbroic xenoliths with rare olivine and adcumulate textures, pyroxene granulites with granoblastic textures, and deformed recrystallized mafic granulites. The variable textures, mineral chemistries and isotopic ratios of these xenoliths show they had experienced a complex history before being incorporated into their ~7 Ma Mg-rich basalt host lava. These mafic xenoliths, along with the ultramafic xenoliths, are interpreted as lower crustal cumulates of basaltic to mafic andesitic arc magmas (e.g., Kay et al., 2013). It is from a mafic two-pyroxene granulite xenolith that we have surprisingly obtained the oldest ages yet reported in the Aleutian arc. This age comes from extremely challenging $^{40}Ar/^{39}Ar$ incremental heating experiments on low K (~$An_{68}Or_{0.4}Ab_{31.6}$) plagioclase, which yield complicated spectra, but give a plateau age of 47.8±4.3 Ma. We interpret this age as a time of metamorphism and recrystallization of mafic arc cumulates by younger arc magmas intruding the existing arc crust.

3. Calc-alkaline I-type plutons, like those thought to be major crustal building blocks of continental margins are rare in oceanic island arcs, but are present in the pre-Pliocene record of the Aleutian arc (e.g., Kay et al., 1990). The oldest and most calc-alkaline of these is the ~10 km wide Hidden Bay pluton on Adak Island, which intrudes the early Tertiary Finger Bay Formation.

Massive 27-28 Ma gabbro on the west side of Amatignak Island, AK. Photo credit: Brian Jicha

Published K-Ar (Citron et al., 1980) and new $^{40}Ar/^{39}Ar$ and U-Pb zircon ages from 16 gabbro, porphyritic diorite, diorite, granodiorite, leucogranodiorite and aplite units show the pluton evolved from 34.6 to 30.9 Ma in a series of events during a waning magmatic phase. The similarity of chemical analyses of the isotropic gabbros with modern Aleutian high-Al basalts supports minimal evolution of the central Aleutian magmatic source since at least 34 Ma. Mineralogical, trace element, and isotopic evidence suggest the plutonic units largely evolved in the deep crust with final crystallization and segregation of aplites occurring at shallow levels. Overall, the diorites are cumulates, whereas the volumetrically dominant granodiorites (58-63% SiO_2) along with the leucogranodiorites (67-70% SiO_2) approach melt compositions. The presence of calc-alkaline plutons in the central Aleutian arc by 34 Ma requires stability of pargasitic hornblende, crustal thicknesses approaching those of the modern arc by 34 Ma (~37 km on Adak; Janiszewski et al., 2013), a parental magma similar to that from the present-day arc, and a contractional stress regime. Such a scenario requires a very rapid build-up of the Aleutian ridge in the Eocene.

4. Building on the model of Yogodzinski et al. (1993), we have also been investigating the early evolution of the western arc. Our new chemical and $^{40}Ar/^{39}Ar$ analyses show that both the host rock (40.3±0.1 Ma) and the gabbroic units (34.7 to 27.2 Ma) have depleted epsilon Nd values (+9-10.8) and Marianas-like trace element chemistry (e.g., depleted LREEs). These NE-striking units are bordered on the west by 35.6 to 28.8 Ma altered MORB-like pillow lavas, breccias and dikes. Still further west lies a band of MORB-like rhyolite-albite granites with one rhyolite giving a $^{40}Ar/^{39}Ar$ age of 16.2±0.1 Ma. Thus, our new data indicates the oldest units on Attu formed in a Marianas-like arc between 40 and 16 Ma. To our knowledge, similar magmatic rocks are virtually unknown east of Attu. In contrast, the youngest Attu volcanic rocks form an east-west trending band of 8-6 Ma calc-alkaline andesites with lower εNd (+7.5-9.0) that erupted as calc-alkaline volcanism was occurring all along the arc. Combining this change in the strike of magmatic centers on Attu with published paleomagnetic data from Kiska (Minyuk and Stone, 2009) suggests a ~40-50° clockwise rotation of the western Aleutians along with uplift on Attu after 16 Ma and before 8 Ma.

Our ongoing and future efforts for the samples collected in 2012 and 2013 coupled with the vast collection at Cornell University will be focused on quantifying subduction erosion and subsequent northward migration of the arc with time, and evaluating the evolution of the different parts of the central and western Aleutian arc in comparison to the Attu-Rat, Delarof, and Kanaga-Adak segments. ■

References

Citron, G.P., Kay, R.W., Kay, S.M., Snee, L., Sutter, J. (1980). Tectonic significance of early Oligocene plutonism on Adak Island, central Aleutian Islands, Alaska, Geology, 8, 375-379.

Grow, J.A., Atwater, T. (1970). Mid-Tertiary tectonic transition in the Aleutian arc, Geological Society of America Bulletin, 81, 3715-3722.

Janiszewski, H.A., Abers, G.A., Shillington, D.J., Calkins, J.A. (2013). Crustal structure along the Aleutian island arc: New insights from receiver functions constrained by active-source data, Geochemistry, Geophysics, Geosystems, 14(8), 2977–2992, doi:10.1002/ggge.20211.

Jicha, B.R., Scholl, D.W., Singer, B.S., Yogodzinski, G.M., Kay, S.M. (2006). Revised age of Aleutian Island Arc formation implies high rate of magma production, Geology, 34, 661-664.

Kay, S.M., Kay, R.W., Citron, G.P., Perfit, M. (1990). Calc-alkaline plutonism in the intra-oceanic Aleutian Arc, Alaska, In Kay, S. M. and Rapela, C.W. (eds.), Plutonism from Antarctica to Alaska, Geological Society of America Special Paper, 241, 233-255.

Kay, S.M., Kay, R.W. (1994). Aleutian magmas in space and time, in Plafker, G., and Berg, H.C., eds., The Geology of Alaska: The Geology of North America, v. G-1: Boulder, Geological Society of America, p. 687-722.

Kay, S.M., Romick, J., Jicha, B.R., Kay, R.W. (2013). Mafic basement xenoliths from Kanaga Island and their implications for Aleutian arc initiation and evolution, Abstract for 2013 Fall Meeting, AGU, San Francisco, CA, V131-06.

Minyuk, P.S., Stone, D.B. (2009). Paleomagnetic determination of paleolatitude and rotation of Bering Island (Komandorsky Islands) Russia: comparison with rotations in the Aleutian Islands and Kamchatka, Stephan Mueller Special Publication Series, 4, 329–348.

Rubenstone, J.L. (1984). Geology and geochemistry of early Tertiary submarine volcanic rocks of the Aleutian Islands, and their bearing on the development of the Aleutian arc [Ph.D. Thesis]: Ithaca, New York, Cornell University, 350 p.

Scholl, D.W., Vallier, T.L., Stevenson, A.J. (1986). Terrane accretion, production, and continental growth: a perspective based on the origin and tectonic fate of the Aleutian-Bering Sea region, Geology, 14, 43-47.

Yogodzinski, G.M., Rubenstone, J.L., Kay, S.M., Kay, R.W. (1993). Magmatic and Tectonic Development of the Western Aleutians: An Oceanic Arc in a Strike-Slip Setting, Journal of Geophysical Research, 98, 11807-11834.

Distinguished Lectureship Program

2015 - 2016

The GeoPRISMS Office is happy to announce the annual Distinguished Lectureship Program for academic year 2015-2016 with an outstanding speakers list. Distinguished scientists involved with GeoPRISMS science and planning are available to visit US colleges and universities to present technical talks and public lectures on subjects related to GeoPRISMS science.

Want to host a speaker? Apply before August 1!

Any US college or university wishing to invite a GeoPRISMS speaker may apply via the GeoPRISMS website before August 1, 2015. Institutions that are not currently involved with GeoPRISMS research are strongly encouraged to apply, including those granting undergraduate or masters degrees, as well as those with PhD programs. Institutions may request a technical and/or public lecture. The GeoPRISMS Office will cover airfare for speakers' travel and will coordinate travel and off-site logistics. Host institutions are responsible for local expenses for the duration of the visit.

Richard Allen with students and faculty at University of Wisconsin-River Falls in February 2015. Photo credit: Ian Williams

Visit the GeoPRISMS website to apply or learn more about the speakers and talks available

Elizabeth Cottrell gave a public lecture at the local IMax theater during her visit at University of South Florida in February 2015. Photo credit: Shuying Yang

ELIZABETH COTTRELL
Smithsonian Institution

BRADLEY HACKER
UC Santa Barbara

BEATRICE MAGNANI
Southern Methodist U

ANDY NYBLADE
Penn State University

ROBERT STERN
UT Dallas

LAURA WALLACE
UT Austin

Questions?
Email info@geoprisms.org
For more information, visit the GeoPRISMS Website at: http://geoprisms.org/education/distinguished-lectureship-program/

NSF Award 1457221

Investigation of the hydrogeologic role of faults in the downgoing plate through comparison of Central America, Cascadia, Nankai, and Alaska subduction zones

Nathan Bangs (nathan@ig.utexas.edu)

The award will fund a GeoPRISMS postdoctoral Fellowship for two years of training at the University of Texas, Institute for Geophysics (UTIG). The proposed work seeks to quantitatively determine the structure and water content in the faults within the select segments of the subducting plates. This will allow the assessment of the effects of subducting water on subduction zone processes. The study will use existing 2D and 3D multichannel seismic data from Central America, Cascadia, Nankai, and Alaska subduction zones. The results will provide a better understanding of the geohazard potential in subduction zones, which is particularly relevant for the Pacific Northwest region where large magnitude earthquakes have occurred on the Cascadia megathrust in recent history. The postdoctoral fellow is an early-career female scientist. The results of the study will be presented at workshops and conferences and will contribute to the high school curriculum development program at UTIG.

NSF Award 1457293

Collaborative Research: Focused Study of Aleutian Plutons and their Host Rocks: Understanding the building blocks of continental crust

Peter Kelemen (peterk@ldeo.columbia.edu)

Arc magmatism is the most important process that generates the continental crust today and likely throughout Earth's history. However, average continental crust composition is andesitic and calc-alkaline, while average arc lava composition is basaltic and tholeiitic. The largely unexposed and unsampled plutonic part of the arcs, on the other hand, may be more similar to the continental crust. Therefore, understanding the genesis of plutonic rocks is a key to understanding continental crust formation and evolution via arc magmatism, a key science goal for the GeoPRISMS initiative. The Aleutian arc is uniquely well-suited for such a study, because of the extensive exposures of plutonic rocks, unmatched in any other intra-oceanic arc. In the Aleutian arc, most felsic plutonic rocks have compositions that overlap estimates for the bulk continental crust. Our pilot study found that Eocene-Miocene plutonic rocks and Holocene volcanic rocks show distinctly different elemental and isotopic signatures, which indicate that they were derived from distinct parental magmas. This difference could reflect temporal variation of the mantle under the region, or fundamentally different mechanisms that form plutons and lavas - perhaps strongly calc-alkaline magmas, with high H_2O contents, tend to degas in the mid-crust, causing a rapid increase in viscosity and crystallinity, therefore they tent to stall and form plutons; while hotter, drier, tholeiitic basalts have lower viscosity and readily erupt to form lavas.

NSF Award 1456630

RUI: Magmatic Evolution Leading Up to the Modern Aleutian Arc on the Alaska Peninsula

Ronald Cole (ron.cole@allegheny.edu)

Alaska contains the largest number of active volcanoes in the United States and is one of the most volcanically active regions in the world. Most of the volcanoes in Alaska form a belt that includes the Aleutian Islands and extends landward onto the Alaska Peninsula, ending across the Cook Inlet from Anchorage. The Alaska Peninsula hosts more than 20 volcanoes with historic activity, five with major eruptions in the past 25 years and includes the world's largest eruption of the 20th century. This project will investigate the growth of the volcanic system on the Alaska Peninsula and evaluate the factors that influence the composition and behavior of volcanoes in this region. The results of this project will contribute to ongoing work of the U.S. Geological Survey and Alaska Volcano Observatory for understanding volcanic behavior in a region where there are roughly 30,000 people per day transported in commercial aircraft over the volcanoes and where eruptions can have severe impact on Anchorage (Alaska's largest population center) and along the Kenai Peninsula. The Alaska Peninsula is also one of the nation's most important mineral resource regions; this project will provide an improved regional framework that will be useful for future detailed studies to delineate economic mineral deposits. Scientific advances made through this project will also contribute to the public-outreach mission of Lake Clark and Katmai National Parks, where several of the volcanoes of this study are located. This project will additionally provide high-level STEM training for undergraduate students. The project is highly cost-effective because it uses publically-available sample collections of the U.S. Geological Survey, building on past investments in federal funding.

NSF Award 1456664

Emplacement of regularly spaced volcanic centers in the East African Rift: Melt production or melt extraction?

Eric Mittelstaedt (emittelstaedt@uidaho.edu)

Volcanoes and volcanic activity present significant natural hazards, but they are poorly understood. The principal goal of this project is to constrain the proccess that regulate the timing, location, and volumes of volcanism at the Earth's surface, specifically within continental rifts, but more broadly in any region undergoing tectonic extension. Observations at continental rifts, such as the East African Rift, find changes in the style of volcanism from widely, irregularly spaced volcanic centers in areas with small amounts of extension to surprisingly regularly spaced, uniform volcanoes in significantly extended regions. We propose that the changes in volcanic style may be controlled by a balance between the location of faults and fractures near the surface and the variability of magma production beneath the crust, in the Earth's mantle. To determine the role of these two processes and how those roles may change with extension, will will use both numerical simulations and analogue laboratory models to develop mathematical tools that will inform our understanding of the drivers of volcanic activity in these areas.

NSF Award 1457361

Interseismic Slip Deficit at the Edge of a Locked Patch: Shumagin Islands, Alaska

Jeffrey Freymueller (jeff.freymueller@gi.alaska.edu)

Alaska is a premier location for studying what controls variations in seismic activity along a margin where tectonic plates converge. This is because the width of the seismic zone is known to differ between segments along the Alaskan subduction zone. The Alaska Peninsula segment includes the transition from a wide, locked region on the plate interface to a dominantly creeping section. The fact that a chain of islands runs across this segment provides an ideal setting for measuring deformation, and these data will be used to determine the distribution of recent slip (or lack thereof) along the plate boundary fault. This is the first time that a detailed view of how the seismogenic zone varies from a locked to a creeping section will be obtained. The findings will inform assessment of earthquake and tsunami hazards, both in relation to the Alaska Peninsula and along the US west coast due to trans-Pacific tsunamis. Investigators will conduct public lectures and work with a teacher in the school district of the local community of Sand Point, Alaska, in the Shumagin Islands. Lesson materials will be developed on the topics of earthquakes and tsunamis in Alaska, subduction and its impact on their local environment.

NSF Awards 1456814, 1456939

Collaborative Research: From the Slab to the Surface: Origin, Storage, Ascent, and Eruption of Volatile-Bearing Magmas

Terry Plank (tplank@ldeo.columbia.edu), Diana Roman (droman@dtm.ciw.edu)

On any given day, approximately 15-30 volcanoes worldwide are either in eruption or show strong signs of unrest (e.g., anomalously high rates of seismic activity, ground deformation, or gas emissions). Volcanic activity, including high-altitude eruptions of ash or emission of large volumes of gas, poses a significant hazard to people and property in the United States and worldwide. This is particularly true in Alaska, with over 10,000 passengers a day flying over 35 historically active volcanoes on North America/Asia flight routes. Although significant progress has been made in recent decades in understanding the physical processes occurring in the upper portions of the Earth's crust that lead directly to volcanic activity and associated unrest, there is a fundamental lack of understanding of how these shallow crustal processes link to and are controlled by the large-scale crustal tectonics and deep mantle melting that are ultimately responsible for arc volcanism. Specifically, although it is well understood that the amount of water and other volatiles dissolved in a magma plays a key role in its generation, ascent, and eruption, it is unclear why some arc volcanoes erupt 'wetter' magmas than others. Identifying large scale controls on magma volatile contents is thus critical for accurate forecasting of the frequency, volume, and explosivity of volcanic eruptions.

NSF Awards 1456710, 1456749

Collaborative Research: Magnetotelluric and Seismic Investigations of Arc Melt Generation, Deliver and Storage Beneath Okmok Volcano

Kerry Key (kkey@ucsd.edu), Ninfa Bennington (ninfa@geology.wisc.edu)

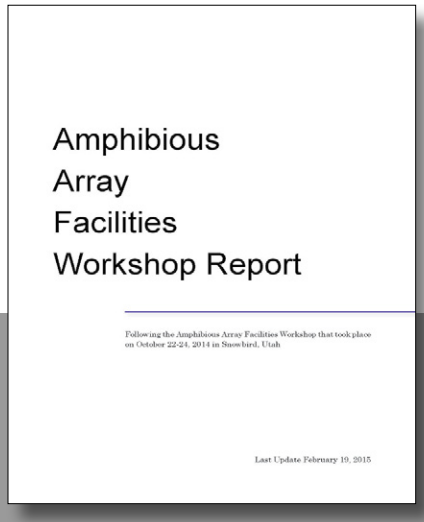
The investigators will conduct a magnetotelluric (MT) survey at Okmok volcano in the Aleutian arc in order to characterize the magmatic system beneath the volcano. New onshore passive seismic and MT data and offshore MT data will be collected to test hypotheses regarding the role of slab fluids in arc melt generation, melt migration within the crust, and the crustal magmatic plumbing and storage system beneath an active caldera. The project will support a female early career investigator several graduate and undergraduate students providing the latter hands-on research at sea. Data from this project is planned to be incorporated into undergraduate Earth Sciences courses and presentations.

Workshop on the Future of the Amphibious Array, October 2014

Susan Schwartz

University of California, Santa Cruz, CA

On October 22-24, 2014, about ninety scientists met for a workshop in Snowbird, Utah to evaluate the ongoing deployment of the Amphibious Array Facilities (AAF) and to chart potential future directions for the array. The Amphibious Array Facilities (AAF) represent a major new capability, providing novel geophysical observations that span the coastline. Starting with Recovery Act funds, the AAF were built to constitute three coordinated shore-crossing elements that were initially deployed in Cascadia: upgrade of 232 onshore PBO geodetic sites to real-time data transfer, reoccupation or occupation of 27 broadband sites at EarthScope-Transportable Array spacing near the Cascadia coast, and 60 new broadband ocean-bottom seismometers (OBSs) deployed across the Juan de Fuca plate with emphasis on Cascadia. While extensive projects on land and offshore have been done before, the Cascadia Initiative (CI) is perhaps the first time that a community-driven science project of this scale has been carried out that crosses the shoreline.



The CI is scheduled to end in mid-late 2015. By late 2014, it was felt that sufficient data and managerial experience had been acquired to assess the overall capabilities of such an array and to consider possible valuable targets for its future use. The workshop participants were charged with answering several questions, including *"What science absolutely requires a coordinated Amphibious Experiment? Given the Cascadia experience, what is this tool good/bad for?"* and *"Given these science motivations, how could it be implemented by amphibious arrays or projects, at candidate margins?"*

The Cascadia Initiative deployment of the Amphibious Array has already been very successful, even though a large part of the data set was only available a few months prior to the Workshop. Early analyses have seismically imaged the full Juan de Fuca Plate showing strong along-strike variations and have imaged a sharp boundary at the subducting plate interface. Other studies have resolved directionality of microseismic noise and its oceanographic sources and have begun documenting source characteristics of microearthquakes. In addition to generating exciting science results, the CI has been extremely successful in building a large community of scientists in the experimental design, implementation and in use of the data. Community planning and vetting of science plans has led to a well-designed, and broadly applicable array. It has brought many scientists into marine geophysics who had never worked in that realm previously, including many early-career scientists. All data and metadata have been made available as rapidly as technically feasible to anybody without cost, which is a critical step in scientific success and community building. As of October 2014 over 20 TB of data have been downloaded to over 500 unique users in 25 countries, many times more than typical PI-driven experiments. Overall, the workshop participants were strongly supportive of continued open community approaches to this type of large-scale projects.

Several complex, critical, and societally relevant solid-earth systems span the coastline, making amphibious approaches necessary for scientific progress. These systems also generate major hazards such as great earthquakes, tsunami, volcanic eruptions, and landslides. The workshop identified three major systems as science targets for the AAF. These all build on recent EarthScope and GeoPRISMS Science Plans and include:

1. Subduction Factory and Magma - Volatiles
2. Passive Margins and Transform Faults
3. Seismogenic Processes at Subduction Margins

The full workshop report can be found on the IRIS website at:

http://www.iris.edu/hq/workshops/2014/10/amphibious_array_facility_workshop

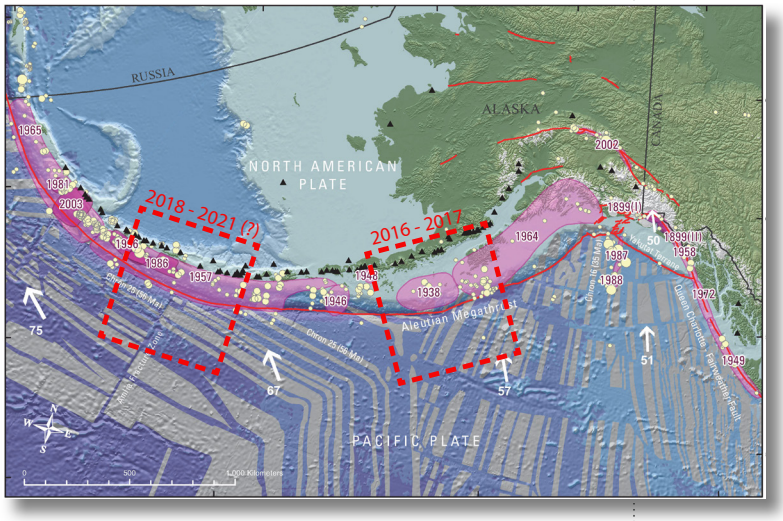
Workshop participants identified favorable regions to deploy the AAF to address key science questions in each of these major systems.

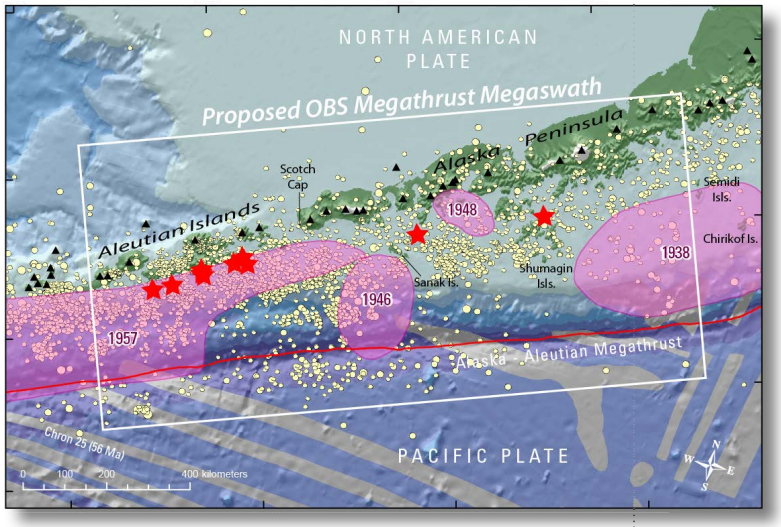
- The Subduction Factory group highlighted two corridors, one off the Alaska Peninsula and one in the Central Aleutians, offering contrast between a continental and oceanic arc (Fig. 1). The latter is an ideal site for looking at oceanic arc growth and along-strike changes at segment boundaries. The Alaska Peninsula site can take advantage of the EarthScope Transportable Array deployed on land there through 2018 and was prioritized for earlier deployment.

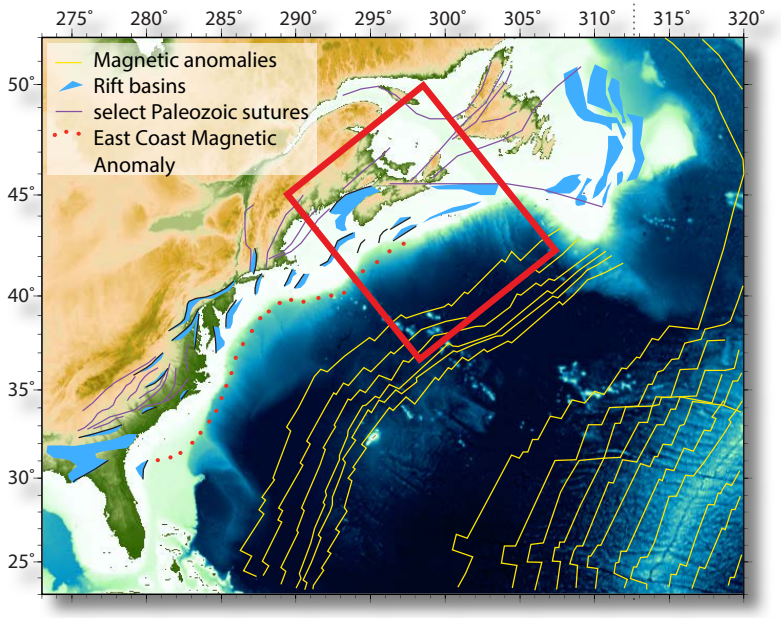
- The Megathrust group highlighted a "Megaswath" off the Alaska Peninsula that spans regions with very different recorded great earthquake history, background seismicity, and geodetic locking (Fig.2). The Megaswath substantially overlaps with the eastern Subduction Factory site.

- The third group identified a critical corridor along the eastern North America margin, from Maine to Nova Scotia, spanning an abrupt geophysical transition from what appears to be magmatic to amagmatic rifting (Fig.3). This transition should figure critically into understanding the role of magmatism in continental breakup and offers access to major rift basins and major sutures within North America that straddle the shoreline.

Significant and societally-relevant scientific questions in the solid earth are ones best addressed at continent-ocean boundaries. Amphibious sensing arrays are a critical component to advancing our understanding of these systems but they are logistically complex and expensive. The Cascadia Initiative has shown the power of the Community Experiment approach where the entire Amphibious Array Facilities are brought to bear on a single problem in a single area. Advantages of this approach include the ability to address large-scale problems, engaging a wide community and a large population of scientists continually, efficiencies and technological benefits of focused deployments, and using open rapid data access effectively. While the workshop concentrated on the seismic array, which has the highest potential to be moved to new sites in the future, redeployment of the AAF has the potential to catalyze a wide variety of parallel complementary scientific efforts. Looking farther forward, such an array seems a likely test bed for a critical component of a Subduction Zone Observatory or other similar large and multinational infrastructure efforts. ■







From top to bottom:
Figure 1. National deployment strategies in Alaska to address the Subduction Factory and Magma-Volatiles questions. The box labeled "2016-2017" would take advantage of coincident TA deployments on land. Rupture patches from Davies et al. (1981).
Figure 2. Megathrust Megaswatch proposed deployment, spanning several rupture segments and Shumagin creeping segment.
Figure 3. Hypothetical location of an amphibious array experiment to address major questions of continental rifting and passive-margin evolution. Array is centered on the inferred major transition in magmatic behavior marked by the termination of the East Coast Magnetic Anomaly, while capturing major tectonic sutures, extensional rift basins, and the complete transition of seafloor spreading and associated segmentation.

Finished passive seismic site on the east side of Mount St. Helens, with solar panel and instrument box. Photo by Carl Ulberg during the iMUSH experiment conducted in Summer 2014.

iMUSH: Imaging Magma Under St. Helens

Carl Ulberg (University of Washington) and members of the iMUSH field team

The imaging Magma Under St. Helens (iMUSH) experiment is a collaborative research project involving several institutions with an aim to illuminate the magmatic system beneath Mount St. Helens, WA, from the slab to the surface. A variety of geophysical imaging techniques (magnetotelluric, active-source, and passive-source seismology) are being used in conjunction with geochemical and petrologic data to image and interpret the crust and upper mantle in the greater Mount St. Helens (MSH) area. All components of the project were underway during the 2014 field season, deploying instruments and collecting data. The active source experiment successfully set off 23 shots, recording data at about 6000 sites in late July and early August. Magnetotelluric measurements were made at 40 sites during the summer of 2014 and many rocks were collected and analyzed. The passive source seismic deployment occurred between June 16 and July 2, and involved installing 70 broadband seismometers in a ~50 km radius around MSH. The following sections detail the passive seismic deployment.

June 16-June 22: Kelso, Organizing

Eighteen people descended on an airport hangar in Kelso, WA, to begin the passive deployment. After a couple of days training on the instruments and installation procedures, buying materials and getting them ready, we headed out to begin the installations. We started out in two large groups to learn the ropes, then began to split into teams of two to three to install further sites.

A Day in the Life (by Steve Malone)

After a late night the evening before with the PIs, "strategizing" about what should next be done, it is an early morning departure. After a half hour drive one team realizes they don't have the maps for where they are going and must return to the motel to pick them up. Another team has a flat tire on some very rough roads and must return on the spare to get it fixed...a good thing since later in the day they have another flat (different tire) so really needed that spare. Using a combination of written instructions, road maps, Forest Service maps, private timber company maps, a laptop computer with mapping software, a compass and a GPS the team finds its way to its assigned installation site which has been investigated and permitted sometime in the last couple of years.

Now it is time to really get to work.

Equipment is hauled from the truck several hundred meters to the actual site, in multiple trips. Discussions, opinions and arguments issue between the two PIs in this team over exactly where the best place for the vault should be. It must be away from tall trees, in ground that can be dug but as close to bedrock as the site provides. In the meantime the hole is dug by hand by Alicia, who just graduated with a PhD and has forgotten that she should leave the digging to current grad students and participate in the PI discussions.

The actual sensor is very sensitive and must be handled with care even when its moving parts are locked for transport. Once installed on the small concrete pier in the bottom of the hole and cables attached it can be unlocked. At this point the sensor is very vulnerable to damage if moved.

In the meantime another team is working on other parts of the station installation. Many sites will be powered by solar panels. Because of the elevation and winter weather they must be installed on a mast to get them above the likely snow depth, sometimes as much as four meters deep in late winter. The mast consists of a wood post buried up to a meter with a sectional pipe bolted to it.

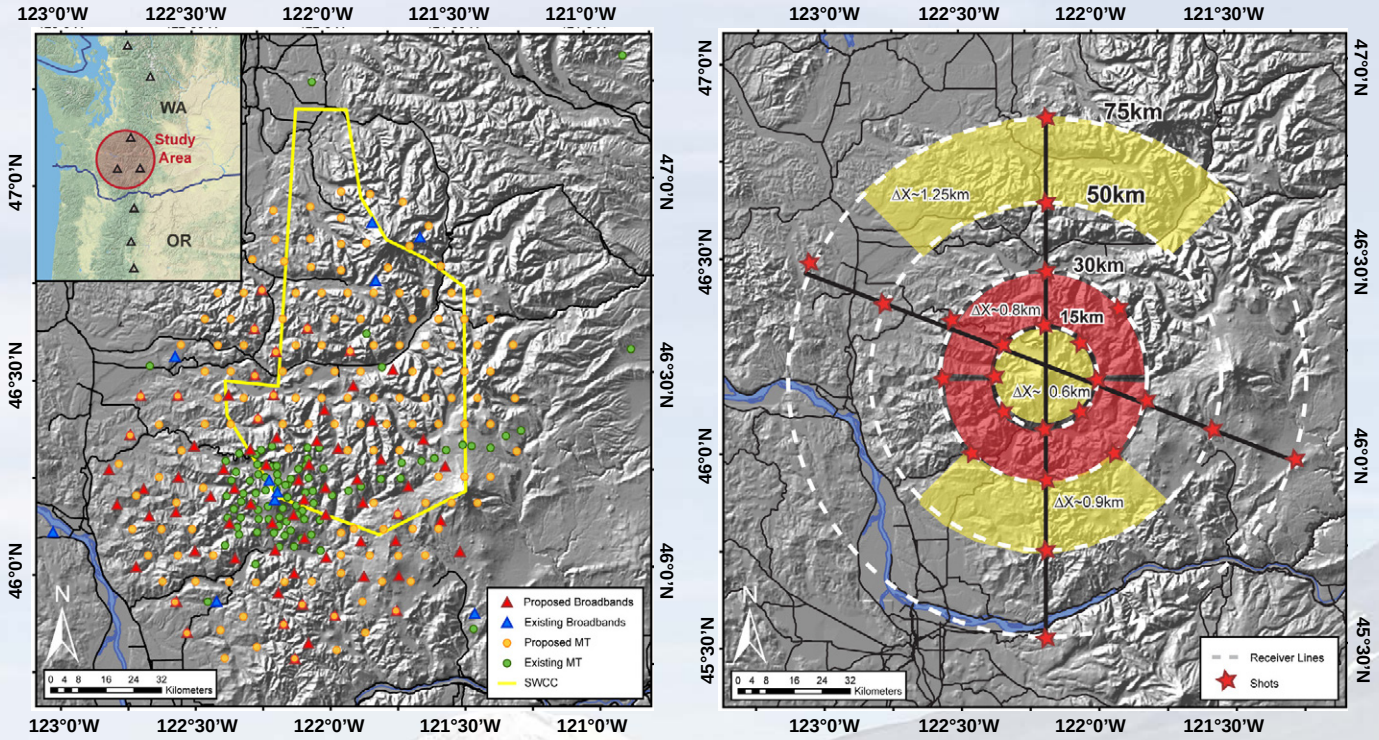


Figure 1. Proposed project map showing deployment locations of passive source seismic imaging and magnetotelluric survey (left) and active source tomography (right) in the greater Mount St. Helens area. For the active part (right), black lines are refraction profiles, each with eight shots (red stars) and 1000 Texans. Colored areas are areal areas, each containing 1600 Texans.

Once all of the heavy work is done it is time to make all the connections and test the system. A rat's nest of wires and cables in the equipment box connects the various components. The seismometer cable comes in through a PVC pipe and power cable is protected from animals with a wire mesh screen. A seismometer control box allows for testing, unlocking and centering the seismometer even without a datalogger. The datalogger gets timing information from a specialized GPS antenna. A regular iPod with special software and cable is used to configure, initialize and test the datalogger. In one case the team forgot the iPod in the equipment box and had to drive all the way back to the site the next day to retrieve it.

Figure 2. The participants practicing seismic station setup in Kelso, WA. Photo credit: Seth Moran

Near the end, with only back filling and covering the vault and cleaning up left to do the site is a mess of tools, equipment boxes, shipping containers and water jugs. Once all of this is hauled back to the truck the site should be relatively inconspicuous.

Other Distractions

Initial sites were on the west side of MSH in a lot of timber land and we quickly found our tires weren't up to the task. We got over ten flats split between six vehicles and thankfully no one ever got stuck, although there were at least two cases of a full flat plus another slow leak where the vehicle was able to make it back to town in time.

The World Cup was happening at the same time so some people used creative means to catch a game, although for the most part we were resigned to learn the results when we returned at night (those of us who cared, that is). Turned out sitting in a tire store waiting for a flat to be fixed was a good way to spend the morning. One team had the luck of a wet mix of concrete, which of course called for eating lunch in town (somewhere with a TV!) waiting for it to dry. Or getting a site where there was still radio reception- sitting in the car for 15 minutes to listen to the US fall to Belgium while your partner digs a hole in the blazing heat isn't so bad, is it?

June 22-June 29: Split up- Trout Lake vs. Randle

After a week based out of the relatively civilized Kelso, WA, the group split into two smaller teams to venture east into the boonies. So the race began between Team Randle and Team Trout Lake.

In Randle, many of the sites were on Forest Service land, with much longer drive times. We began with eight people and dwindled down to five over the next week as other commitments took people away. These were long days with a lot of driving. We used slow-drying cement (the only kind available) the first day, so that delayed things a little bit, since it required returning several days later to finish the installation. Thankfully we had no flats. We were staying in a combination motel/bar/restaurant, and it was the only place we ate dinner for almost a week. It had some variety at least, and a warped pool table, jukebox, and karaoke. Internet service was limited so we had to learn to enjoy each others company instead.

Compared to Randle, Trout Lake initially sounded like a breeze. Great progress was made every day, there were two (!) places to eat at night, and teddy bears on the beds. Not everything was fun and games, however…

"*We have had a few field adventures, fortunately none involving flats. An iMUSH rig was high-centered on a snow drift for 15 minutes on our first day, on a road which turned out to be closed (no sign) due to snow. Fortunately another vehicle came up the road, even more fortunately it had a tow strap and was able to pull the iMUSH rig back to terra firma. Unfortunately we will not be able to reach that site until we get a few good warm days to finally melt off the snow. Another adventure involved installing a site on a steep slope with a thin soil veneer on top of bedrock that defeated all attempts at whacking it with a breaker bar. The site was installed, but the crew is less than confident about its ability to withstand snow creep (particularly the solar panel mount).*"

- Seth Moran (USGS-CVO)

Figure 3. Installing passive seismic stations, from top to bottom: digging the hole, mixing concrete for seismic pier next to a finished site, putting together solar panel pole mount.

"*This site wins the prize for the worst site ever. During the siting visit a year ago Seth badly sprained his ankle. The road in had awful berms and potholes and crazy trees. The slash was crazy deep and slippery. And yet, Ben managed to haul about 160 lbs. of material through it. What a trooper.*

One of the nuts on the solar panel mount was double threaded, so Tim and Roger had to saw it off. We also forgot to undo the solar panel cable before erecting the mast, so Tim got up on Ben's shoulders to reach it. Dinner in Hood River tonight. We earned it. Whoot!"

- Alicia Hotovec-Ellis (UW postdoc)

"*The heat was unforgiving. It was even harder to bear when that overloaded SUV decided to fight back. The odds were against them when she blew a tire on that old dusty road. This wasn't the first hardship they encountered, but it came at the worst time. They couldn't chance being stranded since their comrades were hours away. The only option was to see if that old four wheeler could be put back together. The help they needed was back in town at an old service station, so the two travelers turned tail and ran. Once that old hunk of junk was fixed up, they decided to give it one more go. Although their hopes were high, their original plan was abandoned. They decided to head to the longest and most arduous site, to deploy one of the few remaining seismometers. The two weren't out of the woods yet. They went on a few unexpected detours and were devoured by godless horse flies. After their long day was done, they headed back to that little town shadowed by the mountain. They grabbed a fulfilling meal and drank a nice strong brew... They were victorious.*"

- Gina Belair (UC-Berkeley undergrad and IRIS intern)

June 29-July 2: Finishing up, Kelso

After a week further afield, the remaining participants returned to Kelso to finish up the installs on the west side of the volcano. By this time we were all seasoned pros. Combine that with fewer sites and fewer people to keep track of, and we were able to make quick work of the remaining sites and return home to celebrate the Fourth of July, until some of us returned a couple weeks later to service the instruments before the active seismic experiment began shooting.

July 15-August 5, 2014: Active Seismic Experiment

The iMUSH active seismic experiment was fielded from instrument centers established in the gymnasiums of public schools in the towns of Castle Rock, Woodland, and Carson, Washington. A group of 55 volunteers and four PASSCAL field technicians deployed about 2500 Texan recorders in two deployments. A dozen UNM volunteers and Nodal Seismic personnel fielded the Nodal Seismic recorders. Over 1100 instruments were hiked into the Mount St. Helens National Monument. UTEP personnel from the National Seismic Source Facility oversaw drilling and loading the 23 shotholes, and detonating the explosions. The field operations were preceded by twelve weeks of surveying and permitting. The experiment extended across the Gifford Pinchot National Forest and lands belonging to four timber companies and the State of Washington, requiring permits from fifteen public and private organizations. In addition to excellent recordings of the shots, the iMUSH active source instruments recorded dozens of local earthquakes.

Deploying Texans on foot around Mount St. Helens

More daily blog posts compiled by Steve Malone detailing all parts of the iMUSH experiment are on the website (imush.org). Participants in the passive seismic broadband deployment included Ken Creager, Shelley Chestler, Kelley Hall, Jiangang Han, Alicia Hotovec-Ellis, Mika Thompson, Carl Ulberg, Mark Welch (University of Washington); Geoff Abers, Zach Eilon (LDEO); Tim Clements (Cornell); Gina Belair (UC-Berkeley); Dylan Jamison (USGS-UW); Ben Alonzo, Roger Denlinger, Seth Moran (USGS-CVO); Eric Makarewicz, George Slad (PASSCAL Instrument Center). The active seismic experiment is led by Alan Levander (Rice University), the magnetotelluric component is led by Adam Schultz (Oregon State University) and Paul Bedrosian (USGS) and the petrologic studies are led by Olivier Bachmann (ETH Zurich), Tom Sisson (USGS) and Mike Clynne (USGS).

iMUSH is funded by NSF-GeoPRISMS, NSF-Earthscope with substantial in-kind support from the USGS. Broadband seismometers and support was provided by IRIS-PASSCAL.

Photo by T Clements

Spring-Fall, 2014: Magnetotelluric Deployment

The iMUSH magnetotelluric (MT) deployments were staged from Oregon State University, in Corvallis, OR, with a forward operating base in Portland, OR. A total of 40 MT stations were completed in 2014, 97 additional stations were permitted, and 13 remain to be permitted in 2015. MT field crew participants included a USGS team led by Jarod Peacock and Lyndsay Ball, who did the major 2014 push, and an OSU team led by Myle McDonald, who installed iMUSH sites in the Fall of 2014 until the end of the field season. MT work is seasonal and is usually initiated when the ground is clear of snow and ends when snowfall becomes a significant operating concern. The 2014 field operations were limited by the number of instruments that operated with reliable firmware and the number of magnetic field seasons. The 2015 field season is about to get underway, with OSU taking up the initial installations, and USGS anticipated to resume operations later in the field season. For 2015 operations, the number of wideband MT instruments will increase from four to ten and two field crews will operate simultaneously for much of the field season. ■

Photo by K. Creager

Photo by S. Moran

Drilling a shothole

"Report from the Field" was designed to inform the community of real-time, exciting GeoPRISMS -related research. Through this report, the authors expose the excitement, trials, and opportunities to conduct fieldwork, as well as the challenges they may have experienced by deploying research activities in unique geological settings. If you would like to contribute to this series and share your experience on the field, please contact the GeoPRISMS Office at info@geoprisms.org. This opportunity is open to anyone engaged in GeoPRISMS research, from senior researchers to undergraduate students. We hope to hear from you!

Status Report on the GeoPRISMS Data Portal: April, 2015

Andrew Goodwillie and the IEDA Database Team

Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY

The GeoPRISMS data portal (*www.marine-geo.org/portals/geoprisms*) was established in 2011 to provide convenient access to data and information for each primary site as well as to other data resources. Since the last newsletter report, highlighted below are recent contributions of data sets and field program information of interest to the GeoPRISMS community. Most of the data sets described are also available in GeoMapApp under the Focus Site menu.

Aleutian Arc

Bathymetric grids, generated at 50m horizontal resolution from processed EM300 multibeam swath data, were contributed by Gene Yogodzinski and Scott White from data acquired in 2005 during a geophysical and geochemical survey of the Aleutian back-arc (Fig. 1).

In the last newsletter, we reported on Aleutian arc geochemistry and mineralogical data from twenty published articles being included in the EarthChem-PetDB database. A new batch of analytical data from a further 31 papers published between 1971 and 2010 has since been included. The data sets from this new compilation can be accessed via PetDB *http://www.earthchem.org/petdb/search* (Search by "Feature Name > Volcanic Arc > Aleutian") or via the EarthChem Portal (*http://www.earthchem.org/portal*, use the map-based "Set Location" to define a polygon around your area of interest). If you have suggestions for additional data sets or comments about the current data please contact the PetDB team at info@petdb.org.

EARS

A preliminary East African Rift System geodetic velocity field compiled from continuous and survey mode GPS networks was contributed by Bob King, Michael Floyd, Rob Reilinger, and Becky Bendick. Derived from field data acquired between 1994 and 2013, the data set is part of a wider Africa-Arabia-Eurasia velocity field calculation and is available here: *http://www.marine-geo.org/tools/search/entry.php?id=EARS_King*

Cascadia

Details on Cascadia Initiative Year 4 ocean bottom seismometer deployment and recovery operations are available, along with MT instrument locations for the on-going land-based iMUSH program. Station information for Dave Chadwell's seafloor geodesy transponder array was also added. From their 2013 cruise AT26-04, Paul Johnson, Evan Solomon, and Rob Harris provided long probe and thermal blanket processed heat flow data (*http://www.marine-geo.org/tools/search/entry.php?id=AT26-04*). For the Juan de Fuca Endeavour segment, PIs William Wilcock, Emilie Hooft Toomey, and Doug Toomey contributed an earthquake microseismicity catalog for years 2003-2006 as well as a seismic velocity model for the area (*http://www.marine-geo.org/tools/search/entry.php?id=JdF:Endeavour_Wilcock*).

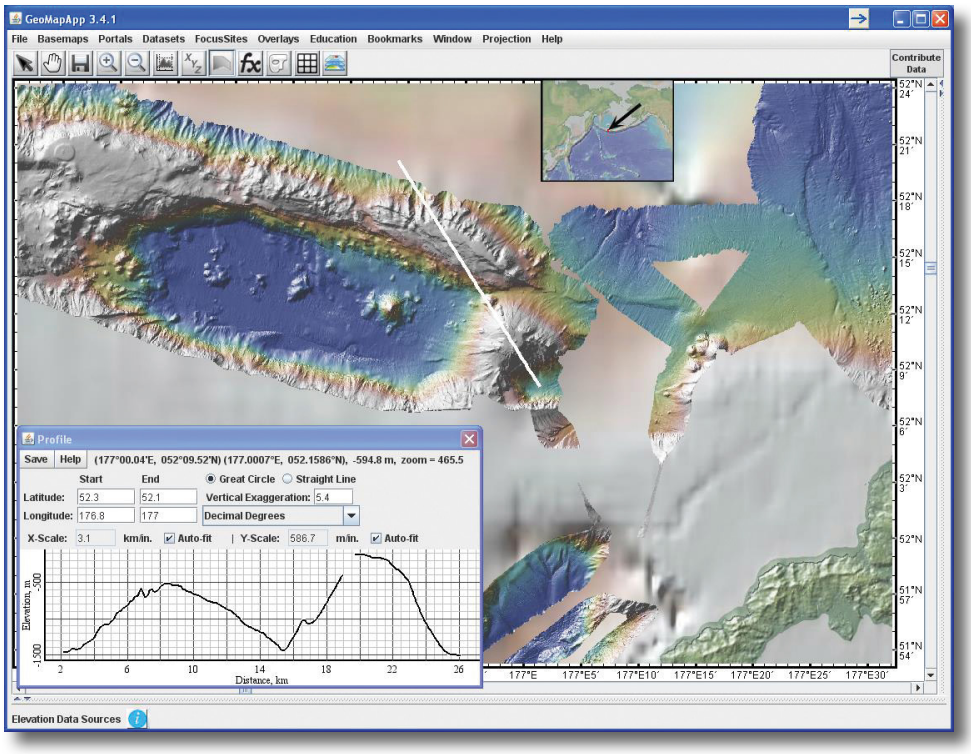


Figure 1. To the west and north of Aleutian island Kiska (lower right), highly-detailed bathymetry data from the Thompson cruise TN182 reveal myriad seafloor features not present in the surrounding base map. The white line shows the location of the elevation profile displayed in the lower left. The grids can be downloaded here: http://www.marine-geo.org/tools/search/entry.php?id=TN182. Image produced with GeoMapApp.

ENAM

The main offshore component of the multi-PI, shoreline-crossing ENAM Community Seismic Experiment took place in Fall 2014 with an R/V Langseth seismic survey. Shots were recorded by Langseth streamers and ocean floor OBS instruments as well as by broadband and short-period seismometers on land. Multi-channel seismic data and field information from the experiment, including land seismometer and OBS deployments, were added to the portal (Fig. 2). Information and data for the preceding Langseth cruise - a USGS Extended Continental Shelf survey, led by Deb Hutchinson and Nate Miller - were also contributed.

GeoPRISMS Data Portal Tools and Resources

Search For Data - The customised GeoPRISMS search tool (*http://www.marine-geo.org/tools/new_search/index.php?funding=GeoPRISMS*) provides a quick way to find GeoPRISMS data using parameters such as keyword, NSF award number, publications, and geographical extent.

Data Management Plan tool - (*www.iedadata.org/compliance*) generates a data management plan for your NSF proposal. The on-line form can be quickly filled in, printed in PDF format, and attached to a proposal. PIs can use an old plan as a template to create a new plan. We also have developed a tool to help PIs show compliance with NSF data policies.

GeoPRISMS Bibliography - (*www.marine-geo.org/portals/geoprisms/references.php*) with more than 760 citations, many tied to data sets. The references can be searched by primary site, paper title, author, year, and journal. The lists of publications can be exported to EndNote™. Submit your papers for inclusion in the bibliography – just the DOI is needed! *http://www.marine-geo.org/portals/geoprisms/ref_submit.php*

GeoMapApp /GMRT - (*www.geomapapp.org*) version 2.7 of the GMRT base map includes newly-added swath bathymetry data from eight cruises in the Cascadia region.

Contribute Data - (*http://www.iedadata.org/contribute*) This updated web submission tools support PI contributions of geophysical, geochemical, and sample data. File formats include grids, tables, spreadsheets, and shapefiles. Once registered within the IEDA system, the data sets become available to the broader community immediately or may be placed on restricted hold. Additionally, PIs can choose to have a DOI assigned to each submitted data set, allowing it to become part of the formal, citable scientific record. ■

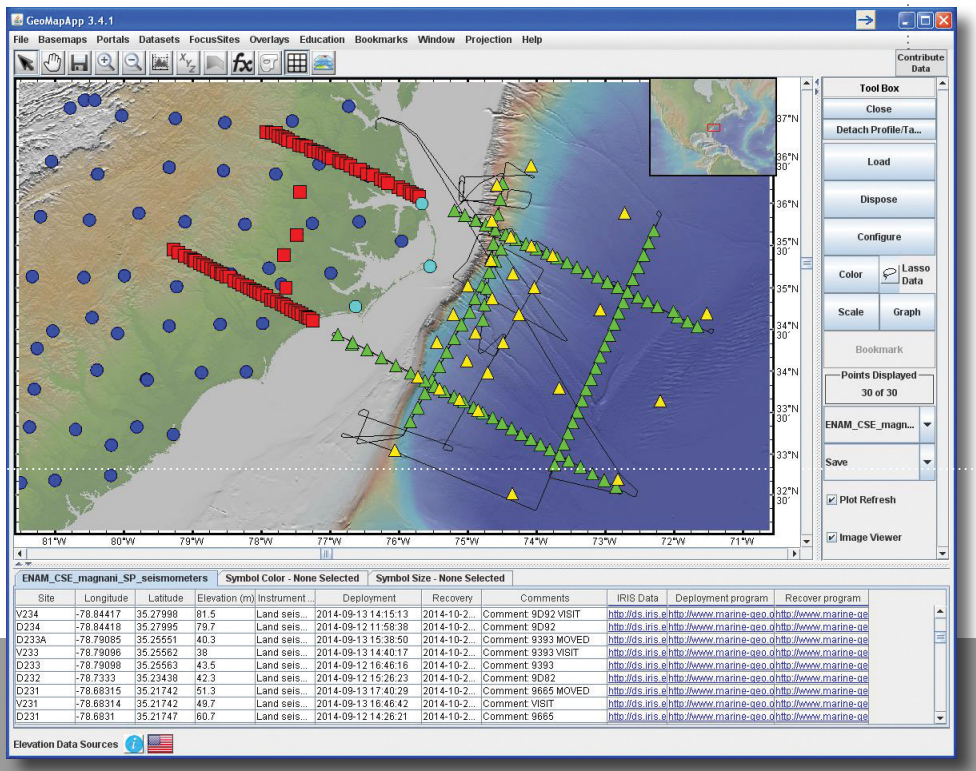


Figure 2. ENAM CSE components are indicated as follows. OBS - Short-period (green), broadband (yellow); Land-based seismometers – short-period (red), broadband (light blue, Outer Banks), EarthScope USArray (dark blue). The black line shows the ship track for Langseth cruise MGL1408 led by co-chief scientists Donna Shillington, Anne Bécel, and Matt Hornbach. Image generated in GeoMapApp. Station locations are available under the Focus Sites > ENAM menu.

The GeoPRISMS Data Portal team is here to serve the community.

Please contact us at info@marine-geo.org

GeoPRISMS Steering and Oversight Committee Highlights

Spring 2015

March 12-13, 2015, NSF Headquarters, Arlington, VA

Edited by Anaïs Férot, GeoPRISMS Science Coordinator & Peter van Keken, GeoPRISMS Chair

Introduction

The annual 2015 GeoPRISMS Steering and Oversight Committee provides the GSOC members and NSF the opportunity to give an update on GeoPRISMS activities, research funding and outcomes, and to address programmatic issues. This Spring meeting also addressed questions provided by NSF ahead of the meeting regarding the planned Theoretical and Experimental Institutes (in the 2014-2016 period), the scope of the program, the program review, and the role of the GeoPRISMS Office.

NSF Update

NSF Program Manager Jennifer Wade (EAR) provided updates from NSF. The current state is in flux since Program Manager Bilal Haq has retired from his program manager position and is involved part-time as Expert. Dennis Geist (EAR) is helping out. Donna Blackman (OCE) is rotating off and the OCE Division is looking for a new rotator and a new permanent staff member. NSF welcomed two new division directors Carol Frost (EAR) and Rick Murray (OCE) in late 2014.

The budget is still under sequester which represents about 10% cut to the program. The budget this year may amount to $4M with some mortgage. The GeoPRISMS solicitation remains open to proposals for Postdoctoral Fellowships with the expectation of one funded postdoc per year.

The Phased Funding Model continues with two-year windows of opportunity for submission of proposal of large data acquisition efforts. This year the program welcomes such large proposal submissions for East African Rift System (second year of the time window) and New Zealand (first year of the time window). Small projects for other sites are still welcome, especially for Alaska-Aleutians considering the move of the TA in Alaska, but projects for Cascadia have to go to Core Program. Funding for further data acquisition at other focus sites may still be obtained through core or other specific funding opportunities. Preparatory work, data analysis and synthesis, and thematic studies are considered for all sites each year.

The logistical support for GeoPRISMS projects in the Aleutians is moving forward with an expected participation of three teams of 12-14 people. They will take advantage of the R/V Maritime Maid ship providing helicopter support and strong USGS collaboration.

The numbers of proposals submitted to GeoPRISMS considerably increased between 2011 and 2012 and remains constant since then (50-60 proposals had been submitted since 2012 every year). There is a 29% success rate in 2014, which is a higher success rate than many other programs in GEO. It was noted that hundreds of projects related to GeoPRISMS Primary Sites are funded in Core for both OCE and EAR. More than 60 proposals related to GeoPRISMS Primary Sites and thematic projects had been funded through MGG and more than a hundred in EAR between 2011 and 2014.

Jennifer Wade provided news from relevant programs or efforts that should be of interest to the GeoPRISMS community which included the announcement of PREEVENTS (Prediction of and Resilience Against Extreme EVENTS; New in FY16), the SAGE/GAGE recompetition of the Seismic and Geodetic Facility and the GEO-wide document "Dynamic Earth" which discusses imperatives and frontiers for the next five years. The latter document is available online at: *http://www.nsf.gov/geo/acgeo/geovision/nsf_ac-geo_dynamic-earth-2015-2020.pdf*

Carol Frost (EAR division director) and Rick Murray (OCE division director) both visited with the committee and discussed their perspectives on the near future developments. With Carol Frost the discussion focused on GEO funding (likely to remain flat), the impacts of a letter from the US House of Representatives appropriations committee regarding science funding priorities, and Congressional oversight of funding. Rick Murray specifically discussed the impact of the Decadal Survey of Ocean Sciences (the 'Sea Change' report) that recommended 5-20% cuts to OCE infrastructure to protect core funding.

Partnership updates

Many GeoPRISMS researchers are active in multiple communities and a series of updates on developments in those were provided. The SAGE-GAGE recompetition that is now open is of importance due to the long-term need for geophysical instrumentation. A number of GSOC members were present at the spring 2015 Lansdowne meeting that discussed the needs for foundational facilities as well as new capabilities and grand challenge questions. Maureen Long provided an update on the current status of the EarthScope stations. The Transportable Array network will be moved this summer to Alaska after a residence time of two years on the East Coast. Some stations will remain on the east coast for the foreseeable future. The Earthscope National meeting will be attended by several GSOC members and will be held June 14-17 in Stowe, VT.

Sarah Penniston-Dorland discussed efforts within ExTerra, which is a self-organized group of geoscientists that aims to investigate rocks exhumed from paleo-subduction zones to better understand the materials and processes hidden beneath the surface in active subduction zones. One of the goals of ExTerra is to conduct collective research on exhumed rocks collaboratively sampled during Field Institutes. Collected Research samples are shared, and managed using International Geo Sample Number (IGSN). The first ExTerra Field Institute was held October 11-13, 2014 in the Santa Lucia Mountains of central coastal California. A potential next Field Institute will be conducted in the Western Alps to focus on field observation of a whole fossil plate interface. A PIRE proposal had been submitted to establish a long-term partnership with the ZIP (Zooming in between Plates) Marie Curie Training network. Further potential future Field Institute includes Fiordland, NZ and Sanbagawa, Japan (that could be held in conjunction with Goldschmidt 2016).

Several developments involve ocean bottom seismometers. Harm van Avendonk is co-convening the OBSIP workshop that will be held in Vancouver, WA on October 5-6. This group focuses on the maintenance, deployment and scientific advances made with the ocean bottom seismometer pool.

GeoPRISMS Program
[Program Solicitation NSF 15-564]
Target date: July 15, 2015

http://www.nsf.gov/pubs/2015/nsf15564/nsf15564.htm

The phased funding model adopted by GeoPRISMS continues to define "windows of opportunity" during which certain types of proposals will be accepted for given primary sites. Large and costly field experiments must be strategically considered and supported. Smaller studies such as preparatory work, data analysis, and synthesis, or thematic studies, requiring a lower percentage of the overall annual budget, are considered for all sites each year. Windows for large-scale data acquisition projects are open for two sites this fiscal year:

EARS: FY15-16 (July 2015 deadline)
New Zealand: FY16-17 (July 2015 and 2016 deadlines)

We will be supporting joint ship and helicopter support in the Aleutians this summer. Pending the availability of funds and vessel scheduling as well as proposal success, there is potential to take advantage of this again in the summer of 2016. Questions about this particular effort should be directed to PO Jennifer Wade: jwade@nsf.gov; 703.292.4739.

It is important to note that the above "window" dates serve only as guidelines, and that NSF is open to accepting proposals that fall outside of these guidelines when justified by unique and time-limited opportunities. In such cases, PIs must contact the program officers ahead of submission.

For more information, please visit:
http://www.geoprisms.org/research

The Amphibious Array Facility is a $10M ARRA funded project consisting of 60 Ocean Bottom Seismographs (OBSs) managed by 3 oceanographic institutions (Scripps, WHOI, LDEO), 27 broadband onshore seismographs, and upgrades to 232 EarthScope GPS sites. The array is currently deployed offshore Cascadia through 2016, deployment referred as Cascadia Initiative. A workshop report (available from geoprisms.org) followed from the October 2014 meeting at Snowbird, UT, which compiled the recommendations to NSF regarding the future of the facility with a focus on community-oriented science activities.

A potential broad and long term effort that is of great interest to the GeoPRISMS community Subduction Zone Observatory (SZO) which at it most ambitious scale would be to initiate a large-scale, amphibious and international observatory stretching 18000 km along the eastern Pacific Ocean from the Aleutians in the North, to Tierra del Fuego in the South and provide an integrated, multi-disciplinary approach to better understand the entire subduction zone as a system. Research within such an SZO will have important societal relevance given the population centers located all along the coast that are directly subject to earthquake-, volcano-, and tsunami-related hazards. Initial discussions regarding the SZO concept have taken place at AGU townhalls in 2013 and 2014. The SZO will logically build on current efforts by IRIS, UNAVCO, GeoPRISMS and international partnerships. A broad international workshop to discuss logistical details and science goals is tentatively planned for 2016.

Program External Review

The decadal GeoPRISMS program is in its fifth year and will undergo an external review in August, 2015. The review panel will evaluate the accomplishments of the program with a focus on the funded research activities, the impact of the Office, and the success of creating shoreline crossing or amphibious projects. This review will identify strengths and weaknesses to OCE and EAR and provide advice for the funding approach to the next five years of GeoPRISMS.

Talking Points from NSF

Out of budgetary and programmatic concerns the program managers Jennifer Wade, Donna Blackman and Bilal Haq put together a few talking points for discussion with the GSOC. In particular the sequester weighs heavily on the GeoPRISMS budget (which is effectively around $3.5M/yr from the initially expected $5M/yr). The following is a short summary of the talking points and GSOC recommendations.

Scheduling TEIs

The Michigan Office had planned to hold a Theoretical and Experimental Institute for each of the SCD and RIE initiatives. The budget for these meetings was dependent on supplements to the office grant after it suffered in the sequester, but these supplements are now unlikely to be available. The GSOC recommended that the Michigan Office combines the funds to offer a single SCD TEI in 2015, in addition to a 'mini-TEI' the Sunday before AGU 2015. The next Office will then host the full RIE TEI.

Program Scope

GeoPRISMS is a strong program but has ambitious science plans with five primary sites, including ones in logistically difficult and/or expensive locations. The phased funding that has taken effect has allowed for the focusing of the funding for large acquisition projects in stages. While the GSOC recognized that the budget cuts affect the success rate of proposals it strongly recommend to maintain the five primary sites and the phase funding, with the potential for opening up past sites after all sites have had their initial two year period.

Program Office

NSF asked the GSOC to evaluate the role of the Office and whether the impact of Office activities is sufficient to warrant the

GeoPRISMS Data Portal

Visit the GeoPRISMS Data Portal to find information for each Primary Site:

- Pre-existing data sets and field programs
- Data sets ready for download
- Links to partner programs and resources
- References database with papers tied to data

GeoPRISMS references database of relevant publications is now available:
http://www.marine-geo.org/portals/geoprisms/references.php

To submit missing data sets, field programs or publications to the GeoPRISMS portal, contact info@marine-geo.org

Apply for a GeoPRISMS Postdoctoral Fellowship
Deadline July 15, 2015
For details, visit the GeoPRISMS website:

http://geoprisms.org/education/geoprisms-postdoctoral-fellowships/

expenditures (currently around $400k/yr). The GSOC found unanimously that the Office is essential to keep GeoPRISMS as a vibrant and growing program. For example, nearly 1000 unique individuals have attended GeoPRISMS meeting; some 9000 students have been exposed to lectures on GeoPRISMS topics through the Distinguished Lectureship Program; many new junior scientists have been enfranchised through workshops and AGU activities that include the Townhall and Student Forum and Student Prize. While the cost of the Office may appear high when compared to just the GeoPRISMS budget it is clear the community activities reach well beyond those sponsored projects. The intrinsic value of the Office is therefore considered to be high compared to the cost.

Initiatives Update

With input from the community several GSOC members spent significant time in discussion of progress in activities that are either funded by GeoPRISMS or are closely related to the goals of GeoPRISMS. Updates were provided from both the RIE and SCD initiatives and demonstrated the significant advances made in the primary and ancilliary sites as well as in thematic studies. The annual update provides an important milestone as the GeoPRISMS Office compiles the research efforts and provides an ideal avenue to demonstrate the impact of the funded science to NSF program managers in EAR and OCE. It also creates an opportunity for interdisciplinary education within the broadly diverse GSOC membership. Updates this year included projects in the Aleutians, Baja California, Mt St. Helens, Oregon Cascades, offshore Cascadia, the Eastern North American margin, Botswana, and Malawi, as well as postdoctoral fellowship activities and thematic studies deploying theoretical and experimental techniques. Andrew Goodwillie also provided an update to the GeoPRISMS Data Portal which is detailed elsewhere in this newsletter.

Education & Outreach Update

Distinguished Lectureship Program

The DLP continues to be popular with 59 applications received in 2014. Lectures have been scheduled at 28 institutions. Due to budgetary constraints the number of speakers will be reduced from eight to six, but each will still deliver 3-4 talks that can be either broadly scientific or technical. Deadline for applications to the DLP is August 1, 2015.

AGU Student Prize

Kristina Walowski (U. of Oregon) and Andrew Parsons (U. of Leeds) received the oral and poster awards (valued each at $500) respectively. Yelebe Birhanu (U. of Montana), Lucile Bruhat (Stanford U.), James Farrell (U. of Connecticut) and William Hutchinson (U. of Oxford) were rewarded for their work with an honorable mention. In 2014 we saw a drop in applications compared to previous years. We invite all students who have mature research topics that are relevant to the GeoPRISMS science objectives to consider applying to this program.

MARGINS Mini-Lesson Project

The MARGINS Mini-lessons project is managed by Juli Morgan at Rice University . It was funded in 2012 and aim to synthesize and incorporate MARGINS research of the last decade into upper level undergraduate geoscience curricula. The objective is to create up to two weeks of course materials developed for each of the four MARGINS Initiatives, previously tested and assessed in the classroom. This effort marries the educational practices from On the Cutting Edge to the scientific expertise from MARGINS. The mini-lessons are almost complete with descriptions at *http://serc.carleton.edu/margins/lesson_descript.html.*

Website, social media and newsletter

GeoPRISMS continues to be active on Facebook and Twitter with posts regarding student and early career opportunities, AGU and other meeting activities, and GeoPRISMS-related science posts. The Office maintains a Listserv and provides support to various initiatives for registration and dissemination of reports (see ExTerra newly developed webpage). The transition to the new website is finally complete with all content from the old website being transferred. The Office continues to distribute the newsletter twice a year with the Spring newsletter online and in print and the Fall newsletter distributed only electronically.

GeoPRISMS at AGU Fall Meeting - Mini-Workshop Reports

December 15-19, 2014 AGU Fall Meeting, San Francisco

As every year, GeoPRISMS provides the opportunity for groups of researchers to meet and discuss GeoPRISMS Science or planning activities at the AGU Fall Meeting. Here are the reports from the topical Mini-Workshops organized at AGU Fall Meeting 2014.

Workshop to cultivate and coordinate GeoPRISMS studies of the Hikurangi subduction margin

Conveners: Laura Wallace (University Texas Institute for Geophysics, UT-Austin), Mike Underwood (University of Missouri), Samer Naif (Scripps Institution of Oceanography, UC San Diego), Bill Fry (GNS Science, NZ), Stephen Bannister (GNS Science, NZ), Nathan Bangs (University Texas Institute for Geophysics, UT-Austin)

On Sunday, December 14, 2014, an enthusiastic group of more than 70 international researchers from a variety of disciplines met in San Francisco at AGU to discuss studies that should be proposed at the Hikurangi subduction margin (part of the New Zealand focus site) for the upcoming GeoPRISMS funding rounds. The meeting began with a brief overview of the GeoPRISMS program by Peter van Keken, which was followed by Mike Underwood's review of the Hikurangi margin science priorities, which are based largely on discussions at the New Zealand Focus site workshop that was held in April 2013. The objective of the mini-workshop was to promote and coordinate new collaborations to fill critical gaps in the GeoPRISMS Implementation Plan. To that end, a series of short talks highlighted projects that are either ongoing, already proposed, or soon to be proposed (*http://geoprisms.org/meetings/mini-workshops/mini-workshop-at-agu-2014-hikurangi/*). The last half of the meeting was focused on open discussion during which participants identified new research opportunities.

The community has already made major progress in advancing key science objectives identified for the Hikurangi margin. Demian Saffer overviewed the IODP drilling proposals to investigate shallow slow slip events (SSEs) at the northern Hikurangi margin; the proposal for riserless drilling has passed through panel reviews and now awaits scheduling by the JOIDES Resolution Facilities Board. A proposal for riser drilling also reviewed well and has been forwarded to the Chikyu Facilities Board. Already underway is the Hikurangi Ocean Bottom Investigation of Tremor and Slow Slip (HOBITSS) to investigate vertical deformation of the seafloor and seismicity related to the shallow SSEs, supported by funding from NSF, New Zealand, and Japanese sources. An NSF-funded heat-flow survey led by Rob Harris is scheduled for May/June 2015 to constrain the thermal regime of the subduction interface. Proposals have been submitted

Left: Mike Underwood, one of the conveners of the Hikurangi Mini-Workshop, leading discussion. Right: attendees of the Hikurangi Mini-Workshop on Sunday morning.

to NSF to (1) acquire 3-D seismic data of the shallow SSE source, (2) conduct onshore and offshore geophysical investigation of megathrust properties along-strike, and (3) to install long-term borehole observatories at the proposed IODP sites.

Numerous representatives from the New Zealand geoscience community introduced ongoing and planned geophysical, geological, and modeling initiatives that dovetail nicely with GeoPRISMS goals. In particular, there are a large number of seismological, electromagnetic (onshore), numerical modeling, and paleoseismological investigations conducted by New Zealand-based researchers. To leverage these existing and planned studies (and not duplicate efforts), it is particularly important for GeoPRISMS-funded investigators to collaborate with and communicate with their New Zealand-based counterparts. David Johnston of GNS Science informed participants about a New Zealand-based initiative called "East Coast Life at the Boundary (LAB)", part of which is targeted at communication of research results on the Hikurangi margin to the general public and local policymakers. This offers an excellent opportunity for GeoPRISMS researchers at Hikurangi to work with the East Coast LAB to coordinate outreach activities in New Zealand. We also heard about ongoing and already funded efforts by Japanese and European researchers focused on the offshore Hikurangi margin over the next four years.

The last half of the mini workshop was dedicated to discussion of critical science gaps. The main discussion focused on:

1. microseismicity, episodic slow slip, and tremor;
2. the state of the incoming plate and the role of incoming sediment properties in subduction thrust behavior and margin evolution;
3. past and present megathrust slip behavior and the physical controls on that behavior;
4. fluid and volatile fluxes in the forearc.

From this discussion we identified some of the most critical studies that are needed to fill gaps. Paleoseismology studies will help resolve the past earthquake behavior of the subduction thrust and whether or not the modern-day geodetic locking pattern is static or varies with time. Increased efforts towards sampling and geochemical analysis of onshore and offshore fluid seeps will yield important insights into volatile cycling and hydrogeology above a shallow subduction thrust. A new idea was raised to use the seafloor drill rig MeBo for coring at numerous points on the Hikurangi Plateau (a Large Igneous Province) where the sedimentary cover is thin (<200 m). Such sampling would address the role of 3-D stratigraphic variability in modulating subduction-interface slip behavior. Controlled-source electromagnetic (CSEM) transects in the offshore forearc and incoming plate will evaluate the role of fluids in megathrust slip behavior and margin evolution. Seafloor (GPS-Acoustic) geodetic studies will help resolve the slip behavior of the shallow subduction thrust. Densification of onshore geodetic instrumentation, and addition of strain meters, tiltmeters, and borehole seismometers will lower the threshold of slow slip event detection, enabling higher-resolution investigation of SSEs and seismicity, and detection of smaller events. Modeling of Hikurangi SSEs assuming a rate-state friction framework, as well as other approaches, will help resolve the physical controls on the diversity of SSE behavior.

The conveners appreciate the participants' contributions and thank them for their help in achieving the goals of the mini-workshop.

South Island, New Zealand primary site coordination mini-workshop

Conveners: Sean Gulick (University of Texas), Mike Gurnis (Caltech), Ellen Syracuse (Los Alamos National Laboratory), Tim Stern (Victoria University of Wellington, NZ), Phaedra Upton (GNS Science, NZ)

On Sunday December 14, 2014, from 1:30 to 5 pm, a diverse group of researchers met in the Grand Hyatt San Francisco before the AGU Fall Meeting to discuss coordination of work within the South Island, New Zealand GeoPRISMS primary site. The South Island of New Zealand offers extraordinary opportunities to address subduction cycles and dynamics science questions. Members of the community are gearing up for work in New Zealand and so the time was ripe to foster collaboration between US scientists and others internationally.

Following an introduction from the organizers, Sean Gulick (UT Austin) recapped the science priorities defined for Puysegur and Fiordland in the GeoPRISMS Implementation Plan. Sean described how the South Island of New Zealand offers a wealth of prospects for subduction zone research. The Puysegur Trench region - a juvenile subduction zone "caught in the act" of initiation - provides unique opportunities to investigate the geodynamics of this fundamental plate tectonic process. In Fiordland, tectonic motions have led to deep exhumation of a pristine Cretaceous arc section and offers a prime locale to investigate the root zones of an ancient arc at outcrop scale. Addressing questions on subduction initiation, exhumed terranes, and subduction thrust slip behavior in one region is an exciting opportunity and will require large geophysical field deployments, targeted geological fieldwork, sampling, geochemical analysis and geodynamic models.

The overview was followed by shorter talks describing specific targets or nascent efforts for larger activities. Joshua Schwartz (CS Northridge) described how an exhumed arc root exposed at Fiordland provides opportunities to address how volatiles, fluids, and melts are stored, transferred, and released through the subduction system. Sarah Penniston-Dorland (U. Maryland) then described how Fiordland presented an outstanding locale for an

Attendees of the South Island Mini-Workshop on Sunday afternoon.

ExTerra Field Institute in which a group of experienced scientists and students would spend several weeks in the field familiarizing newcomers to the area, collecting rock samples, and making other detailed field observations. Jamie Howarth (GNS Science) discussed surface processes and the history of earthquakes from the sedimentary record. Jamie described his own work using sequences of turbidites to understand landslides and erosion in the Southern Alps and how the large magnitude earthquakes within Fiordland can be better understood through the study of turbidites.

Harm Van Avendonk (UT Austin) gave a talk on measuring crustal and fault structure across Puysegur with active source seismology. Harm described how the fundamental geophysical unknowns in Puysegur limit our understanding of subduction initiation. Through detailed models of seismic wave propagation through Puysegur, Harm showed how crustal structure, crustal thickness and dip of the nascent plate boundary could be determined with east-west active source seismic lines. Recent seismic work elsewhere showed that the necessary data could be acquired with an active source experiment. The field geophysical theme continued with a talk by Michal Kordy and Phil Wannamaker (U. of Utah) on constraining mantle volatiles with an MT (magnetotellurics) experiment. They showed how major changes in electrical resistivity are likely associated with volatiles in the mantle and how a combined onshore and offshore MT experiment across Fiordland and Puysegur could constrain the volatile release during subduction initiation. Joann Stock (Caltech) made the case for magnetic measurements along Puysegur - the only subduction zone in which the kinematics of both over-riding and under thrusting plates are well known during the initiation phase.

Brian Jicha (U. of Wisconsin) and Gene Yogodzinski (U. of South Carolina) gave a talk on adakitic volcanism and subduction initiation at Solander Island. Solander is the only sampled volcanism along Puysegur and the andesites there are adakitic. Brian reviewed the other locations in which adakites are found and that melting of MORB eclogite in the subducting oceanic crust is one aspect of their formation. Most studies of subduction initiation have been made on western Pacific arcs and Puysegur provides an opportunity to study a nascent arc which has a different petrological expression. The case was made that there is a large area of submarine volcanism around Solander that has yet to be sampled and that the time is now ripe to do so.

Several talks explored work currently underway on the South Island that complements those planned for GeoPRISMS. Simon Lamb and Tim Stern (Victoria U. of Wellington) gave a talk exploring the putative hyperextended margin of the conjugate to Campbell Plateau that might be the crust now below the central part of the Southern Alps. Martha Savage (Victoria U.) gave an overview of several other South Island projects including seismic anisotropy over the extent of the island and drilling within the Alpine Fault.

The talks were followed by open discussion on both the science and logistics of the various plans presented. In terms of science returns, the participants discussed how the seismic experiments link the plate kinematics to the structure and evolving force balance. The MT experiment would map the first appearance of volatile release heralding the transformation of basalt to eclogite that could have provided a major jump in the force driving subduction initiation. Discussed at length was the question of optimizing the logistics of the passive MT and active seismic experiments while providing opportunities to sample volcanic rocks around Solander Island. The two geophysics experiments have different footprints: the seismic lines are more tightly aligned on the Puysegur margin while the MT experiment extends farther afield. The vessel that deploys or recovers the MT instruments might also be able to dredge for samples around Solander. The broader group discussed logistical aspects of holding an ExTerra Field Institute in the remote Fiordland location highlighting the advantages of coordination with any geophysical deployment. The group identified numerous opportunities and ways to coordinate activities through both NSF programs and international collaboration.

Call for GeoPRISMS Mini-Workshop Proposals at AGU 2015

Application Deadline: July 1st, 2015

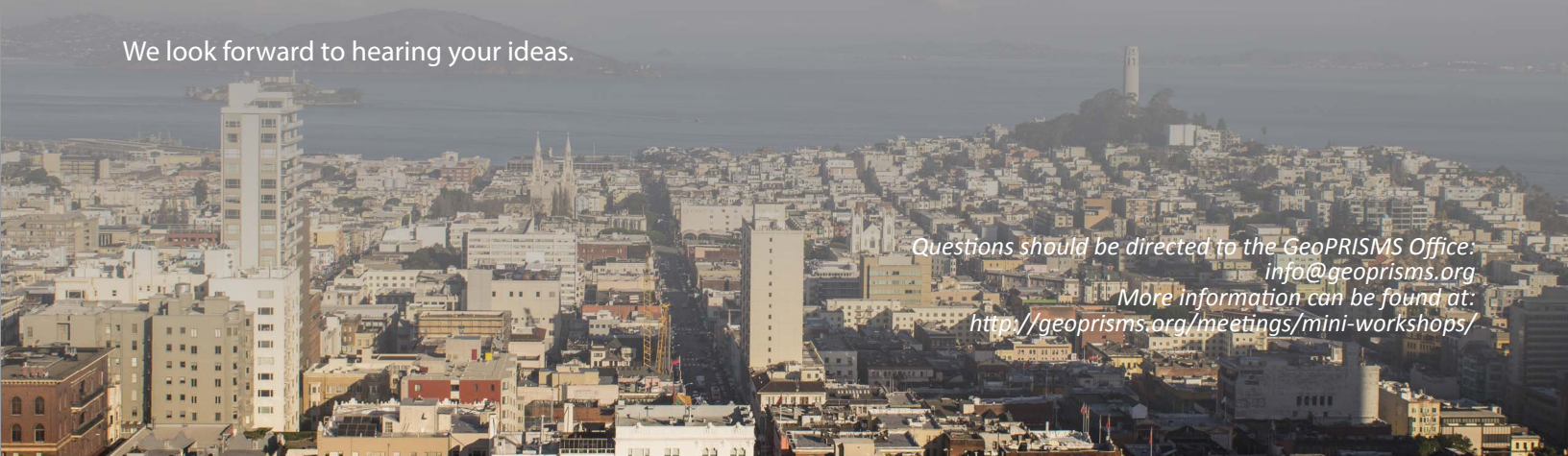
We are pleased to announce that this year we will again be able to host a few Mini-Workshops at the 2015 AGU Fall Meeting (December 13-18). A Mini-Workshop is a research meeting that is held during an evening of the Fall Meeting or on the Sunday leading up to the meeting. Examples of Mini-Workshops held in association with recent and upcoming national and international meetings can be found at: *http://geoprisms.org/meetings/mini-workshops/* .

Mini-Workshops offer excellent opportunities to jump-start science discussions, as well as to coordinate implementation for future GeoPRISMS studies, both for primary sites and thematic studies. We encourage you to consider such an undertaking. The GeoPRISMS Office provides logistical support, a meeting room, and refreshments. We do not cover any travel costs or per diem to the organizers or participants. GeoPRISMS Mini-Workshops will be open to all interested parties and will be advertised via the GeoPRISMS mailing list, newsletter, and website.

If you would like to host a GeoPRISMS-related Mini-Workshop in association with the 2015 AGU Fall Meeting, we invite you to submit your proposal to the GeoPRISMS Office at info@geoprisms.org. The proposals will be reviewed and ranked by the GeoPRISMS Steering and Oversight Committee (GSOC). The number of Mini-Workshops is limited but we expect to be able to host two to three events.

The deadline for upcoming Mini-Workshop proposals is July 1, 2015. The proposal guidelines are described on the GeoPRISMS website at: *http://geoprisms.org/meetings/mini-workshops/* . We encourage you to contact the GeoPRISMS Office with questions or advice prior to submitting at info@geoprisms.org.

We look forward to hearing your ideas.



Questions should be directed to the GeoPRISMS Office:
info@geoprisms.org
More information can be found at:
http://geoprisms.org/meetings/mini-workshops/

GeoPRISMS Student Prize for Outstanding Presentations

2014 AGU Fall Meeting, San Francisco

Congratulations to the winners of the GeoPRISMS 2014 AGU Student Prize! As in previous years, the judges were greatly impressed by the quality of the entrants this year and awarding individual prizes to just a few in such an outstanding field was very difficult. Here we honor two prize winners and four honorable mentions. Thank you to all the entrants and judges for making this contest possible and worthwhile.

Poster Presentation Winner

Andrew Parsons - University of Leeds

Title of Abstract: Microstructural analysis of the Greater Himalayan Sequence, Annapurna-Dhaulagiri Himalaya, central Nepal: Channel Flow and Orogen-parallel deformation

Coauthors: Richard Phillips, Geoff Lloyd, Mike Searle, Richard Law

From the Judges: "Andrew was clearly an expert in his subject" "student did a super job" "well presented and clear poster on interesting, cutting edge study"

From the Student: "It is a privilege to have my work recognised by the scientific community. I am thankful to GeoPRISMS for providing this opportunity to showcase my work and I look forward to being involved in future GeoPRISMS initiatives."

Oral Presentation Winner

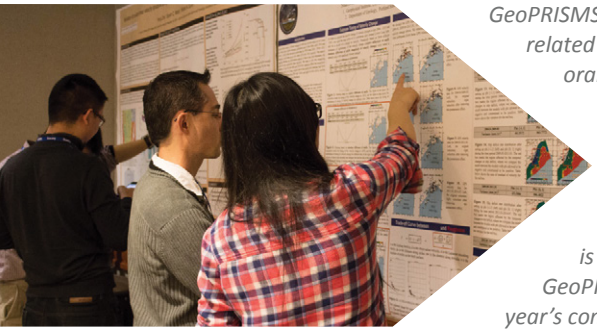
Kristina Walowski - University of Oregon

Title of Abstract: Slab melting and magma generation beneath the southern Cascade Arc

Coauthors: Paul Wallace, Michael Clynne

From the Judges: "Kristina was poised and confident, with a great scientific result" "student demonstrated an expert's knowledge of her research […] carried herself professionally and gave an overall excellent, timely presentation" "I enjoyed this presentation very much!"

From the Student: "I am very honored and excited to be recognized by GeoPRISMS! I greatly appreciate their effort to support graduate students and I look forward to my continued involvement in the GeoPRISMS community."



GeoPRISMS is offering two $500 prizes for Outstanding Student Presentations on GeoPRISMS- or MARGINS-related science at the AGU Fall Meeting in San Francisco. The two prizes, one each for a poster and an oral presentation, highlight the important role of student research in accomplishing MARGINS- and GeoPRISMS-related science goals, and to encourage cross-disciplinary input. The contest is open to any student whose research is related to the objectives of GeoPRISMS or MARGINS.

Presentations are judged throughout the AGU meeting. Students have also the opportunity to display their posters (or poster versions of their AGU talks) at the GeoPRISMS Townhall and Student Forum, organized each year on Monday night at the Westin Market Street Hotel. This is a great opportunity for students to share their results further, to interact with a wide spectrum of GeoPRISMS scientists, and to hear about upcoming events and opportunities. More information on this year's contest will become available closer to AGU on the GeoPRISMS website, so stay tuned!

Honorable Mention

Yelebe Birhanu - University of Montana

Title of Abstract: GPS Constraints on the Spatial Distribution of Extension in the Ethiopian Highlands and Main Ethiopian Rift

Coauthors: Rebecca Bendick, Shimeles Fisseha, Elias Lewi, Robert Reilinger, Robert King, Gladys Kianji

From the Judges: "Yelebe presented his work very clearly to show significant results" "student had a very clearly presented poster and a very clear explanation of the implications of his work" "had fairly novel ideas about kinematics of extension […] and was willing to intelligently argue his point"

From the Student: "It is a great honor that this work has been recognized by GeoPRISMS among the wonderful work done by the community. I greatly appreciate the efforts made by GeoPRISMS to highlight, support and encourage student research. I look forward working with the GeoPRISMS community."

Honorable Mention

Lucile Bruhat - Stanford University

Title of Abstract: Inverting for Shear Stress Rate on the Northern Cascadia Megathrust Using Geodetic Data

Coauthors: Paul Segall, Andrew Bradley

From the Judges: "Lucile gave a clear presentation" "presentation was clear and organized"

From the Student: "I am deeply honored and grateful that GeoPRISMS has recognized the research I presented at the AGU Fall meeting. Thank you for supporting student research! I really look forward to continuing collaborating with the GeoPRISMS community in the future."

Honorable Mention

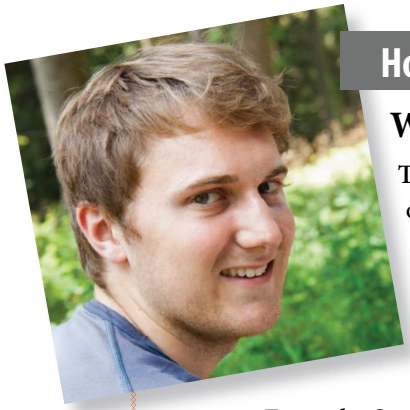
James Farrell - University of Connecticut

Title of Abstract: Brittle deformation within the eastern North American volcanic margin: Paleostress inversion of faults in the Hartford basin

Coauthors: Jean Crespi, Denali Ostebo, Megan Weingart

From the Judges: "Terrific poster that was presented in a completely clear and accessible way […] one of the best poster I saw at the meeting" "poster presentation was very nice laid out" "attractive poster with clearly laid out goals and results"

From the Student: "I am elated to hear there were so many participants in this contest; this is a great way to encourage students working on GeoPRISMS related research. I am thankful for the recognition and hope to see even more student involvement in the coming year."



Honorable Mention

William Hutchison - University of Oxford

Title of Abstract: Integrating remote sensing, field studies and CO_2 surveys to unravel structural controls on fluid pathways at a young rift volcano

Coauthors: David Pyle, Tamsin Mather, Juliet Biggs, Gezahegn Yirgu

From the Judges: "Excellent talk, relaxed but effective communication" "Excellent presentation […] William had engaging slides and expressed his results clearly and convincingly" "Speaker provided a good conceptual introduction and moved through all the results with good attention to detail".

From the Student: "I am extremely grateful to have been recognised as part of the GeoPRISMS AGU student awards. This is a really exciting research community for young scientists to be involved in, and I look forward to future opportunities to collaborate and interact with GeoPRISMS science."

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Theoretical & Experimental Institute - SCD

October 12-14, 2015
Portofino Hotel, Redonodo Beach, California

Please save the date and plan to attend the GeoPRISMS Theoretical and Experimental Institute for the SCD Initiative!

We are pleased to announce that we will hold a Theoretical and Experimental Institute (TEI) for the Subduction Cycles and Deformation initiative in the week of October 11 (Sunday night through Thursday morning) at the Portofino Hotel in Redondo Beach, CA (a few miles south of LAX).

This TEI will allow the community to discuss progress towards the science objectives of the SCD initiative, demonstrate scientific discovery at the primary sites, continue planning for new domestic and international collaborative work, and entrain new talent and disciplines.

We expect to be able to cover lodging and food for 120 participants and have partial travel funding available for graduate students, early career scientists and invited speakers. The preliminary schedule and application form will be announced in July. We expect that the application deadline will be in mid- to late August.

Please save the date and plan to join us!

Questions?
Contact the GeoPRISMS Office at info@geoprisms.org

Contact Us

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Massive 27-28 Ma gabbro on the west side of Amatignak Island, AK. Photo credit: Brian Jicha

In October 2015, The GeoPRISMS Office will organize a Theoretical and Experimental Institute (TEI) which will focus on intermediate synthesis of SCD projects.

More to come on the GeoPRISMS website so stay tuned!