GeoPRISMS

Newsletter - Issue No. 41, Fall 2018

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

I am pleased to welcome you to the Fall 2018 GeoPRISMS newsletter. As has been the case for the past few years, the Fall issue of the Newsletter is electronic only, whereas the Spring issue is distributed both online and in print. The current issue boasts an exciting set of articles including two science reports from projects underway or recently completed at the East African Rift system, and a report from the field from the first stages of the Alaska Amphibious Community Experiment. This issue also includes a summary of GeoPRISMS events and related activities at the upcoming Fall AGU meeting, an update on the GeoPRISMS data portal, and announcements about upcoming opportunities.

It continues to be an exciting and active time for the office, the GeoPRISMS Steering and Oversight Committee, and the GeoPRISMS community, as we turn our attention toward synthesis and integration efforts for the coming years. As a first step in this important process, we are gearing up for a major Theoretical and Experimental Institute (TEI) early next year – to be held, fittingly, at the Menger Hotel in San Antonio, TX where the MARGINS successor planning workshop took place in 2010, and where the GeoPRISMS science plan was first assembled. The goal of this TEI is to facilitate synthesis and integration efforts, identify gaps in knowledge and/or areas where collaboration would bear fruit, define future directions and emerging questions, and lay the groundwork for the program's legacy. Thanks to Katie Kelley (Univ. Rhode Island) and Harm Van Avendonk (Univ. Texas Institute for Geophysics) for their leadership in convening this important and large event on behalf of the community!

I would like to take this opportunity to thank the GeoPRISMS Steering and Oversight Committee (see p. 30 of this issue) for their valued contributions to important science, planning, and outreach activities, and our distinguished lecturers (Jaime Barnes, Anne Bécel, Cindy Ebinger, Abhijit Ghosh; p. 5 of this issue), whose efforts include traveling to and giving talks at 24 universities, and two and four-year colleges across the U.S.

I would also like to extend my thanks to the conveners of this year's two AGU mini-workshops for their efforts in organizing these important opportunities for our community. This year's mini-workshops include one focused on the study of exhumed systems to understand the evolution of arc crust, and one focused on a wide range of ongoing and recent efforts at the Hikurangi subduction zone as part of the New Zealand primary site.

We will of course also be hosting our Town Hall & Community Forum at the Kimpton Hotel Monaco (Paris Ballroom) on Monday evening. In addition to a brief formal program highlighting recent and upcoming activities and programmatic updates, the forum will offer an opportunity to connect with the GeoPRISMS community and to learn about a wide range of exciting and ongoing student research. I hope to see you there!

Demian Saffer

Chair, GeoPRISMS Program

Cover Photograph:
The field team enjoying the view of Oldoinyo Lengai volcano from the top of the border fault to the Natron basin (from left to right: James Muirhead, Tobias Fischer, Amani Laizer, Sara Oliva). Photo credit: James Muirhead

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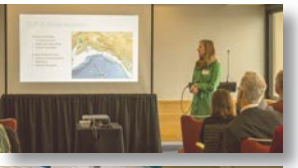
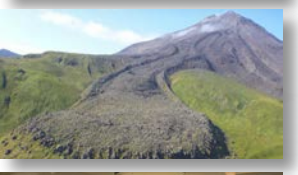
Message from NSF












Happy Fall, GeoPRISMS Community! Here at NSF, we are excited that AGU will be held in D.C. because many Program Directors and various levels of management from EAR, OCE, and other parts of NSF will be attending.

There have been some NSF staff changes since we last wrote. Maurice Tivey has gone back to WHOI, and Debbie Smith has taken over as the OCE GeoPRISMS representative. Terry Quinn of UTIG has joined OCE as Division Director (DD), while the EAR search for a DD is still active. In the meantime, Lina Patino remains EAR's Acting DD.

Some other news-worthy items from NSF that should interest the GeoPRISMS Community:

- This fall, NSF intends to announce Mid-Scale Research Infrastructure funding opportunities. These will be for research infrastructure that will advance the frontiers of discovery in any of the research domains supported by the Foundation. You can read more in this *Dear Colleague Letter*.
- Community input resulting from *Coastlines and People* (CoPe) scoping workshops is helping NSF identify priorities for research initiatives focused on coastal regions. The EAR and OCE Sciences communities and division staff were engaged in four concurrent scoping sessions facilitated on behalf of NSF. The directorates involved are now synthesizing white papers and other outputs to help frame a potential CoPe activity.
- The National Academies of Sciences, Engineering, and Medicine (NASEM) will soon embark on "Catalyzing Opportunities for Research in the Earth Sciences (CORES): a Decadal Survey for NSF's Division of Earth Sciences." The committee in charge will provide NSF with input to help set priorities and strategies for Earth Science research investments over the coming decade. Once the committee kicks off in November, there will be a number of opportunities for you, as community members, to engage and provide input. Please do!
- To help ensure all NSF-funded research and learning environments are free from sexual or other forms of harassment, *NSF is bolstering our policies, guidelines and communications* so that organizations clearly understand expectations and individuals understand their rights. NSF has a zero-tolerance policy on harassment of any kind.

On a related, note, NSF has released its annual revision of the *Proposal & Award Guide*, and it includes not only language about responsible conduct and harassment, but a number of other updates and changes. Be sure to familiarize yourself with it before it takes effect on January 28, 2019.

As of the day we write, our part of the government is still on a Continuing Resolution through early December. This means we have no budget news to share at this time, but as always, promise to spend every dollar they give us on the best science we can.

Best wishes for a successful season of science, and we look forward to seeing many of you at AGU!

Jennifer Wade & Deborah Smith
GeoPRISMS Program Directors, National Science Foundation

Funding Opportunities for GeoPRISMS-Related Proposals

Frontier Research in the Earth Sciences (FRES)

Target Date: February 20, 2019

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504833

The FRES program will support research in Earth systems from its core through the critical zone. The project may focus on all or part of the surface, continental lithospheric, and deeper Earth systems over the entire range of temporal and spatial scales. FRES projects will typically have a larger scientific scope and budget than those considered for funding by core programs in the Division of Earth Sciences (EAR). FRES projects may be interdisciplinary studies that do not fit well within the core programs or cannot be routinely managed by sharing between core programs. Innovative proposals within a single area with results that will have broad relevance to Earth Science research are also encouraged. Investigations may employ any combination of field, laboratory, and computational studies with observational, theoretical, or experimental approaches. Projects should be focused on topics that meet the guidelines for research funded by the Division of Earth Sciences.

Prediction of and Resilience against Extreme Events (PREEVENTS) | NSF 16-562

Submission Window: January 5, 2018 - January 4, 2019

https://www.nsf.gov/pubs/2016/nsf16562/nsf16562.htm

PREEVENTS is designed as a logical successor to Hazards SEES and is one element of the NSF-wide Risk and Resilience activity, which the overarching goal of improving predictability and risk assessment, and increasing resilience, in order to reduce the impact of extreme events on our life, society, and economy. PREEVENTS will provide an additional mechanism to support research and related activities that will improve our understanding of the fundamental processes underlying natural hazards and extreme events in the geosciences.

PREEVENTS is focused on natural hazards and extreme events, and not on technological or deliberately human-caused hazards. The PREEVENTS portfolio will include the potential for disciplinary and multidisciplinary research at all scales, particularly aimed at areas ripe for significant near- or medium-term advances.

PREEVENTS seeks projects that will (1) enhance understanding of the fundamental processes underlying natural hazards and extreme events on various spatial and temporal scales, as well as the variability inherent in such hazards and events, and (2) improve our capability to model and forecast such hazards and events. All projects requesting PREEVENTS support must be primarily focused on these two targets. In addition, PREEVENTS projects will improve our understanding of the effects of natural hazards and extreme events and will enable development, with support by other programs and organizations, of new tools to enhance societal preparedness and resilience against such impacts.

Marine Geology and Geophysics (MG&G) | PD 17-1620

Full Proposal Accepted Anytime

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505468

The Marine Geology and Geophysics program supports research on all aspects of geology and geophysics of the ocean basins and margins, as well as the Great Lakes. The program supports field, analytical, and laboratory experimental projects; methods development; modeling; and the re-analysis and/or synthesis of existing data. The Program interfaces with NSF programs across the geosciences and across the Agency. For proposals that cross between Programs, proposers should contact the relevant Programs to seek guidance on submission.

Geophysics (PH) | 17-554

Full Proposal Accepted Anytime

https://www.nsf.gov/pubs/2017/nsf17554/nsf17554.htm

The Geophysics Program supports basic research in the physics of the solid earth to explore its composition, structure, and processes from the Earth's surface to its' deepest interior. Laboratory, field, theoretical, and computational studies are supported. Topics include (but are not limited to) seismicity, seismic wave propagation, and the nature and occurrence of geophysical hazards; the Earth's magnetic, gravity, and electrical fields; the Earth's thermal structure; and geodynamics. Supported research also includes geophysical studies of active deformation, including geodesy, and theoretical and experimental studies of the properties and behavior of Earth materials.

Petrology and Geochemistry (CH) | 17-547

Full Proposal Accepted Anytime

https://www.nsf.gov/pubs/2017/nsf17547/nsf17547.htm

The Petrology and Geochemistry Program supports basic research on the formation of planet Earth, including its accretion, early differentiation, and subsequent petrologic and geochemical modification via igneous and metamorphic processes. Proposals in this program generally address the petrology and high-temperature geochemistry of igneous and metamorphic rocks (including mantle samples), mineral physics, economic geology, and volcanology. Proposals that are focused on the development of analytical tools, theoretical and computational models, and experimental techniques for applications by the igneous and metamorphic petrology, and high temperature geochemistry and geochronology communities are also invited.

Distinguished Lectureship Program

2018 - 2019

An opportunity for US colleges, universities, museums, and other institutions to host lectures by outstanding scientists.

The distinguished speakers present technical and public lectures on subjects related to the two GeoPRISMS science initiatives:

Subduction **C**ycles and **D**eformation & **R**ift **I**nitiation and **E**volution

As usual, we received strong interest in the program, with applications from more than fifty institutions.

Thank you for making this year's GeoPRISMS Distinguished Lectureship Program successful!

Visit the GeoPRISMS website to learn more about the speakers and their presentations

>>> GeoPRISMS is on YouTube! Subscribe and watch hours of lectures given by the GeoPRISMS distinguished speakers in the past years.

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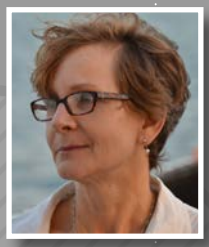

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http://geoprisms.org/education/distinguished-lectureship-program/

Constraining variability in mantle CO_2 flux along the East African Rift System

James D. Muirhead (Syracuse University), Tobias P. Fischer (University of New Mexico), Amani Laizer (University of Dar es Salaam), Sarah J. Oliva (Tulane University), Emily J. Judd (Syracuse University), Hyunwoo Lee (Seoul National University), Emmanuel Kazimoto (University of Dar es Salaam), Gladys Kianji (University of Nairobi), Cynthia J. Ebinger (Tulane University), Zachary D. Sharp (University of New Mexico), Josef Dufek (University of Oregon)

Top: Graduate students Amani Laizer (University of Dar es Salaam) and Sarah Oliva (Tulane University) sampling gas from an actively degassing vent observed along a fault in the Natron basin. Right: Measuring diffusely degassing soil CO_2 in the Balangida basin using a CO_2 accumulation chamber. Photos credit: James Muirhead

In May and June 2018, our team of researchers completed the longest along-strike magmatic CO_2 degassing survey in the East African Rift System (EARS) to date. Our CO_2 flux data now extend over four rift basins, from the Magadi basin (Kenya) southward to the Balangida basin (Tanzania) (Fig. 1). During the 25-day field campaign, we collected over one thousand diffuse soil degassing flux measurements, and sampled hydrothermal spring systems along major fault zones to analyze the sources and fluxes of different volatile species. Here we present preliminary results of diffuse CO_2 flux in zones within one hundred meters of observed spring discharge and use these values to examine variations in magmatic CO_2 discharges between basins. The spatial variability of these data reveal how mantle CO_2 fluxes in the EARS may evolve over the course of rift basin development, and are impacted by the initial composition and structure of the East African lithosphere.

Continental rifts are sites of lithospheric thinning and heating, which is commonly accompanied by magmatism and volatile transfer from Earth's mantle to the lithosphere and atmosphere (White and McKenzie, 1989; Ebinger, 2005; Rooney, 2010; Lee et al., 2017; Foley and Fischer, 2017). They represent a key tectonic setting for natural CO_2 emissions and possibly modulate Earth's climate on geological timescales (Brune et al., 2017; Foley and Fischer, 2017). However, the total volume of mantle CO_2 emitted at rift settings is poorly constrained, as are the mechanisms that control variations in CO_2 flux over the lifetime of rifting.

The original carbon content of cratonic lithosphere is expected to be relatively low (~0.25 Mt C km^{-3} for 2-3 Ga lithosphere; Foley and Fischer, 2017). However, abundant carbon may be sequestered in the mantle lithosphere during the infiltration of both plume melts (e.g., Thompson et al., 2015) and carbon-rich hydrous-silicate melts generated during subduction (Foley and Fischer, 2017; Malusà et al., 2018).

These processes can potentially enrich carbon contents in the mantle lithosphere up to a hundred times above background values (Foley and Fischer, 2017). The resulting carbon accumulated during these events may be released during the generation and ascent of magma at continental rift settings (Malusà et al., 2018) (Fig. 2).

Although continental rifts represent potentially key sites of CO_2 release, measuring the flux of CO_2 from these settings is challenging and requires direct measurements and observations of CO_2 discharge from zones of active rifting. The magma-rich Eastern branch of the East African Rift System (EARS) represents an ideal location to investigate these processes. Earlier degassing studies focused on direct measurements of volcanic plumes emitted from active volcanoes, such as Nyiragongo (Sawyer et al., 2008) and Oldoinyo Lengai (Brantley and Koepenick, 1995). In addition to these plume sources, EARS volcanoes release mantle volatiles to the atmosphere via springs, fumaroles, and zones of diffuse soil degassing, as well as during eruptive episodes (Darling et al., 1995; Fischer et al., 2009; Barry et al., 2013; de Moor et al., 2013; Hutchison et al., 2015; Lee et al., 2017). More recent studies in the EARS have shown that large volumes of mantle carbon are also released to the atmosphere along extensional fault systems situated away from volcanoes (Lee et al., 2016, 2017; Hunt et al., 2017). During this process, termed "tectonic degassing" (Burton et al., 2013; Lee et al., 2016), mantle carbon ascends to the surface along permeable fault zones and exits via springs, diffuse soil degassing zones, and gas vents (Muirhead et al., 2016; Lee et al., 2016, 2017; Hunt et al., 2017). This mantle carbon is primarily sourced from an enriched sub-continental lithospheric mantle and released into the crust and atmosphere by magmas emplaced at lower crustal depths (Lee et al., 2017; Roecker et al., 2017).

Given the large aerial extent, pervasive faulting, and widespread magma emplacement occurring at depth in the EARS (e.g., Keranen et al., 2004; Roecker et al., 2017; Plasman et al., 2017), quantifying the volumes of CO_2 released requires observations from a wide variety of structural settings along the rift system. Results of diffuse soil degassing surveys have thus far been reported from the northern and central Main Ethiopian Rift (Hunt et al., 2017) and Magadi-Natron basin (Lee et al., 2016), with estimates of 0.52-4.36 Mt yr^{-1} and 2.15-5.95 Mt yr^{-1} for each rift sector, respectively.

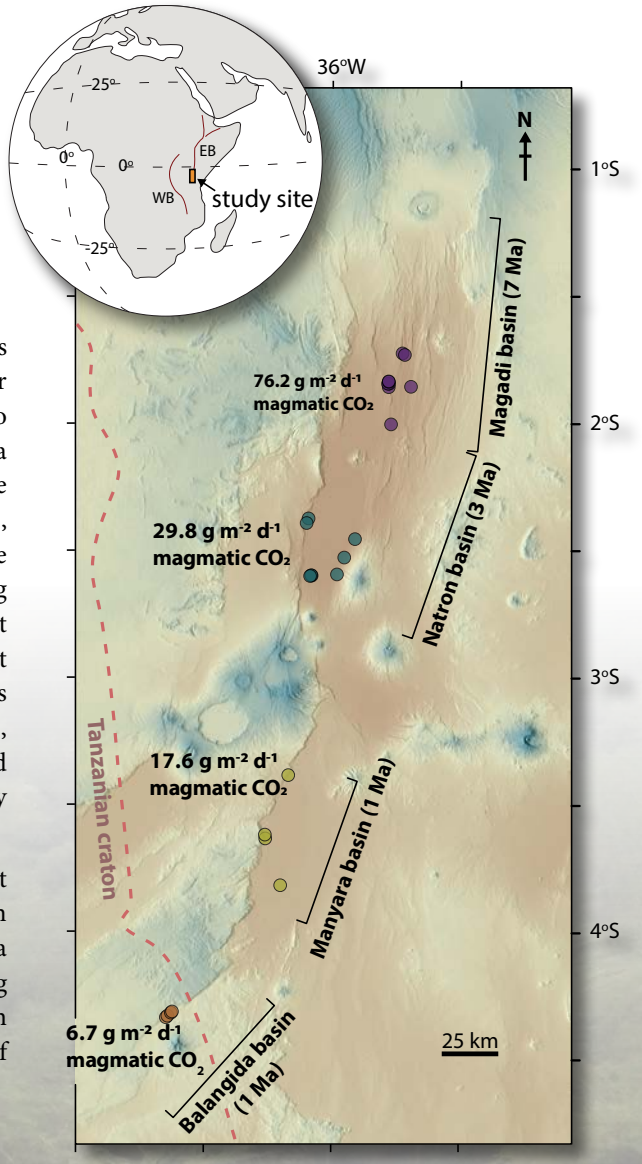

Figure 1. Annotated SRTM map showing the extent of the rift basins in the current study. Filled circles show the location of sampling regions within each basin, and the dashed brown line delineates the eastward-dipping surface boundary between the Tanzanian craton and Proterozoic mobile belt rocks (from the geological map of Thiéblemont et al. (2016)). Also included is the mean flux of magmatic CO_2 from sampling sites in each basin. Inset in the top left shows the location of the DEM map on the African continent. Red lines show the extent of the Eastern (EB) and Western (WB) branches of the EARS.

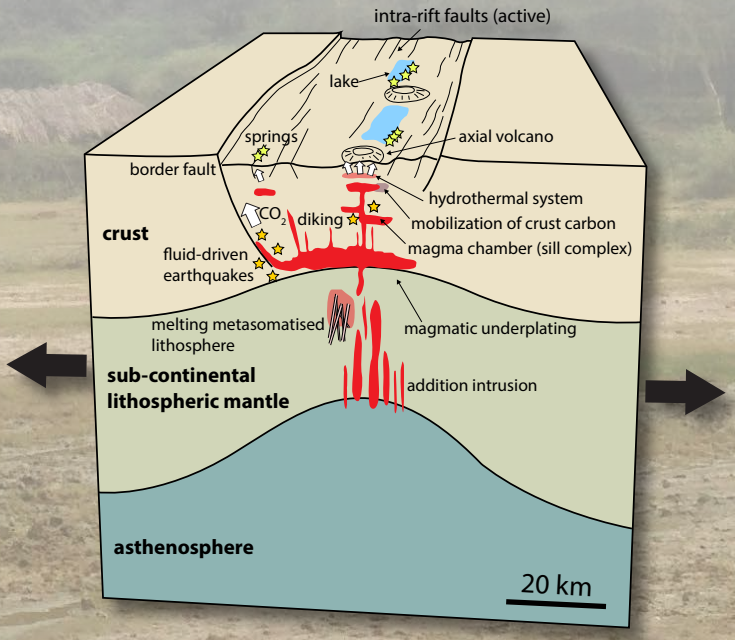

Figure 2. Production and transport of magmatic CO_2 at continental rift settings modified from Hunt et al. (2017). White arrows represent zones of CO_2 fluid flow, yellow stars are hydrothermal springs, and orange stars are deep earthquakes. The CO_2 depicted exsolves from cooling upper and lower crustal magmas. The distribution of crustal magma (red polygons) is based on seismicity from Weinstein et al., (2017) and the seismic tomography model of Roecker et al. (2017).

Extrapolation of these estimates point to potential CO_2 fluxes on the order of 10-100 Mt yr^{-1}, particularly when accounting for dissolved CO_2 volumes transported in springs (Lee et al., 2017). However, these estimates do not consider the spatial and temporal variations of mantle CO_2 discharge expected along any active rift system. The flux of CO_2 within any rift basin should depend on a number of critical factors, such as the volume of carbon trapped within the underlying mantle lithosphere, rates of magma production, and the dissolved CO_2 contents of ascending rift magmas (Foley and Fischer, 2017; Hunt et al., 2017). These variables are expected to vary both spatially and temporally within any continental rift setting, and quantifying their importance for mantle CO_2 release requires extensive along-strike sampling of zones of volatile discharge.

Our recent field campaign was specifically designed to fill in these critical gaps in our understanding of rift CO_2 fluxes, through an investigation of four segments of the Eastern branch of the EARS: the Magadi, Natron, Manyara, and Balangida basins (Fig. 1). These basins encompass a ~350 km-long stretch of continental rifting and range in age between 1 and 7 Ma, and are thus currently at different stages of development. Furthermore, these basins exhibit varying volcanic/magmatic fluxes and histories, and even cross the boundary between Proterozoic mobile belt rocks and the Archean Tanzania Craton (Fig. 1). Therefore, from these data we can assess:

1. How mantle CO_2 fluxes may evolve over the course of basin development; and

2. How CO_2 fluxes are impacted by the initial lithospheric composition and structure of the East African lithosphere.

Tobias Fischer samples an actively degassing vent on the western border fault to the Natron basin. The world's only active carbonatite volcano, Oldoinyo Lengai, can be seen in the background. Photo credit: James Muirhead

Given the inherent variability of CO_2 flux within individual rift basins (e.g., Hunt et al., 2017), when comparing CO_2 discharges between basins it is critical to compare data from sites exhibiting similar structure, substrate, and hydrology. Therefore, we present here a subset of our collected data, focusing specifically on flux data (1) from rift-graben sediments, (2) in the vicinity of faults, and (3) in areas within 100 m of observed spring discharge.

The sources for diffuse soil CO_2 discharges in volcano-tectonic settings are typically characterized as either biogenic or magmatic, with flux data in each population exhibiting a log-normal distribution and the highest mean flux observed in the magmatic population (e.g., Chiodini et al., 1998, 2008). Data from each study site, presented as probability plots in Figure 3, were sub-divided into two distinct populations by adapting the methodology of Sinclair (1974) into a newly designed MATLAB® code. This code iteratively fits biogenic and magmatic regression lines to the log-transformed data. Based on these functions, synthetic data sets are generated for each population and plotted against observed data, with the final solution being that which produces the highest R-squared and smallest root-mean-squared error values between the compared datasets. Outputs from this procedure provide an estimate of the percent contribution of biogenic and magmatic sources and their mean flux values.

Comparing data between basins, we observe a north to south decrease in both the percent contribution of the magmatic flux population and the mean magmatic flux value (see mean flux values in Figure 1). Lower magmatic CO_2 flux values also correspond with younger rift basins (e.g., the Manyara and Balangida basins). These younger basins also exhibit lower volcanic/magmatic inputs (Le Gall et al., 2008; Albaric et al., 2014), which may relate to the low degree stretching and related decompression melting during

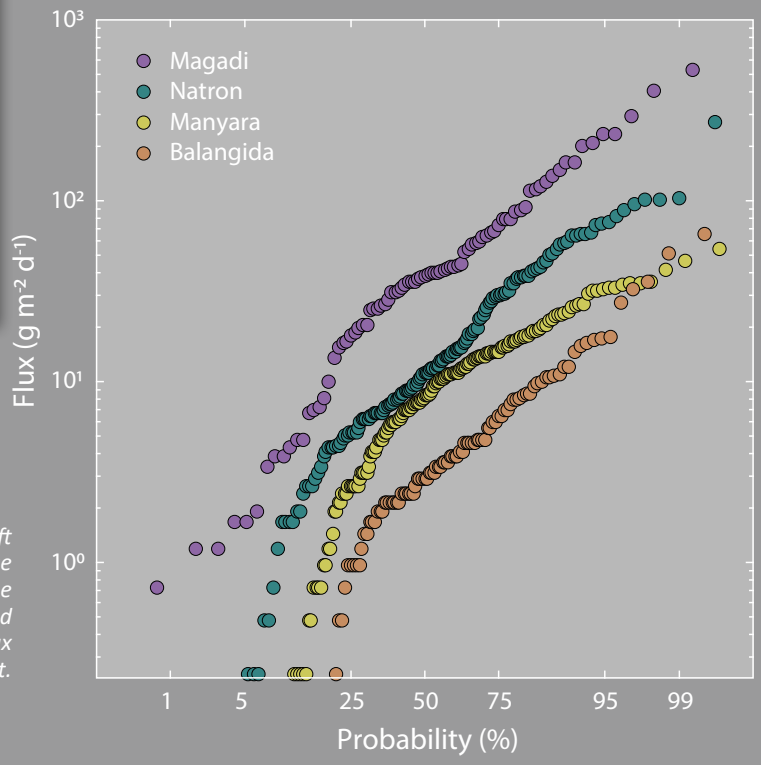

Figure 3. Probability plots of diffuse soil CO_2 fluxes for each rift basin in the study. Note that the overall CO_2 flux values decrease from north (Magadi) to south (Balangida). Flux values below the equipment detection limit (<0.24 g m^{-2} d^{-1}) cannot be presented on the plots, but still affect the probability distribution of flux values above the detection limit.

this earlier stage of rifting, or to the relatively dry nature of thick Archean mantle that enables its preservation (e.g., Currie and van Wijk, 2016). Finally, as the locus of rifting gradually transitions from the Proterozoic mobile belt in the Natron basin, to the Tanzanian craton in the Balangida basin, we observe a significant reduction in the mean magmatic CO_2 flux.

These preliminary results suggest that the volume of mantle CO_2 discharge in the Eastern branch of the EARS is strongly dependent on the degree of lithospheric thinning, mantle hydration state, and related magmatism. The greatest mantle CO_2 discharges in the EARS likely occur in more evolved systems outside the Archaean craton, such as the Kenya Rift (Lee et al., 2016) and Main Ethiopian Rift (Hunt et al., 2017). Furthermore, basins in their earliest rift stages (the ~1 Ma Manyara and Balangida basins) within Proterozoic mobile belt rocks exhibit higher CO_2 fluxes than those in the Archean craton. This observation suggests that the Proterozoic lithosphere in East Africa may contain greater volumes of sequestered carbon, with its structure and composition suited for volumetrically significant CO_2 discharges compared to the thick and probably dehydrated cratonic lithosphere. ■

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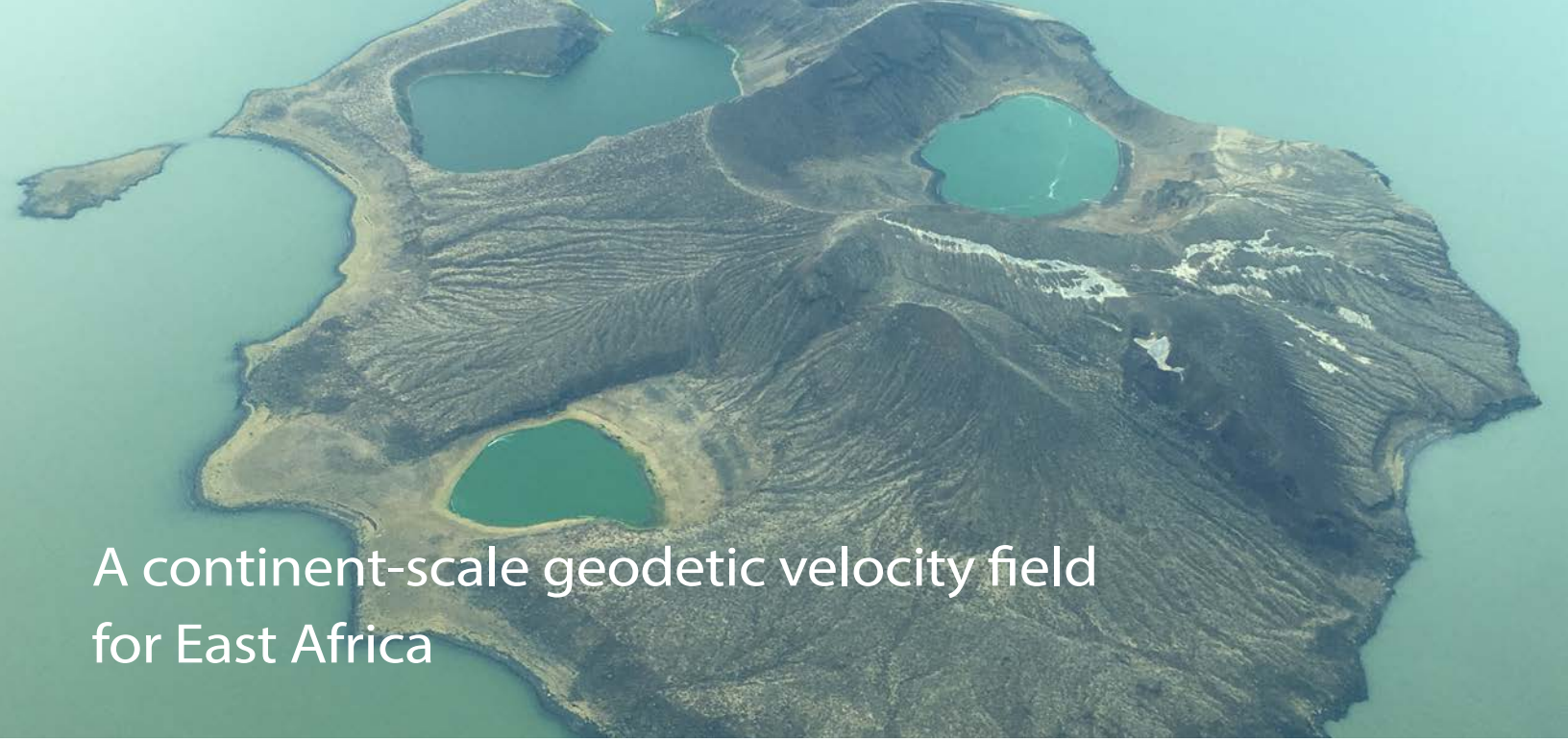

A continent-scale geodetic velocity field for East Africa

Rebecca Bendick (University of Montana), Mike Floyd (MIT), Elias Lewi (Addis Ababa University), Gladys Kianji (University of Nairobi), Robert King (MIT), El Knappe (University of Montana)

Central island in Lake Turkana, which has been active in the Holocene and currently has fumarolic activity. This photo was taken in February 2018 while flying between the Turkana Basin Institute field stations, which now host two new GPS stations.
Photo credit: Ellen Knappe

The East African Rift System is a complicated set of extensional structures reaching from Malawi in the south to Eritrea and Djibouti in the north (Fig. 1)(e.g. Ebinger, 2005). These structures are broadly interpreted as the expression of the ongoing breakup of the African continent into a "Somali" block moving east or northeastward relative to a "Nubia" block, with perhaps additional smaller blocks (e.g. Saria et al., 2014) also involved. The details of the kinematics, the presence or importance of entrained microplates, and even the components of the force balance exciting relative block motions and extensional strains are all the subject of ongoing research and incompletely resolved scientific debates.

Several decades of geophysical and geologic research have contributed a large body of observational data related to the timing (Bosworth, 1992; Bosworth and Strecker, 1997; George et al., 1998; Wichura et al., 2010), chemistry (Aulbach et al., 2008; Bianchini et al., 2014; Chesley et al., 1999; Kaeser et al., 2009; Pik et al., 2006), mechanics (Buck, 2004; Calais et al., 2008; Corti et al., 2003; Weinstein et al., 2017), kinematics (Birhanu et al., 2015; Calais et al., 2008; Modisi et al., 2000; Saria et al., 2014), mantle involvement (Adams et al., 2012; Bastow et al., 2005; Bastow et al., 2008; Chang and Van der Lee, 2011; Fishwick, 2010; Hansen and Nyblade, 2013), magmatism (Bastow et al., 2010; Kendall et al., 2005) and natural hazards (Ayele, 2017) of continental extension in Africa. However, most of these studies are focused on a single "segment" of the larger rift system, hence on a distinct structural unit. Some work has been done to compare segments as a means of exploring the relative importance of contributing factors, such as the availability of fluids in magma-rich and magma-poor segments (Bialas et al., 2010; Hayward and Ebinger, 1996; Roecker et al., 2017; Rooney et al., 2011), the influence of total finite strain (Ebinger, 2005) on rift morphology, or the importance of sublithospheric plume impingement on the force balance (Ebinger and Sleep, 1998; Lin et al., 2005; Nyblade and Robinson, 1994). However, fully synoptic studies for the whole East African Rift System (EARS) are few in number.

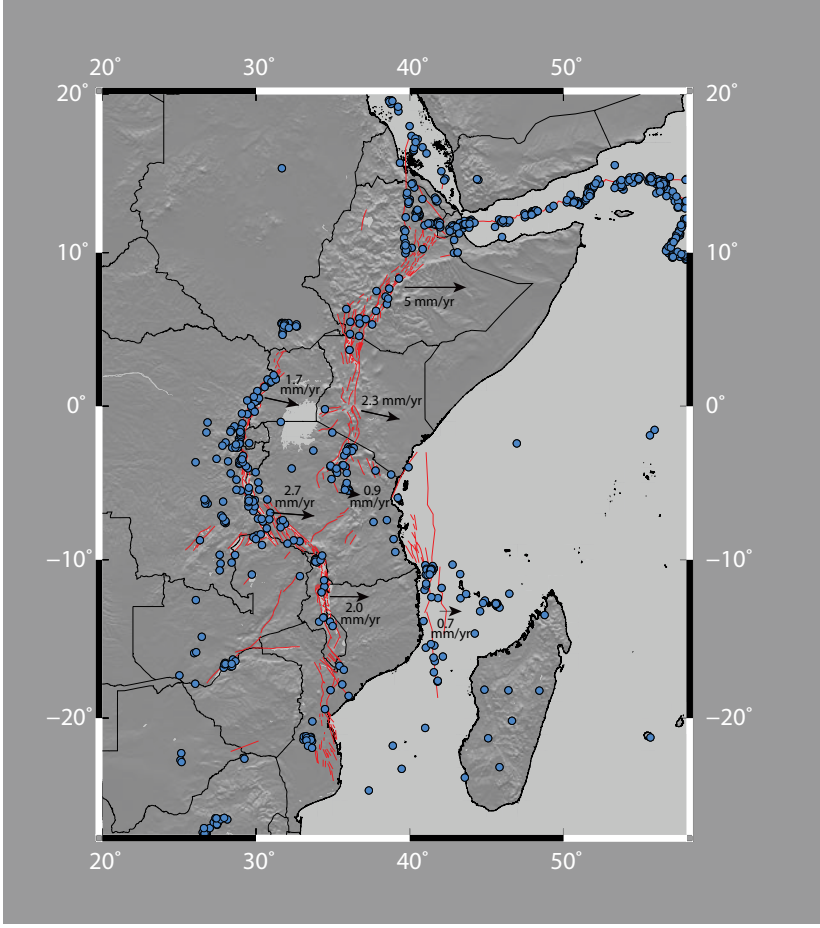

Figure 1. Overview of the EARS, with shaded topography in gray, major faults in red, recorded seismicity of Mw>5 as blue circles, and generalized kinematic velocities from Saria et al. (2014).

A GeoPRISMS-supported collaboration between MIT and the University of Montana targeted the development of a comprehensive, consistent geodetic surface velocity solution for the entire EARS focus area (Fig. 2). This effort included several components:

1. Collection of all publically available raw GPS observations from East Africa from 1992 to 2015;
2. Negotiation for the release and inclusion of several additional restricted GPS observation data sets from European and African sources;
3. Compilation and verification of all related metadata;
4. Systematic assessment and quality control on all available data sets; and
5. Processing of the merged data sets with a consistent processing strategy and reference frame.

The supported work addresses the GeoPRISMS Rift Initiation and Evolution (RIE) goal of synthesis, especially in the context of multiscale mechanics and controls on deformation and localization of strain.

During the period of support for this experiment, we also leveraged the NSF funding to invest in permanent geodetic instrumentation in Ethiopia and add new observations in the Turkana Depression of Ethiopia and Kenya, the part of the EARS with the fewest prior geodetic observations. In the first case, we extended operations of a previously-funded Ethiopian Highlands continuous GPS network for an additional year. That year allowed Addis Ababa University and the University of Montana to negotiate with several different stakeholders in the U.S. and Africa, with the end result that the Institute of Geophysics, Space Science, and Astronomy of Addis Ababa University adopted a fully operational, scientific-grade geodetic network of ten sites for permanent ongoing observations (Fig. 3). The network became the largest entirely African owned and operated geophysical system, and maintains operations and a fully open data policy to the present. In the second case, we added an additional epoch of campaign observations on six campaign GPS sites (Fig. 4) and added two continuous GPS systems in the Turkana Depression (Fig. 5). The continuous sites are located on either side of Lake Turkana and are hosted by the Turkana Basin Institute, a nonprofit entity supporting research through the region.

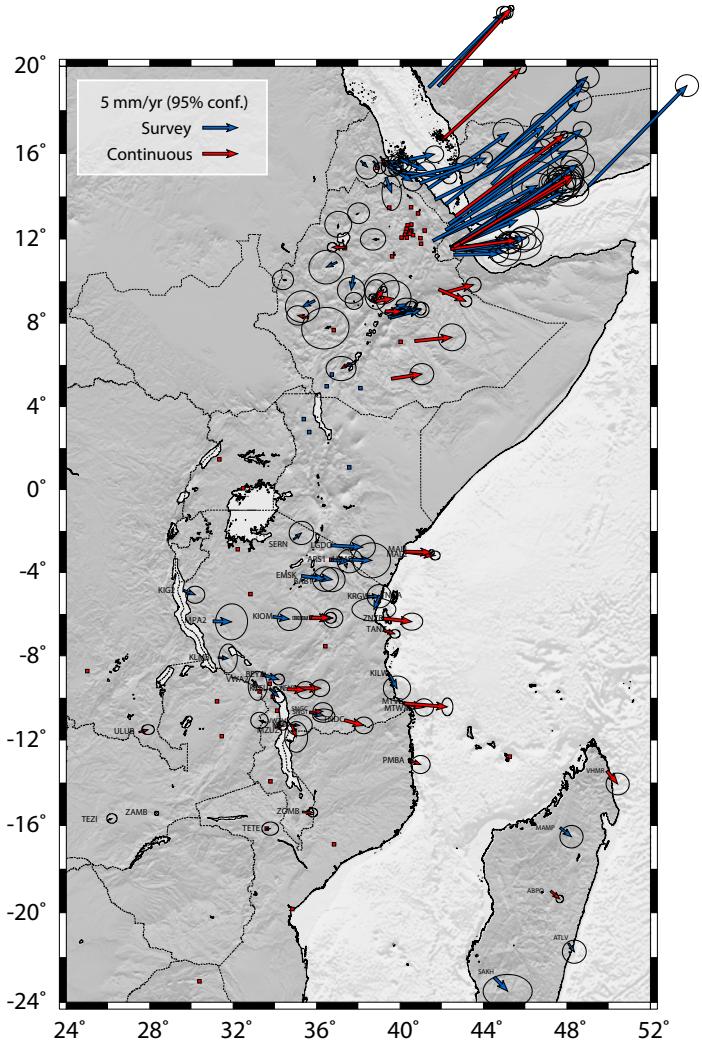

Figure 2. The most recent community geodetic solution, using all available raw data from the EARS region, processed using GAMIT/GLOBK with a consistent quality standard and editing approach, in a single common reference frame. This solution, data sources, and relevant metadata are available from the GeoPRISMS data portal at http://www.marine-geo.org with doi:10.1594/IEDA/321764

The primary purposes of the project were scientific and infrastructural capacity-building. The synoptic geodetic velocity field is intended for use by a wide range of researchers in many different disciplines within the rifting initiative and the EARS focus area. Many users will likely leverage the kinematic framework as boundary conditions, a priori constraints, or tectonic context for more focused studies without having to address data collection, standardization, quality control, metadata management, or processing strategies. We hope that the solution will inform other work and serve as an example of the value of a community commitment to open sharing of high-quality observations. In addition, the successful adoption of the instrumental array by African scientists sets a precedent for negotiated transfers of other instruments and capabilities throughout the region. African researchers and institutions can and should use such combinations of infrastructure and technical skills to pursue their own novel scientific targets and build indigenous training capabilities. Finally, the new Turkana Basin continuous sites are approaching a full year of operation, and will begin to yield usable scientific constraints on the most enigmatic part of the EARS very soon. ■

Top to bottom:

Figure 3. Birhanu Bekele (IGSSA MS student in geodesy) and El Knappe service continuous station SHIS (near Lalibela) supervised by children from a nearby farm. Photo Credit: Shannon Hall

Figure 4. Campaign GPS installation (SEOL) near Sereolipi, Kenya guarded by local wildlife rangers.

Figure 5. Welding the antenna mount for the Turkwel continuous site (XTBT) at the Turkana Basin Institute.

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Sunset in Nekemt, Ethiopia after servicing the Highlands GPS network. Photo credit: Ellen Knappe

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Geophysical Research Letter 45 (8), 3453-3460 (2018), doi.org/10.1002/2017GL076761

Spatial variation of slip behavior beneath the Alaska Peninsula along Alaska-Aleutian Subduction Zone

S. Li, J.T. Freymueller

Earth and Planetary Science Letters 486, 1-14 (2018), doi.org/10.1016/j.epsl.2018.01.001

When does eruption run-up begin? Multidisciplinary insight from the 1999 eruption of Shishaldin Volcano

D.J. Rasmussen, T. Plank, D.C. Roman, J.A. Power, R.J. Bodnar, E.H. Hauri

Geochimica et Cosmochimica Acta 242, 165-190 (2018), doi.org/10.1016/j.gca.2018.08.050

Rates of dehydration of olivines from San Carlos and Kilauea Iki

E. Ferriss, T. Plank, M. Newcombe, D. Walker, E.H. Hauri

Geophysical Journal International 215 (3), 1594-1603 (2018), doi.org/10.1093/gji/ggy360

Estimating emplacement rates for seaward-dipping reflectors associated with the U.S. East Coast Magnetic Anomaly

J.K. Davis, A. Bécel, W.R. Buck

Geology 46(9), 775-778 (2018), doi.org/10.1130/G45140.1

Focusing of melt near the top of the Mount St. Helens (USA) magma reservoir and its relationship to major volcanic eruptions

E. Kiser, A. Levander, C. Zelt, B. Schmandt, S. Hansen

Journal of Volcanology and Geothermal Research 360, 84-99 (2018), doi.org/10.1016/j.jvolgeores.2018.06.016

Quantifying arc migration and the role of forearc subduction erosion in the central Aleutians

B.J. Jicha, S. Kay

Geology 46(4), 299-302 (2018), doi.org/10.1130/G39557.1

Connections between subducted sediment, pore-fluid pressure, and earthquake behavior along the Alaska megathrust

J. Li, D.J. Shillington, D.M. Saffer, A. Bécel, M.R. Nedimović, H. Kuehn, S.C. Webb, K.M. Keranen, G.A. Abers

Geophysical Research Letters 45(15), 7462-7470 (2018), doi.org/10.1029/2018GL078042

The impact of realistic elastic properties on inversions of shallow subduction interface slow slip events using seafloor geodetic data

C.A. Williams, L.M. Wallace

Geophysical Research Letters 45(10), 4710-4718 (2018), doi.org/10.1002/2018GL077385

Triggered slow slip and afterslip on the Southern Hikurangi Subduction Zone following the Kaikōura earthquake

L.M. Wallace, S. Hreinsdóttir, S. Ellis, I. Hamling, E. D'Anastasio, P. Denys

Geochemistry, Geophysics, Geosystems, 19(9), 2934-2961 (2018), doi:10.1029/2018GC007624

Mafic high-pressure rocks are preferentially exhumed from warm subduction settings

P.E. van Keken, I. Wada, G.A. Abers, B.R. Hacker, K. Wang

Journal of Geophysical Research: Solid Earth, 123(8), 6769–6783 (2018), doi:10.1029/2018JB016136

Earthquakes and tremor linked to seamount subduction during shallow slow slip at the Hikurangi Margin, New Zealand

E.K. Todd, S.Y. Schwartz, K. Mochizuki, L.M. Wallace, A.F. Sheehan, S.C. Webb, et al.

Geochimica et Cosmochimica Acta (in review), 10.31223/osf.io/6xq3w

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B. Pitcher, A.J.R. Kent

Journal of Geophysical Research: Solid Earth 122(8), 5852-5870, (2017), doi.org/10.1002/2016JB013839

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M.S. Salmi, H.P. Johnson, R.N. Harris

Journal of Geophysical Research: Solid Earth 122(6), 4584-4600, (2017), doi.org/10.1002/2016JB013689

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H.P. Johnson, J.S. Gomberg, S.L. Hautala, M.S. Salmi

Earth Science Reviews, 168, 24–47 (2017), doi.org/10.1016/j.earscirev.2017.03.005

Along-arc, inter-arc and arc-to-arc variations in volcanic gas CO_2/ST ratios reveal dual source of carbon in arc volcanism

A. Aiuppa, T.P. Fischer, T. Plank, P. Robidoux, R. Di Napoli

please join us to the

GeoPRISMS AGU Townhall & Community Forum

Monday December 10 at 6:00pm
Kimpton Hotel Monaco | 700 F St NW, Washington, DC - Paris Ballroom

The event is open to all with interests in the GeoPRISMS Program and GeoPRISMS (or MARGINS) research. Come hear updates about the GeoPRISMS Program, the latest GeoPRISMS research projects & study areas, and ongoing GeoPRISMS research from student presenters.

* A short formal session (starting at 6:30PM) will include a welcome and opening remarks from the GeoPRISMS Chair Demian Saffer and updates from NSF Program Directors Jenn Wade and Debbie Smith.
* Mini-Workshop Conveners Stacia Gordon (University of Nevada-Reno), Alicia Cruz-Uribe (University of Maine) and Laura Wallace (GNS Science, New Zealand, University of Texas Institute for Geophysics) will present reports on both mini-workshops held the Sunday before AGU
* Lindsay Worthington (University of New Mexico) will provide an update on the Amphibious Array Community Seismic Experiment, including announcement of opportunities.

Students, welcome!

Student entrants for the GeoPRISMS Prize for Outstanding Presentations are invited to display their AGU posters (or poster versions of their talks) and discuss their research with event participants. This will be a great opportunity for students to share their results and to interact with a wide spectrum of GeoPRISMS scientists.

Stay informed, get involved

There will be ample time to mingle and refreshments will be available. Among those present will be Demian Saffer (GeoPRISMS Chair), members of the GeoPRISMS Steering and Oversight Committee, GeoPRISMS Distinguished Lecturers and Program Directors for GeoPRISMS from the National Science Foundation.

Questions should be directed to the GeoPRISMS Office:
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More information can be found at:
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Putting the "Community" in the Alaska Amphibious Community Seismic Experiment (AACSE): Alaska Peninsula and Western Gulf of Alaska, Summer 2018

The AACSE Team*

If you visit Alaska and tell people that you are a seismologist, you are going to hear an earthquake story. The Alaska-Aleutian subduction system is arguably the most seismically active globally, producing more >M8 earthquakes over the last century than any other. As a result, earthquake and tsunami hazard are woven into daily life here. Near downtown Anchorage, you can visit Earthquake Park, occupying part of town that was decimated by a landslide during the 1964 M9.2 event that inspired the term "megathrust" earthquake. If you happen to be in Kodiak on a Wednesday afternoon, you will hear the weekly tsunami siren drill sound throughout the town. Earlier this year that drill was put in to practice as residents made their way through the tsunami evacuation process, meeting up at the school on high ground after midnight on January 29 following the M7.9 earthquake that occurred offshore.

So, how do you study an 800 km section of this subduction zone that is mostly offshore or only accessible via air or boat? Simple. Start with nine Principal Investigators (PIs) and dozens of conference calls; take 85 ocean bottom seismometers (OBS), thirty broadband seismometers, one fishing boat, two float planes, two fixed wing planes, a helicopter, and a 261-ft research ship; add a team of twelve OBS engineers, 24 ships crew, twelve Apply-to-Sail participants, two Alaskan K-12 teachers and two field technicians. Then make the data open and accessible as quickly as possible. This is the Alaska Amphibious Community Seismic Experiment (AACSE) and these are voices from the field.

Aialik Glacier, Kenai Peninsula.
Photo credit: John Clapp

Back deck of the R/V Sikuliaq loaded with TRMs and deep water OBSs at the beginning of Leg 1. Photo credit: Enrique Chon.

OBS Deployment Cruise Leg 1 | Seward, AK to Seward, AK - May 9-29, 2018

>> 9 May, 2018 | We are officially underway • It is 8:30am and we are departing Seward dock. We have donned our full-body immersion suits as part of a safety drill, and are now heading towards the first seismometer deployment site, lying in the Shelikof Strait just north of Kodiak Island. We are on one of the most modern and well-equipped scientific research ships in the world. The *R/V Sikuliaq* was built in 2014 and has a science lab, lounge, dining room, kitchen, gym, and the list goes on. There is even a sauna which apparently can double as a hypothermia recovery room - let's hope we won't be using it for that purpose. For cabins, we are treated to the height of oceanographic luxury. The rooms are practical and very comfortable. The *Sikuliaq* takes its name from the Inupiaq word that means "young sea ice". Thanks to its round hull, the ship is capable of breaking ice up to 2.5 ft thick, which is essential on polar missions. This also gives it a tendency to move around more in high seas. As we travel, we will be collecting meteorological data such as pressure, temperature, and wind speed. We will also be recording bathymetry data to map the seafloor.

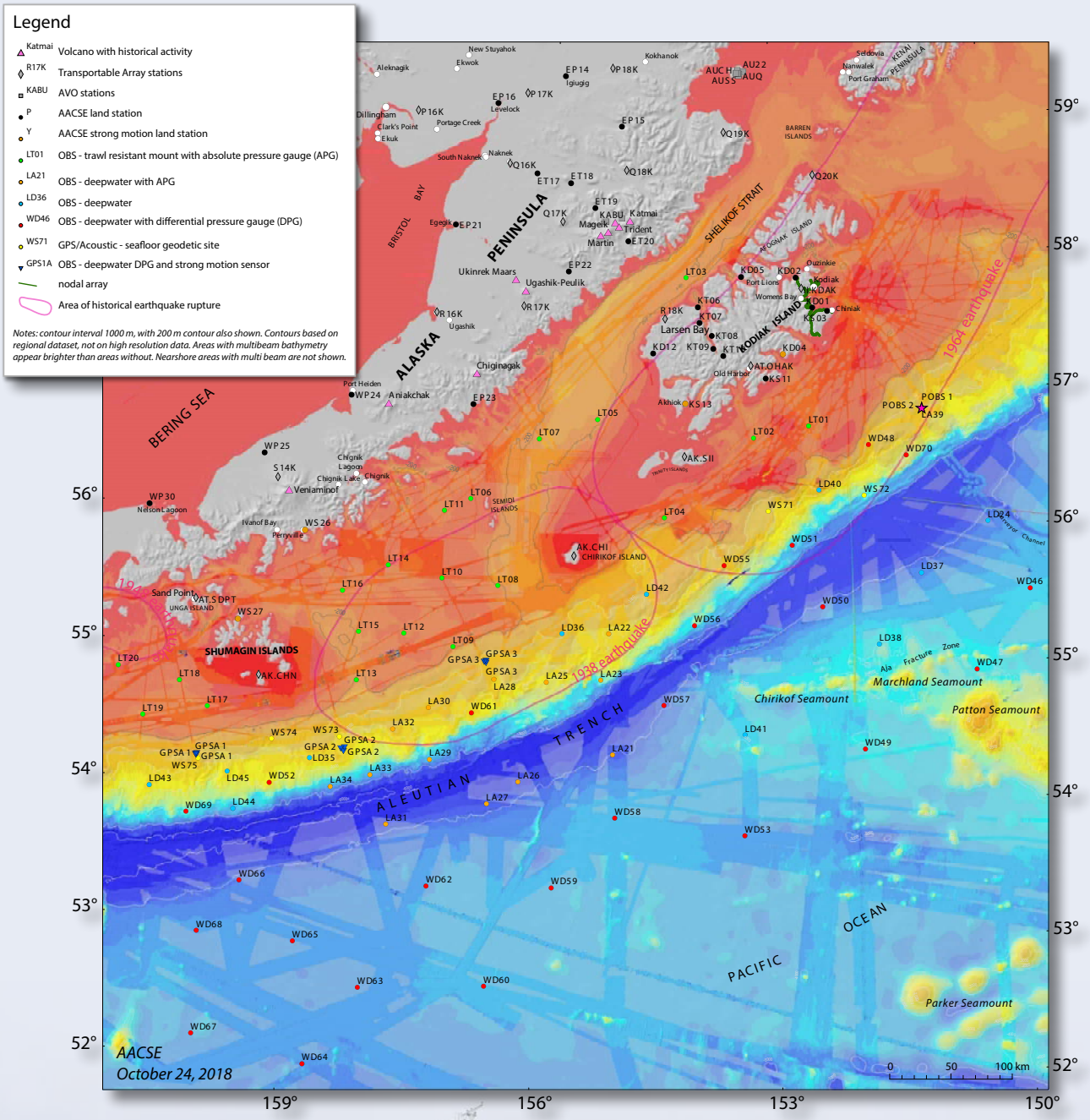
-Robert Martin-Short, University of California Berkeley

>> 10 May, 2018 | Deploying the first OBS instrument • The first OBS (Ocean Bottom Seismometer) is a shallow-water Trawl-Resistant Mounted Seismometer (TRMS), design to resist and deflect the lower leading line of bottom trawl nets. All of the OBSs are instrumented with a seismometer, batteries to last more than fifteen months, transponders to communicate with the ship and burn the wire to release the seismometer for recovery, data logger, temperature sensors, and other equipment necessary to collect these data. The shell for the TRMS itself weighs about 1,300 lbs, the whole instrument weighs about 1,800 lbs. The deployment is a success! After deploying the TRMS, we have to hide from foul weather in Larsen Bay, then assemble more TRMSs. This involves removing the doors and installing brackets to hold equipment, attaching hoods to the pop-up TRMS, checking the transponders to make sure they are properly communicating with the ship, and attaching the transponders. We will stay in the cove and work for a couple hours, then leave once the storm has passed.

-David Heath, Colorado State University

>> 12 May, 2018 | Waiting out the storm • Many of us are taking to personal hobbies and pastimes in between routine status logging. Some people are reading quietly. Others are attempting to catch up on emails, though the internet is particularly slow. Others are taking the opportunity to chat with shipmates, many of whom are still practically strangers after few days on the ship. I am learning that life on a ship provides a unique opportunity for people to connect with each other. I have spent part of the evening receiving a generous guitar lesson from the Chief Steward who is a skilled blues musician. He kindly reached out to play alongside me when he noticed me strumming out on deck. I've got to say, my experience thus far has been pretty great, despite the spotty weather and fits of acute nausea.

-Enrique Chon, University of Colorado



Top: The Alaska Amphibious Community Seismic Experiment (AACSE) deployment map prepared by Peter Haeussler
Bottom: The R/V Sikuliaq offshore the Kenai Peninsula.
Photo credit: Robert Martin-Short

OBS Deployment Cruise Leg 2 | Seward, AK to Seward, AK; July 11-24, 2018

>> 11 July, 2018 | Educators Onboard • There are so many people involved in a research cruise like this. There is an entire ship crew, scientists, graduate students, USGS employees, OBS technicians, and, on this trip, there are even two high school science teachers and I am one of those. I am stoked to be on board. My colleague, Shannon Hendricks, and I were selected as part of the Educator Onboard K12 program. Through this program, educators are given the opportunity to participate in research to better understand current science practices. The goal is to use that knowledge to create engaging, authentic lesson plans to share with other educators. It is a little intimidating to meet all of these experts - as science teachers, we know a little bit about a lot of things, and we have a solid enough science foundation to understand what the experts are talking about (most of the time!). This also means we know enough to realize how much we don't know! It is amazing to get to learn from scientists that have made this their life work. Getting to peek in on their ongoing research makes us better science teachers. And it is nice to know that, just like we tell our own students, there are no stupid questions.

-Bethany Essary, West High School science teacher, Anchorage, AK

>> 23 July, 2018 | The aftershock zone • Day 12 of the cruise, we have just successfully deployed our last OBS, 32 hours ahead of schedule! Half way through this cruise, we decided to move one of the instruments to near the aftershock zone of the M7.9 Offshore Kodiak earthquake. It struck about three hundred kilometers offshore Kodiak Island in the early morning hours of January 23, 2018, in the outer rise region of the Alaska-Aleutian subduction zone. It triggered tsunami warnings and prompted evacuations of thousands of people in Alaskan coastal communities. While the source parameters (such as seismic moment tensor) for the earthquake suggested strike-slip faulting (hence no significant tsunami generated), the true complexity of the source has only become evident through analysis of multiple datasets. At least four conjugate strike-slip faults were involved in the earthquake rupture. However, the distant location of the aftershock source region to the land-based stations made the data analysis and interpretation difficult. On the Leg 1 cruise, a couple of stations were serendipitously placed near or in the aftershock zone. After consultations with the PI group we moved this station to the aftershock cluster. This enhanced network of OBS sensors in the aftershock zone will help characterize the aftershock sequence with much better accuracy.

-Natalia Ruppert, University of Alaska

>> 24 July, 2018 | Good luck • For the past three years, I have been looking at OBS data off the east coast of New Zealand's North Island, and I always wondered about the logistics behind the dataset of earthquakes. It turns out that deploying ocean bottom seismometers is a huge task that includes multiple people. This experience exceeds all my expectations. I imagined a repetitive process, but every single station has its own challenges: the bathymetry indicates a rough or steep relief so we have to move somewhere close by with a more flat and soft bathymetry; we need to be sure that the temperature sensors are the ideal for specific depths; we fill the sheets with station information and log it in our physical and digital forms, etc. This experience makes me really value all the effort that the science crew did for the deployment and recovery of the data that I am currently working on. For the future seismologists who are going to work with the data, I want to say that we did our best to make sure the seismometers were meticulously deployed and I am sure the recovery crew will be equally careful to collect the year-long log of wiggles from the stations deployed by the first and second legs. Good luck!

-Jefferson Yarce, University of Colorado

>> Continued p.22

*AACSE Team and Acknowledgements

This report was edited and compiled by Lindsay Worthington.

AACSE PI team: *Geoff Abers (Lead PI, Cornell U.), Aubreya Adams (Colgate U.), Peter Haeussler (USGS), Emily Roland (U. of Washington), Susan Schwartz (U. of California Santa Cruz), Anne Sheehan (U. of Colorado), Donna Shillington (Lamont Doherty Earth Observatory), Spahr Webb (Lamont Doherty Earth Observatory), Doug Wiens (Washington U. St. Louis), Lindsay Worthington (U. of New Mexico).*

2018 Apply-to-Sail Participants: *Collin Brandl (Graduate Student, U. of New Mexico), Enrique Chon (Graduate Student, U. of Colorado), David Heath (Graduate Student, Colorado State U.), Robert Martin-Short (Graduate Student, U. of California Berkeley), Kelly Olsen (Graduate Student, U. of Texas), Holly Rotman (Postdoctoral Researcher, New Mexico Tech), Samantha Hansen (Associate Professor, U. of Alabama), Tiegan Hobbs (Graduate Student, Georgia Tech), Amanda Price (Graduate Student, Washington U. St. Louis), Heather Shaddox (Graduate Student, U. of California Santa Cruz), Jefferson Yarce (Graduate Student, U. of Colorado Boulder), Natalia Ruppert (Seismologist, U. of Alaska Fairbanks)*

K-12 Educators On Board: *Shannon Hendricks (High School Science Teacher, Anchorage School District), Bethany Essary (High School Science Teacher, Anchorage School District).*

The shore-based field teams included graduate student Michael Mann (Lamont-Doherty Earth Observatory) and undergraduate student Jordan Tockstein (Colgate U.). We thank the captain and crew of the R/V Sikuliaq and the pilots, boat captains and land owners that made these deployments possible. Special thanks to Bill Danforth from the USGS for his bathymetric processing expertise aboard Leg 2 and Patrick Shore from Washington U. for coordinating onshore field logistics and preparing the data for delivery to the DMC.

Right page, top: OBS Deployment Leg 2 Apply-to-Sail participants. Photo credit: Anne Sheehan

Middle: OBS Deployment Leg 1 AACSE scientists, GPS-A scientists and students and Apply-to-Sail participants. Photo credit: Robert Martin-Short.

Left page: Sunrise off the bow of the R/V Sikuliaq, western Gulf of Alaska. Photo credit: Lindsay Worthington

Onshore Deployment: Alaska Peninsula, Kodiak Island and Shumagin Islands; May-June 2018

>> 16 May, 2018 | A for Amphibious • The second A in AACSE stands for Amphibious – fully encompassing the entire subduction zone requires making measurements on land and at sea. The onshore part of the program involves installing instruments on Kodiak Island, the Shumagin Islands (southwest of Kodiak), the Alaska Peninsula and the region around Katmai National Park. These thirty instruments will be placed in remote locations (black circles on the map p.19) accessed by float planes or small fixed-wing planes. One team of three people is installing thirteen sites on Kodiak Island, and a second team is deploying the rest of the sites on the mainland and Shumagin Island. Today the Kodiak team started their first day of work! Like working at sea, the initial work involves unpacking all the gear shipped from across the country, and testing and assembling everything. To make sure everything is working properly, we do a "huddle test," where we set up all of the seismometers and data loggers in one place and let them collect data for one day. We are fortunate to have been given access to some space in the Kodiak Alaska Fisheries Science Center, a research facility that provides valuable data to the fishing industry and that has a wonderful aquarium. This means we are sometimes sharing the space with sea life, like a large half-decomposed salmon shark! Tomorrow, if all goes well, we can start deploying!

- Geoff Abers, Cornell University

>> 21 May, 2018 | Kodiak Island • The road network on Kodiak Island is confined to the region around the town of Kodiak, so one must travel by boat or plane to reach other parts of this rugged and beautiful island. Eight of the thirteen seismic stations that we are installing here are both off the road system and far from towns with air strips, and we have been traveling to them by float plane. One limitation of using small planes for seismic installations is that there is a weight limit on what you can bring. The float plane we have been using, a de Havilland DHC-2 Beaver, can carry 1,200 lbs. Our field team and equipment for two stations weigh 1,175 lbs! We have to do a weigh-in before our first flight – fortunately they weighed our field team together and not individually. Flying also requires better weather than simply driving to a station. So far, we have found that the weather is worse on the eastern part of Kodiak near Kodiak town but improves to the west. We feel lucky to have had three days in a row where we could fly out to some of our sites. In the last three days, we have installed five stations that have taken us to many corners of Kodiak: McDonald lagoon on the southwestern coast, small Anvil Lake in far western Kodiak and the gorgeous Uyak Bay, a fjord that connects to the ocean in the north and cuts across two thirds of the island. This fjord is enabling us to deploy closely spaced stations over a part of the subduction zone fault where large earthquakes occur, one of the primary targets of this project. Traveling by plane across Kodiak is spectacular; you are treated to stunning views of snow-capped mountains and broad valleys. Sometimes you can see mountain goats lining steep slopes, bears meandering along the shore, and frolicking otters in the water. The views from our seismic sites are really amazing, too, when we look up from orienting sensors and plugging in data loggers. Six down, seven to go for the Kodiak team!

-Donna Shillington, Lamont-Doherty Earth Observatory

>> 30 May, 2018 | Challenging Conditions • The three members of the Sand Point team set sail on the Aleut Mistress to install two strong motion sites on Nagai Island. The day started with beautiful glassy-smooth seas and a calm two hour cruise to our first site on the north side of the island. We loaded our equipment into a skiff, hopped onboard and motored to our chosen landing site. This site was chosen by satellite imagery, and as always, conditions on the ground were a little different than expected. Our landing site was a bit marshy, and we had to lug the equipment uphill through marsh grasses and bushes, and then dig through a foot-thick mat of interwoven vegetation to find a suitably dry site for burial. Anything for good data! The equipment worked like a champ, so our time spent testing it in Sand Point paid off. We left the station after five hours of work – only two-and-a-half times longer than it has taken for any other station thus far! Back on the Aleut Mistress, our captain, Boomer, had boiled some Alaskan crab for our lunch. Hard to get it any fresher!

In the afternoon, the seas started picking up with swells a little over two fathoms (that's a little over twelve feet for you land-lubbers). While none of our crew suffered from seasickness, there were some flying objects on deck and in the cabin! We hopped back in the skiff when we reached Nagai site #2, and headed toward shore. We got so close, but in the end the boat crew felt it was unsafe to land with the high seas and changing tide. Disappointed, we made the call to cancel the site. It is a hard decision to choose not to install a station. Fortunately, an excellent Plan B fell into our laps. As luck would have it, Boomer owns property near King Cove and offered his place as a home for our new station. So, a fairly tough first day in the field ended on a high note, with the formation of plans for the future. The next three days passed slowly, as our team waited on unanticipated repairs to the plane needed for other installations out of Sand Point. Everybody wants a well-maintained plane, so we waited patiently for the repairs and sorted through and retested equipment in Sand Point. By the time the plane was ready, our team was raring to hit the field again. We hammered out four more stations in just two days, and have nearly finished our work here in Sand Point.

-Aubreya Adams, Colgate University

Get Involved!

This project is intended to help grow the seismological community, and includes opportunities to sail on OBS cruises and short courses for undergraduates. Upcoming opportunities for 2019 will be announced in December on the project website: *http://geoprisms.org/research/community-projects/alaska/*

Contact members of the PI team for more information. All seismic data from the project will be open to the community upon recovery and QA/QC efforts at the IRIS DMC (OBS array has network code XD (2018-2019) and land array has network code XO (2018-2019)). The first three months of onshore data is currently online. All underway data acquired by the Sikuliaq will be archived and available at the UNOLS rolling deck to repository server: *www.rvdata.us*.

Check out the experiment blog for more stories from the field: *alaskaamphibious.wordpress.com*

Right: Undergraduate student Jordan Tockstein performs a jump test while Patrick Shore checks the instrument on the Alaska Peninsula.

Background: Aerial view heading towards a station near King Salmon, AK. Photos credit: Aubreya Adams

Status Report on the GeoPRISMS Data Portal: October, 2018

Andrew Goodwillie and the IEDA Database Team

Lamont-Doherty Earth Observatory, Columbia University

The GeoPRISMS data portal (http://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 relevant 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 and station locations described in the GeoPRISMS newsletter reports are also available in GeoMapApp under the *Focus Site* and *DataLayers* menus (http://www.geomapapp.org/).

Aleutian Arc

As part of a geophysical project to study the magmatic system beneath Okmok Volcano on the eastern Aleutian arc island of Umnak, offshore magneto-telluric (MT) time series data from the Key et al. 2015 amphibious project is now available. The offshore data was collected along a 300 km-long transect perpendicular to the subduction trench (Fig. 1). The MT stations comprised more than fifty broadband ocean-bottom electromagnetic receivers. All except one was recovered.

The data set is available at: http://www.marine-geo.org/tools/search/entry.php?id=Aleutians_Bennington

During the July 2018 Sikuliaq cruise SKQ201816S (chief scientists Geoff Abers and Doug Wiens) ocean-bottom seismometers were deployed in the Kodiak-Katmai region as part of the Alaska Amphibious Community Seismic Experiment (AACSE). New bathymetry data collected on that cruise has been added to the Global Multi-Resolution Topography (GMRT, https://www.gmrt.org/index.php) synthesis which forms the base map used in GeoMapApp and in GMRT MapTool.

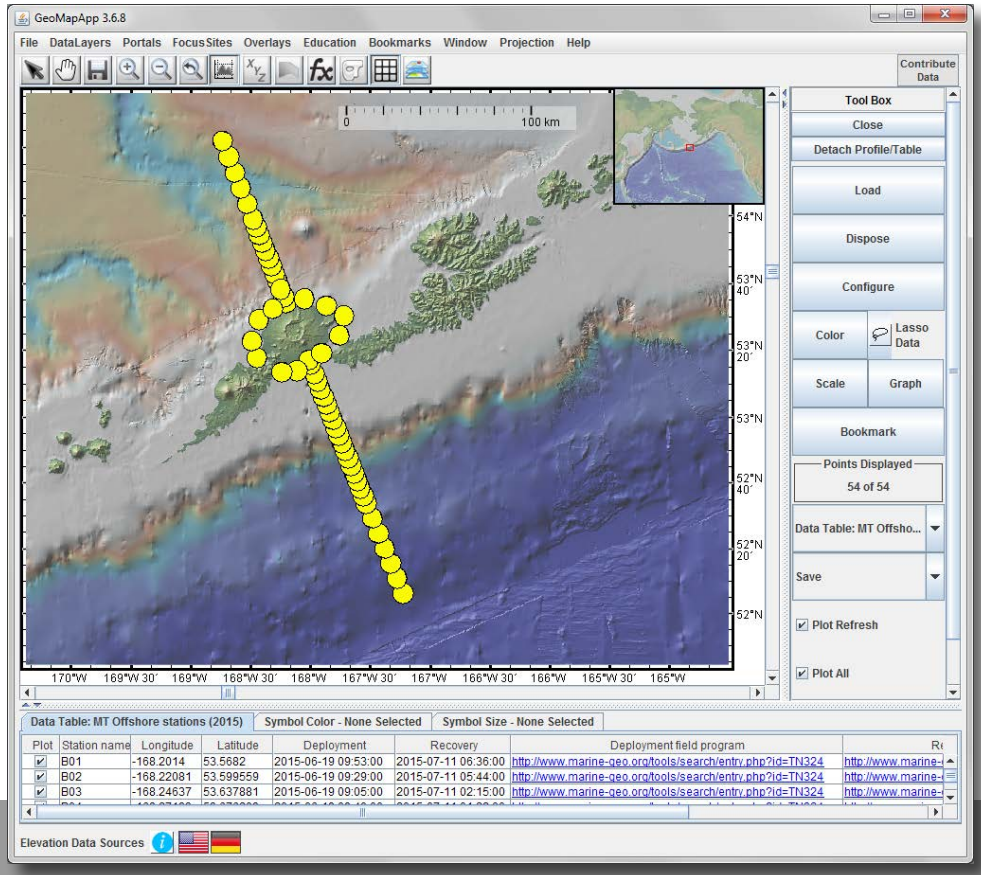


Figure 1. Offshore MT station locations (yellow circles) from the Key et al. 2015 survey. The image is made with GeoMapApp, with stations listed under the Focus Sites menu. The background map is the Global Multi-Resolution Topography (GMRT) synthesis which incorporates the USGS NED land topography data for the Aleutian arc.

The GeoPRISMS Data Portal team is here to serve the community

Please contact us at info@marine-geo.org

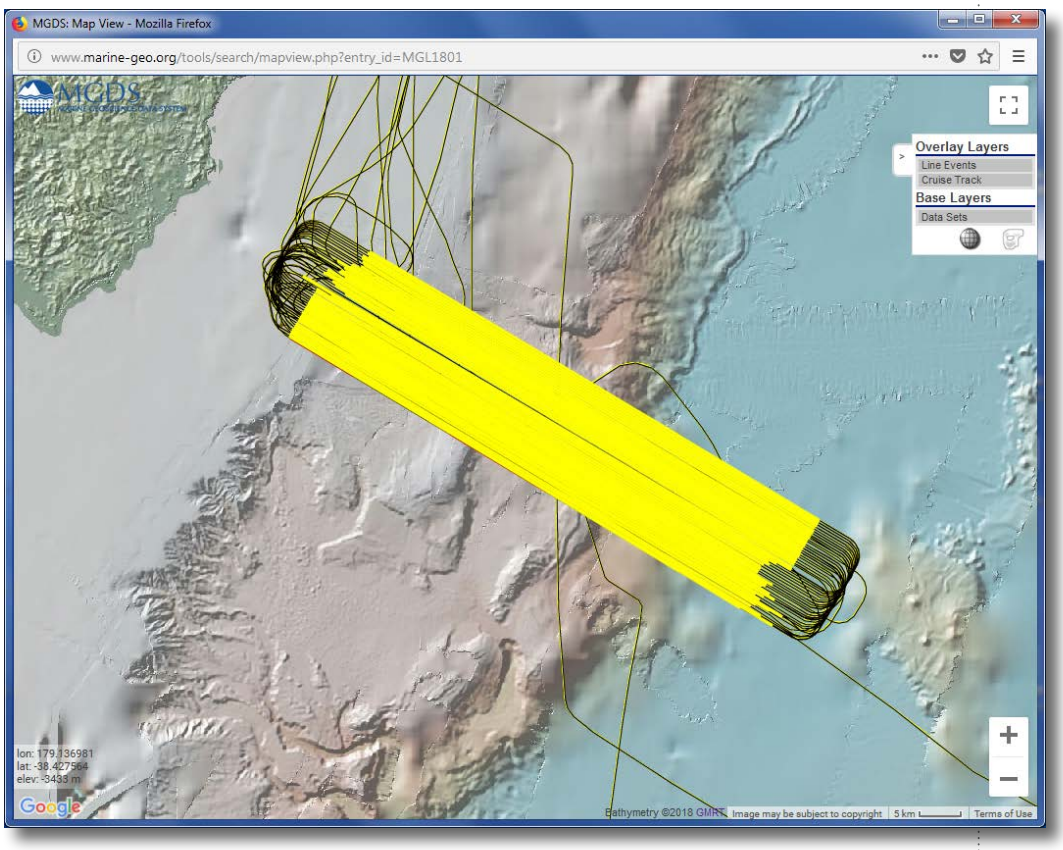


Figure 2. Seismic survey lines (bright yellow) and ship track (black) from the 2018 NZ3D survey of Bangs et al. The background elevation map is the Global Multi-Resolution Topography (GMRT) synthesis. The seismic data sets are available at: http://www.marine-geo.org/tools/search/entry.php?id=MGL1801

New Zealand

Multi-channel seismic shot field data and seismic navigation files were contributed by investigators Nathan Bangs, Shuoshuo Han, Greg Moore, Eli Silver, and Harold Tobin for the early 2018 Langseth active-source survey across New Zealand's Hikurangi Margin. In this 3-D seismic survey, four streamer cables were towed close apart to generate the 15 km x 60 km survey outline across the trench and forearc shown in Fig. 2. The Hikurangi Margin is characterised by regularly-occurring slow-slip events (SSEs) and a main goal of the survey is to gain understanding of the factors associated with slow-slip behavior.

The seismic data sets are available at: http://www.marine-geo.org/tools/search/entry.php?id=MGL1801

GeoPRISMS Data Portal Tools and Other Relevant IEDA Resources

Search For Data (http://www.marine-geo.org/tools/new_search/index.php?funding=GeoPRISMS) The GeoPRISMS search tool 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) Generate 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 have also developed a tool to help PIs show compliance with NSF data policies.

GeoPRISMS Bibliography (http://www.marine-geo.org/portals/geoprisms/references.php) With more than 1,160 citations, many tied to data sets, the references database can be searched by primary site, paper title, author, year, and journal. Submit your papers for inclusion in the bibliography – just the DOI is needed! http://www.marine-geo.org/portals/geoprisms/ref_submit.php

Contribute Data (http://www.iedadata.org/contribute) The web submission tools support PI contributions of geophysical, geochemical, and sample data. Once registered within the IEDA systems, 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. ■

GeoPRISMS Sessions of Interest at the 2018 AGU Fall Meeting

December 10-14, 2018 AGU Fall Meeting, Washington D.C.

The complete AGU Fall Meeting program can be daunting so the GeoPRISMS Office has compiled a list of GeoPRISMS-related sessions that may be of special interest to the GeoPRISMS Community. Please refer to the AGU meeting program to confirm date and time of sessions (*https://agu.confex.com/agu/fm18/prelim.cgi/Home/0*)

Poster Hall A-C: Walter E. Washington Convention Center
Archives, Capitol/Congress, Liberty I-K, L, M, N-P, Independence D, F-H: Marriott Marquis

TECTONOPHYSICS

T11B. T12B. T13F. Observations and models of multiphase deformation in rifts and rifted margins

Monday 08:00- 12:20 (Liberty M)
Monday 13:40-18:00 (Poster Hall A-C)

Conveners: John Naliboff (U. of California, Davis), Rebecca E Bell (Imperial College London), Jolante van Wijk (New Mexico Institute of Mining and Technology), Scott E K Bennett (USGS)

—

T11C. T12C. T13C. T21F. T21G. Subduction top to bottom-2

Monday 08:00 - 12:20 (Liberty L)
Monday 13:40 - 15:40 (Liberty L)
Tuesday 08:00 - 12:20 (Poster Hall A-C)

Conveners: David William Scholl (U. of Alaska Fairbanks), Gray E Bebout (Lehigh U.), Laura M Wallace (U. of Texas at Austin)

—

T13H. T24B. Synthesis: Knowns and unknowns of the Cascadia Subduction Zone

Monday 13:40-18:00 (Poster Hall A-C)
Tuesday 16:00-18:00 (Liberty L)

Conveners: Helen A Janiszewski (Carnegie Institution for Science), Wenyuan Fan (Woods Hole Oceanographic Institution), Ikuko Wada (U. of Minnesota Twin Cities), Caroline Seyler (McGill U.)

—

T13I. T21C. Three-dimensional fault architecture and geometrical Segmentation from fault observations to seismic hazard assessment

Monday 13:40 - 18:00 (Poster Hall A-C)
Tuesday 08:00-10:00 (Liberty M)

Conveners: Valerie J Sahakian (U. of Oregon), Isabelle Manighetti (GEOAZUR-OCA), Ruth Harris (U.S. Geological Survey), Neal W Driscoll (Scripps Institution of Oceanog)

—

T13D. T22C. Whose fault is it? Relating structural and compositional heterogeneity to slip behavior

Monday 13:40 - 18:00 (Poster Hall A-C)
Tuesday 10:20 - 12:20 (Liberty M)

Conveners: Hannah S Rabinowitz (Brown U.), Helen A Janiszewski (Carnegie Institution for Science), Ake Fagereng (Cardiff U.), Samer Naif (LDEO)

—

T21E. T32B. Flow and fracture: Mixed brittle-viscous behavior throughout the lithosphere

Tuesday 08:00- 12:20 (Poster Hall A-C)
Wednesday 10:20-12:20 (Liberty L)

Conveners: Christie D Rowe (McGill U.), Whitney M Behr (U. of Texas at Austin), Christopher C Gerbi (U. of Maine), Andre R Niemeijer (Utrecht U. - Faculty of Geosciences - HPT Laboratory)

—

T22B. T31H. Volatile cycling in subduction zones: Fluid inputs, pathways and outputs, and their impact on geodynamic processes and natural hazards

Tuesday 10:20 - 12:20 (Liberty L)
Wednesday 08:00 - 12:20 (Poster Hall A-C)

Conveners: Stephen Paul Hicks (U. of Southampton), George Frederick Cooper (U. of Durham), Lidong Bie (U. of Liverpool), Richard Gareth Davy (Imperial College London)

—

T23E. T33B. Oceanic lithosphere: Structure and evolution from creation to destruction

Tuesday 13:40 - 18:00 (Poster Hall A-C)
Wednesday 13:40-15:40 (Liberty M)

Conveners: Adrian K Doran (Scripps Institution of Oceanography), Jennifer Harding (U. of Texas, Institute for Geophysics), Zhitu Ma (Brown U.)

—

T33D. T42B. Bridging earthquakes and Earth structure: Reconciling deformation observed over geologic and geodetic timescales

Wednesday 13:40 - 18:00 (Poster Hall A-C)
Thursday 10:20 - 12:20 (Liberty I-K)

Conveners: Curtis William Baden (Stanford U.), Kaj M Johnson (Indiana U.), George E Hilley (Stanford U.), Johanna M Nevitt (U.S. Geological Survey)

—

T41G. T41H. T51C. T52C. Shallow subduction zone structure and dynamics

Thursday 13:40 - 18:00 (Poster Hall A-C)
Friday 08:00 - 12:20 (Liberty N-P)

Conveners: Hongfeng Yang (Chinese U. of Hong Kong), Douglas Wiens (Washington U. in St Louis), Shuichi Kodaira (Yokohama National U.), Yan Hu (U. of Science and Technology of China)

—

T44A. T51E. Exploring subduction initiation processes and subduction zone dynamics: New insights from scientific drilling, marine geophysics, and ophiolites

Thursday 16:00- 18:00 (Liberty L)
Friday 8:00-12:20 (Poster Hall A-C)

Conveners: Joann M Stock (California Institute of Technology), Brandon Shuck (U. of Texas at Austin), Anders John McCarthy (U. of Bristol), Marco Maffione (U. of Birmingham)

—

T51I. T53C. T54C. Subduction zone processes at the Hikurangi Margin, New Zealand

Friday 08:00- 12:20 (Poster Hall A-C)
Friday 13:40-18:00 (Liberty N-P)

Conveners: Laura M Wallace (GNS Science U. of Texas Institute for Geophysics), Rebecca E Bell (Imperial College London), Kimihiro Mochizuki (U. of Tokyo), Demian M Saffer (Pennsylvania State U.)

SEISMOLOGY

S31C. S33A. Emerging science from the EarthScope Transportable Array in Alaska and Canada

Wednesday 8:00 - 12:20 (Poster Hall A-C)
Wednesday 13:40 - 15:40 (Independence D)

Conveners: Natalia A Ruppert (U. of Alaska Fairbanks), Richard C Aster (Colorado State U.), Hersh J Gilbert (U. of Calgary)

—

S41E. The role of slow slip events in the earthquake cycle: Stressing, triggering, and hazard

Thursday 8:00-12:20 (Poster Hall A-C)

Conveners: Bill Fry (GNS Science), Matt Gerstenberger (GNS Science-Institute of Geological and Nuclear Sciences Ltd), Yoshihiro Kaneko (GNS Science)

—

S41B. S42B. S51D. Environmental seismology: Using geophysical tools for Earth surface processes research

Thursday 8:00 - 12:20 (Independence F-H)
Friday 8:00-12:20 (Poster Hall A-C)

Conveners: Danica L Roth (U. of Oregon), Aurélien Mordret (Massachusetts Institute of Technology), Bradley Paul Lipovsky (Harvard U.), Michael Dietze (Deutsches GeoForschungsZentrum)

VOLCANOLOGY, GEOCHEMISTRY AND PETROLOGY

V11C. V12C. V13D. Volcano seismology and acoustics: Recent advances in understanding volcanic processes

Monday 08:00 - 12:20 (Capitol/Congress)
Monday 13:40 - 18:00 (Poster Hall A-C)

Conveners: Alexandra M Iezzi (Geophysical Institute Fairbanks), Diana C. Roman (Carnegie Institution for Science), Benoit Taisne (Asian School of the Environment), Weston A Thelen (USGS Cascades Volcano Observatory)

—

V11D. Chemistry and physics of redox reactions in the solid Earth

Monday 8:00 - 12:20 (Poster Hall A-C)

Conveners: Fred A Davis (U. of Minnesota Duluth), Maryjo N Brounce (U. of California Riverside)

—

V11F. Sulfur: A unique player for redox evolution, volatile degassing, and metal transport in magmatic, volcanic, and hydrothermal systems

Monday 08:00 - 12:20 (Poster Hall A-C)

Conveners: Xiaofei Pu (U. of Michigan), Adrian Fiege (American Museum of Natural History), Tobias P Fischer (U. of New Mexico), Rita C Economos (Southern Methodist U.)

—

V23C. V24A. V31H. Magmatic systems and their interactions with tectonic processes in rifts, arcs, ridges, and volcanic fields

Tuesday 13:40 - 18:00 (Liberty I-K)
Wednesday 08:00 - 12:00 (Poster Hall A-C)

Conveners: Christelle Wauthier (Pennsylvania State U.), Erin DiMaggio (Arizona State U.), Sara Mana (Salem State U.), James D Muirhead (Syracuse U.)

—

V33C. Accessorize it: Controls on the mobility of trace elements during subduction

Wednesday 13:40 - 18:00 (Poster Hall A-C)

Conveners: Alicia M Cruz-Uribe (U. of Maine), Maureen D Feineman (Pennsylvania State U.)

STUDY OF EARTH'S DEEP INTERIOR

DI11A. DI12A. DI13B. Advances in understanding Earth's dynamic processes using seismic anisotropy

Monday 08:00 - 12:20 (Archives)
Monday 13:40 - 18:00 (Poster Hall A-C)

Conveners: Margarete Ann Jadamec (SUNY at Buffalo), Maureen D Long (Yale U.), Manuele Faccenda (U. di Padova)

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

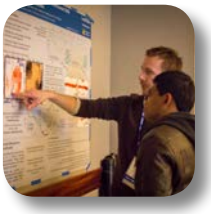
GeoPRISMS references database of relevant publications is now available:

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

AGU Fall Meeting

GeoPRISMS Prize for Outstanding Student Poster & Oral Presentations



This presentation participates in Geo PRISMS Outstanding Student Prize

The GeoPRISMS Program is offering two $500 prizes for Outstanding Student Presentations on GeoPRISMS- or MARGINS-related science at the AGU Fall Meeting in Washington D.C., December 10-14, 2018.

The two prizes, one each for a poster and an oral presentation, will be awarded to highlight the important role of student research in accomplishing MARGINS- and GeoPRISMS-related science goals, and to encourage cross-disciplinary input.

The competition is always very popular. You can help!

We hope that if you attend the AGU Fall Meeting this year that you will be able to help us with judging for the student awards. We generally ask judges for their assessment of three or four presentations. Contact the GeoPRISMS Office at info@geoprisms.org.

Thank you!

Are you willing to help us judge student presentations at the AGU Fall Meeting?

Contact us at info@geoprisms.org

GeoPRISMS Mini-Workshops at the AGU Fall Meeting 2018

Kimpton Hotel Monaco
700 F Street NW, Washington, DC 20004
Athens Room

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

Sunday December 9, 2018 • 8 – 12:15pm

ExTerra: Evolution of arc crust

Conveners: Stacia Gordon[1] and Alicia Cruz-Uribe[2]

[1]University of Nevada-Reno, [2]University of Maine

This mini-workshop will gather a broad group of geoscientists that use a variety of different approaches (field, experimental, petrological, geochemical, geochronological, seismic, numerical modeling) applied to different parts of the arc (the subducting plate, mantle, magma plumbing system, supracrustal rocks) to discuss the major questions that still surround the evolution of arc crust. The group will identify the best tools and methods to answer these questions. The meeting will also serve to provide a space for early career researchers to network with more senior personnel, where scientists from a variety of subdisciplines who work on different arc sections around the world can compare and contrast observations. In addition, this gathering of the arc crust community will make a plan for future convergent margin research, specifically on arc crust. It is important to establish new goals and questions concerning arc crust before GeoPRISMS has fully ended to keep the momentum that this program has established.

Keynote Speaker: Olivier Jagoutz

Sunday December 9, 2018 • 1:15 – 5:30pm

Investigating subduction processes at the Hikurangi margin, New Zealand

Conveners: Laura Wallace[1,2], Dan Bassett[1], Heather Savage[3], Samer Naif[3], Shuo Shuo Han[2], Patrick Fulton[4]

[1]GNS Science, New Zealand, [2]University of Texas Institute for Geophysics, [3]Lamont Doherty Earth Observatory, Columbia University, [4]Texas A&M University

The Hikurangi margin offers an outstanding opportunity to address many of the key topics of GeoPRISMS Subduction Cycles and Deformation initiative. Major international experiments to investigate subduction processes at the Hikurangi margin have taken place in the last year including two IODP drilling expeditions to investigate shallow slow slip events, and two seismic experiments with the R/V Langseth and R/V Tangaroa to investigate controls on plate coupling and slow slip. The objectives of a Hikurangi margin mini-workshop are to discuss new observations from the New Zealand primary site and their implications for an integrated understanding of subduction processes, as well as planning for upcoming experiments.

Keynote Speakers: Jamie Howarth, Demian Saffer, Nathan Bangs, Ryuta Arai, Becky Bell, Harm van Avendonk, Stuart Henrys, Donna Shillington, Laura Wallace, Evan Solomon, Samer Naif, Wiebke Heise

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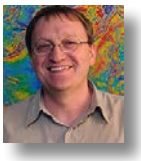

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Call for Participation

Marine EM Survey of Fluids in the Alaskan Megathrust aboard the *R/V Sikuliaq*

Application Deadline: January 15, 2019

More information at: *http://geoprisms.org/listserv-11-20-18/*

Graduate students, postdocs and early-career scientists are invited to participate in a NSF-funded experiment to image fluids in the Alaskan subduction zone using marine electromagnetic methods. This project will collect seafloor magnetotelluric data and deep-towed controlled-source electromagnetic data along a series of profiles crossing the subduction zone off the Alaska Peninsula.

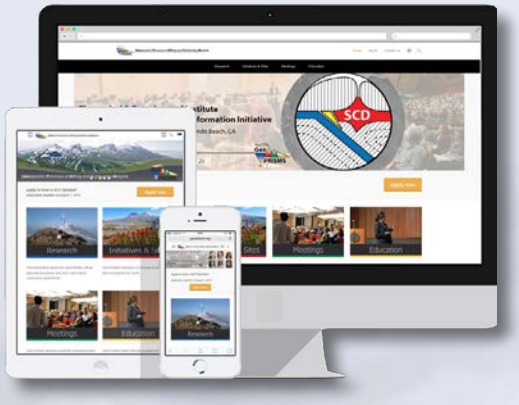
The research cruise is scheduled from May 21 to June 19, 2019, and will depart from and return to Seward, Alaska.

Participants will learn how to prepare, deploy and recover ocean-bottom electromagnetic receivers and how to deep-tow a controlled-source electromagnetic transmitter system.

No previous seagoing experience or experience with electromagnetic geophysics is needed. This research cruise will provide opportunities to become familiar with marine electromagnetic methods and data interpretation. Funds are available to cover travel and subsistence costs for US-based scientists.

Applicants will be selected based on the broad relevance of this project and/or type of data to their current research and career objectives.

Visit the GeoPRISMS website for more information about science planning, meeting outcomes, job opportunities, and funding



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