

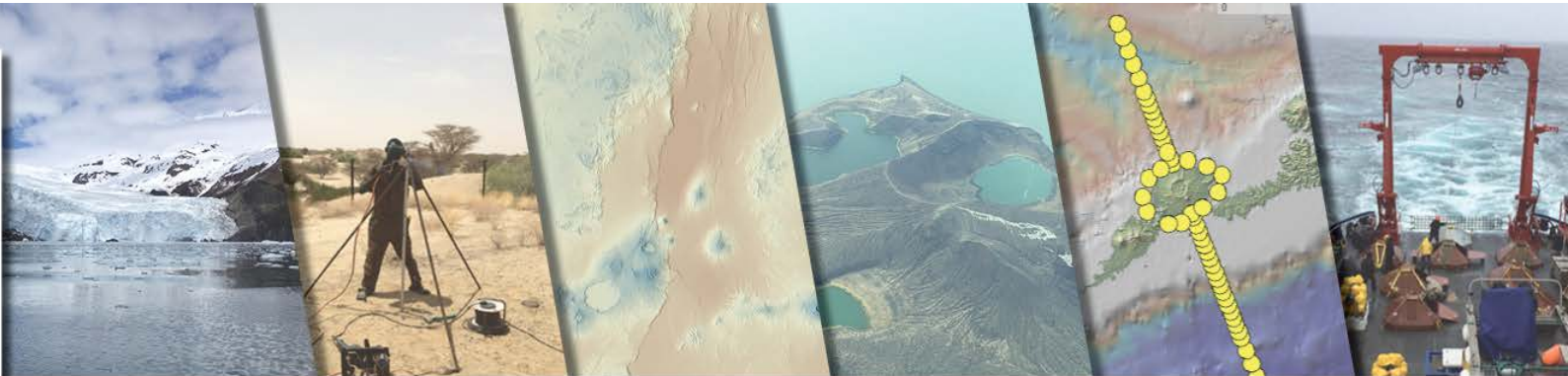
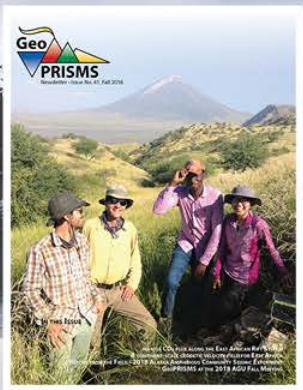
# GeoPRISMS Synthesis & Integration Theoretical and Experimental Institute Early Career Investigator Symposium

Organizers:

**Taryn Lopez and Eric Mittlestaedt**

arm van Avendonk, Katie Kelley, Joe Dufek, Christie Rowe, Phil Skemer, Ikuko Wa

\*Rob Harris, \*Kyle Straub, \*Katie Keranen, \*Jessica Warren



The Fall 2018 issue of the GeoPRISMS newsletter is now available!



## What is GeoPRISMS?

- **Community-driven science program to investigate active processes along continental margins**
  - Interdisciplinary, cross-divisional NSF program that spans the shoreline
  - Integration of field, laboratory, & modeling approaches
  - Focused research at primary sites coupled with overarching thematic studies
- **First-order questions about Earth's most active tectonic, mass transfer, and sedimentary systems in rifts and subduction zones**
  - Relevant to major: earthquakes, volcanic eruptions, tsunamis, and landslides.
- **A vibrant interdisciplinary research community and an intellectual incubator for collaborative research!**



# What is GeoPRISMS?

- Two broadly integrated initiatives:
  - Rift Initiation & Evolution
  - Subduction Cycles & Deformation
- Cross-cutting thematic studies
  - Evolution of continental crust**
  - Fluids, melts, and their interactions**
  - Tectonic-sediment-climate feedbacks**
  - Geochemical cycles**
  - Plate boundary deformation and geodynamics**
- NSF Funding Program guided by science plan
  - Science & Implementation plans driven by community at series of workshops
  - PI- and community-driven science proposals; workshop proposals



# GeoPRISMS Science is planned by the Community

**Community planning at workshops**

**Science Plans with research objectives**

**Proposals guided by Science Plan**

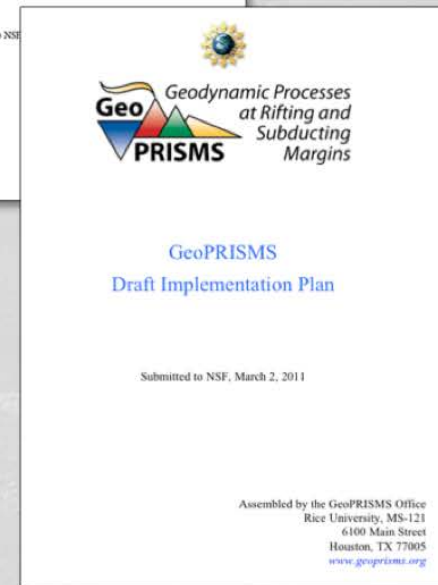
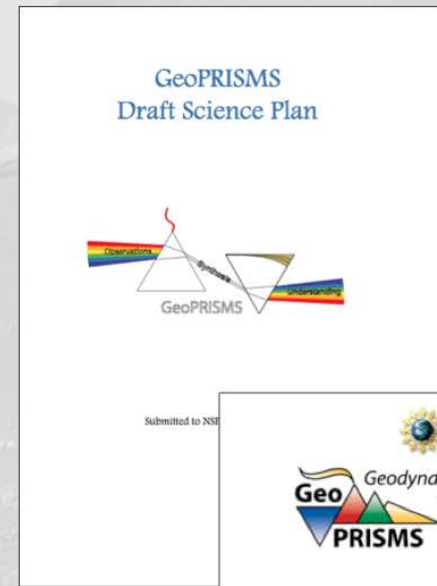
PI-driven proposals

Community-driven proposals

Workshop proposals

Deadline early July

**GeoPRISMS is open, all can participate!!**



*“A Living Document”*

# GeoPRISMS:

Composed of two broad and interlinked initiatives: SCD & RIE, focused effort at 5 primary sites and in thematic studies

Research

Initiatives & Sites

Meetings

Education & Outreach



## Subduction Cycles and Deformation Initiative SCD



Identifying Controls on Fault Slip Behavior and Deformation History

Understanding Mantle Wedge Dynamics

Fore-arc to Back-arc Volatile Fluxes

Metamorphic and Igneous Conditions and Processes at Depth

Subduction Initiation



Research

Initiatives & Sites

Meetings

Education & Outreach

## Rift Initiation and Evolution RIE



Rift Obliquity

Rift Processes as Functions of Strain Rate

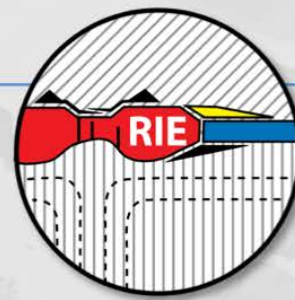
Volatiles in Rift Zone Processes

Sediment Production, Routing, and Transport during and after Rifting

Discrete Events at Rifted Margins







## Rift Initiation and Evolution

Where and why do continental rifts initiate

Fundamental rifting processes and their feedbacks

Controls on the architecture of rifted continental margins

Mechanisms & consequences of fluid & volatile exchange

## Subduction Cycles and Deformation

Controls on size, frequency & slip behavior of subduction plate boundaries

Spatial-temporal deformation patterns during seismic cycle

Linkages between volatiles & plate boundary rheology

Volatile storage, transfer, & release in subduction systems

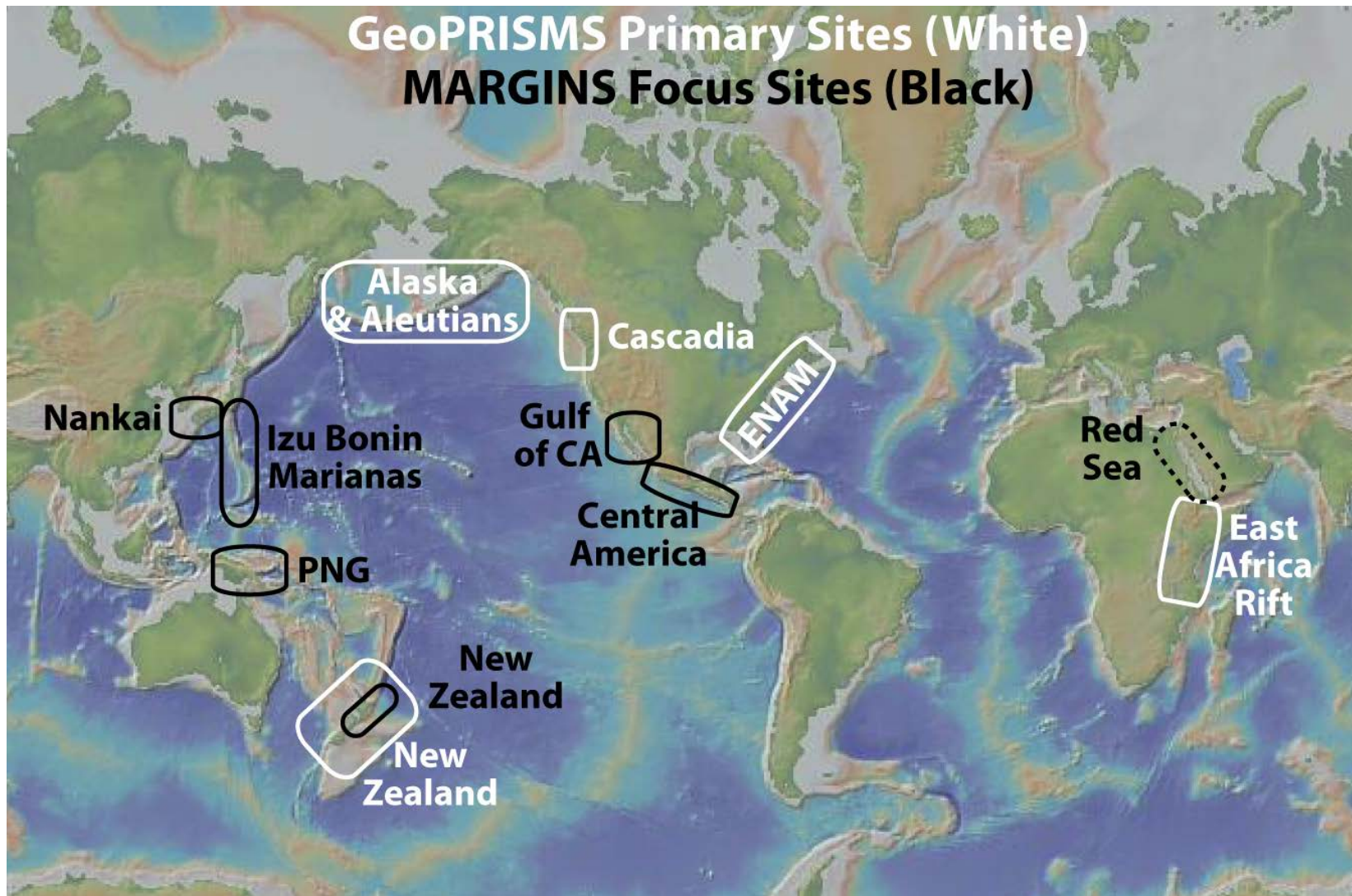
Geochemical products of subduction; continent creation

Subduction zone initiation and arc system formation

Feedbacks between surface processes & subduction dynamics

# GeoPRISMS:

Composed of two broad and interlinked initiatives: SCD & RIE,  
focused effort at 5 primary sites and in thematic studies





## GeoPRISMS:

- Office & Steering Committee provide a link between community and NSF; *is independent of funding decisions.*
- Supports and coordinates community efforts:
  - Workshops, Theoretical & Experimental Institutes; Mini-WIS at AGU
  - Coordination with Domestic and International Partner Organizations
  - Early career & student symposia
- Research communication, dissemination, outreach...
  - Newsletter, Website
  - Distinguished lecture program
  - Student Presentation Awards



# GeoPRISMS Office & Steering Committee: 3-year staggered terms

## Penn State Office



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Science Coordinator



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Jo Ann Lehtihet  
Admin. Staff

*NSF Program Officers and many former GSOC and Margins Steering Committee members are here – feel free to ask them about the program!*



## ExTerra: Evolution of arc crust

Conveners: Stacia Gordon<sup>1</sup> and Alicia Cruz-Uribe<sup>2</sup>

<sup>1</sup>University of Nevada-Reno, <sup>2</sup>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 (MIT)

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

## Investigating subduction processes at the Hikurangi margin, New Zealand

Conveners: Laura Wallace<sup>1,2</sup>, Dan Basset<sup>1</sup>, Heather Savage<sup>3</sup>, Samer Naif<sup>3</sup>, Shuo Shuo Han<sup>3</sup>, Patrick Fulton<sup>4</sup>

<sup>1</sup>GNS Science, New Zealand, <sup>2</sup>University of Texas Institute for Geophysics, <sup>3</sup>Lamont Doherty Earth Observatory, Columbia University, <sup>4</sup>Texas A&M University

The Hikurangi margin offers an outstanding opportunity to address many of the key topics of GeoPRISMS Subduction Cycles and Deformation. 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 focus 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



- Diverse; significant ECI participation & leadership:
  - Since 2010, >1200 participants
- 2018 AGU mini-WS:
  - 2 mini-workshops
  - ~170 Registrants
- Synthesis & Integration TEI, Feb. 2019
  - ~170 participants
  - Large proportion of students/postdocs



# GeoPRISMS Newsletter

Biyearly; Fall in print and  
online, Spring online only

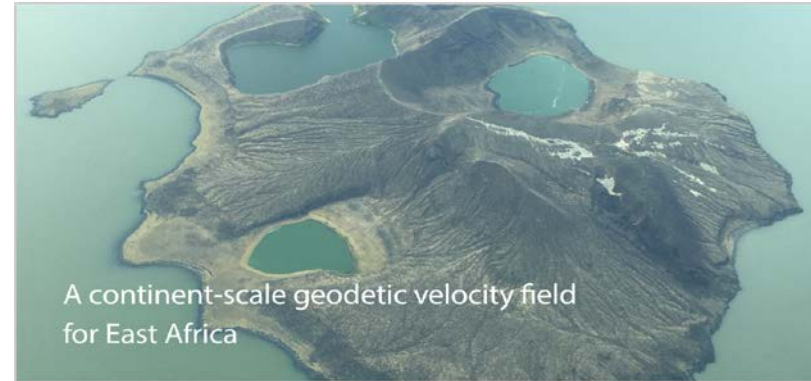


Constraining variability in mantle CO<sub>2</sub> flux along  
the East African Rift System

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)



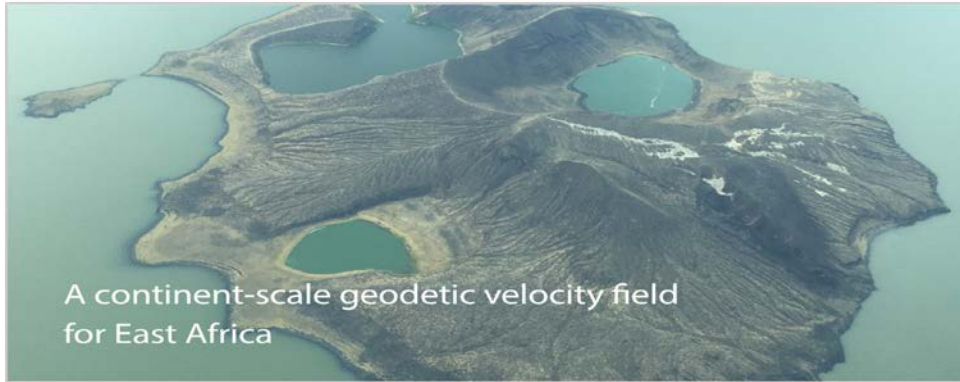
Report from the Field



A continent-scale geodetic velocity field  
for East Africa

- Workshops, Meetings, and Sessions of interest
- Science Articles
- Opportunities, Funding solicitations





## Major Fall 2019 Newsletter Issue Planned: “Grand Finale”

- Invited thematic and primary site reviews
- Individual project “nuggets”
- Summary of DLP, AGU awardees
- Profiles of scientists whose careers incubated in MARGINS/GeoPRISMS
- Forward looking pieces on opportunities and emerging questions
- An important legacy product



# What is a Theoretical and Experimental Institute?

A hybrid workshop, symposium, and short-course – designed to:

- Share and discuss major advances & key findings (state of the science)
- Identify emerging questions, knowledge gaps
- Integrate findings across primary sites and disciplines
- Define new & necessary data, models, experiments, or collaborations





## Three Day “Charge”:

- Identify emerging directions and/or burning questions – pointing to new collaborations, directions, and/or a need for focused workshops to follow.
- Engage ECI and students, foster cross-disciplinary exchange of expertise & results, and identify areas primed for advances through interdisciplinary collaboration.
- Position the GeoPRISMS community & its substantial intellectual momentum for what’s next: - beyond just listing questions. Define and articulate future science and what’s needed to make it happen.
- Develop concrete ideas for legacy products or activities, including