

## 4. Program Management

The GeoPRISMS Program is a combination of a funding opportunity, which is managed jointly by the NSF EAR and OCE Divisions, and a broad community effort, which is coordinated by a national Office and overseen by the GeoPRISMS Steering and Oversight Committee (GSOC). The funding program is managed completely independently from the community effort, but the NSF program managers, GSOC, and Office Director are in regular communication to maximize the impact of the GeoPRISMS Program as a whole.

### 4.1 Funding and management structure

#### *Funding opportunities and awards*

Funding opportunities for GeoPRISMS research are provided through an annual call for proposals with a deadline or target date typically in July. The solicitation for 2015 is available as [NSF 15-564](#). GeoPRISMS funding in the first five years has been awarded to 37 projects with 91 PIs, compared to 135 projects (271 PIs) in 11 years of MARGINS funding. Full details on the awards are provided in Appendix A1. The average number of projects funded per year has declined somewhat since MARGINS. Statistics for projects funded to date (FY11-FY15) and the demographics of their PIs are shown in Table 4.1 with a comparison to those in MARGINS awards (FY00-FY10).

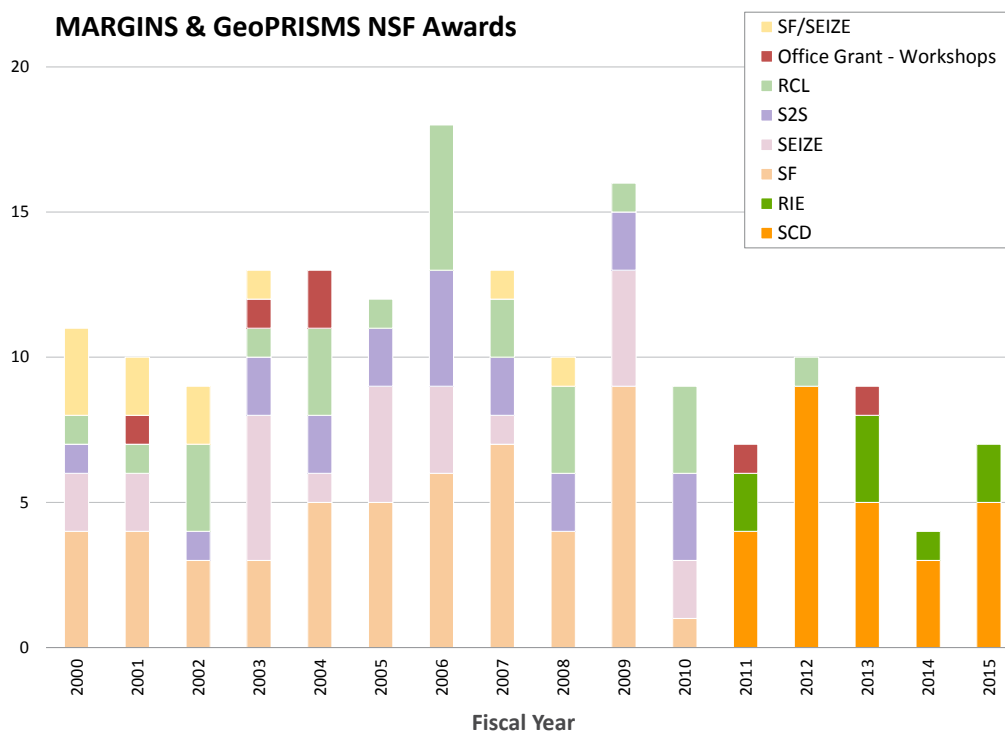


Figure 4.1. MARGINS and GeoPRISMS funding by initiative.

We notice significant and positive trends in the nature of the projects and the demographics of the PIs. Compared to the average MARGINS PI, a GeoPRISMS PI is 50% more likely to be early career, twice as likely to be female, and tends to be involved in projects that are more interdisciplinary and collaborative. The full list of funded projects with an indication of the demographics and nature of funding used as basis for the table below is provided in appendix A1.

	GeoPRISMS	MARGINS
Number of projects	37	135
Number of PIs	91	271
Early career PIs *	23	46
Female PIs *	33	45
Early career PIs (%)	23%	17%
Female PIs (%)	33%	16%
Interdisciplinary projects** (%)	27%	13%
Collaborative projects*** (%)	49%	37%
Number of PIs per project	2.7	2.0

Table 4.1. Comparison of the demographics of the PIs and nature of funded projects between GeoPRISMS (FY11-FY15) and MARGINS (FY00-FY10).

\* We counted a postdoc who was supported by a grant (but not listed as formal PI) as an additional early career and (where appropriate) female PI.

\*\* We define interdisciplinary as a combination of multiple observational approaches that are significantly different or as a combination of observational work with experimental and/or theoretical work.

\*\*\* We define collaborative projects as those involving PIs at multiple institutions.

Proposals are reviewed following standard NSF practices, based on ad-hoc reviews by independent experts, a recommendation by an annual GeoPRISMS panel at NSF, and award decisions made by NSF program managers. Announcements of awards are typically made at the end of the first quarter. The process from submission to review and final decision is carried out completely independently from the GeoPRISMS Office and GSOC. The Office and GSOC are only informed of the recommendations for successful proposals, the amount of the awards, and the success rate, which is all public information. During the early years of the MARGINS Program the MARGINS Steering Committee Chair was asked to provide a short presentation to the review panel at NSF, but this practice was discontinued and has never been implemented in GeoPRISMS. As a consequence neither the Office nor the steering committee has any knowledge about the identities of panel members or how funding decisions are made. This safeguards against real and perceived conflicts of interests.

#### *GeoPRISMS Steering and Oversight Committee (GSOC)*

The GSOC is a continuation of the MARGINS Steering Committee (MSC). It is composed of 12-14 members who generally serve a three-year term. Candidates for GSOC membership can

be proposed by the community, but are most commonly suggested by the sitting members of the committee. Former MSC or GSOC members cannot serve again except in the case that they will become the new Office Director. Only one member can be on the committee from a given institution. This set of practices has made sure that the representation of the community rejuvenates and remains broad and diverse. We also strive to include a few early career scientists (with two serving on the current committee) and seek to maintain gender balance as much as possible. We followed in part the recommendation of the Decadal Review Committee to include members from industry, from the USGS, and from abroad. Lori Summa from Exxon served in the early years of GeoPRISMS and currently Tony Watts from Oxford University serves on the committee. The USGS participation was not realized in the early stages but this may be pursued in future years.

The current membership of the GSOC and their appointments is in Table 4.2. A full list of the members of the 60 MSC and 27 GSOC members is in appendix A5.

Peter van Keken (Chair)	University of Michigan	2013-2016
Estella Atekwana	Oklahoma State University	2014-2017
Brandon Dugan	Rice University	2014-2017
Jeff Freymueller	University of Alaska Fairbanks	2014-2016
Liz Hajek	Penn State	2014-2017
Kerry Key	Scripps Institute of Oceanography	2015-2018
Maureen Long	Yale University	2013-2016
Sarah Penniston-Dorland	University of Maryland	2014-2017
Tyrone Rooney	Michigan State University	2014-2017
Harold Tobin	University of Wisconsin Madison	2013-2016
Harm van Avendonk	University of Texas Austin	2014-2017
Paul Wallace	University of Oregon	2014-2017
Tony Watts	University of Oxford	2014-2017
Gene Yogodzinski	University of South Carolina	2013-2016

Table 4.2. Current membership of the GeoPRISMS Steering and Oversight Committee

The GSOC functions as a channel of communication between NSF and the community. It provides feedback and advice to NSF on programmatic issues. It also helps to implement community activities that serve the Program as a whole. The GSOC currently meets at the National Science Foundation once a year. The frequency of meetings has gone down in 2013 to one from two per year to reduce cost. This decrease in number of meetings was also justified by the completion of the initial planning process for the new Program. GSOC meetings are generally held in March, which is when the funding decisions of the previous round tend to be complete and before the new solicitation is released. The meeting venue at NSF facilitates discussion with program managers from related programs in EAR and OCE (such as Tectonics, IODP, Petrology & Geochemistry, and EarthScope) and with the EAR and OCE directors.

Current tasks of the GSOC include: i) reviewing the community’s progress towards the Program’s science goals; ii) guiding the development of databases, educational products and other infrastructure; iii) aiding in AGU activities including the selection of the mini-workshops; iv) fostering the growth of the interdisciplinary community; and v) exploring international collaboration and communication. Individual members are also expected to promote the GeoPRISMS science goals within their communities. GSOC members have also been instrumental in organizing the science planning meetings, preparing the GeoPRISMS Science and Implementation Plans (in the early years of GeoPRISMS), and preparing this mid-program review document. The agenda for the 2015 meeting is attached as appendix A7 to provide an illustration of topics of discussion during a GSOC meeting. GSOC meeting highlights are distributed in the Spring Newsletter.

*GeoPRISMS Chair and Office Director*

The Director of the GeoPRISMS Office serves as the Chair of the GSOC. Directors are appointed by NSF for a three year period. Julia Morgan (Rice University) served as Director from 2010-2013. Peter van Keken (University of Michigan) is currently the Director (2013-2016). Before the start of their tenure the Director submits a full Office proposal that is reviewed by NSF following standard practices. The role of the Office and its budget is described in more detail below.

*GeoPRISMS Education Advisory Committee (GEAC)*

The GEAC is a continuation of the MARGINS Education Advisory Committee. It meets irregularly and typically by phone conference. The committee provides guidance on education and outreach activities in GeoPRISMS and also selects the AGU Student Prize winners. There are no term limits on membership and the members are invited by the Office Director with advice from the GSOC. The current membership is in Table 4.3.

Cathy Manduca	Carleton College
Rosemary Hickey-Vargas	Florida International University
Jeff Marshall	Cal State Pomona
Sarah Penniston-Dorland	University of Maryland
<i>Ex officio:</i>	
Andrew Goodwillie	Lamont-Doherty Earth Observatory
Peter van Keken	University of Michigan
Julia Morgan	Rice University

Table 4.3. Current membership of the GeoPRISMS Education Advisory Committee

*Amphibious Array Steering Committee (AASC)*

The AASC was formed at the request of NSF to provide guidance on the use of the Amphibious Array that was built using instrumentation provided through 2009 Stimulus or ARRA (American

Recovery and Reinvestment Act) funding. This array includes new ocean bottom seismometers, new seismic instruments in reoccupied sites from the EarthScope Transportable Array, and improvements in on-land GPS capabilities. The initial deployment of this array was for onshore and offshore studies in Cascadia (the [Cascadia Initiative](#); Toomey et al., 2014) and is intended to support research within the EarthScope and MARGINS/GeoPRISMS science objectives.

The current chair is Susan Schwartz (UC Santa Cruz). Membership is typically for three years and service primarily consists of participating in conference calls. The committee was charged initially with making sure the Amphibious Array deployment followed the science plans developed for Cascadia. The current membership, which includes representatives of EarthScope, GeoPRISMS, and the Ocean Bottom Seismograph Instrument Pool ([OBSIP](#)) is listed in Table 4.4.

Susan Schwartz (Chair)	UC Santa Cruz
Jeff Freymueller	University of Alaska Fairbanks
Heidi Houston	University of Washington
Gabi Laske	UC San Diego
Steve McNutt	University of South Florida
Brandon Schmandt	University of New Mexico
Haiying Gao	University of Massachusetts
Rob Evans	Woods Hole Oceanographic Institution
<i>Ex Officio:</i>	
Ramon Arrowsmith	EarthScope
Don Forsyth	OBSIP
Peter van Keken	GeoPRISMS

Table 4.4. Current membership of the Amphibious Array Steering Committee

## 4.2 GeoPRISMS Office Activities

The GeoPRISMS Office provides significant community support through the organization of workshops and meetings, dissemination of scientific results via newsletter and website, facilitation of database efforts, development of new research directions, and organization of education and outreach activities. The Office Director is also the Chair of the GSOC and is appointed by NSF. Julia Morgan (Rice University) was the first Office Director. During her tenure she oversaw the development of the GeoPRISMS Science and Implementation Plans, with significant community input through planning workshops. The current Office at the University of Michigan is overseen by Peter van Keken. Support is provided by full-time staff members Anaïs Férot (science coordinator) and Jeanne Bisanz (administrative coordinator). The Rice Office also included a part-time staff member to help build new education and outreach efforts, but funding for this was discontinued when the Office moved to Michigan.

## Office Budget

The Office budget consists of staff salaries, academic salaries for Office Director (which can be used for teaching buyout), benefits, travel support for GSOC meetings, funds for website development and maintenance, production and dissemination of newsletter, support for planning and research meetings (which have also been funded through supplements to the Office), travel support for Office personnel to attend related meetings and AGU, funds to support AGU activities (such as the GeoPRISMS Townhall, mini-workshops and Best Student Presentation awards), and funds for the Distinguished Lecturer Program (including honoraria for the speakers). The Office budget is supplied out of the sequestered GeoPRISMS budget. A breakdown of the main budget items for the Rice Office (initial and final) and the Michigan Office is shown in Figure 4.2.

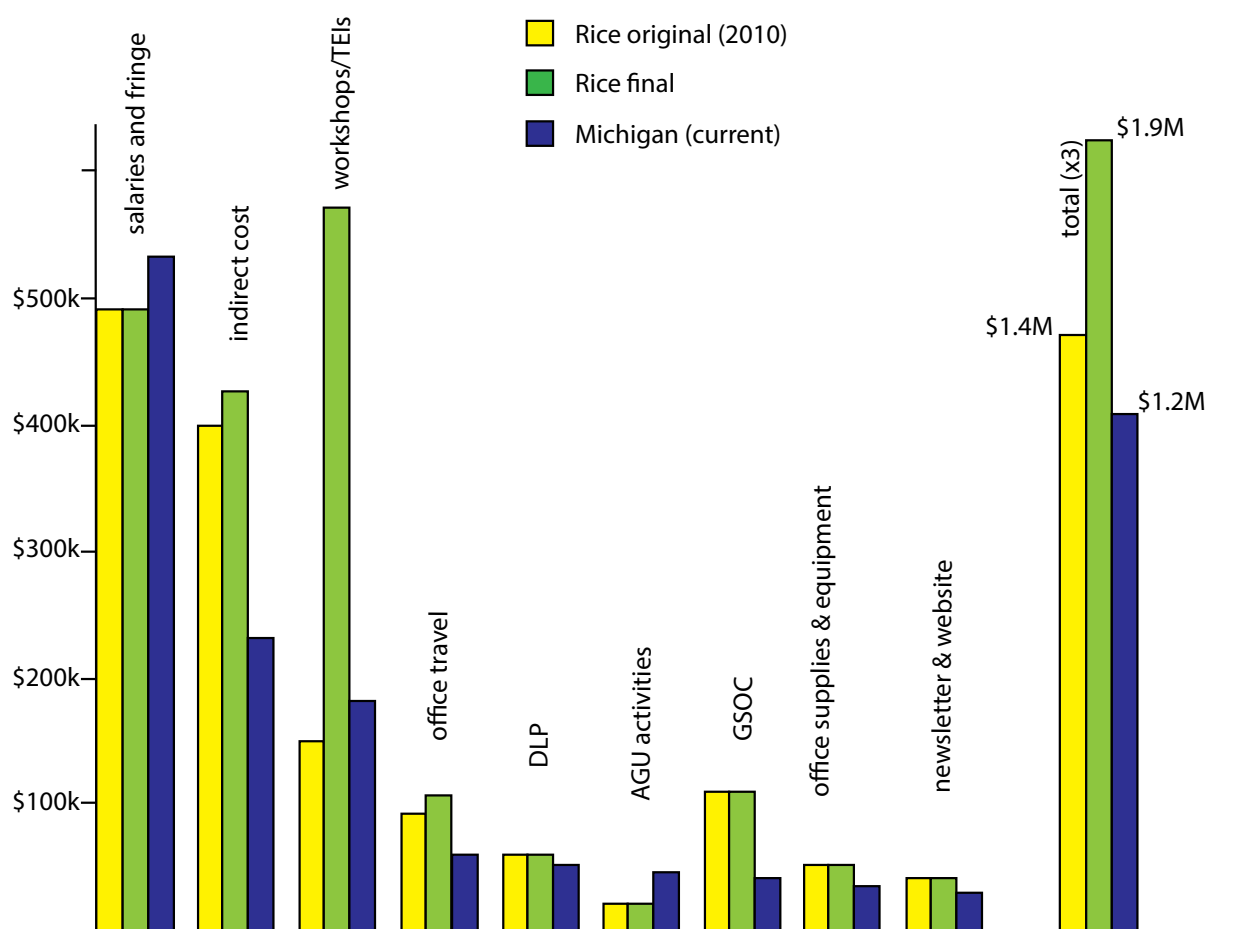


Figure 4.2. Comparison of initial Office budget at Rice (yellow), final Rice budget (green) and current Michigan budget (blue). The Michigan request was reduced from \$1.43M to \$1.2M (19% reduction) because of the federal sequestration starting in FY13 (the first year of the Michigan award).

The difference between the initial and final Rice budgets is principally due to the organization of seven large planning workshops. The original budget request out of Michigan was \$1.43M but was cut by nearly 20% in the FY13 sequestration. The cuts were accommodated by the elimination

of the 0.5 FTE education and outreach coordinator and significant reductions in the funds for the two Theoretical and Experimental Institutes that had been planned for each initiative. The significant reduction in indirect cost going from Rice to Michigan is due to the successful negotiation of an administrative overhead rate at 30% compared to the research overhead rate of 55% at the University of Michigan.

The GSOC was asked by NSF in March 2015 to evaluate the role of the Office and to judge whether the cost (currently at \$400k per year or 11% of a nominal GeoPRISMS budget of \$3.5M/yr) was justified. The GSOC provided a written response to NSF (appendix A8) in which it concluded that “it would be hard to find internal cost savings that can significantly reduce the current Office budget” and that “the Office is essential for the program.” The committee commented further that “[t]he strong and effective community building (as displayed for example by the nearly 1,000 unique individuals that have attended GeoPRISMS meetings) [is] essential to keep GeoPRISMS a vibrant and growing program” and “[t]he Office activities provide several mechanisms to reach new members of the geosciences community through the DLP, student symposia at meetings, and the AGU Townhall and Student Forum.” Finally, the GSOC pointed out in its written comments that “[w]hile the relative cost appears high when measured to just GeoPRISMS-funded science, it is clear that GeoPRISMS reaches a much larger audience than just those funded by GeoPRISMS and that many research activities funded by NSF outside of GeoPRISMS benefit from Office activities. The true relative cost of the Office is therefore seen as significantly less than 11%.” The committee unanimously recommended that the Office remains an integral part of the GeoPRISMS effort.

#### *GeoPRISMS website and listserv*

The GeoPRISMS website is vital to the Program as it provides the main platform for the collection, archiving, and dissemination of information about science planning, meeting outcomes, and opportunities for jobs and funding. It also provides support to various initiatives, including application for participation (examples: ExTerra workshop, Cascadia Initiative Apply-to-Sail Program) and dissemination of reports. The GeoPRISMS website is also used for the public dissemination of GeoPRISMS-related material contributed by community members.

The Rice Office developed the first GeoPRISMS website using the free content management system Joomla and the site was heavily used for all of the above activities. Following the transition of the Office, the GeoPRISMS website underwent a major redesign leading to greater functionality and improved aesthetics (Figures 4.3). Anaïs Férot, science coordinator and administrator of the website, completed the transition with help from Peter Knoop who is an IT expert at University of Michigan. The new, faster, website has been developed using a free open source content management system (WordPress). All content from the old website is now up to date and transferred to the improved version. The modern and more responsive design makes it easier to navigate on any device.

The GeoPRISMS Listserv is managed by the Office and has more than 1950 subscribers. We have kept daily statistics since the move of the website to a new service provider in April 2014. Since that time we have gained 130 users suggesting a net growth of about 100 users per year. Listserv



Figure 4.3. Home page of the fully updated and modernized geoprisms.org website. The website is now easier to navigate on a variety of devices including handhelds.

announcements are usually sent out twice a week and consist of job postings, student opportunities, updates on GeoPRISMS-related science, call for participation in GeoPRISMS events, partner updates, etc. Anyone can submit a request to send out an announcement to the GeoPRISMS Listserv. All listservs are archived on the GeoPRISMS website.

### *GeoPRISMS social media*

The GeoPRISMS Office maintains a Facebook page (more than 450 followers) and a Twitter account. We use these social media for the announcement of GeoPRISMS activities and dissemination of science efforts. We note that several GeoPRISMS-funded projects (including iMUSH, IFM-Unimak 2015, ENAM CSE, and MAGIC) maintain their own Facebook pages, blogs, or Twitter accounts, further providing broad dissemination of GeoPRISMS research and E&O activities.

### *GeoPRISMS newsletter*

The GeoPRISMS newsletter is published twice annually and provides an update to the community about GeoPRISMS activities and scientific advances. To reduce costs the newsletter is now distributed each year once in print and electronic form, and once in electronic form only. The print version is sent out to 950 domestic and 400 international addresses. Following the transition of the Office to the University of Michigan Anaïs Férot made a significant set of changes in the layout, typesetting and cover page, leading to a much more appealing and easy to read newsletter.



The newsletter in general contains updates from the Office chair and NSF program managers, a few articles focusing on scientific advances, a report from the field (generally contributed by a team of students or a postdoc), announcements of meetings and research opportunities, and education and outreach activities, including those at the AGU Fall meeting.

### *GSOC meeting support*

The Office supports the GSOC meeting (currently once yearly at NSF) in coordination with NSF staff by providing support for travel logistics and reimbursements and housing. The GSOC members' travel and onsite costs are fully supported but there is no honorarium.

The Office prepares detailed minutes of the meeting for approval by the GSOC. Extracts (with minor redaction for sensitive information) are published as GSOC meeting highlights in the following issue of the Newsletter.

### *Planning workshops and TEIs*

The Office organizes workshops and Theoretical and Experimental Institutes to allow community science planning and effective dissemination of results. The Rice Office was responsible for seven planning workshops that led to the development of the GeoPRISMS Science Implementation Plans. The Michigan Office had planned to organize two Theoretical and Experimental Institutes (TEIs). These TEIs are intended to document progress towards the science goals, to develop new initiatives, to augment the largely observational nature of the program with theoretical and experimental work, to enhance multidisciplinary collaboration, and to enfranchise new talent such as early career scientists, graduate students and scientists who are not yet fully associated with GeoPRISMS.

Two TEIs were planned for 2014 (SCD initiative) and 2015 (RIE initiative) but due to budget uncertainty and limitations it was decided by NSF and the Office Director, with approval of the GSOC, to use the budgeted funds for a single TEI focused on the SCD initiative and to have the next Office organize an RIE-focused TEI. The SCD TEI will be held at the Portofino Hotel (just south of the main airport of Los Angeles, CA) during the week of October 12, 2015.

Office activities that support these workshops and TEIs include providing teleconferencing facilities for the conveners, providing travel logistical support and reimbursements, organizing the venue including meeting rooms, accommodation and food, helping to organize the student symposia, and support and oversight for report writing, and dissemination of the results through the website and newsletter.



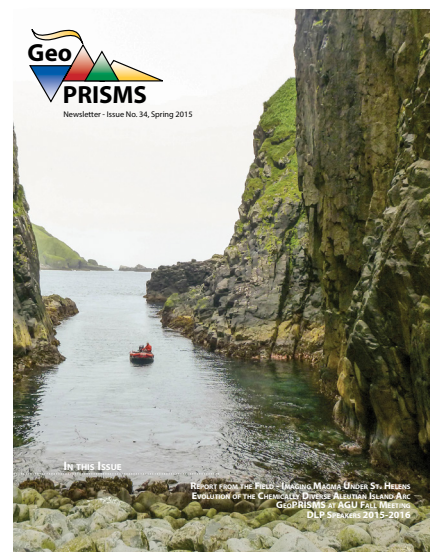
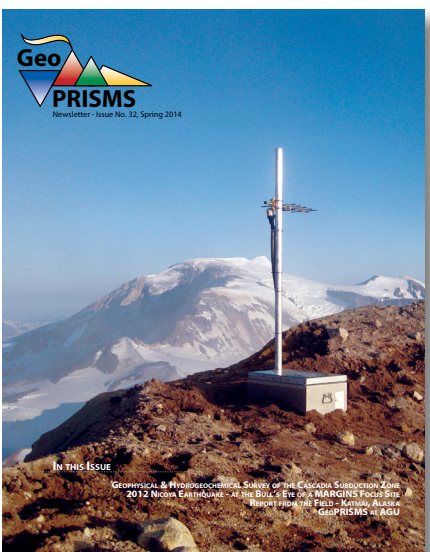
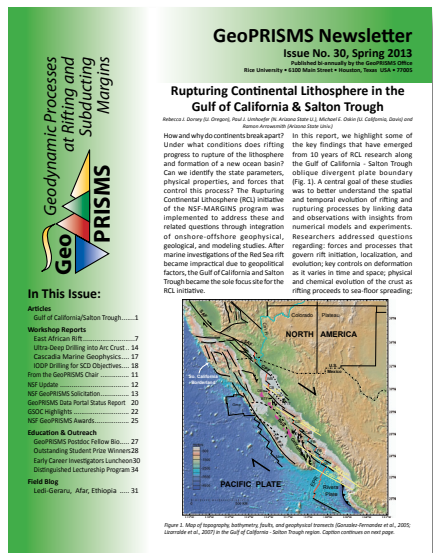
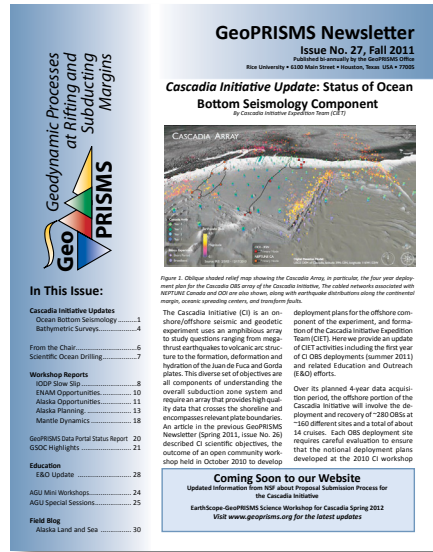


Figure 4.4. Top: Evolution of the cover of the newsletter since the start of the GeoPRISMS Office at Rice. Previous page: The Spring newsletter open at the Report from the Field written by students participating in the iMUSH project.

The workshops organized thus far have been well attended with participation counts ranging from 90 to over 200. Figure 4.5 provides a comparison of the attendance at each workshop organized by MARGINS (since 2000) and GeoPRISMS. Note that we list the MARGINS Successor Planning Workshop (MSPW; convened by Julia Morgan) as the first GeoPRISMS workshop even though it was supported by and with funds through the Lamont MARGINS Office directed by Geoff Abers. The first initiative workshop (RIE in 2010) was jointly organized by the outgoing MARGINS Office and incoming GeoPRISMS Office.

Participant lists for all meetings are available through the GeoPRISMS ([geoprisms.org](http://geoprisms.org)) and MARGINS ([nsf-margins.org](http://nsf-margins.org)) websites. An analysis of the attendance of the workshops demonstrates that the GeoPRISMS community is diverse, youthful, vibrant, and growing. The total number of participants in GeoPRISMS meetings is 1050 (compared to 1559 for all of MARGINS) with 680 unique individuals (compared to 1001 for MARGINS). The number of female participants is 32% (compared to 24% for MARGINS). More than 65% of the attendees of GeoPRISMS workshops had not attended any MARGINS meetings. The percentage of international participants is down from 36% (MARGINS) to 21%, which reflects the refocusing of early GeoPRISMS research to three primary sites in the US (Cascadia, Alaska-Aleutians, Eastern North American Margin) and the paucity of meetings held abroad. The organization of meetings in the US, at locations that are affordable and near airports with competitive routes, has also significantly reduced the per-person cost for the meetings compared to those held during MARGINS.

The large number of individuals who have attended GeoPRISMS meetings is much greater than that supported directly by GeoPRISMS funding. This testifies directly to the broad impact that the GeoPRISMS Office activities have had on community building and facilitating GeoPRISMS science.

#### *Support for Science and Implementation Plans and for the Mid-term Review*

The Office provides significant support for the writing and dissemination of the GeoPRISMS Science and Implementation Plan and for the production of these mid-term review materials. The Office supports the meetings that lead to the production of the documents, provides teleconferencing facilities, data gathering and compilation of statistics on meeting participation, citations to papers resulting from MARGINS and GeoPRISMS funded research, as well as the final production of the review documents. The Michigan Office also formatted the Amphibious Array Workshop report and recommendation that resulted from the October 2014 Snowbird meeting (organized by IRIS).

#### *AGU Activities: Mini-Workshops*

The GeoPRISMS Office has popularized the concept and expanded the reach of the AGU mini-workshops that were initiated late in MARGINS. There is nothing ‘mini’ about the workshops themselves; the term relates to the budget, which can be kept low as the meetings take place in San Francisco during the Fall Meeting of the American Geophysical Union. The Office only provides funds for the meeting venue and food. It does not provide support for travel or accommodation. Each year a call for mini-workshop proposals is advertised through the website, listserv, and newsletter.

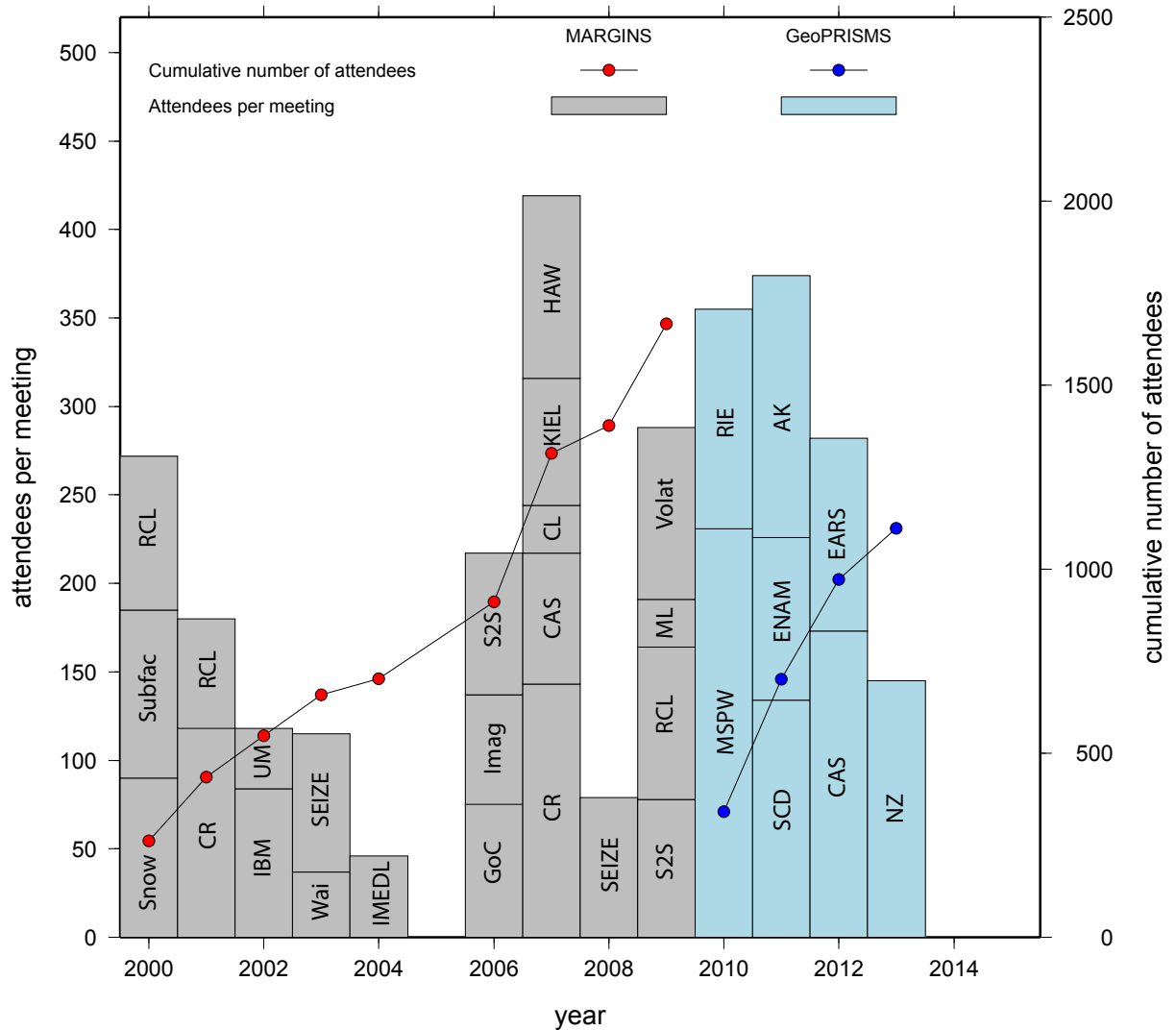


Figure 4.5. Attendance per meeting and cumulative attendance for MARGINS and GeoPRISMS meetings. 2000: SEIZE=SEIZE TEI (Snowbird, UT; January), Subfac=Subfac TEI (Eugene OR, January), RCL=Gulf of California workshop (Puerto Vallarta, Mexico, October). 2001: CR=Central America SEIZE/Subfac workshop (Heredia, Costa Rica, July), RCL=Red Sea workshop (Sharm-el-Sheik, Egypt, March). 2002: IBM=Izu-Bonin-Marianas workshop (Honolulu, HI, September), UM=Subfac modeling workshop (Ann Arbor, MI, October). 2003: Wai=Waipaoa focus area workshop (Gisborne, New Zealand, May), SEIZE=Seismogenic zone revisited TEI (Snowbird, UT, March). 2004: InterMARGINS workshop on modeling the extensional deformation of the lithosphere (Pontresina, Swiss Alps, July). 2006: GoC=Lithospheric rupture in Gulf of California workshop (Ensenada, Mexico, January), Imag=workshop in interpreting upper mantle images (Woods Hole, MA, May), S2S=Source and sediment dispersal workshop (Eel River system, California, September). 2007: CR=Subfac/SEIZE integration workshop (Heredia, Costa Rica, June), CAS=integrated collaborations in Cascadia and Walker Lane/Salton Trough (Monterey, CA, March), CL=education mini-workshop (Arlington, VA, April), KIEL=Global data network meeting (Kiel, Germany, May), HAW=Subfac at Izu-Bonin-Marianas (Honolulu, HI, November). 2008: next decade of SEIZE workshop (Mt Hood, OR, September). 2009: S2S Synthesis meeting (Gisbourne, New Zealand, April), RCL=RCL Synthesis workshop (Charleston, SC, April), ML=Mini-lessons workshop (Palisades, NY, May), Volat=Subfac TEI on volatiles (Mt Hood, OR, September). 2010: MSPW=MARGINS Successor Planning Workshop (San Antonio, TX, February), RIE=RIE Implementation workshop (Santa Fe, NM, November). 2011: SCD=SCD Implementation workshop (Bastrop, TX, January), AK=Alaska/Aleutians site planning workshop (Portland, OR, September), ENAM=EarthScope/GeoPRISMS workshop for ENAM site (Bethlehem, PA, October). 2012: CAS=GeoPRISMS/EarthScope site planning workshop for Cascadia (Portland, OR, April), EARS=planning workshop for East African Rift System (Morristown, NJ, October). 2013: NZ=Planning workshop for New Zealand primary site (Wellington, New Zealand, April).

The GSOC evaluates and ranks the proposals. The mini-workshops are then scheduled, with the number and timing of the meetings dependent on the available budget and cost of venues.

Analysis of the attendance numbers demonstrates the high impact of these modest-cost activities with nearly 700 individuals attending over 4 years (Figure 4.6). The average cost per attendee is generally less than \$100 per participant. Combined with the workshops discussed above we have had nearly 1800 individuals (931 unique) attend GeoPRISMS meetings.

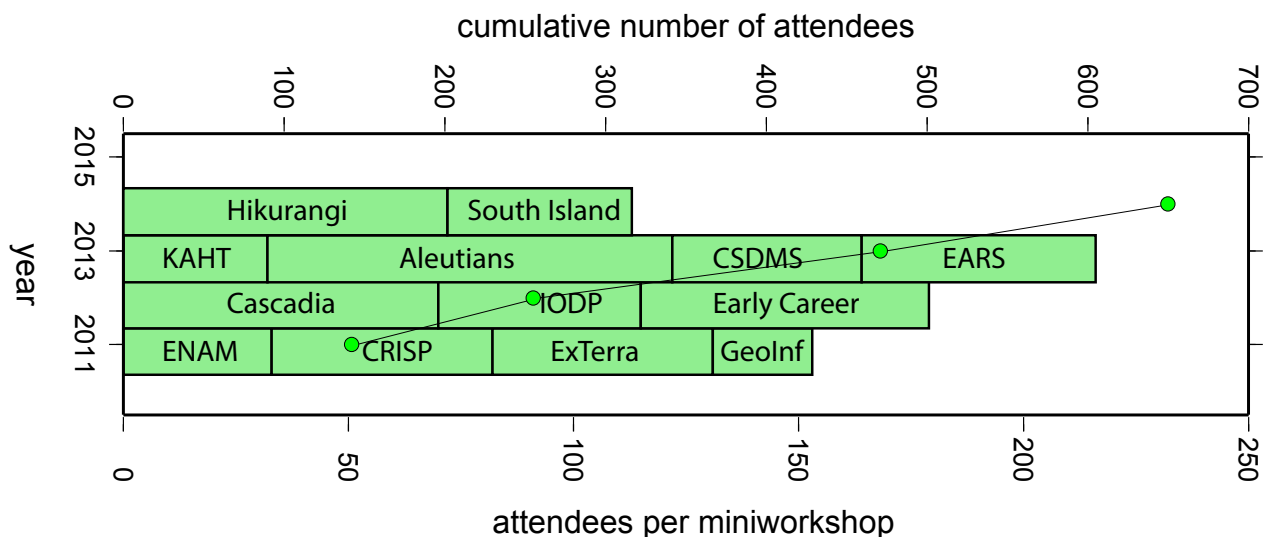


Figure 4.6. Attendance at GeoPRISMS Mini-workshops at the Fall AGU. 2011: ENAM=East North American Margin; CRISP=Costa Rica Seismogenic Project; ExTerra=Exhumed Terranes; GeoInf=GeoInformatics. 2012: Cascadia=Marine Geophysics at Cascadia; IODP=IODP opportunities in SCD; Early Career=GeoPRISMS/EarthScope luncheon. 2013: KATH=Kermadec Arc Havre Trough; Aleutians=logistics preparation workshops; CSDMS=opportunities with the Community Surface Dynamics Modeling System; EARS=planning and logistics.

#### *AGU Activities: Townhall Meeting*

The Office organizes a Townhall Meeting at each Fall Meeting of the American Geophysical Union, typically on the Monday evening of the AGU week. The Townhall is generally attended by some 150 participants who have the chance to mingle with GSOC members and NSF representatives, listen to talks on GeoPRISMS activities and science talks, and view the posters of students that are competing for the Best Student Presentation.

#### *AGU Activities: Best Student Presentation*

Each year we have a competition for best student presentations. We give two awards (one for best poster, one for best talk) and up to two honorable mentions in each category. The Office invites judges from the GeoPRISMS community, former awardees, and GeoPRISMS postdocs. At least three judges are assigned to each presentation. The evaluations are compiled and used by the GEAC to rank the presentations. More detail on the student presentation competition is provided in the Education and Outreach section.

## Distinguished Lecturer Program (DLP)

The Office organizes a program to bring GeoPRISMS science to undergraduate and graduate institutions within the US. Each year we have up to eight distinguished speakers who travel to three or four institutions each. Speakers sign up generally for two years and receive an honorarium of \$1000 per year. The Office invites applications to the DLP in the early summer via website, newsletter, listserv, Facebook, and through printed brochures that are sent out to 750 institutions. The Office coordinates the speakers' schedules with the schools that are awarded a distinguished lecturer within the constraints of the speaker's availability and interests in addition to the diversity of the schools visited. The Office also provides travel logistics and reimburses the speakers for their travel. The schools are responsible for accommodation and local expenses. More details on the DLP are provided in the Education and Outreach section.

### 4.3 Data Management - GeoPRISMS and MARGINS Data Portals

The MARGINS and GeoPRISMS Data Portals host data collections for each program and provide a range of data-related services to the community. To support interdisciplinary science goals, the MARGINS Data Portal (<http://www.marine-geo.org/portals/margins/>) was established in fall 2003 in response to a program call for a dedicated data system that would facilitate the open and timely exchange of data. The GeoPRISMS Data Portal (<http://www.marine-geo.org/portals/geoprisms/>) came on-line in 2011 (Figure 4.7), leveraging the same data system infrastructure. The

Portals and related resources are developed as part of the NSF-supported Interdisciplinary Earth Data Alliance (IEDA) facility based at Lamont-Doherty Earth Observatory.

To overcome traditional challenges in determining what field programs had been conducted in an area, who was involved, what kinds of data were collected, and who holds the data,



Figure 4.7. The MARGINS and GeoPRISMS Data Portals share a common web interface and include links to program information, data, bibliographies, and dedicated searches.

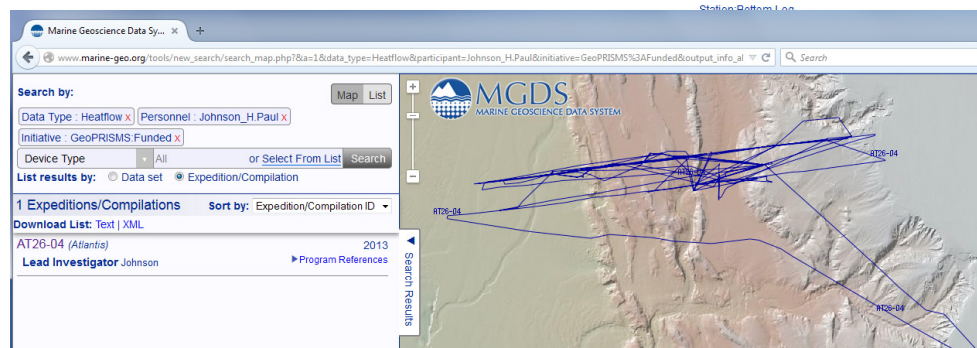
the Data Portals provide services that include web-based, searchable integrated catalogs containing field expedition and modelling/lab experiment information, links to the diverse terrestrial and marine data sets generated under MARGINS and GeoPRISMS awards, a bibliographic database, and PI tools for data management. The GeoMapApp data exploration and visualization tool (<http://www.geomapapp.org/>) provides additional access points to field program data and information and to other data sets of relevance to the community. Efforts promoting greater sharing and interaction with domestic and international data centers have also been pursued.

### System Description

The backbone of the MARGINS and GeoPRISMS Data Portals is an integrated metadata catalog and data repository that provides information on field programs (who, what, when and where), inventories of sensor data and samples, and links to download associated data files which reside either within the Data Portal system or at distributed repositories such as IRIS and UNAVCO.

To accommodate the varied needs of scientists for accessing the broad range of data generated under the MARGINS and GeoPRISMS programs, two main access tools have been developed. One is a browser-based tool that offers a customized [filtered search](#) using a range of parameters such as geographical bounds, data type, and investigator name. It is available in both map-based and text-based formats (Figure 4.8).

Figure 4.8. Screen shots showing the GeoPRISMS Data Portal web search interface with the text-based search on top and map-based search at bottom. In this example, a search was done for Cascadia heat flow data related to investigator H. Paul Johnson. The search returned a downloadable data set gathered from thermal blankets during GeoPRISMS-funded cruise AT26-04.



The second access tool, GeoMapApp (<http://www.geomapapp.org/>), is a platform-independent graphical application that allows users to visualize, explore, manipulate, and extract data holdings within a map interface. For each MARGINS and GeoPRISMS Focus Site, highlighted menus allow quick access to program-funded data sets and tables that can be viewed and compared with thousands of other built-in data sets such as sonar (multibeam, side-scan), focal mechanism solutions from the [Global CMT](#) catalog, deep-sea drilling holes, and locations of samples and stations from program-funded field expeditions (Figure 4.9).

In addition to the search tools and GeoMapApp, the Data Portals employ standards-compliant web services to provide data holdings in flexible formats that allow users greater choice of data visualization and analysis tools such as ArcGIS and Google Earth.

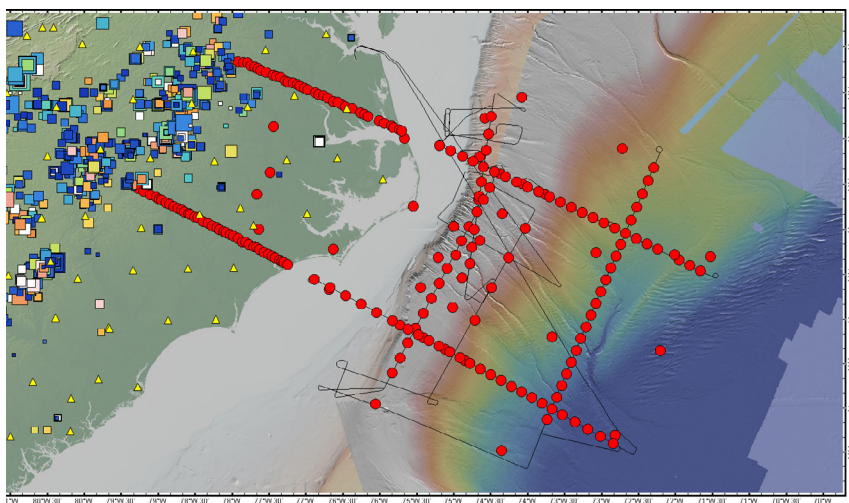


Figure 4.9. In this image of the ENAM primary site, generated from GeoMapApp, red circles give locations of land seismometer and seafloor OBS instruments used as part of the ENAM Community Seismic experiment. ENAM-CSE multi-channel seismic lines were collected during R/V Langseth's cruise MGL1408 (track line in black). The high-resolution Law of the Sea east coast bathymetry grid is plotted for the downslope areas, with artificial illumination from the north. Note the incised channels on the slope, and the large wave forms in the east. Small yellow triangles mark the position of EarthScope USArray stations. On land, squares denote the location of EarthChem geochemistry samples, which in this image are colored on MgO content and scaled according to Al<sub>2</sub>O<sub>3</sub> values.

sets as a formal part of the scientific record, digital object identifiers (DOIs) are assigned to many data sets [cataloged](#) in the GeoPRISMS and MARGINS Data Portals. Data DOIs allow data sets to be discovered programmatically through systems such as DataCite. Information on downloads of contributed data sets is provided to investigators via e-mail letters that are sent at regular intervals.

IEDA provides small grants to help PIs rescue data (e.g., by digitizing analog records). MARGINS researcher James Gill received an IEDA Data Rescue grant in 2013 to help consolidate and preserve geochemical data collected in the IBM focus site.

#### *PI Services*

The Data Portal offers a [Data Management Plan tool](#) and a Data Compliance tool to help PIs with NSF proposal data management requirements (see Appendix A10 for the NSF MARGINS and GeoPRISMS Data Policies).

More than 360 individual PIs have generated over 1,100 data management plans using these tools. On-line submission and registration web pages allow PIs to register rock sample information (through [SESAR](#)) and to [contribute](#) data sets with a range of formats. The ability to cite data sets in a manner similar to the citation of a published article has undergone rapid development in recent years. To help promote data



## Available Data

Currently, the data collection includes information and data for almost all MARGINS-funded field programs (22 terrestrial, 63 marine) covering projects ranging from sampling of volcanic rocks on Guam, deployment of ocean-bottom seismometers in the Gulf of California, sediment coring in the PNG and New Zealand Focus Sites, to earthquake microseismicity and tomographic experiments across

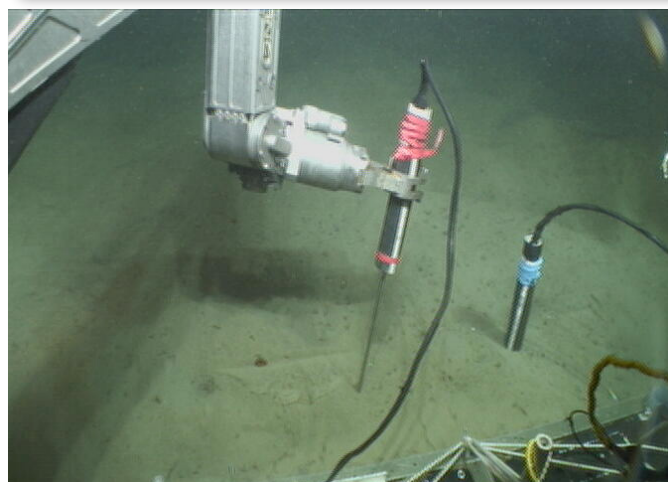
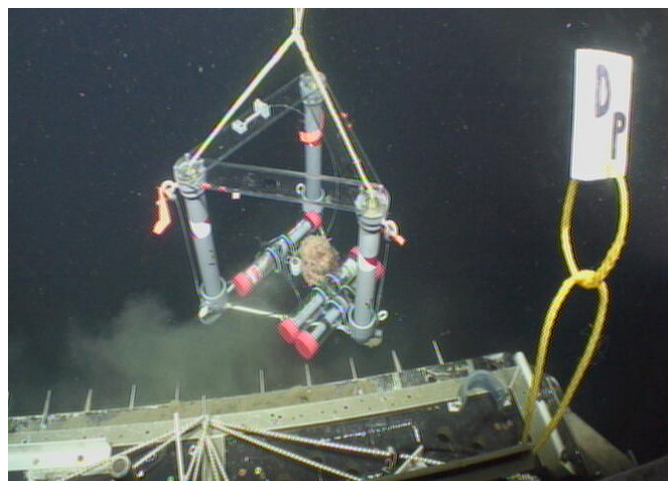


Figure 4.10. Jason II Virtual Van video frame grabs for the 2013 Johnson-Solomon-Harris Cascadia GeoPRISMS-funded Atlantis cruise AT26-04. (Top) Recovery of a Mosquito fluid flow sensor from the seafloor. (Bottom) Image of the Jason II arm used to deploy a pair of heat flow sensors with each unit typically left in the sediment for 20-30 minutes before recovery.

Central America. Available data sets for the land programs include rock and sediment sampling studies (analytical geochemical and radionuclide data), geodetic and active/passive seismometer experiments (access via links to IRIS, UNAVCO, and UTIG), and lacustrine fieldwork. Data sets submitted for the marine expeditions are equally broad-ranging and include bathymetry, side-scan sonar, seismic reflection and OBS data, gravity and magnetics data, water column physical and chemical properties from XBT, MAPR, CTD, and ADCP devices, sound velocity data, Alvin and Jason ocean floor photography, heat flow, and rock, fluid, and sediment sampling information. A significant proportion of the information and data from MARGINS-funded programs was contributed in the 2011-2012.

At present, the GeoPRISMS data collection provides information and data for more than twenty GeoPRISMS-funded and closely related programs. Submitted data sets include a geodetic velocity field of the East African Rift System, a 3-D shear wave tomographic velocity model for Cascadia (accessed through IRIS), multi-channel seismic reflection, CHIRP sub-bottom profiling data and high-resolution bathymetry on the Aleutian, Cascadia and ENAM margins, and heat flow, water column data, and Jason II dive photos in Cascadia. Deployment/recovery field information (Figure 4.10) and links to data for the Cascadia Initiative OBS project are also provided. Instrument location information and data from GeoPRISMS projects has also been added to GeoMapApp, under the Focus Sites tab (Figure 4.11).

In addition to compiling and serving data for MARGINS- and GeoPRISMS-funded programs, a significant focus of the

Data Portal has been to develop access to other field and derived data sets relevant for MARGINS and GeoPRISMS research. These include geodesy, DSDP/ODP drilling data, high-resolution land topography, regional geophysical datasets from the NGDC, SIO, and LDEO collections, and the Global CMT catalog (formerly Harvard CMT), all of which can be accessed through GeoMapApp. Another example is the cleaning of swath bathymetry data from more than 60 Cascadia cruises for inclusion in the Global Multi-Resolution Topography ([GMRT](#)) synthesis that forms the base map for all of the Data Portal map clients as well as for GeoMapApp.

Collaborations with domestic and international data centers and institutions including IODP, IRIS, UNAVCO, JAMSTEC (Japan), and BGR and GEOMAR (Germany) were initiated by the Data Portal and have fostered the development of Open Geospatial Consortium standards-compliant web services for dynamic access to distributed data holdings. These contacts have also resulted in access to several high-quality regional datasets contributed by US-based and international collaborators, including bathymetry and magnetics grids for Central America, bathymetry from the Nankai-IBM area, and bathymetry and acoustic backscatter data for a areas surveyed as part of the US Law of the Sea project.

### *Bibliography*

Citation details for publications stemming from GeoPRISMS awards and from closely related projects have been added to an on-line web-accessible [bibliographic database](#) (Figure 4.12). Parameters including title, author, journal and year can be used for searches, and each paper is listed with links to the article, data, and field expedition where appropriate. On-going collaborations with the Elsevier publishing company have resulted in links from electronic journal articles to the downloadable geochemical and geophysical datasets held within the Data Portal collection. Participation in the newly-established COPDESS group is helping foster links between data repositories and journals, as a means of improving the convenience with which readers can access data.

The GeoPRISMS bibliographic database with information (where available) about funding has been expanded greatly in preparation for this review and currently contains more than 1,100

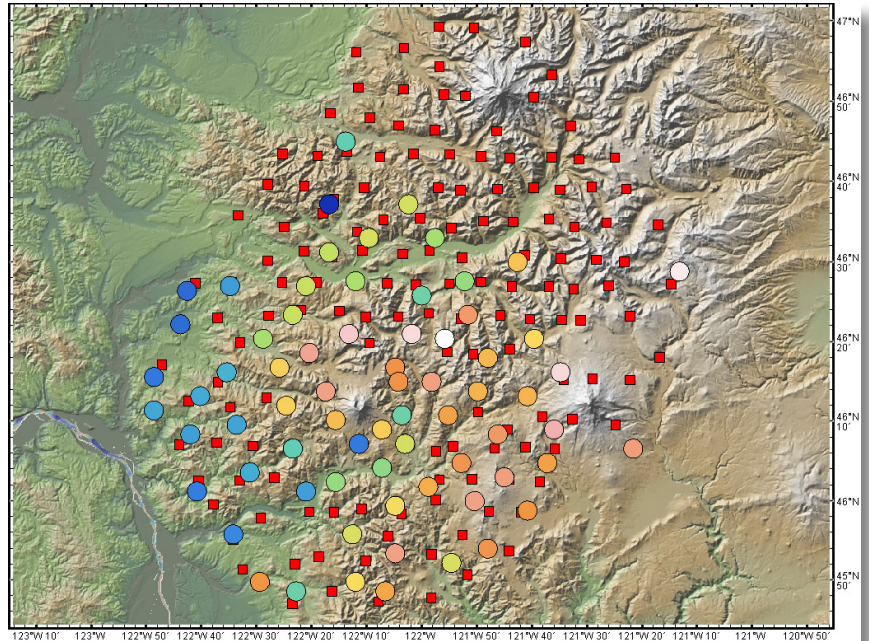


Figure 4.11. For the multi-institution Cascadia iMUSH project, MT instrument positions are shown as red squares, and seismometer locations are plotted as circles that are colored with station elevation (warm colors = higher). Links to IRIS are provided. Background map is the USGS NED 10m high-resolution relief model. Image created using GeoMapApp. Built-in menus provide links to GeoPRISMS data sets and related information and to other externally-funded data sets of interest for each primary site.

GeoPRISMS References Search

Portal Links

- Portal Home
- Data Policy
- What's New
- Project Information
- National Links
- MediaBank
- Tutorials
- GeoPRISMS References
- MARGINS References
- GeoMapApp
- Virtual Ocean
- Field Data

List Data by Site

Select a Site...

Authors	Year	Title	Journal	Data	Expedition/Compilation(s)	Funding Source(s)
Yopopinski, G.M., S.T. Brown, P.B. Kilemon, J.D. Vervoort, M. Portnyagin, K.W.W. Sims, K. Hoernle, B.R. Jicha, and R. Werner	2015	The Role of Subducted Basalt in the Source of Island Arc Magmas: Evidence from Seafloor Lavas of the Western Aleutians	Journal of Petrology	View Data	TIN182	GeoPRISMS Related
Williams, C.A. and L.M. Wallace	2015	Effects of material property variations on slip estimates for subduction interface slow-slip events	Geophys. Res. Lett.	View Data		GeoPRISMS Related
Chadwell and E. Norabuena	2005	locking in the Peru-Chile trench with GPS and acoustic measurements	Nature	View Data	DRFT05RR	GeoPRISMS Related
Gaillardet, J., B. Dupre, P. Louvat and C.J. Allegre	1999	Global silicate weathering and CO <sub>2</sub> consumption rates deduced from the chemistry of large rivers	Chemical Geology			GeoPRISMS Related
Gao, H. and Y. Shen	2014	Upper mantle structure of the Cascades from full-wave ambient noise tomography: Evidence for 3D mantle upwelling in the back-arc	Earth and Planetary Science Letters	View Data	Cascadia_Shen	GeoPRISMS Funded
Gao, H. and Y. Shen	2015	Validation of recent shear wave velocity models in the United States with full-wave simulation	J. Geophys. Res.	View Data	Cascadia_Shen	GeoPRISMS Funded
Gao, H., E.D. Humphreys, H. Yao and R.D. van der Hilst	2011	Crust and lithosphere structure of the northwestern U.S. with ambient noise tomography: Terrane accretion and Cascade arc development	Earth and Planetary Science Letters	View Data	EarthScope_USArray	GeoPRISMS Related
Gao, S.S., K.H. Liu, and M.G. Abdelsalam	2010	Seismic anisotropy beneath the Afar Depression and adjacent areas: Implications for mantle flow	J. Geophys. Res.	View Data	EARS_EAGLE	GeoPRISMS Related
Gashawbeza, E.M., S.L. Klempner, A.A. Nyblade, K.T. Walker	2004	Shear-wave splitting in Ethiopia: Precambrian mantle anisotropy locally	Geophys. Res. Lett.	View Data	EARS Ethiopia-Kenya-BSE	GeoPRISMS Related

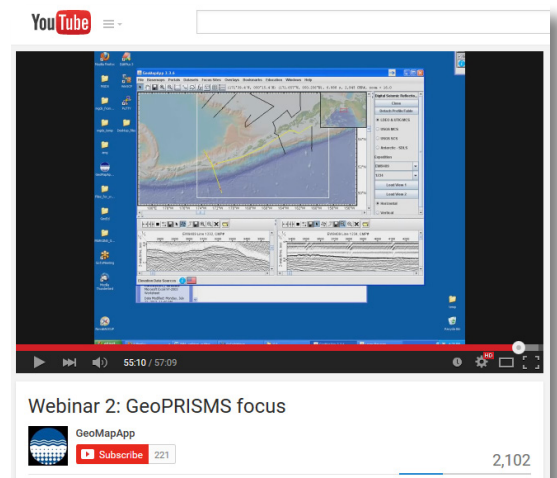
Figure 4.12. Screen shot of part of the GeoPRISMS bibliography. Filtering can be done using keywords. Search results can be sorted by clicking any of the column headers. Links to articles, data, and field program information are provided.

the Data Portal web page lists recent activity and contributions. A formal presentation is also given by Data Portal staff at each GeoPRISMS Steering and Oversight Committee meeting.

Members of the GeoPRISMS and MARGINS communities have participated on the IEDA User and Policy Committees and have taken part in workshops and surveys led by the Data Portal team. Community members have also been polled to help uncover existing datasets of interest to GeoPRISMS, and to help guide future developments of data-related services.

An IEDA exhibit booth at AGU and attendance at other national and international meetings helps the IEDA Data Portal team stay closely in touch with MARGINS and GeoPRISMS community members.

Figure 4.13. A snapshot from the GeoPRISMS-focused webinar shows multi-channel seismic profiles across the Aleutian arc. The webinar, created in July 2013 and available on YouTube™, has been viewed more than 2100 times.



citations. The MARGINS database contains nearly 600 citations. Plans are underway to merge the GeoPRISMS and MARGINS bibliographic databases.

### Community Outreach

Interaction with GeoPRISMS Office staff and with GeoPRISMS PIs is an integral part of the work of the Data Portal team. Communication with individual PIs helps with the flow of data and information into the Portal. IEDA representatives attended each of the GeoPRISMS Planning and Implementation workshops, helped convene a GeoPRISMS-sponsored mini-workshop at AGU, and ran a GeoPRISMS-specific GeoMapApp webinar (Figure 4.13).

To help keep community members abreast of recent developments, a report about the Data Portal is written twice yearly for inclusion in the GeoPRISMS Newsletter, and the GeoPRISMS Office e-mail listserv is used to disseminate important Data Portal events. A News section on