



MARGINS 2009 Review

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4.1 MARGINS Management Structures

Research within MARGINS is funded through an NSF panel, with regular (annual) program deadlines, normal peer-review and panel evaluation procedures. Separate from the panel, the MARGINS Steering Committee (MSC) evaluates progress in the program, helps shepherd and maintain the Science Plan, and fosters communication among the broader MARGINS community and between that community and NSF. The MARGINS Office provides logistical support for the numerous programmatic activities recommended by MSC and receives funding from NSF to do that; the primary goal of Office activities is to foster communication and integration across a broad multidisciplinary community. Each of these elements plays an important part in the MARGINS program.

MARGINS Panel

The MARGINS program has an annual solicitation, most recently with a July 1 deadline, for proposal submissions. Text of the most recent solicitation (NSF07546) can be found in the Supplementary Materials, as can a complete list of awards. The figure, below, shows the numbers of projects funded, per year, over the lifetime of the program.

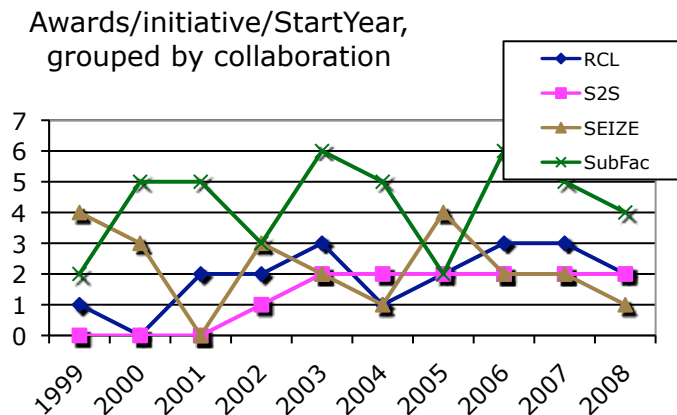


Figure: MARGINS funding history by project.

The proposal evaluation process follows NSF's normal peer-review procedures and to avoid conflicts of interest MSC has no direct input into this process, except where individual MSC members have been asked for reviews. NSF program officers provide statistics on numbers of submissions and lists of awards once the decisions have been publicly announced. MSC does inform the broader community, including the review panel, of perceived priorities, through Science Plans, published white papers, Newsletters, and similar vehicles. Also, the MSC Chair is invited to make a short presentation each year to the review panel, summarizing recent progress and perceived gaps and needs, but then leaves the room before proposals are discussed. This avoids both real and perceived conflicts of interest.

MARGINS Steering Committee (MSC)

The committee comprises 11-15 members, who serve three-year terms, on average. The committee meets twice a year (Spring and Fall) and their work involves, among others:

- prepare white papers, workshop proposals and program summaries;
- foster growth of interdisciplinary communities and proposals;
- review progress toward the various science plans and subsequent updates, and encourage integration and synthesis of MARGINS results;
- develop, promote and nurture national and international collaboration and communicate MARGINS opportunities worldwide;
- guide development of effective databases, education programs, and other infrastructure; and
- provide advice and feedback to NSF program managers and the MARGINS chair concerning issues that arise during the execution of the program.

Each Steering Committee member is expected to work actively to promote MARGINS in their respective community by recognizing the need and theme of workshops and/or theoretical institutes and to work with their community to prepare the necessary proposals.

Nomination to the committee is either via self-nomination or recommendations made by committee members, followed by approval by MSC. MARGINS seeks for the committee to remain balanced, dynamic and unbiased with two constraints on membership: 1) Once a person has served on the steering committee, they cannot re-serve (unless they are being considered for the steering committee chair), and 2) There cannot be institutional duplication by committee members. In selecting members, a balance is also attempted between the four Initiatives and between subdisciplines as much as possible; typically

Current MSC membership (October, 2008)

Geoff Abers (Chair)	Lamont-Doherty Earth Observatory
Thomas Dunne	U.C. Santa Barbara
Nathan Bangs	University of Texas – Austin
Mark Behn	Woods Hole Oceanographic Inst.
Susan Bilek	New Mexico Tech
Cynthia Ebinger	University of Rochester
James Gill	U.C. Santa Cruz
Mike Gurnis	California Institute of Technology
W. Steven Holbrook	University of Wyoming
Steven Kuehl	Virginia Institute of Marine Science
Jeffrey Ryan	University of South Florida
Demian Saffer	Pennsylvania State University
Daniel Stockli	University of Kansas
John Swenson	University of Minnesota Duluth

1-2 members also provide expertise in educational programs. All 52 past and present MSC members are listed in the Appendix.

Steering Committee Chair

The Steering Committee Chair both presides over the MSC meetings, and directs the Office. The Chair rotates every 3 years, typically, moving the Office and all associated infrastructure each time. NSF program officers appoint the Chair. Typically the award that supports Office activities and staff includes partial remuneration for the Chair.

MARGINS Chairs

1996-1997	Dale Sawyer, Rice University
1997-2000	Brian Taylor, University of Hawaii
2000-2003	Garry Karner, Lamont-Doherty Earth Observatory
2003-2006	Julie Morris, Washington University in St. Louis
2006-2009	Geoff Abers, Boston Univ. (06-07) & Lamont-Doherty Earth Observatory

MARGINS Education Advisory Committee (MEAC)

MEAC provides advice and guidance on educational programs coordinated by MARGINS. It was established following the 2004 Review and a 2005 Education Planning Meeting, and meets roughly once per year, often in conjunction with a MSC meeting. It also meets via regular conference calls. MEAC activities are described in the Education and Outreach section of this document.

Current MEAC membership (October 2008)

Geoff Abers (ex-officio)	Lamont-Doherty Earth Observatory
Rosemary Hickey-Vargas	Florida International University
Cathy Manduca	Carleton College
Don Reed	San Jose State University
Jeff Ryan	University of South Florida
Andrew Goodwillie (ex-officio)	Lamont-Doherty Earth Observatory

4.2 MARGINS Office Activities

The MARGINS research program involves focusing expertise and resources in several study areas and across many disciplines. Research is conducted using nested multidisciplinary programs of field experiments, numerical simulations and laboratory analyses. MARGINS funding is awarded through the regular NSF review system, with a separate panel of scientists and program managers that originate from OCE and EAR. The MARGINS Office coordinates meetings, logistics and scientific efforts that are not directly supported by funding to PIs. The MARGINS Office operates under the direction of the Chair of MSC, reporting to MSC, which acts as an informal oversight body, and is funded by NSF. The Office's primary mission is to facilitate and coordinate MARGINS science, and to do so undertakes several common activities:

- 1. Program Planning and Coordination.** The Office schedules, organizes and provides logistical support for regular MSC meetings, twice yearly, along with gatherings at AGU and smaller working groups. The Office prepares pre-meeting materials, produces and distributes meeting minutes, arranges travel, and invites relevant visitors to provide content. The Chair also attends numerous town meetings and planning workshops to aid in program planning, internationally, at NSF and elsewhere in the U.S.
- 2. Workshop Support.** The Office provides encouragement, guidance and logistical support to proponents willing to organize major conferences, and organizes smaller meetings. These workshops have been the cornerstone of the MARGINS effort at building large, new interdisciplinary science communities, and nurturing creative new proposals. Large workshops and MARGINS Theoretical & Experimental Institutes (TEIs) typically involve 75-150 participants (listed in Appendix), and participant expenses are funded through separate grants or supplements. Conveners have the choice of submitting proposals through the Office, after MSC review, or submitting proposals directly and managing the meetings themselves. Roughly 90% submit through the Office, in order to take advantage of logistical support the Office staff provides including budget management, pre-meeting coordination, advertising, application handling, travel and on-site logistics. The goal is to free the conveners of logistical concerns, and focus on the scientific objectives for the meeting.
- 3. Communication.** While research is done at individual institutions, integration and synthesis requires a good understanding of all other aspects of the program, and requires an informed community. One primary vehicle is the web site (www.nsf-margins.org) shown below, and the associated e-mail list server, managed by the Office. These have become central clearinghouses for information on science planning, research, job opportunities, funding, meetings, and documents, both nationally and internationally. The web site also serves as an easily-found portal to science planning documents, database servers, reports on Initiative progress, educational resources, the MARGINS Bibliography, and a community discussion forum.

The Newsletter, published twice yearly, provides summaries of MARGINS-related activities and alerts the community to events, new opportunities and other issues of interest. Finally, MARGINS hosts receptions, forums and town-hall meetings at major international functions such as Fall AGU.



Figure: MARGINS web page, www.nsf-margins.org

- 4. International Collaboration.** Since most MARGINS fieldwork takes place outside the U.S., international collaboration is often essential. The Office facilitates collaborations in several ways: it co-sponsors workshops with international participants; it provides a single point-of-contact where collaborative agreements can be coordinated; the Chair can participate in a variety of planning committees; and the Chair serves as the U.S. representative to InterMARGINS (the international group of MARGINS-like research initiatives).

Anatahan Eruption



Photo courtesy of Allan W. Sauter, May 10, 2003

“Anatahan volcano erupted at about 9:00 GMT on May 10. The eruption was observed from a small ship deploying seismographs for the MARGINS Mariana Subduction Factory imaging project. A helo sent out by the CNMI emergency management office reported an ash cloud reaching to about 40,000 ft. The eruption continued on May 12. The island had been visited by the team on May 6 and there were no indications of an eruption at that time. The island is currently uninhabited. According to the Smithsonian web site, the volcano has not previously erupted during historic times.” Doug Wiens - Washington Univ.; Allan Sauter – Scripps; Juan Camacho - CNMI EMO

- 5. Event Response.** The MARGINS Office serves as a point of contact to facilitate rapid response when critical events occur, as formulated in an Event Response Policy (available on www.nsf-margins.org/eventresponse.html; see Appendix). In May 2003, the Anatahan, Marianas volcano began its first modern eruption, fortuitously during a MARGINS deployment of seismographs there; a JVGR Special Volume (see Supplementary Materials) details these findings. Rapid responses coordinated through the Office were fielded after this and a subsequent eruption, providing invaluable data shortly after eruption. As described in the Policy, the response is supported through the MARGINS Office and NSF, after a short informal written request and approval by both MSC and NSF. The advantage of this approach is the rapid turnaround which is needed for sudden events, and the ability of the Office to proactively involve a broad range of scientists.

- 6. Data Management.** Broad, cross-disciplinary scientific syntheses depend on easy data archival, retrieval and exchange between many communities. The MARGINS database hosted by MGDS is now well-populated and the Office assists efforts at improving both the access and completeness of the collection; a detailed description follows. The Office also fosters interaction between the scientific community and the database developers.
- 7. Education and Outreach.** The MARGINS Office operates several components of the Education program, described in the next chapter, with consultation of the MARGINS Education Advisory Committee, MEAC (established in 2005).

 - A. MEAC meets approximately once per year to review progress and plan new endeavors, and starting 2008 has monthly conference calls.
 - B. The MARGINS Distinguished Lecture Program begins its fourth year in Fall 2008. This program supports 4-8 MARGINS scientists across all initiatives to give both technical and general talks to a variety of colleges nationally that do not normally have access to this kind of speaker (see Education chapter). MSC recommends speakers, and the Office advertises the program broadly, coordinates travel schedules, has managed recordings of many talks, and provides other logistical support.
 - C. Under separate funding from NSF's Division of Undergraduate Education, in 2007 MARGINS and MEAC began development of MARGINS "Mini-Lessons", as described in the next chapter. MARGINS Office staff contribute to this effort through meeting coordination, recruitment and tracking of developers, and publicity of the program.
 - D. MARGINS sponsors a Best Student Paper/Poster award at the Fall AGU meeting; past recipients are listed in the Appendix. This program provides recognition of developing new scientists engaged in MARGINS research. A Student Research Forum and Reception at the AGU meeting also provides student researchers with an opportunity to become part of the broader community. The Office manages the application, judging, and awarding of the Prize, as well as the Forum event.
 - E. A variety of other educational material is being organized on the MARGINS website. These include video/quicktimes of Distinguished Lecturers, powerpoint lectures from keynote presentations at various workshops and TEIs, and daily on-line travelogs from Rapid Event Responses.
 - F. An on-line MARGINS community discussion forum was established on the MARGINS website early in 2008 to disseminate ideas and information on germane issues. As of the end of October 2008, the postings have been uniquely viewed more than 4,250 times.

Office Operations

The MARGINS Office moves and the Office staff change every three years, typically, when the chairmanship rotates. It currently resides at Lamont-Doherty Earth Observatory (see MARGINS Steering Committee for list of past locations). Since 2003, the Office has had two full-time equivalent (FTE) staff members, typically a full-time Administrator who handles operations and a full-time PhD-

level Science Coordinator who deals with larger-scale issues. Currently, the staff consists of a half-time Administrator (Kristen Woodford), a MS-level full-time Office Coordinator (Niva Ranjeet), and a half-time PhD-level Senior Science and Education Coordinator (Andrew Goodwillie) who otherwise works for the MARGINS database group.

The Office is supported by a 3-year grant to the Chair that covers salaries and routine operating costs, including MSC meetings. Most major workshops are funded by separate awards through the Office, and minor additional undertakings are supported as supplements. The undergraduate Mini-Lesson educational development effort is supported separately, through a grant from NSF's Education and Human Resources Directorate, Division of Undergraduate Education.

4.3 MARGINS Data Portal

The MARGINS Data Portal was established in fall 2003 in response to a program call for a dedicated data system to facilitate open and timely exchange of data in support of the interdisciplinary science goals of the program. Prior to this time, only a small proportion of data from modern marine and terrestrial programs relevant for MARGINS research was available in public web-accessible databases. Those data that were available were served through disparate data resources that were difficult to readily integrate (underway trackline geophysical data at NGDC, drilling data through ODP and NGDC, sediment cores at institutional sample repositories, seismometer data at IRIS, geodetic data at UNAVCO). Access to widely-relevant environmental datasets like detailed seabed bathymetry data required prior knowledge of who held these data followed by direct contact and negotiation for access. No central catalog of basic expedition information existed and it was difficult to determine what programs had been conducted in an area, who was involved, and what kinds of data were collected.

The MARGINS Data Portal (www.marine-geo.org/portals/margins) was built to address these limitations, with the primary goal of providing full cataloging, open access, and long-term preservation of both terrestrial and marine data collected during MARGINS programs. See Appendix for the NSF MARGINS Data Policy. The Portal now provides access to basic expedition information and field data for the majority of all MARGINS-funded field programs, as well as a broader suite of geoscience data relevant for MARGINS research. A variety of data access tools has been developed as part of the data system to serve different needs of the diverse MARGINS research community. Efforts to initiate greater data sharing with international data centers have also been pursued. Cumulative data downloads by users of the Data Portal since late 2005 are close to a terabyte corresponding to over 250,000 individual data files.

System Description

The backbone of the MARGINS Data Portal is an expedition metadata catalog and data repository that provide information on field programs (who, what, when and where), inventories of sensor data and samples, relevant metadata and the links to associated data files which reside either within the Data Portal or at distributed repositories. The database system is designed to leverage relevant existing data resources rather than duplicate data holdings and provides a framework for a broader distributed data system.

To accommodate the different needs of scientists for accessing data, two data access tools have been developed; a browser-based text search tool for researchers wanting, for example, to find specific data sets of interest or all data from a cruise or region; and a graphical application, GeoMapApp (www.geomapapp.org), to visualize and explore data holdings in a map interface. For each MARGINS Focus Site, users can visualize available sonar datasets (multibeam, side-scan), plot focal mechanism solutions from the Global CMT catalog, view data from deep-sea drilling holes, and plot locations of samples and stations from MARGINS-funded programs. The Data Portal is adopting standards-compliant web services to serve data holdings in order to provide users with greater flexibility to use the data visualization and analysis tool of their choice (e.g. ArcGIS, NASA World Wind). The MARGINS Data

Portal has been developed in parallel with the Ridge 2000 Data Portal, as part of the Marine Geoscience Data System (MGDS) thereby leveraging development costs across multiple projects. Tools and services for accessing data are common across these projects.

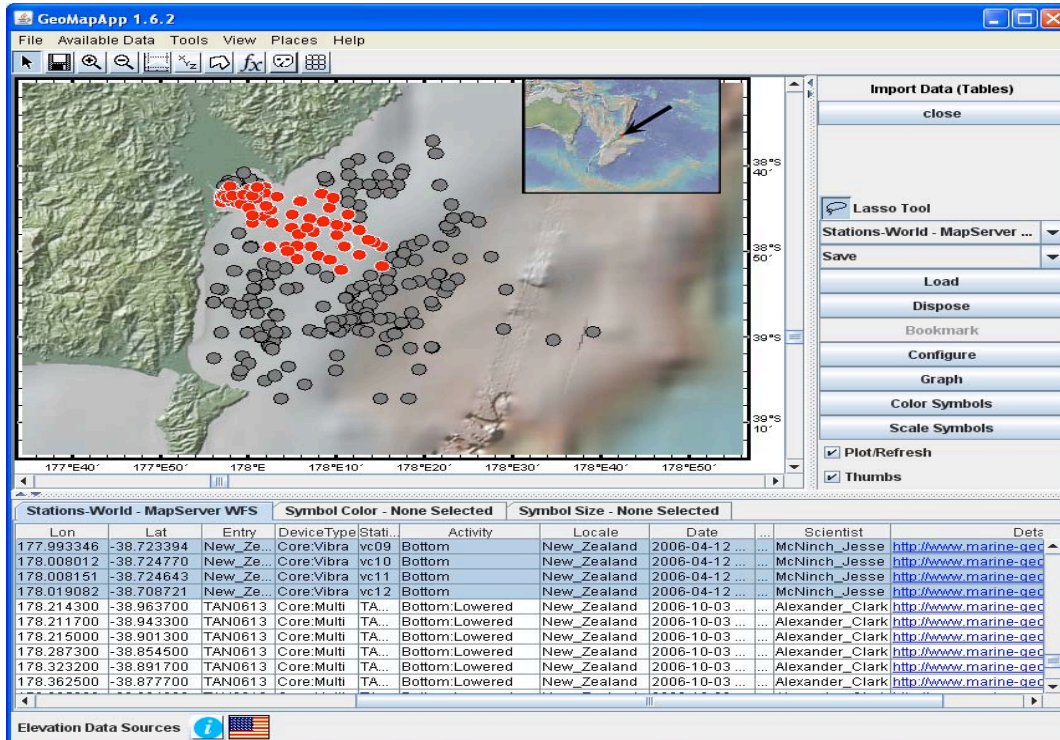


Figure: Example of GeoMapApp map viewer for the New Zealand Waipaoa Focus Site showing location and details of sediment cores collected during MARGINS-funded expeditions.

Available Data

Currently, the MARGINS database contains information and data for 62 MARGINS-funded field programs (11 terrestrial, 51 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 tomographic experiments across Central America. Available data for the 11 land programs range from rock sampling studies (analytic data), to seismometer and geodetic studies (access via links to IRIS and UNAVCO). Data submitted from the 51 marine expeditions are diverse and include bathymetry, side-scan sonar, seismic reflection data, gravity and magnetics data, water column data from XBT, MAPR, CTD, and ADCP devices, sound velocity data, Alvin and Jason bottom photography, heat flow, and rock, fluid, and sediment sampling information. At present MARGINS data holdings total almost 30,000 data files corresponding to a disk volume of 340 GBytes, stored locally.

National and International Collaborations

In addition to compiling and serving data from MARGINS-funded expeditions, a significant focus of the Data Portal has been to develop access to other global data sets relevant for MARGINS research. These include DSDP/ODP drilling data, SRTM 90m land topography, regional underway gravity and

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magnetics datasets of the NGDC, SIO, and LDEO collections, and the Global CMT catalog (formerly Harvard CMT), all of which can be accessed through the map browser tool GeoMapApp. Collaborations with other national and institutional data centers including IODP, IRIS, UNAVCO, NGDC, SIO and EarthChem 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. As a result, all of these data centers now employ web services to make components of their data holdings openly available.

The Data Portal has also been active in initiating dialogue regarding data-sharing with international data centers, and hosted a dedicated workshop in 2007 to exchange approaches for data distribution and access. These contacts have resulted in availability to several high-quality regional data sets contributed by international collaborators, including bathymetry and magnetics grids for Central America and bathymetry in the Nankai-IBM area (see example in following figure).

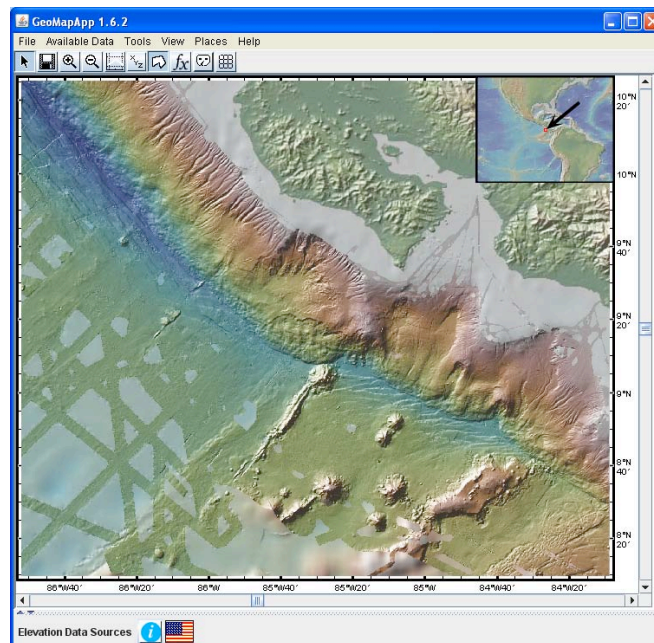


Figure: Central America multibeam bathymetric compilation grid from Weinrebe et al. accessible through GeoMapApp.