MARGINS Program

www.nsf-margins.org

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Program Objective

To understand the complex interplay of processes that govern the evolution of continental margins

Program Overview

Continental margins are the Earth's principal loci for producing hydrocarbon and metal resources, for earthquake, landslide, volcanic and climatic hazards, and for the greatest population density. Despite the societal and economic importance of margins, many of the mechanical, fluid, chemical and biological processes that shape them are poorly understood. Progress is hindered by the sheer scope of the problems and by the space and time scales as well as the complexities of the processes. To overcome these obstacles, the earth science community has identified the outstanding scientific problems in continental margins research and the MARGINS Program is promoting research strategies that redirect traditional approaches to margin studies. In particular, the MARGINS Program focuses on the coordinated, interdisciplinary investigation of four fundamental research initiatives described on four additional posters, respectively. Each initiative is associated with one-two focus sites (maps shown to the right), research locations selected by the community to address the complete range of field, experimental and theoretical studies, over the full range of spatial and temporal scales needed to address fundamental questions associated with each initiative.

Program Structure

The MARGINS Program is funded by the National Science Foundation (NSF), and is driven by input from, and interaction with the earth science community.

MARGINS Steering Committee

MARGINS Steering Committee comprises 11-15 members who serve three years terms, on average. The committee meets twice a year and their work involves, among others:

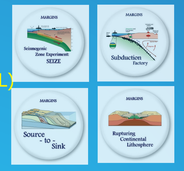
– prepare white papers and workshop proposals;
– review the progress of the program according to the various science plans and feedback from program managers;
– help promote the MARGINS program in the scientific community; and
– provide advice and feedback to NSF program managers and the MARGINS chair concerning issues that arise during the execution of the program.

The ***MARGINS Education Advisory Committee*** provides more specific guidance to the Steering Committee on education and outreach activities.

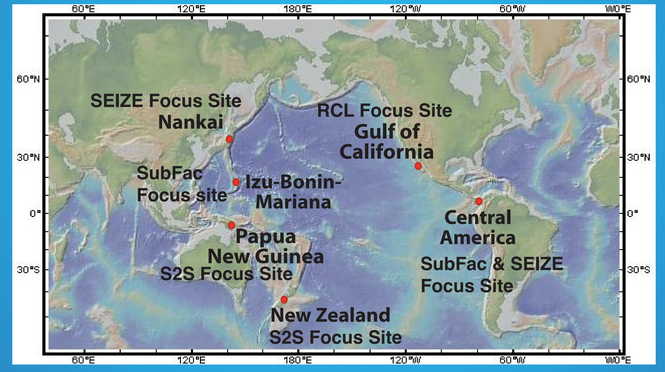
MARGINS Research Initiatives

The MARGINS research program involves focusing expertise and resources in several study areas in order to solve fundamental questions. Research is conducted using nested multidisciplinary programs of field experiments, numerical simulations and laboratory analyses. The program consists of four initiatives with designated focus sites:

- Seismogenic Zone Experiment (SEIZE)
- Subduction Factory (SubFac)
- Rupturing Continental Lithosphere (RCL)
- Sediment Source to Sink (S2S)



Focus Sites



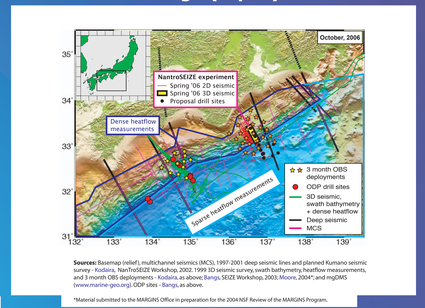
MARGINS Office

The Office works in the communication, coordination and dissemination of science results for the broader MARGINS and Marine Geology & Geophysics community. It provides essential support for the MARGINS community and Steering Committee. It rotates every 3 years, and is at Boston University 2006-2009. Among other activties, the Office:

– organizes MARGINS planning efforts through planning meetings, workshops and special conferences;
– disseminates information about MARGINS research opportunities and activities via website (www.nsf-margins.org), MARGINS Newsletters (www.nsf-margins.org/Publications/Newsletters/Newsletter.html), workging group reports and Theoretical & Experimental Institute publications;
– facilitates collaborative research with international margins programs (e.g., InterMargins);
– helps coordinate a rapid response strategy to natural events such as earthquakes and volcanic eruptions to allow scientist to collect critical data;
– promotes educational and outreach activities (information at http://www.nsf-margins.org/EPO/); and
– is the liaison between principal investigators and the "data access center" for cruise and expedition metadata hosted by the Marine Geoscience Data System (Lamont-Doherty Earth Observatory; http://www.marine-geo.org/margins/).

Study Areas and Surveys

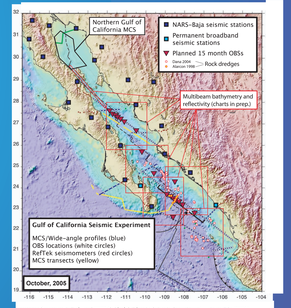
SEIZE Focus Site: Nankai Trough (Japan)



Sources: Basemap (relief), multichannel seismics (MCS), 1997-2001 deep seismic lines and planned Kumano seismic survey - Kodaira, NanTroSEIZE Workshop, 2002, 1999 3D seismic survey, swath bathymetry, heatflow measurements, and 3 month OBS deployments - Kodaira, as above; Bangs, SEIZE Workshop, 2003; Moore, 2004*; and mgDMS (www.marine-geo.org). ODP sites - Bangs, as above.

*Material submitted to the MARGINS Office in preparation for the 2004 NSF Review of the MARGINS Program.

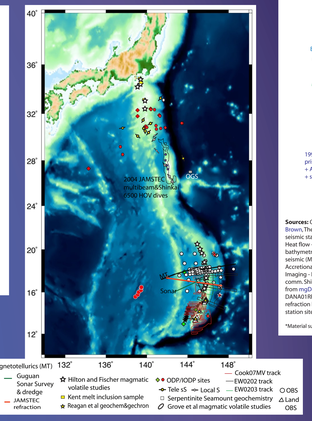
RCL Focus Site: Gulf of California



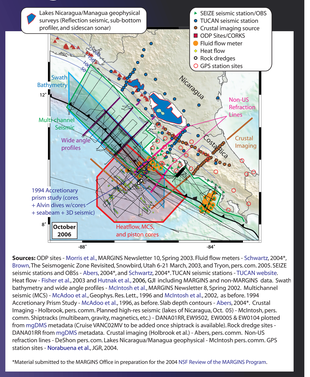
Sources: Basemap (relief) and 2002 Gulf of California Seismic Experiment – Lizarralde, 2004*, NARS-Baja and permanent broadband seismic stations – Gaherty and Collins, 2004*, and Clayton, 2004*. Planned (Oct. 2005) 15 month OBS deployment – Gaherty and Collins, 2004*. 1999 Northern Gulf of California multichannel seismic (MCS) – Stock and Sedlock, 2004*. U.S. Multibeam bathymetry and reflectivity, Alarcon 1998 and Dana 2004 rock dredges - Lonsdale et al., in prep.

*Material submitted to the MARGINS Office in preparation for the 2004 NSF Review of the MARGINS Program

SubFac Focus Site: Izu-Bonin-Mariana



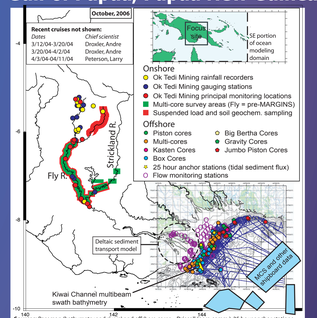
SEIZE & SubFac Central America: Nicaragua-Costa Rica



Sources: ODP sites - Morris et al., MARGINS Newsletter 10, Spring 2003. Fluid flow meters - Schwartz, 2004*, Brown, The Seismogenic Zone Revisited, Snowbird, Utah 6-21 March, 2003, and Tryon, pers. comm. 2005. SEIZE seismic stations and OBSs - Abers, 2004*, and Schwartz, 2004*. TUCAN seismic stations - TUCAN website. Heat flow - Fisher et al., 2003 and Hutnak et al. 2006. GLR including MARGINS and non MARGINS data. Swath bathymetry and wide angle profiles - McIntosh et al., MARGINS Newsletter 8, Spring 2002. Multichannel seismic (MCS) - McAdoo et al., Geophys. Res. Lett., 1996 and McIntosh et al., 2002, as before. 1994 Accretionary Prism Study - McAdoo et al., 1996, as before. Slab depth contours - Abers, 2004*. Crustal Imaging - Holbrook, pers. comm. Planned high-res seismic (lakes of Nicaragua, Oct. 05) - McIntosh, pers. comm. Shiptracks (multibeam, gravity, magnetics, etc.) - DANA01RR, EW9502, EW0005 & EW0104 plotted from mgDMS metadata (Cruise VANCOUMV to be added once shiptrack is available). Rock dredge sites - DANA01RR from mgDMS metadata. Crustal imaging (Holbrook et al.) - Abers, pers. comm. Non-US refraction lines - OrOlson pers. com. Lakes Nicaragua/Managua geophysical - McIntosh pers. comm. GPS station sites - Norabuena et al., JGR, 2004.

*Material submitted to the MARGINS Office in preparation for the 2004 NSF Review of the MARGINS Program.

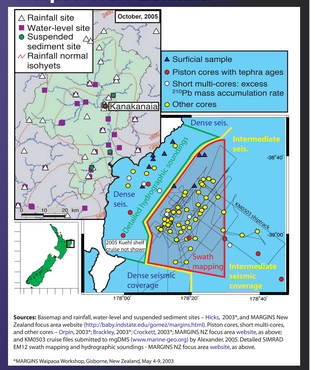
S2S Focus Site: Gulf of Papua, Papua New Guinea



Sources: Basemap (bathymetry and rivers) and offshore cores – Driscoll (pers. comm.), 25 hour anchor stations (tidal sediment flux), flow monitoring stations, and Kiwai Channel multibeam bathymetry – Nittrouer, 2004* and mgDMS (www.marine-geo.org). Multichannel seismics (MCS) and other shipboard data – Crockett, MARGINS Waipaoa Workshop, 2003; Driscoll (pers. comm.); Millman (pers. comm.) and mgDMS. Ok Tedi Mining Ltd. rainfall recorders, gauging stations, and principal monitoring stations – MARGINS New Guinea/Northern Australia group (www.vims.edu/margins/). Multi-core onland survey areas – Dietrich, 2004* and Dietrich, pers. com. 2005. Fly Delta sediment transfer model - Fagherazzi, pers. com., 2005. Ocean modeling domain - Slingerland pers. com., 2005. Suspended load and soil geochemistry sampling - Kurtz, pers. com., 2006

*Material submitted to the MARGINS Office in preparation for the 2004 NSF Review of the MARGINS Program.

S2S Focus Site: Waipoa-New Zealand



Sources: Basemap and rainfall, water-level and suspended sediment sites – Hicks, 2003*, and MARGINS New Zealand focus area website (http://baby.indiate.edu/gomez/margins.html). Piston cores, short multi-cores, and other cores – Orpin, 2003*; Brackley, 2003*; Crockett, 2003*; MARGINS NZ focus area website, as above; and KM0503 cruise files submitted to mgDMS (www.marine-geo.org) by Alexander, 2005. Detailed SWRAD EM12 swath mapping and hydrographic soundings - MARGINS NZ focus area website, as above.

*MARGINS Waipaoa Workshop, Gisborne, New Zealand, May 4-9, 2003

This poster was prepared by the MARGINS Office at Boston University (03/2006).