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March 29, 2009

Bilal Haq
Division of Ocean Sciences
National Science Foundation

Dear Bilal,

The MARGINS Steering Committee met at NSF on March 19 and 20, providing the opportunity to discuss the Decadal Review Committee (DRC) Report and NSF's initial reactions to it. Overall, we are pleased with the DRC report, and excited for the opportunity to help shape a successor program that should NSF follow the report's recommendations. This letter summarizes the Steering Committee's discussions and response, and its plans to propose a successor program, taking into account the advice given by the DRC and subsequent discussions at NSF.

We recognize that the DRC was charged with evaluating the current program, thus its Report is structured around the existing Initiatives. However, we appreciate that a successor is likely to look different in many ways from the current MARGINS Program. While we will build on MARGINS past successes, a primary topic for the next several months will be to identify the outstanding new scientific questions that will guide future research. In this context, we would like to highlight several new scientific opportunities that were discussed only briefly in the DRC Report, but in which we see great potential for transformative discovery.

Projecting MARGINS successes into a successor program.

The Review recognized the success of several core approaches of the current MARGINS Program: the broad approach to community building, the importance of crossing the shoreline, the use of focus sites; the added value in cultivating international partnerships, and the importance of integrating computational and experimental research with field observation. The DRC also recognized that such activities could not have succeeded without a science program separate from core funding. We concur with this assessment and would like to build upon these achievements in a successor to MARGINS.

As a guiding statement, the Steering Committee envisions a successor program that will investigate the coupled geodynamic, surficial, and climatic processes that build and modify continental margins over a wide range of timescales (from s to My). Such a program will have applications to margin evolution and dynamics, construction of stratigraphic architecture, and implications for accumulation of economic resources, associated geologic hazards, climate change and environmental management. Addressing such complex coupled systems requires an integrated approach, and we envision a broad range of studies combining field research in structure and tectonics, geochemistry, geophysics, sedimentology and stratigraphy, but also incorporating experimental, analytical and numerical modeling investigations.

Both the Steering Committee and DRC have recognized that the breadth, energy, and synergy within and between the current initiatives provide an excellent template for thinking broadly about the future, and give a certain advantage to those emphases. Therefore, planning for a successor program can build upon the successful parts of MARGINS, while considering broadly new opportunities and program structure during the community workshop: what separate initiatives to have, if any; the role of focus sites, if any; whether and how to better include industry participation; and how better to address resource, hazards, climate, and management objectives while retaining an emphasis on solid earth dynamics. Unquestionably, new

opportunities exist for a MARGINS successor to interface more closely with other NSF facilities including EarthScope, Ocean Drilling and cyberinfrastructure initiatives such as CIG. These opportunities will lead to integrative transformative discoveries, while further growing the MARGINS community.

With NSF's encouragement, we will submit a proposal for a community-wide planning workshop to identify the critical scientific opportunities that require a successor program, outline a program organization, and lay the groundwork for a draft science plan for NSF to consider. This workshop will be planned for early 2010, and will be open to all interested participants, with emphasis on early career scientists who can help to steer the next generation of MARGINS science. Even prior to this community-wide meeting, initial planning activities are underway within the existing MARGINS initiatives. Two Initiative Synthesis and planning workshops will take place in the next two months (S2S in April and RCL in early May), during which we have reserved time to discuss a successor program and initiative priorities. We have invited additional participants to each workshop who can provide links between the sediment and rifting communities. Likewise, a Theoretical and Experimental Institute on Volatiles in Subduction (September 2009) will include planning discussions. We also plan to solicit proposals for small, focused workshops to explore specific scientific opportunities prior to the community-wide workshop. By taking such a proactive approach, we expect to be able to submit a draft Science Plan to NSF by early- or mid-2010, allowing consideration of a successor program by FY 2011. During this transition period, we will maintain the central MARGINS office as well as ongoing education and outreach programs, in order to facilitate planning and minimize the effects of any hiatus.

Subduction Initiatives.

The DRC spoke highly of the successes of the two subduction initiatives, SEIZE and SubFac, and their recommendations for the future closely parallel those outlined in the MARGINS review documents. Cascadia and the Alaska-Aleutian margin are already Allied sites in both current initiatives for clear scientific reasons (warm and sediment-rich endmembers, history of great earthquakes, etc.). The presence of EarthScope and potentially OOI facilities makes these sites even more attractive, and a successor program that complements EarthScope will promote greater scientific participation from the EAR scientific community. Nonetheless, the community will need to decide which focus site(s) will best address the key questions that will guide the next Science Plan (if the Focus Site concept is to continue), and will need to critically evaluate all feasible alternatives.

One point of discussion could be the integration of SEIZE and SubFac into a single subduction initiative, addressing integrated studies at common focus sites. Certainly, the co-location of the two initiatives at the Central America focus site offered intellectual and logistical advantages that led to discoveries that have transformed our understanding of subduction processes. Similar synergies are likely in the future. Perhaps more importantly, the key processes investigated within SEIZE and SubFac are proving to be increasingly interrelated, and a future joint subduction initiative could entrain those working at the transitions. Counterarguments exist to retain the separation between Initiatives, and the topic should be discussed by the community during the planning process.

Rifts.

The DRC report recommends a significant restructuring of a future rifting initiative relative to the current RCL Initiative. The DRC report recommended that a new initiative contain a more robust sedimentological component to better extract the sedimentary record of rifting, as well as the influence of sediments on rift evolution. Similar discussions have been initiated already within the community, and a small workshop was held in April 2008 at LDEO, generating 3 mini-whitepapers that identified exciting future directions for such a rifting initiative (included in Section 9.1 of the Review Material). These mini-whitepapers also highlight the fundamental role of magmatism and 4D evolution of lithospheric strain as key components of a future program, in addition to sedimentation. While we agree with the DRC that many exciting opportunities exist for studying the interplay between rifting and the sedimentary record, we feel that a full rift

system model must incorporate these other processes as well. In particular, recent studies in the Gulf of California (and elsewhere) show that there are direct links between sedimentation, magmatism, and the timing of breakup. Thus, a successor program that will fundamentally advance our understanding of rift evolution must include studies that focus on both surface and mantle processes, as well as the linkages between them. We suggest that planning for a future rifting initiative include consideration of these topics, and that discussions would also evaluate the benefits of extending MARGINS beyond active rifts to sites where rifting is complete. In anticipation of this discussion, the program for the early May RCL Synthesis workshop includes some time to address these issues.

Sedimentary Process.

There has been much discussion of the DRC's recommendation to fold studies of sedimentary processes into other initiatives in a manner that emphasizes continental evolution, rather than continue S2S independently. Most Steering Committee members reluctantly accept the recommendation. We reiterate evidence from the Review documents that, despite the late start of S2S, important progress has been made that lays the basis for continued work on active sedimentary processes along continental margins. As the DRC recognized, the approaches taken by the S2S community are substantially different from those needed to interpret continental evolution from the sedimentary record, so the proposed reorganization could result in a significant change in the research community involved, and will probably require significant rebuilding of the community. It seems worthwhile at this juncture to think as broadly as possible about the role of earth surface studies (erosion, sediment transport, stratigraphy, etc.) in all of the MARGINS initiatives, beyond the controls on basin stratigraphy. In particular, we would like to seek ways in which the process-oriented approach championed by the S2S community could be best integrated into related studies. Quantitative approaches to sedimentary and erosional systems are rapidly developing, and it seems very possible for the community to identify new directions that differ substantially from those envisioned by the DRC. We hope for extensive discussions of these issues at the upcoming workshops. The April S2S Synthesis Workshop provides an excellent opportunity to engage the current S2S group in thinking about these new problems, and we will seek appropriate venues for similar discussions about subduction settings.

Program structure, societal relevance, education and data.

We generally agree with the Review Committee's assessment of the opportunities for greater societal relevance, ways to usefully restructure the program management, and suggestions to improve the education program. We look forward to continued dialog with NSF and the community on these issues, and expect to use the DRC Report along with the review documents we provided as a basis for structuring these aspects of the program. As a first step, the Education Advisory Committee will meet in late May, to consider the future development of the education program. Once the scientific agenda for a successor program becomes clear, decisions about these programmatic aspects should develop rapidly.

In summary, the Steering Committee views this review very positively, and sees many opportunities to transform the science through a successor program. While we recognize that a successor cannot be authorized by NSF until a Science Plan is submitted, the fact that we are being asked to develop one represents a very positive outcome of the review process. It reflects confidence that integrated approaches to studying the evolution of continental margins will provide transformative breakthroughs over the coming decade, and that these systems will have increasing societal relevance.

Sincerely,

Geoff Abers
Chair, MARGINS Steering Committee, for the MSC

The MARGINS Steering Committee (MSC), March 2009

Geoffrey Abers, Lamont-Doherty Earth Observatory (Chair)

Nathan Bangs, University of Texas - Austin

Mark Behn, Woods Hole Oceanographic Institution

Susan Bilek, New Mexico Institute of Mining & Technology

Cynthia Ebinger, University of Rochester

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Contact information available at

www.nsf-margins.org/MARGINS_Office/AboutSC.html