Proposing an EarthScope Institute

Institutes are viewed as a critical element of EarthScope Science activities, as they foster cross-education among disciplines, and provide focus on fundamental science problems that require broad and creative community efforts to solve. Past Institutes have included The Spectrum of Fault Slip Behaviors (2010), and The Lithosphere-Asthenosphere Boundary (2011). There is scope within the EarthScope community for at least one Institute per year.

As such, teams of investigators are encouraged to consider proposing such Institutes, and to seek funding for them. The EarthScope Science Steering Committee can provide initial advice on timing and scope, and should be used as a first resource during the planning stage. Many funding sources can be sought, but the EarthScope Program Office at NSF can provide advice on funding opportunities and procedures for submission of workshop proposals through NSF (http://www.nsf.gov/pubs/policydocs/pappguide/nsf11001/gpg_2.jsp#IID8). To help maintain programmatic coherence and breadth, the EarthScope Steering Committee (ESSC) puts out an informal annual call for proposal ideas. While responding to this call is not a prerequisite for submitting a proposal for an Institute to NSF, the ESSC can provide suggestions to strengthen a proposal by modifying the scope to better fit programmatic goals or can serve as a "matchmaker" to bring together groups with a similar idea. The next due data for proposal ideas is September 15, 2011. These informal Institute proposal should be short – no more than 1 page.

Successful proposals generally include a scientific and strategic rationale for the workshop, and logistical details such as venue and timeframe, the convener group, meeting format, speaker list, and how the Institute may continue virtually after the workshop. The EarthScope National Office may be able to provide logisitical support for the workshop if the proposal is submitted through the Office.

See below for an example of a Project Summary for a recent successful Institute proposal:

EarthScope Institute: The Lithosphere-Asthenosphere Boundary

Intellectual Merit

The lithosphere is fundamental to the definition of tectonic plates and continents, and yet its dimensions, origins and evolution are still poorly understood. New observations at the interface between the strong lithosphere and weak asthenosphere hold clues as to the thermal, mechanical and chemical variations that create this boundary. Data from the EarthScope Facility have provided a rich array of such observations at the lithosphere-asthenosphere boundary (LAB), some of them conflicting. The variations and discontinuities in seismic velocities, attenuation and anisotropy have led to a proliferation of features and structures that confound the classical view of the lithosphere as a thermal boundary layer.

Such observations are outpacing our ability to interpret them, and require integration with complementary observations from heat flow, electrical conductivity, magmas and mantle xenoliths from the field and laboratory. Because the lithosphere is largely a dynamical construct, it requires understanding within geodynamic models. We propose here a workshop that brings

together seismologists, dynamicists, experimentalists and petrologists to integrate such observations into a new view of the LAB and to develop new ideas as to its dynamic behavior. The primary goals of the workshop are: 1) to provide intellectual leadership and foster critical thinking about the observations that define the LAB and the the physical mechanisms behind its origin and evolution, 2) to promote broad, community interest in the LAB and seed collaborations between observational, theoretical, and laboratory based research programs, and 3) to discuss novel approaches or critical data that are needed to make new observations on the LAB and develop models for its origins.

The LAB is one of the primary science targets identified in the 2010 EarthScope Science Plan, and it is one of the Grand Challenges identified in the 2009 Long-Range Science Plan for Seismology, and thus already has engaged the intellectual drive in these large communities.

Broader Impacts of the Proposed Research

We envision a group of ~100 researchers including postdocs, students, scientists and faculty coming together for a three day meeting in Santa Fe, New Mexico in early spring 2011. The format will include presentations of scientific results, overview talks that are designed to cross-educate researchers from other disciplines, and plenty of time for integrative discussion. Field examples will naturally focus on the US footprint of EarthScope, but will also include key examples from the ocean basins and other continents.

The Institute will foster education and communication across disciplines ranging from seismology to rock mechanics, petrology, magnetotellurics, heat flow, tectonics, and geodynamics. The workshop will provide an opportunity for young researchers to broaden their understanding in a fundamental, emerging problem in geodynamics and to develop ideas for how they might become involved. Anticipated results include broad, community based appreciation of the nature of the LAB and the key problems that need to be addressed. Workshop participants will focus on links between the observations that define the LAB, and the dynamic behavior that affects strength and magmatism on the underside of continents. We anticipate that the workshop will be the initial step in fostering broad, multidisciplinary collaboration on the LAB and that it will provide the foundation for a virtual online Institute that will be facilitated by the EarthScope National Office.