NSF and UNAVCO have accepted these recommendations.
GeoEarthScope activities will be planned and conducted accordingly.

Report from the GeoEarthScope Review Subcommittee

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Background

GeoEarthScope, a component of the EarthScope Program, aims to acquire aerial and satellite imagery and geochronology to assist with EarthScope instrument siting and to examine the strain field at time scales including those longer than the decadal time scales available from the PBO geodetic instrumentation. More generally, a goal of EarthScope is the improved understanding of the tectonic evolution of the North American continent. Identifying and understanding deformation rates in all tectonic regimes is critical to reaching that goal.

Our subcommittee was charged with helping GeoEarthScope decide how to distribute $4.0M between its 3 primary activities: a) InSAR satellite tasking and data acquisition for geodetic imaging of crustal deformation, b) Acquisition of LiDAR high resolution topography along active fault structures, and c) Production of geochronological constraints on rock samples aimed at contributing to general EarthScope goals. Representatives from the relevant communities (in the form of working groups; http://pboweb.unavco.org/?pageid=13&newsid=106) produced reports containing recommendations on how funds should be spent within their respective component (InSAR, LiDAR, geochronology). Before our subcommittee had met, NSF had allocated an $800K to each of the components, thereby leaving our subcommittee to recommend how to distribute the remaining $1.6M between the 3 components.

Recommendations

Our subcommittee wants to thank all the members of the working groups for their efforts in producing their respective reports. We felt that they did an excellent and balanced job within the constraints that were imposed by the program (e.g., what to do, by when it had to be done, and how it was to be accomplished). Our committee was faced with coming up with a way in which to compare these three very disparate activities. While by no means unique, we chose to adopt an approach whereby funds are spent in a way that 1) maximizes probable impact, 2) seeds potentially new growth areas, and 3) follows the spirit of EarthScope in supporting community data acquisition with obvious synergies between different EarthScope components.

LiDAR: Our subcommittee agreed that this was an extremely exciting new data set that the community is just beginning to learn how to take advantage of. We also felt that we had unique opportunity here to accomplish something that would be difficult without GeoEarthScope. How the funds would be spent within this activity seemed clear and with a

probability of significant impact on EarthScope related science and on the scientific community itself. Our subcommittee agreed that LiDAR could become one of the high impact flagships of the EarthScope.

InSAR: Our subcommittee agreed that we must at a minimum ensure that we task all SAR satellites to acquire images for the EarthScope area of interest as much as allowable by the foreign space agencies running the satellites. Not doing so would in many cases cause us to miss many unique and rare events. Furthermore, we also appreciate the need for temporally dense image archives for time series analysis and increasing signal-to-noise ratios. The number of scientists impacted by the availability of these data is now well documented (e.g., see http://winsar.unavco.org) and the integration of these data with other EarthScope data (GPS, strain and seismic) is also well established. Finally, further building of the InSAR knowledgeable research community is key to future development in space borne geodetic imaging. If insufficient funds require prioritization within this group, we hope that they emphasize complete archives for more limited areas as opposed to incomplete archives for all areas.

Geochronology: Generally, our subcommittee was unanimous in its frustration over not knowing how to treat this activity. In particular, we were not comfortable in prescribing credits to projects without knowing what those projects were, the overall impact of those projects, nor the synergy with other EarthScope activities. In addition, we were concerned that the number of samples assumed to be needed for any given study was underestimated, and therefore the predicted impact of this activity is even less than described. In general, given the maturity of the techniques discussed and the relatively small amount of money at our disposal, we did not think that this activity had a high likelihood of having a significant near term impact or seeding a new activity. Despite these reservations, we agree with the working group's decision to allocate whatever funds allotted with emphasis on techniques aimed at younger samples. This perspective is due in part to their importance in extrapolating tectonic studies to time scales longer than reachable with seismic and geodetic techniques, as well as to the desire to maximize impact by focusing the effort. To be clear, our subcommittee does not want our final recommendation to be viewed as a criticism of the scientific targets and methodologies described in the geochronology working group report. However, we believe that achieving the goals of this activity will be best accomplished through the standard proposal route where there is an organic process of partnering PIs and specific geochronology labs. This opinion was further supported by our committee's informal discussion with several members from the geochronology community.

Conclusion

Taking into account the criteria and comments described above, and recognizing that already $800,000 has been allocated to each of the 3 activities, we recommend that of the remaining $1.6M, $1.1M be added to the LiDAR activity and $0.5M to the InSAR activity.