2012-2017 Work Plan

Short-Term Tectonics Priorities

Short-Term Tectonics Working Group priorities for Mar 2012 – Jan 2017.

Immediate, Urgent goals

SOFTWARE DEVELOPMENT

- PyLith development (For more details see PyLith Development Plans)
- Establish interaction with computational seismology group on meshing issues (e.g., keep up-to-date on the development of Geo-CUBIT).

COMMUNITY ACTIVITIES

- Provide training via virtual workshops
  Initial virtual workshop in June 2011 was very successful. We will schedule virtual workshops immediately follow releases in order to get users up to speed on changes and new features. We may also have community workshops focused on solving a specific type of problem or dealing with a specific computational or workflow issue (e.g., meshing).

Continue development of a PyLith wiki to complement the cig-short email list and PyLith manual
Continue series of workshops on biannual basis (even years)

Questions

vationally constrained and internally consistent physics for the entire seismic cycle
e the entire seismic cycle in simulations that capture interseismic deformation, rupture nucleation and ation, and postseismic deformation with realistic Earth models (geometrical complexity, material geneity, and inelastic rheologies). Constraints on fault and bulk rheologies that are consistent with ve geodetic, seismic, and geologic observations are critical to understanding the behavior of fault s and improving the accuracy and precision of earthquake hazard assessments.

ly constrained and internally consistent physics for tectonics of magmatic systems, geothermal systems, phere
eling tectonic processes with heat and fluid flow, thereby enabling complex rheologies with temperature ameters. Incorporating heat and fluid flow into tectonic modeling significantly expands the range of can be addressed (such as seismic tremor in geothermal areas) and permits direct application of physical constraints. Viscoelastic, elastoplastic, and viscoplastic rheologies are important for bridging nic and tectonic time scales.

rained modeling of crustal deformation associated with surface loads
ologies of the crust using geodetic and geologic observations of deformation arising from glacial
bounding, and other surface loads.

ational Techniques

mplications of using currently available and emerging computational techniques for earthquake
ndesirable limitations on the geometry of the domain (e.g., topography) and faults or may introduce

.g., deal.ii and p4est)
hall length scale features through local refinement and coarsening of the mesh.

he uncertainty in parameters based on observations.

ific problems using high-level tools

esolution of dislocations and material boundaries within a structured grid. This would permit a structured
/.

homogenization. Resolution of multiple time scales through slow/fast timescale coupling.

outs of the various stages of modeling (creating the geologic model, meshing the domain, simulating the

urrent software.

e to new users but also provides the flexibility and extensibility required by expert users.
codes Provide funding for expert users to work with code developers to add new features to community

rt modeling codes and tools.

arth science developers and vice versa. This could be implemented via some form of travel grants for in-

d features