2013-2018 Work Plan

Short-Term Tectonics Priorities

Short-Term Tectonics Working Group priorities for Mar 2013 – Jan 2018.

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
We have another virtual workshop scheduled for June 2013. It will coincide with the release of PyLith 2.0 and will focus on intermediate and advanced topics. We solicit ideas from users on additional online training.

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

te goals

DEVELOPMENT

ion framework for geodetic, seismic, and combined inversions.
vision plug-ins for various inversion methods, including Bayesian approaches.
a scientist to lead this effort. Responsibilities would involve getting funding, assembling a development might include a CIG developer), and overseeing software development.

ons

ly constrained and internally consistent physics for the entire seismic cycle
ntire seismic cycle in simulations that capture interseismic deformation, rupture nucleation and nd postseismic deformation with realistic Earth models (geometrical complexity, material heterogeneity, heologies). Constraints on fault and bulk rheologies that are consistent with extensive geodetic, seismic, bservations are critical to understanding the behavior of fault systems and improving the accuracy and rthquake hazard assessments.

trained and internally consistent physics for tectonics of magmatic systems, geothermal systems, and

ctonic processes with heat and fluid flow, thereby enabling complex rheologies with temperature
s.
d fluid flow into tectonic modeling significantly expands the range of problems that can be addressed
or in geothermal areas) and permits direct application of additional geophysical constraints. Viscoelastic,
oplastic rheologies are important for bridging between seismic and tectonic time scales.
trained 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)
nall 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
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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
eatures to community codes in order to solve specific research problems.

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