

## 2007 SCEC Report

### Post-Earthquake Planning for SCEC Science, Workshop

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#### Summary

During 2007 several conference calls were held to prepare for the workshop on “post-earthquake response planning for SCEC science” that was held at the 2007 annual meeting. This report attempts to capture some of that planning effort and to summarize the SCEC specific recommendations of the workshop. The text below may in some cases be copied directly from emails written by various participants (Tom Jordan, Greg Beroza, Jamie Steidl, Lucy Jones, Sue Hough, Paul Somerville, Mark Benthien, and others).

Some of the most important earthquake data are gathered during and right after a major earthquake. Exposures of fault rupture are erased quickly by human activity, aftershocks decay rapidly within days and weeks, and post-seismic slip decays exponentially. The goals of the workshop were to:

- 1) Develop post-earthquake science plan that would be a living document as a wiki
- 2) Identify permanent SCEC and other science facilities that are needed to ensure success of the science plan
- 3) Identify other resources available in the community and innovative ways of using technology for coordination and rapid data processing
- 4) Develop plans for use of Peta-scale computing resources in post earthquake response for evaluation of crustal stress changes along faults as well as short term prediction of potentially damaging ground motion patterns along 'newly stressed' faults
- 5) Develop mechanisms for regular updates of the SCEC post-earthquake response plan
- 6) Roles and interactions between SCEC and other Clearinghouse group members
- 7) Encourage new methods for data collection and distribution

#### Workshop Agenda: SCEC Post Earthquake Workshop 9 am to 12 pm

How should SCEC respond when the next major earthquake strikes California? This workshop will attempt to answer this question and to lay the groundwork for future science and infrastructure planning. Formulating SCEC post-earthquake science goals will be the major focus of the workshop. These goals will range from collection of data in the field to ensure that no opportunities are lost, to peta-scale computer modeling of earthquake sources, ground motions and stress transfer in support of rapid post-earthquake response. The workshop will also address, what infrastructure is required for the next generation post-earthquake science. The SCEC post-earthquake response workshop will include updates on plans of other science responders such as USGS, CGS, and UNAVCO.

- 1) Current agency plans; Egill Hauksson moderator  
Sue Hough, USGS  
Charles Real, CGS  
Mike Jackson, UNAVCO
- 2) SCEC science goals; Greg Beroza – discussion lead  
Designated discussion contributors: Ralph Arculeta, John Anderson, Yehuda Ben-Zion, Elizabeth Cochran, Paul Davis, Ken Hudnut, Duncan Agnew, Tom Rockwell, Gary Fuis, Jeff McGuire, Phil Maechling, Chris Walls, David Sandwell
- 3) Infrastructure and communications; Jamie Steidl, moderator  
Mark Benthien -- phones etc. Vikki Appel -- description of the wiki

## **Recommendations**

### **A. POST-EARTHQUAKE COMMUNICATION**

*Scientific coordinator: Greg Beroza (Chair of the SCEC Planning Committee)*

*Technical coordinator: Mark Benthien*

This group will coordinate the deployment and operation of a satellite-phone system with OES, CGS, and USGS. It will follow up with periodic testing of this system. Additional participants will be USC, Caltech, UCSD, UCSB, Stanford, and UCR, others are welcome to join as well.

The post-earthquake wiki will be a system for the exchange of technical information in real time. It will be used to exchange maps, data, models, etc. without having to resort to phone calls and emails continuously. The post-earthquake wiki URL is: <http://athabasca.gps.caltech.edu/wiki/doku.php>

### **B. POST-EVENT FIELDWORK TASK FORCE**

*Scientific coordinator: Greg Beroza*

*Earthquake Engineering coordinator: Jamie Steidl, UCSB*

*Technical coordinator: John Marquis*

This group will pre-allocate responsibilities to SCEC teams for coordinating post-earthquake response; including field deployments by the Seismology and Tectonic Geodesy disciplinary groups, and field mapping by the Earthquake Geology disciplinary group.

The SCEC Planning Committee has the central role in developing the post-event science plan. The group leaders in Seismology, Geology, and Geodesy need to be involved. Coordination with the USGS and CGS will be essential. The main technical issue is maintaining awareness among the Planning Committee members, and request that they send an email to Greg and Tran as soon as they become aware of a major earthquake that just occurred. This email should include personal calendars & contact info, so we know whose around vs. out of the country).

### **C. REAL-TIME EARTHQUAKE MODELING**

*Scientific coordinator: Egill Hauksson*

*Technical coordinator: Phil Maechling*

The SCEC IT group will maintain arrangements for "on-demand" computing capability that can produce predictive models immediately after an earthquake, both as a guide to fieldwork and for public

information. For example, these models may include the ability to rapidly calculate post-seismic response as an aid to GPS deployments. In addition, it would also set up a prospective-testing program for post-seismic predictions.

This type of modeling could eventually be integrated into the on-demand capabilities of the Earthworks system being developed by the SCEC/CME collaboration.

Eventually, the SCEC ground-motion prediction capabilities will need to be integrated into the ShakeMap infrastructure, to enhance the resolution of the predicted ground motions.

#### D. SCENARIO EXERCISES

*Scientific coordinator: Ken Hudnut*

*Technical coordinator: Mark Benthien*

All of the SCEC post earthquake response plans need to be discussed at least once per year by the Planning Committee. A time slot should be reserved during the June SCEC planning meeting.

We need to develop a plan to include a major system wide test in the 1857 sesquicentennial activities scheduled for 2007.

#### E. COLLABORATIVE EARTHQUAKE ENGINEERING RESPONSE

*Scientific coordinator: Paul Somerville*

*Technical coordinator: Mark Benthien*

Formation of Research Collaborations with EERI, PEER, etc. After the event, SCEC should rapidly identify research issues being raised by the engineering community, and seek to participate in collaborative research with this community. For example, it is often important for engineers to know the ground shaking characteristics that accompanied particular damage conditions at particular locations.

Preparation of Blind Predictions. SCEC is generating very large sets of ground shaking estimates at particular locations (e.g. Cybershake) and ground shaking maps (e.g. TeraShake and DynaShake) that could be used as blind predictions after an event. These would have more force as blind predictions if they were formally archived for this purpose and placed on publicly accessible websites (where they could also be downloaded for other purposes pre-event).