2012 Coordination Workshop

From GMSV Wiki

Organizer: Nico Luco
Date: Monday, April 2, 2012 (9:00am-5:00pm)
Location: SCEC Boardroom, University of Southern California, Los Angeles, CA
Participants: 33 total

Contents

- 1 Background & Objectives
- 2 Agenda
- 3 Participants
- 4 Summary of Outcomes

Background & Objectives

SCEC has established a Technical Activity Group (TAG) focused on Ground Motion Simulation Validation (GMSV) in order to develop and implement testing/rating methodologies via collaboration between ground motions modelers and engineering users. The main purpose of this small workshop will be to coordinate any GMSV-related SCEC projects funded in 2012, before they begin in earnest. Invitees will include Principal Investigators (PI's) of the funded SCEC projects and other select participants. It is important to note that these participants include both ground motion modelers and engineering users. During the workshop, the PI's will present their proposed research and ample time will be dedicated to discussing coordination with other funded projects, as well as any additional research that may be needed in the near future.

Agenda

April 2	**Background and Objectives of Workshop**	Presenter(s)
09:00	SCEC GMSV TAG	T. Jordan / N. Luco
09:15	Related NGA-East and other efforts	N. Abrahamson
09:30	*Discussion*	
	Plans for Ground Motion Simulations to be Validated	
09:45	Validation of broadband ground-motion synthetics using earthquake engineering-relevant metrics	K. Olsen

10:00	US-Japan collaboration on strong ground motion prediction techniques	J. Bayless / P. Somerville
10:15	*Coordination Discussion*	
11:00	Break	
	Plans for Validations using SDOF and MDOF-Building Systems	
11:15	Validation of elastic spectral correlations from ground motion simulations	L. Burks / J. Baker
11:30	Validation of simulated ground motions for multi-degree-of-freedom (MDoF) nonlinear buildling systems	I. Iervolino
11:45	*Coordination Discussion*	
12:15	**Summary of Plans from Morning Session**	N. Luco
12:30	Lunch	
	Plans for Automating Validations	
13:30	Existing SCEC Broadband Platform tools for validation	P. Maechling
13:45	Development of analytical tools for engineering validation of simulated ground motions	F. Zareian
14:00	*Coordination Discussion*	
	Plans for Validations using Geotechnical Systems	
14:15	Validation of simulated ground motions relative to seismic geotechnical engineering demand parameters	J. Stewart
14:30	A framework for validation of ground motion simulations emphasizing predictive power and use of seismic effective stress analyses of soil deposits	B. Bradley
14:45	*Coordination Discussion*	
15:15	Break	
	Plans for Other Validations	
15:30	PBR science for SCEC 4: Validation of ground motion prediction and simulations	G. Biasi
15:45	Validation of simulated ground motions through random vibrations statistical measures	S. Rezaeian
16:00	*Coordination Discussion*	
16:15	**Summary of Plans from Afternoon Session**	N. Luco
16:30	**Discussion/Summary of Future Plans Needed & Next Steps**	N. Luco
17:00	Adjourn	

Participants

Attended In-Person: Brad Aagard (USGS), Norm Abrahamson (PG&E/UC Berkeley), Jack Baker (Stanford), Jeff Bayless (URS), Glenn Biasi (UNR), Jacobo Bielak (CMU), Lynne Burks (Stanford),

Jorge Crempien (UCSB), Jessica Donovan (USC), Christine Goulet (UC Berkeley), Rob Graves (USGS), Bahareh Heidarzadeh (UCLA), Tran Huynh (USC/SCEC), Iunio Iervolino (UNINA), Tom Jordan (USC/SCEC), Nico Luco (USGS), Phil Maechling (USC/SCEC), Kim Olsen (SDSU), Paul Somerville (URS), Jon Stewart (UCLA), Feng Wang (USC), Katie Wooddell (PG&E), Farzin Zareian (UCI)

Attended Remotely: John Anderson (UNR), Ralph Archuleta (UCSB), Brendon Bradley (Canterbury), Luis Dalguer (ETHZ), Steve Day (SDSU), Carmine Galasso (AIR Worldwide), Sanaz Rezaeian (USGS/PEER), Daniel Roten (ETHZ), Fabio Silva (USC), Seok Goo Song (ETHZ)

Unable to Attend: Abbie Liel (CU Boulder), Dominic Asimaki (Georgia Tech)

Summary of Outcomes

In addition to providing feedback on the plans of the 2012 SCEC projects related to GMSV, workshop participants coordinated near-term plans for GMSV of the simulation models listed in Table 1. As requested by Norm Abrahamson (PG&E) [1] (http://collaborate.scec.org/gmsv_wiki/images/0915_Abrahamson_scec_valid_Apr2_2012_Abrahamson_v3.pdf) , the near-term plans will focus on testing/rating the validity of the simulation models for use in developing the median part of ground motion prediction equations (GMPE's) for elastic spectral accelerations at a wide range of periods (0.01 to 10 seconds) and 5% damping. Abrahamson proposed that the testing/rating be done in two parts, using median spectral accelerations from (i) ground-motion records from the historical earthquakes listed in Table 2, and (ii) the scenario earthquakes and empirical GMPE's listed in Table 3 and 4, respectively.

Table 1. Simulations models that are part of the near-term GMSV plans. All of the models are on, or will soon be on, the SCEC Broadband Platform.

Name	Contact Person	Notes
SDSU	Kim Olsen (SDSU)	Already on Broadband Platform
UCSB	Jorge Crempien (UCSB)	Already on Broadband Platform
URS	Rob Graves (USGS)	Already on Broadband Platform
Atkinson stochastic finite fault (EXSIM)	Gail Atkinson (Western Ontario)	
Irikura Recipe	Paul Somerville (URS)	
Point source stochastic	???	
Zeng/Anderson composite source model	Yuehua Zeng (USGS)	

Table 2. Historical earthquakes proposed by the GMSV TAG and Abrahamson for use in testing/rating the simulations models listed in Table 1, in order of decreasing priority.

Year	Location	Mw	EQID	Notes
1994	Northridge	6.7	127	Selected by workshop participants for immediate use, and being used by NGA-East Project
1989	Loma Prieta	6.9	118	Selected by workshop participants for immediate use, and being used by NGA-East Project
1992	Landers	7.3	125	Selected by workshop participants for immediate use
1979	Imperial Valley	6.5	50	Being used by NGA-East Project
1999	Chi-Chi (Taiwan)	7.6	137	Being used by NGA-East Project
2000	Tottori (Japan)	6.6	176	Being used by NGA-East Project
2010	El-Mayor Cucapah	7.2	280	
2004	Parkfield	6.0	179	
1999	Hector Mine	7.1	158	
1992	Big Bear	6.5	126	
1987	Whittier Narrows	6.0	113	
1986	North Palm Springs	6.1	101	
1984	Morgan Hill	6.2	90	
2003	San Simeon	6.5	177	
2010	Darfield (New Zealand)	7.0	281	
2009	L'Aquila (Italy)	6.3	274	
2008	Iwate (Japan)	6.9	279	
2007	Chuetsu-Oki (Japan)	6.7	278	
2004	Niigata (Japan)	6.6	180	
1999	Kocaeli (Turkey)	7.5	136	
1995	Kobe (Japan)	6.9	129	
2011	Mineral	5.8	88	Being used by NGA-East Project
2005	Riviere-du-Loup	4.6	32	Being used by NGA-East Project
1988	Saguenay	5.9	5	Being used by NGA-East Project
~~1983~~	~~Coalinga~~	~~6.4~~	~~76~~	Removed due to few "near-field" stations
~~1971~~	~~San Fernando~~	~~6.6~~	~~30~~	Removed due to few "far-field" stations

Table 3. Scenario earthquakes for use, with the empirical GMPE's listed in Table 4, in testing/rating the simulations models listed in Table 1. These scenario earthquakes are in addition to the historical earthquakes listed in Table 2.

Mw	Distance	Notes
6.5	15km	Example suggested by Abrahamson
6.5	40km	Example suggested by Abrahamson

Table 4. Empirical ground motion prediction equations (GMPE's) proposed for use, with the scenario earthquakes listed in Table 3, in testing/rating the simulations models listed in Table 1.

Author(s)	Year	Notes
Abrahamson & Silva	2010	
Boore & Atkinson	2008	Used by USGS in developing 2008 National Seismic Hazard Maps
Campbell & Bozorgnia	2008	Used by USGS in developing 2008 National Seismic Hazard Maps
Chiou & Youngs	2008	Used by USGS in developing 2008 National Seismic Hazard Maps

To further develop the near-term plans described above, workshop participants formed two subgroups that will correspond primarily via email and phone/web conferences. The two subgroups will correspond with each other and the TAG as a whole, through their respective subgroup leaders and joint correspondence. The first subgroup will develop detailed plans for simulations of the historical and scenario earthquakes listed in Tables 2 and 3, via the simulation models listed in Table 1. The second subgroup will develop detailed plans for testing/rating the simulated ground motions. The current members of the two subgroups are listed below in Tables 5 and 6. The current tasks planned for the two subgroups are listed in Tables 7 and 8.

Table 5. Members of the "GMSV Simulators" subgroup that will develop detailed plans for simulating ground motions of the historical and scenario earthquakes listed in Tables 2 and 3, via the simulation models listed in Table 1.

Name	Affiliation	Notes
Kim Olsen	SDSU	Subgroup Leader, SDSU Simulation Model Contact
Brad Aagard	USGS	
John Anderson	UNR	
Ralph Archuleta	UCSB	NGA-East Simulations Working Group Chair
Jacobo Bielak	CMU	
Jorge Crempien	UCSB	UCSB Simulation Model Contact
Steve Day	SDSU	
Rob Graves	USGS	URS Simulation Model Contact
Tom Jordan	USC/SCEC	
Nico Luco	USGS	Validators Subgroup Leader
Phil Maechling	USC/SCEC	Broadband Platform IT Architect
Paul Somerville	URS	Irikura Recipe Simulation Model Contact
Jon Stewart	UCLA	

Katie Wooddell	PG&E	PG&E Contact
Others?		

Table 6. Members of the "GMSV Validators" subgroup that will develop detailed plans for testing/rating the simulated ground motions from the GMSV Simulators subgroup.

Name	Affiliation	Notes
Nico Luco	USGS	Subgroup Leader
Jack Baker	Stanford	
Jeff Bayless	URS	
Glenn Biasi	UNR	
Brendon Bradley	Canterbury	
Lynne Burks	Stanford	
Christine Goulet	PEER	NGA-East Project Manager
Bahareh Heidarzadeh	UCLA	
Iunio Iervolino	UNINA	
Tom Jordan	USC/SCEC	
Phil Maechling	USC/SCEC	Broadband Platform IT Architect
Kim Olsen	SDSU	GMSV Simulators Subgroup Leader
Sanaz Rezaeian	USGS/PEER	
Jon Stewart	UCLA	
Farzin Zareian	UCI	
Others?		

Table 7. Tasks of the "GMSV Simulators" subgroup (listed in Table 5) that will develop detailed plans for the simulations of the historical and scenario earthquakes listed in Tables 2 and 3, via the simulation models listed in Table 1.

ID	Due Date	Description
S1	April, 2012	Obtain from Abrahamson a final list of historical earthquakes, their recorded ground motions (or recording stations), and site corrections for adjusting their response spectra to a reference rock site (e.g. Vs30 of 865 m/s).
S2	May, 2012	Develop detailed plans, considering the broad tasks below.
S3	June, 2012	Complete simulations of the historical earthquakes selected by workshop participants and this subgroup for immediate use (see Table 2), via the models already on the Broadband Platform (see Table 1). Focus on simulating ground motions that correspond to the recorded ground motions obtained in Task S1.

S4	June, 2012	"Complete set up (e.g. 1-D Green's functions) of validation cases [i.e. all historical and scenario earthquakes listed in Tables 2 and 3] on Broadband Platform." (As requested by Abrahamson)
S5	July, 2012	"Additional existing methods [list above in Table 1] added to Platform." (As requested by Abrahamson)
S6	August, 2012	Review validations completed in Task V3 (below) of the ground motions simulated in Task S3 (above).
S7	September, 2012	Present progress of GMSV Simulators subgroup at GMSV workshop during SCEC Annual Meeting.
S8	October, 2012	Complete simulations of all the historical earthquakes listed in Table 2, via simulation models listed in Table 1. (Requested by Abrahamson)
S9	January, 2013	Complete simulations of scenario earthquakes listed in Table 3, for validation using the empirical GMPE's listed in Table 4. (Requested by Abrahamson)

Table 8. Tasks of the "GMSV Validators" subgroup (listed in Table 6) that will develop detailed plans for testing/rating the simulated ground motions from the GMSV Simulators subgroup.

ID	Due Date	Description
V1	May, 2012	Develop detailed plans for testing/rating, considering the broad tasks below and the validation plans that have been developed by the PEER NGA-East Project (courtesy of Christine Goulet) [2] (ftp://ftpext.usgs.gov/pub/cr/co/golden /Luco/GMSV/Validation_Guidelines_NGA-East_July28-2011+Email.pdf) .
V2	June, 2012	Add the empirical GMPE's listed in Table 4 to the Broadband Platform.
V3	July, 2012	Complete validation of the ground motions simulated in Task S3.
V4	September, 2012	Present progress of GMSV Validators subgroup at GMSV workshop during SCEC Annual Meeting.
V5	November, 2012	Complete validation of the ground motions simulated in Task S8. (Requested by Abrahamson)
V6	February, 2013	Complete validation of the ground motions simulated in Task S9. (Requested by Abrahamson)
V7	March, 2013	Have validations from Tasks V5 and V6 reviewed by a SCEC panel, and list simulation models that "pass" the validations. (Requested by Abrahamson)

Return to Main Page

2012 Progress Workshop

From GMSV Wiki

Organizer: Nico Luco
Date: September 9, 2012 (13:00-17:00)
Location: Hilton Palm Springs Resort, Palm Springs, CA
Participants: 157 total (http://www.scec.org/workshops/participants_all.php?event=1950&question=yesno02&title=1950)

Background & Objectives

SCEC has established a Technical Activity Group (TAG) focused on Ground Motion Simulation Validation (GMSV) in order to develop and implement, via collaboration between ground motion modelers and engineering users, testing/rating methodologies for the use of ground motion simulations in engineering applications. In April of this year, the TAG held a small workshop to coordinate GMSV-related SCEC projects funded in 2012, before they began in earnest. At that workshop, participants also discussed near-term plans for GMSV of the simulation models on (or soon to be on) the SCEC Broadband Platform, for use in developing the median part of ground motion prediction equations for elastic spectral acceleration (e.g., Abrahamson and Silva, 2010).

The main purposes of this half-day workshop at the SCEC Annual Meeting are to ...

1. Share and discuss progress on the GMSV-related SCEC projects funded in 2012 and the Broadband Platform Validation Project, and

2. Obtain feedback on these projects and identify priority activities/topics for the 2013 SCEC Science Collaboration Plan.

Agenda

13:00-13:05	Welcome and Background of GMSV Technical Activity Group and Broadband Platform Validation Project	*T. Jordan*
13:05-13:10	Overview of Agenda (pdf (http://www.scec.org/workshops/2012/gmsv/1305_Jordan_Overview_of_Agenda.pdf))	*T. Jordan*
	SCEC Broadband Platform Validation Project Moderator: *Phil Maechling*	
13:10-13:15	Session Introduction	*P. Maechling*
13:15-13:30	Motivation and Needs (pdf (http://www.scec.org/workshops/2012/gmsv/1315_Abrahamson_scec_valid.pdf))	*N. Abrahamson*

13:30-13:45	Validation Plans (pdf (http://www.scec.org/workshops /2012/gmsv/1330_Goulet_GMSV.pdf))	*C. Goulet*
13:45-14:00	Simulation Plans (pdf (http://www.scec.org/workshops /2012/gmsv/1345_Somerville_SCEC-BB-Workshop.pdf))	*P. Somerville*
14:00-14:30	Discussion	*All*
14:30-14:45	*Break*	
	SCEC GMSV Technical Activity Group Projects Moderator: *Nico Luco*	
14:45-14:50	Session Introduction (pdf (http://www.scec.org/workshops /2012/gmsv/1445_SessionIntroduction.pdf))	*N. Luco*
14:50-15:05	Engineering Perspective on Simulation Validation and Use of the Broadband Platform (pdf (http://www.scec.org /workshops/2012/gmsv /1450_Baker&Burks_EngineeringValidation.pdf))	*J. Baker* *L. Burks*
15:05-15:20	Validation of Broadband Platform Ground Motion Simulations for Historical Events (pdf (http://www.scec.org /workshops/2012/gmsv/1505_Zareian_SCEC.pdf))	*F. Zareian* *S. Rezaeian*
15:20-15:35	Comparison of CyberShake Hazard Models with NGA Models Using Averaging-Based Factorization (pdf (http://www.scec.org/workshops/2012/gmsv /1520_Wang&Jordan_SCEC2012GMSV.pdf))	*F. Wang* *T. Jordan*
15:35-15:50	Discussion	*All*
15:50-16:05	*Break*	
	Priority GMSV Activities/Topics for 2013 SCEC Science Collaboration Plan Moderator: *Kim Olsen*	
16:05-16:10	Session Introduction	K. Olsen
16:10-16:20	Summary and Background of 2012 Priorities (pdf (http://www.scec.org/workshops/2012/gmsv /1610_Summary+Background_of_2012_Priorities.pdf))	N. Luco
16:20-16:50	Discussion	*All*
16:50-17:00	Summary of Discussions	*K. Olsen*, *N. Luco*
17:00	*Adjourn*	

Notes from Workshop Discussions

- Distinguish between validation for hazard calculations (where what matters is getting distributions of the intensity measure correct, including joint distributions of multiple intensity measures) and validation for engineering analysis (where what matters is building response, and typically the target intensity measure level that the ground motion should have is specified).
- Make sure there is language linking GMSV to the six main objectives in the science plan, so that

proposers understand how to note which science plan objectives their proposal addresses.

- Invite proposals for implementation and/or validation of new components on the Broadband platform (e.g, nonlinear site response).
- Emphasize analysis/estimation of site effects, including nonlinear effects (for GMP-related projects, as well as GMSV-related projects).
- Expand pseudo-dynamic rupture generators, in particular to include super-shear rupture.