



SCEC Workshop on 3D Site Effects in Physics-Based GM Simulations

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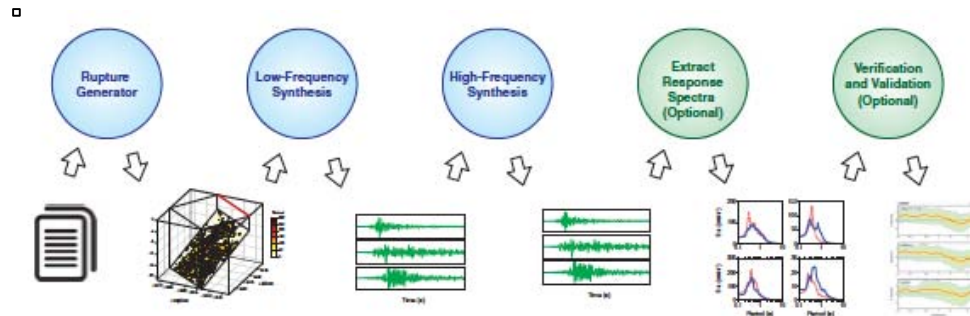
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A glimpse into the future of engineering design

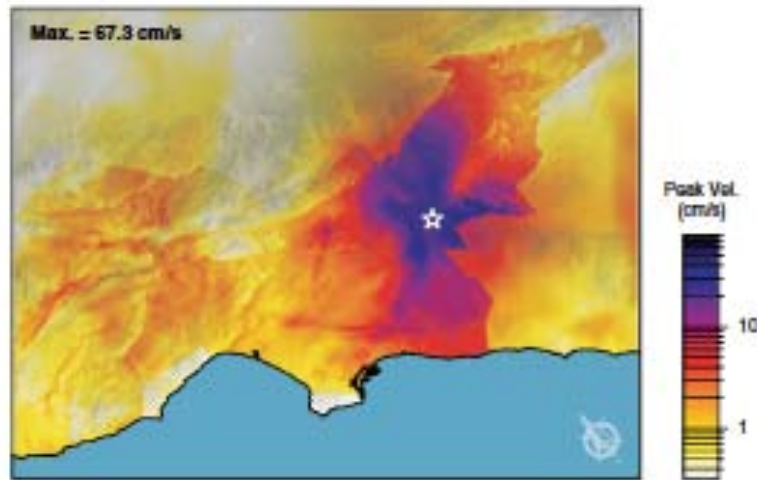
M8-1.0 velocity Magnitude



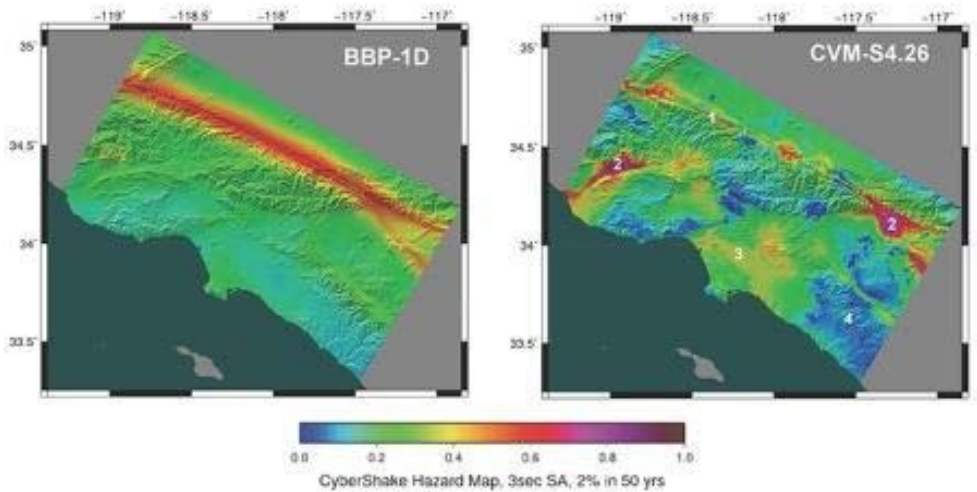
From SCEC to engineering design in S CA



a. The SCEC Broadband Platform:
1D velocity structure; stochastic high frequencies



b. Physics-based (deterministic)
3D ground motion simulations



c. Cybershake: Physics-based regional hazard

Nonlinear site effects in simulated GMs

Three challenges:

1. Computational: Spatiotemporal discretization via multi-scale methods? Computational efficiency?

2. Constitutive models: What is the simplest model necessary to predict realistic ground motions?

3. Site (region) characterization: Input parameters on a regional scale? Empirical correlations?

SCEC & nonlinear site effects

Three 'products':

- 1. BBP platform:** Empirical amplification factors (likely based on Fourier spectral ratios)
- 2. 3D Simulations:** What soil models are available? Can they be implemented? What next?
- 3. Cybershake:** Use 3D simulations to develop region-specific nonlinear correction factors? Equivalent linear properties?

Workshop Deliverables & Timeline

- White paper summarizing challenges and research roadmap for next 5 years
- Questionnaire on last page of handout
- Responses by **Monday, May 11**
- Circulate white paper for comments May 20
- Deliver to SCEC by May 29

Presentations: 15 minutes **strict**

Additional comments (2-3 slides)?