SCEC Broadband Platform Validation Introduction

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Objective

- Evaluation of current BBP for estimation of elastic response spectral values
  - Which modules/methods are ready for engineering applications
    - What are the reliable ranges (Mag, dist, freq) for application
  - Which modules needs additional work
  - Snapshot in time

Short Term Need for Validations

- Projects
  - NGA-East
  - SWUS - Ground motion models for Southwestern US
    - Nuclear power plant application

Short Term Need for Validations

- Use of Results – Elastic Spectral Values at 5% Damping
  - NGA-east
    - Constrain low frequency scaling of PSA to guide double-corner point source model
    - Develop alternative GMPE based on FF simulations
  - NPP application
    - Provide estimates of PSA (0.1 to 100 Hz) for cases not well constrained in empirical GMPEs
    - Provide constraints on epistemic uncertainty
      - Broaden range of empirical GMPEs
  - Use of simulated time histories for fragilities may be considered later (1-2 yrs)

Required Schedule for SWUS

- Aug 2013
  - Selected set of simulation methods (modules) that pass the validation
    - "None" is an acceptable answer
- Oct 2013
  - Initial results from forward simulations from methods that passed validation
  - Explanation of the causes of differences
- Feb 2014
  - Final results from second set of forward simulations

Validation of BBP

- GMSV TAG has a broad scope for validation
  - Afternoon presentations address more advanced validation
- Separate accelerated validation effort for just elastic spectral values
- Moving the BBP from a research tool to a usable engineering tool
  - Requires fixed versions of BBP to allow QA (repeatability of results)
  - Change in focus from understanding of earthquake physics to understanding impacts of results

BBP

- Move from a research tool to a resource available for engineering projects
  - Change of focus to results, not basic understanding of physics

Moving Forward with BBP: Topics for Discussion

- New Features in BBP
  - Improved inputs (easier to understand)
  - Plots of inputs for checking
  - Computation of GF within the BBP
  - Allow for non-planar ruptures

Moving Forward with BBP: Topics for Discussion

- Validation – response spectral values (median)
  - 1-D crustal models
    - Complete validation for remaining 13 active crustal region earthquakes
    - Validation for 3 EUS earthquakes
  - 3-D crustal models
    - Repeat validation using 3-D crustal models
      - What is the improvement compared to 1-D models?

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