

Future SCEC Utilization of Ground Motion Simulations (UGMS) for Seismic Design of Structures

2026 SCEC Annual Meeting Panel Session

C.B. Crouse

Decision for Engineers

- To use or not to use 3-D physics-based simulations in seismic design
- Yes (when appropriate)

2018 SCEC UGMS Data Access Tool for MCE_R & DE Response Spectra

Site-Specific MCE_R & Design Response Spectra per Sect. 21.2, 21.3, 21.4 of ASCE 7-16

Input Parameters

Report Title

Latitude and longitude in decimal degrees (or click on map to select site):

Site Geotechnical Classification:

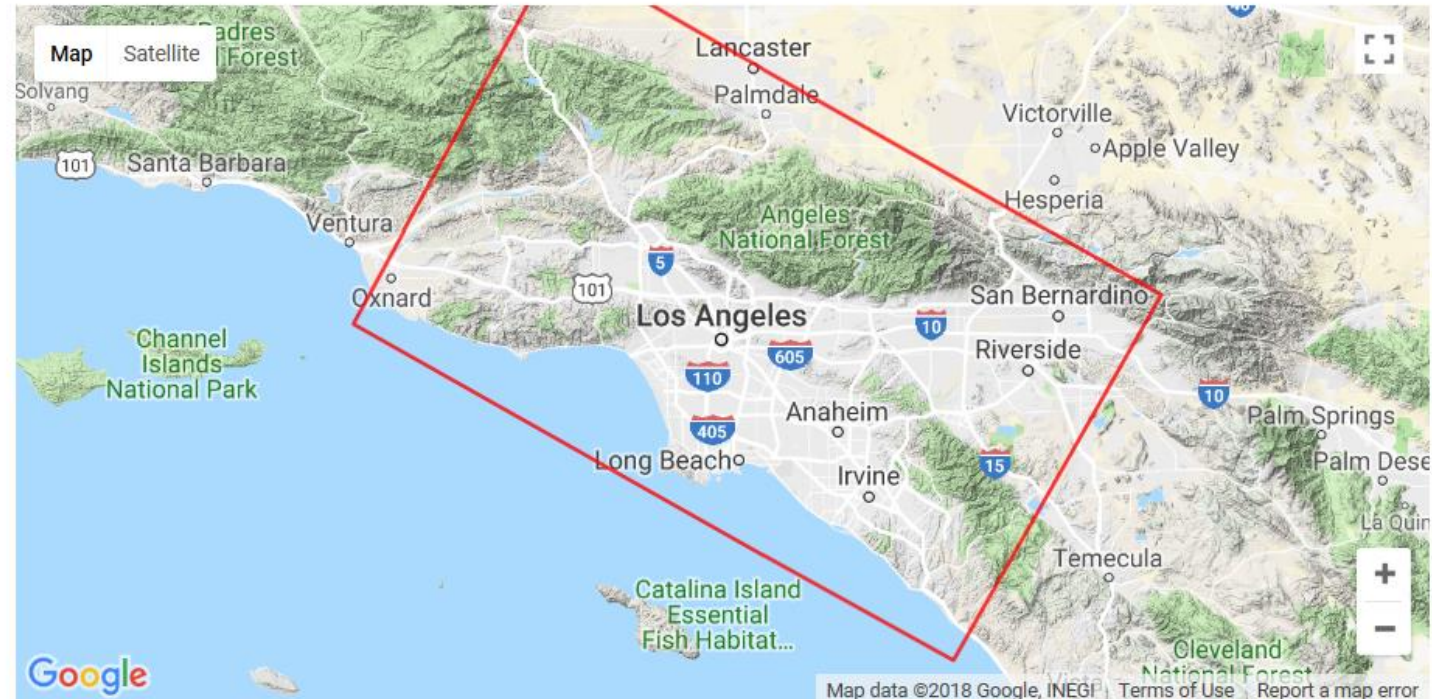
☒ **Site Class**

Site Class NOT automatically determined based on site location.

- OR -

☐ V_{s30} (m/s)

- OR -

☐ Unknown (V_{s30} estimated from Wills et al., 2015)

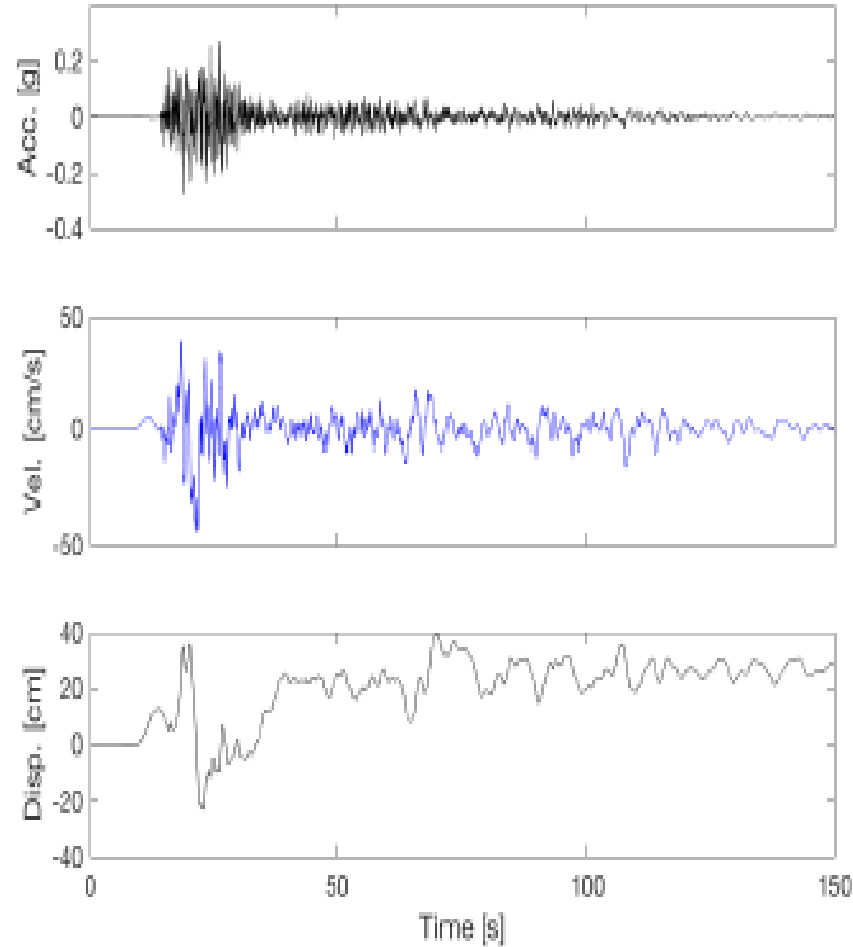
The UGMS MCE_R tool was developed by the SCEC Committee for Utilization of Ground Motion Simulations (or "UGMS Committee") from research supported by the Southern California Earthquake Center (SCEC). SCEC is funded by NSF Cooperative Agreement EAR-1033462 & USGS Cooperative Agreement G12AC20038. For more information on the UGMS Committee, visit <https://www.scec.org/research/ugms>.

Future SCEC UGMS MCE_R & DE Data Access Tool

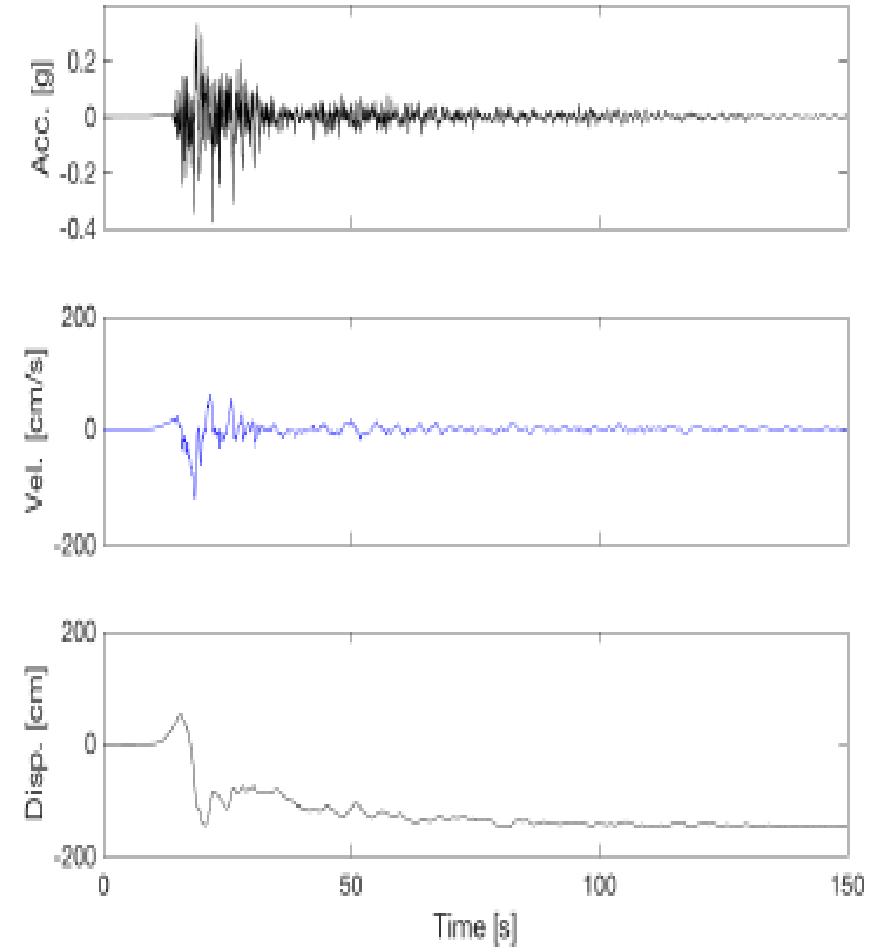
- Update to conform to ASCE 7-22 & forthcoming 7-28 Standards
 - Upgrade CyberShake (extend to shorter T, include variations in material properties in upper 200m, include topography)
 - update fault recurrence models
- Include Service Level Earthquake (LATBSDC Guidelines)
- Include option for existing buildings (ASCE 41) ~ 2020 SCEC Beta version

2020 SCEC UGMS Time Histories Data Access Tool (not easy to use)

S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG, M = 8.15, R = 39km, comp 1

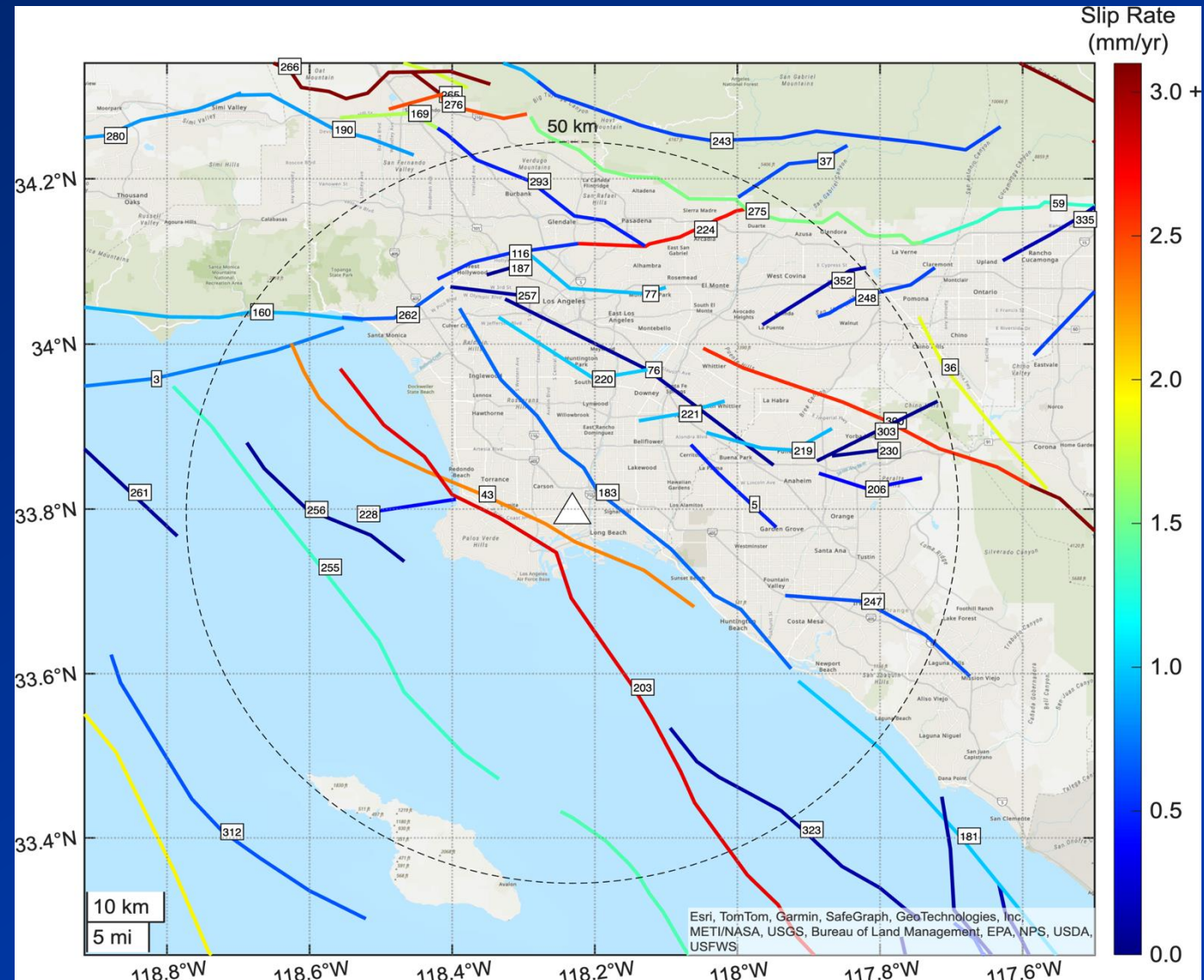


S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG, M = 8.15, R = 39km, comp 2



Future SCEC UGMS Time Histories Data Access Tool (easier to use)

- Add more broadband simulations
- Drop-down listing of regional faults
- Options for directivity (forward, neutral, backward)
- Options for other parameters (M , D_{5-95} etc.)
- No. of Time Histories
- Outputs ~ PEER Time History Tool



Needs to aid use of Broad-Band Simulations in Seismic Design

- Easy-to-use tools familiar to engineers
- Inform geotech/structural engineers & building officials
 - Proper venues (e.g., SEAOC dinner mtgs., LATBSDC mtg.)
 - Present case-history example
 - Discuss advantages
- Future code revisions to encourage use of simulated motions?