

2021 San Francisco Bay Region Unified Structural Representation Workshop

Summary of Breakout Sessions

Integrating geology, geophysics, and seismology

- We could do a better job of reconciling datasets by seeking solutions that satisfying all of them. These present opportunities to address more difficult (and potentially more interesting) questions. San Leandro gabbro – opportunity to better integrate datasets and resolve issues.
- The geologic structure can be described by different geologic bodies separated by faults, unconformities, and bounds with different histories. The models needs to be simple as possible but not too simple.
- We need a team working on a joint/cooperative inversion of the elastic properties and geologic structure. In the 3D geologic models, there are a small number of features that are well-constrained; these should be used as a priori constraints in seismic analyses.

Shallow structure

- Focus on urban areas and infrastructure as well as areas where surface materials are weak (low Vs).
- Need to understand in-situ material to better constrain Vp/Vs. Water saturation, shearing, anisotropic, and weather all affect shallow properties.
- UC Berkeley, Stanford, and University of Nevada Reno have experiments applying distributed acoustic sensing to fiber optic cables in their vicinity.

Basin structure

- Tie ground motion in sedimentary basins to geology. Can we distinguish between southern CA and northern CA basins? What do we need to know to predict ground motions will be different?
- Exploration of all possible basin geometries that satisfy the observations is generally intractable; explore representative cases.
- Connect basin structure to ground-motion records using a data-driven approach.

Special study areas

- “Area” can be a geographic region or a new data source.
- Community experiment.
- Potential candidates
 - Santa Clara: abundant of seismic data and gravity data with two basins; already pretty well constrained.
 - Livermore basin: deep basin but geometry and gradient in seismic velocity are relatively poorly constrained.
 - San Joaquin Delta: young sediment and oil industry data; strong contrast with basement.
 - Napa basin: confined from other large geologic structures; geologic and seismic data have not been well integrated.

General

- Want to reduce time to generate and evaluate 3D seismic and geologic models; need cyberinfrastructure. SCEC is facing the same issue.
- Want efficient leveraging of community resources and ideas.
- Risk-based assessment could be used to target areas for improvement.
- San Francisco Bay region contains significant secondary hazards (landslides and liquefaction). Need to improve resolution of structural models to predict secondary hazards on a regional scale.
- Consider forming a consortium (could be broadened to seismic hazard in general) to seek and direct funding and facilitate collaboration.