Constraints on statistics of small-scale heterogeneities from sonic borehole logs

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Obtain more constraints on small-scale heterogeneities

- Collect well logs to extract parameters for assumed statistical distributions of small-scale heterogeneities (e.g., Hurst number, correlation length, standard deviation, anisotropy).

- Further investigate depth dependence, velocity/stratigraphy dependence.

- Use closely spaced wells to obtain horizontal correlation length directly (e.g., Song et al., SCEC AM 2014).
Damage/LVL Zones

- Map the velocity structure and (surface) width of fault damage/low-velocity zones around faults

Roten, Olsen, Day and Cui (2017)
Surface Topography

- CyberShake, High-f simulations have used a flat free surface so far
- AWP in the process of adding support for topography
- Hercules has a version supporting topography
- Do the SCEC CVMs include surface topography? If not, enable
Recommendations

- Collect all available oil-company sonic/Vs logs to obtain better constraints on distributions of small-scale heterogeneities:
  - Strength (standard deviation, depth/geology dependent)
  - Correlation length, anisotropy (depth/geology dependent)
  - Hurst number

- Map and include fault damage zones/LVLs in CVMs

- Include surface topography in CVMs