Building a Las Vegas Seismic Model

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Model Rendered as Amplification Map

- Geology, Basin Depth, Geotech, Geophysical data into *ModelAssembler*

- Field (2001) Predicted Amplifications, from Jachens & Blakely USGS Gravity Results for Basin Depths, and Wagoner & Taylor Las Vegas Valley Stratigraphic Model Details
Max. Ground Motion Computed– 0.5 Hz

- E3D elastic finite-difference solution, by Shawn Larsen, LLNL

Log10 E3D Computed Ground Motions from Little Skull Mtn. Source at 2 sec Period, with Jachens & Blakely USGS Gravity Results for Basin Depths, and Wagoner & Taylor Las Vegas Valley Stratigraphic Model Details

Deep Volcanic Rifts

Las Vegas Basin

Little Skull Mtn.
LVV GM Pattern Computed at 0.5 Hz

- Raw maximum horiz. motion is “speckly” (left)
- Smooth to clarify streaks (arrows, right); geological input to grid is smooth
LVV GM Pattern Origin in Basin Depth?

- GM pattern in LVV (left) does not resemble basin-depth map (right)
- Some GM amplification at steep walls of basin on north and east (circled)
LVV GM Pattern Origin in Basin Edges?

- Complexities in the basin edges—re-entrants of shallow basins into the bedrock (circles)—concentrate conversion of Rayleigh-wave energy in the bedrock to Love-wave energy in the re-entrants, which channels down the small valleys and “beams” across the main basin.
- This effect is highly source, path, and basin dependent.
- The re-entrant basins need only be ~100 m deep.