Broadband High-Performance Computing Simulations of an M7.0 Hayward Fault Earthquake

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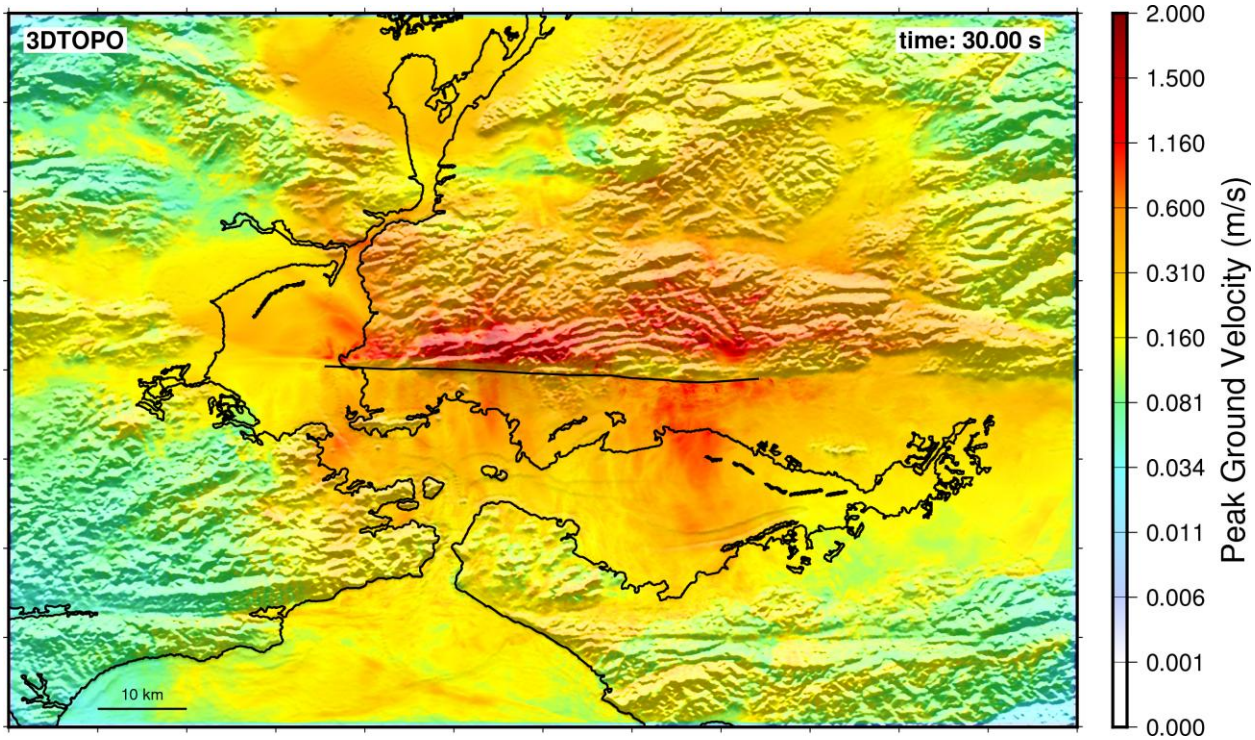
This talk will describe fully deterministic broadband (0-4 Hz) high-performance computing ground motion simulations of a magnitude 7.0 scenario earthquake on the Hayward Fault (HF) in the San Francisco Bay Area of northern California. Simulations rely on SW4, a fourth order finite difference code, and world-class HPC systems at LLNL and LBNL. We use a model of the three-dimensional (3D) geologic/seismic structure developed by the United States Geologic Survey (USGS). Ground motion intensities for the 3D model display dramatic differences across the HF due to geologic heterogeneity, with low wavespeeds east of the HF amplifying motions. We are investigating path effects using recordings of moderate (M 4) earthquakes in the region. Simulated ground motion time-histories enable engineering analysis of structures.



Peak ground velocity for our simulation of a magnitude 7.0 Hayward Fault earthquake.

BIO*: Arthur Rodgers is a seismologist at LLNL working on computational seismology. He obtained his PhD in Physics from the University of Colorado in 1993 and held postdoc positions at New Mexico State University and the University of California Santa Cruz before joining LLNL in 1997. In 2010 he was a Fulbright Scholar to Grenoble France. He is also a visiting researcher at LBNL and UC Berkeley Seismology Lab.*