

LLNL scientists simulate 1906 earthquake and possible future tremblors along local faults

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There are seven major earthquake faults in the San Francisco Bay area: the San Gregorio, San Andreas, Hayward, Calaveras, Rodgers Creek, Concord–Green Valley, and Greenville faults.

Lawrence Livermore National Laboratory scientists today unveiled detailed computerized recreations of the 1906 San Francisco earthquake, as well as simulations of temblors along other local faults that could have devastating effects on the Bay Area, Central Valley and Delta region.

Working with the U.S. Geological Survey, Livermore scientists worked for two years on the 1906 simulations, which show that the magnitude 7.8 earthquake that struck San Francisco on April 18, 1906 was centered off the coast and caused severe damage along more than 300 miles of the

San Andreas Fault.

The 1906 simulations show how the waves spread as far south as San Juan Bautista and as far north as Cape Mendocino. Santa Rosa in the north was severely damaged. Livermore researchers used a three-dimensional model and a seismic velocity model to assess the damage.

Using supercomputers at the Laboratory that are capable of calculating a magnitude 7.0 or greater earthquake on any given fault, seismologists and engineers can assess the potential damage that lies in its wake.

“By recreating the 1906 earthquake, we can get a closer look at how the ground responds. It gives us insight into what might happen along other faults in the area,” said Arthur Rodgers, leader for Livermore’s seismology group. “One thing we have to keep in mind is that earthquakes don’t rupture uniformly.”

In addition to the 1906 recreation, the scientists created simulations of earthquakes along other faults such as the Hayward Fault, which show severe damage to major transportation corridors, power lines and water pipelines. Impacts in the Delta region include possible damage to levees, buildings and bridges.

The simulations are part of the Laboratory’s seismology program, which combines physics and engineering with high-performance computing to assess local, state, national and global effects from earthquakes and national security threats.

Source: Lawrence Livermore National Laboratory

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