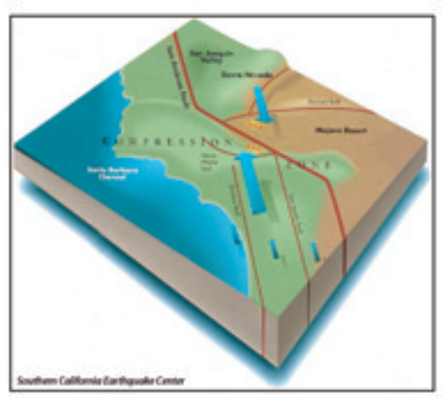
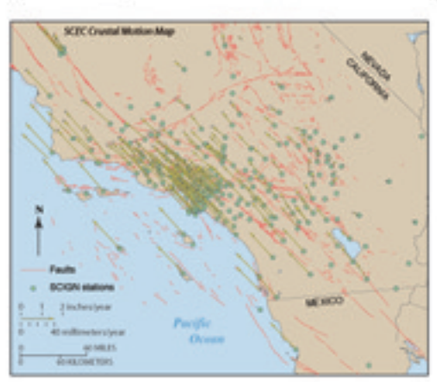
The Southern California Integrated GPS Network

Using the Global Positioning System to Study Earthquakes

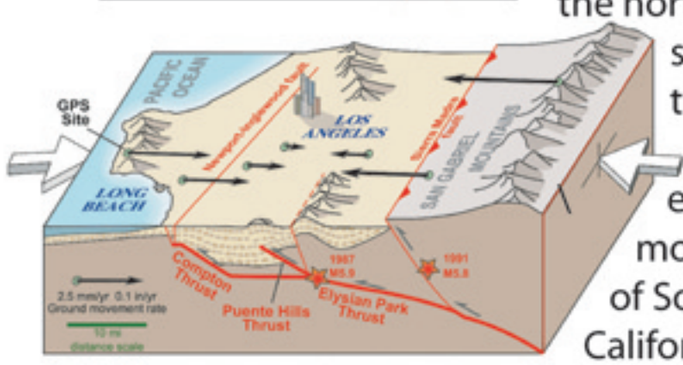
SCIGN
Southern California Integrated GPS Network
www.scign.org

Southern California is a giant jigsaw puzzle, and scientists are now using GPS satellites to track the pieces. These puzzle pieces are continuously moving, slowly straining the earth's crust. That strain is eventually released in earthquakes. The innovative Southern California Integrated GPS Network (SCIGN) tracks the motions of these pieces over most of southern California with unprecedented precision. This new network greatly improves our ability to assess seismic hazards and quickly measure the larger displacements that occur during and immediately after earthquakes.

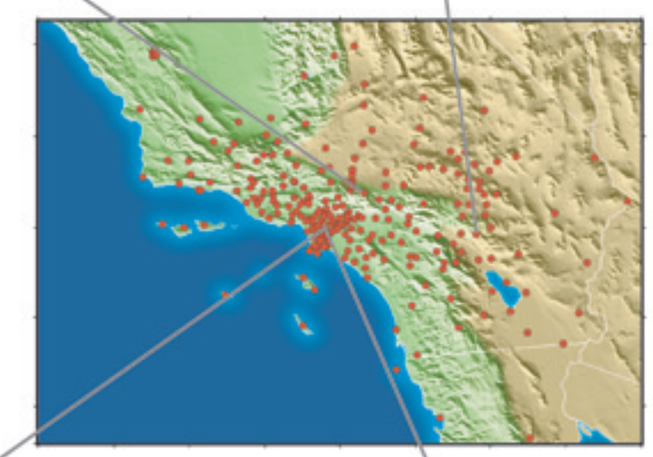




S. California is on the boundary between the North American and Pacific plates. The Pacific plate moves northwest relative to the N. American plate at about 2 inches/year. SCIGN measures the horizontal motion across S. California and the north-south squeeze that uplifts the east-west mountains of Southern California.



SCIGN has over 250 stations in Southern California, in urban, desert, and mountain locations. There are more stations in LA since population, and therefore earthquake hazard, are highest here.



SCIGN suffered no damage in the November 2003 fires ...

but this is how close the fire came to the SCIGN station at Glen Helen Regional Park.

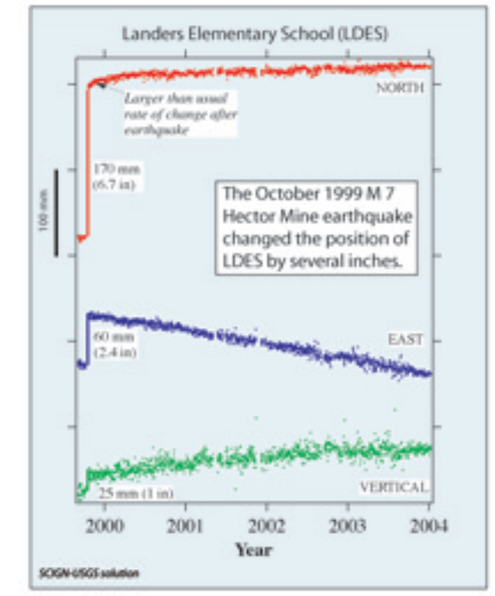
SCIGN thanks the firefighters who saved the station!

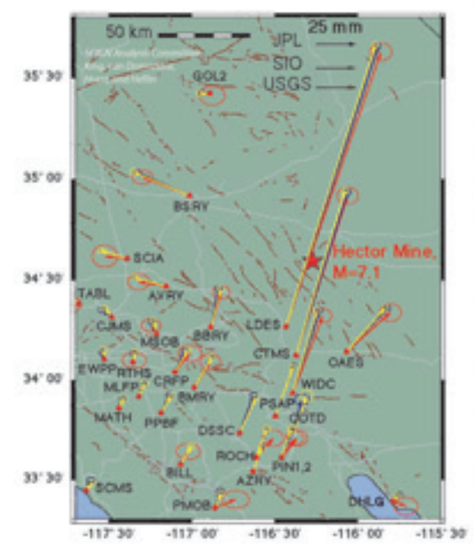
Skrokkalda, Iceland

The dome developed by SCIGN is used all over the world.

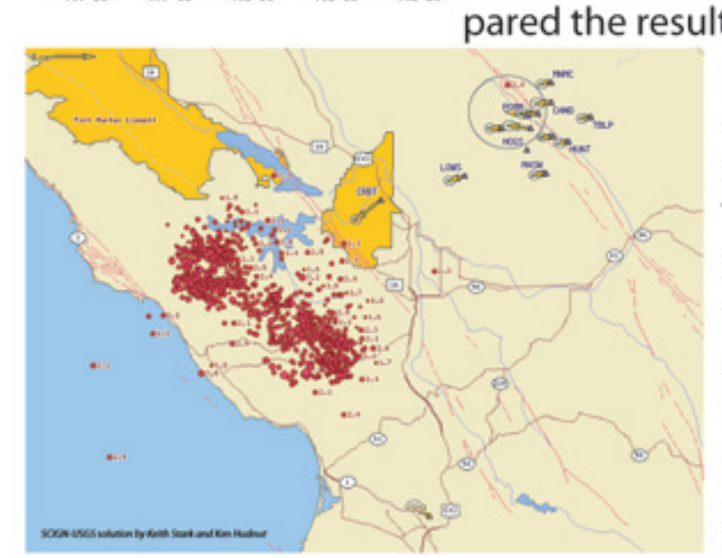
South Pole

Between large quakes, SCIGN measures slow but steady changes in station positions. The changes are fractions of an inch per year. When an earthquake of M 6 or larger occurs nearby, the position changes are much larger. This plot for LDES shows both kinds of motion.





Two large earthquakes have occurred since SCIGN began operating. The October 1999 M 7.1 Hector Mine earthquake shifted the positions of almost all SCIGN stations. Those close to the earthquake moved by several inches. SCIGN calculated the station motions several different ways and compared the results; the different methods produced very similar results. The December 2003 M 6.5 San Simeon earthquake moved the northern SCIGN stations by 1 to 2 inches.



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