Integrating GPS, InSAR, and UAVSAR date into the QuakeSim Computational Environment

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QuakeSim is an earthquake and geophysical modeling environment that incorporates modeling and analysis applications with geologic and InSAR data. Crustal deformation observed at the surface provides insight into fault behavior at depth. Global Positioning System (GPS) data provide velocity information at precise network stations as well as daily station point positions that can be used for time series analysis. Interferometric Synthetic Aperture Radar (InSAR) collected from airborne (UAVSAR) and spaceborne platforms provide snapshots of crustal deformation over fairly large regions or swaths. These data as well as geologic fault data are incorporated into the QuakeTables database and QuakeSim computational environment. The data are integrated with analysis tools that do the following with the relevant application listed in parentheses: invert for fault motion at depth (simplex), construct forward crustal deformation models based on fault data from QuakeTables or user input (disloc and GeoFEST), and provide dates and locations of changes in the characteristics of GPS time series data (RDAHMM). The time series state changes can be displayed in movie format spanning many days, providing insight into evolution of changes within the network associated with earthquakes or changes in the ground water table.