**QuakeSim Computational Infrastructure for Integrating DESDynI and UAVSAR Data into Earthquake Models**

Andrea Donnellan, Jay Parker, Robert Granat, Greg Lyzenga, Margaret Glasscoe

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA, 818-354-4737, 818-354-0966, andrea.donnellan@jpl.nasa.gov

Dennis McLeod, Rami Al-Ghanmi, University of Southern California, Los Angeles, USA, 213-740-4504, 213-740-5807, mcleod@usc.edu

Marlon Pierce, Geoffrey Fox, Indiana University, Bloomington, USA, 812-320-0876, mpierce@indiana.edu

Lisa Grant Ludwig, University of California, Irvine, USA, 949-824-2889, 949-824-0529, lgrant@uci.edu

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QuakeSim is a computational infrastructure for studying, modeling, and forecasting earthquakes from a system perspective. QuakeSim takes into account entire earthquake cycle of strain accumulation and release, requiring crustal deformation data as a key data source. Interferometric Synthetic Aperture Radar (InSAR) and Global Positioning System (GPS) data provide current crustal deformation rates, while paleoseismic data provide long-term fault slip rates and earthquake history. The QuakeTables federated multimedia database contains spaceborne and UAVSAR InSAR data for the California region as well paleoseismic fault data from a number of self-consistent datasets, such as the Uniform California Earthquake Rupture Forecast (UCERF), California Geological Survey (CGS), and Virtual California. Access to QuakeTables is provided through a web interface and a Web Services based application program interface (API) for data delivery. Data are categorized into self consistent datasets that can be queried in their original form or a derivation therefrom. QuakeTables provides access to mapping features through a web interface, that provides users with direct access to the QuakeTables federated data. Users can browse, map and navigate the available datasets. These include crustal deformation modeling, and pattern analysis. The crustal deformation tools include forward elastic dislocation models (DISLOC) and 3D viscoelastic finite element models (GeoFEST), and elastic inversions of crustal deformation data (SIMPLEX). The tools support mapping and applications for visualizing results in vector or interfermetric form. Virtual California simulates interacting fault systems. Pattern analysis tools include RDAHMM for identifying state changes in time series data, and RIPI for identifying hotspot locations of increased probabilities for magnitude 5 and above earthquakes. The QuakeSim infrastructure automatically posts UAVSAR data to QuakeTables for storage and modeling establishing infrastructure for doing the same for DESDynI data when they are available.

The first UAVSAR interferogram of an earthquake occurred in Southern California at the northern extent of the April 4, 2010 El Mayor-Cucapah earthquake and resides in the QuakeTables database. QuakeSim tools have also been used to invert the interferogram for fault slip. Examination of results from RDAHMM, RIPI, Virtual California, and inversions of GPS data suggests an active shear zone that extends from the Big Bend of the San Andreas fault southward, through the San Fernando Valley. The zone steps eastward near downtown Los Angeles and continues southward along the Elsinore and San Jacinto fault zones. Continued modeling will illuminate any relationships between the shear zones and the Landers and El Mayor-Cucapah earthquakes. The zone of shear correlates with hot spots identified through RIPI from seismicity data, and a line of anomalous GPS stations as identified through RDHAMM. GPS velocity vectors also show a velocity gradient of 5-15 mm/yr along this shear zone. The fusion of these multiple data types and methodologies resulted in the identification of the proposed zone of shear. Models are being developed using Virtual California to simulate fault interactions, and Simplex to invert the velocity field data to identify the geometry and rates along the shear zone.