

## InSAR Community Geodetic Model: Consensus Deformation Time Series and Velocities in Southern California

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**Abstract.** The InSAR Community Geodetic Model (CGM) working group, which was established as part of the Southern California Earthquake Center (SCEC), has been focused on advancing research into improving InSAR processing techniques, establishing best practices, reaching a community consensus for the best InSAR-based deformation time series and velocity model for Southern California, and exploring integration with GNSS. Our motivation is to create a set of self-consistent and well documented products (time series and velocities) over southern California, and make them easily accessible to the Earth science community through a searchable web interface.

We present the latest version of the InSAR CGM, consisting of time series and velocities from four overlapping InSAR tracks in Southern California. The model is a combination of six different solutions that were provided by groups at SIO/UC San Diego, UC Berkeley, USGS, UC Riverside, and NASA JPL. Each group has used a distinct approach to estimating deformation time series and velocities, all of which we summarize in this presentation. We have corrected the combined InSAR velocities for the absolute bulk plate motion, and we show that this correction improves the agreement between InSAR and GNSS velocity datasets. We have explored and compared several methods for estimating InSAR velocity and time series uncertainties. To calculate uncertainties for our consensus InSAR velocity product, we chose to apply a method that is commonly used with GNSS time series, incorporating both white and temporally correlated noise sources. Using an assumption of flicker noise, we calculate the covariance matrix for every pixel following the equations of Zhang et al. (1997) and perform a time series model inversion (including velocity and seasonal terms) to obtain the uncertainty estimate. This approach allows us to obtain a robust uncertainty estimate without requiring individual measurement uncertainties.

Our updated InSAR CGM, including the latest corrections and uncertainties as well as the tools for working with the dataset, will be made available on the SCEC website: <http://moho.scec.org/cgm-viewer/>. The development of the model is ongoing, and it will be updated regularly. Current research is focused on the integration of the InSAR velocities and time series with GNSS for a joint Community Geodetic Model, expanding the temporal and geographical extent of our products, and isolating deformation signals due to the 2019 Ridgecrest earthquakes.

# Consensus line-of-sight velocity model for Southern California

