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# InSAR and GPS integration for the study of Strike Slip fault system.

Noel Gourmelen (1), Nicolas Houlie (1), and Falk Amelung (2)
(1) School of Earth and Environment, University of Leeds, UK, (2) University of Miami, USA

The principal limitations of Interferometric Synthetic Aperture Radar (InSAR) in measuring subtle deformation in strike slip environment are uncertainties associated with the satellite orbits and atmospheric water vapor. We investigate these uncertainties in the Eastern California Shear Zone by integrating InSAR and GPS time-series.
At each SAR epoch, the phase discrepancy between InSAR and GPS is modeled as orbital phase error, or OPE. In our orbital model, the range variation in OPE is directly related to the satellites baseline errors, while the azimuth variation in OPE relates to the variation of the baseline errors, which we model as a second order polynomial (Gourmelen et al., 2009).
We then investigate the role of water vapor in the determination of the OPE. OPE is sensitive to coordinates errors of the GPS reference points induced by a troposphere changes (Houlie et al., 2006). Indeed, troposphere can impact the relative correction made on each SAR scene by shifting (change of the velocity of GPS sites) or deforming each scene (change in the coordinates of GPS sites). We test the impact of troposphere OPE by integrating GPS data corrected of troposphere contribution.
We investigate the fault parameters across the Eastern California Shear Zones from the newly produce InSAR-GPS time series and velocity map.