



Processing methodology for calculation of ground deformation rates along Hayward fault, northern California, from RADARSAT-2 synthetic aperture radar images acquired during 2008-2011

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We present linear deformation rates for northern California region along the Hayward fault calculated from Radarsat-2 ascending and descending SAR images acquired during 2008-2011. We use quad-polarization data and perform standard InSAR processing. All possible interferograms are created and the topographic phase is removed using an existing DEM. We then analyze a normalized polarization phase difference between HH and VV channels averaged over a temporal set of images and select pixels that demonstrate predominantly even or odd bounce scattering properties. The interferometric phase for these pixels is extracted and unwrapped and a time series analysis is performed based on an SBAS approach that estimates the time series of deformation and linear deformation rates. The images produced display a variety of ground deformation. While the predominant motion observed on these images is creep along the Hayward fault, landslides and subsidence produced by groundwater extraction are also clearly visible. It is anticipated that the locking depth at the Hayward fault will be determined by inverting DInSAR and GPS results.