

The stress states on faults and magmatic systems east of the Sierra Nevada Mountains of California and Nevada are sensitive to surface loading from hydrological mass that varies over seasons, drought cycles and climate changes. Recently, three moderate to large earthquakes, the M7.1 2019 Ridgecrest, M6.5 2020 Monte Cristo Range, and M6.0 2021 Antelope Valley earthquakes, occurred near the perimeter of the central and southern Sierra Nevada during the summer months when hydrologic loads were at a minimum. To investigate the specific configuration of strain changes associated with these hydrological loads we use satellite geodesy, including GPS data from the MAGNET and EarthScope Network of the Americas, and Sentinel-1 InSAR data to constrain models of seasonal to multi-annual three-component displacement. A multispectral analysis of snow cover is incorporated into the InSAR analysis to aid in pixel selection in the High Sierra where snow cover can cause radar decorrelation.

We correct the displacement time series for the co- and post-seismic effects from nearby earthquakes and GPS for equipment changes. The InSAR time series are aligned to the GPS, and from the displacement time series we isolate the deformation modes of the phase and amplitude of seasonal variation and long term trends attributable to tectonic deformation.