Geodetic Measurements of Four Decades of Horizontal Strain Near the White Wolf Fault, Southern California.

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The White Wolf fault, located in the southern San Joaquin Valley, is the NE-SW trending left lateral-oblique reverse fault responsible for the M_L 7.21952 Kern County earthquake. Dunbar *et al.* [Bull. SSA, 70, 1893, 1980] and Stein and Thatcher [JGR, 86, 4913, 1981] analyzed triangulation and leveling data for 0,2 to 20 years prior to and for 10 years after the Kern County earthquake. Dunbar *et al.* calculated a maximum shear strain rate ($\dot{\gamma}_T$) of 0.36±0.10 μstrain/yr. prior to the Kern County earthquake, but the strain rate measured across the fault was twice the strain rate measured away from the fault. For ten years after the Kern County earthquake, Dunbar *et al.* calculated a mean $\dot{\gamma}_T$ of 0.8 ±0.2 μstrain/yr., with higher strain rates closer to the fault. In 1993, we resurveyed many of the same monuments with Global Positioning System (GPS) receivers to look at the current fault-crossing and off-fault strain rates, as well as regional strain patterns.. The GPS data were processed with JPL's Gipsy-OasisII. Using FONDA (Dong, 1993), the GPS observations have been compared with NGS and USGS triangulation and trilateration data. Our results for the 10 year epoch following the Kern County earthquake agree with Dunbar *et al.*, with a $\dot{\gamma}_T$ of 0.77±0.24 μstrain/yr. The average maximum shear strain rate ($\dot{\gamma}_T$) for all stations within the network for the 1963-93 epoch is 0.24±0.03 μstrain/yr. This strain rate drop, between the 1952-63 and 1963-93 epochs, appears to be due to post-seismic relaxation, and may indicate a relaxation time on the order of 10 years. For the 1963-93 epoch, the maximum shear strain rate away from the fault is lower than network average, with a $\dot{\gamma}_T$ of 0.17±0.04 μstrain/yr. It is unclear whether the fault-crossing strains are higher due to tectonic influences or due to subsidence from groundwater or oil withdrawal. Further data analysis and modeling will help resolve the nature of the spatial strain differences,