

## **Strain Transients and Fault Interaction Associated with Earthquakes: An Intraplate Strategy**

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A major focus of PBO is strain transients associated with earthquakes, and how they may affect interactions among other faults within a system. High strain rate areas, such as the Cascadia and Aleutian margins and the San Andreas fault zone present important opportunities for CGPS networks, but a nagging limitation in observing all but the largest, rather short-lived effects in these regions is the large correction for strain accumulation, whose error is as large as, and often exceeds, the values of the residual strain. Signals from transient phenomena on the order of 10's of nstr/yr may be observable up to several hundred years after an earthquake. With model subtractions of order 100 to 300 nstr/yr, though, any transient or precursory phenomenon in this range is difficult to observe, because the errors involved in removing strain accumulation are optimistically at least a few tens of percent.

In the intraplate fault system of the Basin and Range, transient signals from earthquakes are just as large as those for earthquakes that occur near the plate boundary (except perhaps for the very largest earthquakes), and thus transient signals are of the same order of magnitude in the two areas. However, strain accumulation rates in the Basin and Range are only about 10 nstr/yr, and the error in correcting for strain accumulation is thus only a few nanostrains per year. Therefore, the details of transient phenomena, such as the viscoelastic response of the lithosphere to earthquakes, and the influence of these transients on neighboring faults in the system, can be much better observed in the setting of a well defined intraplate fault system than along the main plate boundary fault and its subsidiary strands. Indeed, anomalous motions observed by the BARGEN CGPS network adjacent to the central Nevada seismic belt suggest that signals from earthquakes that occurred 50 to 100 years ago are readily apparent in the strain field even without correction (Wernicke et al., 2000, GSA Today, in press).

Therefore, known ruptures over the last few hundred years in the Basin and Range would likely provide our best measurements of how the lithosphere responds to seismic excitation, at timescales generally not observable along the plate margin. We propose densifying existing and proposed backbone CGPS sites in the northern Basin and Range with semi-dense arrays of CGPS sites both along and across the 1872 Owens Valley, 1915/1954 Dixie Valley-Pleasant Valley, 1959 Hegben Lake, and 1983 Borah Peak ruptures, using approximately 10 to 15 CGPS sites each. In addition, we propose general densification of the northern Basin and Range CGPS infrastructure by an additional 50 sites, so as to fully characterize the effect of ruptures within the seismic belts on those in intervening areas. Particularly important will be comparison of geodetic data with paleoseismic data across the province to investigate how viscoelastic waves might influence the apparent tendency of Basin and Range earthquakes to cluster on a particular fault zone.