



Measuring Transient Signals in Plate Boundary Faults Zones with Strainmeters

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One of the fundamental goals the U.S. National Science Foundation (NSF) funded Earthscope program was to provide a high-quality, continuous geodetic data set that would allow the scientific community to study the evolution of plate boundary zones. Of particular importance was enabling investigation of the role aseismic transient deformation plays in the release of accumulated stress. For example, to allow the comparison of the amount of strain released through Episodic Tremor and Slip (ETS) events to that released in subduction zone earthquakes or, provide the ability to geodetically illuminate the kinematics of fault creep in strike-slip fault zones. The ability to easily integrate these measurements with compatible geophysical data sets was also an essential objective. With goals such as these in mind NSF funded the Plate Boundary Observatory (PBO) to record the continuous deformation field across the western US Plate Boundary. PBO, built and operated by UNAVCO, now consists of over 1100 GPS stations, 76 co-located borehole strain and seismic sites, 6 long baseline strainmeters, Depending on the scientific questions being addressed sites may also have tiltmeter, meteorological, pore pressure and meteorological instrumentation.

This presentation will focus on the transient deformation signals recorded by the PBO strainmeter network. PBO strainmeters, which excel in recording signals on the order of nanostrain over hours, have provided unprecedented temporal resolution of aseismic transients such as ETS events in the Cascadia subduction zone, creep signals along the central section of the San Andreas fault system and tsunami generated strain waves. UNAVCO is responsible not only for the ongoing operation of PBO but also the generation of data products associated with each instrument type. In this presentation we will highlight some of the transient signals these instruments have captured, outline the processing steps required to extract these signals data and describe the strainmeter data products produced by UNAVCO.