

Solid Earth Physics Seminar, Harvard University

Monday 22 May 2017, 1:00 pm
Room 309 Cruft Lab*, 19A Oxford Street

Geodetic Constraints on Slow Slip in Parkfield, CA

Brent G. Delbridge
Berkeley Seismological Laboratory
Department of Earth and Planetary Science
UC Berkeley

Abstract:

It is thought that large bursts of deep tremor (>20km depth) near Parkfield, CA are associated with quasi-periodic shear dislocations on the deep extent of the San Andreas Fault. Slow slip has been discovered in subduction zones worldwide and manifests aseismically as geodetic transients in GPS and seismically as a long duration, low amplitude seismic signal known as tectonic tremor. However, deformation associated with tremor in a transform fault environment has not previously been observed despite the ubiquitous presence of tremor and low frequency earthquakes (LFEs) and targeted attempts to observe this deformation. We report geodetic measurements of surface strains to constrain the slow slip that is inferred to be concurrent with large bursts of tremor. The strain rates associated with these events are below the detection level of GPS networks, thus in order to observe this deformation we have utilized two long-baseline laser strainmeters (LSM) located in Cholame, CA. The average surface strains associated with these events are on the order of several nanometers and correspond to fault slip on the order of 5 millimeters per event (assuming a fault patch extending ~25 km along-strike and ~15km in depth). The measured moment associated with these events is a factor of two smaller than previously proposed based on theoretical estimates.

***Easiest access:** Enter Pierce Hall, 29 Oxford Street, via it's southernmost door facing Oxford St., and ascend staircase to 2nd floor of Pierce. Then walk left along an indoor bridge that will take you to Cruft (you'll emerge on the 3rd floor of Cruft). Walk right as soon as you enter Cruft. Rm 309 will be on your right.