

Searching for Strain Transients in PBO data at Alaska and Southern Cascadia

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We applied a recently developed strain anomaly detector, the Network Strain Filter [Ohtani *et al.*, 2010], to the continuous GPS datasets from the PBO in Alaska and Southern Cascadia. The strategy of the filter is to find spatially and temporally coherent signals by processing data from the entire network simultaneously. Compared to previous Network Inversion Filter [Segall and Matthews, 1997], the new detector does not require the knowledge of potential sources, which can be either unknown and/or very numerous in a large tectonically active area.

At Alaska, we detected a slow slip event in the south central Alaska Subduction Zone [Wei *et al.*, GRL, 2012]. The slow slip event started in early 2010 at a depth of 35 km beneath the Cook Inlet, near the down-dip end of the locked zone, and is ongoing as of November 2011 with an accumulated magnitude of Mw 6.9. Analysis of the earthquake catalog in the same area using the stochastic Epidemic Type Aftershock Sequence model (ETAS) shows a small but detectable seismicity increase during the slow slip event. Recently, we are doing a follow up study on whether the slow slip event has ended.

At Southern Cascadia, the post-seismic deformation of the January 10, 2010 Mw 6.5 Earthquake dominates the transient signals in stations near the coast of Northern California. These signals are valuable because it is rare for land-based geodesy to capture postseismic slip from an oceanic strike-slip earthquake. We fit the afterslip data with a rate-and-state model and constrain the friction and stress parameters. Several clusters of stations with regular slow slip events are also identified and strainmeter data show minor signals from these slow slip events. However, these slow slip events are very small and only maximum 4 stations detect a single event, which prevents a meaningful static slip inversion.

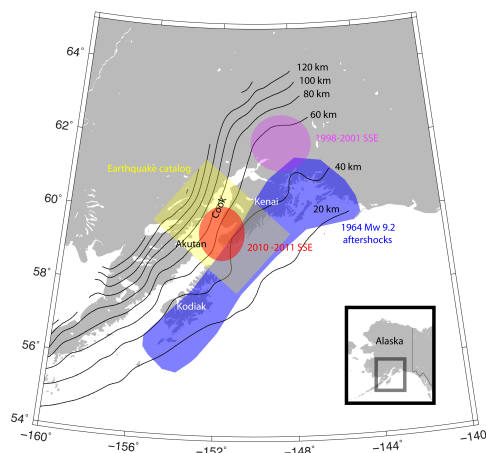


Figure. Map of south central Alaska. Dark purple shows the aftershock area of the 1964 earthquake by Furumoto [1965]. Light purple area is the region of the slow slip event between 1998 and 2001 reported by Ohta *et al.* [2006]. Red region shows the slow slip event in this study. Yellow box covers the area used in the seismicity anomaly analysis. Black solid lines are interface depths from Slab 1.0 [Hayes *et al.*, 2012].