AGU PUBLICATIONS

Geophysical Research Letters

Supporting Information for

Aftershocks driven by afterslip and fluid pressure sweeping through a fault-fracture mesh

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Contents of this file

Figures S1 to S3
Tables S1 to Sx

Additional Supporting Information (Files uploaded separately)

Captions for Dataset S1
Captions for Movies S1 to S2

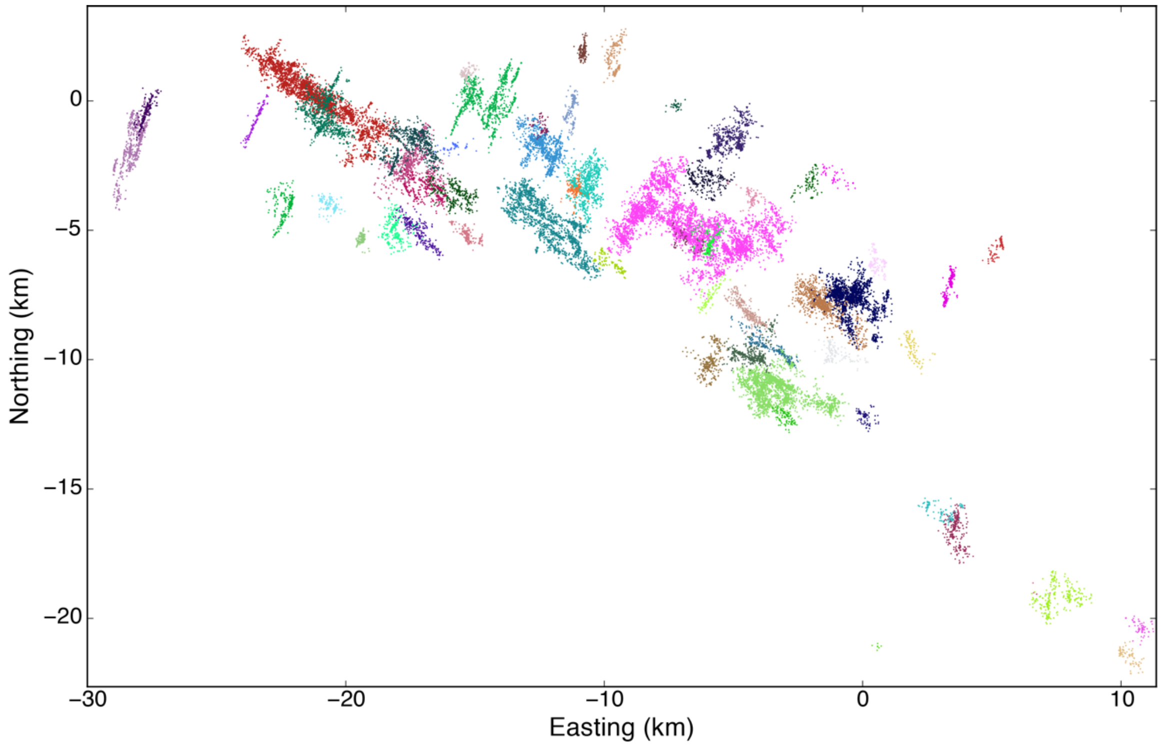

Figure S1. Cluster definitions. Each cluster produced by the DBSCAN algorithm is color-coded for visibility. Clusters are spatially-compact and have at least 100 events. Many of the clusters overlap because they are fully separated in depth.

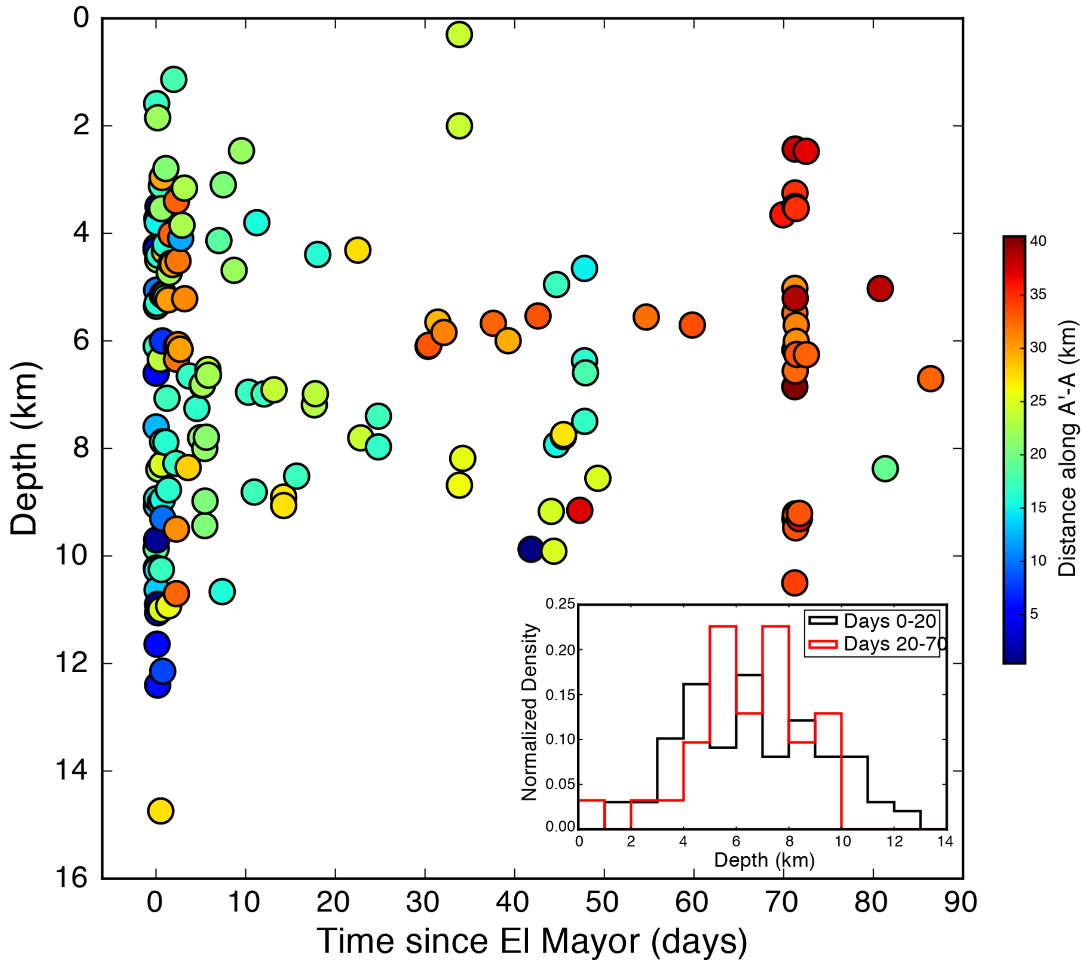

Figure S2. Depth evolution for El Mayor-Cucapah aftershocks with M > 3.5. Over the first few days following EMC, events occur over the entire depth range of 0-12 km. Afterward, events occupy a narrower depth range.

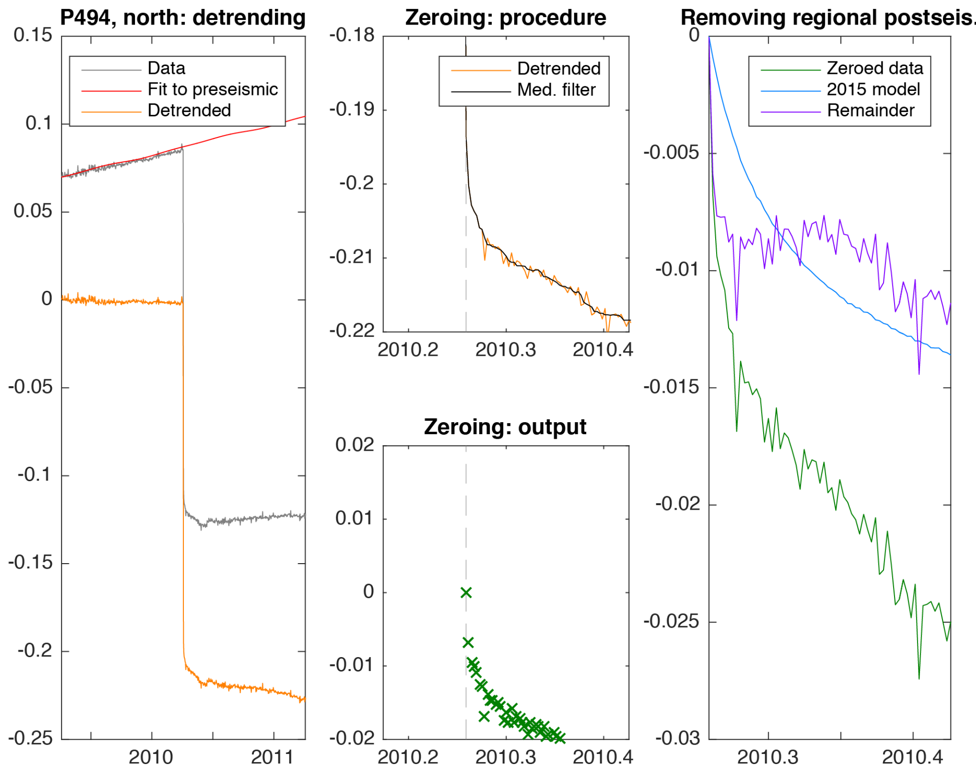

Figure S3. Procedure for extraction of the signal of local postseismic deformation from SOPAC GPS timeseries. (left) To detrend the timeseries, we fit the pre-EMC timeseries to a combination of a linear trend, annual and semiannual oscillations, and visually identified offsets, then subtract the prediction of this model in the postseismic period from the timeseries in the postseismic period. (center, top) To ensure that the postseismic timeseries begin at zero, we run a seven-day median filter on the detrended timeseries, then subtract the filtered location on the first postseismic day from the detrended timeseries, yielding a "zeroed" timeseries (center, bottom). (right). To isolate the local postseismic deformation, we remove a published model of larger-scale postseismic deformation [*Rollins et al.*, 2015], from the zeroed timeseries. The published model included an afterslip source in the Yuha Desert that did not fully fit the local postseismic timeseries but helped reduce the regional misfit; we remove the timeseries generated by this afterslip source alone from the timeseries generated by the published postseismic model, and then remove the timeseries of the modified forward model from the zeroed data, yielding the local timeseries we use here.

Data Set S1. Yuha Desert aftershock catalog. This file contains all earthquakes used in the study. The columns from left to right, are year, month, day, hour, minute, second, event ID, latitude, longitude, depth, magnitude, relocation status. Events that were successfully relocated have a number greater than 1 in the relocation status column, and unrelocated events have either 0 or 1[

Movie S1. Animation of aftershock evolution in map-view**.** This animation shows the spatiotemporal progression of aftershocks over the 90 day period following El Mayor Cucapah. White dots indicate events that have not occurred yet, black dots indicate events that have already occurred, and red circles indicate M > 1 events which are happening at the time.

Movie S2. Animation of aftershock evolution along cross-section A-A'. Same as Movie S1, but for aftershocks in a fault-parallel perspective.