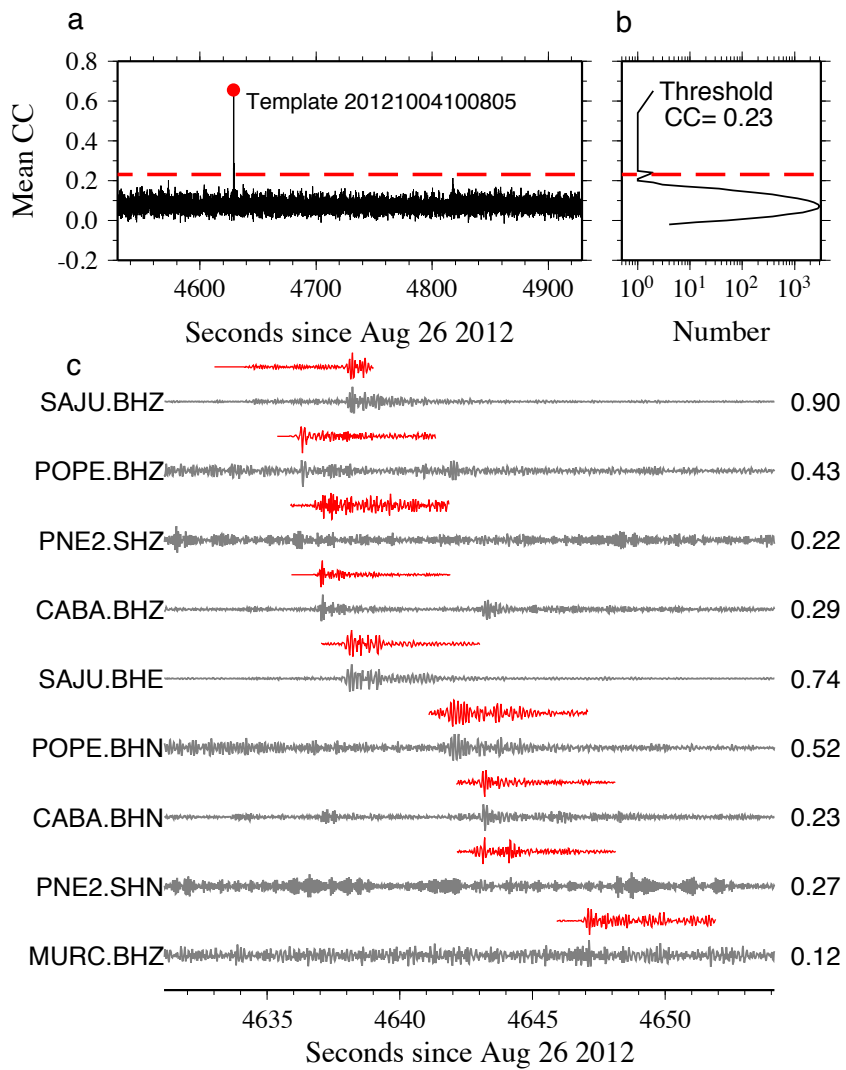
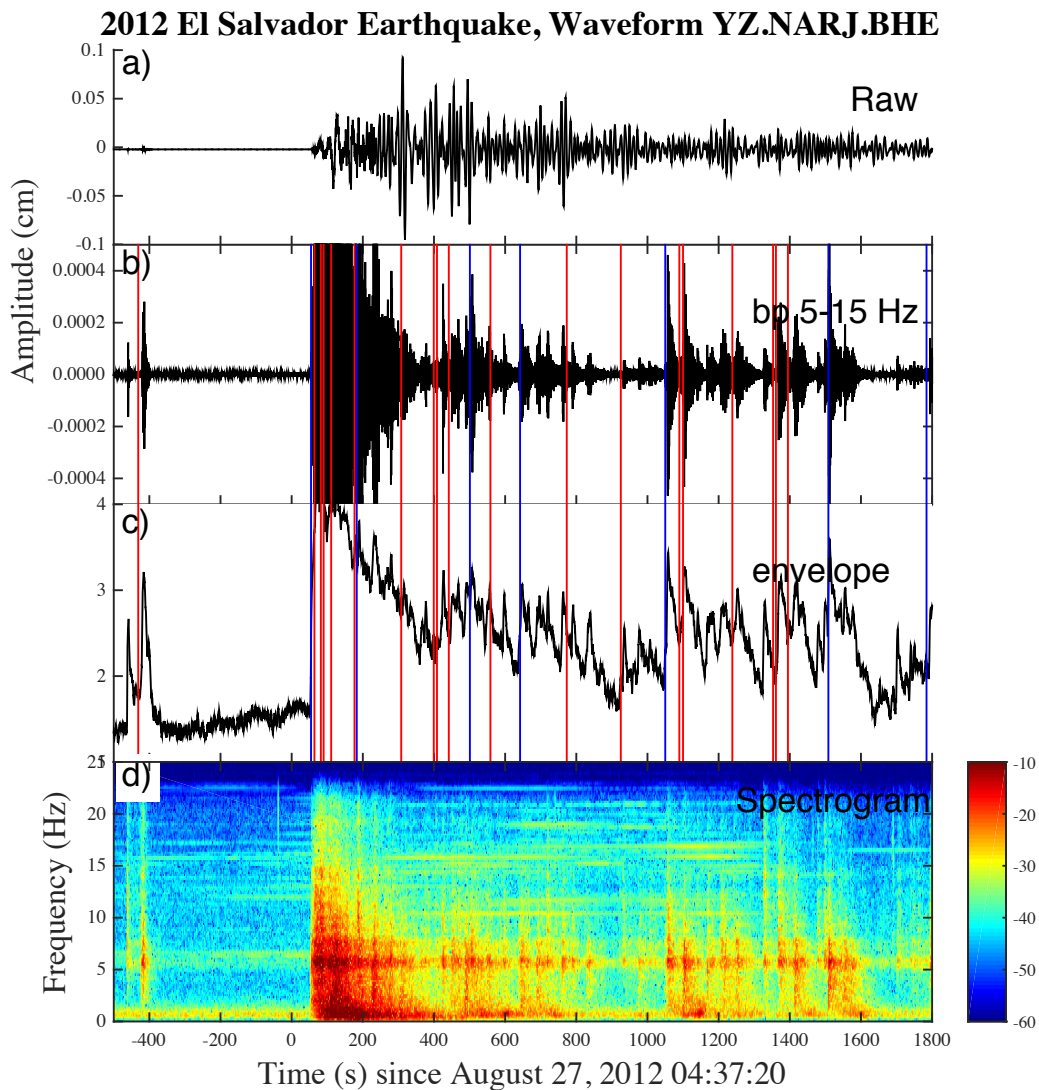


## **Supplementary Material**

Supplementary material includes 6 supplementary figures and the full matched-filter catalog (catalog.txt). The text file columns are: day of the year, latitude, longitude, depth, magnitude, number of phases, template event ID, year, month, day, network cross-correlation coefficient, median absolute deviation (MAD), hour, min, sec.

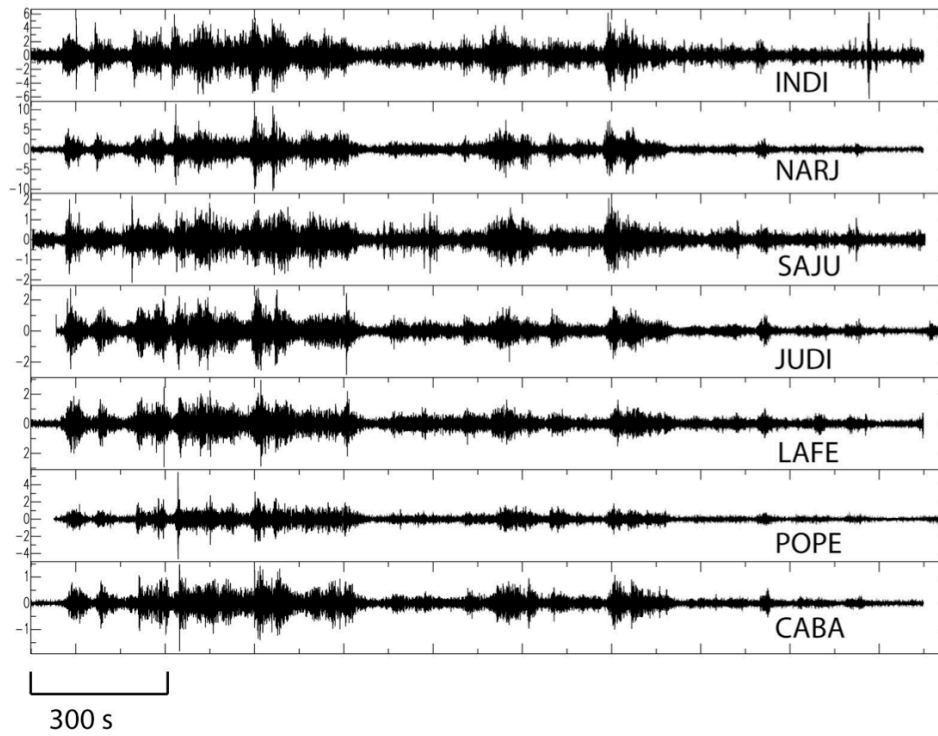


**Supplementary Figure S1:** Illustration of the matched-filter technique, which detected a foreshock from a template aftershock. (a) Mean stacked cross-correlation coefficient indicating high cross-correlation for the detection relative to other time periods. Red line indicates 9 times the median absolute deviation (MAD). (b) Histogram of cross-correlation values for that day in August 26, 2012. (c) Template waveforms in red and continuous data in gray, including station cross-correlation values to right.

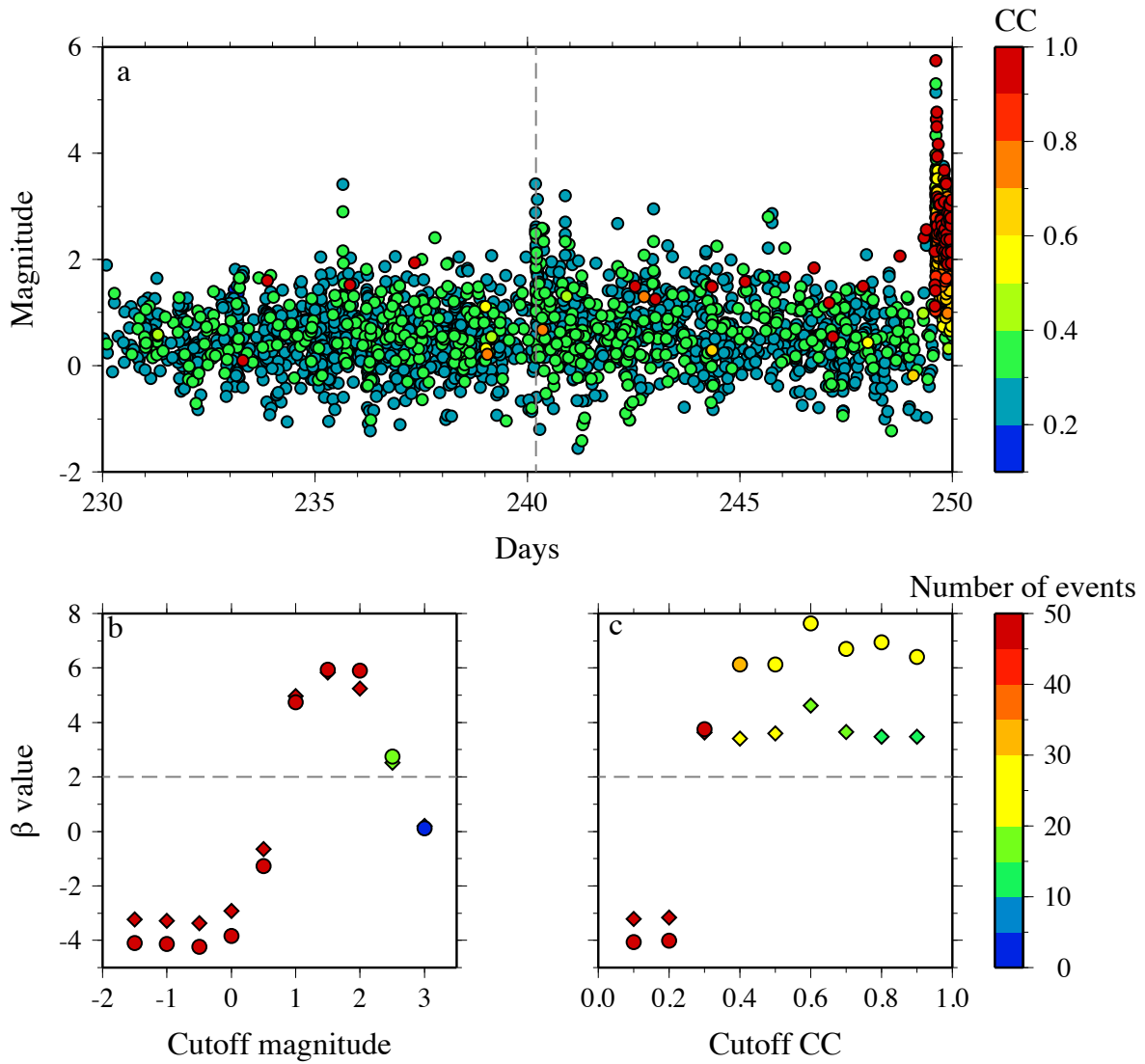


**Supplementary Figure S2:** Local Nicoya Peninsula seismicity triggered by the El Salvador earthquake as recorded at station NARJ. The data is windowed between 500 and 1,800 s after the origin time of the El Salvador event and includes (a) instrument-corrected broadband horizontal component of ground velocity, (b) 5 Hz corner frequency high-passed filter of same seismogram, and (c) spectrogram. Vertical red lines are local seismicity identified by this study, while vertical blue lines are USGS-reported seismicity (<http://earthquake.usgs.gov/earthquakes/map/>) near the El Salvador event, corrected for travel-time to the Nicoya Peninsula.

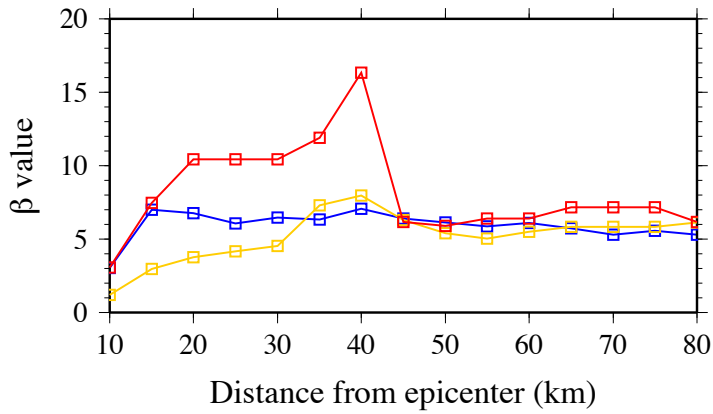
EAST COMPONENT TREMOR FILTERED BETWEEN 2-5 HZ



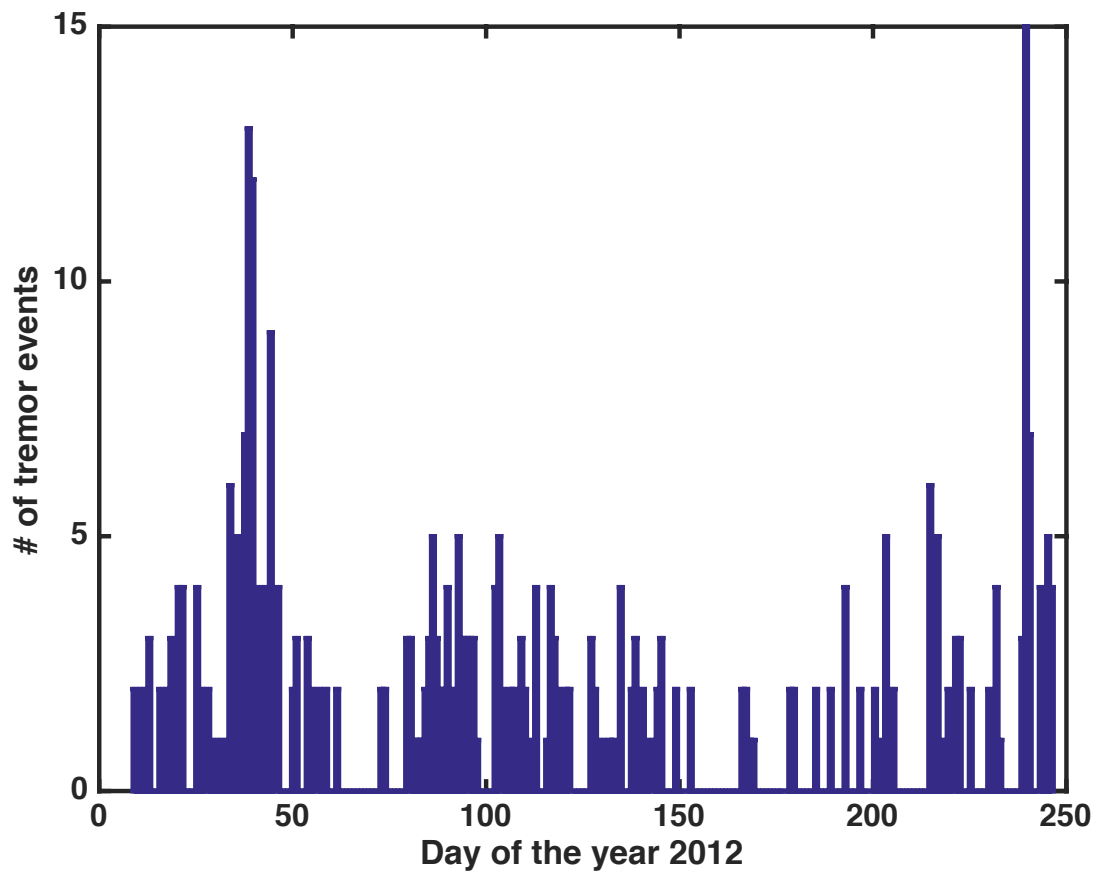
**Supplementary Figure S3:** An example of 30-min of tremor activity on September 4, 2012, one day before the mainshock. Seismograms are the east component and filtered between 2-5 Hz.



**Supplementary Figure S4:** Catalog of seismicity and  $\beta$  values for cross-correlation coefficient and cutoff magnitude for events identified at MAD threshold of 9. (a) Local-magnitude for events color-coded according to event cross-correlation. (b)  $\beta$  values for events at various catalog magnitude cutoffs; this study utilizes a magnitude cutoff of 1.0, as Figure S1 indicates a completeness magnitude of 1.0. Diamonds indicate data where last half-day prior to the mainshock is excluded. Data is color-coded according to number of events. (c)  $\beta$  values for events at various cross-correlation cutoffs, where shapes and color-coding according to (b).



**Supplementary Figure S5:**  $\beta$  values calculated for a range of radii from the mainshock nucleation for the time periods in Figure 3b for median absolute deviation (MAD) thresholds of 9 (blue), 10 (yellow), and 12 (red) indicating statistical significance even if MAD threshold is adjusted higher; this study utilizes MAD of 9 or greater to identify a new event.



**Supplementary Figure S6:** Histogram of daily tremor detections through day 250 in 2012.

Tremor detection occurs when there is a 300 s time period where the low frequency envelopes (Section 3.3 of the main text) at 10 station pairs have correlation coefficients larger than 0.65.

Daily tremor detections are lower in Figures 1 and 4 due to additional spatio-temporal clustering requirements for those events depicted in the main text.