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Supporting Online Material for

Tidal Modulation of Nonvolcanic Tremor

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Supporting Online Material

Materials and Methods:

Because we are seeking the amplitude of tremor, we remove glitches and earthquakes from the seismograms through a combination of automatic and manual processing. We compute the amplitude of the tremor at each station by computing the envelope of the seismogram after bandpass filtering between 1 and 8 Hz, the band where tremor signal-to-noise ratio is greatest. The envelopes are low-pass filtered at 8 seconds period and the resulting time series at each array are summed (stacked) so that noise sources localized to individual stations are reduced and the tremor, which is coherent across the array, is enhanced.

The spectrum is computed on a 13-day window of tremor. This window is approximately centered on the peak tremor activity at each array. The tremor amplitude is tapered on both ends to prevent spurious results caused by edge effects. We also pad the signal with zeros to improve the precision of the spectral measurements and to increase the speed of computation. This same processing is applied to the indicated 13-day periods during which tremor was absent or very weak to characterize the noise at each array.

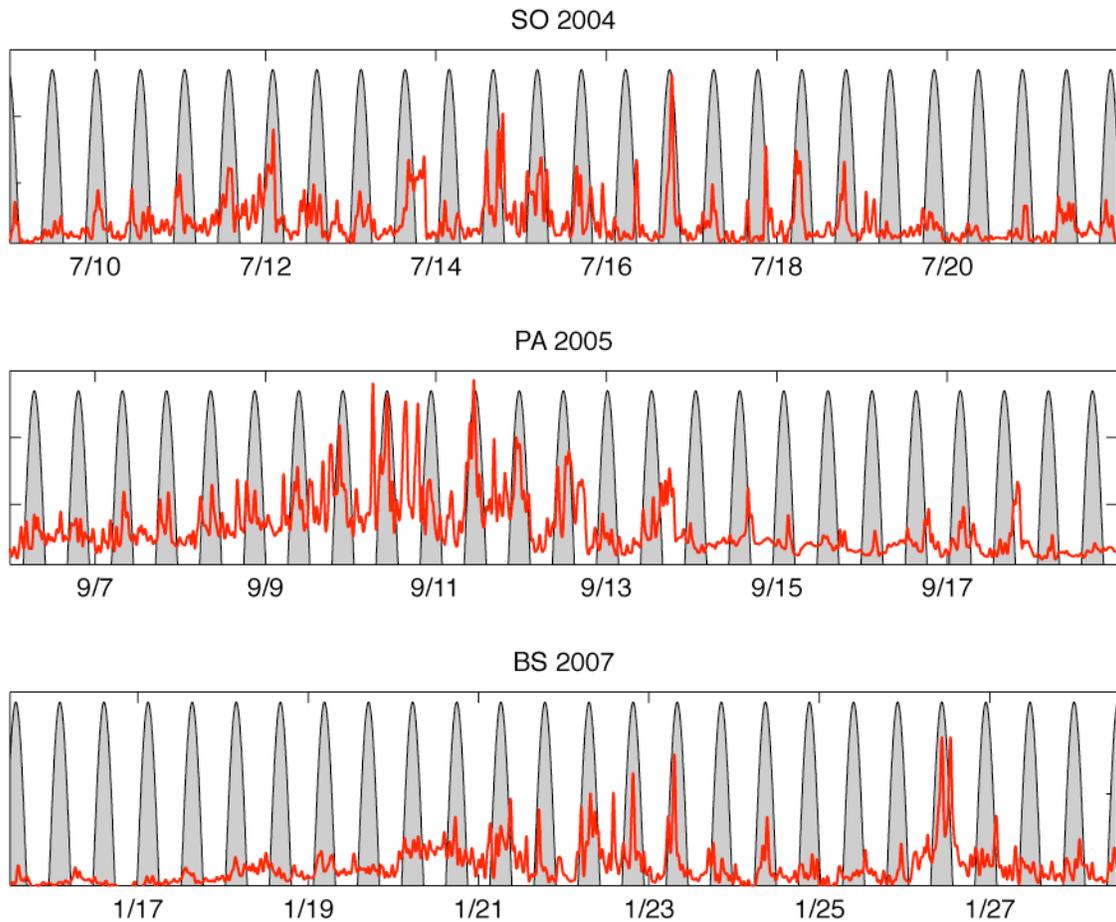


Figure S1: Tremor Amplitude vs 12.4-hr Sinusoid – Amplitude of tremor at one array for each of the tremor episodes studied (red line). Shaded regions represent the upper half of a sinusoid with 12.4-hour periodicity (the period of the principal lunar tide) that best correlates with the tremor amplitude for that array. Many peaks in the tremor amplitude correlate with the positive lobes of the sinusoid.

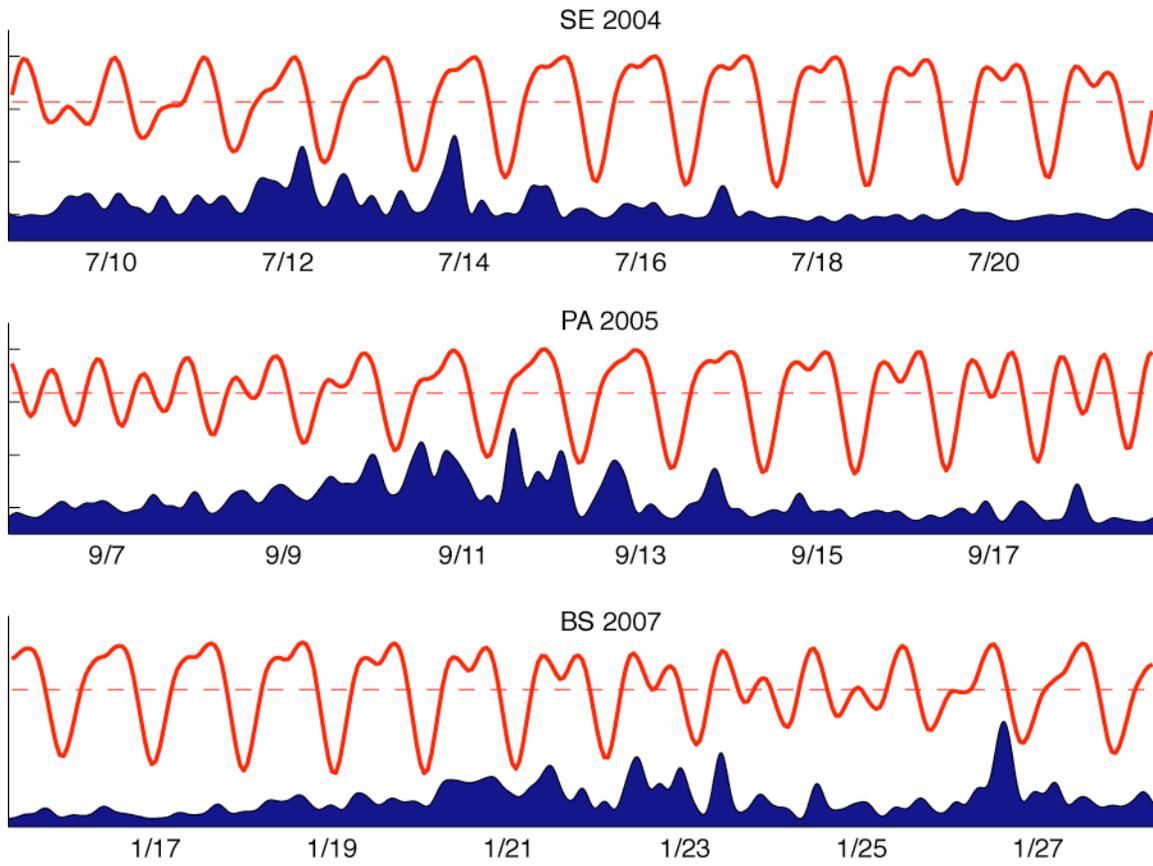


Figure S2: Tremor Amplitude vs. Water Levels at Port Angeles – Amplitude of tremor (blue filled region) at the array closest to Port Angeles for all three ETS episodes. Water levels at the Port Angeles tide gauge are plotted in red and the mean water level at the time is plotted as a dashed red line. Tremor amplitudes have been low pass filtered at 6 hours period to mute out higher frequency variability in tremor amplitude. Both tremor amplitude and water height have been normalized by their peak values.