

Triggering of deep low-frequency earthquakes along the Parkfield-Cholame section of the San Andreas Fault by local and regional earthquakes

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Long-period surface waves from large distant earthquakes are capable of triggering deep tectonic tremor along major plate boundary faults. However, it is relatively challenging to observe such triggering following local or regional earthquakes, mainly because the frequency band of tremor overlaps with those of triggering earthquakes. Our recent studies have shown that moderate to large-size earthquakes can trigger tremor and slow-slip events at regional distances. Here we examine tremor triggering behavior along the Parkfield-Cholame section of the San Andreas Fault following local and regional earthquakes in California and surrounding regions. We primarily use the deep low-frequency earthquake (LFE) catalog detected by the 88 LFE template families with a matched filter technique, as well as visual inspection of high-frequency (> 20 Hz) waveforms during and immediately following earthquakes. We find that the 2019/07/06 M7.1 Ridgecrest mainshock triggered a few high-frequency tremor events at Parkfield during the first few cycles of its surface waves. However, the 2019 Ridgecrest mainshock was not followed by a prolonged major tremor sequence in Cholame, unlike the 2014 M6.0 South Napa earthquake (Peng et al., 2015). This is likely because a major tremor sequence just occurred a few days ago before the Ridgecrest mainshock. Hence, the region may not be ready to be triggered by the Ridgecrest event. In addition, we find that a M4.3 local earthquake near Parkfield on 2019/12/17 triggered a one-hour episode of migrating tremor north of Parkfield, but it apparently did not trigger tremor in the Cholame region. Our next step is to examine the 19-year LFE catalog since 2001 to identify how tremor behaviors in Parkfield change following local and regional earthquakes in California, and use them to better understand the physical mechanism of tremor generation.

Keywords: Tremor, Parkfield, Triggering