

## **Nonvolcanic Tremor Evolution and the San Simeon and Parkfield, California Earthquakes**

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Nonvolcanic tremors have generally been observed in transition zones between freely slipping and locked faults and in many cases, tremor activity appears to increase with detectable transient fault zone deformation (slow-slip events) or with dynamic stress changes from tides or teleseismic surface waves. These spatial, temporal and stressing relationships suggest that tremor activity may be closely related to the processes related to the generation of larger earthquakes. Monitoring of the San Andreas Fault in the Parkfield-Cholame region of California reveals that after 2003 San Simeon M6.5 and 2004 Parkfield M6 earthquakes tremor activity increased in a nearly dormant tremor zone, increased and became periodic in a previously active zone and has remained elevated and periodic for over four years. Static shear- and Coulomb-stress increases from the earthquakes of 6-14 KPa are coincident with step increases in tremor rates. The periodicity of tremor episodes is reminiscent of episodic tremor and slip (ETS) behavior observed in Cascadia, and the persistent elevation in tremor activity suggest that the rate of deep deformation may have increased beneath a portion of the San Andreas fault that

last ruptured in the great M7.8 Ft. Tejon earthquake of 1857.