Characteristics of tectonic tremors in the northern Mexican subduction zone remotely triggered by the 2017 Mw8.2 Tehuantepec earthquake

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Surface waves from the 2017 Mw8.2 Tehuantepec earthquake, Mexico, on September 8th, 2017 (UTC), remotely triggered tectonic tremors in the Jalisco region, approximately 1000 km WNW in the northern Mexican subduction zone, where no triggered tremor has been found previously. While prior studies found tectonic tremors triggered by teleseismic waves in subduction zones and plate boundaries, further investigation of tremor triggering is crucially important for understanding the causative mechanism. Given that the relatively low spatial coverage of the seismic network prevented the location of the triggered tremors, we calculate the stress and strain changes across the three-dimensional plate interface attributable to seismic waves from the 2017 Tehuantepec earthquake by full wavefield simulation. The maximum magnitude of the dynamic strain tensor eigenvalues on the plate interface, where tremors likely occur, is approximately 10^{-6}. The subducting slab geometry effectively amplifies triggering waves. The triggering Coulomb failure stress changes resolved for a thrust fault plane consistent with the geometry are estimated at 10-50 kPa. The relationship between the triggering stress and triggered tremor amplitude may indicate that the $A\sigma$ of the rate-state-dependent friction law is 10-100 kPa.

Keywords: 2017 Tehuantepec earthquake, tectonic tremor, dynamic triggering

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