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# History of seismic and aseismic slip along the central Ecuador subduction zone

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## Abstract

In subduction zones, slip along the plate interface occurs according various modes including earthquakes, steady slip, and transient accelerated aseismic slip during either Slow Slip Events (SSE) or afterslip. Here, we use a decade of continuous GPS measurements along the central Ecuador subduction segment to investigate how the different slip modes are organized in space and time in the area of the 2016 Mw 7.8 Pedernales earthquake. Previous works (Nocquet et al., 2014, Chlieh et al., 2014) have shown that during the years before the Pedernales earthquake, locked areas define a spatially heterogeneous pattern, but remains confined to the first 35 km shallowest kilometer of the plate interface. We find several SSEs occurring at the periphery of the locked areas (Vaca et al., 2018), but also identify some SSEs occurring in highly locked areas. The 2016 Pedernales earthquake ruptured two main asperities that were locked prior to 2016, but did not propagate into areas having experienced SSEs. Finally, we find that afterslip occurred predominantly up dip the rupture of the Pedernales earthquake and is largely enhanced at areas where SSEs occurred before 2016 (Rolandone et al., 2018). In the case of central Ecuador, areas experiencing SSEs seem to delimit the seismic rupture, as also observed for Costa Rica (Dixon et al., 2014). Therefore, observing and interpreting SSE in complement to the interseismic locking models might help to improve our ability to anticipate where large earthquakes can take place.

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