

## Slow slip events along the Ecuador subduction zone: an overview

J. M. Nocquet<sup>1, 2</sup>, P. Jarrin<sup>3</sup>, F. Rolandone<sup>3</sup>, P. Mothes<sup>4</sup>, S. Vaca<sup>4</sup>, M. Vallée<sup>2</sup>

<sup>1</sup>Geoazur, IRD, Université Côte d'Azur, CNRS, OCA, Valbonne, France

<sup>2</sup>Institut de Physique du Globe de Paris, Université de Paris, CNRS, Paris, France

<sup>3</sup>Sorbonne Université, CNRS-INSU, Institut des Sciences de la Terre Paris, France

<sup>4</sup>Instituto Geofísico at the Escuela Politécnica Nacional, Quito, Ecuador

Slow slip events (SSE) are transient processes releasing stress at faults through episodes of aseismic slip. SSE have been documented in most subduction zones monitored by continuous GPS networks. In Ecuador, previous SSE have been documented at shallow depth (<20 km) in central Ecuador in the area of La Plata island (Vallée et al., 2013, Segovia et al., 2018) and in northern Ecuador near Punta Galera (Vaca et al., 2018). Rolandone et al. (2018) further evidenced a ~50 km deep SSE in central Ecuador.

Here, we first use continuous GPS time series along the Ecuadorian coast to perform a systematic search of transient displacement since 2008. Aside from previously identified areas of SSE, we find that the area of Santa Elena north of the Gulf of Guayaquil experiences small SSE inducing 3-5 millimeters trenchward displacement several times per year. We also perform a systematic kinematic inversion of every SSE benefitting from at least three CGPS detection. In the La Plata area, small SSE with equivalent magnitude around 6.-6.3 and lasting a few days appear to occur every 2-3 years at locations varying from one SSE to another. Two large events with equivalent magnitude of 6.8 to 7.1 and lasting weeks occurred in 2005 and 2016, the latter having been likely triggered by the 2016 Mw 7.8 Pedernales earthquake. Both appear to rupture the whole locked area from 20 km depth up to the trench.

In the Punta Galera area, we find that a new SSE occurred at the end of 2018 at the same location as the 2013-2014 SSE studied by Vaca et al. (2018). However, the 2018 event occurred in an area experiencing afterslip following the 2016 Pedernales earthquake and highlights a spatially confined area of accelerated slip lasting three months.

The occurrence of SSEs highlights areas of the subduction interface where stress appears to be released aseismically. Using our results, we will present a preliminary budget estimate of the interseismic slip deficit for the 2008-2016 period along the different segment of the Ecuador-Southern Colombia subduction zone.