



## **Interseismic transient deformations along southern Peru and Northern Chile subduction zone**

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For several years, the interseismic period has been studied using geodetic data in different places worldwide, especially using coupling maps supposing constant deformation rates. The growing number of continuous global positioning system (GPS) stations and development of new detection techniques have facilitated the detection of a wide range of transient deformation, even masked in the noise.

The GPS networks of the South Peru – North Chile subduction zone have seen an increase in continuous GPS stations over the past decade, which is a good opportunity to investigate the details of non-linear interseismic deformation in these areas. In this study, we apply a geodetic matched-filter approach (Rousset et al., 2017, JGR) in the residual time series of 66 GPS stations available in the region over 10 years. The method allows us to detect 41 potential small slow slip events (sSSEs), with magnitudes ranging from 6.1 to 6.9 and duration from 3 to 93 days. Most of these events are located at the deeper part of the seismogenic zone. The comparison of the detected sSSEs location with the interseismic coupling map shows that 68% of these events are located in areas of intermediate coupling, from 0.25 to 0.75. A comparison with the background seismicity in the region, reveals some interactions between sSSEs located in the transition zone and intermediate deep seismicity. This relationship between seismic and aseismic deformation might be related to processes associated with slab acceleration at depth prior to the occurrence of large earthquakes and/or postseismic deformation.