Supporting Information for "Uncovering the geodetic signature of silent slip through repeating earthquakes"

William B. Frank[1], Mathilde Radiguet[2], Baptiste Rousset[2], Nikolaï M. Shapiro[1], Allen L. Husker[3], Vladimir Kostoglodov[3], Nathalie Cotte[2], and Michel Campillo[2]

[1]Équipe de Sismologie, Institut de Physique du Globe de Paris, Paris Sorbonne Cité, CNRS, Paris, France
[2]ISTerre, Université Grenoble Alpes, CNRS, IRD, Grenoble, France
[3]Instituto de Geofísica, Universidad Nacional Autónoma de México, México, Mexico

0094-8276/15/$5.00

Contents of this file

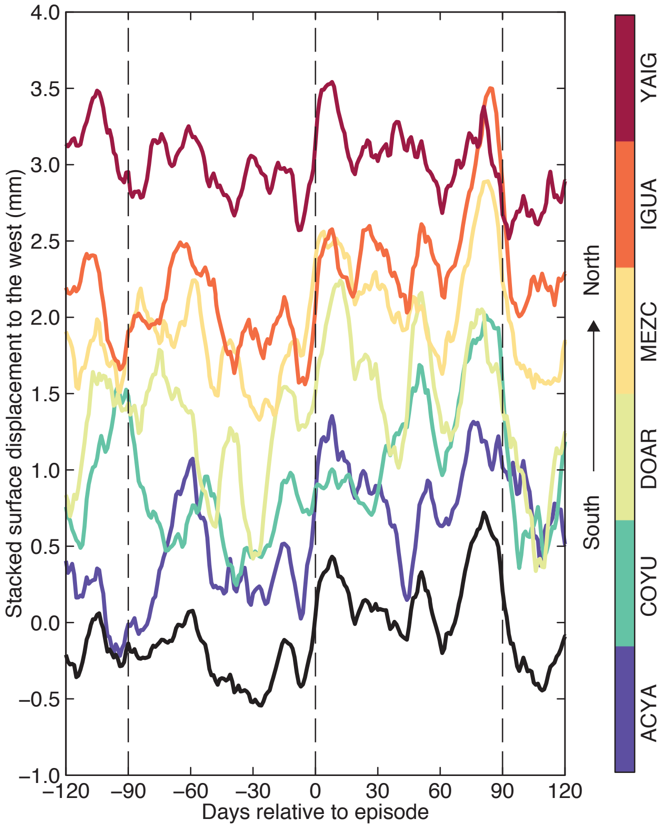

Figure S1. Stacked smoothed west-east displacement time series on the regional cGPS network. The average stacked displacement for the plotted subset of stations is shown in black. For a more complete description, please see Figure 3 of the main text.

Text S1.: Static inversion for the slip distribution at the plate interface The displacement vectors are determined by applying a 10-day moving average to the stacked GPS time series and then calculating the difference between ±10 days. The GPS surface displacements are then inverted to evaluate the slip distribution on the subduction interface. The modeled fault plane that represents a simplified subduction interface extends 468 km along strike. The plane has a dip angle of 15° and becomes subhorizontal 150 km inland, with a depth of 40 km [*Radiguet et al.*, 2012]. The Green functions were calculated for a layered elastic half-space assuming a layered crustal model [*Hernandez et al.*, 2001] The static GPS displacements are inverted using a linear problem least-square formulation [*Radiguet et al.*, 2011, 2012] with an additional positivity constraint. The rake of the inversion is fixed, and optimized for lower misfit, resulting in a rake angle of 90° (pure thrust) for the 2006 SSE inversion and 100° (in the direction of the plate convergence) for the small slow slip. Smoothing is controlled by a correlation length, describing the correlation between nearby fault patch fixed to 50 km for the 2006 SSE and to 200 km for small slow slip.

References

Hernandez, B., N. M. Shapiro, S. K. Singh, J. F. Pacheco, F. Cotton, M. Campillo, A. Iglesias, V. M. Cruz-Atienza, J. M. Gomez, and L. Alcantara (2001), Rupture History of September 1999 Intraplate Earthquake of Oaxaca, Mexico (Mw=7.5) from Inversion of Strong-Motion Data, *Geophys. Res. Lett.*, *28*(2), 363–366, doi:10.1029/2000GL011975.

Radiguet, M., F. Cotton, M. Vergnolle, M. Campillo, B. Valette, V. Kostoglodov, and N. Cotte (2011), Spatial and temporal evolution of a long term slow slip event: the 2006 Guerrero Slow Slip Event, *Geophys. J. Int.*, *184*(2), 816–828, doi:10.1111/j.1365-246X.2010.04866.x.

Radiguet, M., F. Cotton, M. Vergnolle, M. Campillo, A. Walpersdorf, N. Cotte, and V. Kostoglodov (2012), Slow slip events and strain accumulation in the Guerrero gap, Mexico, *J. Geophys. Res.*, *117*, B04305, doi:10.1029/2011JB008801.

Corresponding author: William B. Frank, Équipe de Sismologie, Institut de Physique du Globe de Paris, 1, rue Jussieu, Paris 75238, France. (frank@ipgp.fr)