



Constraining the slip distribution of the Mw 8 Pisco (15 Aug 2007) and Mw 7.7 Tocopilla (14 Nov 2007) earthquakes with Wide Swath and Image Mode Interferometric Synthetic Aperture Radar

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The plate boundary between the Nazca plate and South American plate along the Chile-Peru convergent margin has been the site of large destructive earthquakes for many centuries. The Mw 8 2007 Pisco and Mw 7.7 2007 Tocopilla earthquakes were among the first earthquakes for which Wide Swath Envisat data were available. We demonstrate how Wide Swath sensor aboard the Envisat satellite is suited to investigate mega-thrust events and continental-scale tectonics. We analyse - using interferograms from descending and ascending tracks, coseismic observations of surface deformation fields for these two large events and invert to obtain displacements along the thrust interface. We fix the geometry of the fault plane according to seismic information and solve for the variable amount of slip model using a newly developed iterative sensitivity-based fitting method. We find that the predicted surface deformation from the teleseismic inversion is only in part consistent with InSAR observations. We also find significant differences between the geodetic-derived fault slip models and those that have been proposed based on seismic data.