Title: Exploring the conditions for seismic or aseismic fault slip on the Longitudinal Valley Fault, Taiwan.

Marion Thomas, JPAvouac, Jian-Cheng Lee, Yaru Hsu

Abstract:

The Longitudinal Valley Fault (LVF) in eastern Taiwan runs parallel to the east coast of Taiwan and accommodates about half of the 8 cm/yr convergence rate across Taiwan. Due to the thrust component of slip, the fault zone is exhumed in the Coastal range. Deformation of anthropogenic features show that aseismic creep accounts for a significant fraction of fault slip near the surface but a fraction of the slip is also seismic since this fault has produced large M>6.5 earthquakes in 1951 and 2003. Surface strain across the fault is monitored from creepmeters at one site and a few GPS stations. In this project we analyze strain-meter measurements, and GPS times series and SAR interferograms to document more precisely the spatio-temporal evolution of slip on the fault. The strain-meter measurements show the fault indeed creeps near the surface and that the creep rate varies seasonally, suggesting that the fault is sensitive to meteorological factors. The data are inverted for the temporal evolution of slip a depth using the Principal Component Analysis base Inversion Method (PCAIM) of Kositsky and Avouac (2009). We document the portion of the fault which is undergoing aseismic creep and where the creep rate shows seasonal fluctuations. This analysis helps identify the cause of seasonal strain and shed light on the mechanical properties of fault zone.