Geophysical Research Abstracts
Vol. 15, EGU2013-13343, 2013
EGU General Assembly 2013

Interseismic Contractional Strain Accumulation Above Puente Hills Thrust, Metropolitan Los Angeles

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12 years of GPS observation of in metropolitan Los Angeles are tightly constraining the distribution of shortening across metropolitan Los Angeles, California, providing information on strain accumulation across blind thrust faults. We are finding right-lateral shear strain across the Mojave segment of the San Andreas fault to be accumulating at a rate consistent with slip along the fault at 22 mm/yr beneath a locking depth of 18 km. Contractional strain above the Los Angeles segment of the Puente Hills thrust is building up quickly. An elastic model incorporating sedimentary basin rocks (using the EDGRN/EDCMP algorithm of Wang et al. 2003) suggests the Puente Hills thrust and nearby upper Elysian Park thrust is slipping at 9 mm/yr beneath a locking depth of 12 km. This 9 mm/yr slip rate exceeds that estimated from paleoseismology, suggesting that M 7 earthquakes in metropolitan Los Angeles occur more frequently than previously thought.