

Coseismic Displacements and Slip Distribution Inferred from GPS Geodetic Observations for the 1 April 2006 Peinan, Southeastern Taiwan, Earthquake

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Abstract

We have set up 52 campaign-mode stations combined with 6 continuously recording GPS stations (CORS) in an area of 15x15 km² which located in southeastern Taiwan since 2001, complemented with the precise leveling to detect the near fault deformations. On the 1st April 2006 occurred a moderate (M_W 6.10) shallow earthquake, near Peinan township, Taitung, and the epicenter is located at 22.88°N 121.08°E (Broadband Array in Taiwan Seismology, BATS, 2006). This event provides a good opportunity to study the detail geological structures of the Longitudinal Valley Fault (LVF) near the Taitung area. According to the GPS and precise leveling results, the displacements show three different deformation types, which are with about 35 mm westward and 30 mm subsidence in the southernmost part of the Coastal Range, with about 45 mm southward and 20 mm uplift in the east margin of the Central Range, and about 10 mm northward and 15 mm uplift near the Luyeh area on the west side of the Coastal Range. This unique coseismic deformation pattern can be used to realize the collision characteristics of the suture zone between the Philippine Sea plate and Eurasian plate at the southernmost Longitudinal Valley. The final fault geometry is determined by grid search and consists of two west-dipping fault segments with dip 83° between 0.5 km and 12 km depth, and dip 73° between 12 km and 21.5 km depth. Our optimal fault is located along the western boundary of the main aftershock cluster beneath the Longitudinal Valley.