



Crustal deformation and Coseismic displacement from Continuous GPS in the last Decade in Taiwan

K.-C. Lin (1), J.- C. Hu (1), S.- Y. Wei (2), P.- C. Chang (2), K.- E. Ching (3), and R.- J. Rau (3)

(1) National Taiwan University, Geosciences, Taipei, Taiwan (can0168@yahoo.com.tw), (2) Seismological Observation Center of the Central Weather Bureau, Taipei, Taiwan., (3) Department of Earth Sciences, National Cheng Kung University, Tainan, Taiwan.

Using data at 150 Continuous GPS (CGPS) stations from September 1999 to December 2008, we characterised the surface deformation in Taiwan after the $M_w = 7.6$ Chi-Chi earthquake of September 21, 1999. During this period, three large earthquakes occurred, $M_w = 6.8$ Hualien offshore earthquake on March 31, 2002, $M_w = 6.8$ Chengkung earthquake on December 10, 2003 and $M_w = 7.2$ Pingtung offshore earthquake on December 26, 2006. The smaller $M_w = 5.9$ Ilan and $M_w = 5.6$ Hualien earthquakes occurred in 2005. From the CGPS data, the maximum coseismic deformation during the Chengkung earthquake reached 17.9 cm (horizontal) and 20.3 cm (vertical). Hualien offshore earthquake maximum coseismic deformation is 11.1 cm (horizontal) and -1.8 cm (vertical). Pingtung offshore earthquake maximum coseismic deformation is 7.3 cm (horizontal) and -6.6 cm (vertical). We compare the velocity field of the CGPS stations relative to the stable continental shelf with the results of GPS measurements from 1990 to 1995 before the Chi-Chi earthquake. The stations of the eastern Taiwan showed average displacement of 34.1-92.1 mm/yr towards azimuth 302° - 322° , mainly revealing across-suture shortening. Significant postseismic deformation after the Chi-Chi earthquake has been detected in the central Taiwan, with a major increase in displacement velocity towards South China, about 29.1-46.2 mm/yr towards azimuth 283° - 289° . Extensional strain affects the Ilan and Pingtung plains near belt tips, revealing lateral escape and extrusion towards the adjacent subduction zones. Extensional strain also affects the southern Central Range, as a consequence of the rapid uplift related to the southward-propagating collision process.