Geophysical Research Abstracts, Vol. 8, 01830, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01830

Landslides in Central Taiwan Induced by Chi-Chi Earthquake as Revealed by PIV Analysis

C.-H. Tseng (1), J.-C. Hu (1), Y.-C. Chan (2), H.-T. Csu (3), J.-F. Lee (3), J.-Y. Wei (3), C.-Y. Lu (1), M.-L. Lin (4)

(1) Institute of Geoscience, National Taiwan University, (2) Institute of Earth Science, Academia Sinica, (3) Central Geological Survey, (4) Institute of Civil Engineering, National Taiwan University (B89204007@ntu.edu.tw)

The Chi-Chi Earthquake occurred in the western foothills of Central Taiwan, which triggered two fast and catastrophic dip slope Chiufengershan landslides and Tsaoling rockslides (Shou et al., 2003; Hung, 2000). After 3 to 5 days of Chi-Chi event, the Hongtsaiping Landslide is reported that there were several meters of slide in an area of about 1.2 km^2 (800 m x 1500 m). Therefore, we want to know if non-failure or unobvious landslides are the omens of landslides or rockslides in this area. We also try to characterize in detail the sliding directions, their magnitudes and region of the landslide. We use two gray orthographic aerial photos of the same selected area acquired from Central Geological Survey and Chinese Society of Photogrammetry & Remote Sensing which are taken in 1998, 1999 and 2002 with a software Particle Image Velocimetry analysis. Trough PIV we can set reference points at will in order to let PIV correlate the pixels of these two aerial photos so that they can tell us the displacement vector field due to the topographic change. PIV can also show displacement field instead of vectors, so we will differentiate regions of different amount of displacement. The results will be precise if we can remove the offsets between these two gray aerial photos and if the amount of displacement is obviously large enough. Therefore, the results of PIV analysis will help us not only find the areas in which sliding has happened, but also evaluate the azimuth and magnitudes of sliding. We use PIV analysis in Hongtsaiping area which covers a dimension of 3228 x 2448 pixels. Our results show that the maximum horizontal displacement is about 24 meters towards NW in the study area of about 1.2 km^2. This tremendous landslide needs further investigation in combining with the geological data.