Geophysical Research Abstracts, Vol. 9, 08369, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08369

The observation of landslide coupling uplift of earthquake with Interferometric Synthetic Aperture Radar – the case study of Chi-Chi earthquake and Ju-Fen-Err mountain area

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he Chi-Chi earthquake struck Taiwan in 1999 with magnitude of 7.6, which induced over 20,000 landslides in central Taiwan area. The landslide identification techniques including Spot images and aerial photos were used to identify ground variation area. However, the interferomatric synthetic aperture radar (InSAR) was simply applied to the observation of the Eurasia plate subduction condition and plates intrusions. The landslide related research becomes difficult in this case is owing to the uplift of Philippine sea plate. The variation condition of the ground surface exceeded the capacity of the InSAR and could not produce fringe and ground displacement. Therefore, the alternative usage of the InSAR data is the intensity part of radar image. The intensity presents the reflection of ground condition. Owing to the characteristic of radar signal, the intensity varied with ground objects. For example, the radar signal disappeared into water body and could not receive any signal in such condition. In order to apply the intensity images to earthquake landslide, the cases nearby Ju-Fen-Err mountain area were selected as test sites. The ERS-2 scenes of 1999/03/13, 1999/07/31 and 1999/11/13 of track 461 were selected as the major and slave scenes to produce intensity images. The baseline of the time sequential scenes are 103m and -37m, respectively. The baseline between the first and the last scene is 66m. The landslide scars were plotted with SPOT 4 images and aerial photos as the reference positions of landslide. The intensity maps suggest that the Ju-Fen-Err mountain landslide can

be identified in this case. However, the landslides with area smaller than Ju-Fen-Err landslide are difficult to identify and more stochastic algorithm is required to produce landslide inventory map from InSAR intensity images.

Keywords: Chi-Chi earthquake; landslide; InSAR