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Advanced DInSAR Monitoring of Landslides in Zhouqu, China: the Relation to the 2008 Wenchuan Earthquake

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Zhouqu country has always been exposed to widely landslides hazards for its typically mountainous geological environment, especially the large massive landslide took place on August 8th in 2010, caused by heavy rains. In this work advanced DInSAR technique (i.e., StaMPS-SBAS method) is successfully applied to monitor the landslides in Zhouqu country for the first time by exploiting 16 ascending ALOS/PALSAR images. Four individual landslides, which are referred to Suertou, Nanshanqiaotou, Xielupo, Luojiayu-Sanyanyu landslides, had been detected in the DInSAR results. Considering the imaging geometry of the used ALOS PALSAR ascending data, it is hard to detect the deformation occurred in some areas with the slope orientations parallel to the satellite orbit. Besides, seriously geometric distortion in the mountain area is another limitation for the monitoring results. The factors for the landslides are complex. By combining the formation conditions of landslides with the physic-geographical environment and human activities in our study area, we hold the opinion that the predominant factors of the landslide are precipitation and earthquake. The correlation analysis is subsequently carried out between the deformed area change along steepest slope in 46 days and the 46 days average precipitation data acquired from meteorological station that is located in the center of detected landslides. Generally, a time lag of about three months had been found between the crest of the deformed area change and the precipitation. However, an exceptional large deformed area change happened on Jun 2008 around,

only several days after the Wenchuan earthquake. Since the Wenchuan country is only about 266 km away from the Zhouqu country, it is induced that the 2008 Wenchuan earthquake can be responsible for the phenomenon of unequal time interval between the maximum deformed area change on late Jun 2008 and the maximum precipitation on late July 2007.

Key words: DInSAR, landslides, Zhouqu, Wenchuan earthquake

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