



Land subsidence monitoring in central Taiwan by using PS-InSAR technique

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Ground subsidence induced by heavy withdrawal of underground water has resulted in environmental hazard and potential risk in Taiwan, particularly in the Choushui River alluvial fan where the Yunlin section of the Taiwan High Speed Rail had been constructed. The Yunlin County located in the southwestern coastal region of Taiwan is one of the most counties with serious land subsidence because of the agricultural needs. Yunlin County is one of the important agricultural production regions located in the southwestern coastal region of Taiwan where the irrigated area is up to 123,000 hectares and agricultural water consumption reaches approximate 90 percents of all available water resources in the Choshui River Basin. Moreover, since there is no sufficient surface water supplied, groundwater becomes a vital resource for every water consumption targets. Seasonal effects of land subsidence occurring in the study area had been estimated using a regression analysis of a series of weekly GPS height solutions. These results demonstrated the average rate of ground subsidence in this area over the period of 1995-2001 was 3 cm/yr. Based on data collected at the piezometer, the variation of land subsidence rate appears to be associated with an unstable underground water level, which drop gradually during winter and either remains constant or rises during summer time. Consequently, land subsidence rates vary considerably from 1.5 cm/yr for the summer time to 9.0 cm/yr for the winter time. In addition, anthropogenic ground subsidence due to massive pumping of groundwater is one of problems in Taiwan. In this study, we represented a both stacking D-InSAR and PS-InSAR results deduced from 1996-1999 time spans for monitoring of land subsidence in this area. Both D-InSAR and PS-InSAR results show the Baojhou, Tuku Township and northern Mailiao reveal a maximum subsidence rate of about 6 cm/yr along LOS and the Taishi Township located on the coastal area reveals a subsidence rate of 1.6 cm/yr, which is quite coincident with precise leveling result. These two results have proven that the effective reduction of labor and cost could be achieved by using this technique on monitoring land subsidence in Yunlin County.