Geophysical Research Abstracts
Vol. 13, EGU2011-5824-3, 2011
EGU General Assembly 2011

Monitoring seasonal and long-term surface displacement of Choushui River Fluvial Plan in the central Taiwan Using PSI and DInSAR

Chih-Heng Lu (1), Chung-Pai Chang (1,2), Jiun-Yee Yen (3), Yi-An Chen (4), and Wei-Chia Hung (4)

(1) Center for Space and Remote Sensing Research, Nation Central University, Jhongli, Taoyuan, Taiwan , (2) Institute of Geophysics, National Central University, Jhongli, Taoyuan, Taiwan , (3) Department of Natural Resource and Environmental Studies, National Dong-Hua University, Hualien, Taiwan, (4) Green Energy and Environment Research Laboratories, Industrial Technology Research Institute, Taiwan

Choushui River Fluvial Plan (CRFP) located in central Taiwan is threatened by serious land subsidence, which is mainly caused by water pumping since 1970s. In this study we choose 51 ERS images (from Oct. 1993 to Jul. 2001) and 19 Envisat images (from Jun. 2004 to Aug. 2008) to observe the land subsidence of this area. We used two approaches in this study, first is the Differential Interferometric SAR (DInSAR) technique, which can assay the seasonal surface deformation; second is Persistent Scatterer Interferometric SAR (PSI) technique, which can help us to reveal the long-term deformation.

According to the local rainfall record, the seasonal change in CRFP is quite clear. During the dry season (from Oct. to Apr. of next year), the rainfall is less than 15 percent of the annual amount. Our DInSAR result shows the similar pattern that during dry season the land subsidence is evident, but during the wet season, the subsidence is very slight. Moreover, during the dry season, the subsidence is concentrated in the coastal plan area, but for the wet season, the subsidence center moves to the mountainous area in the eastern CRFP.

The PSI result reveal the long-term deformation in CRFP area. The land subsidence is closely related to the population distribution and human being's activities. In order to examine our PSI result, the precise leveling data were also taken for auxiliary data to verify the deformation rate and pattern in this area. Generally, the PSI slant range displacement rate and the leveling date vertical displacement rate are almost the same, and their time-series patterns are very similar. Comparing with the continuous GPS and ground water data also proves that the PSI result is good for monitoring the subsidence CRFP.

Keyword: Choushui River Fluvial Plan, subsidence, DInSAR, Persistent Scatterer