



## **InSAR atmospheric correction: estimation of liquid water delay by using observations and rainfall data in Choushui River Fluvial Plain of central Taiwan**

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The development of SAR interferometry is one of the most important techniques in Geodesy, and it applied in many fields of earth science as well. To improve the accuracy of InSAR technique, several methods have been proposed to estimate the corrections of atmospheric delay effect, such as atmospheric data collection, GPS zenith delay estimations, and multispectral satellite imagery analysis. Although these methods indicated the mitigation part of the atmospheric delay effect successfully, one of the atmospheric effect components, liquid water delay is often ignored. In order to estimate the quantity of liquid water delay, the precise observation data and detail rainfall data are necessary. Due to Choushui River Fluvial Plain (CRFP) located in central Taiwan has threatened by serious pumping-induced land subsidence since 1970s, the accuracy leveling and rainfall data have been recorded more than 30 years can be used. Moreover, the 23 SAR images acquired from Envisat satellite between 2004 and 2008 are divided into two groups, one is affected by rainy effect, the other is not. Therefore we assume the residuals between two SAR image groups come from the liquid water delay of atmospheric effect and verify this assumption with leveling and rainfall data. The results indicate the liquid water delay can attain 10 mm/yr and reduces gradually from east to west. The spatial correlation between residuals and rainfall shows positive. Moreover, the estimation of liquid water delay could eliminate the residuals near the costal area. Base on this correction method, SAR interferometry would respond the surface deformation more precisely.