Application of Space-borne Radar Interferometry on the Crustal Deformation in Taiwan

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In the past few years the use of DInSAR (Differential interferometric SAR) for monitoring earth deformation process has received considerable attention because of its great potential for mapping the movement associated with large earthquakes and groundwater fluctuation. This study aims at applying this DInSAR technique to determine the crustal deformation of the Taiwan area. The SAR images used in this study are principally acquired by the satellites ERS1 and ERS2 launched by European Space Agence.

The orogen of Taiwan is young and active as indicated by the high elevation of topography and the dense seismicity. The ongoing crustal deformations have therefore caused considerable damages. With the very high population density in Taiwan, the prevention of geological hazard becomes a very urgent task for natural disaster mitigation. We will review our recent results using the DInSAR technique to study crustal deformation in Taiwan. In order to better describe the approach and limitation of this technique, we have classified crustal deformation into intense event and gentle event in terms of different deformation styles. Five case studies of deformation events using DInSAR images have been reported: the coseismic deformation of Chichi earthquake, the uplift of Tainan area, the active deformation of the Hukuo area, the rapid land-subsidence of the Chungli area, and the seasonal-varied land-subsidence of the Pingtung area. These results show that this technique is worth developing for future study on the neotectonic activity and environmental change.

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