



Transition of Ground Uplift and Kinematic Model in Southwestern Taiwan from PSI and GPS Observations

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Tainan Plain at the southwestern deformation front of Taiwan oblique subduction

-collision system includes three geomorphic units: the Tainan tableland, the Dawan lowland, and the Chungchou terrace. These units are bounded by three buried thrust faults: From west to east are the Tainan fault dipping to east, the Houchiali fault dipping to west, and the Chungchou fault dipping to east. Previous researches based on Differential InSAR (DInSAR) techniques with ERS-1 and ERS-2 SAR images acquired before 2001, revealed that the uplift pattern of Tainan tableland and Dawan lowland were in good agreement with the local topography and therefore claimed that the Tainan tableland is a pop-up structure formed by the Tainan and Houchiali faults. In addition, a decollement- ramp model, which includes a back-thrust branch developed eastward to the Dawan lowland, was proposed to explain a low uplift rate about 4-5 mm/yr occurred at east of the Houchiali fault.

This study applies a Persistent Scatterer Interferometry (PSI) technique with StaMPS/MTI method to process twenty Envisat ASAR images covering Tainan Plain from 2005-2008. The most important feature of StaMPS/MTI method is to estimate errors based on spatial correlation, and provide result with better spatial-temporal coverage and resolution than DInSAR, the PSI products are able to relate the ground uplift patterns with the bounded faults. Our results reveal that the Dawan lowland has experienced a higher uplift rate than Tainan tableland from 2005 to 2008. This pattern is consistent with the 2005-2008 precise leveling measurements but in contrast with that before 2001, indicating a transition of vertical motion in Tainan Plain. This study will furthermore combine PSI results of ERS data and continuous GPS observations to construct time series of ground motion for analyzing the inception of this transition phase and its relation to the geometry and tectonic loading of the bounded faults.