

PLOVER COVE DAM MONITORING WITH SPACEBORNE INSAR TECHNIQUE IN HONG KONG

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Abstract: *From the Tai Mei Tuk Peninsula, the 2 km long Plover Cove dam was built in 1960s across the strait to connect it with the small Harbour Island. The marine dam was formed by dumping earth and rockfill under water after removal of the marine deposits in the dam foundation. The whole scheme was completed with the capacity of Plover Cove Reservoir to 186,244 acre-ft. Monitoring deformation of dams and reservoirs is important to ensure the safety of adjacent and surrounding areas. Traditional geodetic measurements require frequent field trips which cost lots of human and money resources. In this paper, we apply the remote sensing spaceborne Synthetic Aperture Radar Interferometry (InSAR) technique to monitor the deformation at Plover Cove dam in Hong Kong.*

Spaceborne InSAR has become nowadays a very powerful technique to monitor ground motions and terrain height. The advanced permanent scatterers (PS) technique, which exploits a long series of SAR data, could monitor ground deformations with millimeter accuracy on a high spatial density grid of pointwise targets. With the development of high resolution SAR sensors like TerraSAR-X and Cosmo-Skymed, many permanent scatterers can be found in one individual man-made construction like building or dam. Therefore PS-InSAR technique starts to play an important role in civil surveillance like ground motion and structure stability monitoring.

For monitoring Plover Cove Dam, we apply PS-InSAR technique to 72 scenes of data including 61 TerraSAR-X and 11 TanDEM-X images acquired between October 2008 and June 2012 in Hong Kong. Hundreds of permanent scatterers were successfully found and millimetric non-linear time series movements were detected on the road of the dam and embankments of reservoir. We correlated the PS-InSAR results with water level data of the reservoir provided by Water Supplies Department (WSD) of Hong Kong government. The results show good agreement with each other.

Keywords: InSAR; PS-InSAR; deformation monitoring; TerraSAR-X