

Subsidence Monitoring on High-Speed Linear Infrastructures by TerraSAR-X interferometry

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ABSTRACT:

Natural hazards like ground subsidence pose a great threat to the safety of rapidly emerging high-speed linear infrastructures in China. Although InSAR time series analysis with current C-band and L-band SAR data provides us an effective tool to study the time varying pattern of subsidence, the data with moderate resolution and relatively long revisiting cycle sometimes limit us to gain improved understanding of ground dynamics. In this paper we experiment to adopt high resolution stripmap data acquired by TerraSAR-X to monitor the high-speed linear infrastructures in Tianjin region where serious subsidence is occurring due to the groundwater withdraw. Based on the TCPInSAR approach, a promising alternative to multi-temporal InSAR techniques and image pairs with extra short spatial baselines, the subsidence rates along the high-speed linear infrastructures and their surrounding areas are successfully retrieved without the aid of external DEM. The result has been validated by the ground measurements indicating the TCPInSAR approach is adequate for subsidence monitoring with high resolution SAR data.