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Monitoring of Individual Ground Structures with Very High-Resolution Satellite Synthetic Aperture Radar: Results with the TerraSAR-X System

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Differential Interferometric Synthetic Aperture Radar (DInSAR) and Persistent Scatterers Interferometry (PSI) have been proven to be effective for accurate localization and monitoring of displacements of ground targets. The high accuracy and spatial density of the measurements make these techniques cost effective compared to classical geodetic techniques typically used in the risk monitoring context.
Most of the International Space Agencies have hence hugely invested in the launch of high resolution systems. The new generation of high-resolution SAR sensors allows acquiring, systematically, data with spatial resolution reaching metric/submetric values.
The hardware improvement has been complemented by the development of advanced processing techniques able to extract the highest possible information content from the data: This is the case of SAR tomography that extends and improves the classical DInSAR and PSI interferometric analysis of ground structures.
In this work we present the results obtained by processing very high resolution TerraSAR-X data with the SAR tomography technique to demonstrate the potential of the use of this technology to the monitoring of individual ground structures.