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Exploitation of the results of an extend DInSAR analysis performed since 1992 in the urban area of Roma

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Remote sensing is a key tool for environmental monitoring due to its outstanding capabilities to provide unique and timely information about Earth surface. In this framework, differential SAR interferometry (DInSAR) represents nowadays a well-established remote sensing technique for the investigation of surface deformation phenomena. In particular, the advanced DInSAR techniques that have been developed over the last years allow the detection and monitoring of the time evolution of very localized deformation signals affecting single buildings or man-made structures on the ground. In this context, DInSAR technology can play a significant role in monitoring ground settlements affecting single buildings and infrastructural network in urban areas.
Recently, the availability of high-resolution SAR images collected by the sensors of the Italian Space Agency (ASI) Cosmo Sky-Med constellation has allowed the generation of DInSAR products with improved spatial and temporal resolution characteristics with respect to previous SAR systems. This enhanced the capabilities of controlling deformation phenomena affecting the historical heritage in large urban areas, such as the town Roma. As a matter of fact, the monitoring of monuments and historical buildings represents a challenging issue for the preservation of historical heritage which is more sensible to factors causing structural deterioration that may lead to severe degrees of damage up to irreversible situations.
This work is aimed at investigating the capability improvement of DInSAR technique to map deformation phenomena affecting the urban area of Rome guaranteed by the exploitation of SAR data acquired by the new X-band SAR instruments onboard of the Cosmo-Skymed (CSM) sensors, with respect to that obtained through the first generation C-band ERS/ENVISAT radar systems. To this aim, we have analyzed three different archives of SAR images gathered by the CSM, the ERS and the ENVISAT platforms over the area of Roma (Italy) from 1992 to 2010. The achieved DInSAR products have been used to perform a comparative analysis and evaluate the reliability of the Cosmo-SkyMed DInSAR products.
The presented results have been obtained in the framework of the WHERE (World HEritage monitoring by Remote sEnsing) ASI project and the ASI COSMO SKY MED Project 1441.