

ASSESSMENT OF THE SENTINEL-1 INTERFEROMETRIC CAPABILITIES IN THE INTERFEROMETRIC WIDE-SWATH MODE

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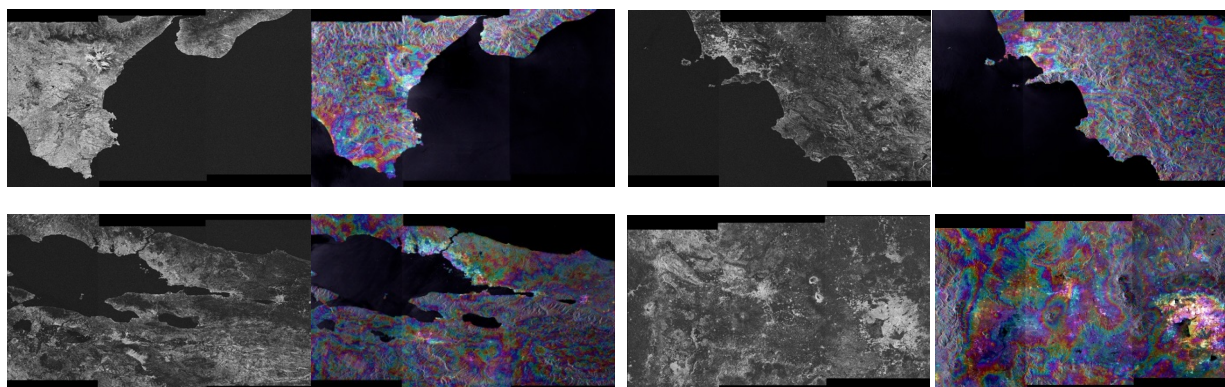
KEY WORDS: Sentinel-1, TOPS, SAR interferometry, differential SAR interferometry.

ABSTRACT:

The contribution will focus on the current status of the ESA study entitled “INSARAP: Sentinel-1 InSAR Performance study with TOPS Data”. The study investigates the performance of the interferometric wide swath (IW) mode of Sentinel-1, which is implemented using the terrain observation by progressive scans (TOPS) mode [1]. The key aspects of the TOPS mode that need to be considered for accurate interferometric processing will be presented, and first analyses with Sentinel-1 time series will be shown. The results will focus on different pilot sites, namely, Campi Flegrei/Vesuvius area and Mount Etna, both located in Italy, Istanbul city in Turkey, and Mexico City. The evaluation of the results will be performed using in-situ geodetic measurements based on continuous GPS stations located on the different sites.

The evaluation of differential interferometric results and persistent scatterer interferometry (PSI) exploiting time series will focus on several aspects. On the one hand, the interferometric performance of Sentinel-1 in terms of burst synchronization and interferometric performance (e.g., NESZ, coherence over different land types, phase unwrapping) will be presented. On the other hand, the PSI performance for surface deformation will be assessed using the in-situ geodetic measurements, as well as with the cross-comparison between different PSI processing chains.

The figure below shows some of the first Sentinel-1 interferograms in the IW mode (coherence and flattened phase with overlaid reflectivity) computed within the study over the pilot areas. From left to right and top to bottom: Mount Etna, Campi Flegrei/Vesuvius, Istanbul, Mexico City.



[1] F. De Zan and A. Monti Guarnieri, “TOPSAR: Terrain Observation by Progressive Scans,” IEEE Trans. Geosci. Remote Sens., vol. 44, no. 9, pp. 2352–2360, Sep. 2006.

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