Surface Deformation on the Historical Centre of the City of Rhodes Based on Radar Interferometric Techniques

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ABSTRACT:

This poster presents the satellite based Interferometric Synthethic Aperture Radar (InSAR) processing we carried out in the framework of the European Seventh Framework Programme "Perpetuate" project (Performance-Based Approach To Earthquake Protection Of Cultural Heritage In European And Mediterranean Countries). "Perpetuate" project intends to develop European Guidelines for the evaluation and mitigation of seismic risk to cultural heritage assets, with innovative techniques for the seismic strengthening of historical buildings and the preservation of unmovable artworks. Our objective was to perform an assessment of ground surface displacement in the historical centre of the city of Rhodes using the satellite based Persistent Scatterers Interferometry technique (PSI).To do so we used the European Space Agency ENVISAT Advances Synthetic Aperture Radar data acquired between 2002 and late 2010 (28 images). We produced a velocity map for the period 2002-2010 on the historical center of city of Rhodes using PSI techniques. This map shows us a subsidence trend on selected ground targets (buildings). The maximum observed trend of subsidence is as high as 1.5 cm per year. On selected targets, we have extracted Time Series of surface displacements. The Time Series allow us to follow the temporal evolution and trends of the subsidence movement on selected targets. We suggest that the buildings associated to these targets should be monitored in more details with ground observation. In a further work, we suggest to couple our InSAR PSI measurement to ground measurements in order to better characterize the surface movements. The results presented here complement field observation and might be very useful to plan new dedicated field missions and measurements. The PSI results provide a new look to help evaluating seismic risks in the city of Rhodes.