Geophysical Research Abstracts
Vol. 20, EGU2018-18927, 2018
EGU General Assembly 2018

SAR monitoring of buildings damaged by slow-moving landslides in the Italian southern Apennines

Diego Reale (1), Gianfranco Nicodemo (2), Dario Peduto (2), Settimio Ferlisi (2), Giovanni Gullà (3), and Gianfranco Fornaro (1)

(1) IREA-CNR, Italy (reale.d@irea.cnr.it), (2) University of Salerno, Department of Civil Engineering, Italy, (3) IRPI-CNR, Italy

Many urban areas all over the world are affected by a wide spectrum of dangers related to either natural phenomena or human activities. Among natural phenomena, slow-moving landslides are widespread and their interaction with the urban environment often originate detrimental effects to existing facilities (e.g., buildings and infrastructures) with related social consequences and economic losses. For these reasons, landslide hazard and vulnerability analyses represent key steps for a reliable prediction of the expected damage to exposed facilities as well as for properly designing and implementing the most suitable risk mitigation strategies.
Synthetic Aperture Radar (SAR) data processed via advanced interferometric techniques (DInSAR), such as the one based on the use of SAR Tomography, can be extremely useful in providing long-term ground/facility displacement archives. In this regard, the availability of recent high-resolution X-Band SAR data promoted the monitoring capabilities in urban environments, leading to a major step toward the risk analysis at single facility level.
In this study, with reference to an urban area located in Calabria region (southern Italian Apennines) – were the existence of several slow-moving landslides of different types interacting with masonry and reinforced concrete buildings can be recognized – the DInSAR-derived differential settlements experienced by a given building are combined with the corresponding damage severity level (recorded via in-situ surveys) to retrieve the relationship between cause (differential settlements) and effect (damage) for both masonry and reinforced concrete buildings. The obtained results represent the knowledge basis to generate more sophisticated tools (e.g. fragility and vulnerability curves) useful for risk analysis purposes.