Geophysical Research Abstracts
Vol. 19, EGU2017-17791, 2017
EGU General Assembly 2017

Landslides affecting critical infrastructures: the use of a GB-InSAR based warning system in Calatabiano (Southern Italy).

Teresa Nolesini, William Frodella, Federica Bardi, Emanuele Intrieri, Tommaso Carlà, Lorenzo Solari, Giulia Dotta, Federica Ferrigno, and Nicola Casagli

University of Florence

Landslides represent one of the most frequent geo-hazard, not only causing a serious threat to human lives, but also determining socio-economic losses, countable in billions of Euros and expressed in terms of damage to property, infrastructures and environmental degradation. Recent events show a significant increase in the number of disasters with natural and/or technological causes, which could have potentially serious consequences for Critical Infrastructures (CI). Where these infrastructures tend to fail or to be destroyed, the resulting cascade effect (chain of accidents) could lead to catastrophic damage and affect people, the environment and the economy. In the field of landslide detection, mapping, monitoring and management, the availability of advanced remote sensing technologies, which allow systematic and easily updatable acquisitions of data, may enhance the implementation of near real time monitoring activity and the production of landslide maps, optimizing field work.
This work aims at presenting an example of the advantages given by the combined use of advanced remote sensing techniques, such as Ground-Based Interferometric Synthetic Aperture Radar (GB-InSAR), Terrestrial Laser Scanning (TLS) and Infrared Thermography (IRT), in order to monitor and map the Calatabiano landslide, located in the Catania Province (Sicily Island, Southern Italy). The landslide occurred on October 24th 2015, after a period of heavy rainfall, causing the rupture of a water pipeline transect of the aqueduct supplying water to the city of Messina. As a consequence of this event a considerable lack in water resources occurred for a large number of the city inhabitants. A provisional by-pass, consisting of three 350 m long pipes passing through the landslide area, was implemented in order to restore the city water supplies during the emergency management phase. In this framework an integrated monitoring network was implemented, in order to assess the residual risk by analyzing the landslide geomorphological and kinematic features, and to support the early warning procedures needed to ensure the safety of the personnel involved in the by-pass realization and the long term landslide stabilization works.
The intrinsic characteristics of the abovementioned techniques, such as the capability of: i) producing near-real time displacement maps without physical access to the analysed area; ii) observing the investigated scenario 24 hours per day and in all-weather conditions; iii) generating high-resolution images, especially for local scale phenomena analysis; iv) providing high versatility and transportability; represent consistent advantages with respect to the traditional methods. The preliminary monitoring results and a 3D landslide mapping have shown its effectiveness during the emergency and the post emergency management phase.