PhD Course in
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XXXIII Cycle

"SLOW-MOVING LANDSLIDES IN URBAN AREAS: KINEMATIC CHARACTERIZATION BY NUMERICAL MODELLING AND MULTI-SOURCE MONITORING DATA"

Mariantonia Santoro

Supervisor:
Prof. Dario Peduto

Coordinator:
Prof. Fernando Fraternali

Co-Supervisor:
Dr. Eng. Giovanni Gullà

ABSTRACT

The slow-moving landslides, being able to develop in different geological contexts, yearly induce huge damages on structures and/or infrastructures interacting with them with consequent losses of economic nature. For this reason, studies aimed at analysing landslides and predicting the aforementioned damages are of great interest for Scientific Community and Authorities in charge of identifying the most suitable strategies for management and the land-use planning of urban areas affected by slow-moving landslides. Obviously, the carrying out of activities related to the pursuit of those objectives requires very high costs linked to the large amount of information to be acquired for the generation of landslides analysis models. In addition, the reconnaissance, mapping and analysis of kinematic features of slow-moving landslides evolving along medium-deep sliding surfaces in urban areas can be a difficult task due to the presence and interactions of/with anthropic structures/ infrastructures and human activities that can conceal morphological signs of landslide activity. In this PhD thesis an original methodology is proposed for the kinematic characterization of slow-moving landslides in urban areas. In particular, the proposed empirical procedure is based on the full integration of conventional monitoring data (such as on-site tests and damage severity surveys) and DInSAR remote sensing data (deriving from the processing of images acquired by synthetic aperture radars installed on satellite platforms using differential interferometry techniques). This procedure was developed with reference to the case study of the historic center of Lungro (Calabria, Southern Italy). The analyzes were carried out exclusively at a detailed scale (on the single landslide) with a multi-scalar approach. The results obtained highlight the potential of the proposed methodology

which, thanks to a full integration of the monitoring data, allows the development of an advanced geotechnical-structural modelling useful for territorial planning and the management of urban areas affected by slow-moving landslides.