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Ph.D. Course “Models and methods for material and environmental sciences”

INNOVATIVE TECHNIQUES FOR LANDSLIDE MONITORING AND ASSESSMENT

abstract

Landslides are among the most important and widespread natural risks for people and infrastructures. Despite the fact that they often lack the same media resonance of other natural disasters, their frequency and intensity is unfortunately expected to increase as a result of ongoing climate change (as during the extreme events of May 2023 in Emilia Romagna). Therefore, studying landslide’s mechanisms and their evolution in space and time is a key challenge for an improved land use planning, civil protection, risk management and mitigation.

This research project aims to develop and apply innovative monitoring and hazard assessment techniques for such purposes. Specifically, the goal is to study landslides by integrating conventional and emerging survey and monitoring techniques such as aerial imaging, Unmanned Aerial Vehicles (equipped with LiDAR), Robotic Total Stations and continuous GNSS, with innovative data analysis approaches based on statistics and/or AI algorithms that can improve hazard assessments. It is envisaged that the research will be carried out with respect to case studies located both in the northern Apennines and the eastern Alps.

The PhD project is expected to unfold with the following schedule: a first year, focused on increasing background knowledge about landslide monitoring and state-of-the-art technologies in the kinematic and morphological study of landslide processes, and their application to real case studies. A second year focused on data collection and analysis, as well as to publishing, and a period on research institutes abroad. A third year focused on the finalization of data collection and analysis, as well as publishing and finalizing the PhD thesis.