Relationship between slope and fluvial dynamics in the Scoltenna basin (Northern Apennines): Identification and modelling of slope instability processes for Civil Protection purposes

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Abstract

The aims of the project are the investigation of the relationship between slope and fluvial dynamics, including the identification, monitoring and modelling of geomorphological processes, and the integrated use of different methods and techniques to define the most suitable research approach for Civil Protection purposes.
The study area is the Scoltenna basin, located in the Northern Apennines, province of Modena. This area is affected by active river erosion processes and landslides, which can cause damages to buildings and infrastructures, including bridges.

The first steps of the project consist in the review of existing literature and thematic map, together with multitemporal analysis of aerial and satellite images, field surveys, analysis of historical data (i.e. LiDAR) and analysis of existing interferometric data. This will lead to the identification of geomorphological processes both in the whole catchment area and to the selection of specific sites in which more detailed investigation will be carried out. The latter comprise new interferometric data analysis and processing (i.e. CSK and Sentinel1) and the use of terrestrial laser scanner, UAV photogrammetry and GNSS systems. The study also foresees the use of different software, such as ArcGIS, PhotoScan, Google Earth Pro and Google Earth Engine.

The expected results of the project are the modelling of slope instability processes in relation to fluvial dynamics, and the identification of an integrated methodological approach suitable to be replicable to similar morphogenetic environments. The research is expected to provide the regional Civil Protection with insights for risk prevention.