



Geo-hydrological risk mitigation in a terraced landscape: LiDAR data analysis in the Portofino natural park, Italy

Guido Paliaga (1), Francesco Faccini (1,2), Fabio Luino (1), Laura Turconi (1), and Paolo Tarolli (3)

(1) Research Institute for Geo-Hydrological Protection CNR IRPI, Torino, Italy (gpaliaga@gmail.com), (2) Department of Earth, Environmental and Life Sciences, University of Geona, Genova, Italy, (3) Department of Land, Environment, Agriculture and Forestry, University of Padova, Legnaro (PD), Italy

Modification of steep slopes with man-made terraces is an ancient and widespread habit in many areas of the world. If the modification assures agricultural practices in mountainous areas, it results even as an important interference with the geomorphic processes: important quantities of soil and sediments are subtracted to the degradation processes and, in case of total abandonment of terraces, they result again available to erosion. Intense rain event may cause partial instability or even collapse of the anthropogenic structures, configuring terraces as an additional source of Geo-hydrological hazard. Recent events in Liguria - northern Italy, in Cinque Terre 2011 and Leivi (Chiavari) 2014, caused damages and even casualties due to the sudden collapse of terraced slopes.

A crucial point in assessing the potential hazard caused by abandoned terraced slopes is identifying their real extension. LiDAR data analysis is an important assessment tool particularly in strong steepness areas due to the capability of recognizing linear regular structures.

In the present research LiDAR data analysis has been used to identify terraces in the Portofino Natural Park area (Liguria region, Italy) as one of the preliminary activities of the RECONNECT European Union's Horizon 2020 Research and Innovation Programme project. The project plans to realize nature based solutions to mitigate geo-hydrological risk in two pilot areas in the Portofino promontory and the recovery of terraces is one of the foreseen actions. Mapping terraces is the first step to evaluate the potential risk associated to the possible instability processes and the interventions to be realized. Land use evolution in the area from 1800 to present have been indeed found through historical maps examination and used in conjunction with LiDAR analysis results.