Geophysical Research Abstracts
Vol. 20, EGU2018-4320, 2018
EGU General Assembly 2018

A model for the economic assessment of forest protection service against rockfall

Cristian Accastello, Ettore Bianchi, Simone Blanc, and Filippo Brun
University of Turin, Department of Agriculture, Forest and Food Science - DISAFA, Italy (cristian.accastello@unito.it)

In the last decades, the Alps, one of the most densely populated mountain areas in the world, are facing several threats that are deeply influencing the relationship between its inhabitants and the area. Among those, we have demographic variations, tourism and abandonment of historical practices. Coupled with these societal changes, also climate changes are showing an increasing influence, with negative consequences expected to raise in frequency and intensity in the future. In this uncertain scenario, forests, with the wide array of benefits and functions that can provide, holds a key role.
In this work, developed under the Interreg Alpine Space project "RockTheAlps", we focus on the protection service offered by forests in relation to rockfall risks. Among the several natural hazards occurring in the Alps, rockfall, because of its features of unpredictability, is one of the least considered, even if its consequences may be locally very relevant. Nonetheless, many studies already showed the high level of safety for dwellers and assets that forests can offer, a service that can be enhanced through an active and targeted management.
The computation model we developed assesses, from an economical perspective, the role of the forests against rockfall through a multidisciplinary approach that allowed to integrate different aspects as i) the measure of forest effectiveness against rockfall; ii) different risk acceptance levels; ii) defensive facility standardization and iv) active forest management. The established replacement cost approach was implemented in a harmonized methodology, ensuring its applicability on other mountainous regions subjected to this risk.
The model was tested in 2 case studies in the Italian Alps with different characteristics in terms of forest features and rockfall mitigation effects. To evaluate the forest effectiveness in risk reduction, the Rockfall Protection Index developed in the Arange project has been adopted; while the European guidelines ETAG 27 served to shape standard defensive facilities. Finally, forest management costs were computed with the standard economic assessment procedure, hypothesizing interventions in the considered timespan. Considering different levels of risk acceptance in relation to the goods to be protected, the model gives a monetary measure of the protection value of forest stands, allowing its comparison with other stands having similar roles.
In case 1, where a coppice stands with limited protection effectiveness was studied, the protective value was estimated as a reduction obtained from building smaller defensive facilities. On the other hand, case 2 was a forest able to ensure a high level of protection, then its value was estimated equal to the protection measures needed if it would not be present.
Further developments of the model will be soon deployed in the form of a freeware tool able to consider alternative assessment approaches. We believe this evaluation could help raising awareness about the importance of forests in risks mitigation of natural hazards, especially in consideration of increasing disturbances due to climate change. In fact, the inclusion of this assessment in the local risk management strategies would help fostering an active management of this widespread but often undervalued resource.