Submitted Abstract

ID IMC22-FSAbstr- 346

First Author First Name Last Name	 Tina (1) Grätz
Submitting Author First Name Last Name	 Tina Grätz
Correspondence	tina.graetz@students.boku.ac.at
Co-Authors **>> E-Mails will be not listed**	Vospernik, Sonja (1); Scheidl, Christian (2)
Organisations	1: University of Natural Resources and Life Sciences, Vienna, Department of Forest and Soil Sciences, Institute of Forest Growth, Austria 2: University of Natural Resources and Life Sciences, Vienna, Department of Civil Engineering and Natural Hazards, Institute of Mountain Risk Engineering, Austria
Country	Austria
Region	Western Europe
Title	Evaluation Of High-Elevation Afforestation.
Keywords	High-Elevation Afforestation, Random Forest, Land Cover Classification, Evaluation Protective Forest, Tree Species Classification
Type	List Of Focus Session
Focus Session ID	05

Abstract

In alpine regions. mountain forests are important to protect people and infrastructure against frequently recurring natural hazards. In this context, and particularly to mitigate the effects of deforestation in the 19th century, more than 5,000 high elevation afforestation sites have been established in Austria since 1906. Today, the question of future development strategies for such afforestation sites arises, which makes an assessment of their effectiveness necessary. Typically, such assessments are usually done by collecting forest data through time-consuming and costly field surveys. However, in recent years, the automatic detection of forest parameters with remote sensing data has been successively improved and has already been applied in numerous forestry issues. Here, we focus on the usability of RGB-orthophotos - covering 30 afforestation sites located in the Paznaun and Stanzervalley, Tyrol, Austria. Five different recent land cover classes as well as actual tree species were classified by combining the remote information (RGB) with the random forest ensemble learning method.

Land cover classification results were assessed by using overall, producer and user accuracies, dividing the number of correctly classified pixels by the total number of pixels, the number of pixels in the respective class and the number of pixels predicted for the respective class. In total, an accuracy of more than 90 % could be achieved in 26 cases and an accuracy between 80 and 90 % in three other cases. Producer and user accuracies above 80 % were obtained in the classification of the individual classes, making them comparable to other studies. Furthermore, the proportion and spatial distribution of the predicted land cover classes showed results close to reality.

For the classification of the tree species, the typical high-elevation tree species Norway spruce, European larch, Cembran pine, Scots pine, Mountain pine, and deciduous trees were considered. For almost all sites, the classification based on a spectral analysis of the RGB information showed accuracies between 72-95 % and thus predicted realistic tree species proportions comparable with similar studies.

We conclude that the accuracy of classifying land cover and tree species from RGB orthophotos is sufficient, making it a cost-effective option for assessing the protective effects of existing afforestation sites at high elevations. Remote sensing in combination with the presented ensemble learning methodology can facilitate the assessment of high-elevation afforestation sites, especially for locations that are difficult to access.