

AN ASSESSMENT OF THE CONDITION OF FORESTS IN THE TATRA NATIONAL PARK USING DECISION TREE METHOD AND MULTISPECTRAL LANDSAT TM SATELLITE IMAGES

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ABSTRACT

Landsat data because of the long period of acquisition are useful for environment monitoring and change detection. Vegetation is one of the sensitive component of the environment and it is an index of climate changes, especially in mountain areas. In this study Tatra mountains in Polish part of National Park were chosen to assess the forest condition based on Decision Tree (DT) method.

Landsat data since 1987 to 2011 from similar phenological period (June-September) were selected. Images were corrected atmospherically in ATCOR 2/3 software. Dominant land cover types were classified using Maximum Likelihood method which allowed to select forested areas and to mask other classes. Vegetation indices as Normalized Difference Vegetation Index and Moisture Stress Index were calculated for all images and used in Decision Tree classifier. The condition of forest stands was divided into 4 classes: poor, medium, good and very good and each class was differentiated into subclasses based on the canopy moisture leading to distinguish finally 9 classes of condition.

The results are presenting the maps of distribution of forest condition and the statistics showing the condition classes of forest stands in Tatra National Park in selected dates. The analysis shows general improvement of forest condition and for the most recent images a big parts of dead forests caused by bark beetle. The worst condition was observed for the 1987, where 133.6 km² was covered by forest stands where about 21% were in the worst condition and 87% in medium condition. The best one was for the 2005, where 152.4 km² was covered by forest stands where about 75.51% were in good condition and 11% were in the best condition. This research shows the potential of using Landsat multitemporal data and Decision Tree method in forest condition and change detection analysis.