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DETECTION OF ENVIRONMENTAL CHANGES DUE TO WINDTHROWS USING LANDSAT 7 ETM+ SATELLITE IMAGES

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Abstract

The changes caused by windthrows regarding spruce stand lead to significant environmental modifications. In this article aspects regarding the detection of environmental changes caused by windthrows in Sanmartin Forest Division within Miercurea Ciuc Forest District of National Forest Administration are covered using Landsat 7 ETM+ satellite images. Two pre and post-event satellite images, from 2001 when massive windthrows occurred, were used in this study. The techniques used in changes detection were univariate image differencing (UID), selective PCA and change vector analysis (CVA). The indices used in changes detection were NDVI, RVI, SAVI and those obtained from Tasseled Cap transformation (TCW, TCG, TCB). The results show that the most appropriate technique for detecting windthrows regarding the studied area is UID applied to TCW, with a classification accuracy of 82.3%. Poor results were obtained by applying the first component to SAVI, the classification accuracy being of 51.3%. With reference to the images obtained as a result of applying the changes detection techniques suitable threshold values were determined, allowing the detection of changes specific to the studied area and the development of binary maps of vegetation. Thus, it turned out that significant changes are detected using TCW by determining the threshold value to <−2s and +>2s in relation to the average, the pixels from the histogram's tail representing 5−7% out of the total of scene pixels. The use of changes detection techniques together with NDVI, RVI and SAVI vegetation indices allow the detection of changes during the slight interval (average−1s) to moderate (1−2s).

Key words: change detection, satellite images, windthrows

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