

Dear Reader,

This document describes the purpose of our ongoing research called Capturing the dynamics in the fragments of virgin forest of Carpathian region using dense satellite image time series.

There is a high demand for a good satellite time series analyze method in these days in the field of forestry. The image archive of some older high resolution earth observation satellite systems become freely available few years ago. Recently launched satellite families are providing data with better spatial and time resolution. The archive and the future imagery creating a great opportunity for us to use them for forest monitoring. Also the computing background of today's technology allows us to develop the method on high performance workstations what was unconceivable two decades ago. The information technologies become ubiquitous in recent years. Information is easily available today for everyone. These factors are showing that our research for method development is well-timed.

There are many existing project which are using automated methods for detecting changes from earth observation data. Most of them are extracting only land cover changes from the sparse image time series and some of them could handle dense time series for vegetation monitoring. These solutions are mainly used simple or more advanced image processing methods. The GIS analyze and the validation used to be the last step in these workflows. By integrating the GIS system into the workflow it makes easier to get more satisfying results. A harmonized use of image materials and the area of interest database from the first step of the workflow let the algorithm to do decision support for different cases.

We entered the big data era of remote sensing. By big data we mean that it is almost impossible to extract information from the all available datasets with the usual manual and semi-automatic methods within reasonable time. Thus we have to use automated solutions for data mining. In that case we could only supervise the algorithm parameters during the processes. In our research we downloaded around 5000 images but after the filtering algorithms less 3000 remained for further processing. This amount of data required automatic solution. Of course the automated methods have many drawbacks but for this case this is the optimal.

Observing changes on a natural ecosystem is never as easy as it looks for the first time. In our case we are observing the fragments of virgin forests internal regrowth dynamic. We assume that there were no artificial changes during the investigated time period. In this case we could manifest the different parts of the virgin forest fragments which are representing different age groups. We are using dense time series of imagery. The forests phenology changes during the vegetation period are highly affecting the result. We would like to separate the small scale changes from the phonology curve and classify them. This brings us one step closer to create further versions of our method for managed forests in the future. We are using a

classification method to derive trends from the time series. We are using the image archive of the last 30 years but in the future imagery there is more potential for this kind of research.

On the attached workflow chart you can find the steps of our method. Since it is an ongoing research this is not the final version. We hope that our project could help the further works in this topic.

Best Regards,

The Authors

Please visit the following site for more information about our research:

<http://geo.emk.nyme.hu/barton.html>

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