

EGU2020-10702

<https://doi.org/10.5194/egusphere-egu2020-10702>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



## Using geotagged photographs and remote sensing to examine visual and recreational landscape values in Estonia

Oleksandr Karasov<sup>1</sup>, Mart Külvik<sup>1</sup>, Stien Heremans<sup>2</sup>, and Artem Domnich<sup>3</sup>

<sup>1</sup>Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, Tartu, Estonia (oleksandr.karasov@student.emu.ee)

<sup>2</sup>Research Institute for Nature and Forest, Brussels, Belgium

<sup>3</sup>Institute of Computer Science, University of Tartu, Tartu, Estonia

Integrated use of citizen science (crowdsourcing in general) and remote sensing is essential to comprehend the complexity of the notion of landscape, based on subjective experience and objective structure of environment. Organisation-related landscape attributes, such as landscape diversity and orderliness, as well as the extent of colour harmony, greenness, and transport accessibility, were recently recognised as indicators for visual and recreational values of environment. However, it is currently an open research question, whether mentioned anthropocentric nature-related values are dependable on these landscape attributes, quantifiable with GIS and remote sensing, and accurate mapping of aesthetic and recreational landscape services is important to answer this question. Image hosting services and social networks provide a huge source of evidence on the aesthetic and recreational landscape experience, allowing for mapping the intangible anthropocentric values with publicly shared georeferenced photographs. Therefore, we aimed to apply automated image recognition with Clarifai service to assign each photograph with tags, reflecting its content, and further topic modelling (a variety of textual analysis) to group the tags into the categories.

In this study, we used combined Flickr and VK.com dataset for 2016-2018 years, collected via official APIs within the territory of Estonia; outdoor photographs were grouped into three classes: aesthetic landscape experience, outdoor recreation activities and wildlife watching. Non-relevant photographs and photographs with repeating content from the same author were excluded from analysis; a dataset of >10000 photographs was finally analysed. Cloud-free summertime Landsat-8 mosaic for 2018 was used to estimate the landscape diversity, orderliness, colour harmony extent, greenness and other metrics, whereas digital elevation model and land use/land cover model were used to map landscape coherence, terrain ruggedness, and indicate transport accessibility. Contrary to previous findings, users of Flickr and VK.com tend to take photographs of lower landscape diversity and lower greenness. We confirm that, according to the photographs being studied, water presence, terrain ruggedness, and transport accessibility are the best indicators of recreational experience. Colour harmony of land cover and landscape coherence are moderately higher for actual outdoor photographs.

Performance of the mentioned indicators varies among the groups of photographs, wildlife

watching is the least predictable class of recreational landscape services. The applicability of remote sensing-based mapping of landscape attributes and textual analysis of tags, extracted for outdoor photographs, is examined and discussed. Our results contribute to the deeper understanding of landscape pattern and processes, responsible for visual and recreational values, as well as the methodology is based on the integrated quantitative approach, supporting evidence-based landscape science and decision-making.