

Abstract

Numerous areas in the Czech landscape have been abandoned by human activity, allowing natural processes to take over. Some of these areas have transformed into new wilderness characterized by diverse vegetation compositions, representing various successional stages. The aim of this work is to conduct a comprehensive and accurate classification of vegetation in the new wilderness area utilizing remote sensing techniques. For this purpose, multispectral UAS data with a 5 cm spatial resolution, hyperspectral aerial data with a 60 cm spatial resolution, and botanical data collected at three different dates within the area of interest were used. Based on the collected data and the assessment of species separability, three classification legends were proposed to classify the area of interest using Maximum Likelihood, Random Forest and object-based classifiers. The F1-score was used to assess the classification accuracy of vegetation classes. The results demonstrated the suitability of the object classifier for classifying a highly diverse vegetational area at a very high spatial resolution (achieving the highest overall accuracy of 84.06% across 22 classes). The Random Forest classifier yielded better results for vegetation classification on hyperspectral data with a lower spatial resolution (achieving the highest overall accuracy of 80.35% across 12 classes). The addition of an elevation layer to the multispectral orthomosaics contributed significantly to the overall accuracy of the classifications and to the increase in separability of the classification classes.

Key words: classification, abandoned land, new wilderness, vegetation species, F1-score, Jeffries-Matusita distance