SEMI-AUTOMATIC ASSESSMENT OF NORWAY SPRUCE (PICEA ABIES) IN MODERN DIGITAL AERIAL PHOTOGRAPHS

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ABSTRACT:

In present times, forest conversion due to climate change confronts forest administrations with dramatic challenges when menacing vast areas of forested surfaces by the effects of temperature rise and drought. In Bavaria, especially Norway spruce (Picea abies) is threatened by decreasing vitality and the proliferation of bark beetle damage. The Bavarian Forest Service is confronted with the problem, that there is only little information available about the approximately 1.6 Mio ha of non-governmental forest property in Bavaria to fulfill its advisory tasks, because of data privacy convention. For this reason, the Bavarian State Institute of Forestry conducted a research project focusing on possible semi-automatic approaches of anonymous information extraction from digital aerial photographs. This method mainly comprises the segmentation and object-based classification of 4-channel 16 bit aerial photographs in combination with an image homogenization process. The project showed a classification accuracy of 80% (young stands) up to more than 90% (old growth). A reliable classification (up to 80% accuracy) has even been achieved for Norway spruce stands younger than 30 years that cannot be interpreted by visual stereoscopic interpretation. The project results enable the Bavarian State Institute of Forestry to gain sufficiently reliable identification of Norway spruce for vast non-governmental forest areas. In a subsequent investigation, the method has to prove its cost-efficiency and is to be transferred to other tree species of interest in the debate of environmental change.

TOPIC: Image processing and pattern recognition
ALTERNATIVE TOPIC: Land cover classification