

Impact of remote sensing characteristics for biodiversity monitoring

A case study of Southern Myanmar mangroves

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Abstract

The protection of mangrove forests and their endangered biodiversity is of crucial importance in Southern Myanmar as over-exploitation and unsustainable management practices threaten these highly valuable ecosystems. Remote sensing has proven to offer a rapid and cost-efficient method to regularly monitor the extent and condition of mangroves. However, the current availability of various sensor types and different classification methods complicates a well-informed selection of the most appropriate methodology for an effective biodiversity monitoring. In order to assist applied ecologists in this highly complex decision-making process, this study compared the suitability of medium-resolution Landsat 8 and high-resolution RapidEye imagery to accurately monitor mangrove forests. Spatial and spectral resolution, classification algorithms and different predictor combinations were investigated as influencing elements. Results of the analysis revealed that medium-resolution Landsat 8 imagery mostly leads to higher classification accuracies than high-resolution RapidEye data in the context of mangrove mapping in Southern Myanmar. The comparison of different predictor combinations could show, that this difference is mainly attributable to the different spectral capabilities of both sensors. Due to the high sensitivity of fine-resolution images to intra-class spectral variability, medium-resolution data was identified as being more suitable for mangrove mapping along the coast of Southern Myanmar with respect to the majority of land cover classes. Moreover, the accuracy of land cover predictions was strongly influenced by the choice of specific classification algorithms and predictor combinations. Referring to the main findings of this study, the application of medium-resolution Landsat 8 data is recommended to applied conservationists. This is based on its superior performance as well as on its cost-free availability. By formulating recommendation for practitioners, this study aims to bridge the gap between research and its implementation in applied conservation. The resulting patterns are valuable to analyse the importance of Sentinel-2 data for the monitoring of mangroves.

Keywords: Sensor Performance, Biodiversity, Classification, Coastal Zones, Mapping
