Tracing variations of deciduous component over grassland–forest continuum by subpixel classification

Skånes, Helle[(1)], Pitkänen, Timo[(2)], Käyhkö, Niina[(2)]

[(1)]Department of Physical Geography and Quaternary Geology, Stockholm University, 106 91 Stockholm, Sweden
[(2)]Department of Geography and Geology, University of Turku, 20014 Turku, Finland

Land cover classifications based on satellite imagery has traditionally paid little attention to fragmented and complex components of the landscape, such as grasslands and deciduous forests. They are typically treated as spectral noise between more robust and major classes and as such they are obliterated from the final classification through post-classification procedures. However, the deciduous component, including deciduous forests, wooded grasslands and spontaneous deciduous forests succession on former grasslands, is generally pinpointed as the main carrier of biodiversity in the rural landscape [1][2] and must therefore be treated in any future satellite based environmental monitoring process.

In this paper, we test the possibilities of using mid-resolution satellite imagery (Landsat TM and SPOT) in the detection and quantification of transitional deciduous component. As the component is highly heterogeneous in terms of spectral characteristics, we have selected a hybrid classification which combines supervised and spectral unmixing approaches, assisted by high precision acquisition of training data from CIR aerial photographs. The rationale behind the procedure is to narrow down the complexity of the target and utilize the advantages of different classification methods thus gaining a reliable estimate of the deciduous characterization of grassland–forest continuum. As a result, a three-level product including pure grassland component, pure deciduous forest component and mixed transitional component with further categorization is presented. Furthermore, landscape ecological consequences of the classification as well as its relation to land use history are discussed.

Preliminary results indicate that as expected, detection of pure components is fairly straightforward compared to the classification of the mixed component. Spectral unmixing approach offers a promising way of making detailed observations on fractional elements and has previously been tested *e.g.* to detect urban mixed vegetation [3] and cypress canopies [4], but workflow also includes the specification of multitudinous parameters which make the results prone to unintentional misinterpretations. However, if accomplished carefully and subjected to detailed verification, results may be highly applicable for detection and stratification of transitional deciduous component in a way significant for landscape ecological approaches.

References

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