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LIMITS TO THE DETECTABILITY OF FLOWERING PLANTS WITHIN SEMI-ARID SAVANNAS USING 0.6-METER AIRBORNE HYPERSPECTRAL DATA

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ABSTRACT:

Using airborne hyperspectral data we test the suitability and accuracy of hyperspectral data for producing the first ever flowering and floral cycle map for a study site in eastern Africa. Knowledge about the spatial distribution of flowering plants and the floral cycle is of upmost importance for valuating pollination effects, and help to understand the relationship between melliferous plants in the landscape and the quantity and quality of bee keeping products. Airborne AISA/EAGLE hyperspectral data, 440nm to 990nm, was captured in February 2013 during the maximum flowering period and in January 2014 at the beginning of the floral period. We combined linear spectral unmixing, on single date AISA imagery respectively, with Change Vector Analysis (CVA) to discern flowering plants from other landscape features. We found permissible overall accuracies of over 90% for white flowering (compact) acacia trees for the 2013 imagery. For all melliferous plants the overall accuracy of the 2013 imagery was 80% and 55% for the 2014 imagery. Detectability is largely influence by the õbackgroundô leaf characteristics, flowering compaction and spectral endmember variability. There is a need to investigate upscaling options to space-borne sensors for repeatable monitoring of the floral cycle at key sites in Africa.

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