

Spaceborne hyperspectral data for mapping and monitoring biodiversity in the Brazilian Cerrado

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Abstract:

Global trends of declining biodiversity are widely acknowledged, which have a direct impact on ecosystems' functioning and their provisioning of services. Systematic mapping and monitoring of biodiversity patterns, e.g. of biological communities and their turnover, are thus needed. Earth observation data, coupled with suitable methods for analysis, have great potential for characterising these patterns in an accurate manner. Previous studies have shown that hyperspectral data systematically collected at repeated times are able to provide very detailed information on the Earth's surface, and this way are suitable for characterising complex ecological systems. The highly dynamic and heterogeneous Brazilian Cerrado, while remaining largely understudied, holds ca. 5% of the world's species. However, economic pressures and relaxed conservation laws result in the continuous destruction of this globally important system thus constituting a global biodiversity hotspot. In this study we used time series of hyperspectral (EO-1 Hyperion) and multispectral (Landsat) data to map spatial transitions in woody plant communities transitions, based on ground-based inventory data. We applied a Sparse Generalised Dissimilarity Modelling approach, capable of analysing such complex data. We further assessed the trade-offs between the spectral and temporal domains for describing biodiversity patterns in our study area. We conclude that our approach is suitable to systematically monitor changes in plant community patterns.