

MAPPING WETLAND ENVIRONMENTS IN THE BRAZILIAN SAVANNAH FROM HIGH RESOLUTION IKONOS IMAGE DATA

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ABSTRACT:

Wetlands are complex ecosystems hosting a high diversity of landscape associated with water, soil and vegetation variations. It provides several essential resources for wildlife and human populations and supports a miscellany of aquatic plant species. The Pandeiros Wildlife Sanctuary is a unique wetland ecosystem surrounded by semiarid savannas. It supports large communities of macrophytes and terrestrial plants and stores large quantities of organic matter. As such, it plays an important role in cycling nutrients, providing refuge for fish breeding and is considered a strong carbon sink. These plant communities are associated with hydraulic parameters (depth, flux, turbidity) and soil composition and their identification constitutes a way to characterize these environments and their hydrological features. Here we propose a methodology for classifying these wetlands using their spectral and spatial signature extracted from Ikonos image data. To overcome the inaccessibility of the study area and the associated validation problem, we acquired photographs from a microlight aircraft flown at low altitudes to identify the main plant communities. Ground data also complemented these photographic records. Classification trials were made using both a pixel-based and a region-based algorithm with combinations of spectral and spatial feature (texture) to assess the most appropriate approach. As a result five classes of macrophytes (as dominant specie) and six terrestrial vegetation classes were identified with an accuracy of over 80% with both classifiers. Texture data did not bring a significant improvement to the region-based classification but did improve thematic accuracy considerably with the pixel-based approach.

TOPIC: Land cover classification

ALTERNATIVE TOPIC: Physical modeling and signatures