

ASSESSMENT OF BIOPHYSICAL STRUCTURE OF RIPARIAN ZONES BASED ON SEGMENTATION METHOD, SPATIAL KNOWLEDGE AND TEXTURE ANALYSIS

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ABSTRACT:

Riparian forests play an important role in the ecological balance of river ecosystems. Given the narrow nature of these environments, medium resolution sensors such as Landsat had limited use. Conversely, products obtained from high-resolution images, such as Ikonos-2, have wide applications in riparian forest studies. The objective of this article is to describe a methodology for delineating riparian areas and extracting their biophysical parameters from an Ikonos scene. The methodology is divided into two stages. Firstly the image is segmented into riparian and non-riparian classes using a segmentation algorithm and a river-based buffer. The segmentation package MAGIC (Map Guide Image Classification) was used to delineate the riparian zones. In the second phase, texture features derived the co-occurrence matrix were used to estimate the biophysical parameters of the riparian forest. Allometric measurements were made in 70 plots of riparian area from both sides of the Pandeiros River, located in Northern Minas Gerais, Brazil. These plots were used to train and validate our models based on texture parameters. The forest structure variables included height, diameter at breast height, basal area, stem density and leaf area index which were acquired by direct measurements in the field. The results show that MAGIC segmented the riparian environment with an accuracy of more than 80% when compared with the map obtained by visual image interpretation. The best results for modeling riparian structure were obtained respectively for diameter at breast height and stem density ($R^2=0.72$ and $R^2=0.61$) using Homogeneity and small window of analysis (11×11 pixels).

TOPIC: Image processing and pattern recognition

ALTERNATIVE TOPIC: Remote sensing applications