

Land-Cover Classification in the Brazilian Amazon with Satellite Images: Towards Increasing Accuracy

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This presentation summarizes our research on land-cover classification, especially vegetation classification, in the Brazilian Amazon. Our research has involved in the comparison of different classification approaches (e.g., minimum distance classifier (MDC), maximum likelihood classifier (MLC), ECHO, and decision tree classifier (DTC)), multisensor data fusion (e.g., Landsat ETM+ and Radarsat data, Landsat TM and SPOT HRG data), combination of spectral and textural images, and modeling of forest stand parameters. This research has indicated the complexity of land-cover classification, especially successional vegetation stages and agroforestry. Selection of a suitable classifier and use of textures are effective for improving land-cover classification accuracy. The ECHO and DTC classifiers have significantly better classification performance than MDC and MLC. Incorporation of multisensor data fusion and textures provides better classification accuracies than single sensor data with pure spectral signatures. However, the classification accuracy for successional vegetation stages is still poor, no matter what spectral or textural information is used during image classification. A forest stand structure based approach benefits successional vegetation classification. An entropy measure, calculated using tree height distribution from field vegetation inventory data and then modeled with the integration of Landsat spectral signatures and field measurements, can effectively classify successional vegetation into three stages with overall accuracy greater than 80%, which is significantly better than direct classification of remotely sensed data.

Science Theme: LC (Land Use and Land Cover Change)

Presentation Type: Poster

Abstract ID: 18