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Large Area Mapping in Rondônia using Spectral Mixture Analysis and Decision Tree Classifiers, an Update

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Abstract

In previous work we described spatiotemporal variation in land-cover over 80,000 km^2 in central Rondônia. Land-cover change was mapped using a multistage process to map primary forest, pasture, second growth, urban, rock/savanna, and water in an area covered by three contiguous Landsat scenes acquired between 1975 and 1999. Based on this research, Rondônia can be characterized as highly fragmented, with the most intense forest clearing extending at least 50 km along the margins of BR364. Pastures in Rondônia persist over many years and are not typically abandoned to second growth which, when present, rarely remained unchanged longer than 8 years. Annual deforestation rates, pasture area and the ratio of second growth to cleared area varied spatially. Highest initial deforestation rates (2%) occurred in the southeast but increased to 3% by the late 1990s. In central Rondônia (Ji-Paraná) deforestation rates rose from 1.2% between 1978 and 1986 to a high of 4.2% in 1999. The lowest initial deforestation rates (0.5%), occurred in the northwest, in the vicinity of Ariquemes, but also increased in the late 1990s, peaking at 3% in 1998. The percentage of cleared lands abandoned to second growth varied substantially from southeast to northwest, ranging from 18% in the southeast to up to over 50% in the northwest for some years.

Accuracy of the 1999 land-cover map was assessed using digital videography and exceeded 85%. However, a number of systematic errors were also identified including: 1) primary forest mapped as second growth on sun lit slopes; 2) over mapping of second growth in early dry season images; 3) over mapping of land-clearing in smoke contaminated scenes. In this paper we present updated analysis for Rondônia. Changes include 1) improved methods for reducing smoke contaminated data; 2) a reduction of topographic errors (ie, overmapped second growth) and 3) expanded spatial and temporal coverage. We extend the spatial coverage analysis to include two additional Landsat scenes in Rondônia, one that includes PortoVelho (P233 R66), the other the city of Cacoal (P230 R68).