Vegetation pattern recognition using SPOT images at regional scale in Niger

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anding patterns and associated vegetation structures appear readily on aerial photographs. Satellite data provide new methods to detect and map vegetation patterns at local and regional scales. Vegetation patterns depend on ecological parameters as topography, surface or soil features and rainfall. In western Niger, aerial photographs and SPOT satellite panchromatic and multispectral images (10 and 20 m pixel size) have been used:

✓ to identify and classify the vegetation patterns;

✓ to extrapolate results at regional scale. Most patterns in the region cannot be discriminated using Landsat TM imagery due to its too coarse resolution (30 m).

The selected classification system is OASIS. Initial data are supervised or unsupervised classifications, NDVI or color index thresholding. In a window of approx. 10-15 pixels, each vegetation structure is defined by a reference pattern.. The composition of this window centered successively on each pixel of the image, is calculated and classified according to its similarity with the reference windows. We obtained thus a new classified image.

We propose a NDVI where red band is substituted by a combination of XS2 and panchromatic bands. This vegetation index has been validated along pattern transects in relationships with vegetation cover percentage. Other parameters describing vegetation patterns include length and direction of bands or patchès. Theses parameters are extracted from image after binarization and reduction of vegetation

SPECIFIC METHODS OF STUDY

structures to a single line. The digital number of each pixel represents the structure length or the direction angle. A photointerpretation on aerial photographs is used as the reference map. However, some limits are very difficult to delineate. The combination of automatic classification based on bands length and modified NDVI is very accurate compared to the reference map. The extrapolation of results requires to verify the stability of windows composition for each pattern along a large latitudinal climatic transect. Multispectral data without panchromatic band gives also good results consistent with regional scale studies.