

# CONTEXTUAL CLASSIFICATION OF LANDSAT-TM DATA IN A MOUNTAINOUS TERRAIN IN NORTHERN MEXICO

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## ABSTRACT

Sierra de Artega, in Northern México, is a mountainous area that represents an important biological area at regional level due its great diversity in species and endemisms. This area has a wide elevation range from 800 to 3500 meters above sea level, which results in an interesting mosaic of plant communities along the study area. These communities are Pine forest, Oak forest, *Pinus-Abies-Pseudotsuga* forest, Pine-Oak forest, Submontane scrub, Desert scrub, Chaparral and some Grasslands. These vegetation types have a close relation with the climate, altitude, slope and aspect conditions.

The importance of this area makes necessary the actualization of a vegetation map for designing an ecological planning program. This map was elaborated using Landsat-TM imagery from august 2000. A multispectral image classification was performed using the pixel-based maximum-likelihood method, with a precision percentage lower than 80%.

This percentage was improved through the incorporation of the physiographic aspects of this area (slope, aspect and altitude,) to the classification process using e-cognition software. This software has introduced the object-oriented classification method. In many cases, image analysis leads to meaningful objects only when the image is segmented into homogeneous areas. Image segmentation is the efficient method to generate image objects for object-oriented image analysis. Object-based classification starts by segmenting the entire image. The resulting image objects identify their neighbors and are then classified. The physical and contextual characteristics of the image objects can be described by means of fuzzy logic.

Fuzzy rules included both spectral and contextual information. This contextual classification provided more accurate results as compared to the single date classification.

**Key words:** contextual classification, mountainous terrain, vegetation map