

A PROPOSAL OF DIGITAL PROCESSING OF MULTISPECTRAL IMAGES TO ENHANCE GEOBOTANICAL ANOMALIES

1ALMEIDA, T. I. R. and 2FROMARD, F. 1Instituto de Geociências, São Paulo, Brazil;
2Laboratoire d'Ecologie Terrestre, Toulouse, France.

The Geobotany was born with the multi-spectral imagery in the late '70s. But this remote sensing application to mineral exploration has had problems with the lack of evident patterns for stress responses. The spectral behavior is mainly controlled by the leaf pigments in the visible, by the leaf structure in the near infrared, and by the leaf water content in the short waves infrared regions. In this work we propose a methodology using all the three spectral regions simultaneously. The response of each region is partially independent and can help differentiate vegetal formations. Three indices are used to enhance the behavior of each spectral region: a vegetation index as NDVI for the near infrared, a Humidity Index - SWIR/NIR - for the short waves infrared and a new Leaf Pigment Index - $(\text{blue} + \text{red}) / \text{green}$ - to define the behavior induced by Carotene and Chlorophyll a and b. A Principal Component Analysis is performed on these three indices and spectral bands used, in this case TM bands 1 to 5. The choice of Principal Components (PCs) to compose a color composition is made after the eigenvector matrix. The PCs with higher correlation with the indices concentrates the most of vegetation information and the generic vegetal anomalous responses are strongly enhanced in these PCs. The methodology, thus, does not aim at enhancing a specific behavior, but the generic deviations of spectral behavior, due to alterations of leaf pigments, structure or water content or in the vegetal assemblage.