

# Vegetation regrowth detection after a forest fire in South Portugal using SPOT data.

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## Abstract

Vegetation cover estimation after a forest fire is becoming a crucial topic in the post-fire management of a burnt area. The evolution and changes of a burnt area can be addressed by estimating how the vegetation cover changes through time. Remote sensed data has proved to be useful for this task, and the approaches to do so are evolving. This article presents the evaluation of the performance of SPOT 5 in retrieving vegetation cover from an area burnt during the summer of 2003 in south Portugal (Herdade de Parra). Spectral Mixture Analysis (SMA), Spectral Angle Mapper (SAM) and the SWIR/NIR vegetation index are used in this project. SMA extracts the abundances of endmembers at a sub-pixel scale. It assumes that the pixel reflectance is a linear mixture of the endmembers multiplied by their fractional abundance. SAM determines the similarity between two spectra by calculating the “spectral angle” between them, treating them as vectors in a space with dimensionality equal to the number of bands. Due to the spectral resolution of this sensor, only 5 endmembers were extracted by means of the Minimum Noise Fraction and Pixel Purity Index techniques. Visualization of the data and selection of the endmember pixels was done through the n-D visualizer, which allows the construction of scattergrams with more than 3 dimensions. The SWIR/NIR ratio (also referred to as the Moisture Stress Index –MSI-) has been widely used to detect forest cover changes. An increase of vegetation over a burned area is related to an increase of moisture in the area. SWIR is influenced by the moisture content, while NIR region is relatively unaffected by it, thus the ratio between them reflects moisture changes. For each technique applied, changes in vegetation cover were detected in order to study post-fire regeneration. Field work was performed contemporary to the satellite image acquisition in order to thoroughly test the accuracy of the results.

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