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Correlation scaling properties between soil moisture and vegetation indices

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The distribution and crop phenology are largely associated with climate, terrain characteristics and human activity. Remote sensing data provide the opportunity to monitor crop dynamics and its changes. The images of earth surface obtained by satellites with a high resolution give huge information on these being the main characteristic of these images a high local variability in their digital values. Traditional segmentation techniques for image analysis are many times non useful when such complexity is found in the images.

The images of Guadalajara (Central Spain), which correspond to an area of 250x250 km, have been studied. Normalized difference of vegetation index (NDVI) and soil humidity (NDSI) values which had been extracted with a resolution of 512x512 pixels for this area at March and June of 2006 were analyzed using multifractal analysis (MFA). The MFA gives a new representation of two images at different times, which allows the analysis of the vegetation scenario using different parameters from the multifractal spectrum. The scaling properties of the correlation between soil humidity and vegetation index at two different moments are discussed and compared. This approach could be a powerful way to monitor various dynamic parameters of the vegetation in Central Spain.