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## Multifractal Characterization of Multispectrum Satellite Images.

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The images of earth surface obtained by satellites with a high resolution give much more information and new techniques are needed for their analysis. The main characteristic of these images is the high local variability in their digital values. This variability is a consequence of the increase in spatial and radiometric resolution that implies an increase in complexity that it is necessary to characterize. Traditional segmentation techniques for image analysis are non useful when such complexity is found in the images.

In this present work the multifractal (MF) behavior of multispectral images obtained by IKONOS-2 and LANDSAT-7 are analyzed. Both satellites have four bands (spectral region) to observe earth surface, between 0.45 μm and 0.9 μm, but with different spatial resolution (4 m with Ikonos and 30 m with Landsat) and radiometric (11 bits and 8 bits respectively). For each common band the MF spectrum has been calculated following Chhabra-Jensen method. This method allows to determinate the MF spectrum directly, obtaining the Hölder exponents (α) and the singularities spectrum f(α).

The MF spectra and the generalized dimensions (Dq) of both images, for each band, have been compared. This comparison tries to characterize the information captured in function of the wavelength that the surface earth has been observed. Finally, a similar comparison has been made to study the influence of spatial and radiometric resolution on the MF spectra obtained.