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Influence of spatial and radiometric resolution of satellite images in scaling/multiscaling behavior.

C. Alonso (1), A.M. Tarquis (2,3), R.M. Benito(4) and I. Zúñiga(5)

(1) Remote Sensing Department, Indra Espacio S.A., Madrid, Spain. (2)Dept. of Applied Mathematics to Agriculture Engineering, E.T.S.I.A., Universidad Politécnica de Madrid, Madrid, Spain. (3) CEIGRAM - UPM, Madrid, Spain. (4) Dept. of Physics and Mechanics, E.T.S.I.A., U.P.M, Madrid, Spain. (5) Fundamental Physics Dept., Facultad de Ciencias, U.N.E.D., Madrid, Spain. (calonso@indra.es)

One of the sources of information on the dynamic processes in the Earth surface and atmosphere is the data provided by the Earth Observation satellites. The images provided by the satellites show the Earth in a wide range of wavelength (from the visible to the thermal infrared or the microwaves) and with a great variety of spatial resolutions (from few kilometres until less than a meter). These images of Earth surface obtained by satellites with a high resolution give much more information and its analysis is a challenging problem that requires new algorithms and methods. The main characteristic of theses images is the high local variability in the digital values registered by the sensor. The increase in spatial and/or radiometric resolution implies an increase in the complexity of the image that it is necessary to analyze. Traditional segmentation techniques for image analysis are non useful for these cases. In the present work the multifractal (MF) behaviour of multi-spectral images obtained by IKONOS-2 and LANDSAT-7 are analyzed. Both satellites have several bands (in visible and near-infrared spectral regions) in common to observe earth surface but with different spatial resolution, 4 m with IKONOS and 30 m with LANDSAT, and radiometric resolution, 11 bits and 8 bits respectively. For each common band the MF spectrum has been calculated to determinate directly the Hölder exponents (alfa) and the singularities spectrum (f(alfa)) from box-counting algorithm. We have observed that multifractal behaviour of the information contained in each one of the four analyzed bands is influenced by spatial (pixel size) and radiometric (number of bits coding the im-

age) resolution. Meanwhile spatial resolution has a similar effect in the four bands; radiometric resolution has a bigger influence in blue and green bands than in red and infrared bands.