



Spatial characterization of El Pardo landscape using Detrended Fluctuation analysis

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The interactions among abiotic, biotic, and anthropic factors and their influence at different scales create a complex dynamic in landscape evolution. Scaling and multifractal analysis has the potential to characterize the landscape in terms of the statistical signature of the measure selected, in this case altitude. The study zone is a matrix of 2053 x 2053 pixels, with a resolution of 5m (25 m² by pixel), obtained from a digital terrain model (DTM) using the latest informatics tools. This zone corresponds to homogeneous region with respect to soil characteristics and climatology but with topographic distinctive areas, known as “Monte de El Pardo”. We found that the fluctuation statistics at different scales revealed a non-Gaussian character in the data.

Generalized Hurst dimensions were calculated on several transects crossing the area studied exhibit multifractality in all of them within a certain range. Analysis of the directionality by means of a Generalized Hurst rose plot showed differences in scaling characteristics along river and reservoir direction and across it. The results show a growth of persistent behavior in all the directions and a clear anisotropy to be considered in bi-dimensional detrended fluctuation analysis.