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# Empirical meaning of DTM multifractal parameters in the precipitation context

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The main objective of this research is to interpret the multifractal parameters in the case of precipitation series from an empirical approach. In order to do so nineteen precipitation series were generated with a daily precipitation simulator derived from year and month estimations and considering the classical statistics, used commonly in hydrology studies, from actual data of four Spanish rain gauges located in a gradient from NW to SE.

For all generated series the multifractal parameters were estimated following the technique DTM (Double Trace Moments) developed by *Lavalle et al. (1993*) and the variations produced considered. The results show the following conclusions:

1. The intermittency, $C_1$, increases when precipitation is concentrating for fewer days, making it more variable, or when increasing its concentration on maximum monthly precipitation days, while it is not affected due to the modification in the variability in the number of days rained.

2. Multifractility, $\alpha$, increases with the number of rainy days and the variability of the precipitation, yearly as well as monthly, as well as with the concentration of precipitation on the maximum monthly precipitation day.

3. The maximum probable singularity, $\gamma_s$, increases with the concentration of rain on the day of the maximum monthly precipitation and the variability in yearly and monthly level.

4. The non-conservative degree, $H$, depends on the number of rainy days that appear on the series and secondly on the general variability of the rain.

**References**

Lavallée D., S. Lovejoy, D. Schertzer and P. Ladoy, 1993. Nonlinear variability and landscape topography: analysis and simulation. In: Fractals in Geography (N. Lam and L. De Cola, Eds.) Prentice Hall, Englewood Cliffs, 158-192.