



Dealing with the rainfall intermittency: a multifractal analysis of weighed rainfall fields

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One of the main features of the rainfall field is its intermittency. Furthermore, a rainfall data set generally contains a great percentage of zero values. In order to investigate their influence on a multifractal analysis, we have used two data sets corresponding to a heavy rainfall event in the south of France. Both of them, rainfall output of simulations performed with the help of the Meso-NH model (Meteo-France/CNRM and Laboratoire d'Aérodologie, Toulouse, France) and radar data, were first analyzed by the usual multifractal methods. While both have exhibited the same qualitative scaling behaviour, the estimates of the parameters were rather different. A deeper analysis of the results has showed that the percentage of zero values of the rainfall might greatly influence the estimates of multifractal parameters.

The multifractal analysis basically consists in estimating different statistical moments at various scales. We proposed a new technique to evaluate the influence of the rainfall zeroes on multifractal estimates that is based on the use of weighted moments instead of the usual ones. The weight attributed to a pixel (or time step) at a larger scale depends on the percentage of zero values of the corresponding smaller scale pixels. In particular, this would reduce the influence of the pixels that have only zero values. Such weighted rainfall analysis was also performed on both data sets, the Méso-NH simulation and the radar data, and yielded the same quantitative estimates for both data sets, furthermore on wider range of scale.