



Multifractal signature of the temporal structure of precipitation observed with hourly data

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The scaling structure present in many hydrological processes allows for a characterization of these processes over a range of scales, leaving behind the problem of artificial scale truncations and the discussion about the applicability of models beyond a certain scale (for which the model was developed in first place).

This work discusses results of scale invariant and multifractal analyses of the temporal structure of precipitation, using hourly point precipitation data from Portugal. The time span of the records is more than 40 years for some of the data sets. Empirical multifractal exponent functions describing the scaling statistical properties of the precipitation intensity over a range of scales are determined. The applicability to precipitation of a three-parameter multifractal model based on Lévy random variables is discussed. Results are leading to a better understanding of the precipitation variability and confirm that multifractal theory and techniques enable the convenient exploration of the invariance of properties across scales.