



## **Theoretical and empirical comparison of stochastic disaggregation and downscaling approaches for rainfall time series**

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High-resolution rainfall time series are usually crucial for many hydrological applications, but the majority of historical datasets available has daily resolution, which is often too coarse. Therefore, for the last three decades a large amount of literature has been dealing with the problem of generating rainfall sequences at the timescale of interest given the observed data at a lower resolution. In this work, we focus on existing downscaling and disaggregation approaches with two different structures: one characterized by power-law correlations which account for long-term persistence of rainfall (as in the fractional Gaussian noise or Hurst-Kolmogorov model) and the other characterized by a multifractal structure. The two approaches are analysed and compared in terms of their capability of reproducing the statistical behaviour of a high density (and high-resolution) raingauge network covering the urban area of Rome.