



Scaling and non-scaling methods for the downscaling and disaggregation of temporal rainfall

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Theoretical and observational descriptions of the temporal structure of rainfall as a function of the aggregation scale

are important both conceptually and operationally. For example, disaggregation and downscaling methods, which preserve large scale means exactly and in the ensemble mean respectively, require a detailed knowledge of how rainfall statistics change with the temporal scale.

Non-scaling scale relations, which imply a non-power-law

form of the second order moment, are reviewed and are applied to a wide data set representative of different rainfall regimes. Scaling approaches to downscaling and disaggregation are also explored, based on canonical and microcanonical cascades. Additionally, a 'hybrid' method, which uses a non-scaling method to estimate the second order moment at small scales to be imposed in the calibration of a cascade model, is also developed and implemented.

The scaling, non-scaling, and hybrid methods for disaggregation/downscaling are comparatively considered and applied to determine their relative merits and performance.