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An entropy approach for rainfall time series analysis

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The entropy theory was developed by Shannon (1948), and during the next years there has been a large application of entropy in hydrology and water resource. Recently, Koutsoyiannis showed how entropy can be used to explain and model hydrological phenomena, such as the observed dependence properties of the rainfall occurrence process, including the clustering behavior and persistence. In this paper an entropy approach is presented, in order to gain more information from available data. First of all an investigation of basic statistical properties (maximum and mean values, variances, skewness, probability and length of dry intervals, and dependence structure of rainfall) is performed for different time scales, ranging from 1 to 24 hours. Then, using the entropy concept, properties like proportion of dry intervals and rain amount are evaluated. The analysis are performed using a data set of 20 rain gauges from North Lazio Region, in Central Italy, for the years 1993-2008. In conclusion, a possible way to use informative entropy in disaggregation context is shown.