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Multisite stochastic model for rainfall simulation

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In the context of flood management , it is useful and reliable to provide scenarios by rainfall simulation, in order to overcome data limitations in terms of time and spatial resolution. This paper summarizes a methodology for a space-time simulation of hourly rainfall. The first step is to fit a generalized linear model (GLM) in order to generate daily rainfall at a network of rain gauges, preserving properties of the rainfall process (maximum and mean values, variances, skewness, probability and length of dry intervals, and dependence structure of rainfall). Next, using an entropy based method, the daily data of some rain gauges of the network are disaggregated to an hourly time scale. The hourly times series are used to guide the multisite disaggregation in other sites, preserving the daily totals . The methodology is tested using a data set from North Lazio Region, in Central Italy, for which a 40 rain gauges network is available at daily time scale (rainfall data recorded between 1980 and 2008 for almost all rain gauges) and hourly time scale (rainfall data recorded between 1993 and 2008 for an half of the network). The study concludes with a discussion of results, to evaluate , to evaluate the synthetic hourly records against historical rainfall data, in order to use simulated rainfall in a flood risk evaluation methodology .