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The role of uncertainty and accuracy of measured data in the assessment of climatological patterns from rainfall time series

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Detection, simulation and forecasting of rainfall process characteristics at high resolution - such as intermittency and fractional coverage - may results decisive for e.g. in the assessment of the flood producing potential of the observed and/or predicted precipitation scenarios at any larger scales. At the same time, obtaining suitable sets of rainfall estimates for climatologic purposes is made difficult by both the scarcity of long historical time series and the lack of homogeneity of data recorded in each time series. The main objective of this work is the development of a suitable "a posteriori" correction procedure to be applied to historical time-series, in order to assess the influence of measurement errors on climatological trends and extreme value statistics. Most part of long rainfall series (longer than 100 years) have been recorded at low resolution in time (at best with daily resolution) so that the assessment of uncertainties must be performed by means of probabilistic procedures. We developed two distinct stochastic procedures based on both disaggregation and simulation techniques and we compared their performances by applying the two procedures to the same data set. We also investigated the influence of resolution and extension in time of the considered time series on the effectiveness of climatological surveys and on the correction procedures themselves.