How to interpolate and simulate precipitation in space and time?

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Interpolation and simulation of precipitation is a challenge for stochastic hydrology. Besides finding the possibly most accurate interpolation the uncertainty of the estimation is also of large importance. There are a large number of different methods available both for interpolation and simulation. These methods are based on different assumptions on the underlying stochastic process. These assumptions can only be partly tested. In this contribution the assumption of Gaussian dependence in space and time is discussed. Using binary coding it is shown that both the daily and the hourly time scales precipitation shows a non-Gaussian dependence. The other focus of this contribution is the treatment of zeros – the finer the temporal resolution the more precipitation data become zero inflated. The influence of zeros on the dependence is very strong and can lead to unreasonable results. Different alternatives to treat zeros are discussed. Examples from radar observations and large sets of gauge observations from Germany illustrate the methodologies.