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Progress in single-site Poisson-cluster modelling of rainfall

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The Bartlett-Lewis or Neyman-Scott point processes have been used extensively in conjunction with rectangular pulses of random intensity and duration for the generation of realistic rainfall sequences. The paper focuses upon the fact that such rectangular pulses are however not suitable for the reproduction of sub-hourly features of the precipitation signal. By replacing this coarse representation by another Poisson process generating instantaneous pulses, we obtain a three-tiered model. The model has been tested on one data set from New Zealand. We find that it reproduces the main features of the rainfall signal at time-scales from 5 minutes to 24 hours, namely the variance, skewness, proportion of rainfall over small thresholds, and distribution of extreme values.