

## ***Interactive comment on “Regionalizing non-parametric precipitation amount models on different temporal scales” by Tobias Mosthaf and András Bárdossy***

**Anonymous Referee #1**

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General comments:

The authors analyse fitting and regionalisation of parametric and non-parametric distributions for precipitation amounts considering temporal discretisations from 1 hour to 1 month. The topic is highly relevant for stochastic precipitation modelling for unobserved locations and subsequent hydrological applications like derived flood frequency analysis in mesoscale catchments.

The interpolation scheme for non-parametric distributions using control quantiles is novel. The results show that non-parametric distributions are beneficial for the short hourly time steps and that the non-parametric interpolation is working well and quite robust. Regarding parametric interpolation, the use of moments instead of parameters

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seems better. In general, the utilisation of additional information from daily network is always beneficial.

The paper is well written and clear in structure. The conclusions are well supported by the analyses. However, some presentation issues mentioned below should be addressed in a revision before publication.

Detailed comments:

1. Page 2, lines 15-16: How is the interpolation of non-parametric distributions by Lall et al. (1996) done. This becomes not clear here.
2. Page 9, 10: The application of MLM and MOM for parameter estimation of distribution functions is well known. The authors may consider to remove this part with Eq. (18) to (22) and use just a reference here.
3. Page 10: Also, the estimation of the rank correlation is well known. This part with equations (23) to (25) may be removed here as well.
4. Page 12: How are the theoretical variograms fitted; which method is used; using least squares over the full range of distances? If yes, for the latter, why are close distances not given higher weights since they are more important for interpolations? Please give some more information, may be include an equation for fitting.
5. Page 14, lines 24ff: It becomes not fully clear how zero precipitation values are handled in the whole process. I thought they were excluded from the cdf's but now we have P0 again? This needs to be better explained.
6. Page 15, lines 11-20: This explanation becomes not clear to me. I thought daily amounts were disaggregated according to the closest hourly proportions on the daily sum from the closest recording station? So, in this explanation for instance what means “assign the rainfall values” (line 12); what means Eq. (36); at which step are the daily data disaggregated, etc? This part needs to be much better explained.

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7. Page 19: I would suggest to give some example variograms here. Also, compare and contrast the variogram parameters to the spatial persistence of T (Fig. 3).

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