

# ***Interactive comment on “Development and Evaluation of a Stochastic Daily Rainfall Model with Long Term Variability” by A. F. M. Kamal Chowdhury et al.***

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This paper deals with the development of a stochastic rainfall model based on Markov Chains, taking long term variability into account. Overall, this is an interesting paper that deserves to be published given that it takes into account some comments, as listed below. One major remark is that the paper could largely benefit from statistical tests demonstrating the significance of some results. Now, it is based on a visual appreciation. Although the latter is important as well, further strengthening these appraisals by statistical tests is recommended.

1. In the abstract, only the variability at large aggregation levels is mentioned, but maybe it would be good to also reflect on the quality at a daily resolution.

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2. Lines 49-51: a reference can be added to support this sentence.
3. Lines 57 to 62: maybe it would be good to expand a little on the alternative types of stochastic rainfall models. Now there's only a reference to Markov Chain models, while several other types of models, e.g. Neymann-Scott and Bartlett-Lewis models, are frequently used as well for this purpose.
4. Line 94: "... with modified Markov Chains" (plural)
5. Line 169: "This paper also used the ..."
6. Line 178: introduce that SD stands for standard deviation.
7. Lines 182-184: how are wet spells defined? How much time should be between two wet instants to separate two spells? (is one day sufficient?)
8. Lines 234-236: setting rainfall below 0.3 mm to 0.3 mm: doesn't this lead to a bias in the total amount of rainfall?
9. Lines 271 and 276: "For model according to ...": not phrased well.
10. Lines 326-333: explain all the variables that are introduced in formula 4. In the current list, it is not clear how these variables are calculated.
11. Lines 334-337: another alternative is mentioned: can this alternative get a name?
12. Section 6: in the comparison using distribution statistics, it would be interesting to also investigate the tail behaviour, as mainly the tails are important when these stochastic models are used in designing hydraulic structures or for water management.
13. Section 6.3 focusses on wet spells, but a similar section on dry spells would be interesting as well, especially, if this stochastic model would be used in the frame of water management in drought conditions.
14. Lines 402-403: "... that can match not only the short resolution (daily) variability, ...": this was not addressed in the paper.

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15. Line 417: “For the simulation” (add “the”)
16. Line 421: “For the mean” (add “the”)
17. Line 426: “At the monthly” (add “the”)
18. Line 463: “. . . MC parameters show a better . . .” (add “a”)
19. Line 519: “. . . was involved in scientific . . .” (add “in”)
20. Reference list: for some references, all words in the title are capitalized (e.g. Bardossy and Plate, 1992), while for others, this is not the case (e.g. Chowdhury et al, 2015): please make this consistent.
21. Figure 5: explain the blue colour in the caption or in a legend in the figure.
22. Figure 12: explain the blue colour in the caption or in a legend in the figure.

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