**Hydrology and
Earth System
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Discussions**

Interactive
Comment

Interactive comment on "Gains from modelling dependence of rainfall variables into a stochastic model: application of the copula approach at several sites" *by* P. Cantet and P. Arnaud

Anonymous Referee #2

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General comments

The manuscript presents an improvement in an existing hourly stochastic rainfall model by introducing a copula based model to represent the depth-duration dependence. The presented work can potentially make an interesting piece. However, the authors have not given clear details of their work and I find their evaluation approach not so strong. So, I believe that the authors need to rework the manuscript in view of providing more details and carrying out rigorous evaluation of their model.

Detailed comments

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Interactive Discussion

Discussion Paper

The authors have detailed the copula based modelling of the depth-duration relationship. However, I could not get how this model is incorporated in the stochastic rainfall model. The details given about the model do not show how the rainfall series are generated. It is only stated that the different descriptive variables that define an even are generated in 'a specific order'. Since this part is the essence of the paper, details of how the time series are generated and how the copula model is incorporated in the generation should be explicitly stated. Also, section 3 can be shortened and emphasis can be put on coupling of the two models.

The statement on page 11238, lines 5-7 is not clear. May be this becomes clearer if the authors present their modelling procedure in detail.

Page 11238, lines 20-21: Why are only the 'major storms' considered? What are the criteria used to distinguish between 'major' and 'ordinary' storms? If the introduced models deals only with part of the data, how can one preserve the statistical features of the entire timeseries?

Page 11240, lines 10-12: I am not sure whether I have understood the authors claim that their results are climatologically consistent. Also, I did not get how the results suggest what is stated in the last statement of this paragraph.

What is the L2-distance mentioned in the last paragraph of page 11240?

Page 11241, page 5: I think some details of the goodness-of -fit test that was implement in the work should be given.

Why is evaluation of the model performance carried out only on the extremes? The model is an hourly rainfall model and there are many features of precipitation at such scale that need to be properly simulated. The authors have not even evaluated whether the depth-duration relationship has been properly reproduced by the rainfall model. I think, it would only be fair if the authors extended their evaluation to assess their models ability to reproduce at least a few of the storm characteristics.

I could not understand what messages the authors are trying to get across in the statements on lines 15-19 on page 11243

Finally, I think the authors need to rework the language usage. I had difficulty at places to grasp what the authors try to mean.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 11227, 2012.