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# *Interactive comment on* "Generating spatial precipitation ensembles: impact of temporal correlation structure" *by* O. Rakovec et al.

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Received and published: 3 May 2012

The authors present an interesting investigation into the temporal error structure of spatial rainfall fields. They employ this error structure to generate consistent ensembles. Furthermore, they investigate the effects of temporal correlation on the error, which is of significant interest in hydrological settings.

MAJOR REMARKS The article is well written and fits well in the scope of the journal. Also, its scientific contribution is large enough. However, I do have a few significant comments

1) I am unclear why the authors chose to use such a simplistic rainfall cell, rather than

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use a (slightly) more realistic gaussian kernel design.

2) I feel that the real world experiment is discussed far too briefly. For example, certain comments are made about the real world semi-variogram, which is never shown. Also, how do the mentioned rainstorms look, and what statistics do they have (besides the autocorrelation). Although the authors refer to another study, some of this information should be repeated here, and study specific data should be shown.

3) The authors seem to implicitly extend many of the conclusions of the synthetic study to that of the real-life study. However, due to the simplistic nature of the synthetic experiment, I highly doubt that this is possible. Furthermore, solid comparison between the synthetic case and the real life case, e.g. through the semivariogram, is not made thus asking the reader to make a leap of faith. I would try to show that the two experiments are comparable,

4) The authors seem to investigate the effects of various conditions on the temporal correlation for synthetic experiments (see 3 and 1 as well) rather than building an ensemble generator. That is, as far as the building of a 'plausible ensemble precipitation generator', without validating this for real(istic) fields, and comparing it to 'unobserved' (as far as training is concerned) fields, I am skeptical about this. I would either include such a section, or consider repositioning the paper, or including a validation on real(istic) data.

5) As a semi-major remark, I would include a diagram or very clear and concise description of the experimental setup. These papers can be incredibly hard to read, and I think that having such a figure or list to hold on to when reading the results/conclusions would dramatically improve readability.

I gather that the authors create a synthetic rainfall field, and then 'measure' it with rain gauges. Based on these gauges, the semivariograms (in space-time) are determined and an ensemble is generated with conditional simulation based on both temporal and spatial variograms. These fields are then statistically compared with the 'true' fields,

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and the efficacy of the method observed.

If that is correct, I have another remark:

6) How do the authors condition on previous fields? Nowhere do I see a temporal/spatial semivariogram, and if the shown semivariograms are already conditional on the previous fields, nowhere is it shown how this influences the shape.

TECHNICAL REMARKS

The authors refer to a 'plausible precipitation ensemble generator', they should elaborate on what this entails.

The authors consistently refer to the raincells as spherical, however, they are circular (as they are 2D) or, more technically, disk-shaped.

I assume that the variograms are fitted using the gstat package, this should be acknowledged.

Figure 2 appears to be somewhat useless. The authors should either use it, or remove it.

The interpretation and use of Figure 9 isn't completely clear to me. In the paper, it apparently corroborates various findings, but I am not entirely sure how.

As a final remark, I find the paper very interesting indeed. However, it appears to lack a clear goal to which all experiments and questions are geared. This makes it hard to read, and difficult to really get a handle on. If the authors have questions regarding my review, feel free to contact me at: Martinus.vandenBerg@Ugent.be

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 3087, 2012.