

Review of the revised version of the manuscript HESS-2016-17:
“Areal rainfall estimation using moving cars - computer
experiments including hydrological modeling”
by E. Rabiei, U. Haberlandt, M. Sester, D. Fitzner, M. Waliner

Recommendation

I have to say that I am a bit disappointed by the revised version of this manuscript, in the sense that the authors did not properly address some of the important questions and issues raised by the two reviewers. I further elaborate on this issue in the next section.

I do not think the manuscript is suitable for publication in HESS as is, and in my view major revisions are still needed to reach the required quality.

General comments

1. I will not argue on vocabulary, but in some part of the text, the use of “rainfall estimation” is confusing in my opinion. Not a major issue though...
2. I understand that the authors do not want to address the issue of rainfall intermittency, but at least this should be mentioned in the text. Again, this could be a significant source of uncertainty in areal rain-rate estimation when working at relatively high temporal resolution like 5 min. In particular, the authors do not explain how they treat 0 in rain rate values.
3. Same here: it is not sufficient to say that other studies do the same mistake by applying kriging to non-Gaussian data to wave out the issue. In addition, the authors did not address the other part of my comment concerning stationarity and the treatment of possible negative rain-rate values. Stationarity is a crucial assumption for kriging and it is not even mentioned in the paper... By not separating the occurrence and the quantity of rainfall in the interpolation, there is a risk to generate negative values of rain rate. How this issue is addressed is not mentioned either.
4. It seems the authors missed the point of my questions about continuous simulation. If I am getting it correct, they continuously simulate 4-5 years of rain rate and the corresponding discharge over different catchments. If so, the time series of areal rain rate and discharge values will be dominated by 0 and low values respectively. Such dominance may affect the estimated comparison criteria and bias the interpretation conducted on these results (i.e. fig.6 and 7). This was my question in the first round of review...

Specific comments

1. P.5, l.24: “proposed to use...” instead of “proposed using...”.

2. P.6, l.24-25: the added sentence explaining how the sensor is working reads strange (e.g., bounce, escape...).
3. P.7, l.7-8: “Considering Eq.4 does not...”: the sentence is incomplete or incorrect.
4. P.7, l.17: obtained instead of estimated.
5. P.13, l.15: preventing the derivation (just a suggestion) but estimation is not relevant here.
6. P.20, l.4: “and that we did not take into...”.
7. P.20, l.23: rainfall spatial variability.
8. P.21, l.3: the underestimation likely results from the non-Gaussianity of the rain rate, as kriging is an unbiased estimator when the required assumptions are met.