

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
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## Comment on hess-2021-105

Anonymous Referee #1

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Referee comment on "A climatological benchmark for operational radar rainfall bias reduction" by Ruben Imhoff et al., Hydrol. Earth Syst. Sci. Discuss.,  
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The paper introduces the new CARROTS method to adjust radar QPE with climate factors derived from ten years of radar data. The resulting product is compared to an operational as well as reference QPE of the Netherlands in terms of precipitation input to selected catchments as well as discharge measurements. The manuscript is well written and structured. The method is introduced, applied, validated and critically discussed. Relevant conclusions are drawn and the authors give proper credit to related work. Overall, I propose some but still minor revisions. Text-related comments are given directly in the attached pdf. More general comments, questions, and ideas to be discussed in the paper or interactive discussion are given below.

- Do you think, MFB could be improved by dividing the NL into spatial segments (like the classical moving window) or even depending on the distance to the radar, or is the density of automatic stations too low? (The argument that MFB is limited to one factor for a whole country does not hold in general.)
- Does the RA adjustment eliminate spatial dependencies of the resulting QPE? To be more precise: Is the quality of RA depending on the distance to the radar site? And if so - would CARROTS allow for the derivation of an improved adjustment procedure?
- What's the effect of temporally present spikes (positive and negative) in the historical data set?
- I propose to add a figure showing the pixel-based differences between MFB and RA as well as RC and RA on a 5-min-basis, e.g. box-whisker (NL mean or catchments) and map with median and percentiles. This would help understanding the effects on discharges in different regions.
- What is the performance in heavy rain situations? Despite mean numbers, please comment on the effects.
- Could a dbz-dependent factor improve CARROTS?

Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2021-105/hess-2021-105-RC1-supplement.pdf>