

# ***Interactive comment on “At-site and regional frequency analysis of extreme precipitation from radar-based estimates” by Edouard Goudenhoofd et al.***

## **Anonymous Referee #3**

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### General comments:

The authors apply local and regional frequency analysis (RFA) for extreme rainfall on two radar data products (advanced QPE and basic CAP) for Belgium and compare the results with station based extreme value statistics. They find that the basic radar product shows unrealistic high extremes, the 24h extremes need bias correction and that the fit of the QPE probability distribution is within the confidence interval of the point distribution. The results for RFA are more complex.

The topic of the paper is very important and of high relevance for the community. The results are interesting. However, the description of methodology is not clear enough

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to follow the procedures and understand all the results. This concerns especially the sampling strategy for RFA. Also the presentation of results could be more distinct. Details are given below. However, the research is worth of publication after the authors have the opportunity to make some revisions.

Detailed comments:

1. Abstract, lines 10-15: I cannot really understand these sentences: RFA within 20 km?, which region(s)?, rain gauge vs. automatic gauge?, which radar product?, etc.
2. Page 6, lines 23ff: It is not fully clear if the 10 highest gauge extremes or the 10 highest radar extremes are selected. In the abstract “rain gauges and collocated radar estimates” is mentioned, so I assume the highest gauge values with collocated radar data are used. This should be stated clearly here in the text as well. The rationale for this choice should also be discussed.
3. Page 7, lines 26ff: see comment 2
4. Page 8, section 4.1: The sampling for RFA is not clear to me. Do you do a separate RFA for each 20 km radius? How can you apply a minimum distance of 50 km to secure independence with a 20 km radius? If you apply RFA for each radar pixel and consider a minimum distance of e.g. 10 km, then the (collocated) sample is different for each estimate? What about the “index rainfall”? How did you regionalise it? etc.
5. Page 10, lines 11-12: “.. using a radius of 10 km (with a decorrelation distance of 50 km)” I don’t understand this.
6. Fig. 2-5: The many lines in in these figures are hardly to disentangle visually. I have not really a good idea what to do here, may be showing only two distributions with confidence limits or excluding the confidence limits of the radar data, or showing additionally bar plots with a comparison of selected quantiles, etc.?

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