Interactive comment on "At-site and regional frequency analysis of extreme precipitation from radar-based estimates" *by* Edouard Goudenhoofdt et al.

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Thank you for considering our response and your additional comments on the revised manuscript.

Temporal Declustering

Choosing 3 days instead of 12 hours for the temporal lag removes rank 30 (radar) and rank 14 (gauge) at station Humain ; it removes rank 27 (gauge) at station Uccle. This changes very slightly the scale parameter but only for the gauge : from 7.5 to 7.6 and

from 6.8 to 6.9, respectively. Using 6 hours instead of 12 hours does not change the extremes up to rank 30 for the radar and the gauge at the two stations.

Radar and gauge comparison

The text has been clarified as followed : "Since the level of missingness is limited, the impact on the statistics is expected to be small".

Return levels maps

There is indeed an impact of the circle from the RFA but it is relatively limited in most of the study area. Since this is mainly due to radar artifacts we don't consider it as a drawback of the proposed RFA method. The discussion has been improved as follows : "Circular patterns appear on the maps due to the influence of the pixels located at their centers. The high values are caused by pixels contaminated by non-meteorological echoes (e.g. at the German border) and hail. A stronger filter for non-meteorological echoes is not used because it could remove actual precipitation information. The circular effect might be reduced by using a larger radius or a higher threshold rank but this is computationally expensive." The RFA has been limited to 1 hour extremes in this paper since it has the best potential for radar data. Extending the approach to other durations is interesting for future research.

Other comments

1. Done.

2. Done.

3. Done.

4. We do not refer to radar and gauge merging. We mean a quality similar to our datasets : reanalysed and verified radar-based QPE (with or without gauge merging) and as reference 10 min quality-controlled rain gauge data with 40 years of records.

5. Since the GPD has one more parameter than the EXP, it will react more to individual errors in the data.

6. This has been corrected.

7. The reference has been dropped.

8. Due to the significantly higher reflectivity of hail, the averaged value from a large sample volume should still exceed the hail threshold of 55 dBZ. The probability of very high reflectivity is believed to increase with altitude due to the dynamics of convective storms and hail processes.

9. The Conclusions have been organised in two sections : "Results" and "Prospects". We think it is relevant to combine the methodological information and the results in the Conclusions.