Review of the manuscript "The Dutch real-time gauge-adjusted radar precipitation product" submitted to ESSD.

This manuscript describes in detail the new precipitation product over the Netherlands and surrounding areas. It compares its performance to the previous version of the product by analyzing statistics over a full year (the last year of the former product, and the first year of the renewed product).

The manuscript is well written and mostly well explained. The dataset it describes is of great utility for many applications.

I have a few remarks about the radar data quality and the radar rainfall retrieval, and some minor comments listed below.

I think it should be published in ESSD after addressing these points.

Major points:

1) Calibration of the radars is only mentioned in the discussion. Does this mean there is no prior calibration performed? Given that the radars used belong to multiple agencies, it is not clear if and how the calibration is performed.

2) I wonder why the rainfall retrieval does not make use of polarimetry. The polarimetry is used for the clutter identification, the attenuation correction but not for improving the actual retrievals. Z-R relationships have been shown to perform much worse than polarimetric retrievals (Specific differential phase or more recently specific attenuation, or even hybrid retrievals). See for example Chen et al .2021.

Chen, J., S. Trömel, A. Ryzhkov, and C. Simmer, 2021: Assessing the Benefits of Specific Attenuation for Quantitative Precipitation Estimation with a C-Band Radar Network. *J. Hydrometeor.*, **22**, 2617–2631, <u>https://doi.org/10.1175/JHM-D-20-0299.1</u>.

And why the choice of the Marshall-Palmer relationship? Is this relation the most adequate to this region?

3) Concerning the topic of beam blockage, why not include a quality index associated with it and reduce the weight in the pixels affected by it? And also why not mitigate the problem with polarimetry? Using phase based retrievals could improve the product where partial beam blockage is a problem. Seems like the tools were all there.

4) The gauge adjustments and the adjustment that is only performed the next hour, this was not clear to me. Maybe I misunderstood, but it is not logic to me to adjust radar rainfall with gauge measurements from another time interval.

Minor comments:

Lines 84-85: I think the part "except for the renewed radar product....." is related to the previous sentence and makes no sense here after mentioning the cause of the lower availability.

Line 153: Why only mention the weights for this case and not for the Dutch radars?

Lines 170-175: There seems to be a lot of repetition in this paragraph. Please rewrite in a more clear way.

Lines 175-176: Check this sentence I think it should be "NO attenuation correction is applied to voxels above…"

Line 182: If you are showing the relationship for Kv, why not show the equivalent relationship for Kh?

Lines 611-612: I am a bit confused here. Should it maybe be "higher than 6" instead of "fewer than 6"?

Section 4, when the performance scores are presented: Could the authors justify the reason these scores were chosen instead of more commonly used scores like RMSE, MAE?

Lines 285-286: "Clutter for the land surface seems less of an issue for the old radar product, and even less so for the renewed radar product" I don't think this statement is accurate. Over the NL the problem seems worse.

Line 292: Suggest changing "will be" to "could be".

Line 303: Could the authors try to explain such a severe underestimation to the east of the Essen radar in figure 4 a)? There is absolutely no rain (blank in the figure) but RG measures values > 1000 mm? And this is so close to the Essen radar, what is happening here?

Lines 324-325: This sentence is not very clear, please rewrite: "The underestimation for true precipitation events in the old radar product is expected to be larger, because of compensation by clutter leading to overall less underestimation"

Section 4.5 To better understand this section it would be nice to include a discussion on the spatial variability of the indexes and the quality.

Line 349: "German Weather Service has already corrected their radar data for attenuation, so it has been corrected for attenuation twice"

This doesn't make any sense, why would you correct twice for attenuation? Obviously this will introduce errors.

Line 350: Suggest changing "As for" to "Similar to"

Section 4.6: What is the conclusion from these results? Comment on the performances for each thresholds for both products.

Line 395: Suggest changing to "may be the best option".

Line 411: applied instead of applies.

Line 476: What is "Agile"?

Figure 1: The colored points in b and c are very difficult to see, this figure needs to be enlarged.

Figure 4: Mention what the red crosses are in the legend.