

## ***Interactive comment on* “Evaluation of radar-gauge merging methods for quantitative precipitation estimates” by E. Goudenhoofd and L. Delobbe**

### **Anonymous Referee #5**

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#### General Comments

This paper presents a study comparing different methods of enhancing daily radar quantitative precipitation estimates (QPE) using raingauge data. Though the methods considered are not new, their application to a large data set (3 years) and the inclusion in the analysis of aspects such as raingauge network density or seasonality performance make of this work a very valuable contribution, particularly from the point of view of practitioners wishing to implement already existing methodologies. In my opinion this paper deserves publication after a few clarifications and minor corrections are

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done (please see specific and technical comments below).

### Specific Comments

1. Page 2979, line 2. Please specify antenna beam-width and the lowest antenna elevation angle used.
2. Page 2979, line 6. Why 1500-m pseudo CAPPI products are used? Is this the lowest CAPPI elevation available? Note that this may distort the range-dependence analysis done later which seems more consistent with a PPI product, where echo height increases systematically with distance. I think this should be briefly discussed.
3. Page 2980, lines 9-10. The choice of averaging a window of 9 x 9 pixels centred at the gauge location certainly requires clarification and a minimal discussion. Considering a general fuzzy approach for verification (in terms of Ebert, 2008) or, more specifically, wind-drift on surface radar QPE (Lack and Fox, 2007) could be mentioned in the discussion.
4. Page 2981, line 18. What does the acronym SRD mean? Perhaps "Static Range-Dependent" correction? Please clarify.
5. Page 2985, line 3. To avoid misunderstandings I suggest including the formula of the RMSF, as has been done for RMSE and MAE earlier. Note that in other studies (such as in Gjertsen et al 2003, mentioned in your paper), this term is used for different quantities.
6. Page 2986, section 4.3. The final statement in the seasonal analysis, should it be understood in terms of higher variability of convective rainfall, which seems predominant in summer in the region of study? I suggest explaining this a bit more - I think that trying to be more specific with the phenomena involved (convective precipitation), instead of the season where they take place, allows interpreting the results in more general terms, adding value to the analysis.
7. Page 2987, section 4.4. Did the authors check seasonal range-dependence varia-

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tions? For example, the bright band effect mentioned in the text? This aspect could be briefly expanded as may be important in regions with very marked seasonal precipitation differences. For example Bech et al. (2007) found clear different range-dependencies when examining blockage corrections in Scandinavia.

8. Figure 8. Is the last class ">100 km" or "100-120 km"? Please clarify.

## Technical Comments

9. Page 2976, line 6. Typo: geostatitcal -> geostatistical

10. Page 2977, line 2. Suggest: Radar -> Weather radar

11. Page 2977, line 19. Please clarify year of reference "Pereira et al.": 1998 or 2003? [Check reference list].

12. Page 2978, line 9. Borga -> Borga et al.

13. Page 2978, line 16. rain gauges networks -> rain gauge networks

14. Page 2980, line 5. 600 x 600 m -> 600 x 600 square meters [or m2]

15. Figure 5 and Figure 6 labels. Suggest: db, DB -> dB [as in Table 1, Figure 2, etc.]

## REFERENCES

Ebert E.E., 2008: Fuzzy verification of high-resolution gridded forecasts: a review and proposed framework. *Meteorological Applications*, 15, 51-64

Bech J., U. Gjertsen, G. Haase, 2007: Modelling weather radar beam propagation and topographical blockage at northern high latitudes. *Quarterly Journal of the Royal Meteorological Society*, 133, 1191-1204

Lack S.A., N.I. Fox, 2007: An examination of the effect of wind-drift on radar-derived surface rainfall estimations. *Atmospheric Research* 85, 217-229

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