

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

### **Anonymous Referee #1**

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The authors summarize seven different methods (with different degrees of complexity) to merge radar and rain gauge data at the daily scale. This is an interesting study and I think that the paper should be published after moderate revision.

General comments:

- What is the spatial resolution of the radar data?
- Given a certain radar pixel size, why do you average the 9 radar pixels (pg. 2980, line 9)? Even though you are working at the daily scale, spatial sampling errors (e.g.,

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Villarini and Krajewski 2008) would increase. Please justify your choice or use a single pixel estimate.

- The study by Sun et al. (2000) showed that cokriging of radar and rain gauge data (over other merging techniques) significantly improves flood estimation. In a study like this, I think that cokring should be included.

- Can you say anything about the transferability of these results to other regions?

Specific comments:

- On pg. 2977, line 5: the references about radar-rainfall uncertainties are a bit dated. I would also add Germann et al. (2006) and Ciach et al. (2007).

- A paper dealing with hydrological applications of merged radar and rain gauge data was recently published (Cole and Moore 2008). It may be a good reference to add.

- On pg. 2978, line 16: it should be "rain gauge networks"; instead of "rain gauges networks."

- On pg. 2979, line 2: I am not sure what a "watchdog scan" is. Please explain in the text or remove.

- On pg. 2980, lines 18-19: the unconditional bias only corrects for an erroneous coefficient  $a$  in the Z-R relation. Please clarify in the text.

- On pg. 2983, line 20: please add that the variogram is assumed isotropic as well.

- On pg. 2986, last sentence: can your statement be explained by summer convection?

- When possible, add grids to the figures.

- Figure 1: could you add a DEM to the map to give the reader information about the topography of the area?

- Figure 5: why do you show the results for only 4 methods? Please add the other three.

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## References

Cole, S.J., and R.J. Moore, Hydrological modeling using raingauge- and radar-based estimators of areal rainfall, *Journal of Hydrology*, 358, 159-181, 2008.

Ciach, G.J., W.F. Krajewski, and G. Villarini, Product-error-driven uncertainty model for probabilistic precipitation estimation with NEXRAD data, *Journal of Hydrometeorology*, 8(6), 1325-1347, 2007.

Germann, U., G. Galli, M. Boscacci, and M. Bolliner, Radar precipitation measurement in a mountainous region, *Quarterly Journal of the Royal Meteorological Society*, 132(618), 1669-1692, 2006.

Sun, X., R.G. Mein, T.D. Keenan, and J.F. Elliott, Flood estimation using radar and raingauge data, *Journal of Hydrology*, 239, 4-18, 2000.

Villarini, G., and W.F. Krajewski, Empirically-based modeling of spatial sampling uncertainties associated with rainfall measurements by rain gauges, *Advances in Water Resources*, 31(7), 1015-1023, 2008.

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