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Hydrology and Earth System Sciences Discussions

Interactive comment on "Evaluation of radar-gauge merging methods for quantitative precipitation estimates" *by* E. Goudenhoofdt and L. Delobbe

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We would like to thank Geoff Pegram for his interest in our study and the very constructive questions and suggestions.

Responses to questions

The parameter k controls the degree of smoothing in the Brandes method. It is assumed constant over the whole network. This is valid because the spatial distribution of the network is relatively uniform especialy for sparser networks by construction. The parameter k is computed as a function of the mean density δ of the network, given by the number of gauges divided by the total area. A simple inverse relation has been

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chosen and adjusted to get an optimal k for the full network. The optimal k was estimated by trial and error based on the verification for the year 2006. The inverse relation is then used to determine k for the different network densities we have tested. We are aware that more advanced optimisation of this parameter could be investigated.

In the kriging method, we used only the 20 nearest stations. This allows reducing the computational cost with only little loss of accuracy. Indeed, the kriging coefficients tend to decrease with the distance and become negative after the 10th coefficient on average. This is probably related to a shielding effect as suggested by the reviewer. For the sake of consistency, the same value was used when studying the effect of the network density. For the relatively sparse network of 20 gauges, the kriging coefficients tend to be negative after the 5th coefficient. Verification for the year 2006 reveals that the mean absolute error is 1.8394 mm when using 20 gauges and 1.8383 mm when using 60 gauges, which is hardly better. This result further legitimates the choice of using a limited number of stations.

The application of a static local bias correction to the radar data before all the methods have been considered. A positive effect has been noticed but the improvement was smaller when applied before the more sophisticated methods. The use of radar data without this correction has been prefered to allow a fair comparison between the different merging methods. Nevertheless we could recommend to apply a static local bias correction as a pre-treatment before any radar-gauge merging method.

The specific comments will be taken into account to prepare a revided version of the paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2975, 2008.

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