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Interactive
Comment

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

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Review of

Evaluation of radar-gauge merging methods for QPE

E. Goudenhoofd and L. Delobbe

This thorough, practical, well thought out and dispassionately executed paper is a valuable contribution in the ongoing struggle to make radar as useful as its potential. Seven methods of estimating rainfall by interpolation at ungauged sites are compared over

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years, seasons, distance from radar and network density. The principal criterion used for comparison is mean absolute error, which is relatively insensitive to outliers. The technique of decimation of the network was skillfully and intelligently done, preserving the convex hull and balancing distances. . It turns out that, as long as the network is dense enough for the information to be transferred over distance, Kriging with External Drift (KED), closely followed by Kriging with Radar-based Error correction (KRE) perform best overall. What is intriguing is that the Brandes/Barnes method (BRA, suggested over 30 years ago!) is a respectable third. The method that performs well over sparse networks is shown (by a small margin here) to be the method based on static corrections of local bias and range dependence (SRD in the paper).

I have some questions for the authors:

Would it make sense to optimize the parameter k in equation (3) as a function of the sparseness of the network rather than basing it arbitrarily on $2[\delta]$, even though that seems a sensible choice? Might this not improve the performance of this method relative to Kriging based methods, particularly for networks sparser than 1 gauge per 500 sq km, which is not a 'very low density' outside Europe?

The variogram used for Kriging was chosen as a linear one (essentially the method of Multiquadrics) but limited to 20 nearest neighbours. Was this number used even in the decimated network of 20 gauges? Did the authors check the signs of the Kriging coefficients? Was the shielding effect evident, in the sense that closer coefficients tend to be positive and those in the 'second rank' are sometimes negative?

Did the authors consider combining the 'static' method of SRD with the 'dynamic' Kriging-based methods, the first as pre-treatment and the second as adaptive treatment of the radar fields? Might this not make an improvement to the overall behaviour, enabling a methodology to give an improved estimate over a wider range of network densities?

These questions are not intended to detract from what I see is a very valuable contri-

bution, which should be published after the small corrections are made.

Small corrections:

2976:6 .. geostatistical .. : 24 Interest in quantitative .. 2977: 23 All kinds of .. 2978: 3 Cross-validation.. :15 One of the contributions of this paper is to determine the best .. density. :25 .. a posteriori analysis in the case .. 2985:15 .. compared to the difference between the original radar data and the gauge values (ORI).

[I think that is what you mean, but there is no other place where ORI is defined. You might consider substituting 'ORI' for 'original data' elsewhere in the paper where appropriate.]

2988: 8 .. network of 50 .. : .. lowest ..

Geoff Pegram 29 November 2008

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

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