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Hydrology and Earth System Sciences
Discussions

Interactive comment on "The use of personal weather station observation for improving precipitation estimation and interpolation" *by* András Bárdossy et al.

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We thank the anonymous referee for positive review and for the suggested corrections.

2. Figure 1: Red triangles are difficult see against brown elevations. Please consider changing colour, e.g. to black and bigger triangles

We will revise this figure accordingly, Reviewer 4 also has also recommended some changes

3. Lines 102-103: Why can multivariate methods like Co-Kriging not applied to random

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Discussion paper

fields?

This sentence will be corrected. The problem for applying Co-Kriging is that co-variograms cannot be calculated in a traditional way as there are no common observation locations between the primary and the secondary networks. We found an interesting reference (Clark et al. 1989) where a non-collocated version of Co-Kriging was presented. We applied this methodology to the filtered data. The results show significant improvements, but the combination of the transformation and the Ordinary Kriging leads to superior results.

4. Lines 146-147ff: The sentence with quantiles and percentiles first caused some confusion to me. After reading several times I understood that the term "quantiles" is used here for precipitation values with certain non-exceedance probabilities (Eq. 5), which is common. But the term "percentiles" is used here for the non-exceedance probabilities (Eq. 4), which is not always common. Often, it also refers to the quantiles which divide the distribution into 100 equal portions. In order to avoid confusion, I would suggest beside giving equation (4) also verbally to make clear that with percentiles the non-exceedance probability is referred to. Please, also make a comment on G(y) and F(x) if here empirical or theoretical distributions will be used.

We will address and clarify these issues in the revised manuscript

5. Equation (5,6): It becomes not immediately clear which x(i) locations are related the y(j) location. Please, explain in the text and make a reference to Appendix A here.

We checked the equations (5,6), the primary observation locations are x_i the secondary y_j. This is correct in the equations, but we'll add some text to better explain the procedure.

6. Line 160: The estimate for y at time t can be bigger the observation at this time but cannot be bigger than the maximum observation for all times t at x, if an empirical distribution for F(x) is used. Please comment.

The remark is correct. If one would use fitted theoretical distributions one could obtain *new record* values. The usefulness of this approach has to be tested. We'll add some discussions on this.

7. Line 205: Is there a reference available for KU?

Delhomme (1978), we'll add this reference.

11. Line 277: "There is no improvement..." From Table 3 I see improvement for the different time aggregations between 17% and 60% of the stations?

The 17 % means that in 17 % of the cases the estimation was better and in 83 % of the cases it was worse.

The other minor comments (1., 8., 9.,10.,12. and 13.) will all be considered in the revised version of the manuscript. Furthermore we will add the following references:

Clark, I., Basinger, K. L., and Harper, W. V., 1989, MUCK - a Novel Approach to Co-Kriging,in B. E. Buxton (Ed.), Proc. of the Conf. on Geostatistical, Sensitivity, and Uncertainty Methods for Ground-Water Flow and Radionuclide Transport Modeling: Battelle Press, p. 473–493.

Delhomme, J.: 1978, Kriging in the hydrosciences, Advances in Water Resources, 251–266,

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