

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

Anonymous Referee #3

Received and published: 2 March 2020

General comments:

The manuscript provides an interesting approach to error correct and incorporate information from personal weather stations into spatial interpolation of precipitation for different temporal resolutions. The methodology is clear and plausible. The manuscript is well written and concise. I have only some minor comments for improvement (see detailed comments).

Detailed comments:

1. Line 20: spelling error Netamto -> Netatmo

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2. Figure 1: Red triangles are difficult to see against brown elevations. Please consider changing colour, e.g. to black and bigger triangles
3. Lines 102-103: Why can multivariate methods like Co-Kriging not be applied to random fields?
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.
5. Equation (5,6): It becomes not immediately clear which $x(i)$ locations are related to the $y(j)$ location. Please, explain in the text and make a reference to Appendix A here.
6. Line 160: The estimate for y at time t can be bigger than 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.
7. Line 205: Is there a reference available for KU?
8. Table 1: The definition of p_0 is missing.
9. Lines 265ff: Please add interpolation methods OK or KU.
10. Line 272, Tables 3,4: I would suggest to name the errors “temporal error” and “spatial error” and repeat this in Tables 3 and 4. The terms temporal and spatial correlation in the tables might be misleading. These are correlations as performance measures to quantify the spatial and temporal errors.

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

12. Table 4: In the header I think it should read here “Percentage of time steps . . .” not of stations, if the correlation is calculated for each time step using all stations?

13. Figures 6-9: In order to be consistent with the terms “under- und overestimation” of the secondary data based interpolation in comparison to the primary data based interpolation (as it is used here e.g. in Lines 323 and 331) I would suggest to change the differences in d) to a)-b) and e) to c)-b).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-42>, 2020.

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