

Interactive comment on “Influence of rainfall observation network on model calibration and application” by A. Bárdossy and T. Das

Anonymous Referee #2

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General comments:

The paper is significant and of broad international interest. It is well written and clear in structure. The paper addresses the interesting question how well a hydrological model performs if for calibration and application phase different precipitation networks are used. The results show, that for different networks a re-calibration might be required, especially if the density of the network is reduced from the calibration to the validation phase. The authors also show, that missing values for the validation or application phase should be replaced e.g. by multiple regression to improve model performance compared to the pure application of the reduced network. The paper could be improved by adding some more information to the description of experiments, e.g. the optimal

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network selection procedure, the variogram fitting method, the calibration technique for HBV, etc. Since flood simulation is an important issue here and is often mentioned as application some discussion about the time discretisation problem (i.e. only daily data available but shorter time step required) would be desirable.

Specific comments:

1) p. 3696, line 16: How are optimal locations for the rain gauges defined? What is the objective function here for simulated annealing? The authors should give some more information here.

2) p. 3696, line 22: There is no information given about variogram estimation. Did the authors use an average variogram or single daily variograms, did they use an automatic fitting procedure or manual fitting, what theoretical variogram model was used, etc.?

3) p. 3697, line 4: It becomes not quite clear, how the “standard deviation of the interpolated precipitation” is calculated here. Is it the standard deviation of the estimated areal precipitation over time or the standard deviation of all observation points or of all interpolated raster cells in space averaged over some time?

4) p. 3698, line 17: Some more information about the automatic calibration method would be useful for the reader, e.g. number and ranges of calibration parameters, objective function for optimisation, parameter selection principle of simulated annealing, etc.

5) p. 3698, line 26: A daily time step is usually not appropriate for flood simulation and operational forecasting. The applied uniform disaggregation to 6 hourly values might improve the situation. However, there is too little discussion about the time discretisation problem here.

6) Table 5: Indicate if the model performances are related to calibration, validation or both periods.

7) p. 3705, line 23: What means “excluding the given event”? According to the descrip-

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tion above the coefficients have been estimated using data from the whole calibration period?

8) Table 6: The comparison in that table should show the improvement when multiple regression is applied to pre-estimate precipitation for some missing stations compared to the application of kriging based on the reduced network. For correct comparisons the 10 available stations for validation in the 20/10 experiment should be the same as the 10 stations with real observations for validation in the 20/20MulRgre experiment. Is that the case here? According to the description above (p. 3704, line 29) it seems the opposite way around?

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