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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Post processing rainfall forecasts from numerical weather prediction models for short term streamflow forecasting" *by* D. E. Robertson et al.

Anonymous Referee #1

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This paper describes an approach for post processing rainfall forecasts from NWP models. This approach combines a simplified version of the Bayesian joint probability modelling approach for calibrating the marginal distributions with the Schaake shuffle for modelling spatio-temporal correlations. Its effectiveness is demonstrated with forecasts from the ACCESS-R NWP model at rain gauge locations in the Ovens catchment in southern Australia. The method described in the paper is new, interesting and potentially useful also for other NWP systems and regions with possible limitations pointed out in the discussion. It is well written and, while not fully self-contained, comprehensible apart from a few paragraphs where some further clarification would

be desirable. Apart from one more severe concern regarding the forecast verification I have only minor comments and suggestions which are detailed below. If these points are addressed appropriately, the paper is suitable for publication in 'Hydrology and Earth System Sciences'.

p. 6766, l. 25: "forecasts" instead of "forecast"

p. 6769, l. 21: sth is missing after "post processed probabilistic"

section 3.1: I find it a bit confusing that initially the model is written as a multiple predictor, multiple predictand problem where also the correlations between the different predictands are modelled through R, while later only single predictands are modelled in that way and correlations between different predictands are modelled indirectly via the Schaake shuffle. Please make this point a bit clearer.

p. 6774, l. 13: isn't it rather "cumulative marginal distribution"?

section 3.3.1: In my opinion the comparison with the raw ensemble is unfair. While it is true that the CRPS reduces to the MAE in the case of a point forecast, it is not appropriate to use the CRPS to compare a probabilistic forecast with a point forecast. This results in an unfair comparison because it implicitly presumes that the deterministic NWP prediction was probabilistic with zero uncertainty (which is not true, it simply does not provide uncertainty information). A fair comparison should either involve only probabilistic forecasts and use the CRPS, or should involve only point forecasts and use the MAE. The latter can be achieved by taking the median of the probabilistic forecast as a point forecast.

section 3.3.4 and p. 6782, l. 7: the authors refer to "space time correlation structure" but I cannot quite see where the spatial aspect comes in. When the authors study cumulative totals, I understand that "cumulative" refers to lead time only. For space to play a role one I would expect that some accumulation over several observation sites is considered, but unless I have missed sth this is not what is being done here

section 4.2.4 and Fig. 10: I suggest that the reliability diagrams are enhanced with uncertainty information (confidence intervals) to give quantitative support for the statement that "there is considerable sampling uncertainty associated with the observed frequencies"

Fig. 2.: I think the word "space" is missing after "transformed and untransformed"

Fig. 6: Please define "percentage bias" in the text

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 6765, 2013.