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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Hydrological appraisal of operational weather radar rainfall estimates in the context of different modelling structures" *by* D. Zhu et al.

D. Zhu et al.

d.zhu@swansea.ac.uk

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Thank you very much for the comments. The corresponding reply are listed as follows:

1.The recommended references will be supplemented in the revised paper.

2.Reducing the errors indicated by R2 was the priority in model calibration, the other three indicators (MAE, RMSE, and R) were assisted to examine and reinsure the improvement of model performance. And the details of model calibration can be founded in Zhu and Cluckie (2012).

3.There are more delicate interpolation methods to average the raingauge rainfall over

catchment, such as Kriging. And it is interesting to compare the difference between using Kriging and Thiessen polygons. One of comprehensive studies on comparison of various raingauge interpolation methods can be referred to Goudenhoofdt and Delobbe (2009).

4.I agree that the raingauge measurements are point measurements and not able to represent the 'true' catchment averaged rainfall, which would possibly cause the error in the comparison. Therefore, further analysis and comments on the errors in radar-gaguge rainfall comparison will be provided in the revised paper, focusing on the source of errors.

5.The outflow of the small upstream catchment that Weirwood TBR located was controlled by the Weirwood reservoir, which certainly has a significant impact on this catchment by introducing storage and delay into the rainfall-runoff process. Without the operation rules, it was difficult to construct a hydrological model with a built-in reservoir at this scale. However, the daily compensation flow released from Weir Wood Reservoir dominated the baseflow discharge. Thus, it could be set as the boundary condition in the hydrodynamic model (MIKE 11) in order to maintain its influence on the baseflow but the reservoir itself, was excluded outside the model boundary.

6.The data of model calibration and validation data sets are in same annual period and the data quality are similar and verified beforehand.

7.The use of more advanced radar-gauge merging techniques such as kriging with external drift will definitely improve the rainfall estimation over the catchment and hydrological modelling. However, the complex techniques come with heavy computational cost, which will affect the efficiency of model during the flood forecasting. Moreover, the cost-benefit impact has to be evaluated before the method is applied. Again, it is very interesting to compare the different radar-gauge merging techniques, especially for the study of extreme weather impact. The related discussion has been included in author's another draft paper.

Reference

Goudenhoofdt, E., & Delobbe, L. (2009). Evaluation of radar-gauge merging methods for quantitative precipitation estimates. Hydrology and Earth System Sciences, 13(2), 195-203.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 10495, 2013.