HESSD

Interactive
comment

Interactive comment on "How good are hydrological models for gap-filling streamflow data?" *by* Yongqiang Zhang and David Post

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General comments

This study explores the efficiency of gap-filling of streamflow data by using simulations of a hydrologic model. The main objective is to evaluate the annual trends and annual variables obtained from gap-filled streamflow data using two hydrological models (GR4J and SIMHYD) in 217 catchments in Australia. The results show that when the missing rate of streamflow data is less than 10%, the gap-filled streamflow data from hydrological models perform very close to the benchmark data. Interestingly, the relative streamflow trend bias caused by the gap-filling is not very large even in very dry catchments where typically the hydrological model calibration is poor. Authors con-

clude that the gap filling using hydrological modelling has little impact on the estimation of annual streamflow and its trends in selected catchments in Australia.

Overall, the study is very clearly written, has a good structure and it is within the scope of HESS. The presentation of take home messages is very compact and clear. I have only one question which remained unanswered after reading the manuscript. What is the impact of patterns of missing data in terms of dominant hydrologic regime in the catchments? I expect that the large dataset in Australia covers catchments with different hydrological (seasonal) runoff regime. Are the missing data more-less evenly distributed thorough the year in all catchments or are there some seasonal patterns of gaps? What is the impact if majority of missing data are from the most/least important season (in terms of maximum monthly runoff)? I would expect that if the majority of e.g. 10% missing data are from seasons with minimum monthly runoff then the impact on annual mean or trend will be smaller and vice versa. Are there some differences between catchments with different seasonal regime? Some more discussion around it will be interesting.

Finally I would like to congratulate the authors for a very nice analysis. I enjoyed reading it.

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