

Interactive comment on “Hydrological evaluation of open-access precipitation data using SWAT at multiple temporal and spatial scales” by Jianzhuang Pang et al.

Anonymous Referee #1

Received and published: 24 March 2020

This paper uses two open-access precipitation products (CHIRPS and CPC) and a dataset from rain gauges to drive the SWAT hydrological model in the Jiang river watershed in China. All three precipitation datasets are shown to produce generally similar hydrological model performances, with the calibrated parameterisation reducing the effect of the identified differences in the precipitation datasets through changing hydrological processes. This is a potentially useful paper for the hydrological modelling community in that it highlights that an acceptable hydrological performance according to the commonly-used Moriasi et al (2007) criteria for the Nash Sutcliffe Efficiency metric does not mean that the hydrological processes are correctly simulated – but that it can indicate that the calibration process has merely been successful in altering the

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catchment hydrological processes to compensate for inadequacies in the input data. However, I have three main concerns with the current paper: 1) The paper fails to articulate the implications of its finding (that hydrological models can give very similar model performance, with differing process behaviour, with precipitation datasets with quite different characteristics) in either the Conclusions or the Abstract. For example, Remesan and Holman (2015) study cited by the authors showed that such ‘similar’ calibrated/validated models, when subsequently run using perturbed inputs (e.g. climate change scenario), can lead to different magnitudes and directions of hydrological change due to their differing parameterisation. The authors should consider how their findings can guide modellers in the use of these different precipitation datasets for the hydrological modelling of the current and future climate. 2) Given that the authors are simulating a 159,000km² catchment using a single flow gauge for calibration / validation, there is huge equifinality in their results. Given that they used the SUFI-2 / SWATCUP, I would have expected some assessment and discussion of the uncertainty in their model results 3) The paper provides three sets of SWAT output analyses – monthly, daily and daily aggregated to monthly. However, SWAT is a daily model so the monthly SWAT outputs are themselves an internal aggregation of its daily outputs; so the presentation and description of the daily aggregated to monthly outputs (L439-448 and Figures 12 and 13) are meaningless and should be removed.

Other minor comments L19 – change “All three products” to “Both OPPs” as the text is comparing to the gauge model L153 – is the evapotranspiration “actual”, “potential” or “reference”? L169-170 – how has the classification accuracy been determined, given that it was based on “manual visual interpretation”? L194 – how does a dataset (CHIRPS v2.0) released in 2015 provide data to the “present”? L237 – looking at equation (3), isn’t the optimal value of STD_n = 1 e.g. identical STDs? And why should STD_n values range from 0-1 which implies STD gauge can never be < STD_{opp}? General – RMSE, STD and PBIAS have units – please use them throughout L463 – “antecedent” is the more usual term for “early-stage” L483 – there are no ALPHA-BF parameter ranges given in Table 1 and 2 to substantiate this. The values of ALPHA_{BF} and

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GWRECH_DP should be added to the tables L486 – what is “proletarian” flow? L500 – equation 7 L560 – “streamflow photograph”? hydrograph?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-56>, 2020.