Corrigendum for

"Suitability of 17 rainfall and temperature gridded datasets for largescale hydrological modelling in West Africa" by Dembélé et al.

Author's report

In our paper HESS-2020-68 submitted to HESSD, we have realized an erroneous reporting of the objective function used for model calibration with streamflow data. Instead of using E_{KG} as currently reported in the manuscript, we used a combination of the Nash-Sutcliffe efficiency (Nash and Sutcliffe, 1970) of streamflow (E_{NS}) and the Nash-Sutcliffe efficiency of the logarithm of streamflow (E_{NSlog}), similarly to Dembélé et al. (2020). This setting has the advantage of identifying a parameter set that better predicts both high and low flows because E_{NS} is known to be very sensitive to high flows, while E_{NSlog} is a metric for low flows (Krause et al., 2005; Oudin et al., 2006; Pushpalatha et al., 2012).

Therefore, the current objective function (Eq.3) will be replaced by the following in the revised manuscript:

$$\Phi_Q = \frac{1}{g}\sum_1^g \sqrt{(1 - E_{NS})^2 + \left(1 - E_{NSlog}\right)^2}, \text{ with} \quad (3)$$

$$E_{NS} = 1 - \frac{\sum_1^t \left(Q_{mod}(t) - Q_{obs}(t)\right)^2}{\sum_1^t (Q_{obs}(t) - \overline{Q_{obs}})^2} \text{ and} \quad (4)$$

$$E_{NSlog} = 1 - \frac{\sum_1^t \left[\log\left(Q_{mod}(t)\right) - \log\left(Q_{obs}(t)\right)\right]^2}{\sum_1^t \left[\log\left(Q_{obs}(t)\right) - \overline{\log(Q_{obs})}\right]^2} \quad (5)$$

where Q_{mod} and Q_{obs} are the modelled and observed streamflow, t is the number of time steps of the calibration period, and g is the number of streamflow gauging stations present within the modelling domain.

These modifications do not affect the current results, rather they reinforce the analysis as we will report on the model performance for streamflow with multiple skill scores (i.e. E_{NS}, E_{NSlog} and E_{KG}). Consequently, we will additionally report on the model performance for streamflow using E_{NS} and E_{NSlog} in the revised manuscript. Changes will be made to Appendix A3, and Figure 3 will be modified as follows:

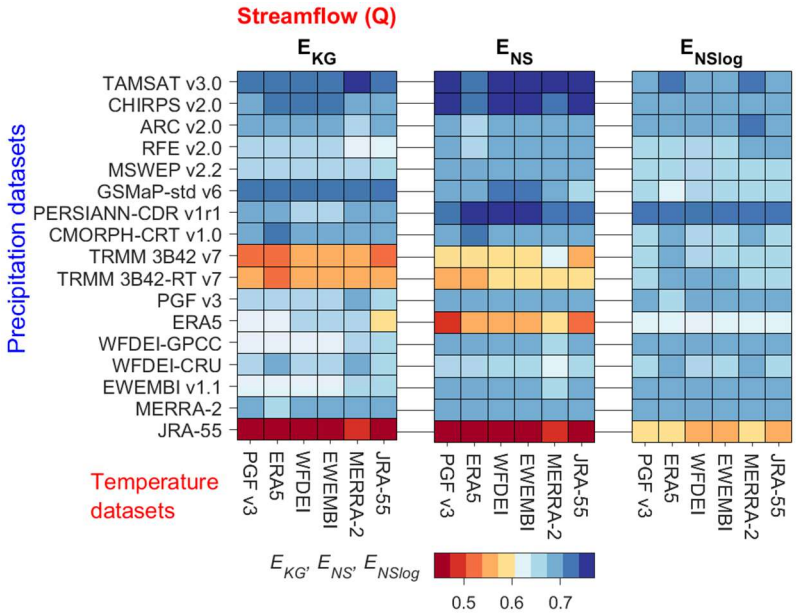

Figure 3. Median Kling-Gupta efficiency (E_{KG}), Nash-Sutcliffe efficiency (E_{NS}) and Nash-Sutcliffe efficiency of the logarithm (E_{NSlog}) of daily streamflow (Q) over the simulation period (2003-2012) for 102 combinations of 17 rainfall datasets (y-axis) and 6 temperature datasets (x-axis) used as forcing for the hydrological model.

Additional figures with detailed statistics and boxplots will be added to the supplementary materials.

References

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