

Geosci. Model Dev. Discuss., author comment AC2
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Reply on RC2

Luca Trotter et al.

Author comment on "Modular Assessment of Rainfall–Runoff Models Toolbox (MARRMoT) v2.1: an object-oriented implementation of 47 established hydrological models for improved speed and readability" by Luca Trotter et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-135-AC2>, 2022

Thank you very much for your comments and suggestions. We have uploaded a revised version of our manuscript to address them. In our responses below we outline how for each specific points in italics. Note that all line numbers in our response refer to the manuscript under discussion (old version), unless otherwise indicated.

Although I appreciate the quantitative comparison of v1.4 and v2.0 shown in Figure 2 it would be nice if there was an assessment of the conditions under which the largest differences occur (for example in m_34_flexis_12p_5s).

As mentioned in the manuscript under discussion (ll244-247), the largest differences occur in the models where the stores ODEs are solved differently between v1.4 (sequentially) and 2.0 (concurrently). We believe this is responsible for the largest discrepancies as it "may introduce errors in v1.4 that are not present when all stores are solved simultaneously in v2.0." (ll 246-247)

Section 3.1 - Although Knoben et al. (2020) details the calibration process used it would be helpful to summarize the process used in this paper.

Regarding the calibration process described by Knoben et al. (2020), we included some additional context Section 3.1 of the revised version. "The authors calibrated the models using the Covariance Matrix Adaptation Evolution Strategy (CMA-ES) algorithm (Hansen and Ostermeier, 1996; Hansen et al., 2003) to optimise the Kling-Gupta Efficiency (KGE, Gupta et al., 2009). The parameter values they found are available as supplementary material to Knoben et al. (2020)." (ll 231-234, revised version)

Line 300 - Add reference for "implementing adapting time-stepping schemes based on error estimates (ref)"

Finally, thanks for pointing out the lack of reference in line 300. We added a reference to (Clark and Kavetski, 2010) in the revised version of the manuscript (l 309, revised version).

References:

Knoben, W.J.M., Freer, J.E., Peel, M.C., Fowler, K.J.A., Woods, R.A., 2020. A Brief Analysis

of Conceptual Model Structure Uncertainty Using 36 Models and 559 Catchments. Water Resources Research 56, 1–23. <https://doi.org/10.1029/2019WR025975>

Clark, M.P., Kavetski, D., 2010. Ancient numerical daemons of conceptual hydrological modeling: 1. Fidelity and efficiency of time stepping schemes. *Water Resources Research* 46. <https://doi.org/10.1029/2009WR008894>