

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2022-16

Anonymous Referee #1

Referee comment on "Evaluating a reservoir parametrization in the vector-based global routing model mizuRoute (v2.0.1) for Earth system model coupling" by Inne Vanderkelen et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-16-RC1>, 2022

Vanderkelen et al. present an analysis of reservoir storage implementation in mizuRoute. The paper is very well written with excellent level of detail in method description and clear results. Results are unsurprising and lead to little in the way of new insight from a pure science perspective. The paper is therefore appropriately targeted to GMD rather than a research-oriented journal. I recommend publication if just a couple of relatively minor issues and omissions of recent data/literature can be addressed.

1. Just 26 sites are used to test the performances of the various model settings applied. This is far too few for a robust analysis of model performance. The authors will be interested in the recent data publication by Steyaert et al. (2022), which provides daily storage and flows for approximately 700 dams in the US - <https://www.nature.com/articles/s41597-022-01134-7>. Although these data are US centric, they will provide a far better sample for performance analysis.

2. Discussion on limitations of Hanasaki relative to natural lake method cover inflow bias, but don't venture into much detail on the possible limitations of the generic method itself. The authors may wish to support their analysis of "Hansaki" by drawing on the very recent findings of Turner et al. (2021), which compares Hanasaki (forced with observed flow) against observation-driven rules for hundreds of US reservoirs: <https://doi.org/10.1016/j.jhydrol.2021.126843>. Findings therein suggest significant limitations in the generic scheme, particularly in both storage representation, which may explain weak storage performances relative to natural lake shown in Figure 5.

Other comments:

- Consider strengthening the motivation in the introduction, particularly the final sentences (~L75 onwards) where you suggest the coupled approach "will enable to

investigate climate change impact on human water management..." As you note earlier, many hydrological models already account for water management and thus already enable impact studies. Therefore I suggest to expand on the importance of reservoir implementation in earth systems models specifically.

- Why just 1773 reservoirs at global scale? GRanD contains many more reservoirs than this.

- How are gridcells containing multiple reservoirs dealt with?