Comment on essd-2021-434
Dai Yamazaki (Referee)

Referee comment on "River network and hydro-geomorphology parametrization for global river routing modelling at 1/12° resolution" by Simon Munier and Bertrand Decharme, Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-434-RC2, 2022

Review

This manuscript describes about the new river network data for river routing models. The new data is developed using the latest river topography dataset MERIT Hydro, and its accuracy is assessed using various river-related datasets as well as model simulations using CTRIP. I think the manuscript contains adequate description as a data paper, and the estimated accuracy is promising. Given that the river network map is a widely used fundamental information in many hydrology and earth system science studies, I think the manuscript is worth publishing on ESSD, after minor corrections on a few ambiguous parts.

L68: some recent studies provide new upscaled river network based on MERIT-Hydro (see, e.g., Eilander et al., 2021), they do not necessarily follow a D8 convention, and they do not provide model parameters consistent with the new river network (such as sub-grid topography).

Please carefully review the paper Eilander et al., 2021. Their IHU method also generated D8 format river network, and it also provide some sub-grid topography info. Thus, some descriptions in this sentence is not correct.

L191: The automatic algorithm of MERIT-Hydro chose the outlet that flows into the Nelson River basin.

Development of MERIT Hydro was done with extensive quality assessment, and some input data such as water mask and elevations are modified to ensure realistic river network. Thus, it is not proper to say “Nelson river is chosen as mainstem by “automatic
algorithm”. Rather than that, the developer of MERIT Hydro decided that Nelson River to be the major outlet of the South Indian Lake, considering the existing diversion project.

L203 Fig. 8

Probably it is better to explain that how to treat Lake Hulun is the source of the difference. Lake Hulun is usually an inland lake without outlet, but it is connected to the Amur in flooding year. Whether to include Lake Hulun in Amur basin or not highly depends on the developer’s decision.

L204: This major difference can be neglected since it is within the arid region of the Arabian Peninsula.

This sentence is confusing, I assume the authors are discussing about the Amur basin, but why “Arabian Peninsula” is mentioned?

L328: we prefer here to focus on the routing part and capillary rise as well as floodplain evaporation deactivated.

It must be better to note that floodplain scheme affect river discharge and thus evaluation metrics is also affected. Therefore, there are some uncertainties in stating “increase in evaluation metrics mean river network quality is better”. This point must be discussed.

L406: impacted by the new parametrization

What the authors mean by “new parameterization”? Does this simply mean “new river network map” or does this mean “sub-grid topography parameters”? Please clarify.

L219: which impacts the generation of floodplains and aquifers sub-grid parametrization;
2. the use of observed-based river width for CTRIP-12D.

I assume floodplain scheme is deactivated for these simulations, so it is not reasonable to discuss its potential impacts on simulation here. Also, did ground water scheme considered in this test simulations? Please provide informations.