Comment on essd-2021-434
Anonymous Referee #4

Referee comment on "River network and hydro-geomorphological parameters at 1/12° resolution for global hydrological and climate studies" by Simon Munier and Bertrand Decharme, Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-434-RC4, 2022

Review of the ESSD paper on global river network and hydro-geomorphology parameterization for global river routing modeling at 1/12 resolution

This paper uses the DRT method to upscale MERIT-Hydro hydrography datasets to 1/12 degree, and used it for CTRIP streamflow simulations and compare it with a coarse resolution CTRIP run. While this work is very interesting and involves lots of work, I found it lacking sufficient justification to be published in ESSD, as this journal focused more on "data" instead of "model simulation". First, the 1/12 degree river network data and its hydro-geomorphology data seems to be specifically designed for CTRIP and I am wondering what is the wider use of this dataset for other models. Second, a larger portion of this study is on comparing two simulations of CTRIP runs, instead of focusing on the river network dataset. The authors seem to not have introduced new updates to DRT. So I cannot help asking what is their "data contribution"? It seems an existing method (DRT) was applied to an existing dataset (MERIT Hydro). To justify its publication in ESSD, I think authors will need to make more efforts to describe their contribution to data (instead of to model simulation). So I cannot recommend publish this paper unless these questions are sufficiently addressed.

Here are more comments:
FIG. 15: Can the authors mention it is daily or monthly evaluation? Can you add both daily and monthly evaluation here? Because routing models generally matter more for daily streamflow simulations than monthly. If it is monthly then L385 “clearly shows quite good performances” should be revised a little bit.

Fig. 16: I do not think this figure is separately needed. Because there is not much information in the main text (around L384), it can be added as a subplot to Fig. 15. Otherwise, authors should describe much more about Fig. 16 to justify the use of this figure.

L405 and Fig. 17: why only show stations with KGE > -1? Didn’t CTRIP-12D do better than HD for all KGEs? This is a bit confusing and needs more description.

Also, about the use of NIC, why not simply use KGE differences, and positive KGE means better performances?

Fig. 18: again, this figure has little new information than Fig. 17. L408 says “a closer look at” but I didn’t think this adds much information other than saying the same thing as Fig. 17.

Minor ones:

L93: “consist of”