Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., community comment CC1
https://doi.org/10.5194/hess-2021-484-CC1, 2021

Short Comment on hess-2021-484

Luca Brocca

Community comment on "Toward hyper-resolution global hydrological models including human activities: application to Kyushu island, Japan" by Naota Hanasaki et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-484-CC1, 2021

I read the paper with attention as the topic is highly of interest to me, and I guess to HESS readership. I believe hyper-resolution (1km) global hydrological modelling is an important topic and the number of challenges to be addressed are well underlined in the paper. Indeed, for running hyper-resolution hydrological modelling we need not only High Performance Computing and Storage but also to improve both our modelling capabilities and, likely more important, the observations capabilities at 1km scale, mainly related to the human impact on the water cycle. The paper clearly underline the huge role of water management (agricultural, industrial and domestic), water infrastructures, and the reservoir management at 1km scale and the difficulties to obtain data for that on a global scale.

I have a short comment related to the results of the hydrological simulation, i.e., river discharge simulations. By reading lines 370-375 it seems that the better performance of localized (LOC) simulation with respect to (wrt) global (GLB) simulation is related the the improved spatial resolution of input meteorological data. I believe that improvements are related to: (1) better accuracy of local meteorological data wrt global reanalysis, and (2) LOC model calibration wrt observations. The spatial resolution is likely not as important as written in the paper. It can be easily tested by performing additional experiments.
(A) Calibrating the GLB model wrt observations as done for LOC model.
(B) Aggregating local observations at larger spatial scale (28x28 arcmin as GLB model input) and check if results will deteriorate (I think deterioration will be only small).

Minor comment: I believe that, very likely, the use of ERA5 reanalysis (the most recent reanalysis) will improve the results wrt ERA-Interim.