Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., community comment CC2
https://doi.org/10.5194/hess-2022-320-CC2, 2022

Reply on CC1

Manh-Hung Le

Community comment on "Utility of Deep Learning and Data-rich Regions in Predicting Monthly Basin-scale Runoff in Ungauged Regions" by Manh-Hung Le et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2022-320-CC2, 2022

Thank you very much for your constructive comments. Since our study aims to examine our method in a real-world case study, we focus on transforming climatological streamflow information. CAMELS databases are only accessible in the U.S., UK, Chile, Brazil, and Australia. It would be possible to collect more samples for our analysis by averaging streamflow to get a long-term hydroclimatology value per catchment. We have highlighted this limitation in our revised manuscript [In Section 5 – Limitations and further studies].

"The purpose of our study is to investigate our method in the context of a real-world case study, so we focus on transforming climatological streamflow information. We understand climatological streamflow may have practical limitations, however, by averaging streamflow to get a long-term hydroclimatology value per catchment, it might be possible to collect more samples for our analysis. There are publicly available CAMELS datasets with finer temporal resolution (daily time step). However, CAMELS databases are only accessible in the U.S., UK, Chile, Brazil, and Australia. Further refinements of streamflow prediction (e.g., daily) could be investigated in the future when CAMELS becomes available in a wider region."

With respect to your suggested references, we have incorporated these references in the revised manuscript because they are pertinent to our research.

As per your suggestion, we conducted additional analysis using UMAP. Figure 1 (in the attached file), for example, (you can find all month's UMAP result in the Supporting Information document), shows the spatial pattern analysis using UMAP which untangles the inputs for source and target regions for January (Other months' results are pretty comparable). It is interesting to note that the target catchments (rectangular) are mostly within catchments from the source, demonstrating a possibility that pre-trained ML over the source regions (circle, cross and plus marks) can predict the output at the target regions. However, it is worth noting that that the UMAP only displays the relative distance. Therefore, it would be premature to assume that pre-train ML models cannot predict streamflow in target regions even if the target and source UMAP values are far off.

Manh-Hung Le,

On behalf of all authors

Please also note the supplement to this comment:
https://hess.copernicus.org/preprints/hess-2022-320/hess-2022-320-CC2-supplement.pdf