Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-194-SC1, 2020

Hydrology and Earth System Sciences
Discussions

Interactive comment on "A Tri-Approach for Diagnosing Gridded Precipitation Datasets for Watershed Glacio-Hydrological Simulation in Mountain Regions" *by* Muhammad Shafeeque and Luo Yi

Muhammad Ashraf

dr.ashraf@kfueit.edu.pk

Received and published: 31 August 2020

The manuscript presents a good insight about the runoff generation from UIB using different gridded precipitation products and characterized the basin as leaky and gaining. Adjusted precipitation graph and the map indicates that the precipitation stations at the lower elevations like Gilgit, Bunji and Skardu receives very less amount of precipitation which is established fact thus adjustment factor is maximum for these stations. However, it is mentioned in the WAPDA reports and papers that the maximum precipitation occurs in the elevation zone of approx. 4500 – 5100 m.a.sl. Moreover, as reported

by different researchers and also mentioned in this manuscript that the precipitation is largely affected by topography. Therefore, it would better to consider the topography, which actually plays role in vertical distribution of precipitation, to adjust the precipitation rather than the correction of low elevation precipitations gauges data. One significant information one can reveal from the simulated results of the runoff model that the good correlation with observed flows could be attributed to the increased precipitation (adjusted) of the stations installed at lower elevations. Therefore, increase in precipitation could be further attributed to the excessive melt of glaciers in the ablation zone which corroborate the findings of the previous researches that have reported thinning of glaciers (losing mass) in ablations zones. Authors have well documented this fact and cited relevant literature. Authors have made comparison between the different gridded precipitation datasets and the measured precipitation which provides the interesting insight e.g., HAR dataset underestimates the precipitation in Himalaya and over predicts in the Hindukush and Karakoram (Figure 5). It is noteworthy to mention that Himalaya region is influenced by Monsoon Precipitation and the other two regions are nourished by westerlies. In my opinion, appropriate corrections in HAR dataset may result better runoff simulation which could be considered for future researches. Therefore, I would suggest authors to discuss this aspect to provide the directions for future research. Moreover, HAR data set pattern is in-phase with the observed one and shows the maximum precipitation in winter season for Karakoram and Himalaya regions which also corroborates the previous findings. In addition, I would suggest authors to mention the suitability of different gridded sets for the sub-catchments of UIB for the selection of suitable one based on influential precipitation system. The paper is good contribution to the existing knowledge and can be used as preliminary step before any complex modelling approach using gridded datasets. The directions for the correction of under or overestimated precipitation based on water and mass balance are well explained.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-

194, 2020.