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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Investigating basin-scale water budget dynamics in 18 rivers across Tibetan Plateau through multiple datasets" *by* Wenbin Liu et al.

Anonymous Referee #1

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General comments: This manuscript investigates the seasonal cycles and trends of water budgets over 18 river basins in the Tibetan Plateau using a wide range of datasets from satellite-observed, land-surface-models simulated, reanalysis and upscaled results of in-situ observations. Prior to seeking the general hydrological features over 18 basins under the Budyko framework, they first assessed the accuracy of six ET products using the water-balance-method derived ET values. They also found that P, Q and ET generally increased in past 30 years in most basins, demonstrating an overall moistening trend in TP. While a quantitative illustrating the uncertainties in the results is very difficult due to the lack of in-situ observation over this remote area, the authors indeed documented the possible uncertainties in the selected datasets, provid-

ing a helpful clue for future research. In my view, this MS describes interesting results, which contributes to advancing our understanding of the hydrological cycle regime over such a hydrometrologically important but sparsely-instrumental area. Overall, the MS is nicely structured and presented, and is of a topic that should be of interest to the readers of HESS. I think it is publishable after addressing the comments below. My recommendation is minor revision.

Major comments: I think some analyses over the westly-controlled basins need to be revised because of its special climate patterns compared to other basins. L356-357: "more snow melt contributions" may be due to its special seasonality of precipitation in the westlies-controlled basins rather than its "colder" status. By the way, could you show the annual mean temperature for each basin in Figure 6 to support they are indeed "colder"? Also, I think the (limited) water availability plays a more important role than the heat stress (i.e. colder status) in leading to a relatively less vegetation over such basins. From Figure 4 c and d, it appears than R2 between ET and NDVI (0.76) is much higher than that between T and NDVI (0.35).

Specific comments: L3: "river basins" may be more appropriate than "rivers" L67: Most stations are located only in eastern TP and few of them situated in the western part. It would be better if you can highlight such a challenge. L71: It seems that "snow depth" is recorded by these stations. I suggest deleting such a term. L77: labor and/or technical support for maintaining in-situ observation is also a great challenge in addition to the high cost. L419: reword "attributed to the ascending P exceed the increase in PET" as "due to the higher rates of the increase of P than that of PET" L426: change "precipitation" to "rain"? L463: The increase of PET/P may be consistent to the changes in moisture flux of TP, as illustrated by Gao et al. (2014). L553: change "; receded at some tributaries" to "with the exception of some tributaries of" L555: revise "a decrease trend" and change "corresponded" to "corresponds" L562: change "indicated" to "indicates" L567: delete "under global warming"

Reference: Gao. Y., Cuo, L., Zhang, Y. 2014. Changes in Moisture Flux over

the Tibetan Plateau during 1979–2011 and Possible Mechanisms. J. Clim., doi: 10.1175/JCLI-D-13-00321.1

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