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Interactive comment on "Seasonal cycles and trends of water budget components in 18 river basins across Tibetan Plateau: a multiple datasets perspective" *by* Wenbin Liu et al.

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Short summary

Liu et al., presented an excellent study that investigates water cycle at Tibetan Plateau. Comparing multiple datasets (model derived product, satellite derived product, in situ observations) is challenging, because of scale mismatch, methodology inconsistency, data quality. Sometime, it's hard to extract consistent and insightful information from multiple datasets. But this study is doing quite good to this end. The major finding is that Tibetan Plateau is becoming wetter as the climate warming up, indicated by both model and data products. This is a high impact finding, which will potentially foster lots of discussion in terms of e.g., ecological consequences, soil biogeochemistry alteration, and green house gases (particularly CH4 in TP region) emissions in response

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Discussion paper

to the regional wetting.

Strengths

First of all, the paper is well written. Data, method, results, evidences and literature supports are clearly presented. Secondly, the storyline is logistically consistent. Finally, the results are scientifically significant. I like this study very much. Below, I listed a few comments that might help to improve the presentation and results interpretation. But, overall, this study is a well done.

Weaknesses & Major comments

The trend of westerly, Indian monsoon and East Asian summer monsoon (Figure 9) seems not significant. At least, by visually checking, there is no positive trend at all. Is there a rigorous way (or statistical test) to show that the positive trend is detectable and statistically significant?

As climate warming, we expect to see more water coming from glacier-melt. As a result, the contribution of glacier-melt to discharge might go up. While in the Table 3, they are fixed numbers, which may bias the estimate of ET (eqn. 2). I guess to estimate the change of "contribution of glacier-melt to discharge" is technically difficult. But at least, the paper should discuss the uncertainty associated with this particular issue.

Specific comments

L35. Insights -> dynamics

L37 land surface water cycle

L38 list the components, e.g., precipitation, runoff . . .. . .

L38 through the use of -> using

L38 through the water balance -> remove

L47 corresponded to -> consisten with

L47 The general hydrological regimes . . . complex modeling approaches. Not sure need this sentence or not.

L55 environments -> regions

L55 benefit -> beneficial

L65 with ->, from which

L67 , which -> It

L85 to some extend -> remove

L86 due to the lack of quantitative observations of the land surface processes -> remove

L87 break -> overcome

L88 point scale -> in situ

L90 the harsh environment and is often difficult to be applied to -> remove

L91 more popular way -> workaround

L95-97 it is also limited . . . complex terrains. -> sentence change the active voice

L99 In recent years, remove

L100 have been released recently

L148 Is it necessary to mention gauging station here? What's the purpose?

L156 used for water balance calculation for 18 TB basins, remove

L164, which is -> This dataset is

L169 The VIC_IGSNRR . . .. . . is above 0.65. belongs to result section.

L176 used, remove

L179 applied -> used

L182 The CMA precipitation . . . TP conditions. Belongs to result section

L218 Two vegetation parameter datasets, remove

L247 also, remove

L258 traditionally, remove

L272 concluded -> derived

L273 existing studies -> literatures

L284 for 18 basin, remove

L308 Did you use the same method (MM) to quantify the the trend of westerly, Indian monsoon and East Asian summer monsoon (Figure 9)?

L315 monthly performances of, remove

L315 in 18 TP basins against our calculated ET at a monthly basis.

L316 which was calculate through . . . water storage change, remove

L335 the perspective of, remove

L344 The figure also shows a clear vegetation control on ET. higher ENVI -> higher ET. The R2 is highest among those linear regressions.

L404 dryness declined in al basins. This is one of the most significant findings of this study, I guess it warrant more discussion about implications?

L408. Linear trend 0.21. Is this trend statistically significant? What's the p value? L440. Linear threnl is 0.0006, which is tiny.

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