

On behalf of the authors, we would like to thank the anonymous reviewer 2 for the valuable suggestions, which helped us to improve the manuscript further. Here, we will list all the comments, demonstrate all the probable misunderstandings, and their questions for our manuscript. Then, all corresponding modifications are done based on each comment and discussions. Here, the reviewer's comments is written in bold italics and our answers are highlighted in red as below.

Response to Reviewer #2

First of all, we appreciate reviewer 2 carefully check our manuscript and expresses several constructive concerns about the structure and places which need to be modified. Reviewer 2 suggests that we should strengthen and highlight our motivation and its relevance to HESS community. Here, we rewrite and add corresponding content for that in the Introduction section.

Generally, glaciers remained on the Tibetan Plateau are one of the main reservoirs of water, the meltwater of these glaciers and rainfall benefit billions of people living around several major Asian rivers downstream (Bookhagen and Burbank 2010, Shrestha, Wang et al. 2012). Specifically, the glacier mass balance is determined by several surface properties, e.g. surface roughness, elevation change, glacier displacements, and absorbed energy for melting process. Moreover, the atmosphere layer as one of the main heating source, overlying the Tibetan Plateau dominated both by regional atmosphere circulations (e.g. mid-latitude westerlies and summer monsoons) supplies a large amount of energy for glacier melting process. For instance, the glacier speed will decrease, and less mass will be transported downwards to lower elevations, when the glacier mass balance is negative according to the variation of melting process and other mechanism (Heid and Kaab 2012). However, the understanding of the interactions between atmosphere layer and the variations of Tibetan glaciers is still not sufficient and relevant observations to characterize these process and phenomenon is limited. Meanwhile, appropriate changes have been made in the paper to account for your comments. For now we would like to provide a reply to the issues addressed in your comment. We have enhance and new content the review of the methods, accuracy assessment of the results, the summary of post-processing chain, discussion and conclusion. Additionally, we also rephrased and modified the incorrect grammar in the manuscript as well.

Minor comments

P1556L23: Change "controllers" to "controls"

Re: Changed.

P1556L24: Sentence starting with "However" is poorly writing.

Re: The sentence has been rephrased.

P1557L2: "Glacier"? This sentence is poorly written.

Re: The sentence has been rephrased.

P1557L10: Missing "be"

Re: Added.

P1559L4: Change "has" to "have"

Re: Changed.

P1562L16: You keep shifting between image and imagery. Which is it?

Re: They have been unified.

P1563L8: "culled"?

Re: Changed.

P1564L11: Change "≈2" to "2".

Re: Changed.

References:

Bookhagen, B. and D. W. Burbank (2010). "Toward a complete Himalayan hydrological budget: Spatiotemporal distribution of snowmelt and rainfall and their impact on river discharge." Journal of Geophysical Research-Earth Surface **115**.

Heid, T. and A. Kaab (2012). "Repeat optical satellite images reveal widespread and long term decrease in land-terminating glacier speeds." Cryosphere **6**(2): 467-478.

Shrestha, M., et al. (2012). "Modeling the Spatial Distribution of Snow Cover in the Dudhkoshi Region of the Nepal Himalayas." Journal of Hydrometeorology **13**(1): 204-222.