

Interactive comment on “Recent glacier mass balance and area changes in the Kangri Karpo Mountain derived from multi-sources of DEMs and glacier inventories” by Wu Kunpeng et al.

Anonymous Referee #1

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General comments:

The study of Wu et al utilizes DEMs derived from Topographic Maps, SRTM DEMs and TerraSAR-X/TanDEM-X to investigate recent glacier mass, length, and area changes in the Kangri Karpo Mountains, southeastern Tibetan Plateau, combined with glacier inventories. In this region, glaciers belong to monsoonal temperature type, which are highly sensitive to global climate change, especially temperature rising. It is important to better understanding of these glaciers' response to climate change for revealing regional glacier change and associated impacts. Also, it is important for better understanding the fundamental mechanism of recent accelerated mass loss in the monsoon-

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dominated region.

The science of the manuscript is very interesting, but there are some issues that the authors should consider. The followings are the main points which I think have potential to be expanded upon to increase the value of the study. 1) The study found that most glaciers show significant mass loss and shrinkage, while nine glaciers are in advance for the study period. The authors investigated the reason for advance of these glaciers in the section of 6.2, but this discussion is a little bit simple. The glaciers of this region belong to monsoonal temperature type, where previous studies suggested accelerated mass loss (e.g., Yao et al., 2012) and no such phenomena. Hence, if possible, can the authors provide more discussion for this behavior in this region? 2) As discussed in the manuscript, debris-covered glaciers exist in this region. In particular, the authors found that debris-covered areas are much more thinning on average than clean-ice areas. The manuscript did not introduce how to separate the debris-free and debris-covered regions, Can the authors provide this process in the manuscript? 3) “However, previous studies found that glacier ablation on debris-covered regions were greater than on the exposed ice regions” (Lines 16-17 of page 12). The authors should rewrite this sentence. As previous suggested, ice ablation on debris-covered regions is greater than that on the exposed ice regions, when debris thickness is less than critical thickness (Østrem, 1959; Nakawo and Young, 1981, 1982; Mattson et al., 1993; Kayastha et al., 2000). 4) The English of the manuscript is not well. I strongly advise the authors to improve their English in the manuscript.

Specific comments: P1, L18: “change . . . , increase . . .” changes to “changes . . . , and increases . . .” P2, L8: “Mountains” changes to “Mountain”. This should be considered in the manuscript. In some places, it is ‘Mountains’, and other places, it is ‘Mountain’. The authors should make standard format in the manuscript. P2, L37: 1) ‘extent’ should be ‘extents’; 2) The region IS located in . . . P3, L7: ‘become’ should be ‘becomes’ P3, L16: ‘long’ should be ‘in length’ P4, L36-37: it is not necessary to introduce RGI, and the authors can directly use the second Chinese glacier inventory. P8, L33: delete

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while P10, L35: For 'km²', '2' is superscript P11, L24: 'Nyainqentanglha Mountian' should be 'Nyainqentanglha Mountians' Figures 1 and 2: can two figures merger one? Figure 4: I cannot catch two figures difference.

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