Dear Referee #1,

Thank you for your valuable suggestions and I have already revised the article according to your suggestions. The following are a few answers to some questions.

General comments:

(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?”

Answer: I have already provided more discussion for advanced glaciers, and we found that advance of individual glaciers resulted from the increase of high precipitation.

“For advancing glaciers the mean size is about 0.51 km^2, mean surface slope about 27.9 °, most have an S or SW aspect, and a mean accumulation area ratio (AAR) of 51. Previous studies also found advancing glaciers in the Kangri Karpo (Liu et al., 2006; Shi et al., 2006). Comparing the CGI2 and GAMDAM inventories, the location of most glacier termini in 2000 are very close to those in 2014, indicating that the advance mainly occured before 2000. Unfortunately, due to location and climatic features, most Landsat MSS/TM image quality was too low to identify the snouts. Fortunately, two Landsat TM scenes (LT51340401994189BKT00 and LT51340401988301BJC00) did have enough quality to be used. Comparing the Landsat image of the terminus of Glacier 5O282B0111 (Fig. 3B), it could be determined that the advance occurred mainly before 1988 after which time the glacier retreated continuously (Fig. 7), and was likely due to increased precipitation in the 1980s (Shi et al., 2006). Annual precipitation data for 1980–2012 from the three nearest meteorological stations (Bomi, Zuogong and Zayu), indicated that the maximum precipitation was 1.3 times the mean precipitaion in the decade (1153 mm in 1988 vs. 891 mm) at Bomi (29°52′N, 95°46′E, 2736 m a.s.l.). At Zuogong (29°40′N, 97°50′E, 3780 m a.s.l.) the maximum precipitation was 1.5 times the mean (683 mm in 1987 vs. 405 mm), while at Zayu (28°39′N, 97°28′E, 2423 m a.s.l.) it was 1.4 times the mean (1091 mm in 1988 vs. 792 mm). Assuming variations in precipitation at the high-elevation glacier areas reflect those of the three nearest meteorological stations, the increased accumulation could certainly have influenced terminus activity. In complex terrain the accumulation distribution varies greatly so the response of glaciers may differ; some individual glaciers did advance between 1980 and 1988.”

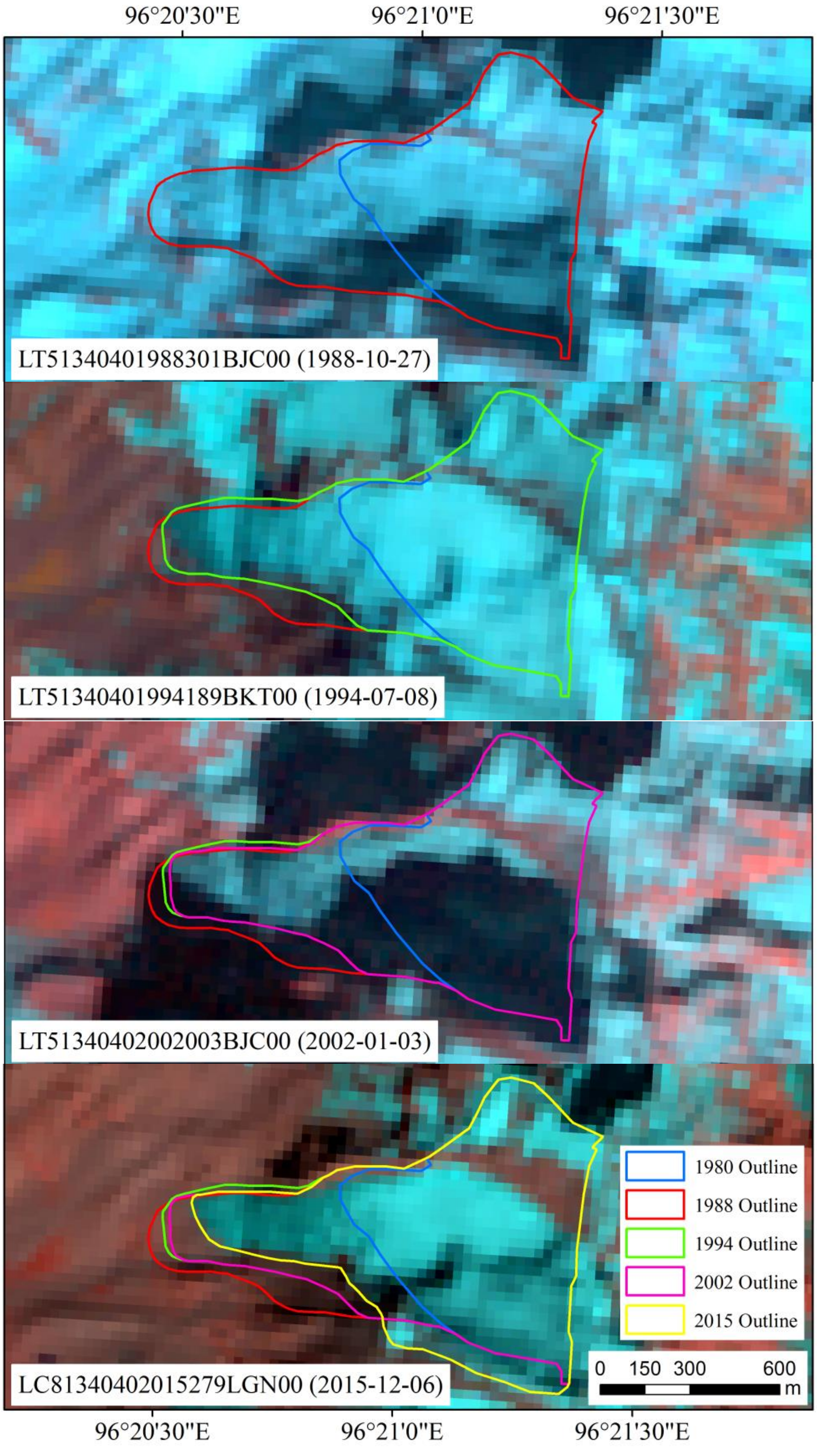

Figure 7. Terminus changes of Glacier 5O282B0111 from 1980 – 2015.

(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?"

Answer: Thank you for your suggestion. Actually, I have already introduced how to separate the debris-free and debris-covered regions in the section of 4.1.

"A semi-automated approach, using the TM3/TM5 band ratio, was applied to delineate glacier outlines in 2015 using Landsat OLI images (Bolch et al., 2010b; Paul et al., 2009; Racoviteanu et al., 2009). To ensure that ice patches were larger than 0.01 km^2, a 3 × 3 median filter was applied to eliminate isolated pixels (Bolch et al., 2010b; Wu et al., 2016b). The derived glacier polygons were checked manually against images from adjacent years with less or no snow and cloud-free, to discriminate proglacial lakes, seasonal snow, supraglacial boulders and debris-covered ice (Fig. 3)."

Due to a small proportion of debris-covered regions in Whole Mountain Range, the debris-free and debris-covered regions were separated manually using Landsat OLI images.

(3) & (4) "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). The English of the manuscript is not well. I strongly advise the authors to improve their English in the manuscript.

Answer: Thank you for your valuable suggestions and I have already revised this sentence and improve English in the manuscript according to your suggestions.

Specific Comments:

"Figure 1 and 2: Can two figures merger one?"

Answer: At first figure 1 and 2 were drawn together, while a lot of information can't be clearly displayed, such as the locations of sample glaciers and drainage basins. Hence, it is better that there have two figures to show the information of whole study area and detailed study area, respectively.

"Figure 4: I cannot catch two figures difference."

Answer: The two figures look similar, but there still have difference between before and after the co-registration, especially in off-glacier regions. Before the co-registration, elevation increase and decrease are both obvious in off-glacier regions, and these phenomena are caused by relative horizontal and vertical distortions between two data sets. After co-registration, histogram statistics of the elevation differences for off-glacier regions showed that elevation difference in off-glacier regions concentrated on the mean elevation difference from 4.94 m to 0.67 m. It is concluded that elevation difference in off-glacier regions have stabilized, the pre-processed DEMs were acceptable and suitable for the estimation of changes in glaciers mass balance.

Best Regards,

Wu Kunpeng and other authors